QC Development
PO Box 916
Storrs, CT 06268
860-670-9068
QCDevelopment9068@gmail.com

January 26, 2015

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

Notice of Exempt Modification – New Cingular Wireless PCS, LLC (AT&T)
171 Town Hill Road, Plymouth, CT 06786
N 41-40-06.21
W 73-01-11.63

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 115-foot level of the existing 170-foot Monopole at 171 Town Hill Road, Plymouth, CT. The tower is owned by Crown Castle. The property is owned by Terryville Lions Club. AT&T now intends to replace Three (3) of its existing antennas with three (3) new Quintel LTE 2300 MHz WCS band antennas. These antennas would be installed at the 115-foot level of the tower. AT&T also intends to install three (3) Ericsson LTE 2300 MHz WCS band remote radio units, as well as remove twelve (12) Powerwave TMAs and add one (1) Raycap surge unit, three (3) CCI TMAs and six (6) CCI triplexers.

This facility was approved by the Planning and Zoning Commission of the Town of Plymouth with Zoning Permit # 00-201 on June 22, 2000. This approval included no condition(s) that could feasibly be violated by this modification, including total facility height or mounting restrictions. This modification therefore complies with the aforementioned approval.

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.C.S.A. § 16-50j-73, a copy of this letter is being sent to David

Merchant, Mayor for the Town of Plymouth, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

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

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

3. The proposed modifications 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 Communications 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 constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Please feel free to call me at (860) 670-9068 with any questions regarding this matter. Thank you for your consideration.

Sincerely,

Mark Roberts
QC Development
Consultant for AT&T

Attachments

cc: David Merchant - as elected official
Crown Castle - as tower owner (via e-mail)
Terryville Lions Club - as property owner (via e-mail)

Power Density

Existing Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							7.47%
AT&T LTE	1	1313	115	0.0397	734	0.4893	0.81%
AT&T LTE	2	875	115	0.0530	1900	1.0000	0.53%
AT&T GSM	1	283	115	0.0086	880	0.5867	0.15%
AT&T UMTS	2	565	115	0.0342	880	0.5867	0.58%
AT&T UMTS	4	525	115	0.0636	1900	1.0000	0.64%
Site Total							10.18%

*Per CSC Records (available upon request, includes calculation formulas)

** If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

Proposed Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							7.47%
AT&T LTE	2	1791	115	0.1084	2300	1.0000	1.08%
AT&T LTE	1	1313	115	0.0397	734	0.4893	0.81%
AT&T LTE	2	875	115	0.0530	1900	1.0000	0.53%
AT&T GSM	1	283	115	0.0086	880	0.5867	0.15%
AT&T UMTS	2	565	115	0.0342	880	0.5867	0.58%
AT&T UMTS	4	525	115	0.0636	1900	1.0000	0.64%
Site Total							11.26%

*Per CSC Records (available upon request, includes calculation formulas)

** If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

TOWN OF PLYMOUTH, CONNECTICUT

ZONING PERMIT NO. 00-201
Fee Paid: $ 100.00 # 058194
Date: July 5 19 2000

Permission is hereby granted to Terryville Lions Club & Omnipoint to erect a Telecommunication Tower on the east side of Town Hill Rd (fair grounds) as follows: Size ____ ft. long, ____ ft. wide, ____ stories high; distance from road center line ____ ft; distance from each lot line: E ____ ft.; W ____ ft.; S ____ ft.; N ____ ft.; for the use of the facility as a Telecommunication Tower as approved by P+Z on 6/22/2000 with stipulations

PLANNING AND ZONING COMMISSION, TOWN OF PLYMOUTH CONNECTICUT

Ronald J Mounds
Agent of the Planning and Zoning Commission

* see approved Site Plan dated 3/2000 3/8/2000 3/16/2006 Received 6/22/2000

The recipient of this permit accepts this permit on the condition that he, as owner or as representing the owner, agrees to comply with all applicable ordinances and regulations of the Town of Plymouth and the State of Connecticut regarding the use, occupancy and type of activity to be instituted. It is furthermore understood that the facility can not be used until a Certificate of Occupancy has been issued by the Planning and Zoning Commission and that any change of use similarly does require a new Certificate of Occupancy. Before a Certificate of Occupancy will be issued a plot plan drawn to a scale of 1" - 50' prepared and certified by a licensed engineer or land surveyor must be submitted to the Planning and Zoning Commission showing all boundaries of the line of any public or private right-of-way, sanitary facilities and water supply. This permit shall be valid for one year.

MOTION: Gaye Zukauskas made a motion to add Town Hill Road/Lions back on the agenda. Steve Panasuk seconded. VOTE: S. Panasuk – Aye, G. Zukauskas – Aye, W. Radke – Aye and Chairman Herzing so voted.

MOTION: Patrick Herzing made a motion for a 5-minute recess at 9:23 p.m. VOTE: All in favor.

Chairman Patrick Herzing called the meeting back to order at 9:28 p.m.

Town Hill Road/Lions - Special Permit – Telecommunication Tower – Omnipoint – MOTION: Gaye Zukauskas made a motion to approve the application for the telecommunication tower-Town Hill Road-Lions Club and Omnipoint-State ID #CT-11417C consisting of 5 sheets, cover dated 6/20/00, vicinity plan dated 3/8/00, sheet C-1, C-2 and C-3 all dated 6/20/00 with the only stipulation that Plymouth emergency services to have free access as needed with no charge to the Town. Any additional carriers to come in for a special permit. Bond to be set by Public Works in the event of abandonment. Steve Panasuk seconded. VOTE: S. Panasuk - Aye, G. Zukauskas – Aye, W. Radke – Aye and Chairman Herzing so voted.

11. Town Hill/Washington Roads – Pines Subdivision – Bond Reduction – CT Water Co. – CT Water Co. has sold most of the lots in the subdivision to Mr. Zappone. Discussion was had. **MOTION:** Wayne Radke made a motion to reduce the bond as requested and get a new bond from Mr. Zappone before reduction of CT Water Co.'s bond. Gaye Zukauskas seconded. VOTE: S. Panasuk – Aye, G. Zukauskas – Aye, W. Radke – Aye and Chairman Herzing so voted.

16. Plymouth Housing Authority – Section 8-24 Review – Yefko Property – Mr. Kuehn read the memo dated 6/21 from Anthony A. Lorenzetti, PE into the record. He is in support of this proposal. It would be a solution to the parking situation at Gosinski Park. Half of it would be for off street parking and the other half for a minimum 20,000 sq. ft. residential parcel for a low/moderate income housing. The resolution should be 39,100 not 29,100. Mr. Kuehn read the resolution into the record. **MOTION:** Gaye Zukauskas made a motion to accept the resolution for an 8-24 review. Wayne Radke seconded. VOTE: S. Panasuk – Aye, G. Zukauskas – Aye, W. Radke – Aye and Chairman Herzing so voted.

18. Land Use Corner – Gaye strikes again. The final revision has been faxed to the Plymouth News. Gaye suggested that Mr. Kuehn do one next month on industrial property.

21. Correspondence from ZBA Chairman Mike Cole – Patrick Herzing will call Mike Cole and get a time set up – probably in September to get together to discuss the zoning regulations. It was suggested to have Mike come up with an agenda of issues to look at ahead of time.

22. Proposed ordinance for zoning violations – The Town Council tabled this item at their last meeting so no public hearing has been scheduled. It recommends a $150 fine per violation. Maybe we can not issue any permits to people who have not finished and cleaned up their last items.

STAFF COMMENTS –Mr. Kuehn informed the Commission that 36 signs will be going up in the industrial park for the public hearing.

WIRELESS COMMUNICATIONS FACILITY
CT1086 - LTE 3C
CROWN SITE # 826768
PLYMOUTH TOWN HILL ROAD
171 TOWN HILL ROAD
PLYMOUTH, CT 06786

GENERAL NOTES

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

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT

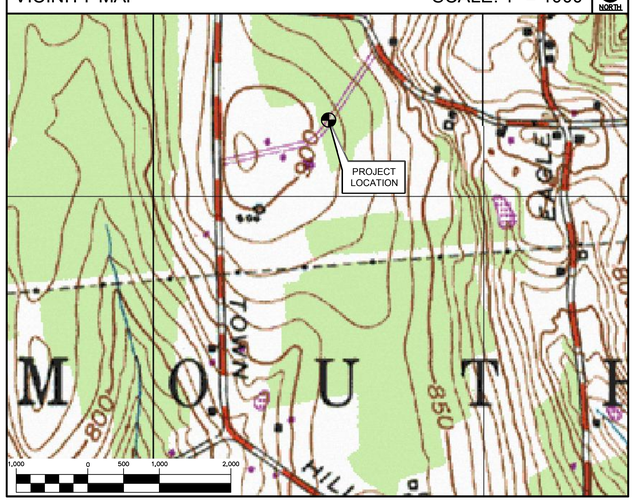
TO: 171 TOWN HILL ROAD
TERRYVILLE, CT 06786

1.	TURN LEFT ONTO CAPITOL BLVD	0.4 mi
2.	TURN LEFT ONTO WEST STREET	0.2 mi
3.	TAKE RAMP LEFT FOR I-91 S	0.3 mi
4.	AT EXIT 22N, TAKE RAMP RIGHT FOR CT-9 NORTH TOWARD NEW BRITAIN	1.7 mi
5.	AT EXIT 28, TAKE RAMP LEFT FOR CT-72 WEST TOWARD BRISTOL	6.6 mi
6.	KEEP STRAIGHT ONTO I-84 W/CT-72 W	3.2 mi
7.	AT EXIT 33, TAKE RAMP RIGHT FOR CT-72 WEST TOWARD BRISTOL	0.3 mi
8.	ROAD NAME CHANGES TO CT-72	1.5 mi
9.	KEEP STRAIGHT ONTO CT-72 W	1.2 mi
10.	BEAR RIGHT ONTO CT-72/PINE ST	1.2 mi
11.	TURN RIGHT ONTO CT-72/CT-229/MIDDLE ST	0.8 mi
12.	TURN LEFT ONTO CT-72/MEMORIAL BLVD	0.2 mi
13.	KEEP STRAIGHT ONTO MEMORIAL BLVD	0.2 mi
14.	KEEP STRAIGHT ONTO CT-72/SCHOOL ST	0.8 mi
15.	BEAR LEFT ONTO US-6/MAIN ST	3.5 mi
16.	TURN LEFT ONT TOWN HILL RD	1.3 mi

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   A. REMOVE AND REPLACE EXISTING GSM 850 ANTENNA FOR PROPOSED LTE ANTENNA, (1) PER SECTOR.
   B. INSTALL (3) NEW RRUS-32 MOUNTED BY ANTENNA ON EXISTING TOWER.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT1086
AT&T SITE NAME:	PLYMOUTH TOWN HILL RD
SITE ADDRESS:	171 TOWN HILL ROAD TERRYVILLE, CT 06786
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-40'-4.972"N LONGITUDE: 73°-01'-13.998"W GROUND ELEVATION: ±891' AMSL

SHEET INDEX

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	01/14/16	CAG	HMR	CONSTRUCTION DRAWINGS – ISSUED FINAL
0	12/21/15	CAG	HMR	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

at&t

SAI communications

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

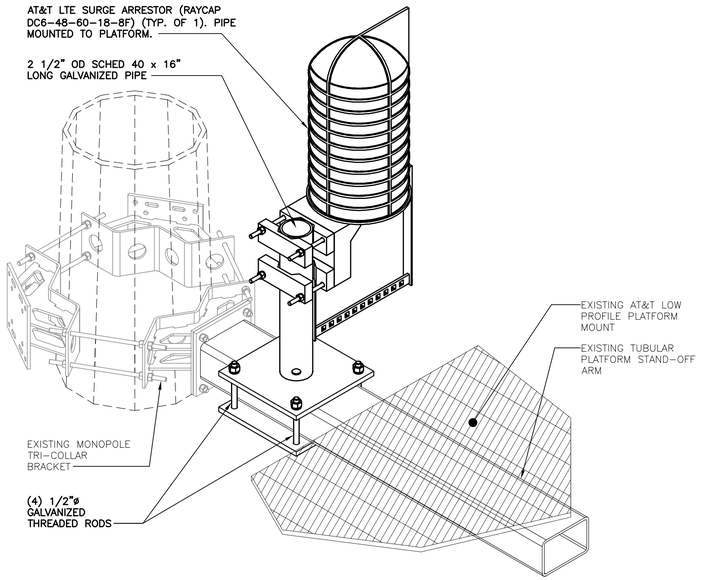
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
PLYMOUTH TOWN HILL RD
SITE NUMBER: CT1086 - LTE3C
171 TOWN HILL ROAD
TERRYVILLE, CT 06786

DATE: 11/15/15
SCALE: AS NOTED
JOB NO. 15267.002

TITLE SHEET

T-1

Sheet No. 1 of 7



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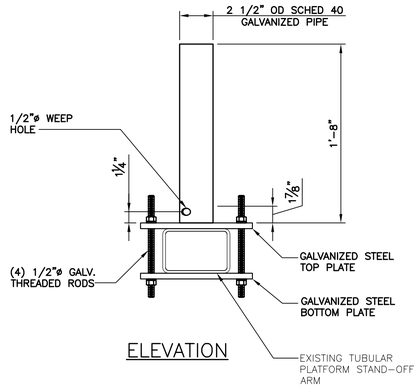
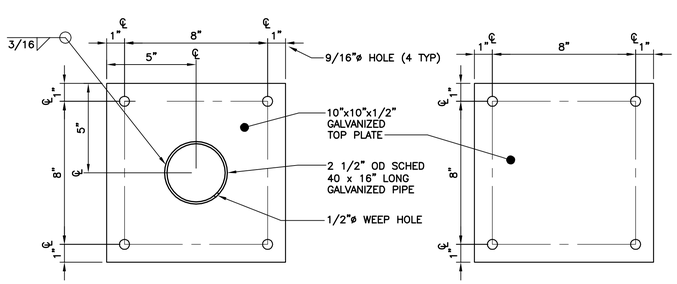


ELEVATION



TOP PLATE (PLAN VIEW)

BOTTOM PLATE (PLAN VIEW)

1 / N-1 **RAYCAP DC6 MOUNTING DETAIL**

SCALE: 1 1/2" = 1'-0"

NOTES AND SPECIFICATIONS

DESIGN BASIS

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT STATE BUILDING CODE AND 2009 AMENDMENTS.

1. DESIGN CRITERIA:
   - WIND LOAD: PER EIA/TIA 222 F-96 (ANTENNA MOUNTS): 80 MPH (FASTEST MILE), EQUIVALENT TO 100 MPH (3 SECOND GUST).
   - BASIC WIND SPEED (OTHER STRUCTURE): 95 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
   - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON CL&P OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
   - A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   - C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   - D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   - E. PIPE---ASTM A53 (FY = 35 KSI)
   - F. CONNECTION BOLTS---ASTM A325-N
   - G. U-BOLTS----ASTM A36
   - H. ANCHOR RODS---ASTM F 1554
   - I. WELDING ELECTRODE---ASTM E 70XX
2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:
   - A. SHERWIN WILLIAMS POLANE-B
   - B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
2. COAXIAL CABLES:
   - A. ONE COAT OF DTM BONDING PRIMER (2-5 MILS. DRY FINISH)
   - B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5-5 MILS. DRY FINISH)
   - C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI-SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH-PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON-PETROLEUM-BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

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

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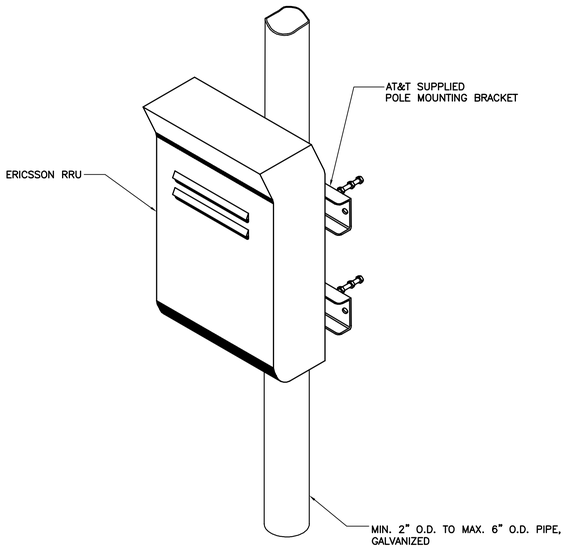
NOTES AND SPECIFICATIONS

N-1

Sheet No. 2 of 7



ISOMETRIC VIEW

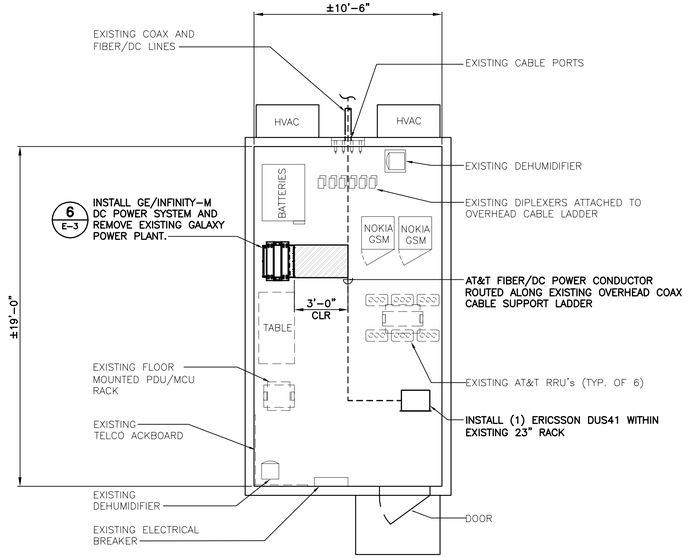
NOTES:

1. AT&T SHALL SUPPLY RRU, AND RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.

3. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

3 C-1 TYPICAL RRU MOUNTING DETAILS

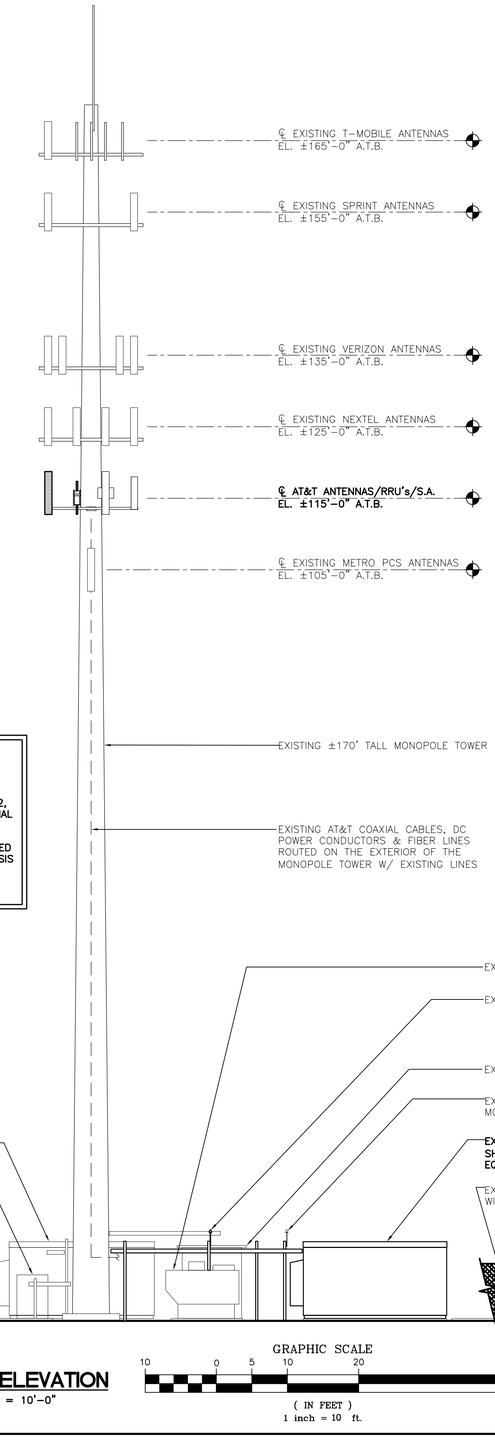
SCALE: NTS



2 C-1 EQUIPMENT BUILDING FLOOR PLAN

SCALE: 1/4" = 1'–0"

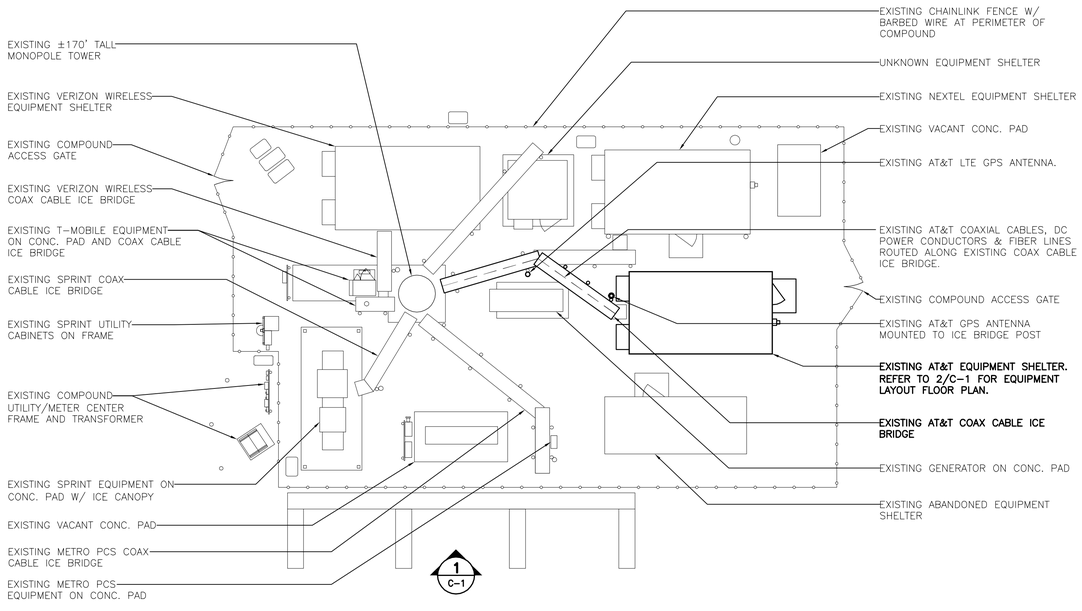
APPROX. NORTH



TOWER STRUCTURAL NOTES:

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY AERO SOLUTIONS, LLC FOR CROWN CASTLE, PROJ. NO. 003–15–0772, DATED DECEMBER 31, 2015 FOR ADDTIONAL INFORMATION AND REQUIREMENTS.

2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.



4 C-1 COMPOUND PLAN

SCALE: 1" = 10'–0"

APPROX. NORTH

1 C-1 EAST ELEVATION

SCALE: 1" = 10'–0"

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

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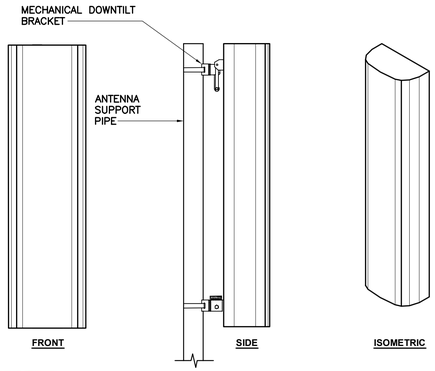
PLANS, ELEVATION AND DETAILS

C-1

Sheet No. 3 of 7



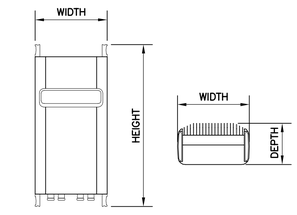
BOTTOM

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: QUINTEL MODEL: QS66512-3	72"H x 12"W x 9.6"D	112-LBS

5 C-2 PROPOSED ANTENNA DETAIL

SCALE: NTS

NOTES:
1. INSTALL ANTENNA TO EXISTING PIPE MAST USING MANUFACTURERS SUPPLIED BRACKETS AND MOUNTING HARDWARE
2. SET MECHANICAL DOWNTILT TO VALUE SPECIFIED IN LATEST RFDS



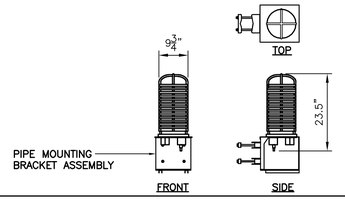
FRONT VIEW BOTTOM VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 32	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

7 C-2 ERICSSON RRUS A2 DETAIL

SCALE: 1" = 1'-0"

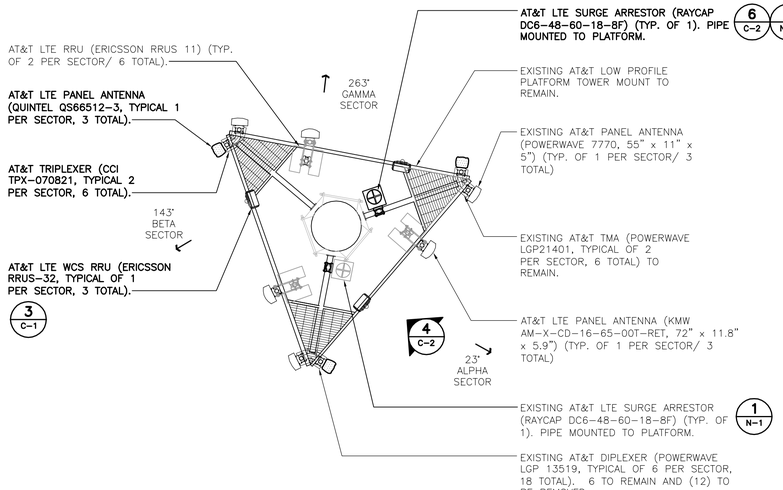


SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
	MAKE: RAYCAP (SQUID) MODEL: DC6-48-60-18-8F	(1) PER SITE	TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

6 C-2 SURGE ARRESTOR DETAIL

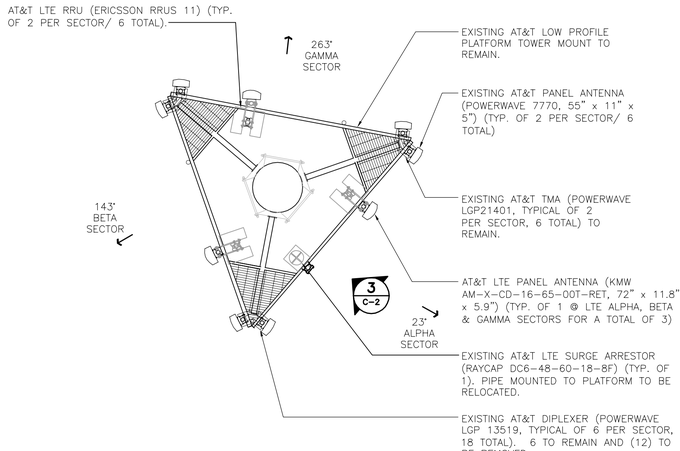
SCALE: NTS



2 C-2 PROPOSED ANTENNA PLAN

SCALE: 1/2" = 1'-0"

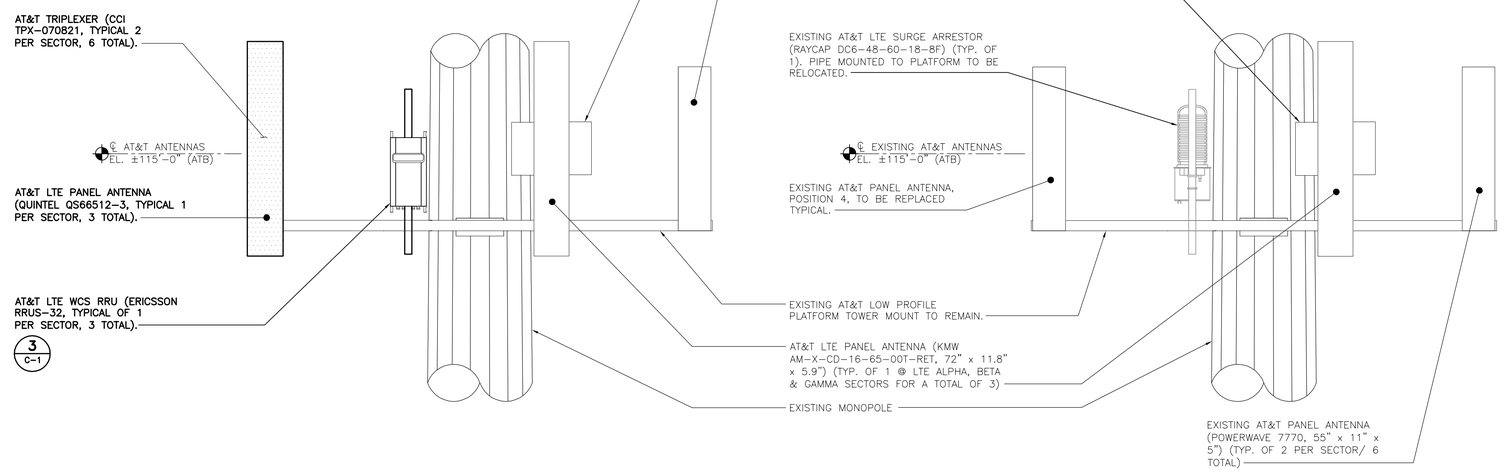
NORTH



1 C-2 EXISTING ANTENNA PLAN

SCALE: 1/2" = 1'-0"

NORTH



4 C-2 PROPOSED ANTENNA PLAN

SCALE: 1/2" = 1'-0"

3 C-2 EXISTING ANTENNA PLAN

SCALE: 1/2" = 1'-0"

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

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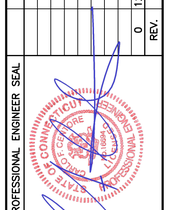

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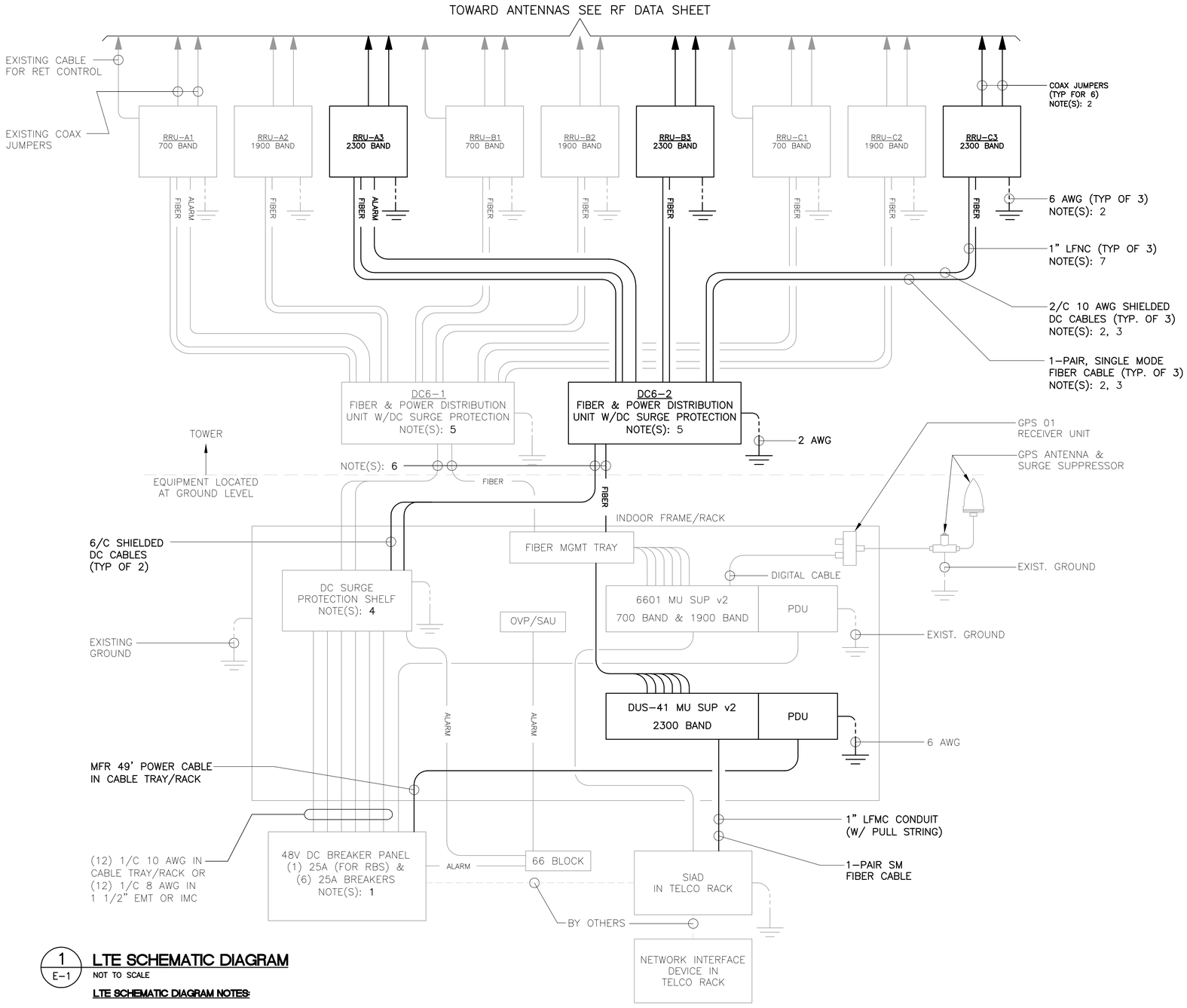
LTE 2C EQUIPMENT DETAILS

C-2



1 / E-1

LTE SCHEMATIC DIAGRAM

NOT TO SCALE

LTE SCHEMATIC DIAGRAM NOTES:

1. BREAKERS TO BE TAGGED AND LOCKED OUT. A 20A (MIN.) OR 30A (MAX.) BREAKER FOR RRUs MAY BE SUBSTITUTED FOR THE RECOMMENDED 25A BREAKER. SIZE 12 CONDUCTORS MAY BE USED ONLY WITH 20A BREAKERS.
2. LEAVE COILED AND PROTECTED UNTIL TERMINATED.
3. DC AND FIBER CABLE SHALL BE ROUTED WITH THE EXISTING COAX CABLE.
4. DC SURGE PROTECTION SHELF SHALL BE RAYCAP DCx-48-60-RM.
5. FIBER & DC DISTRIBUTION BOX W/DC SURGE PROTECTION SHALL BE RAYCAP DC6-48-60-18-8F. SEE DETAIL 1410 OR 1410B FOR INTERNAL WIRING DIAGRAM.
6. SUPPORT FIBER & DC POWER CABLES WITH SNAP-IN HANGERS SPACED NO GREATER THAN 3 FEET APART ON TOWER. SUPPORT FIBER AND DC POWER CABLES INSIDE MONOPOLE WITH CABLE HOISTING GRIPS AT 250 FT MAXIMUM INTERVALS. DRESS CABLES TO PREVENT CONTACT WITH ENTRANCE AND EXIT OPENINGS.
7. CONDUIT TO BE USED ON A TOWER IF THE RRU IS MORE THAN 10' FROM THE DISTRIBUTION UNITS. MAX CABLE LENGTH IS 16 FEET.
8. SINGLE-CONDUCTOR DC POWER CABLES SHALL BE TELCOFLEX® OR KS24194™, COPPER, UL LISTED RHH NON-HALOGEN, LOW SMOKE WITH BRAIDED COVER, TYPE TC (1/0 AND LARGER). UNLESS OTHERWISE NOTED, STRANDING SHALL BE CLASS B (TYPE III) FOR CABLES SIZES 14, 12 & 10 AWG AND CLASS I (TYPE IV) FOR SIZES 8 AWG AND LARGER. CABLES SHALL BE COLOR CODED RED FOR +24V, BLUE FOR -48V AND GRAY FOR 24V AND 48V RETURN CONDUCTORS. MULTI-CONDUCTOR DC POWER CABLES SHALL BE COPPER, CLASS B STRANDING WITH FLAME RETARDANT PVC JACKET, TYPE TC, UL LISTED FOR 90°C DRY/ 75°C WET INSTALLATION.
9. GROUNDING WIRES SHALL BE COPPER, GREEN THHN/THWN UL LISTED FOR 90°C DRY/75°C WET INSTALLATION. MINIMUM SIZE IS 6AWG UNLESS NOTED OTHERWISE.

ELECTRICAL NOTES

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

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

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

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

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

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

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

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

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	12/21/15	CAG	HMR	CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

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63-2 North Branford Road
Branford, CT 06405
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AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

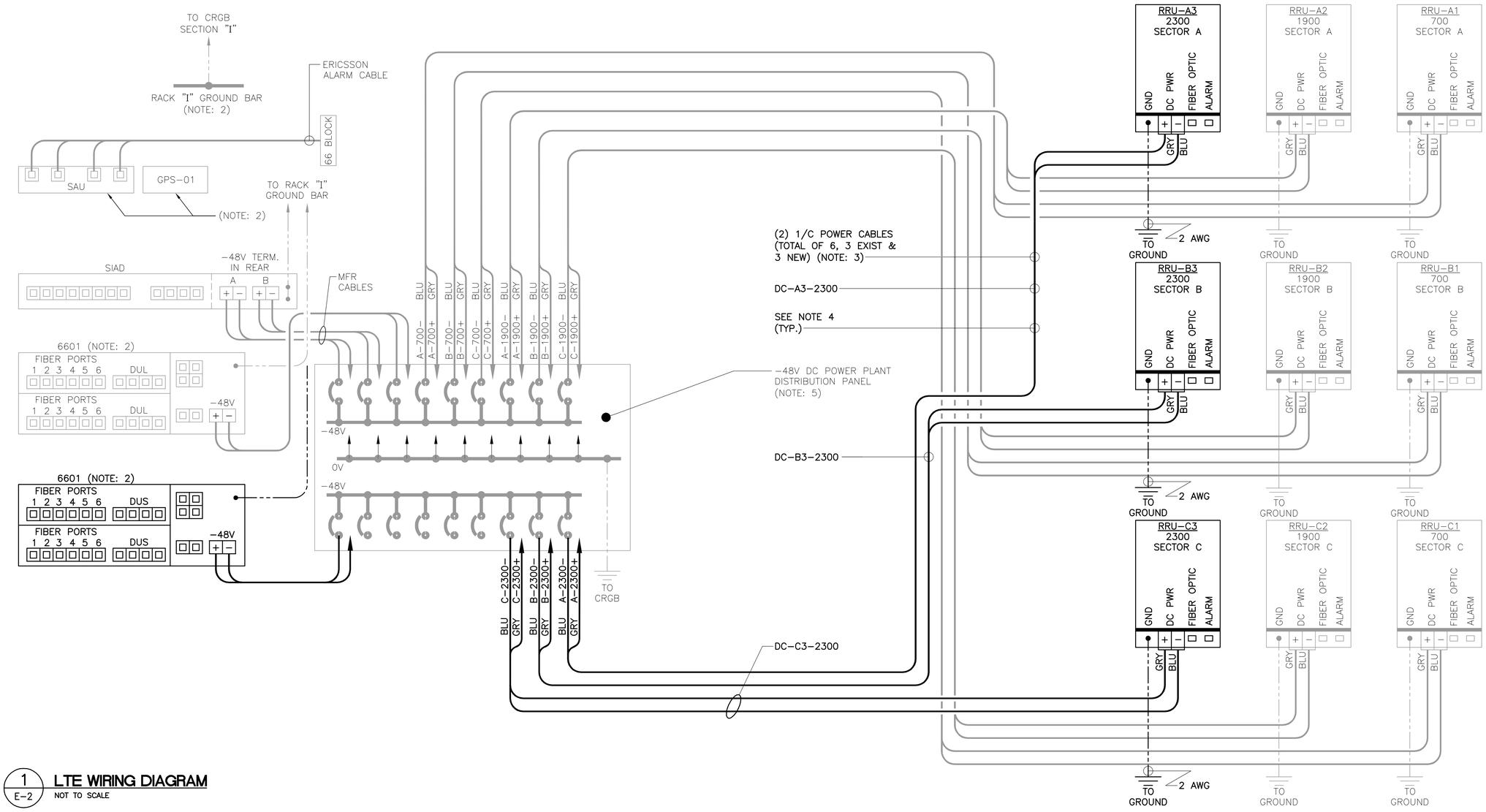
PLYMOUTH TOWN HILL RD
SITE NUMBER: CT1086 - LTE3C
171 TOWN HILL ROAD
TERRYVILLE, CT 06786

DATE: 11/15/15
SCALE: AS NOTED
JOB NO. 15267.002

LTE SCHEMATIC DIAGRAM AND NOTES

E-1

Sheet No. 5 of 7



1 E-2 LTE WIRING DIAGRAM

NOT TO SCALE

LTE WIRING DIAGRAM NOTES:

1. LABEL THE DC POWER CABLES AT BOTH ENDS OF EVERY WIRE AND IN ANY PULL BOX IF USED. LABEL SHALL BE DURABLE, SELF ADHESIVE, WRAPPED LONGITUDINALLY ALONG THE CABLE AND STATE THE SECTOR, FREQUENCY BAND AND POLARITY; I.E. "A-2300+". CABLE AND WIRE LABELS SHOWN ARE REPRESENTATIVE AND MAY BE MODIFIED AS DIRECTED BY AT&T.
2. INSTALL ON BASEBAND EQUIPMENT RACK.
3. MAXIMUM CABLE LENGTH IS 49 FEET WITHOUT SURGE PROTECTION AT RRU. INCREASE CONDUCTOR SIZE TO 10 OR 8 AWG WHERE BREAKER RATING IS GREATER THAN 20A.
4. CABLE GROUND WIRE AND SHIELD DRAIN WIRE TO BE LEFT UN-TERMINATED AT RRU AND DC POWER PLANT.
5. SEE LTE SCHEMATIC DIAGRAM DETAIL 1/E-1 FOR BREAKER RATING.

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171 TOWN HILL ROAD

TERRYVILLE, CT 06786

DATE: 11/15/15

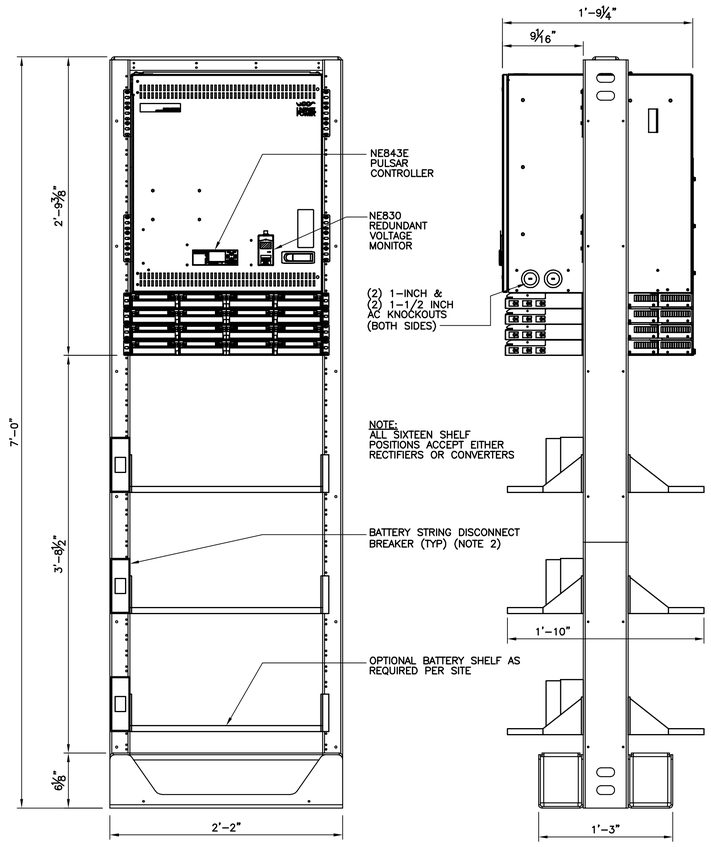
SCALE: AS NOTED

JOB NO. 15267.002

LTE WIRING DIAGRAM

E-2

Sheet No. 6 of 7



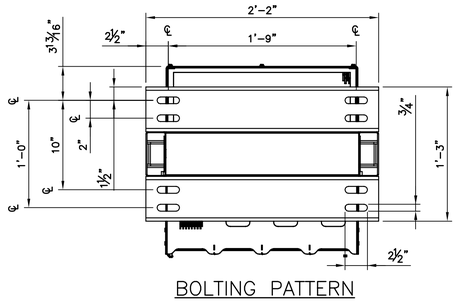
FRONT VIEW

SIDE VIEW

WEIGHT:
FRAME W/DC POWER SYSTEM AND WITHOUT BATTERIES = 435lbs

BATTERY SHELF (W/(4) 155AH BATTERIES = APPROXIMATELY 500lbs PER SHELF

CLEARANCE:
FRONT = 36"
REAR = 6"
SIDES = 2"



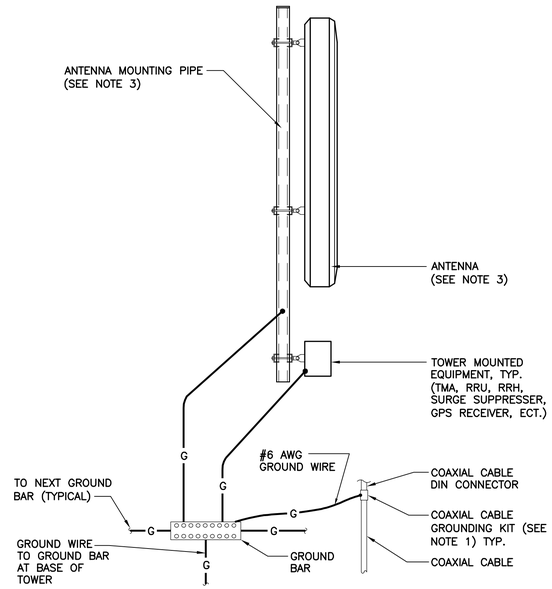
BOLTING PATTERN

6 E-3 GE/INFINITY-M DC POWER SYSTEM DETAIL

NOT TO SCALE

NOTES:

1. GE/LINEAGE FLOOR ANCHOR KIT **(P/N: 847135688)** MAY BE USED UNLESS LOCAL REQUIREMENTS GOVERN.
2. DISCONNECT MAY BE MOUNTED TO EITHER SIDE OF TRAY OR DIRECTLY TO FRAMEWORK.

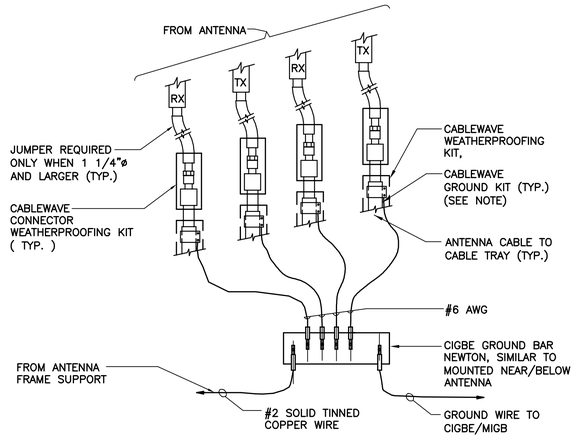


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

2 E-3 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

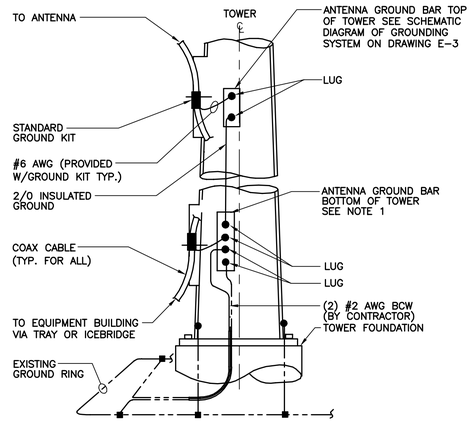


NOTE:

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

5 E-3 CONNECTION OF GROUND WIRES TO GROUND BAR

NOT TO SCALE

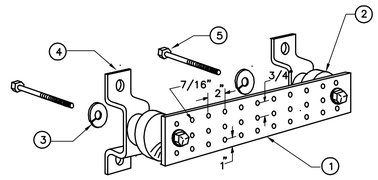


NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

1 E-3 ANTENNA CABLE GROUNDING - TOWER

NOT TO SCALE

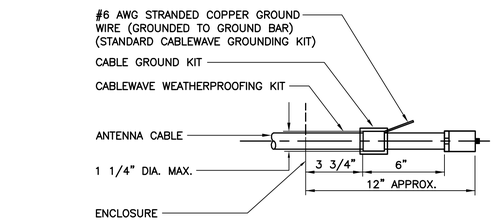


LEGEND

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

3 E-3 GROUND BAR DETAIL

NOT TO SCALE



NOTE:

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

4 E-3 ANTENNA CABLE GROUNDING DETAIL

NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	12/21/15	CAG	HMR	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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DATE: 11/15/15
SCALE: AS NOTED
JOB NO. 15267.002

TYPICAL ELECTRICAL DETAILS

E-3

Sheet No. 7 of 7

Date: **December 31, 2015**

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

Aero Solutions LLC
5555 Central Avenue, Suite 100
Boulder, CO
(720) 304-6882

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1086
	Carrier Site Name:	Plymouth
Crown Castle Designation:	**Crown Castle BU Number:**	826768
	Crown Castle Site Name:	PLYMOUTH/RT 6
	Crown Castle JDE Job Number:	360819
	Crown Castle Work Order Number:	1170459
	Crown Castle Application Number:	320466 Rev. 0
Engineering Firm Designation:	**Aero Solutions LLC Project Number:**	003-15-0772
Site Data:	**171 Town Hill Road, Plymouth, Litchfield County, CT**	
	Latitude *41° 40' 6.197"*, Longitude *-73° 1' 11.842"*	
	169 Foot - Monopole Tower	

Dear Sean Dempsey,

Aero Solutions LLC is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 858593, in accordance with application 320466, revision 0.

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

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

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

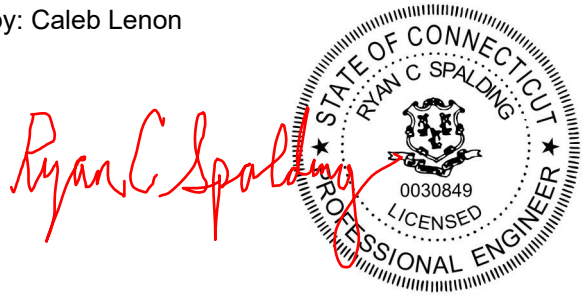
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Structural analysis prepared by: Caleb Lenon

Respectfully submitted by:

Ryan Spalding, P.E.
Structural Engineer
CT PE#:30849
Expires: 01/31/2016



1.4.2016

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 169 ft Monopole tower designed by PIROD MANUFACTURES INC. in September of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 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
115.0	115.0	3	cci antennas	DTMABP7819VG12A	1 2	3/8" 5/8”	
		6	cci antennas	TPX-070821			
		3	ericsson	WCS RRUS-32-B30			
		3	quintel technology	QS66512-3 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			

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
164.0	169.0	1	decibel	ASP-952	12 4	1-5/8" 7/8"	1
		1	rfs celwave	PD220			
		1	rfs celwave	PD455-6			
		1	sinclair	SRL-229			
	166.0	3	commscope	ATBT-BOTTOM-24V			2
		3	commscope	LNX-6515DS-VTM w/ Mount Pipe			
	164.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe			1
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Platform Mount [LP 403-1]			
155.0	155.0	3	alcatel lucent	1900MHz RRH	4	1-1/4"	1
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	TD-RRH8x20-25			2
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			1
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			2
		1	tower mounts	Platform Mount [LP 303-1]			1
144.0	144.0	3	alcatel lucent	RRH2X60-AWS	2	1-5/8"	2
		3	alcatel lucent	RRH2X60-PCS			
		3	alcatel lucent	RRH2x60-700			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		6	antel	LPA-80080/6CF w/ Mount Pipe	12	1-5/8"	1
		6	commscope	SBNHH-1D65B w/ Mount Pipe			2
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 403-1]			1
121.0	125.0	1	rfs celwave	201-4	2	1/2"	1
	121.0	1	tower mounts	Side Arm Mount [SO 701-1]			
115.0	115.0	6	ericsson	RRUS 11	1 2 12	3/8" 5/8" 1-5/8"	1
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			3
		12	powerwave technologies	LGP2140X			
		1	raycap	DC6-48-60-18-8F			1
		1	tower mounts	Platform Mount [LP 303-1]			
105.0	105.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8"	1
80.0	91.0	1	rfs celwave	PD455-6	1	7/8"	1
	80.0	1	tower mounts	Side Arm Mount [SO 701-1]			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
170	170	12	ems wireless	RR65-16-00XP		
160	160	12	ems wireless	RR-65-16-00XP		
150	150	12	ems wireless	RR-65-16-00XP		
140	140	12	ems wireless	RR-65-16-00XP		
130	130	12	ems wireless	RR-65-16-00XP		
120	120	12	ems wireless	RR-65-16-00XP		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C.	3491991	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PiRod, Inc.	3678682	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, Inc.	3491992	CCISITES

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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	169 - 164.25	Pole	TP26x18x0.25	1	-0.200	1062.230	0.1	Pass
L2	164.25 - 129.125	Pole	TP34.063x21.5x0.313	2	-9.973	1663.291	30.9	Pass
L3	129.125 - 96.083	Pole	TP41.75x31.944x0.375	3	-19.159	2484.672	49.9	Pass
L4	96.083 - 63.25	Pole	TP49.063x39.78x0.375	4	-27.501	2928.414	66.6	Pass
L5	63.25 - 31.25	Pole	TP56.125x46.951x0.375	5	-36.940	3355.068	76.2	Pass
L6	31.25 - 0	Pole	TP62.938x53.846x0.375	6	-49.641	3684.958	86.6	Pass
							Summary	
						Pole (L6)	86.6	Pass
						Rating =	86.6	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	77.0	Pass
1	Base Plate	0	86.6	Pass
1	Base Foundation	0	80.7	Pass
1	Base Foundation Soil Interaction	0	50.2	Pass

Structure Rating (max from all components) =	86.6%

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

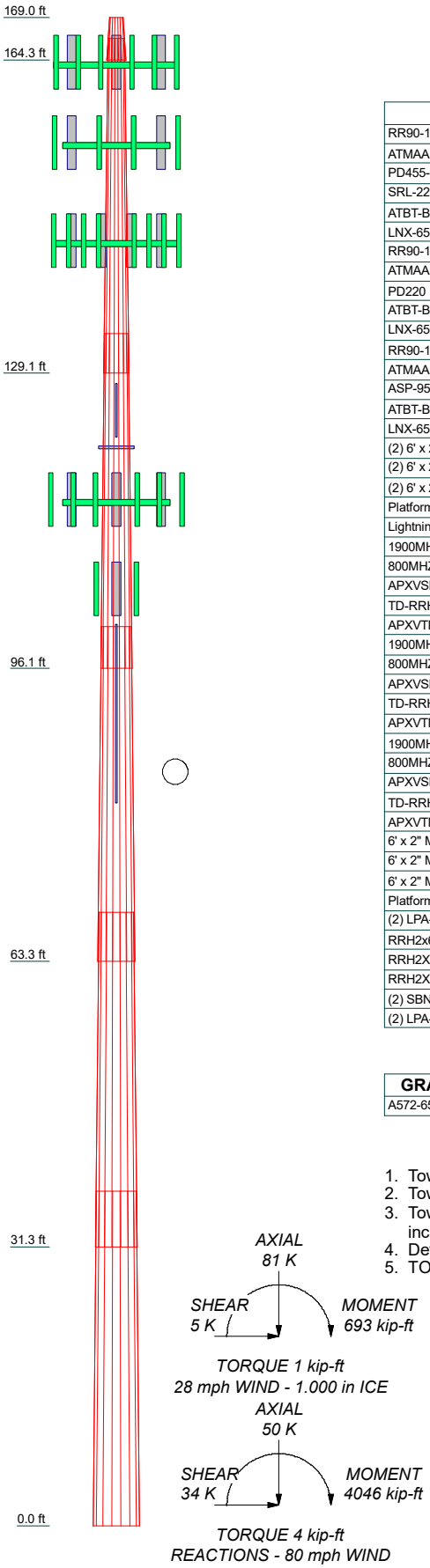
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	4.750	18	0.250	2.375	18.000	26.000		0.3
2	37.500	18	0.313	4.458	21.500	34.063		3.5
3	37.500	18	0.375	4.667	31.944	41.750		5.5
4	37.500	18	0.375	5.500	39.780	49.063	A572-65	6.7
5	37.500	18	0.375	6.250	46.951	56.125		7.8
6	37.500	18	0.375		53.846	62.938		8.8
								32.6



AXIAL
81 K

SHEAR
5 K

MOMENT
693 kip-ft

TORQUE 1 kip-ft
28 mph WIND - 1.000 in ICE

AXIAL
50 K

SHEAR
34 K

MOMENT
4046 kip-ft

TORQUE 4 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
RR90-17-02DP w/ Mount Pipe	164	RRH2x60-700	144
ATMAA1412D-1A20	164	RRH2X60-AWS	144
PD455-6	164	RRH2X60-PCS	144
SRL-229	164	(2) SBNHH-1D65B w/ Mount Pipe	144
ATBT-BOTTOM-24V	164	(2) LPA-80080/6CF w/ Mount Pipe	144
LNX-6515DS-VTM w/ Mount Pipe	164	RRH2x60-700	144
RR90-17-02DP w/ Mount Pipe	164	RRH2X60-AWS	144
ATMAA1412D-1A20	164	RRH2X60-PCS	144
PD220	164	(2) SBNHH-1D65B w/ Mount Pipe	144
ATBT-BOTTOM-24V	164	DB-T1-6Z-8AB-0Z	144
LNX-6515DS-VTM w/ Mount Pipe	164	Platform Mount [LP 403-1]	144
RR90-17-02DP w/ Mount Pipe	164	201-4	121
ATMAA1412D-1A20	164	Side Arm Mount [SO 701-1]	121
ASP-952	164	(2) RRUS 11	115
ATBT-BOTTOM-24V	164	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
LNX-6515DS-VTM w/ Mount Pipe	164		
(2) 6' x 2" Mount Pipe	164	7770.00 w/ Mount Pipe	115
(2) 6' x 2" Mount Pipe	164	DTMABP7819VG12A	115
(2) 6' x 2" Mount Pipe	164	(2) TPX-070821	115
Platform Mount [LP 403-1]	164	WCS RRUS-32-B30	115
Lightning Rod 1/2"x4' on 15' Pole	162	QS66512-3 w/ Mount Pipe	115
1900MHz RRH	155	DC6-48-60-18-8F	115
800MHZ RRH	155	(2) RRUS 11	115
APXVSPP18-C-A20 w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
TD-RRH8x20-25	155		
APXVTM14-C-120 w/ Mount Pipe	155	7770.00 w/ Mount Pipe	115
1900MHz RRH	155	DTMABP7819VG12A	115
800MHZ RRH	155	(2) TPX-070821	115
APXVSPP18-C-A20 w/ Mount Pipe	155	WCS RRUS-32-B30	115
TD-RRH8x20-25	155	QS66512-3 w/ Mount Pipe	115
APXVTM14-C-120 w/ Mount Pipe	155	DC6-48-60-18-8F	115
1900MHz RRH	155	(2) RRUS 11	115
800MHZ RRH	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
APXVSPP18-C-A20 w/ Mount Pipe	155		
TD-RRH8x20-25	155	7770.00 w/ Mount Pipe	115
APXVTM14-C-120 w/ Mount Pipe	155	DTMABP7819VG12A	115
6' x 2" Mount Pipe	155	(2) TPX-070821	115
6' x 2" Mount Pipe	155	WCS RRUS-32-B30	115
6' x 2" Mount Pipe	155	QS66512-3 w/ Mount Pipe	115
Platform Mount [LP 303-1]	155	Platform Mount [LP 303-1]	115
(2) LPA-80080/6CF w/ Mount Pipe	144	APXV18-206517S-C w/ Mount Pipe	105
RRH2x60-700	144	APXV18-206517S-C w/ Mount Pipe	105
RRH2X60-AWS	144	APXV18-206517S-C w/ Mount Pipe	105
RRH2X60-PCS	144	PD455-6	80
(2) SBNHH-1D65B w/ Mount Pipe	144	6' x 2" Mount Pipe	80
(2) LPA-80080/6CF w/ Mount Pipe	144	Side Arm Mount [SO 701-1]	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 86.6%

Aero Solutions LLC
5555 Central Avenue, Suite 100
Boulder, CO
Phone: (720) 304-6882
FAX: (720) 304-6883

Job: ***BU# 826768 PLYMOUTH-RT 6***			
Project: ***Existing 169 Ft. Monopole***			
Client: Crown Castle	Drawn by: clenon		App'd:
Code: TIA/EIA-222-F	Date: 12/31/15		Scale: NTS
Path: P:\004_CCI_SITES\826768 PLYMOUTH-RT 6\003-15-0772\Engineering\Aero Calculations\Working RISA\826768 PLYMOUTH-RT 6.eri			Dwg No. E-1

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 Litchfield County, Connecticut.
5) Basic wind speed of 80 mph.
6) Nominal ice thickness of 1.000 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.000 pcf.
9) A wind speed of 28 mph is used in combination with ice.
10) Temperature drop of 50.000 °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	169.000-164.250	4.750	2.375	18	18.000	26.000	0.250	1.000	A572-65 (65 ksi)
L2	164.250-129.125	37.500	4.458	18	21.500	34.063	0.313	1.250	A572-65 (65 ksi)
L3	129.125-96.083	37.500	4.667	18	31.944	41.750	0.375	1.500	A572-65 (65 ksi)
L4	96.083-63.250	37.500	5.500	18	39.780	49.063	0.375	1.500	A572-65 (65 ksi)
L5	63.250-31.250	37.500	6.250	18	46.951	56.125	0.375	1.500	A572-65 (65 ksi)
L6	31.250-0.000	37.500		18	53.846	62.938	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.278	14.085	560.634	6.301	9.144	61.312	1122.006	7.044	2.728	10.912
	26.401	20.433	1711.654	9.141	13.208	129.592	3425.561	10.218	4.136	16.544
L2	22.640	21.015	1191.883	7.522	10.922	109.127	2385.334	10.510	3.234	10.349
	34.588	33.476	4817.433	11.981	17.304	278.404	9641.206	16.741	5.445	17.424
L3	33.621	37.575	4731.088	11.207	16.228	291.546	9468.401	18.791	4.962	13.232
	42.394	49.247	10650.982	14.688	21.209	502.192	21315.979	24.628	6.688	17.835
L4	41.566	46.901	9200.619	13.989	20.208	455.295	18413.344	23.455	6.341	16.91
	49.819	57.950	17355.138	17.284	24.924	696.329	34733.112	28.981	7.975	21.267
L5	49.042	55.437	15193.664	16.534	23.851	637.021	30407.320	27.724	7.603	20.276
	56.991	66.356	26056.151	19.791	28.511	913.882	52146.587	33.185	9.218	24.581
L6	56.215	63.644	22989.557	18.982	27.354	840.453	46009.365	31.828	8.817	23.512
	63.908	74.465	36822.895	22.210	31.972	1151.714	73694.242	37.240	10.417	27.779

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 169.000-164.250				1	1	1		
L2 164.250-129.125				1	1	1		
L3 129.125-96.083				1	1	1		
L4 96.083-63.250				1	1	1		
L5 63.250-31.250				1	1	1		
L6 31.250-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
AVA7-50(1-5/8")	C	No	Inside Pole	164.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
LDF5-50A(7/8")	A	No	Inside Pole	164.000 - 0.000	4	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF7-50A(1-5/8")	C	No	Inside Pole	164.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
***								
HB114-1-08U4-M6F(1-1/4")	B	No	Inside Pole	155.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB114-21U3M12-XXXF(1-1/4)	B	No	Inside Pole	155.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	144.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8")	C	No	Inside Pole	144.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
***								
LDF4-50A(1/2")	A	No	CaAa (Out Of Face)	121.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.007
						4" Ice	0.000	0.023
LDF4-50A(1/2")	A	No	CaAa (Out Of Face)	121.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.007
						4" Ice	0.000	0.023
***								
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	115.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030
FB-L98B-034-XXX(3/8")	A	No	Inside Pole	115.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG82ST-BRDA(5/8)	A	No	Inside Pole	115.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
FB-L98B-034-XXX(3/8")	A	No	Inside Pole	115.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG82ST-BRDA(5/8)	A	No	Inside Pole	115.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
2" Rigid Conduit	A	No	CaAa (Out Of Face)	115.000 - 0.000	2	No Ice	0.200	0.003
						1/2" Ice	0.300	0.004
						1" Ice	0.400	0.006
						2" Ice	0.600	0.013
						4" Ice	1.000	0.032
***								
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	105.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
***								
LDF5-50A(7/8")	A	No	Inside Pole	80.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000

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	169.000-164.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L2	164.250-129.125	A	0.000	0.000	0.000	0.000	0.046
		B	0.000	0.000	0.000	0.000	0.132
		C	0.000	0.000	0.000	0.000	0.503
L3	129.125-96.083	A	0.000	0.000	0.000	7.567	0.369
		B	0.000	0.000	0.000	0.000	0.213
		C	0.000	0.000	0.000	0.000	0.712
L4	96.083-63.250	A	0.000	0.000	0.000	13.133	0.610
		B	0.000	0.000	0.000	0.000	0.330
		C	0.000	0.000	0.000	0.000	0.708
L5	63.250-31.250	A	0.000	0.000	0.000	12.800	0.599
		B	0.000	0.000	0.000	0.000	0.321
		C	0.000	0.000	0.000	0.000	0.690
L6	31.250-0.000	A	0.000	0.000	0.000	12.500	0.585
		B	0.000	0.000	0.000	0.000	0.314
		C	0.000	0.000	0.000	0.000	0.674

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	169.000-164.250	A	1.214	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
L2	164.250-129.125	A	1.195	0.000	0.000	0.000	0.000	0.046
		B		0.000	0.000	0.000	0.000	0.132
		C		0.000	0.000	0.000	0.000	0.503
L3	129.125-96.083	A	1.158	0.000	0.000	0.000	16.609	1.790
		B		0.000	0.000	0.000	0.000	0.213
		C		0.000	0.000	0.000	0.000	0.712
L4	96.083-63.250	A	1.111	0.000	0.000	0.000	28.343	2.904
		B		0.000	0.000	0.000	0.000	0.330
		C		0.000	0.000	0.000	0.000	0.708
L5	63.250-31.250	A	1.044	0.000	0.000	0.000	27.022	2.694
		B		0.000	0.000	0.000	0.000	0.321
		C		0.000	0.000	0.000	0.000	0.690
L6	31.250-0.000	A	1.000	0.000	0.000	0.000	25.550	2.434
		B		0.000	0.000	0.000	0.000	0.314
		C		0.000	0.000	0.000	0.000	0.674

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	169.000-164.250	0.000	0.000	0.000	0.000
L2	164.250-129.125	0.000	0.000	0.000	0.000
L3	129.125-96.083	0.000	-0.336	0.000	-0.646
L4	96.083-63.250	0.000	-0.542	0.000	-1.010
L5	63.250-31.250	0.000	-0.549	0.000	-1.024
L6	31.250-0.000	0.000	-0.555	0.000	-1.021

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
Lightning Rod 1/2"x4' on 15' Pole	A	From Leg	0.500 0.000 8.000	0.000	162.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.450 7.400 9.287 12.865 17.774	5.450 7.400 9.287 12.865 17.774	0.129 0.187 0.256 0.406 0.851
***									
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.593 5.088 5.578 6.588 8.731	3.319 4.089 4.784 6.225 9.308	0.034 0.072 0.115 0.224 0.557
ATMAA1412D-1A20	A	From Leg	4.000 0.000 0.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.167 1.314 1.469 1.806 2.584	0.467 0.575 0.691 0.951 1.573	0.013 0.021 0.030 0.056 0.137
PD455-6	A	From Leg	4.000 0.000 5.000	0.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.050 8.281 10.529 15.075 24.367	6.050 8.281 10.529 15.075 24.367	0.023 0.067 0.125 0.283 0.772
SRL-229	A	From Leg	4.000 0.000 5.000	0.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.450 8.633 10.833 15.283 24.014	6.450 8.633 10.833 15.283 24.014	0.025 0.071 0.131 0.293 0.785
ATBT-BOTTOM-24V	A	From Leg	4.000 0.000 2.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.121 0.172 0.232 0.377 0.771	0.075 0.119 0.172 0.303 0.668	0.003 0.004 0.006 0.013 0.045
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	0.083 0.173 0.273 0.506 1.151
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.593 5.088 5.578 6.588 8.731	3.319 4.089 4.784 6.225 9.308	0.034 0.072 0.115 0.224 0.557
ATMAA1412D-1A20	B	From Leg	4.000 0.000 0.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.167 1.314 1.469 1.806 2.584	0.467 0.575 0.691 0.951 1.573	0.013 0.021 0.030 0.056 0.137
PD220	B	From Leg	4.000 0.000 5.000	0.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.080 5.300 7.537 12.060 21.307	3.080 5.300 7.537 12.060 21.307	0.023 0.049 0.088 0.209 0.622
ATBT-BOTTOM-24V	B	From Leg	4.000 0.000 2.000	60.000	164.000	No Ice 1/2" Ice 1" Ice	0.121 0.172 0.232 0.377	0.075 0.119 0.172 0.303	0.003 0.004 0.006 0.013

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	0.771	0.668	0.045
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	0.083 0.173 0.273 0.506 1.151
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.593 5.088 5.578 6.588 8.731	3.319 4.089 4.784 6.225 9.308	0.034 0.072 0.115 0.224 0.557
ATMAA1412D-1A20	C	From Leg	4.000 0.000 0.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.167 1.314 1.469 1.806 2.584	0.467 0.575 0.691 0.951 1.573	0.013 0.021 0.030 0.056 0.137
ASP-952	C	From Leg	4.000 0.000 5.000	0.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.025 4.156 5.304 6.963 9.760	3.025 4.156 5.304 6.963 9.760	0.017 0.039 0.069 0.149 0.403
ATBT-BOTTOM-24V	C	From Leg	4.000 0.000 2.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.121 0.172 0.232 0.377 0.771	0.075 0.119 0.172 0.303 0.668	0.003 0.004 0.006 0.013 0.045
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	60.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	0.083 0.173 0.273 0.506 1.151
(2) 6' x 2" Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Platform Mount [LP 403-1]	C	None		0.000	164.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.850 24.300 29.750 40.650 62.450	18.850 24.300 29.750 40.650 62.450	1.500 1.797 2.093 2.686 3.872
***									
1900MHz RRH	A	From Leg	4.000 0.000	0.000	155.000	No Ice 1/2"	2.907 3.145	3.801 4.065	0.044 0.075

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
			0.000			Ice	3.391	4.337	0.110
						1" Ice	3.909	4.908	0.192
						2" Ice	5.050	6.152	0.407
						4" Ice			
800MHZ RRH	A	From Leg	4.000	0.000	155.000	No Ice	2.490	2.068	0.053
			0.000			1/2"	2.706	2.271	0.074
			0.000			Ice	2.931	2.481	0.098
						1" Ice	3.407	2.928	0.157
						2" Ice	4.462	3.927	0.318
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	155.000	No Ice	8.498	6.946	0.083
			0.000			1/2"	9.149	8.127	0.151
			0.000			Ice	9.767	9.021	0.227
						1" Ice	11.031	10.844	0.406
						2" Ice	13.679	14.851	0.909
						4" Ice			
TD-RRH8x20-25	A	From Leg	4.000	0.000	155.000	No Ice	4.720	1.703	0.070
			0.000			1/2"	5.014	1.920	0.097
			0.000			Ice	5.316	2.145	0.128
						1" Ice	5.948	2.622	0.201
						2" Ice	7.314	3.680	0.397
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000	0.000	155.000	No Ice	7.134	4.959	0.077
			0.000			1/2"	7.662	5.754	0.132
			0.000			Ice	8.183	6.472	0.193
						1" Ice	9.256	8.010	0.339
						2" Ice	11.526	11.412	0.753
						4" Ice			
1900MHz RRH	B	From Leg	4.000	-30.000	155.000	No Ice	2.907	3.801	0.044
			0.000			1/2"	3.145	4.065	0.075
			0.000			Ice	3.391	4.337	0.110
						1" Ice	3.909	4.908	0.192
						2" Ice	5.050	6.152	0.407
						4" Ice			
800MHZ RRH	B	From Leg	4.000	-30.000	155.000	No Ice	2.490	2.068	0.053
			0.000			1/2"	2.706	2.271	0.074
			0.000			Ice	2.931	2.481	0.098
						1" Ice	3.407	2.928	0.157
						2" Ice	4.462	3.927	0.318
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000	-30.000	155.000	No Ice	8.498	6.946	0.083
			0.000			1/2"	9.149	8.127	0.151
			0.000			Ice	9.767	9.021	0.227
						1" Ice	11.031	10.844	0.406
						2" Ice	13.679	14.851	0.909
						4" Ice			
TD-RRH8x20-25	B	From Leg	4.000	-30.000	155.000	No Ice	4.720	1.703	0.070
			0.000			1/2"	5.014	1.920	0.097
			0.000			Ice	5.316	2.145	0.128
						1" Ice	5.948	2.622	0.201
						2" Ice	7.314	3.680	0.397
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000	-30.000	155.000	No Ice	7.134	4.959	0.077
			0.000			1/2"	7.662	5.754	0.132
			0.000			Ice	8.183	6.472	0.193
						1" Ice	9.256	8.010	0.339
						2" Ice	11.526	11.412	0.753
						4" Ice			
1900MHz RRH	C	From Leg	4.000	-15.000	155.000	No Ice	2.907	3.801	0.044
			0.000			1/2"	3.145	4.065	0.075
			0.000			Ice	3.391	4.337	0.110
						1" Ice	3.909	4.908	0.192
						2" Ice	5.050	6.152	0.407
						4" Ice			
800MHZ RRH	C	From Leg	4.000	-15.000	155.000	No Ice	2.490	2.068	0.053

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
			0.000 0.000			1/2" Ice	2.706 2.931	2.271 2.481	0.074 0.098
						1" Ice	3.407	2.928	0.157
						2" Ice	4.462	3.927	0.318
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	-15.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
TD-RRH8x20-25	C	From Leg	4.000 0.000 0.000	-15.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	-15.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Platform Mount [LP 303-1]	C	None		0.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101
***									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857
RRH2x60-700	A	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS	A	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.190 2.398 2.613 3.071 4.090	1.429 1.611 1.801 2.209 3.126	0.044 0.060 0.079 0.125 0.259

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			
RRH2X60-PCS	A	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.568 9.220 9.838 11.104 13.754	7.004 8.185 9.081 10.904 14.926	0.066 0.135 0.211 0.392 0.897
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	40.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857
RRH2x60-700	B	From Leg	4.000 0.000 0.000	40.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS	B	From Leg	4.000 0.000 0.000	40.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.190 2.398 2.613 3.071 4.090	1.429 1.611 1.801 2.209 3.126	0.044 0.060 0.079 0.125 0.259
RRH2X60-PCS	B	From Leg	4.000 0.000 0.000	40.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	40.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.568 9.220 9.838 11.104 13.754	7.004 8.185 9.081 10.904 14.926	0.066 0.135 0.211 0.392 0.897
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857
RRH2x60-700	C	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS	C	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.190 2.398 2.613 3.071 4.090	1.429 1.611 1.801 2.209 3.126	0.044 0.060 0.079 0.125 0.259
RRH2X60-PCS	C	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice	2.567 2.791 3.025 3.517	2.011 2.218 2.435 2.894	0.055 0.075 0.099 0.155

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	4.606	3.915	0.313
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.568 9.220 9.838 11.104 13.754	7.004 8.185 9.081 10.904 14.926	0.066 0.135 0.211 0.392 0.897
DB-T1-6Z-8AB-0Z	C	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
Platform Mount [LP 403-1]	C	None		0.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.850 24.300 29.750 40.650 62.450	18.850 24.300 29.750 40.650 62.450	1.500 1.797 2.093 2.686 3.872
***									
201-4	A	From Leg	3.000 0.000 4.000	0.000	121.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.125 2.004 2.898 4.314 6.532	1.125 2.004 2.898 4.314 6.532	0.004 0.014 0.029 0.076 0.245
Side Arm Mount [SO 701-1]	A	From Leg	1.500 0.000 0.000	0.000	121.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.850 1.140 1.430 2.010 3.170	1.670 2.340 3.010 4.350 7.030	0.065 0.079 0.093 0.121 0.177
***									
(2) RRUS 11	A	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.051 0.071 0.095 0.153 0.313
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
DTMABP7819VG12A	A	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.139 1.284 1.437 1.769 2.538	0.391 0.488 0.595 0.833 1.414	0.019 0.026 0.036 0.060 0.140
(2) TPX-070821	A	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	0.008 0.011 0.016 0.030 0.083
WCS RRUS-32-B30	A	From Leg	4.000	23.000	115.000	No Ice	3.866	2.762	0.077

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
			0.000 0.000			1/2" Ice 1" Ice 2" Ice 4" Ice	4.151 4.444 5.055 6.383	3.021 3.290 3.852 5.081	0.105 0.136 0.211 0.412
QS66512-3 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.290 9.910 11.176 13.829	8.463 9.657 10.620 12.610 16.806	0.131 0.206 0.290 0.486 1.023
DC6-48-60-18-8F	A	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.798 3.038 3.543 4.658	2.567 2.798 3.038 3.543 4.658	0.019 0.041 0.067 0.129 0.299
(2) RRUS 11	B	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.051 0.071 0.095 0.153 0.313
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
DTMABP7819VG12A	B	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.139 1.284 1.437 1.769 2.538	0.391 0.488 0.595 0.833 1.414	0.019 0.026 0.036 0.060 0.140
(2) TPX-070821	B	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	0.008 0.011 0.016 0.030 0.083
WCS RRUS-32-B30	B	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.866 4.151 4.444 5.055 6.383	2.762 3.021 3.290 3.852 5.081	0.077 0.105 0.136 0.211 0.412
QS66512-3 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.290 9.910 11.176 13.829	8.463 9.657 10.620 12.610 16.806	0.131 0.206 0.290 0.486 1.023
DC6-48-60-18-8F	B	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.798 3.038 3.543 4.658	2.567 2.798 3.038 3.543 4.658	0.019 0.041 0.067 0.129 0.299

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) RRUS 11	C	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.051 0.071 0.095 0.153 0.313
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
DTMABP7819VG12A	C	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.139 1.284 1.437 1.769 2.538	0.391 0.488 0.595 0.833 1.414	0.019 0.026 0.036 0.060 0.140
(2) TPX-070821	C	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	0.008 0.011 0.016 0.030 0.083
WCS RRUS-32-B30	C	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.866 4.151 4.444 5.055 6.383	2.762 3.021 3.290 3.852 5.081	0.077 0.105 0.136 0.211 0.412
QS66512-3 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.290 9.910 11.176 13.829	8.463 9.657 10.620 12.610 16.806	0.131 0.206 0.290 0.486 1.023
Platform Mount [LP 303-1]	C	None		0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101
***									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.000 0.000 0.000	7.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.404 5.960 6.481 7.547 9.919	4.700 5.860 6.734 8.515 12.277	0.052 0.097 0.150 0.280 0.679
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.000 0.000 0.000	5.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.404 5.960 6.481 7.547 9.919	4.700 5.860 6.734 8.515 12.277	0.052 0.097 0.150 0.280 0.679
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.000 0.000 0.000	-20.000	105.000	No Ice 1/2" Ice 1" Ice	5.404 5.960 6.481 7.547	4.700 5.860 6.734 8.515	0.052 0.097 0.150 0.280

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	9.919	12.277	0.679
***									
PD455-6	A	From Leg	3.000 0.000 11.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.050 8.281 10.529 15.075 24.367	6.050 8.281 10.529 15.075 24.367	0.023 0.067 0.125 0.283 0.772
6' x 2" Mount Pipe	A	From Leg	3.000 0.000 2.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Side Arm Mount [SO 701-1]	A	From Leg	1.500 0.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.850 1.140 1.430 2.010 3.170	1.670 2.340 3.010 4.350 7.030	0.065 0.079 0.093 0.121 0.177

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

Comb. No.	Description
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	169 - 164.25	Pole	Max Tension	2	0.000	-0.000	-0.000
			Max. Compression	14	-0.336	0.000	0.000
			Max. Mx	5	-0.201	-0.333	0.000
			Max. My	2	-0.201	-0.000	0.333
			Max. Vy	5	0.180	-0.333	0.000
			Max. Vx	2	-0.179	-0.000	0.333
			Max. Torque	6			-0.000
L2	164.25 - 129.125	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-21.009	0.506	1.324
			Max. Mx	11	-9.977	332.021	-2.613
			Max. My	2	-10.007	-2.677	329.082
			Max. Vy	5	16.842	-331.677	2.969
			Max. Vx	2	-16.563	-2.677	329.082
			Max. Torque	11			-2.402
L3	129.125 - 96.083	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-36.799	0.077	4.689
			Max. Mx	11	-19.164	1003.483	-5.935
			Max. My	2	-19.194	-6.820	991.511
			Max. Vy	5	25.104	-1003.437	7.719
			Max. Vx	2	-24.810	-6.820	991.511
			Max. Torque	10			-2.249
L4	96.083 - 63.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-49.428	-0.159	10.982
			Max. Mx	5	-27.504	-1864.058	12.991
			Max. My	2	-27.527	-11.109	1843.304
			Max. Vy	5	28.584	-1864.058	12.991
			Max. Vx	2	-28.261	-11.109	1843.304
			Max. Torque	11			-3.907
L5	63.25 - 31.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-63.010	-0.450	16.546
			Max. Mx	5	-36.942	-2803.427	17.860
			Max. My	2	-36.955	-15.329	2773.173
			Max. Vy	5	31.404	-2803.427	17.860
			Max. Vx	2	-31.084	-15.329	2773.173
			Max. Torque	11			-4.045
L6	31.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-80.572	-0.838	23.250
			Max. Mx	5	-49.641	-4038.736	23.696
			Max. My	2	-49.641	-20.342	3997.376
			Max. Vy	5	34.413	-4038.736	23.696
			Max. Vx	2	-34.099	-20.342	3997.376
			Max. Torque	11			-4.215

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	80.572	-0.000	0.000
	Max. H_x	11	49.657	34.391	-0.121
	Max. H_z	2	49.657	-0.121	34.077
	Max. M_x	2	3997.376	-0.121	34.077
	Max. M_z	5	4038.736	-34.391	0.121
	Max. Torsion	5	4.213	-34.391	0.121
	Min. Vert	1	49.657	0.000	0.000
	Min. H_x	5	49.657	-34.391	0.121
	Min. H_z	8	49.657	0.121	-34.077
	Min. M_x	8	-3988.863	0.121	-34.077
	Min. M_z	11	-4036.962	34.391	-0.121
	Min. Torsion	11	-4.215	34.391	-0.121

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	49.657	0.000	0.000	-4.131	-0.869	0.000
Dead+Wind 0 deg - No Ice	49.657	0.121	-34.077	-3997.376	-20.342	-0.607
Dead+Wind 30 deg - No Ice	49.657	17.300	-29.572	-3472.078	-2036.677	-2.632
Dead+Wind 60 deg - No Ice	49.657	29.844	-17.144	-2017.606	-3507.485	-3.951
Dead+Wind 90 deg - No Ice	49.657	34.391	-0.121	-23.695	-4038.736	-4.213
Dead+Wind 120 deg - No Ice	49.657	29.723	16.934	1975.455	-3488.087	-3.347
Dead+Wind 150 deg - No Ice	49.657	17.090	29.451	3444.180	-2003.015	-1.583
Dead+Wind 180 deg - No Ice	49.657	-0.121	34.077	3988.863	18.558	0.606
Dead+Wind 210 deg - No Ice	49.657	-17.300	29.572	3463.575	2034.887	2.633
Dead+Wind 240 deg - No Ice	49.657	-29.844	17.144	2009.113	3505.700	3.954
Dead+Wind 270 deg - No Ice	49.657	-34.391	0.121	15.204	4036.962	4.215
Dead+Wind 300 deg - No Ice	49.657	-29.723	-16.934	-1983.956	3486.319	3.346
Dead+Wind 330 deg - No Ice	49.657	-17.090	-29.451	-3452.691	2001.242	1.581
Dead+Ice+Temp	80.572	0.000	-0.000	-23.250	-0.838	0.000
Dead+Wind 0 deg+Ice+Temp	80.572	0.007	-5.413	-692.639	-2.087	-0.040
Dead+Wind 30 deg+Ice+Temp	80.572	2.745	-4.691	-603.594	-341.180	-0.556
Dead+Wind 60 deg+Ice+Temp	80.572	4.748	-2.713	-359.074	-589.079	-0.923
Dead+Wind 90 deg+Ice+Temp	80.572	5.478	-0.007	-24.598	-679.360	-1.044
Dead+Wind 120 deg+Ice+Temp	80.572	4.741	2.700	310.212	-587.834	-0.884
Dead+Wind 150 deg+Ice+Temp	80.572	2.733	4.684	555.643	-339.023	-0.488
Dead+Wind 180 deg+Ice+Temp	80.572	-0.007	5.413	645.932	0.403	0.040
Dead+Wind 210 deg+Ice+Temp	80.572	-2.745	4.691	556.888	339.496	0.556
Dead+Wind 240 deg+Ice+Temp	80.572	-4.748	2.713	312.368	587.395	0.924
Dead+Wind 270 deg+Ice+Temp	80.572	-5.478	0.007	-22.108	677.677	1.044
Dead+Wind 300 deg+Ice+Temp	80.572	-4.741	-2.700	-356.917	586.151	0.884
Dead+Wind 330 deg+Ice+Temp	80.572	-2.733	-4.684	-602.349	337.340	0.488
Dead+Wind 0 deg - Service	49.657	0.047	-13.311	-1565.206	-8.493	-0.239
Dead+Wind 30 deg - Service	49.657	6.758	-11.552	-1359.881	-796.703	-1.033
Dead+Wind 60 deg - Service	49.657	11.658	-6.697	-791.319	-1371.672	-1.551
Dead+Wind 90 deg - Service	49.657	13.434	-0.047	-11.869	-1579.339	-1.653
Dead+Wind 120 deg - Service	49.657	11.610	6.615	769.620	-1364.069	-1.313
Dead+Wind 150 deg - Service	49.657	6.676	11.504	1343.749	-783.532	-0.620
Dead+Wind 180 deg -	49.657	-0.047	13.311	1556.674	6.716	0.238

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
Service						
Dead+Wind 210 deg - Service	49.657	-6.758	11.552	1351.350	794.924	1.033
Dead+Wind 240 deg - Service	49.657	-11.658	6.697	782.790	1369.893	1.551
Dead+Wind 270 deg - Service	49.657	-13.434	0.047	3.340	1577.562	1.654
Dead+Wind 300 deg - Service	49.657	-11.610	-6.615	-778.150	1362.294	1.313
Dead+Wind 330 deg - Service	49.657	-6.676	-11.504	-1352.280	781.756	0.620

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	0.000	-49.657	0.000	0.000	49.657	0.000	0.000%
2	0.121	-49.657	-34.077	-0.121	49.657	34.077	0.000%
3	17.300	-49.657	-29.572	-17.300	49.657	29.572	0.000%
4	29.844	-49.657	-17.144	-29.844	49.657	17.144	0.000%
5	34.391	-49.657	-0.121	-34.391	49.657	0.121	0.000%
6	29.723	-49.657	16.934	-29.723	49.657	-16.934	0.000%
7	17.090	-49.657	29.451	-17.090	49.657	-29.451	0.000%
8	-0.121	-49.657	34.077	0.121	49.657	-34.077	0.000%
9	-17.300	-49.657	29.572	17.300	49.657	-29.572	0.000%
10	-29.844	-49.657	17.144	29.844	49.657	-17.144	0.000%
11	-34.391	-49.657	0.121	34.391	49.657	-0.121	0.000%
12	-29.723	-49.657	-16.934	29.723	49.657	16.934	0.000%
13	-17.090	-49.657	-29.451	17.090	49.657	29.451	0.000%
14	0.000	-80.572	0.000	-0.000	80.572	0.000	0.000%
15	0.007	-80.572	-5.413	-0.007	80.572	5.413	0.000%
16	2.745	-80.572	-4.691	-2.745	80.572	4.691	0.000%
17	4.748	-80.572	-2.713	-4.748	80.572	2.713	0.000%
18	5.478	-80.572	-0.007	-5.478	80.572	0.007	0.000%
19	4.741	-80.572	2.700	-4.741	80.572	-2.700	0.000%
20	2.733	-80.572	4.684	-2.733	80.572	-4.684	0.000%
21	-0.007	-80.572	5.413	0.007	80.572	-5.413	0.000%
22	-2.745	-80.572	4.691	2.745	80.572	-4.691	0.000%
23	-4.748	-80.572	2.713	4.748	80.572	-2.713	0.000%
24	-5.478	-80.572	0.007	5.478	80.572	-0.007	0.000%
25	-4.741	-80.572	-2.700	4.741	80.572	2.700	0.000%
26	-2.733	-80.572	-4.684	2.733	80.572	4.684	0.000%
27	0.047	-49.657	-13.311	-0.047	49.657	13.311	0.000%
28	6.758	-49.657	-11.552	-6.758	49.657	11.552	0.000%
29	11.658	-49.657	-6.697	-11.658	49.657	6.697	0.000%
30	13.434	-49.657	-0.047	-13.434	49.657	0.047	0.000%
31	11.610	-49.657	6.615	-11.610	49.657	-6.615	0.000%
32	6.676	-49.657	11.504	-6.676	49.657	-11.504	0.000%
33	-0.047	-49.657	13.311	0.047	49.657	-13.311	0.000%
34	-6.758	-49.657	11.552	6.758	49.657	-11.552	0.000%
35	-11.658	-49.657	6.697	11.658	49.657	-6.697	0.000%
36	-13.434	-49.657	0.047	13.434	49.657	-0.047	0.000%
37	-11.610	-49.657	-6.615	11.610	49.657	6.615	0.000%
38	-6.676	-49.657	-11.504	6.676	49.657	11.504	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00026433

3	Yes	5	0.00000001	0.00051631
4	Yes	5	0.00000001	0.00056490
5	Yes	5	0.00000001	0.00006260
6	Yes	5	0.00000001	0.00049818
7	Yes	5	0.00000001	0.00052718
8	Yes	4	0.00000001	0.00052013
9	Yes	5	0.00000001	0.00055096
10	Yes	5	0.00000001	0.00050743
11	Yes	5	0.00000001	0.00004914
12	Yes	5	0.00000001	0.00054454
13	Yes	5	0.00000001	0.00051056
14	Yes	4	0.00000001	0.00007878
15	Yes	5	0.00000001	0.00017066
16	Yes	5	0.00000001	0.00018129
17	Yes	5	0.00000001	0.00018190
18	Yes	5	0.00000001	0.00016814
19	Yes	5	0.00000001	0.00017256
20	Yes	5	0.00000001	0.00017035
21	Yes	5	0.00000001	0.00015965
22	Yes	5	0.00000001	0.00017111
23	Yes	5	0.00000001	0.00017321
24	Yes	5	0.00000001	0.00016795
25	Yes	5	0.00000001	0.00018087
26	Yes	5	0.00000001	0.00018038
27	Yes	4	0.00000001	0.00013045
28	Yes	5	0.00000001	0.00004768
29	Yes	5	0.00000001	0.00005729
30	Yes	4	0.00000001	0.00033995
31	Yes	5	0.00000001	0.00004514
32	Yes	5	0.00000001	0.00005047
33	Yes	4	0.00000001	0.00014173
34	Yes	5	0.00000001	0.00005418
35	Yes	5	0.00000001	0.00004607
36	Yes	4	0.00000001	0.00031279
37	Yes	5	0.00000001	0.00005420
38	Yes	5	0.00000001	0.00004739

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	34.434	29	1.665	0.007
L2	166.625 - 129.125	33.606	29	1.665	0.007
L3	133.583 - 96.083	22.436	29	1.514	0.004
L4	100.75 - 63.25	12.974	29	1.204	0.003
L5	68.75 - 31.25	6.079	29	0.824	0.002
L6	37.5 - 0	1.844	29	0.442	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.000	RR90-17-02DP w/ Mount Pipe	29	32.691	1.663	0.007	47688
162.000	Lightning Rod 1/2"x4' on 15' Pole	29	31.996	1.660	0.007	34960
155.000	1900MHz RRH	29	29.575	1.641	0.007	18099
144.000	(2) LPA-80080/6CF w/ Mount Pipe	29	25.842	1.586	0.005	10269
121.000	201-4	29	18.558	1.408	0.003	6253
115.000	(2) RRUS 11	29	16.813	1.352	0.003	5860
105.000	APXV18-206517S-C w/ Mount Pipe	29	14.072	1.250	0.003	5304

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
80.000	PD455-6	29	8.225	0.962	0.002	5034

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	87.882	4	4.252	0.019
L2	166.625 - 129.125	85.770	4	4.252	0.019
L3	133.583 - 96.083	57.279	4	3.867	0.010
L4	100.75 - 63.25	33.131	4	3.076	0.006
L5	68.75 - 31.25	15.527	4	2.104	0.004
L6	37.5 - 0	4.711	4	1.130	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.000	RR90-17-02DP w/ Mount Pipe	4	83.438	4.247	0.019	19212
162.000	Lightning Rod 1/2"x4' on 15' Pole	4	81.665	4.240	0.019	14009
155.000	1900MHz RRH	4	75.489	4.191	0.017	7200
144.000	(2) LPA-80080/6CF w/ Mount Pipe	4	65.967	4.052	0.013	4064
121.000	201-4	4	47.383	3.597	0.007	2468
115.000	(2) RRUS 11	4	42.931	3.454	0.007	2311
105.000	APXV18-206517S-C w/ Mount Pipe	4	35.933	3.194	0.007	2090
80.000	PD455-6	4	21.008	2.457	0.005	1979

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	169 - 164.25 (1)	TP26x18x0.25	4.750	0.000	0.0	39.000	20.433	-0.200	796.872	0.000
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.313	37.500	0.000	0.0	39.000	31.994	-9.973	1247.780	0.008
L3	129.125 - 96.083 (3)	TP41.75x31.944x0.375	37.500	0.000	0.0	39.000	47.794	-19.159	1863.970	0.010
L4	96.083 - 63.25 (4)	TP49.063x39.78x0.375	37.500	0.000	0.0	39.000	56.330	-27.501	2196.860	0.013
L5	63.25 - 31.25 (5)	TP56.125x46.951x0.375	37.500	0.000	0.0	39.000	64.536	-36.940	2516.930	0.015
L6	31.25 - 0 (6)	TP62.938x53.846x0.375	37.500	0.000	0.0	37.124	74.465	-49.641	2764.410	0.018

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	169 - 164.25 (1)	TP26x18x0.25	0.334	0.031	39.000	0.001	0.000	0.000	39.000	0.000
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.313	333.546	15.746	39.000	0.404	0.000	0.000	39.000	0.000
L3	129.125 - 96.083 (3)	TP41.75x31.944x0.375	1006.575	25.544	39.000	0.655	0.000	0.000	39.000	0.000
L4	96.083 - 63.25 (4)	TP49.063x39.78x0.375	1868.833	34.093	39.000	0.874	0.000	0.000	39.000	0.000
L5	63.25 - 31.25 (5)	TP56.125x46.951x0.375	2809.492	39.008	39.000	1.000	0.000	0.000	39.000	0.000
L6	31.25 - 0 (6)	TP62.938x53.846x0.375	4046.383	42.160	37.124	1.136	0.000	0.000	37.124	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	169 - 164.25 (1)	TP26x18x0.25	0.180	0.009	26.000	0.001	0.000	0.000	26.000	0.000
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.313	16.878	0.528	26.000	0.041	1.810	0.042	26.000	0.002
L3	129.125 - 96.083 (3)	TP41.75x31.944x0.375	25.142	0.526	26.000	0.040	2.246	0.028	26.000	0.001
L4	96.083 - 63.25 (4)	TP49.063x39.78x0.375	28.613	0.508	26.000	0.039	3.685	0.033	26.000	0.001
L5	63.25 - 31.25 (5)	TP56.125x46.951x0.375	31.433	0.487	26.000	0.037	3.804	0.026	26.000	0.001
L6	31.25 - 0 (6)	TP62.938x53.846x0.375	34.440	0.462	26.000	0.036	3.951	0.020	26.000	0.001

Pole Interaction Design Data

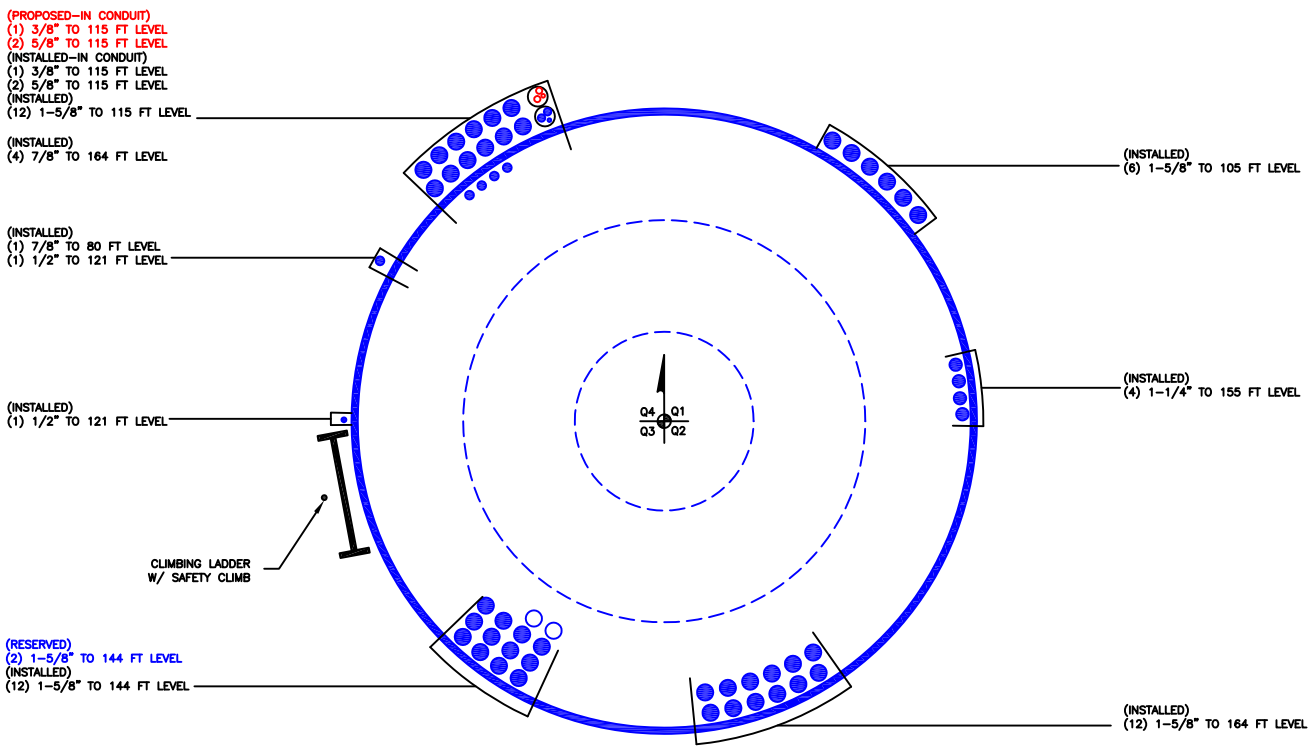
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 164.25 (1)	0.000	0.001	0.000	0.001	0.000	0.001 ✔	1.333	H1-3+VT ✔
L2	164.25 - 129.125 (2)	0.008	0.404	0.000	0.041	0.002	0.412 ✔	1.333	H1-3+VT ✔
L3	129.125 - 96.083 (3)	0.010	0.655	0.000	0.040	0.001	0.666 ✔	1.333	H1-3+VT ✔
L4	96.083 - 63.25 (4)	0.013	0.874	0.000	0.039	0.001	0.887 ✔	1.333	H1-3+VT ✔
L5	63.25 - 31.25 (5)	0.015	1.000	0.000	0.037	0.001	1.015 ✔	1.333	H1-3+VT ✔
L6	31.25 - 0 (6)	0.018	1.136	0.000	0.036	0.001	1.154 ✔	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	169 - 164.25	Pole	TP26x18x0.25	1	-0.200	1062.230	0.1	Pass
L2	164.25 - 129.125	Pole	TP34.063x21.5x0.313	2	-9.973	1663.291	30.9	Pass
L3	129.125 - 96.083	Pole	TP41.75x31.944x0.375	3	-19.159	2484.672	49.9	Pass
L4	96.083 - 63.25	Pole	TP49.063x39.78x0.375	4	-27.501	2928.414	66.6	Pass
L5	63.25 - 31.25	Pole	TP56.125x46.951x0.375	5	-36.940	3355.068	76.2	Pass
L6	31.25 - 0	Pole	TP62.938x53.846x0.375	6	-49.641	3684.958	86.6	Pass
							Summary	
						Pole (L6)	86.6	Pass
						RATING =	**86.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED-IN CONDUIT)
(1) 3/8" TO 115 FT LEVEL
(2) 5/8" TO 115 FT LEVEL
(INSTALLED-IN CONDUIT)
(1) 3/8" TO 115 FT LEVEL
(2) 5/8" TO 115 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 115 FT LEVEL
(INSTALLED)
(4) 7/8" TO 164 FT LEVEL
(INSTALLED)
(1) 7/8" TO 80 FT LEVEL
(1) 1/2" TO 121 FT LEVEL
(INSTALLED)
(1) 1/2" TO 121 FT LEVEL
CLIMBING LADDER
W/ SAFETY CLIMB
(RESERVED)
(2) 1-5/8" TO 144 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 144 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 105 FT LEVEL
(INSTALLED)
(4) 1-1/4" TO 155 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 164 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#:	*826768*
Site Name:	*PLYMOUTH-RT 6*
App #:	*320466 R0*
Pole Manufacturer:	*Pirod*

Reactions		
Moment:	4046.3795	ft-kips
Axial:	49.641	kips
Shear:	34.439635	kips

Anchor Rod Data		
Qty:	45	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	68	in

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

Anchor Rod Results

Maximum Rod Tension:	62.4 Kips	Rigid
Allowable Tension:	81.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	77.0% **Pass**	Fty*ASIF

Plate Data		
Diam:	73	in
Thick:	1.5	in
Grade:	50	ksi
Single-Rod B-eff:	4.44	in

Base Plate Results

Flexural Check	Rohn/Pirod, OK	Rigid
Base Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	50.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	Rohn/Pirod, OK	Y.L. Length: 25.75

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

n/a

Stiffener Results N/A for Rohn / Pirod

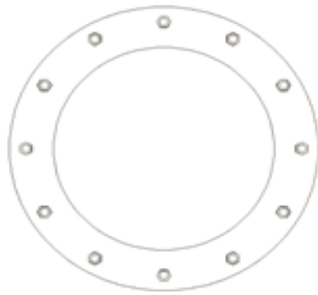
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Diam:	62.9375	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: *826768*
Site Name: *PLYMOUTH-RT 6*
App #: *320466 R0*

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	8.5	ft
Pad Thickness, T:	2.5	ft
Pad Width=Length, L:	27	ft
Pier Cross Section Shape:	Round	<--Pull Down
Enter Pier Diameter:	7.5	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	44.18	ft^2
Pier Height:	6.50	ft
Soil (above pad) Height:	6.00	ft

Soil Parameters		
Unit Weight, γ:	125.0	pcf
Ultimate Bearing Capacity, qn:	12.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	34.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	9.00	ksf
Passive Pres. Coeff., Kp	3.54	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	46.5	kips
Pad Force Location Above D:	1.18	ft
ϕ(Passive Pressure Moment):	54.78	ft-kips
Factored O.T. M(WL), "1.6W":	5881.1	ft-kips
Factored OT (MW-Msoil), M1	5826.28	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	4.05	ft
Sum of Soil Wedges Wt:	83.65	kips
Soil Wedges ecc, K1:	11.97	ft
Ftg+Soil above Pad wt:	830.1	kips
Unfactored (Total ftg-soil Wt):	913.72	kips
1.2D. **No Soil Wedges**.	1055.65	kips
0.9D. **With Soil Wedges**	867.02	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	49.641	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	34.43964	kips
Unfactored WL Moment, M:	4046.379	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	59.5692	kips
0.90	0.9D+1.6W, Pu:	44.6769	kips
1.35	Vu:	46.49351	kips
	Mu:	5462.612	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	1055.65	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	5826.28	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	5.52	ft
Orthogonal qu=	2.63	ksf
qu/ϕ*qn Ratio=	**29.25%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	3.90	ft
Diagonal qu=	2.86	ksf
qu/ϕ*qn Ratio=	**31.83%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	867.02	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	4925.29	ft-kips

Orthogonal ecc3 = M2/P2 =	5.68	ft
Ortho Non Bearing Length,NBL=	11.36	ft
Orthogonal qu=	2.19	ksf
Diagonal qu=	2.41	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	4046.38		
M Orthogonal:	8068.25	**50.15%**	**Pass**
M Diagonal:	8068.25	**50.15%**	**Pass**

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#: *826768*
Site Name: *PLYMOUTH-RT 6*
App #: *320466 R0*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	4270.237	ft-kips **(* Note)**
Max. Service Shaft P:	49.641	kips
Max Axial Force Type:	Comp.	

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

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

Load Factor	Shaft Factored Loads		
1.30	Mu:	5551.308	ft-kips
1.30	Pu:	64.5333	kips

Pier Properties		
Concrete:		
Pier Diameter =	7.5	ft
Concrete Area =	6361.7	in^2
Reinforcement:		
Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	4	
Vert. Cage Diameter =	6.82	ft
Vert. Cage Diameter =	81.87	in
Vertical Bar Size =	9	
Bar Diameter =	1.13	in
Bar Area =	1	in^2
Number of Bars =	39	
As Total=	39	in^2
A s/ Aconc, Rho:	0.0061	0.61%

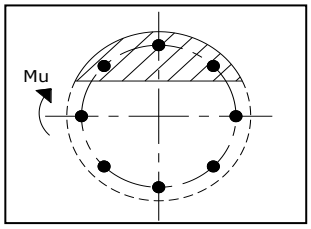
Material Properties		
Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2002	
Seismic Properties		
Seismic Design Category =	D	
Seismic Risk =	**High**	

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

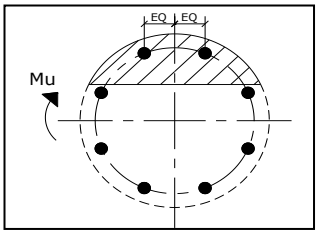
ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0032
200 / Fy: 0.0033

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis: **12.86** in
Extreme Steel Strain, ϵt: **0.0171**
ϵt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Minimum Rho Check:
Actual Req'd Min. Rho: 0.33% Flexural
Provided Rho: 0.61% **OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	12395.38	kips
at Mu=(ϕ=0.65)Mn=	8136.61	ft-kips
Max Tu, (φ=0.9) Tn =	2106	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	64.53	kips
Drilled Shaft Moment Capacity, φMn:	**6876.00**	ft-kips
Drilled Shaft Superimposed Mu:	**5551.31**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**80.7%**