Crown Castle
3530 Toringdon Way Suite 300
Charlotte NC 28277

Tel (704) 405-6600

September 23, 2014

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

RE: **T-Mobile-Exempt Modification - Crown Site BU: 826768**
T-Mobile Site ID: CT11417A
Located at: 171 Town Hill Rd, Plymouth, CT 06783

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of T-Mobile. T-Mobile is making modifications to certain existing sites in its Connecticut system in order to implement their 700MHz technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to The Honorable. David V. Merchant, Mayor for Town of Plymouth.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **171 Town Hill Road, Plymouth, CT 06783**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to T-Mobile's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the 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 tower. T-Mobile's replacement antennas will be located at the same elevation on the existing tower.

2. There will be no proposed modifications to the ground and no extension of boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for T-Mobile's modified facility is included as Exhibit-3.

5. A Structural Modification Report confirming that the tower and foundation can support T-Mobile's proposed modifications is included as Exhibit-2.

For the foregoing reasons, T-Mobile respectfully submits the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Jerry Feathers
Real Estate Specialist

Enclosure

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

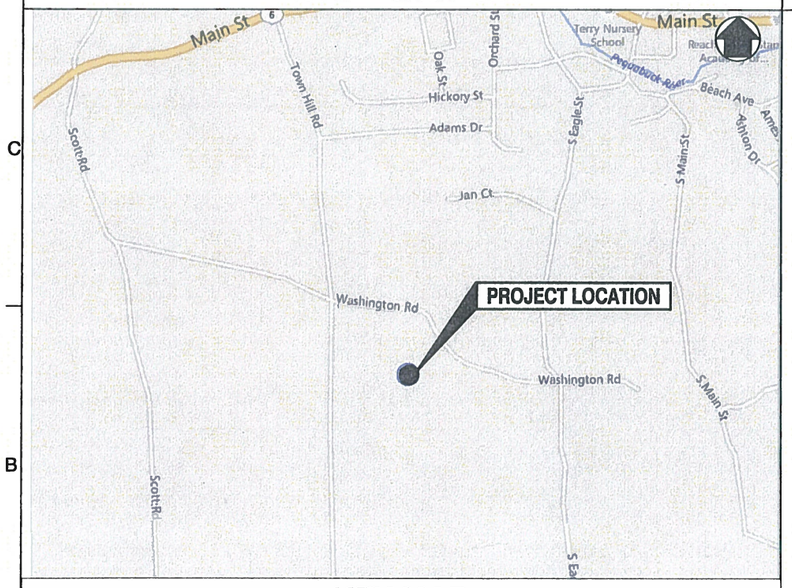
cc: The Honorable David V. Merchant, Mayor
Town of Plymouth
Town Hall, 80 Main Street
Terryville, CT 06786

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11417C
CROWN CASTLE BU #: 826768
SITE NAME: PLYMOUTH / RT6
171 TOWN HILL ROAD
PLYMOUTH, CT 06786
LITCHFIELD COUNTY

SITE CONFIGURATION: 704G

SITE INFORMATION



KEY MAP
N.T.S.

DIRECTIONS: (FROM PARSIPPANY):

START OUT GOING WEST ON SYLVAN WAY TOWARD CENTURY DR. TURN RIGHT ONTO LITTLETON RD/US-202 N. KEEP LEFT AT THE FORK TO GO ON LITTLETON RD E. MERGE ONTO I-287 N. MERGE ONTO I-87 S/I-287 E/NEW YORK TRWY S TOWARD I-87 S/TAPPAN ZEE BRG/NEW YORK CITY. TAKE THE I-87 S EXIT TOWARD SAW MILL PKWY S/NEW YORK CITY. TAKE THE NY-119/SAW MILL PKWY N EXIT 8A TOWARD ELMSFORD. MERGE ONTO SAW MILL RIVER PKWY N VIA THE RAMP ON THE LEFT TOWARD KATONAH. MERGE ONTO I-684 N VIA THE EXIT ON THE LEFT. MERGE ONTO I-84 E VIA EXIT 9E TOWARD DANBURY. MERGE ONTO CT-8 N/JAMES H DARCEY MEMORIAL HWY N VIA EXIT 20 ON THE LEFT TOWARD TORRINGTON. TAKE THE US-6 E/CT-222 EXIT 39 TOWARD THOMASTON/BRISTOL. TURN RIGHT ONTO US-6 E/E MAIN ST. TURN RIGHT ONTO TOWN HILL RD. 71 TOWN HILL RD IS ON THE LEFT.

PROJECT INFORMATION

T-MOBILE SITE #:	CT11417C
CROWN CASTLE BU #:	826768
SITE ADDRESS:	171 TOWN HILL ROAD PLYMOUTH, CT 06786 LITCHFIELD COUNTY
LATITUDE:	N 41° 40' 6.197"
LONGITUDE:	W 73° 1' 11.842"
TOWER OWNER:	CROWN CASTLE 1200 MACARTHUR BLVD., SUITE 200 MAHWAH, NJ 07430
CONTACT:	PETER TISI (201) 236-9224
APPLICANT:	T-MOBILE NORTHEAST, LLC 4 SYLVAN WAY PARSIPPANY, NJ 07054
CONTACT:	PHONE #: (973) 397-4800 FAX #: (973) 292-8893
ENGINEER:	DEWBERRY ENGINEERS INC. 600 PARSIPPANY ROAD, SUITE 301 PARSIPPANY, NJ 07054
CONTACT:	GREG NAWROTZKI (973) 576-9653
SCOPE OF WORK:	REMOVE AND REPLACE (1) EXISTING EQUIPMENT CABINET AT GRADE, ADD (3) NEW ANTENNAS, ADD (3) NEW BIAS TEES, ADD (3) NEW RRU'S AT GRADE, ADD (6) NEW COAX CABLES

SHEET INDEX

SHEET NO.	SHEET DESCRIPTION
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G-1	GENERAL NOTES
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C-2	ANTENNA LAYOUTS & ELEVATIONS
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E-1	GROUNDING NOTES & DETAILS

APPROVALS

T-MOBILE — DATE

OWNER/ LANDLORD — DATE

RF ENGINEER — DATE

ZONING — DATE

CONSTRUCTION — DATE

Dewberry®
Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054
PHONE: (973) 397-4800
FAX: (973) 292-8893

PLYMOUTH / RT6

CT11417C

171 TOWN HILL ROAD
PLYMOUTH, CT 06786
LITCHFIELD COUNTY

SEAL

STATE OF CONNECTICUT — JIANG YU — No. 29922 — REGISTERED PROFESSIONAL ENGINEER

SCALE
AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	09/12/14	HMP	ISSUED AS FINAL
A	09/05/14	HMP	ISSUED FOR REVIEW

REVISIONS

DRAWN BY HMP
CHECKED BY BSH
APPROVED BY GHN
DATE 09/05/14
TITLE

TITLE SHEET

PROJECT NO. 50066258/50068456

T-1

SHEET NO.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   PROJECT MANAGEMENT – CROWN CASTLE
   CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T–MOBILE
   OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF PROJECT MANAGEMENT.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
5. DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
9. CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. CONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. CONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH PROJECT MANAGEMENT.
10. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
14. CONTRACTOR SHALL NOTIFY DEWBERRY 48 HOURS IN ADVANCE OF POURING CONCRETE, OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS & POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEER REVIEW.
15. CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. CONTRACTOR SHALL NOTIFY PROJECT MANAGEMENT OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
16. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY CONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
17. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

1. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO:
   A) FALL PROTECTION
   B) CONFINED SPACE
   C) ELECTRICAL SAFETY
   D) TRENCHING & EXCAVATION.
3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
6. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T–MOBILE SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTION NOTES.
11. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
12. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
3. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
4. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
5. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
6. CABLES SHALL NOT BE ROUTED THROUGH LADDER–STYLE CABLE TRAY RUNGS.
7. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA, AND MATCH EXISTING INSTALLATION REQUIREMENTS.
8. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).
9. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
10. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
11. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
12. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL.) PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC & OSHA AND MATCH EXISTING INSTALLATION REQUIREMENTS.
13. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
14. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
15. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
16. ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).
17. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
18. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
19. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
20. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
21. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
22. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
23. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
24. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
25. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
26. CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
27. WIREWAYS SHALL BE EPOXY–COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
28. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
29. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED, OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
30. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
31. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
32. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE (UNO). SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
   FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
8. AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM–A–36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".
2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
3. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"Ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
4. NON–STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
5. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
6. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
7. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
   CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T–MOBILE ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
2. COORDINATION OF WORK:
   CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
3. CABLE LADDER RACK:
   CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.
4. GROUNDING OF ALL EQUIPMENT AND ANTENNAS IS NOT CONSIDERED PART OF THE SCOPE OF THIS PROJECT AND IS THE RESPONSIBILITY OF THE OWNER AND CONTRACTOR AT THE TIME OF CONSTRUCTION. ALL EQUIPMENT AND ANTENNAS TO BE INSTALLED AND GROUNDED IN ACCORDANCE WITH GOVERNING BUILDING CODE, MANUFACTURER RECOMMENDATIONS AND OWNER SPECIFICATIONS.

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CT11417C

171 TOWN HILL ROAD
PLYMOUTH, CT 06786
LITCHFIELD COUNTY

SEAL

SCALE

AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	09/12/14	HMP	ISSUED AS FINAL
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REVISIONS

DRAWN BY HMP
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APPROVED BY GHN
DATE 09/05/14

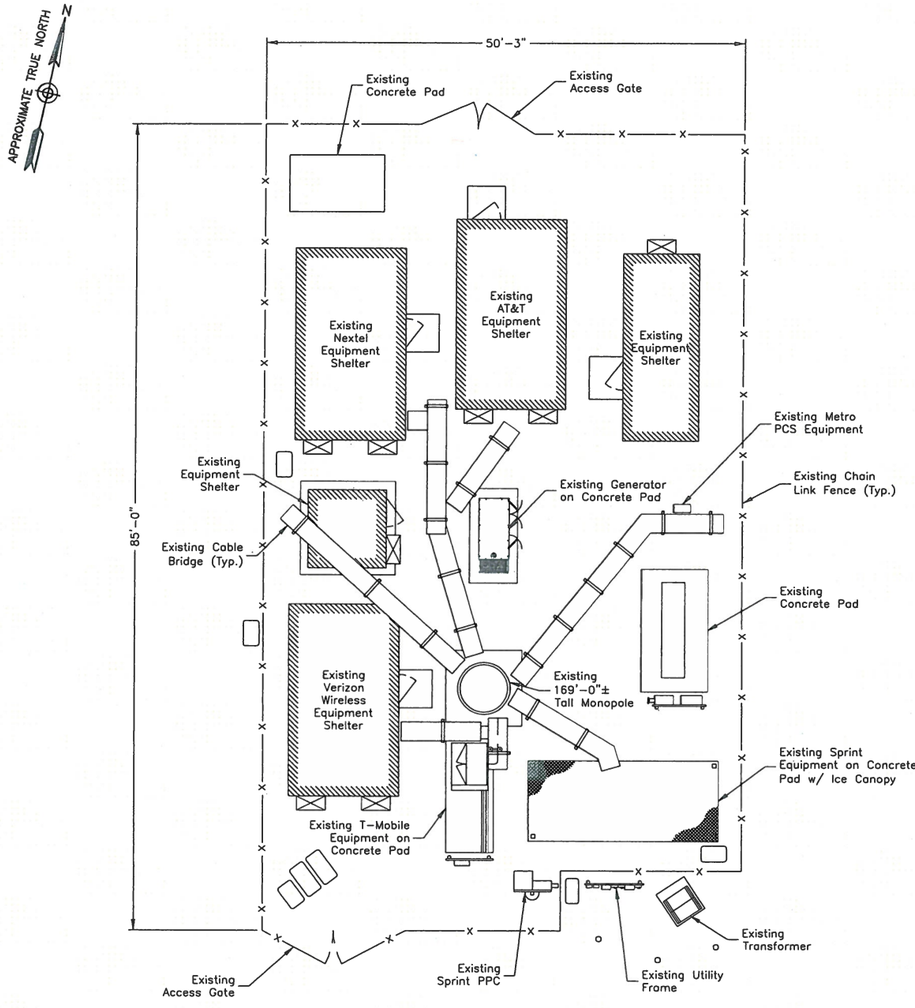
TITLE

GENERAL NOTES

PROJECT NO. 50066258/50068456

G - 1

SHEET NO.

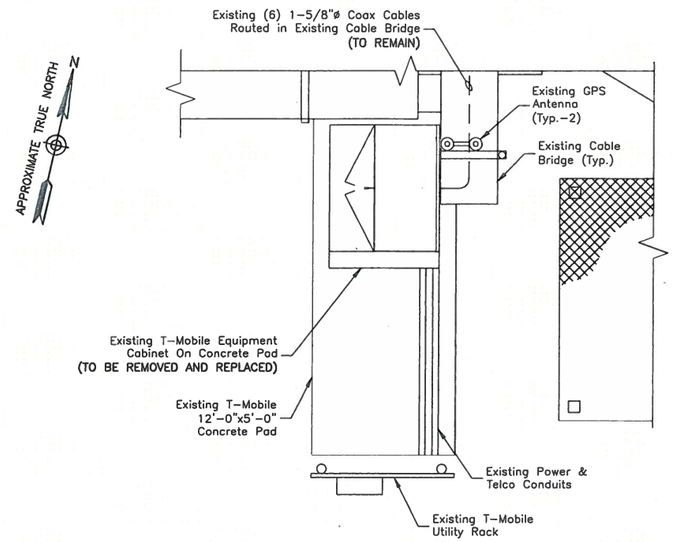


COMPOUND PLAN

SCALE: 1/16"=1' FOR 11"x17"
1/8"=1' FOR 22"x34"

0' 4' 8' 16'

(1)

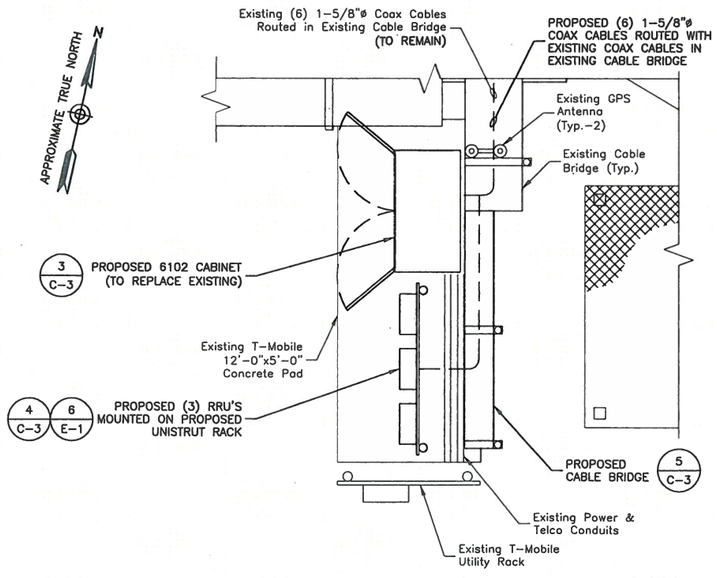


EXISTING EQUIPMENT PLAN

SCALE: 3/16"=1' FOR 11"x17"
3/8"=1' FOR 22"x34"

0' 2' 4' 6'

(2)



PROPOSED EQUIPMENT PLAN

SCALE: 3/16"=1' FOR 11"x17"
3/8"=1' FOR 22"x34"

0' 2' 4' 6'

(3)

NOTES:

1. NORTH SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. MOUNT ALL ANTENNAS, BIAS TEES, COAX, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS TO BE COMPLETED BY OTHERS.

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LITCHFIELD COUNTY

SEAL

STATE OF CONNECTICUT
JIANG YU
No. 23222
PROFESSIONAL ENGINEER
JIANG YU, P.E.
CONNECTICUT LICENSE NO. 23222

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AS SHOWN

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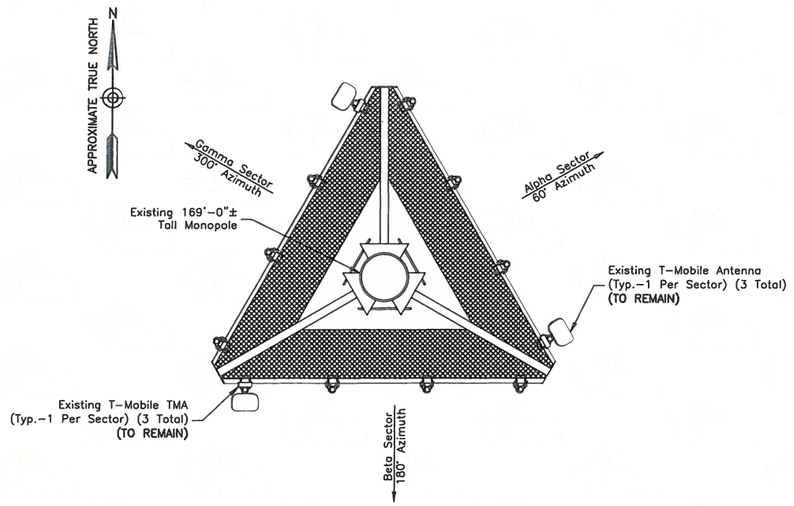
COMPOUND PLAN & EQUIPMENT PLANS

PROJECT NO. 50066258/50068456

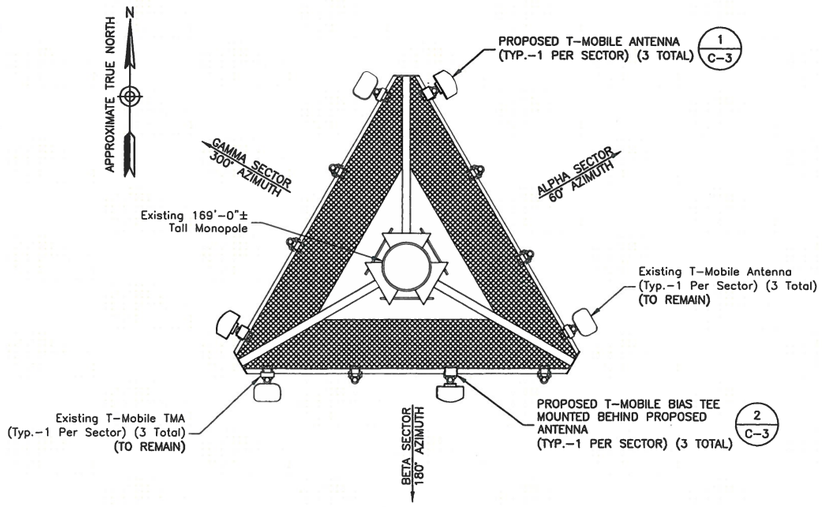
C - 1

SHEET NO.



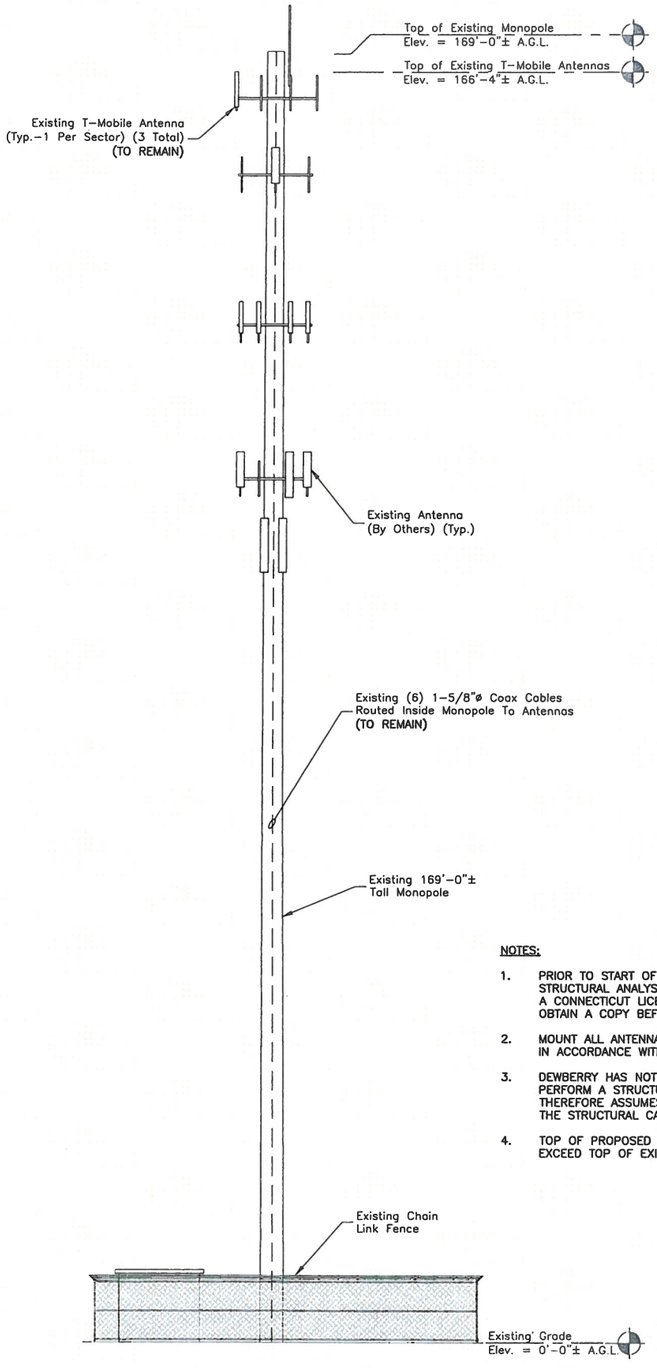
EXISTING ANTENNA LAYOUT (1)

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT (2)

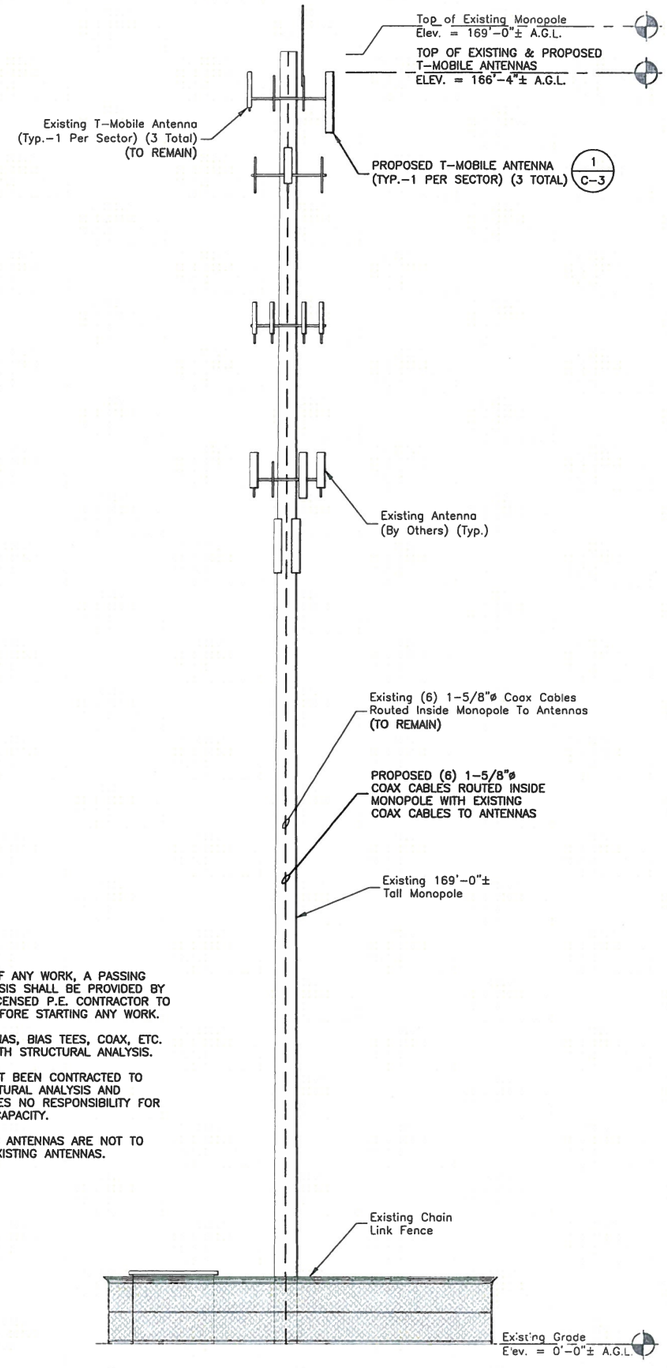
SCALE: N.T.S.



EXISTING ELEVATION (3)

SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"

0' 10' 20'



PROPOSED ELEVATION (4)

SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"

0' 10' 20'

NOTES:

1. PRIOR TO START OF ANY WORK, A PASSING STRUCTURAL ANALYSIS SHALL BE PROVIDED BY A CONNECTICUT LICENSED P.E. CONTRACTOR TO OBTAIN A COPY BEFORE STARTING ANY WORK.
2. MOUNT ALL ANTENNAS, BIAS TEES, COAX, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS.
3. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.
4. TOP OF PROPOSED ANTENNAS ARE NOT TO EXCEED TOP OF EXISTING ANTENNAS.

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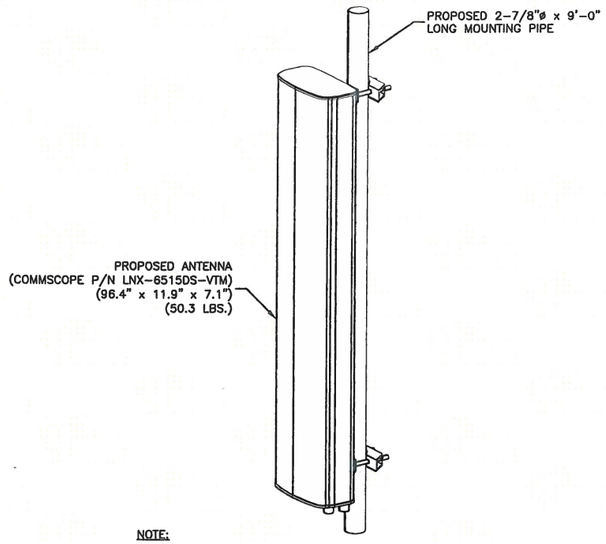
TITLE

ANTENNA LAYOUTS & ELEVATIONS

PROJECT NO. 50066258/50068456

C - 2

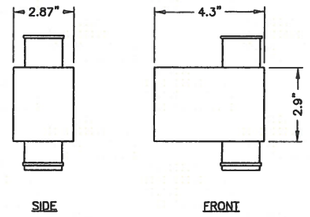
SHEET NO.



NOTE:

1. MOUNT ANTENNAS PER MANUFACTURER'S RECOMMENDATIONS.
2. GROUND ANTENNAS AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED ANTENNAS WITH THE LATEST RFDS.

ISOMETRIC ANTENNA DETAIL (1)
SCALE: N.T.S.

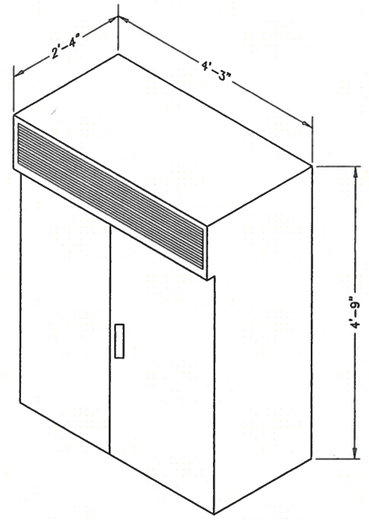


COMMSCOPE ATBT-BOTTOM-24V

NOTE:

1. MOUNT EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS.
2. GROUND EQUIPMENT AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED EQUIPMENT WITH THE LATEST RFDS.

BIAS TEE DETAIL (2)
SCALE: N.T.S.

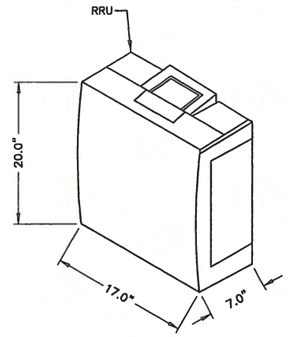


ISOMETRIC

NOTE:

1. CONTRACTOR SHALL SECURE CABINET AS PER MANUFACTURER RECOMENDATIONS.

ERICSSON RBS 6102 CABINET (3)
SCALE: N.T.S.



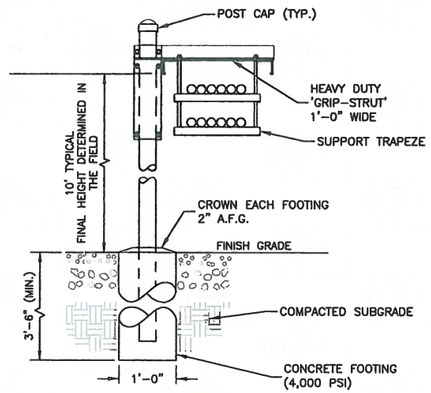
SPECIFICATIONS:	
HEIGHT:	20.0"
WIDTH:	17.0"
DEPTH:	7.0"
WEIGHT:	50.7 LBS

ERICSSON RRUS-11 B12

RRU NOTES:

1. MOUNT EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS.
2. GROUND EQUIPMENT AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED EQUIPMENT WITH THE LATEST RFDS.

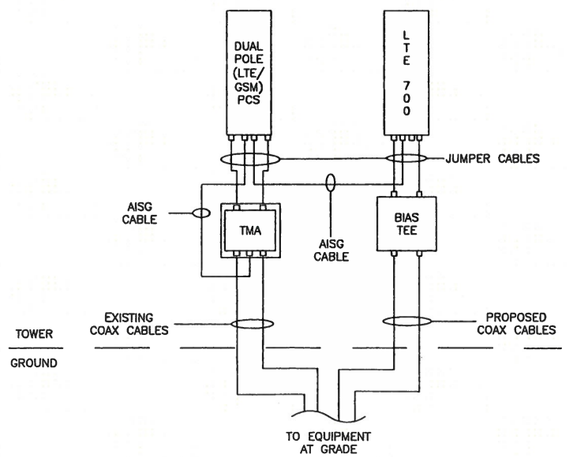
RRUS-11 - REMOTE RADIO UNIT (4)
SCALE: N.T.S.



NOTES:

1. CABLE BRIDGE SHALL BE SITE PRO 1 12" GRIP-SPAN ICE BRIDGE KITS WITH Z-BRACKET TRAPEZE (P/N: IB12D-216Z) OR APPROVED EQUAL.
2. ALL COMPONENTS SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
3. CONTRACTOR SHALL DETERMINE REQUIRED QUANTITY OF ALL CABLE BRIDGE COMPONENTS.
4. SNAP-IN HANGERS, SPLICE KITS, HINGE KITS, EXTENSION KITS, STIFFENERS, AND OTHER MISCELLANEOUS HARDWARE SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED.
5. CABLE BRIDGE SHALL BE ROUTED TO ACCOMMODATE THE MINIMUM BENDING RADIUS OF THE COAXIAL CABLE.
6. CABLE BRIDGE COMPONENTS SHOWN ARE SCHEMATIC, CONSULT MANUFACTURER FOR EXACT AND CURRENT SPECIFICATIONS.

CABLE BRIDGE DETAIL (5)
SCALE: N.T.S.



SITE CONFIGURATION 700MHZ (6)
SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX LENGTH
	EXISTING	PROPOSED	EXISTING	PROPOSED	
ALPHA	—	COMMSCOPE LNX-6515DS-VTM	(2) 1-5/8"	(4) 1-5/8"	214'
	EMS RR90-17-02DP	EXISTING TO REMAIN			
BETA	—	COMMSCOPE LNX-6515DS-VTM	(2) 1-5/8"	(4) 1-5/8"	214'
	EMS RR90-17-02DP	EXISTING TO REMAIN			
GAMMA	—	COMMSCOPE LNX-6515DS-VTM	(2) 1-5/8"	(4) 1-5/8"	214'
	EMS RR90-17-02DP	EXISTING TO REMAIN			

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LITCHFIELD COUNTY

SEAL

STATE OF CONNECTICUT
JIANG YU
No. 23222
PROFESSIONAL ENGINEER
JIANG YU, P.E.
CONNECTICUT LICENSE NO. 023222
APPROVAL PENDING

SCALE
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TITLE

CONSTRUCTION DETAILS

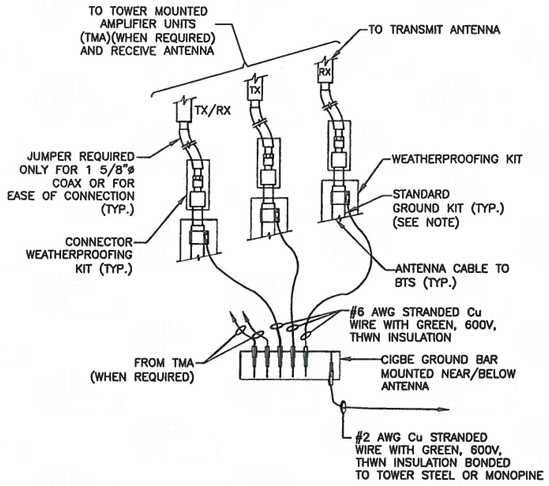
PROJECT NO. 50066258/50068456

C - 3

SHEET NO.

GROUNDING NOTES:

1. THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ). THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE CONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE ENGINEER FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS. ALL AVAILABLE GROUNDING ELECTRODES SHALL BE CONNECTED TOGETHER IN ACCORDANCE WITH THE NEC.
3. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. USE OF OTHER METHODS MUST BE PRE-APPROVED BY THE ENGINEER IN WRITING.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS ON TOWER SITES AND 10 OHMS OR LESS ON ROOFTOP SITES. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.
5. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
6. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
7. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO TRANSMISSION EQUIPMENT.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.
11. EACH INTERIOR TRANSMISSION CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH 6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRE UNLESS NOTED OTHERWISE IN THE DETAILS. EACH OUTDOOR CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER WIRE UNLESS NOTED OTHERWISE IN THE DETAILS.
12. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
13. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM T-MOBILE MARKET REPRESENTATIVE.
14. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.
15. ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.
16. ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTORS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP TRANSMISSION EQUIPMENT AND STRUCTURAL STEEL.
17. COAX BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO-HOLE MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.
18. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
19. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
20. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
21. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
22. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.

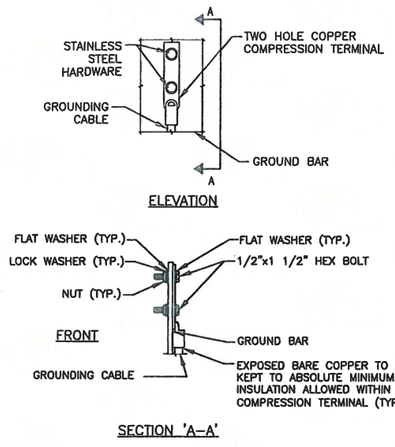


NOTE:

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

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE) 1

SCALE: N.T.S.

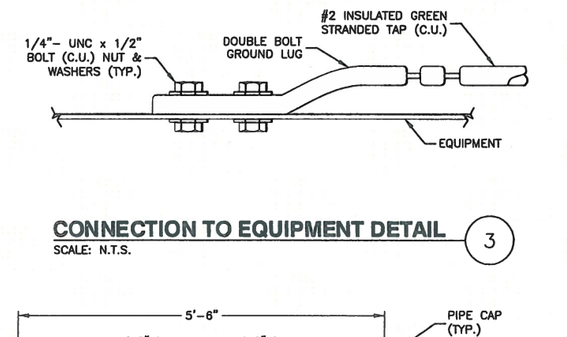


NOTES:

1. DOUBLING UP OR STACKING OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

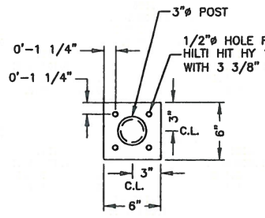
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL 2

SCALE: N.T.S.

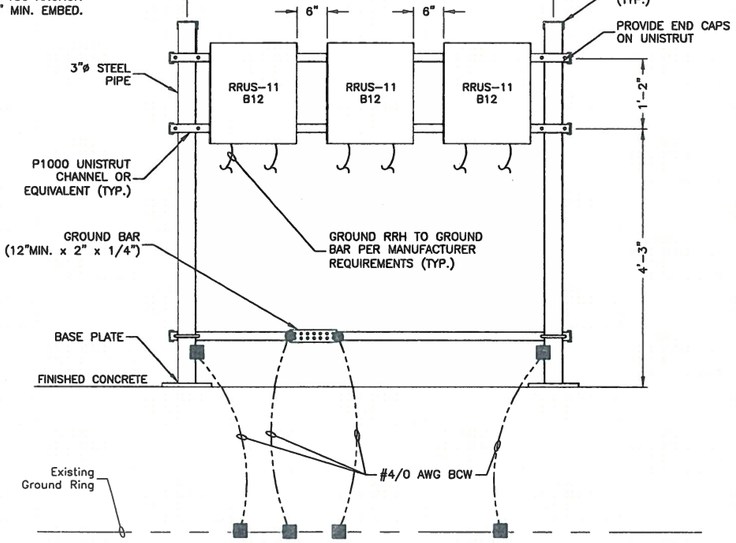


CONNECTION TO EQUIPMENT DETAIL 3

SCALE: N.T.S.



BASE PLATE

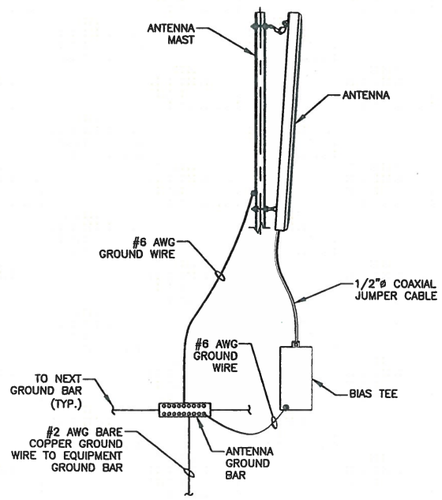


NOTES:

1. CONTRACTOR SHALL SUPPLY AND INSTALL UNISTRUT (OR EQUIVALENT) MOUNTING CHANNELS.
2. CONTRACTOR SHALL SUPPLY (BUT NOT INSTALL) 3/8"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS. TYPICAL FOUR PER RRU. CONTRACTOR SHALL BAG THE BOLTING HARDWARE AND HANG FROM INSTALLED UNISTRUT FRAME.
3. SPACING MAY VARY BASED ON SELECTED EQUIPMENT. ADJUSTMENTS TO SPACING WILL BE MADE BY RRU INSTALLER.
4. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

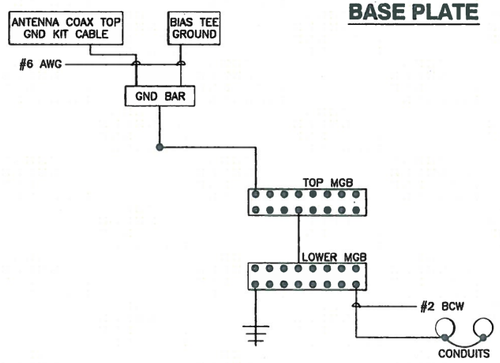
RRU RACK DETAIL 6

SCALE: N.T.S



TYPICAL ANTENNA GROUNDING DETAIL 4

SCALE: N.T.S



NOTES:

1. BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.
3. SCHEMATIC GROUNDING DIAGRAM IS TYPICAL FOR EACH SECTOR.

SCHEMATIC GROUNDING DIAGRAM 5

SCALE: N.T.S.

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PLYMOUTH / RT6

CT11417C

171 TOWN HILL ROAD
PLYMOUTH, CT 06786
LITCHFIELD COUNTY

SEAL

SCALE

AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	09/12/14	HMP	ISSUED AS FINAL
A	09/05/14	HMP	ISSUED FOR REVIEW

REVISIONS

DRAWN BY HMP
CHECKED BY BSH
APPROVED BY GHN
DATE 09/05/14

TITLE

GROUNDING NOTES & DETAILS

PROJECT NO. 50066258/50068456

E - 1

SHEET NO.

Date: **September 04, 2014**

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

Aero Solutions LLC
5500 Flatiron Parkway, Suite 100
Boulder, CO 80301
(720) 304-6882

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11417C
	Carrier Site Name:	Plymouth/RT6
Crown Castle Designation:	**Crown Castle BU Number:**	826768
	Crown Castle Site Name:	PLYMOUTH/RT 6
	Crown Castle JDE Job Number:	304493
	Crown Castle Work Order Number:	919545
	Crown Castle Application Number:	263039 Rev. 0
Engineering Firm Designation:	**Aero Solutions LLC Project Number:**	003-14-0915
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 Charles Trask,

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 686316, in accordance with application 263039, 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: Sina Erturk

Respectfully submitted by:

Shraddha Dharia, P.E.
Structural Engineer
CT PE#: PEN0028187
Expires: 01/31/2015

9.4.2014

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
164.0	164.0	3	commscope	ATBT-BOTTOM-24V	6	1-5/8"	
		3	commscope	LNX-6515DS-VTM w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
164.0	169.0	1	decibel	ASP-952			3
		1	rfs celwave	PD220			
		1	rfs celwave	PD455-6			
		1	sinclair	SRL-229			
	165.0	3	rfs celwave	ATMAA1412D-1A20	6	1-5/8"	1
	164.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 403-1]			
155.0	155.0	3	alcatel lucent	1900MHz RRH	3	1-1/4"	1
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	TD-RRH8x20-25	1	1-1/4"	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
148.0	150.0	1	miscl	6' Generic Dipole Antena			1
	148.0	1	tower mounts	Side Arm Mount [SO 311-1]			
144.0	144.0	3	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	12	1-5/8"	1
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 403-1]			
127.0	130.0	12	decibel	DB846G90A-XY w/ Mount Pipe	12	1-5/8"	1
	127.0	1	tower mounts	Platform Mount [LP 303-1]			
121.0	125.0	1	rfs celwave	201-4	1	1/2"	1
	121.0	1	tower mounts	Side Arm Mount [SO 701-1]			
115.0	117.0	6	ericsson	RRUS 11	1 2 12	3/8" 3/4" 1-5/8"	1
		6	kathrein	AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		12	powerwave technologies	LGP2140X			
		1	raycap	DC6-48-60-18-8F			
	115.0	1	tower mounts	Platform Mount [LP 304-1]			
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
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C.	3491991	CCISITES
4-TOWER FOUNDATION	PiRod, Inc.	3678682	CCISITES

Document	Remarks	Reference	Source
DRAWINGS/DESIGN/SPECS			
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	-0.201	1062.230	0.1	Pass
L2	164.25 - 129.125	Pole	TP34.063x21.5x0.313	2	-9.353	1663.291	26.7	Pass
L3	129.125 - 96.083	Pole	TP41.75x31.944x0.375	3	-19.974	2484.672	49.9	Pass
L4	96.083 - 63.25	Pole	TP49.063x39.78x0.375	4	-28.358	2928.414	68.7	Pass
L5	63.25 - 31.25	Pole	TP56.125x46.951x0.375	5	-37.853	3355.068	79.5	Pass
L6	31.25 - 0	Pole	TP62.938x53.846x0.375	6	-50.638	3684.958	91.0	Pass
							Summary	
						Pole (L6)	91.0	Pass
						Rating =	91.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	81.1	Pass
1	Base Plate	0	91.0	Pass
1	Base Foundation	0	85.0	Pass
1	Base Foundation Soil Interaction	0	52.8	Pass

Structure Rating (max from all components) =	91%

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

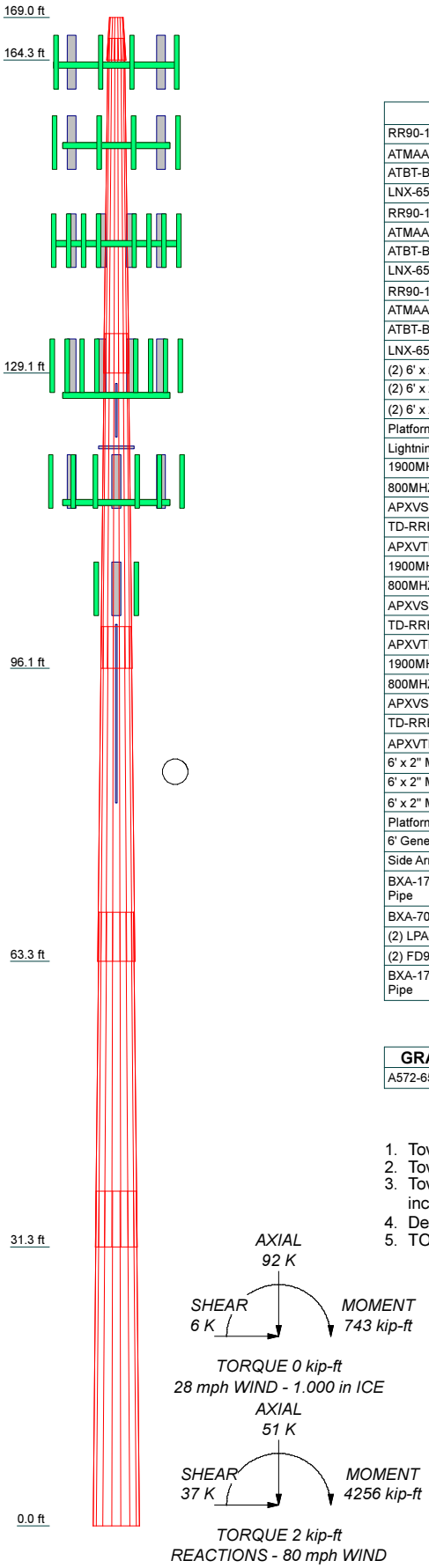
4.1) Recommendations

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		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
							A572-65	32.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
RR90-17-02DP w/ Mount Pipe	164	BXA-70063/6CF w/ Mount Pipe	144
ATMAA1412D-1A20	164	(2) LPA-80080/6CF w/ Mount Pipe	144
ATBT-BOTTOM-24V	164	(2) FD9R6004/2C-3L	144
LNX-6515DS-VTM w/ Mount Pipe	164	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	144
RR90-17-02DP w/ Mount Pipe	164	BXA-70063/6CF w/ Mount Pipe	144
ATMAA1412D-1A20	164	(2) LPA-80080/6CF w/ Mount Pipe	144
ATBT-BOTTOM-24V	164	(2) FD9R6004/2C-3L	144
LNX-6515DS-VTM w/ Mount Pipe	164	Platform Mount [LP 403-1]	144
RR90-17-02DP w/ Mount Pipe	164	(4) DB846G90A-XY w/ Mount Pipe	127
ATMAA1412D-1A20	164	(4) DB846G90A-XY w/ Mount Pipe	127
ATBT-BOTTOM-24V	164	(4) DB846G90A-XY w/ Mount Pipe	127
LNX-6515DS-VTM w/ Mount Pipe	164	Platform Mount [LP 303-1]	127
(2) 6' x 2" Mount Pipe	164	201-4	121
(2) 6' x 2" Mount Pipe	164	Side Arm Mount [SO 701-1]	121
(2) 6' x 2" Mount Pipe	164	(2) RRUS 11	115
Platform Mount [LP 403-1]	164	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
Lightning Rod 1/2"x4' on 15' Pole	162	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
1900MHz RRH	155	(2) LGP2140X	115
800MHZ RRH	155	(2) RRUS 11	115
APXVSPP18-C-A20 w/ Mount Pipe	155	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
TD-RRH8x20-25	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
APXVTM14-C-120 w/ Mount Pipe	155	(4) LGP2140X	115
1900MHz RRH	155	(2) RRUS 11	115
800MHZ RRH	155	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
APXVSPP18-C-A20 w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
TD-RRH8x20-25	155	(6) LGP2140X	115
APXVTM14-C-120 w/ Mount Pipe	155	DC6-48-60-18-8F	115
6' x 2" Mount Pipe	155	6' x 2" Mount Pipe	115
6' x 2" Mount Pipe	155	6' x 2" Mount Pipe	115
6' x 2" Mount Pipe	155	6' x 2" Mount Pipe	115
Platform Mount [LP 303-1]	155	Platform Mount [LP 304-1]	115
6' Generic Dipole Antena	148	APXV18-206517S-C w/ Mount Pipe	105
Side Arm Mount [SO 311-1]	148	APXV18-206517S-C w/ Mount Pipe	105
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	144	APXV18-206517S-C w/ Mount Pipe	105
BXA-70063/6CF w/ Mount Pipe	144	PD455-6	80
(2) LPA-80080/6CF w/ Mount Pipe	144	6' x 2" Mount Pipe	80
(2) FD9R6004/2C-3L	144	Side Arm Mount [SO 701-1]	80
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	144		

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: 91%

Aero Solutions LLC
5500 Flatiron Parkway, Suite 100
Boulder, CO 80301
Phone: (720) 304-6882
FAX: (720) 304-6883

Job:	***BU# 826768 PLYMOUTH-RT 6***		
Project:	***Existing 169 Ft. Monopole***		
Client: Crown Castle		Drawn by: Serturk	App'd:
Code: TIA/EIA-222-F		Date: 09/04/14	Scale: NTS
Path: P:\004_CCI_SITES\826768 PLYMOUTH-RT 6\003-14-0915\Engineering\Aero Calculations (LC7)\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 Round Or Flat

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

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
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
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
***								
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

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
***								
LDF7-50A(1-5/8")	A	No	Inside Pole	144.000 - 0.000	12	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	CaAa (Out Of Face)	127.000 - 0.000	2	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	127.000 - 0.000	10	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
***								
LDF4-50A(1/2")	A	No	Inside Pole	121.000 - 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
***								
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-L98-002-XXX(3/8)	A	No	CaAa (Out Of Face)	115.000 - 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	0.006
						4" Ice	0.000	0.022
WR-VG86T(3/4)	A	No	CaAa (Out Of Face)	115.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.007
						4" Ice	0.000	0.024
2" Flex Conduit	A	No	CaAa (Out Of Face)	115.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.030
***								
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	105.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	105.000 - 0.000	5	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
***								
LDF5-50A(7/8")	A	No	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.008
						4" Ice	0.000	0.025
***								

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	0.146
		B	0.000	0.000	0.000	0.000	0.132
		C	0.000	0.000	0.000	0.000	0.318
L3	129.125-96.083	A	0.000	0.000	0.000	1.766	0.586
		B	0.000	0.000	0.000	0.000	0.169
		C	0.000	0.000	0.000	12.243	0.606
L4	96.083-63.250	A	0.000	0.000	0.000	6.501	0.865
		B	0.000	0.000	0.000	0.000	0.168
		C	0.000	0.000	0.000	13.002	0.623
L5	63.250-31.250	A	0.000	0.000	0.000	6.336	0.849
		B	0.000	0.000	0.000	0.000	0.164
		C	0.000	0.000	0.000	12.672	0.607
L6	31.250-0.000	A	0.000	0.000	0.000	6.187	0.829
		B	0.000	0.000	0.000	0.000	0.160
		C	0.000	0.000	0.000	12.375	0.592

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	0.146
		B		0.000	0.000	0.000	0.000	0.132
		C		0.000	0.000	0.000	0.000	0.318
L3	129.125-96.083	A	1.158	0.000	0.000	0.000	3.897	2.195
		B		0.000	0.000	0.000	0.000	0.169
		C		0.000	0.000	0.000	27.021	2.396
L4	96.083-63.250	A	1.111	0.000	0.000	0.000	14.106	4.060
		B		0.000	0.000	0.000	0.000	0.168
		C		0.000	0.000	0.000	28.212	2.436
L5	63.250-31.250	A	1.044	0.000	0.000	0.000	13.447	3.813
		B		0.000	0.000	0.000	0.000	0.164
		C		0.000	0.000	0.000	26.895	2.264
L6	31.250-0.000	A	1.000	0.000	0.000	0.000	12.713	3.443
		B		0.000	0.000	0.000	0.000	0.160
		C		0.000	0.000	0.000	25.425	2.058

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	-0.427	0.170	-0.785	0.312
L4	96.083-63.250	-0.444	0.000	-0.800	0.000
L5	63.250-31.250	-0.453	0.000	-0.819	0.000
L6	31.250-0.000	-0.459	0.000	-0.824	0.000

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 1.000	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
ATBT-BOTTOM-24V	A	From Leg	4.000 0.000 0.000	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 0.000	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 1.000	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
ATBT-BOTTOM-24V	B	From Leg	4.000 0.000 0.000	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	B	From Leg	4.000 0.000 0.000	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	60.000	164.000	No Ice	1.167	0.467	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
			0.000			1/2"	1.314	0.575	0.021
			1.000			Ice	1.469	0.691	0.030
						1" Ice	1.806	0.951	0.056
						2" Ice	2.584	1.573	0.137
						4" Ice			
ATBT-BOTTOM-24V	C	From Leg	4.000	60.000	164.000	No Ice	0.121	0.075	0.003
			0.000			1/2"	0.172	0.119	0.004
			0.000			Ice	0.232	0.172	0.006
						1" Ice	0.377	0.303	0.013
						2" Ice	0.771	0.668	0.045
						4" Ice			
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.000	60.000	164.000	No Ice	11.683	9.842	0.083
			0.000			1/2"	12.404	11.366	0.173
			0.000			Ice	13.135	12.914	0.273
						1" Ice	14.601	15.267	0.506
						2" Ice	17.875	20.139	1.151
						4" Ice			
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	164.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			1.000			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	164.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			1.000			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	164.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			1.000			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
Platform Mount [LP 403-1]	C	None		0.000	164.000	No Ice	18.850	18.850	1.500
						1/2"	24.300	24.300	1.797
						Ice	29.750	29.750	2.093
						1" Ice	40.650	40.650	2.686
						2" Ice	62.450	62.450	3.872
						4" Ice			
***									
1900MHz RRH	A	From Leg	4.000	0.000	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	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

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			
APXVTM14-C-120 w/ 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	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
1900MHz RRH	B	From Leg	4.000 0.000 0.000	-30.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.907 3.145 3.391 3.909 5.050	3.801 4.065 4.337 4.908 6.152	0.044 0.075 0.110 0.192 0.407
800MHZ RRH	B	From Leg	4.000 0.000 0.000	-30.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	-30.000	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	B	From Leg	4.000 0.000 0.000	-30.000	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	B	From Leg	4.000 0.000 0.000	-30.000	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 0.131 0.193 0.338 0.752
1900MHz RRH	C	From Leg	4.000 0.000 0.000	-15.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.907 3.145 3.391 3.909 5.050	3.801 4.065 4.337 4.908 6.152	0.044 0.075 0.110 0.192 0.407
800MHZ RRH	C	From Leg	4.000 0.000 0.000	-15.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
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	7.134 7.662 8.183 9.256	4.959 5.754 6.472 8.010	0.077 0.131 0.193 0.338

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	11.526	11.412	0.752
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
***									
6' Generic Dipole Antena	A	From Leg	3.000 0.000 2.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.950 3.381 3.819 4.719 6.606	2.000 2.691 3.225 4.114 5.979	0.025 0.039 0.059 0.114 0.296
Side Arm Mount [SO 311-1]	A	None		0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.970 4.390 5.810 8.650 14.330	3.510 5.330 7.150 10.790 18.070	0.062 0.094 0.127 0.191 0.321
***									
BXA-171085-8BF-EDIN-0 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	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-70063/6CF 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	7.979 8.621 9.228 10.473 13.082	5.407 6.558 7.422 9.198 12.952	0.042 0.101 0.168 0.328 0.788
(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
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
BXA-171085-8BF-EDIN-0	B	From Leg	4.000	20.000	144.000	No Ice	3.179	3.353	0.029

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
w/ Mount Pipe			0.000 0.000			1/2" Ice 1" Ice 2" Ice 4" Ice	3.555 3.964 4.853 6.767	3.971 4.595 5.893 8.885	0.061 0.099 0.193 0.488
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.979 8.621 9.228 10.473 13.082	5.407 6.558 7.422 9.198 12.952	0.042 0.101 0.168 0.328 0.788
(2) LPA-80080/6CF w/ Mount Pipe	B	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
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
BXA-171085-8BF-EDIN-0 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	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-70063/6CF 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	7.979 8.621 9.228 10.473 13.082	5.407 6.558 7.422 9.198 12.952	0.042 0.101 0.168 0.328 0.788
(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
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 0.000	20.000	144.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
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
***									
(4) DB846G90A-XY w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.229 5.783 6.303 7.365 9.694	7.529 8.715 9.615 11.449 15.603	0.041 0.098 0.162 0.318 0.770
(4) DB846G90A-XY w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.229 5.783 6.303 7.365 9.694	7.529 8.715 9.615 11.449 15.603	0.041 0.098 0.162 0.318 0.770

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			
(4) DB846G90A-XY w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.229 5.783 6.303 7.365 9.694	7.529 8.715 9.615 11.449 15.603	0.041 0.098 0.162 0.318 0.770
Platform Mount [LP 303-1]	C	None		0.000	127.000	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
***									
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 2.000	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
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.846 8.452 9.088 10.376 13.072	6.650 7.873 8.844 10.726 14.690	0.086 0.150 0.222 0.393 0.883
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	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
(2) LGP2140X	A	From Leg	4.000 0.000 2.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.260 1.416 1.581 1.936 2.750	0.378 0.493 0.617 0.890 1.541	0.014 0.021 0.030 0.055 0.135
(2) RRUS 11	B	From Leg	4.000 0.000 2.000	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
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	23.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.846 8.452 9.088 10.376 13.072	6.650 7.873 8.844 10.726 14.690	0.086 0.150 0.222 0.393 0.883
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0.000	23.000	115.000	No Ice 1/2"	8.498 9.149	6.304 7.479	0.074 0.139

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*
			2.000			Ice	9.767	8.368	0.212
						1" Ice	11.031	10.179	0.385
						2" Ice	13.679	14.024	0.874
						4" Ice			
(4) LGP2140X	B	From Leg	4.000	23.000	115.000	No Ice	1.260	0.378	0.014
			0.000			1/2"	1.416	0.493	0.021
			2.000			Ice	1.581	0.617	0.030
						1" Ice	1.936	0.890	0.055
						2" Ice	2.750	1.541	0.135
						4" Ice			
(2) RRUS 11	C	From Leg	4.000	23.000	115.000	No Ice	3.249	1.373	0.051
			0.000			1/2"	3.491	1.551	0.071
			2.000			Ice	3.741	1.738	0.095
						1" Ice	4.268	2.138	0.153
						2" Ice	5.426	3.042	0.313
						4" Ice			
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	C	From Leg	4.000	23.000	115.000	No Ice	7.846	6.650	0.086
			0.000			1/2"	8.452	7.873	0.150
			2.000			Ice	9.088	8.844	0.222
						1" Ice	10.376	10.726	0.393
						2" Ice	13.072	14.690	0.883
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.000	23.000	115.000	No Ice	8.498	6.304	0.074
			0.000			1/2"	9.149	7.479	0.139
			2.000			Ice	9.767	8.368	0.212
						1" Ice	11.031	10.179	0.385
						2" Ice	13.679	14.024	0.874
						4" Ice			
(6) LGP2140X	C	From Leg	4.000	23.000	115.000	No Ice	1.260	0.378	0.014
			0.000			1/2"	1.416	0.493	0.021
			2.000			Ice	1.581	0.617	0.030
						1" Ice	1.936	0.890	0.055
						2" Ice	2.750	1.541	0.135
						4" Ice			
DC6-48-60-18-8F	C	From Leg	4.000	23.000	115.000	No Ice	2.567	2.567	0.019
			0.000			1/2"	2.798	2.798	0.041
			2.000			Ice	3.038	3.038	0.067
						1" Ice	3.543	3.543	0.129
						2" Ice	4.658	4.658	0.299
						4" Ice			
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	115.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			2.000			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	115.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			2.000			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	115.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			2.000			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
Platform Mount [LP 304-1]	C	None		0.000	115.000	No Ice	17.460	17.460	1.349
						1/2"	22.440	22.440	1.625
						Ice	27.420	27.420	1.900
						1" Ice	37.380	37.380	2.451
						2" Ice	57.300	57.300	3.554
						4" Ice			

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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
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 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
***									
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

Comb. No.	Description
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	169 - 164.25	Pole	Max Tension	11	0.000	-0.000	-0.000
			Max. Compression	14	-0.336	0.000	0.000
			Max. Mx	11	-0.201	0.333	-0.000
			Max. My	2	-0.201	-0.000	0.333
			Max. Vy	11	-0.180	0.333	-0.000
			Max. Vx	2	-0.180	-0.000	0.333
			Max. Torque	5			-0.000
L2	164.25 - 129.125	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-19.062	0.087	0.811
			Max. Mx	11	-9.367	283.759	-2.685
			Max. My	2	-9.366	-2.976	284.699
			Max. Vy	11	-14.373	283.759	-2.685
			Max. Vx	2	-14.413	-2.976	284.699
			Max. Torque	10			-0.355
L3	129.125 - 96.083	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-40.691	3.455	1.949
			Max. Mx	11	-19.985	998.574	-6.902
			Max. My	2	-19.993	-6.755	997.824
			Max. Vy	11	-26.878	998.574	-6.902
			Max. Vx	2	-26.788	-6.755	997.824
			Max. Torque	2			0.855
L4	96.083 - 63.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-55.875	7.013	7.904
			Max. Mx	11	-28.365	1919.822	-9.984
			Max. My	2	-28.372	-10.343	1916.427
			Max. Vy	11	-30.576	1919.822	-9.984
			Max. Vx	2	-30.457	-10.343	1916.427
			Max. Torque	10			-1.726
L5	63.25 - 31.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-71.954	10.805	13.407
			Max. Mx	11	-37.857	2924.484	-13.163
			Max. My	2	-37.861	-13.736	2917.576
			Max. Vy	11	-33.564	2924.484	-13.163
			Max. Vx	2	-33.445	-13.736	2917.576
			Max. Torque	10			-1.786

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L6	31.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-92.250	15.365	20.066
			Max. Mx	11	-50.638	4244.080	-16.769
			Max. My	2	-50.638	-17.627	4233.035
			Max. Vy	11	-36.723	4244.080	-16.769
			Max. Vx	2	-36.606	-17.627	4233.035
			Max. Torque	10			-1.860

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	92.250	0.000	0.000
	Max. H_x	11	50.656	36.699	-0.122
	Max. H_z	2	50.656	-0.122	36.582
	Max. M_x	2	4233.035	-0.122	36.582
	Max. M_z	5	4239.108	-36.699	0.122
	Max. Torsion	4	1.846	-31.843	18.397
	Min. Vert	1	50.656	0.000	0.000
	Min. H_x	5	50.656	-36.699	0.122
	Min. H_z	8	50.656	0.122	-36.582
	Min. M_x	8	-4226.350	0.122	-36.582
	Min. M_z	11	-4244.080	36.699	-0.122
	Min. Torsion	10	-1.860	31.843	-18.397

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	50.656	0.000	0.000	-3.249	2.413	0.000
Dead+Wind 0 deg - No Ice	50.656	0.122	-36.582	-4233.035	-17.627	-1.251
Dead+Wind 30 deg - No Ice	50.656	18.455	-31.742	-3676.389	-2135.719	-1.786
Dead+Wind 60 deg - No Ice	50.656	31.843	-18.397	-2135.585	-3680.874	-1.846
Dead+Wind 90 deg - No Ice	50.656	36.699	-0.122	-23.455	-4239.108	-1.417
Dead+Wind 120 deg - No Ice	50.656	31.721	18.185	2094.102	-3660.829	-0.609
Dead+Wind 150 deg - No Ice	50.656	18.243	31.620	3649.658	-2100.922	0.365
Dead+Wind 180 deg - No Ice	50.656	-0.122	36.582	4226.350	22.597	1.247
Dead+Wind 210 deg - No Ice	50.656	-18.455	31.742	3669.705	2140.690	1.796
Dead+Wind 240 deg - No Ice	50.656	-31.843	18.397	2128.900	3685.846	1.860
Dead+Wind 270 deg - No Ice	50.656	-36.699	0.122	16.769	4244.080	1.421
Dead+Wind 300 deg - No Ice	50.656	-31.721	-18.185	-2100.789	3665.800	0.599
Dead+Wind 330 deg - No Ice	50.656	-18.243	-31.620	-3656.344	2105.893	-0.379
Dead+Ice+Temp	92.250	-0.000	-0.000	-20.066	15.365	-0.000
Dead+Wind 0 deg+Ice+Temp	92.250	0.011	-5.927	-738.303	13.556	-0.249
Dead+Wind 30 deg+Ice+Temp	92.250	2.988	-5.138	-643.029	-346.926	-0.426
Dead+Wind 60 deg+Ice+Temp	92.250	5.164	-2.973	-380.857	-610.315	-0.489
Dead+Wind 90 deg+Ice+Temp	92.250	5.957	-0.011	-22.035	-706.034	-0.422
Dead+Wind 120 deg+Ice+Temp	92.250	5.154	2.954	337.290	-608.436	-0.241
Dead+Wind 150 deg+Ice+Temp	92.250	2.969	5.128	600.838	-343.672	0.004
Dead+Wind 180 deg+Ice+Temp	92.250	-0.011	5.927	697.991	17.315	0.248
Dead+Wind 210 deg+Ice+Temp	92.250	-2.988	5.138	602.716	377.797	0.426

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 240 deg+Ice+Temp	92.250	-5.164	2.973	340.544	641.185	0.489
Dead+Wind 270 deg+Ice+Temp	92.250	-5.957	0.011	-18.277	736.904	0.421
Dead+Wind 300 deg+Ice+Temp	92.250	-5.154	-2.954	-377.602	639.306	0.240
Dead+Wind 330 deg+Ice+Temp	92.250	-2.969	-5.128	-641.150	374.542	-0.005
Dead+Wind 0 deg - Service	50.656	0.048	-14.290	-1656.820	-5.373	-0.490
Dead+Wind 30 deg - Service	50.656	7.209	-12.399	-1439.229	-833.383	-0.702
Dead+Wind 60 deg - Service	50.656	12.439	-7.186	-836.895	-1437.421	-0.726
Dead+Wind 90 deg - Service	50.656	14.335	-0.048	-11.214	-1655.634	-0.556
Dead+Wind 120 deg - Service	50.656	12.391	7.104	816.577	-1429.561	-0.238
Dead+Wind 150 deg - Service	50.656	7.126	12.351	1424.669	-819.764	0.145
Dead+Wind 180 deg - Service	50.656	-0.048	14.290	1650.120	10.355	0.490
Dead+Wind 210 deg - Service	50.656	-7.209	12.399	1432.529	838.365	0.703
Dead+Wind 240 deg - Service	50.656	-12.439	7.186	830.195	1442.403	0.728
Dead+Wind 270 deg - Service	50.656	-14.335	0.048	4.514	1660.617	0.557
Dead+Wind 300 deg - Service	50.656	-12.391	-7.104	-823.277	1434.543	0.236
Dead+Wind 330 deg - Service	50.656	-7.126	-12.351	-1431.369	824.746	-0.147

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	-50.656	0.000	0.000	50.656	0.000	0.000%
2	0.122	-50.656	-36.582	-0.122	50.656	36.582	0.000%
3	18.455	-50.656	-31.742	-18.455	50.656	31.742	0.000%
4	31.843	-50.656	-18.397	-31.843	50.656	18.397	0.000%
5	36.699	-50.656	-0.122	-36.699	50.656	0.122	0.000%
6	31.721	-50.656	18.185	-31.721	50.656	-18.185	0.000%
7	18.243	-50.656	31.620	-18.243	50.656	-31.620	0.000%
8	-0.122	-50.656	36.582	0.122	50.656	-36.582	0.000%
9	-18.455	-50.656	31.742	18.455	50.656	-31.742	0.000%
10	-31.843	-50.656	18.397	31.843	50.656	-18.397	0.000%
11	-36.699	-50.656	0.122	36.699	50.656	-0.122	0.000%
12	-31.721	-50.656	-18.185	31.721	50.656	18.185	0.000%
13	-18.243	-50.656	-31.620	18.243	50.656	31.620	0.000%
14	0.000	-92.250	0.000	0.000	92.250	0.000	0.000%
15	0.011	-92.250	-5.927	-0.011	92.250	5.927	0.000%
16	2.988	-92.250	-5.138	-2.988	92.250	5.138	0.000%
17	5.164	-92.250	-2.973	-5.164	92.250	2.973	0.000%
18	5.957	-92.250	-0.011	-5.957	92.250	0.011	0.000%
19	5.154	-92.250	2.954	-5.154	92.250	-2.954	0.000%
20	2.969	-92.250	5.128	-2.969	92.250	-5.128	0.000%
21	-0.011	-92.250	5.927	0.011	92.250	-5.927	0.000%
22	-2.988	-92.250	5.138	2.988	92.250	-5.138	0.000%
23	-5.164	-92.250	2.973	5.164	92.250	-2.973	0.000%
24	-5.957	-92.250	0.011	5.957	92.250	-0.011	0.000%
25	-5.154	-92.250	-2.954	5.154	92.250	2.954	0.000%
26	-2.969	-92.250	-5.128	2.969	92.250	5.128	0.000%
27	0.048	-50.656	-14.290	-0.048	50.656	14.290	0.000%
28	7.209	-50.656	-12.399	-7.209	50.656	12.399	0.000%
29	12.439	-50.656	-7.186	-12.439	50.656	7.186	0.000%
30	14.335	-50.656	-0.048	-14.335	50.656	0.048	0.000%
31	12.391	-50.656	7.104	-12.391	50.656	-7.104	0.000%
32	7.126	-50.656	12.351	-7.126	50.656	-12.351	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	-0.048	-50.656	14.290	0.048	50.656	-14.290	0.000%
34	-7.209	-50.656	12.399	7.209	50.656	-12.399	0.000%
35	-12.439	-50.656	7.186	12.439	50.656	-7.186	0.000%
36	-14.335	-50.656	0.048	14.335	50.656	-0.048	0.000%
37	-12.391	-50.656	-7.104	12.391	50.656	7.104	0.000%
38	-7.126	-50.656	-12.351	7.126	50.656	12.351	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	0.00034938
3	Yes	5	0.00000001	0.00058678
4	Yes	5	0.00000001	0.00060881
5	Yes	4	0.00000001	0.00067413
6	Yes	5	0.00000001	0.00057749
7	Yes	5	0.00000001	0.00057706
8	Yes	4	0.00000001	0.00068242
9	Yes	5	0.00000001	0.00060889
10	Yes	5	0.00000001	0.00058638
11	Yes	4	0.00000001	0.00035765
12	Yes	5	0.00000001	0.00058573
13	Yes	5	0.00000001	0.00058665
14	Yes	4	0.00000001	0.00007917
15	Yes	5	0.00000001	0.00018931
16	Yes	5	0.00000001	0.00019879
17	Yes	5	0.00000001	0.00019753
18	Yes	5	0.00000001	0.00018185
19	Yes	5	0.00000001	0.00018951
20	Yes	5	0.00000001	0.00018910
21	Yes	5	0.00000001	0.00018048
22	Yes	5	0.00000001	0.00019613
23	Yes	5	0.00000001	0.00019808
24	Yes	5	0.00000001	0.00018946
25	Yes	5	0.00000001	0.00020346
26	Yes	5	0.00000001	0.00020315
27	Yes	4	0.00000001	0.00015256
28	Yes	5	0.00000001	0.00005535
29	Yes	5	0.00000001	0.00005975
30	Yes	4	0.00000001	0.00016935
31	Yes	5	0.00000001	0.00005461
32	Yes	5	0.00000001	0.00005446
33	Yes	4	0.00000001	0.00016987
34	Yes	5	0.00000001	0.00005967
35	Yes	5	0.00000001	0.00005529
36	Yes	4	0.00000001	0.00015272
37	Yes	5	0.00000001	0.00005644
38	Yes	5	0.00000001	0.00005656

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	35.306	35	1.663	0.002
L2	166.625 - 129.125	34.479	35	1.663	0.002
L3	133.583 - 96.083	23.246	35	1.539	0.001
L4	100.75 - 63.25	13.529	35	1.248	0.001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L5	68.75 - 31.25	6.362	35	0.860	0.001
L6	37.5 - 0	1.934	35	0.463	0.000

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	35	33.565	1.662	0.002	78956
162.000	Lightning Rod 1/2"x4' on 15' Pole	35	32.870	1.660	0.002	51746
155.000	1900MHz RRH	35	30.446	1.645	0.002	22950
148.000	6' Generic Dipole Antena	35	28.046	1.619	0.002	14737
144.000	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	35	26.692	1.601	0.001	12235
127.000	(4) DB846G90A-XY w/ Mount Pipe	35	21.143	1.492	0.001	7483
121.000	201-4	35	19.287	1.444	0.001	6756
115.000	(2) RRUS 11	35	17.494	1.391	0.001	6158
105.000	APXV18-206517S-C w/ Mount Pipe	35	14.665	1.293	0.001	5363
80.000	PD455-6	35	8.599	1.002	0.001	4931

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	90.176	10	4.250	0.004
L2	166.625 - 129.125	88.066	10	4.250	0.004
L3	133.583 - 96.083	59.390	10	3.934	0.003
L4	100.75 - 63.25	34.578	10	3.189	0.002
L5	68.75 - 31.25	16.264	10	2.198	0.002
L6	37.5 - 0	4.946	10	1.185	0.001

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	10	85.734	4.246	0.004	31690
162.000	Lightning Rod 1/2"x4' on 15' Pole	10	83.959	4.241	0.004	20669
155.000	1900MHz RRH	10	77.769	4.203	0.004	9121
148.000	6' Generic Dipole Antena	10	71.645	4.139	0.004	5847
144.000	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	10	68.188	4.091	0.004	4852
127.000	(4) DB846G90A-XY w/ Mount Pipe	10	54.021	3.814	0.003	2959
121.000	201-4	10	49.281	3.691	0.003	2669
115.000	(2) RRUS 11	10	44.704	3.556	0.003	2430
105.000	APXV18-206517S-C w/ Mount Pipe	10	37.480	3.305	0.003	2114
80.000	PD455-6	10	21.981	2.562	0.002	1938

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	-0.201	796.872	0.000
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.313	37.500	0.000	0.0	39.000	31.994	-9.353	1247.780	0.007
L3	129.125 - 96.083 (3)	TP41.75x31.944x0.375	37.500	0.000	0.0	39.000	47.794	-19.974	1863.970	0.011
L4	96.083 - 63.25 (4)	TP49.063x39.78x0.375	37.500	0.000	0.0	39.000	56.330	-28.358	2196.860	0.013
L5	63.25 - 31.25 (5)	TP56.125x46.951x0.375	37.500	0.000	0.0	39.000	64.536	-37.853	2516.930	0.015
L6	31.25 - 0 (6)	TP62.938x53.846x0.375	37.500	0.000	0.0	37.124	74.465	-50.638	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	287.067	13.551	39.000	0.347	0.000	0.000	39.000	0.000
L3	129.125 - 96.083 (3)	TP41.75x31.944x0.375	1004.492	25.491	39.000	0.654	0.000	0.000	39.000	0.000
L4	96.083 - 63.25 (4)	TP49.063x39.78x0.375	1927.892	35.170	39.000	0.902	0.000	0.000	39.000	0.000
L5	63.25 - 31.25 (5)	TP56.125x46.951x0.375	2934.592	40.745	39.000	1.045	0.000	0.000	39.000	0.000
L6	31.25 - 0 (6)	TP62.938x53.846x0.375	4256.483	44.349	37.124	1.195	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	14.524	0.454	26.000	0.035	0.347	0.008	26.000	0.000
L3	129.125 - 96.083 (3)	TP41.75x31.944x0.375	26.967	0.564	26.000	0.043	0.346	0.004	26.000	0.000
L4	96.083 - 63.25 (4)	TP49.063x39.78x0.375	30.657	0.544	26.000	0.042	1.726	0.015	26.000	0.001
L5	63.25 - 31.25 (5)	TP56.125x46.951x0.375	33.642	0.521	26.000	0.040	1.786	0.012	26.000	0.000
L6	31.25 - 0 (6)	TP62.938x53.846x0.375	36.799	0.494	26.000	0.038	1.860	0.009	26.000	0.000

Pole Interaction Design Data

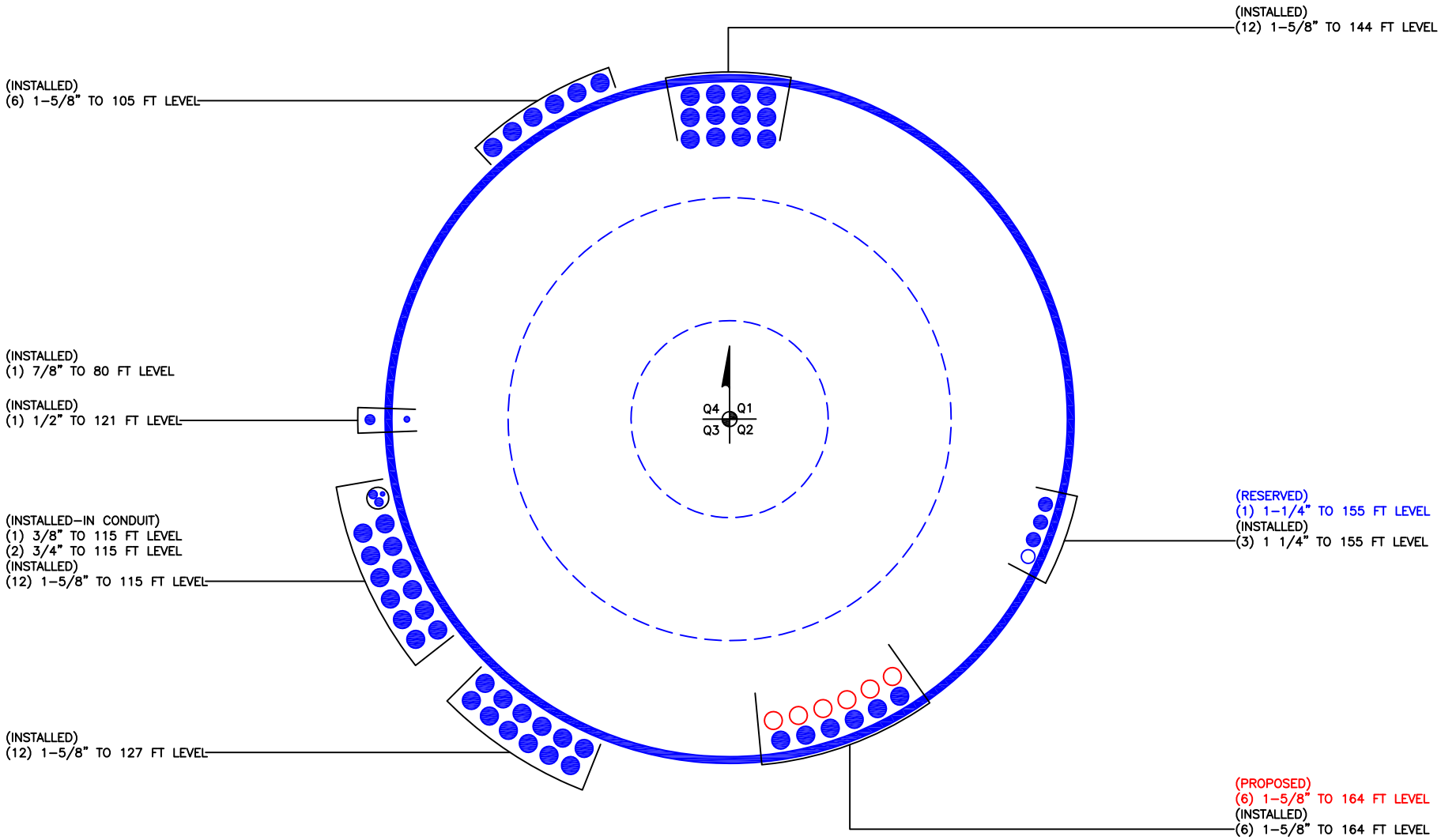
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 164.25 (1)	0.000	0.001	0.000	0.001	0.000	0.001 ✔	1.333	H1-3+VT ✔
L2	164.25 - 129.125 (2)	0.007	0.347	0.000	0.035	0.000	0.355 ✔	1.333	H1-3+VT ✔
L3	129.125 - 96.083 (3)	0.011	0.654	0.000	0.043	0.000	0.665 ✔	1.333	H1-3+VT ✔
L4	96.083 - 63.25 (4)	0.013	0.902	0.000	0.042	0.001	0.915 ✔	1.333	H1-3+VT ✔
L5	63.25 - 31.25 (5)	0.015	1.045	0.000	0.040	0.000	1.060 ✔	1.333	H1-3+VT ✔
L6	31.25 - 0 (6)	0.018	1.195	0.000	0.038	0.000	1.213 ✔	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	-0.201	1062.230	0.1	Pass
L2	164.25 - 129.125	Pole	TP34.063x21.5x0.313	2	-9.353	1663.291	26.7	Pass
L3	129.125 - 96.083	Pole	TP41.75x31.944x0.375	3	-19.974	2484.672	49.9	Pass
L4	96.083 - 63.25	Pole	TP49.063x39.78x0.375	4	-28.358	2928.414	68.7	Pass
L5	63.25 - 31.25	Pole	TP56.125x46.951x0.375	5	-37.853	3355.068	79.5	Pass
L6	31.25 - 0	Pole	TP62.938x53.846x0.375	6	-50.638	3684.958	91.0	Pass
							Summary	
						Pole (L6)	91.0	Pass
						RATING =	**91.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(INSTALLED)
(12) 1-5/8" TO 144 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 105 FT LEVEL
(INSTALLED)
(1) 7/8" TO 80 FT LEVEL
(INSTALLED)
(1) 1/2" TO 121 FT LEVEL
(INSTALLED-IN CONDUIT)
(1) 3/8" TO 115 FT LEVEL
(2) 3/4" TO 115 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 115 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 127 FT LEVEL
Q4
Q1
Q3
Q2
(RESERVED)
(1) 1-1/4" TO 155 FT LEVEL
(INSTALLED)
(3) 1 1/4" TO 155 FT LEVEL
(PROPOSED)
(6) 1-5/8" TO 164 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 164 FT LEVEL

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 #: *263039*

Pole Manufacturer:	*Pirod*

Reactions		
Moment:	4256.4867	ft-kips
Axial:	50.6383	kips
Shear:	36.799262	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

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

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

Pole Data		
Diam:	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	

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

Anchor Rod Results

Maximum Rod Tension:	65.6 Kips	Rigid
Allowable Tension:	81.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	81.1% **Pass**	Fty*ASIF

Base Plate Results Flexural Check

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

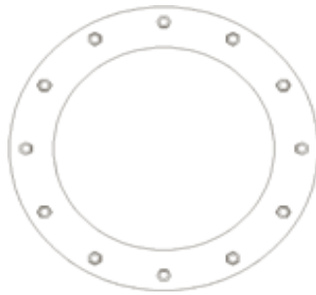
n/a

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



* 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 #: *263039*

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):	49.7	kips
Pad Force Location Above D:	1.18	ft
ϕ(Passive Pressure Moment):	58.53	ft-kips
Factored O.T. M(WL), "1.6W":	6193.4	ft-kips
Factored OT (MW-Msoil), M1	6134.84	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	4.05	ft
Sum of Soil Wedges Wt:	85.67	kips
Soil Wedges ecc, K1:	11.73	ft
Ftg+Soil above Pad wt:	830.1	kips
Unfactored (Total ftg-soil Wt):	915.74	kips
1.2D. **No Soil Wedges**.	1056.84	kips
0.9D. **With Soil Wedges**	869.74	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:	50.6383	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	36.79926	kips
Unfactored WL Moment, M:	4256.487	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	60.76596	kips
0.90	0.9D+1.6W, Pu:	45.57447	kips
1.35	Vu:	49.679	kips
	Mu:	5746.257	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	1056.84	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	6134.84	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	5.80	ft
Orthogonal qu=	2.70	ksf
qu/ϕ*qn Ratio=	**29.96%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	4.10	ft
Diagonal qu=	2.99	ksf
qu/ϕ*qn Ratio=	**33.25%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	869.74	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	5230.57	ft-kips

Orthogonal ecc3 = M2/P2 =	6.01	ft
Ortho Non Bearing Length,NBL=	12.03	ft
Orthogonal qu=	2.26	ksf
Diagonal qu=	2.54	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	4256.49		
M Orthogonal:	8056.31	**52.83%**	**Pass**
M Diagonal:	8056.31	**52.83%**	**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 #: *263039*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	4495.682	ft-kips **(* Note)**
Max. Service Shaft P:	50.6383	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:	5844.386	ft-kips
1.30	Pu:	65.82979	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%

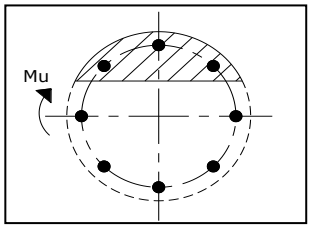
Material Properties		
Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2002	
Seismic Properties		
Seismic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

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

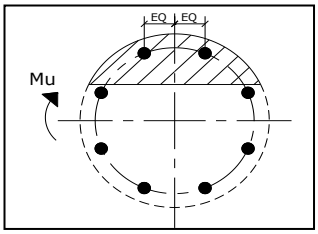
ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0032
200 / Fy: 0.0033

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis: **12.86** in
Extreme Steel Strain, εt: **0.0170**
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:	65.83	kips
Drilled Shaft Moment Capacity, φMn:	**6879.63**	ft-kips
Drilled Shaft Superimposed Mu:	**5844.39**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**85.0%**

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

T-Mobile Existing Facility

Site ID: CT11417A

Plymouth / Rt 6
171 Town Hill Road
Plymouth, CT 06786

September 11, 2014

EBI Project Number: 62144652

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	78.57 %

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

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September 11, 2014

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11417A – Plymouth / Rt 6**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **171 Town Hill Road, Plymouth, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (µW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **171 Town Hill Road, Plymouth, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

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

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

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

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

7) The antennas used in this modeling are the **Andrew RR90_17_02DP** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Andrew RR90_17_02DP** has a maximum gain of **14.4 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerline of the proposed antennas is **164 feet** above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Andrew RR90_17_02DP	Make / Model:	Andrew RR90_17_02DP	Make / Model:	Andrew RR90_17_02DP
Gain:	14.4 dBd	Gain:	14.4 dBd	Gain:	14.4 dBd
Height (AGL):	164	Height (AGL):	164	Height (AGL):	164
Frequency Bands	1900 MHz(PCS)	Frequency Bands	1900 MHz(PCS)	Frequency Bands	1900 MHz(PCS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	3,505.81	ERP (W):	3,505.81	ERP (W):	3,505.81
Antenna A1 MPE%	0.95	Antenna B1 MPE%	0.95	Antenna C1 MPE%	0.95
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	164	Height (AGL):	164	Height (AGL):	164
Frequency Bands	700 Mhz	Frequency Bands	700 Mhz	Frequency Bands	700 Mhz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	445.37	ERP (W):	445.37	ERP (W):	445.37
Antenna A2 MPE%	0.27	Antenna B2 MPE%	0.27	Antenna C2 MPE%	0.27

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**3.66**
Sprint	7.25 %
Town	20.35 %
Verizon Wireless	18.13 %
Nextel	4.87 %
AT&T	24.31 %
Site Total MPE %:	**78.57 %**

T-Mobile Sector 1 Total:	1.22 %
T-Mobile Sector 2 Total:	1.22 %
T-Mobile Sector 3 Total:	1.22 %
Site Total:	78.57 %

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Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.22 %
Sector 2:	1.22 %
Sector 3 :	1.22 %
T-Mobile Total:	3.66 %
Site Total:	78.57 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **78.57%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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RF Engineering Director

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