Crown Castle
3530 Toringdon Way Suite 300
Charlotte NC 28277

Tel (704) 405-6600

February 19, 2015

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

RE: **T-Mobile-Exempt Modification - Crown Site BU: 845455**
T-Mobile Site ID: CTNH211B
Located at: 85 Quaker Farms Road, Oxford, CT 06478

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 George R. Temple, Town Selectman for the Town of Oxford, and James W. and Elaine W. Schiavi, Property Owners.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **85 Quaker Farms Road, Oxford, CT 06478**. 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: George R. Temple, Town Selectman
Oxford Town Hall
486 Oxford Road
Oxford, CT 06478

James W. and Elaine W. Schiavi
85 Quaker Farms Road
Oxford, CT 06478

T-Mobile®

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CTNH211B
CROWN CASTLE BU #: 845455
SITE NAME: OXFORD-QUAKER FARMS
85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY

PROPOSED CONFIGURATION: 704G

SITE INFORMATION

KEY MAP
N.T.S.

DIRECTIONS: (FROM PARSIPPANY):

DEPART SYLVAN WAY TOWARD CENTURY DR. TURN RIGHT ONTO US-202/LITTLETON RD. KEEP RIGHT ONTO LITTLETON RD. KEEP RIGHT ONTO LITTLETON RD. TAKE RAMP LEFT AND FOLLOW SIGNS FOR I-80 EAST. TAKE RAMP LEFT FOR I-95 NORTH TOWARD G WASHINGTON B/NEW YORK. KEEP LEFT TO STAY ON I-95 N. AT EXIT 27A, TAKE RAMP RIGHT FOR CT-25/CT-8 TOWARD WATERBURY/TRUMBULL. KEEP RIGHT ONTO CT-8N. AT EXIT 15, TAKE RAMP RIGHT FOR CT-34 TOWARD DERBY. TURN LEFT ONTO CT-34 W/MAIN ST. TURN RIGHT ONTO CT-188/SQUANTUCK RD. AT ROUNDABOUT, TAKE 3RD EXIT. ARRIVE AT QUAKER FARMS RD. SITE WILL BE ON THE LEFT

PROJECT INFORMATION

T-MOBILE SITE #:	CTNH211B
CROWN CASTLE BU #:	845455
SITE ADDRESS:	85 QUAKER FARMS ROAD OXFORD, CT 06478 NEW HAVEN COUNTY
LATITUDE:	N 41° 23' 02.36"
LONGITUDE:	W 73° 08' 14.54"
TOWER OWNER:	CROWN CASTLE 1200 MACARTHUR BLVD., SUITE 200 MAHWAH, NJ 07430
CONTACT:	WARREN KELLEHER (781) 970-0055
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 WITH (1) NEW EQUIPMENT CABINET AT GRADE, REMOVE AND REPLACE EXISTING ANTENNA MOUNT WITH A NEW ANTENNA MOUNT, ADD (3) NEW ANTENNAS, ADD (3) NEW RRU'S AT GRADE, ADD (3) NEW BIAS TEES, ADD (6) NEW LINES OF COAX
PROPOSED DESIGN:	**704G**

SHEET INDEX

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

OXFORD-QUAKER FARMS

CTNH211B

85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY

SEAL

STATE OF CONNECTICUT — JIANG YU — No. 23222 — LICENSED PROFESSIONAL ENGINEER — CONNECTICUT LICENSED NO. 0023222

SCALE
AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	01/23/15	JC	ISSUED AS FINAL
A	11/14/14	JC	ISSUED FOR REVIEW

REVISIONS

DRAWN BY JC
CHECKED BY BSH
APPROVED BY GHN
DATE 11/05/14
TITLE

TITLE SHEET

PROJECT NO. 50066258/50070378

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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OXFORD-QUAKER FARMS

CTNH211B

85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY

SEAL

SCALE
AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	01/23/15	JC	ISSUED AS FINAL
A	11/14/14	JC	ISSUED FOR REVIEW

REVISIONS

DRAWN BY JC
CHECKED BY BSH
APPROVED BY GHN
DATE 11/05/14

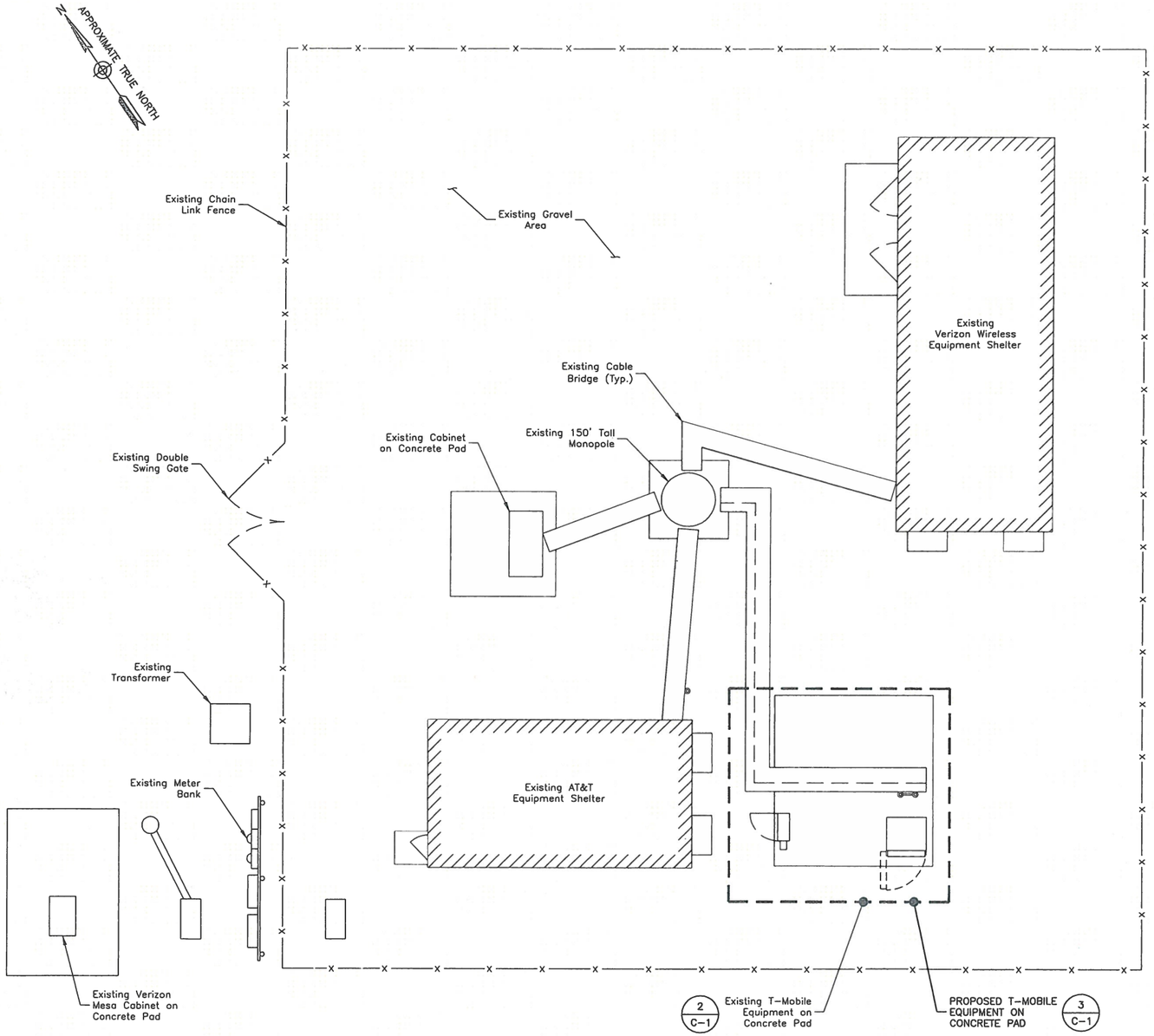
TITLE

GENERAL NOTES

PROJECT NO. 50066258/50070378

G - 1

SHEET NO.

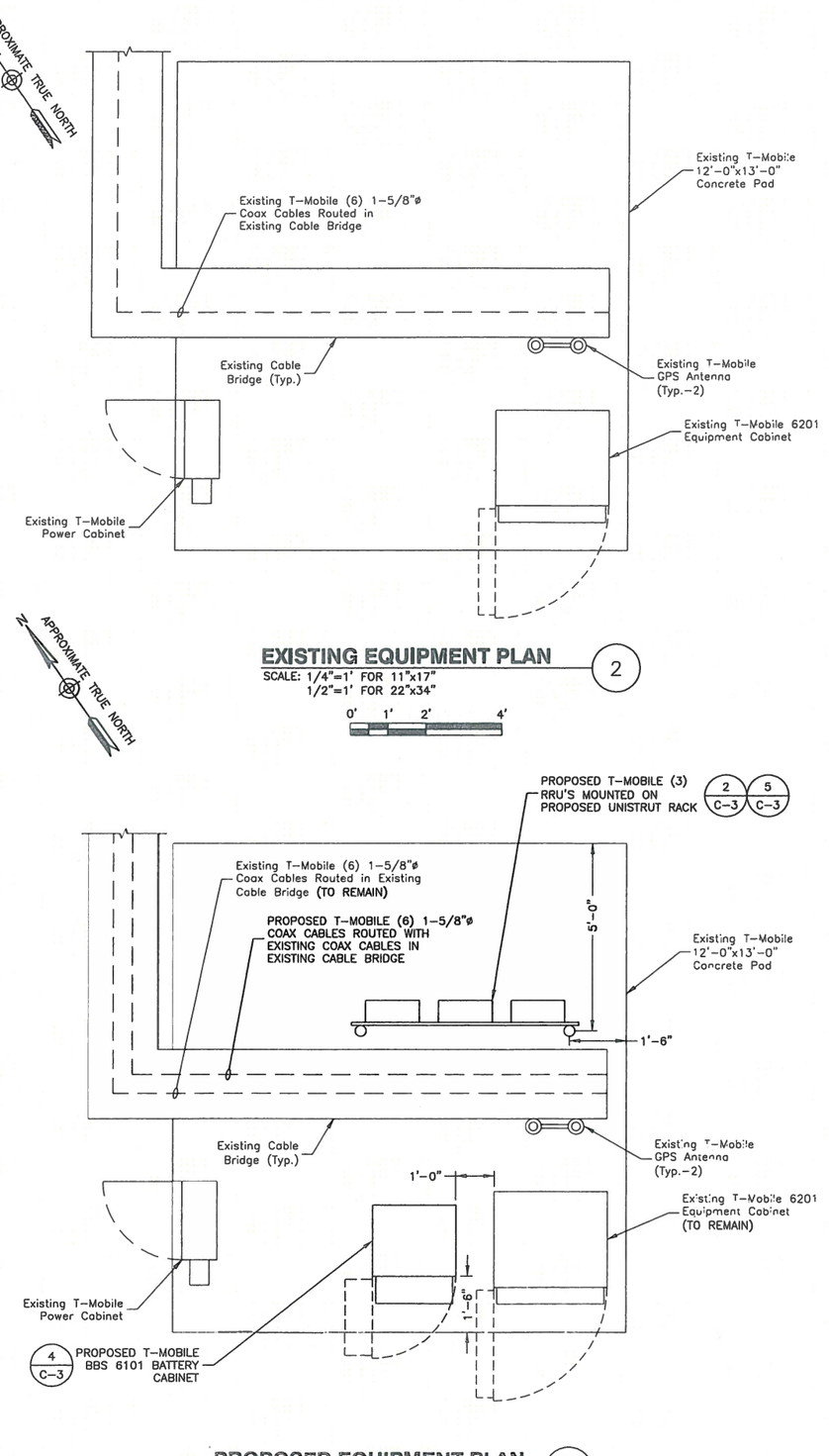


COMPOUND PLAN

1

SCALE: 1"=10' FOR 11"x17"
1"=5' FOR 22"x34"

0' 5' 10'



EXISTING EQUIPMENT PLAN

2

SCALE: 1/4"=1' FOR 11"x17"
1/2"=1' FOR 22"x34"

0' 1' 2' 4'

PROPOSED EQUIPMENT PLAN

3

SCALE: 1/4"=1' FOR 11"x17"
1/2"=1' FOR 22"x34"

0' 1' 2' 4'

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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SEAL

STATE OF CONNECTICUT
JIANG YU
JIANGYU 28222
LICENSE NO. 28222
PROFESSIONAL ENGINEER

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AS SHOWN

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DRAWN BY JC
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APPROVED BY GHN
DATE 11/05/14

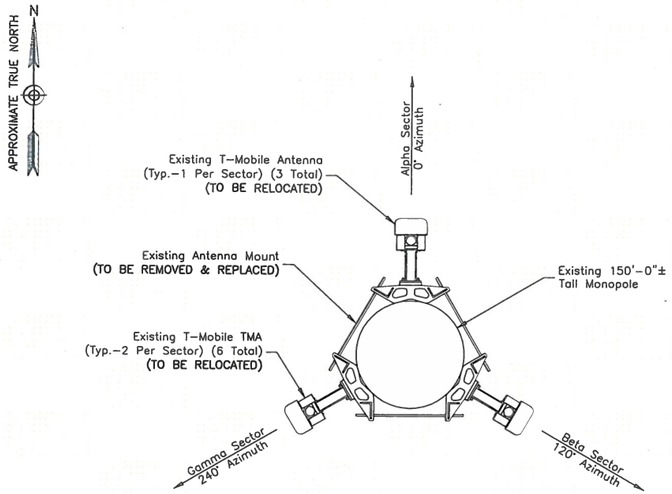
TITLE

COMPOUND PLAN & EQUIPMENT PLANS

PROJECT NO. 50066258/50070378

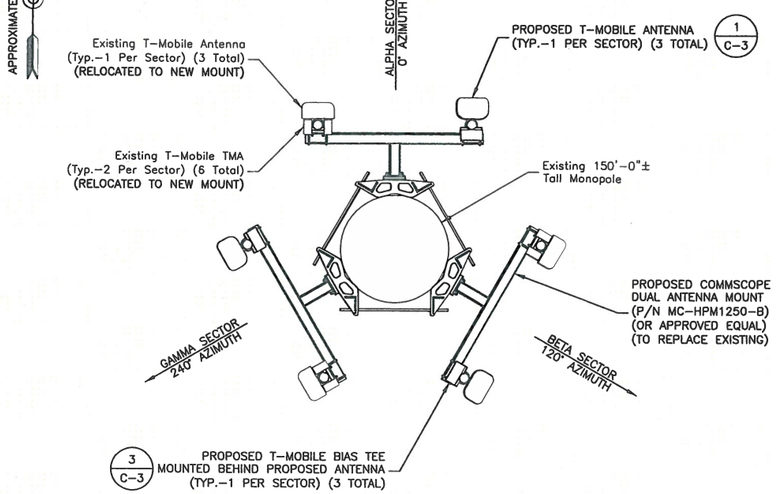
C - 1

SHEET NO.



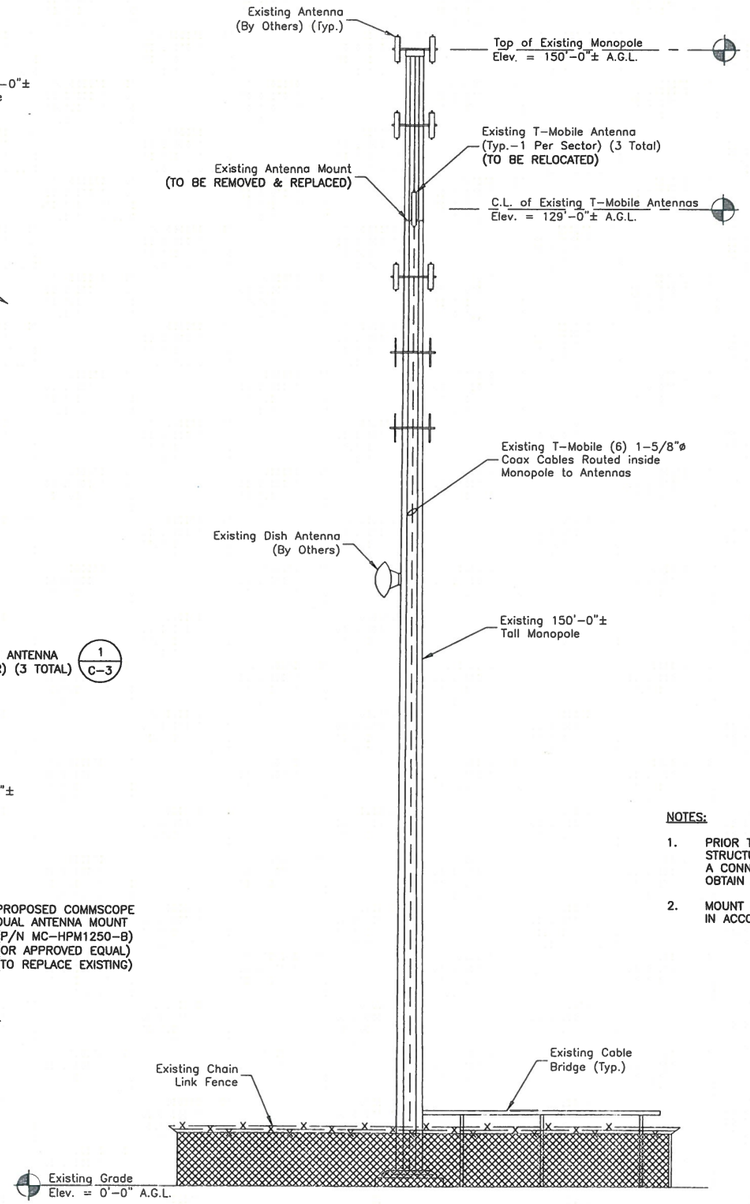
EXISTING ANTENNA LAYOUT (1)

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT (2)

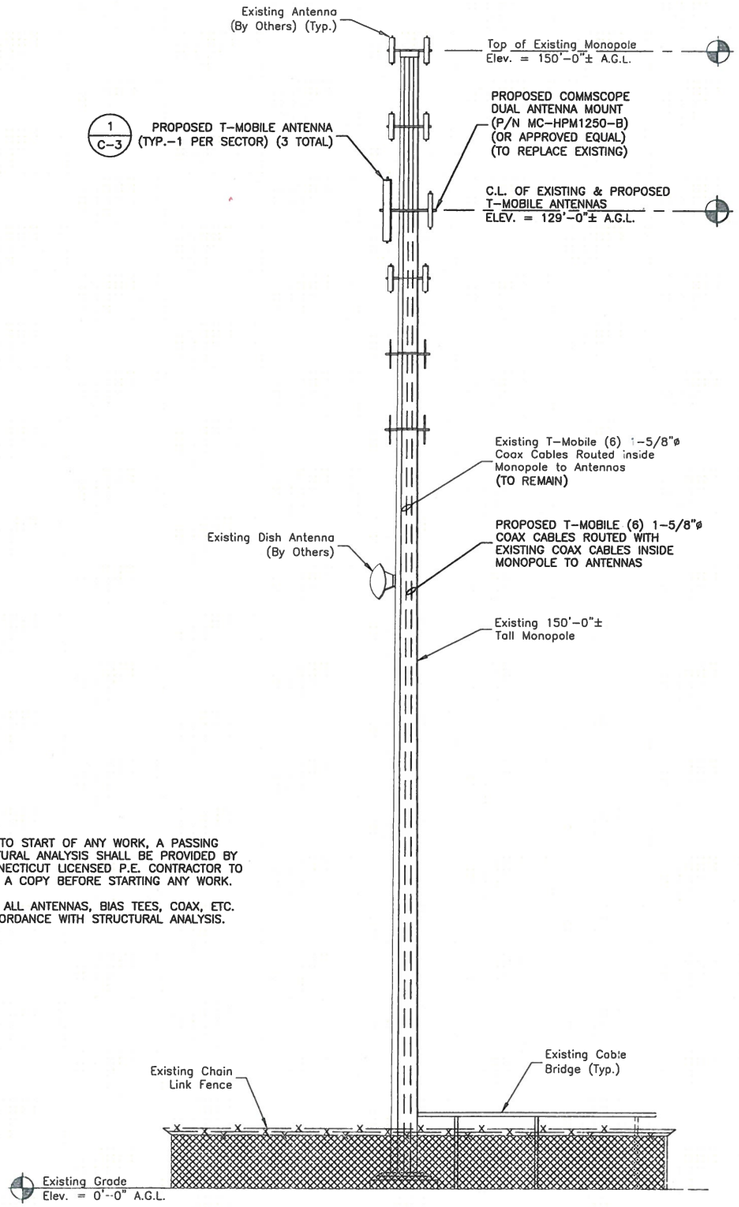
SCALE: N.T.S.



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.

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OXFORD-QUAKER FARMS

CTNH211B

85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY

SEAL

STATE OF CONNECTICUT
JIANG YU
No. 23222
LICENSED PROFESSIONAL ENGINEER
CONNECTICUT LICENSE NO. 23222

SCALE
AS SHOWN

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APPROVED BY CHN
DATE 11/05/14

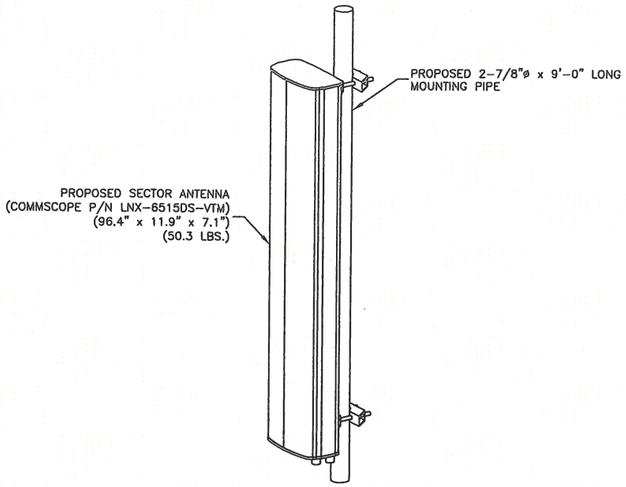
TITLE

ANTENNA LAYOUTS & ELEVATIONS

PROJECT NO. 50066258/50070378

C - 2

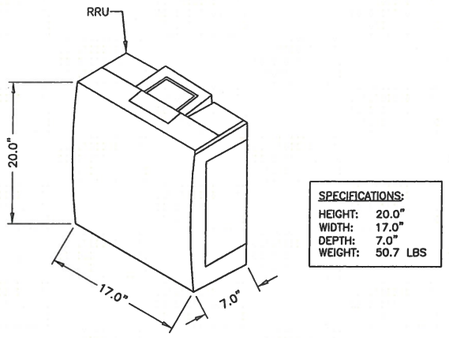
SHEET NO.



NOTES:

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.



SPECIFICATIONS:

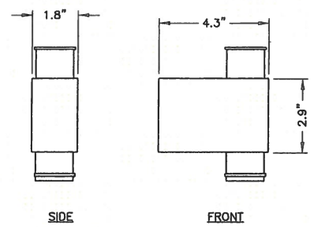
HEIGHT:	20.0"
WIDTH:	17.0"
DEPTH:	7.0"
WEIGHT:	50.7 LBS

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 (2)
SCALE: N.T.S.

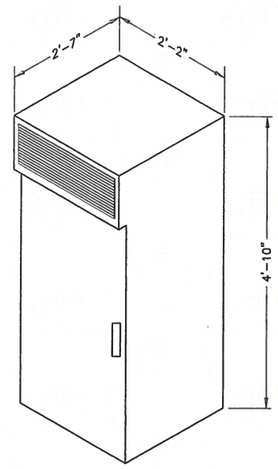


ANDREW ATBT-BOTTOM-24V

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.

BIAS TEE DETAIL (3)
SCALE: N.T.S.

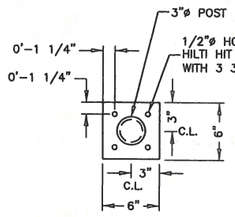


ISOMETRIC

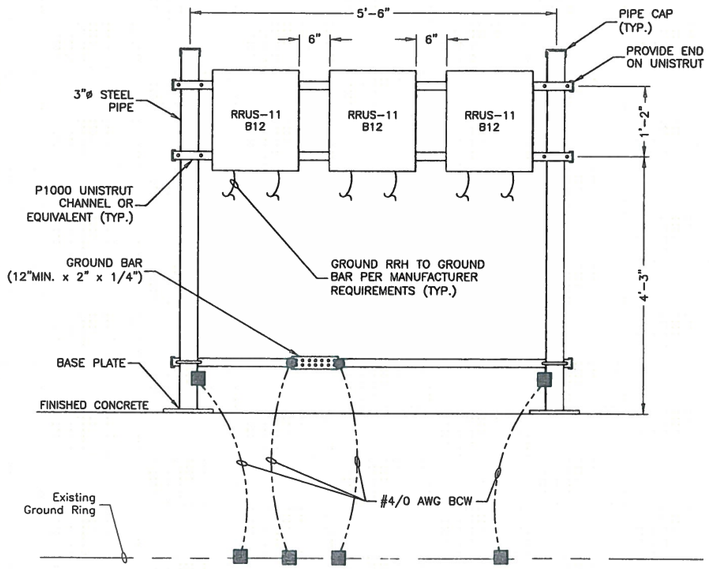
NOTE:

1. CONTRACTOR SHALL SECURE CABINET AS PER MANUFACTURER RECOMMENDATIONS.

ERICSSON BBS 6101 CABINET (4)
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 (4)
SCALE: N.T.S

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX LENGTH
	EXISTING	PROPOSED	EXISTING	PROPOSED	
ALPHA	RFS APXV18-209014-04	EXISTING TO REMAIN	(2) 1-5/8"	(2) 1-5/8"	182'
	–	COMMSCOPE LNX-6515DS-VTM			
BETA	RFS APXV18-209014-04	EXISTING TO REMAIN	(2) 1-5/8"	(2) 1-5/8"	182'
	–	COMMSCOPE LNX-6515DS-VTM			
GAMMA	RFS APXV18-209014-04	EXISTING TO REMAIN	(2) 1-5/8"	(2) 1-5/8"	182'
	–	COMMSCOPE LNX-6515DS-VTM			

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OXFORD-QUAKER FARMS

CTNH211B

85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY

SEAL

JIANG YU
CONNECTICUT LICENSE NO. 23222

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AS SHOWN

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REVISIONS

DRAWN BY JC
CHECKED BY BSH
APPROVED BY GHN
DATE 11/05/14

TITLE

CONSTRUCTION DETAILS

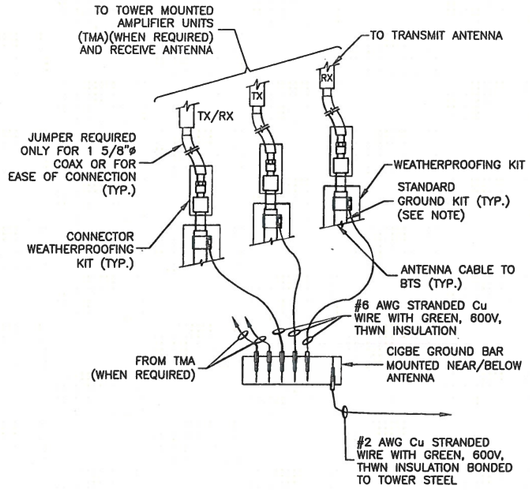
PROJECT NO. 50066258/50070378

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.

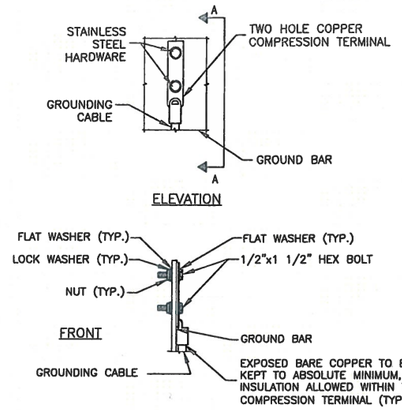


NOTE:

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.



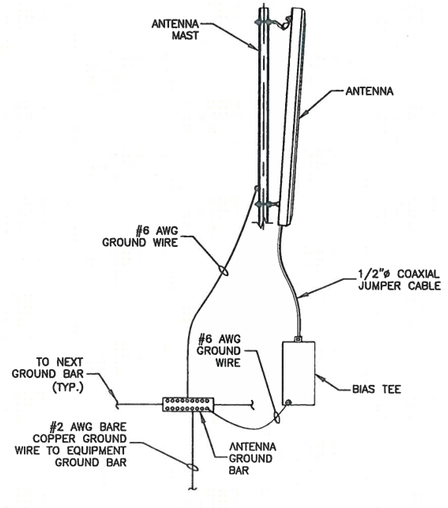
SECTION 'A-A'

NOTES:

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

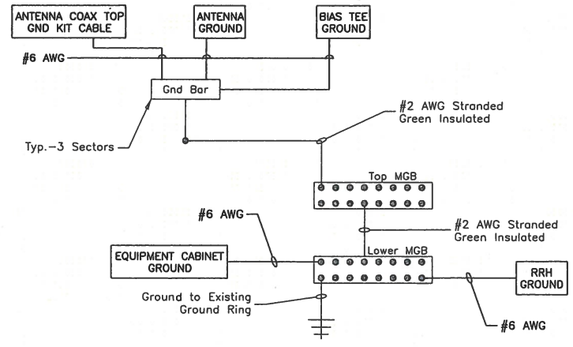
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL — 2

SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL — 3

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.
4. VERIFY EXISTING GROUND SYSTEM IS INSTALLED PER T-MOBILE STANDARDS.

SCHEMATIC GROUNDING DIAGRAM — 4

SCALE: N.T.S.

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OXFORD-QUAKER FARMS

CTNH211B

85 QUAKER FARMS ROAD
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DRAWN BY JC

CHECKED BY BSH

APPROVED BY GHN

DATE 11/05/14

TITLE

GROUNDING NOTES & DETAILS

PROJECT NO. 50066258/50070378

E - 1

SHEET NO.

Date: **February 10, 2015**

Rebecca Klein
Crown Castle
525 Alderman Lane
Fort Mill, SC 29715

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CTNH211B
	Carrier Site Name:	NH211/Quaker Farms_Collo
Crown Castle Designation:	**Crown Castle BU Number:**	845455
	Crown Castle Site Name:	OXFORD-QUAKER FARMS
	Crown Castle JDE Job Number:	314191
	Crown Castle Work Order Number:	1000666
	Crown Castle Application Number:	271494 Rev. 3
Engineering Firm Designation:	**Crown Castle Project Number:**	1000666
Site Data:	**85 QUAKER FARMS ROAD, OXFORD, New Haven County, CT** **Latitude *41° 23' 2.36"*, Longitude *-73° 8' 14.54"*** **149 Foot - Monopole Tower**	

Dear Rebecca Klein,

Crown Castle 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 1000666, in accordance with application 271494, revision 3.

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.

***The structure has sufficient capacity once the loading changes described in the Recommendations section of this report are completed.**

The analysis has been performed in accordance with the TIA/EIA-222-F Standard and the 2005 Connecticut State Building Code with the 2009 Amendments based upon a wind speed of 85 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 *Crown Castle* 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: Nathan Martinak, EIT / JGK

Respectfully submitted by:

Andrew J. Fandozzi, P.E.
Engineering Supervisor

tnxTower Report - version 6.1.4.1

STATE OF CONNECTICUT
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No. 30516
LICENSED
PROFESSIONAL ENGINEER

2-10-15

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1) INTRODUCTION

This tower is a 149 ft Monopole tower designed by PennSummit Tubular, LLC in April of 2005. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

The modification drawings designed by CCI on October 31, 2014 were not considered in this analysis.

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 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
129	132	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	6	1-5/8	-
		3	kathrein	782 11066			

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
149	150	2	andrew	SBNH-1D6565C w/ Mount Pipe	6 3	1-5/8 1/2	1
		3	ericsson	RRUS-11			
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	149	1	tower mounts	Side Arm Mount [SO 103-3]			
139	140	3	powerwave technologies	7770.00 w/ Mount Pipe	6	1-5/8	1
		6	powerwave technologies	TMA DD 1900 with 850 BYPASS			
	139	1	tower mounts	Side Arm Mount [SO 104-3]			
129	132	3	powerwave technologies	LGP 13901	6	1-5/8	1
		3	rfs celwave	APXV18-209014-C w/ Mount Pipe			
	129	1	tower mounts	Side Arm Mount [SO 104-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120	120	3	alcatel lucent	RRH2X60-AWS	2	1-5/8	2
		3	alcatel lucent	RRH2X60-PCS			
		3	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		3	andrew	SBNHH-1D65B w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		3	antel	BXA-80080/6CF w/ Mount Pipe	18	1-5/8	1
		1	tower mounts	Side Arm Mount [SO 104-3]			
109	109	1	tower mounts	Side Arm Mount [SO 104-3]	-	-	3
99	99	1	tower mounts	Side Arm Mount [SO 104-3]	-	-	3
80	80	1	antenna systems and solutions inc	FO150-3	3	1/2	1
		1	pctel	MPRD2449			
		1	tower mounts	Pipe Mount [PM 601-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Empty Mount to Be Removed; not considered in this analysis

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)
148.5	148.5	6	allgon	7920 Panel	-	-
139	139	9	generic	48" x 12" x 3" Panel Antenna	-	-
129	129	9	generic	48" x 12" x 3" Panel Antenna	-	-
119	119	9	generic	48" x 12" x 3" Panel Antenna	-	-
109	109	6	generic	48" x 12" x 3" Panel Antenna	-	-
99	99	6	generic	48" x 12" x 3" Panel Antenna	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	WEI Geotechnical Engineers	4911888	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PennSummit Tubular, LLC / Paul J. Ford and Company	5113082	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. Crown Castle 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	149 - 111.5	Pole	TP29.487x23x0.1875	1	-5.03	879.47	49.9	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-9.53	1215.80	96.5	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-15.62	1851.52	99.0	Pass
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-26.59	2909.79	89.4	Pass
							Summary	
						Pole (L3)	99.0	Pass
						Rating =	99.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	93.5	Pass
1	Base Plate	0	75.6	Pass
1	Base Foundation Soil Interaction	0	69.8	Pass

Structure Rating (max from all components) =	99%

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

4.1) Recommendations

The tower and foundation have sufficient capacity to carry the existing, reserved, and proposed loading. In order for the results of this analysis to be considered valid the loading modification listed below must be completed.

Loading Changes:

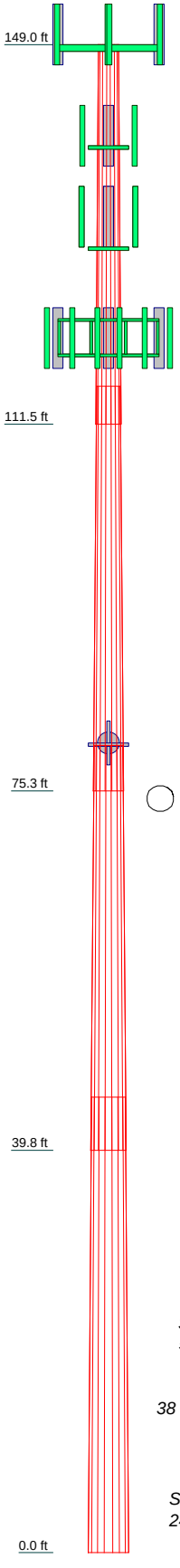
1.) Removal of empty mounts at 99 ft and 109 ft

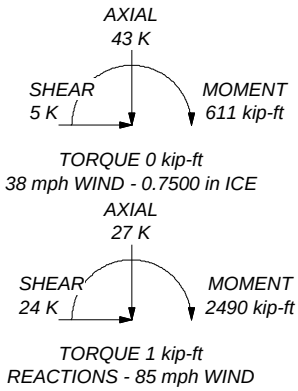
No structural modifications are required at this time, provided that the above listed changes are implemented.

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	37'6"	18	0.1875	3'9"	23.0000	29.4870	A607-65	2.0
2	40'	18	0.2188	4'6"	28.4633	35.3830		3.0
3	40'	18	0.2813	5'3"	34.1670	41.0860		4.5
4	45'	18	0.3750		39.6154	47.4000		7.9
								17.4





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
FO150-3	149	LNX-6515DS-VTM w/ Mount Pipe	129
SBNH-1D6565C w/ Mount Pipe	149	LNX-6515DS-VTM w/ Mount Pipe	129
SBNH-1D6565C w/ Mount Pipe	149	LNX-6515DS-VTM w/ Mount Pipe	129
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	782 11066	129
7770.00 w/ Mount Pipe	149	782 11066	129
7770.00 w/ Mount Pipe	149	782 11066	129
7770.00 w/ Mount Pipe	149	Side Arm Mount [SO 104-3]	129
(2) LGP21401	149	BXA-80080/6CF w/ Mount Pipe	120
(2) LGP21401	149	BXA-80080/6CF w/ Mount Pipe	120
(2) LGP21401	149	BXA-80080/6CF w/ Mount Pipe	120
RRUS-11	149	HBXX-6517DS-A2M w/ Mount Pipe	120
RRUS-11	149	HBXX-6517DS-A2M w/ Mount Pipe	120
RRUS-11	149	HBXX-6517DS-A2M w/ Mount Pipe	120
DC6-48-60-18-8F	149	SBNHH-1D65B w/ Mount Pipe	120
Side Arm Mount [SO 103-3]	149	SBNHH-1D65B w/ Mount Pipe	120
4' x 2" Pipe Mount	147	SBNHH-1D65B w/ Mount Pipe	120
4' x 2" Pipe Mount	147	RRH2X60-AWS	120
4' x 2" Pipe Mount	147	RRH2X60-AWS	120
Side Arm Mount [SO 102-3]	147	RRH2X60-AWS	120
7770.00 w/ Mount Pipe	139	RRH2X60-PCS	120
7770.00 w/ Mount Pipe	139	RRH2X60-PCS	120
7770.00 w/ Mount Pipe	139	RRH2X60-PCS	120
(2) TMA DD 1900 with 850 BYPASS	139	DB-T1-6Z-8AB-0Z	120
(2) TMA DD 1900 with 850 BYPASS	139	DB-T1-6Z-8AB-0Z	120
(2) TMA DD 1900 with 850 BYPASS	139	(2) 4' x 2" Pipe Mount	120
4' x 2" Pipe Mount	139	(2) 4' x 2" Pipe Mount	120
4' x 2" Pipe Mount	139	(2) 4' x 2" Pipe Mount	120
4' x 2" Pipe Mount	139	(2) 6' x 2" Horizontal Mount Pipe	120
Side Arm Mount [SO 104-3]	139	(2) 6' x 2" Horizontal Mount Pipe	120
APXV18-209014-C w/ Mount Pipe	129	(2) 6' x 2" Horizontal Mount Pipe	120
APXV18-209014-C w/ Mount Pipe	129	Side Arm Mount [SO 104-3]	120
APXV18-209014-C w/ Mount Pipe	129	FO150-3	80
LGP 13901	129	6' x 2" Mount Pipe	80
LGP 13901	129	Pipe Mount [PM 601-1]	80
LGP 13901	129	MPRD2449	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99%

CROWN CASTLE
The Foundation for a Wireless World

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
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Job: ***BU #845455***			
Project:			
Client: Crown Castle	Drawn by: JKazmierczak		App'd:
Code: TIA/EIA-222-F	Date: 02/10/15		Scale: NTS
Path: X:\ENG Work Area\NMartinak\845455 WO1000666\JGK\845455.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 New Haven County, Connecticut.
5) Basic wind speed of 85 mph.
6) Nominal ice thickness of 0.7500 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.333.
15) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	149'-111'6"	37'6"	3'9"	18	23.0000	29.4870	0.1875	0.7500	A607-65 (65 ksi)
L2	111'6"-75'3"	40'	4'6"	18	28.4633	35.3830	0.2188	0.8750	A607-65 (65 ksi)
L3	75'3"-39'9"	40'	5'3"	18	34.1670	41.0860	0.2813	1.1250	A607-65 (65 ksi)
L4	39'9"-0'	45'		18	39.6154	47.4000	0.3750	1.5000	A607-65 (65 ksi)

Tapered Pole Properties

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

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	23.3548	13.5763	892.6152	8.0984	11.6840	76.3964	1786.4050	6.7894	3.7180	19.829
	29.9419	17.4369	1891.1513	10.4013	14.9794	126.2502	3784.7910	8.7201	4.8597	25.918
L2	29.5611	19.6105	1976.4982	10.0268	14.4594	136.6934	3955.5970	9.8071	4.6245	21.141
	35.9288	24.4150	3814.1390	12.4833	17.9746	212.1965	7633.2967	12.2098	5.8424	26.708
L3	35.4845	30.2494	4388.2314	12.0295	17.3569	252.8241	8782.2369	15.1276	5.5184	19.621
	41.7198	36.4259	7662.4750	14.4857	20.8717	367.1229	15335.0324	18.2164	6.7361	23.951
L4	41.1487	46.7059	9086.0569	13.9303	20.1246	451.4897	18184.0695	23.3574	6.3123	16.833
	48.1312	55.9715	15637.3103	16.6939	24.0792	649.4115	31295.1965	27.9911	7.6824	20.486

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 149'-111'6"				1	1	1		
L2 111'6"-75'3"				1	1	1		
L3 75'3"-39'9"				1	1	1		
L4 39'9"-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
***								
LDF4-50A(1/2")	C	No	Inside Pole	149' - 0'	3	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	149' - 0'	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	139' - 0'	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
LDF7-50A(1-5/8")	B	No	Inside Pole	129' - 0'	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	129' - 0'	5	No Ice	0.00	0.70
						1/2" Ice	0.00	2.23
						1" Ice	0.00	4.38

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.00	10.50
						4" Ice	0.00	30.07
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	129' - 0'	1	No Ice	0.20	0.70
						1/2" Ice	0.30	2.23
						1" Ice	0.40	4.38
						2" Ice	0.60	10.50
						4" Ice	1.00	30.07
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	120' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	120' - 0'	8	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
2" Rigid Conduit	C	No	Inside Pole	120' - 0'	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
***								
LDF4-50A(1/2")	A	No	Inside Pole	80' - 0'	3	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
***								

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	149'-111'6"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.518	0.16
		C	0.000	0.000	0.000	0.000	0.50
L2	111'6"-75'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	7.286	0.33
		C	0.000	0.000	0.000	0.000	1.07
L3	75'3"-39'9"	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	7.135	0.32
		C	0.000	0.000	0.000	0.000	1.05
L4	39'9"-0'	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	7.990	0.36
		C	0.000	0.000	0.000	0.000	1.17

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	149'-111'6"	A	0.884	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	6.611	0.49
		C		0.000	0.000	0.000	0.000	0.71
L2	111'6"-75'3"	A	0.849	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	13.694	1.02
		C		0.000	0.000	0.000	0.000	1.98
L3	75'3"-39'9"	A	0.802	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	13.166	0.97
		C		0.000	0.000	0.000	0.000	1.90

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
L4	39'9"-0'	A	0.750	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	14.362	1.04
		C		0.000	0.000	0.000	0.000	2.06

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	149'-111'6"	0.1245	0.0719	0.2126	0.1228
L2	111'6"-75'3"	0.2429	0.1403	0.4105	0.2370
L3	75'3"-39'9"	0.2455	0.1418	0.4147	0.2394
L4	39'9"-0'	0.2475	0.1429	0.4135	0.2387

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
FO150-3	C	From Leg	2.00 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.09 1.35 1.62 2.20 3.61	1.09 1.35 1.62 2.20 3.61	0.00 0.01 0.02 0.06 0.17
SBNH-1D6565C w/ Mount Pipe	A	From Leg	2.00 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.09 0.18 0.28 0.52 1.16
SBNH-1D6565C w/ Mount Pipe	B	From Leg	2.00 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.09 0.18 0.28 0.52 1.16
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	2.00 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
7770.00 w/ Mount Pipe	A	From Leg	2.00 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
7770.00 w/ Mount Pipe	B	From Leg	2.00 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
7770.00 w/ Mount Pipe	C	From Leg	2.00	0.0000	149'	No Ice	6.12	4.25	0.06

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'			1/2"	6.63	5.01	0.10
			1'			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) LGP21401	A	From Leg	2.00	0.0000	149'	No Ice	1.29	0.23	0.01
			0'			1/2"	1.45	0.31	0.02
			1'			Ice	1.61	0.40	0.03
						1" Ice	1.97	0.61	0.05
						2" Ice	2.79	1.12	0.14
						4" Ice			
(2) LGP21401	B	From Leg	2.00	0.0000	149'	No Ice	1.29	0.23	0.01
			0'			1/2"	1.45	0.31	0.02
			1'			Ice	1.61	0.40	0.03
						1" Ice	1.97	0.61	0.05
						2" Ice	2.79	1.12	0.14
						4" Ice			
(2) LGP21401	C	From Leg	2.00	0.0000	149'	No Ice	1.29	0.23	0.01
			0'			1/2"	1.45	0.31	0.02
			1'			Ice	1.61	0.40	0.03
						1" Ice	1.97	0.61	0.05
						2" Ice	2.79	1.12	0.14
						4" Ice			
RRUS-11	A	From Leg	2.00	0.0000	149'	No Ice	3.25	1.37	0.05
			0'			1/2"	3.49	1.55	0.07
			1'			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
RRUS-11	B	From Leg	2.00	0.0000	149'	No Ice	3.25	1.37	0.05
			0'			1/2"	3.49	1.55	0.07
			1'			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
RRUS-11	C	From Leg	2.00	0.0000	149'	No Ice	3.25	1.37	0.05
			0'			1/2"	3.49	1.55	0.07
			1'			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
DC6-48-60-18-8F	A	From Leg	2.00	0.0000	149'	No Ice	1.27	1.27	0.02
			0'			1/2"	1.46	1.46	0.04
			1'			Ice	1.66	1.66	0.05
						1" Ice	2.09	2.09	0.10
						2" Ice	3.10	3.10	0.21
						4" Ice			
Side Arm Mount [SO 103-3]	C	None		0.0000	149'	No Ice	9.50	9.50	0.22
						1/2"	11.80	11.80	0.32
						Ice	14.10	14.10	0.41
						1" Ice	18.70	18.70	0.60
						2" Ice	27.90	27.90	0.97
						4" Ice			
***									
4' x 2" Pipe Mount	A	From Leg	1.00	0.0000	147'	No Ice	0.79	0.79	0.03
			0'			1/2"	1.03	1.03	0.04
			0'			Ice	1.28	1.28	0.04
						1" Ice	1.81	1.81	0.07
						2" Ice	3.11	3.11	0.17
						4" Ice			
4' x 2" Pipe Mount	B	From Leg	1.00	0.0000	147'	No Ice	0.79	0.79	0.03
			0'			1/2"	1.03	1.03	0.04
			0'			Ice	1.28	1.28	0.04
						1" Ice	1.81	1.81	0.07
						2" Ice	3.11	3.11	0.17

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' x 2" Pipe Mount	C	From Leg	1.00 0' 0'	0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.79 1.03 1.28 1.81 3.11	0.79 1.03 1.28 1.81 3.11	0.03 0.04 0.04 0.07 0.17
Side Arm Mount [SO 102-3]	C	None		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
***									
7770.00 w/ Mount Pipe	A	From Leg	2.00 0' 1'	0.0000	139'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
7770.00 w/ Mount Pipe	B	From Leg	2.00 0' 1'	0.0000	139'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
7770.00 w/ Mount Pipe	C	From Leg	2.00 0' 1'	0.0000	139'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) TMA DD 1900 with 850 BYPASS	A	From Leg	2.00 0' 1'	0.0000	139'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.36 0.48 0.60 0.87 1.52	0.17 0.24 0.32 0.49 0.95	0.02 0.02 0.03 0.05 0.12
(2) TMA DD 1900 with 850 BYPASS	B	From Leg	2.00 0' 1'	0.0000	139'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.36 0.48 0.60 0.87 1.52	0.17 0.24 0.32 0.49 0.95	0.02 0.02 0.03 0.05 0.12
(2) TMA DD 1900 with 850 BYPASS	C	From Leg	2.00 0' 1'	0.0000	139'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.36 0.48 0.60 0.87 1.52	0.17 0.24 0.32 0.49 0.95	0.02 0.02 0.03 0.05 0.12
4' x 2" Pipe Mount	A	From Leg	2.00 0' 0'	0.0000	139'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.79 1.03 1.28 1.81 3.11	0.79 1.03 1.28 1.81 3.11	0.03 0.04 0.04 0.07 0.17
4' x 2" Pipe Mount	B	From Leg	2.00 0' 0'	0.0000	139'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.79 1.03 1.28 1.81 3.11	0.79 1.03 1.28 1.81 3.11	0.03 0.04 0.04 0.07 0.17
4' x 2" Pipe Mount	C	From Leg	2.00 0' 0'	0.0000	139'	No Ice 1/2" Ice	0.79 1.03 1.28	0.79 1.03 1.28	0.03 0.04 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	1.81	1.81	0.07
						2" Ice	3.11	3.11	0.17
						4" Ice			
Side Arm Mount [SO 104-3]	C	None		0.0000	139'	No Ice	3.30	3.30	0.29
						1/2" Ice	4.13	4.13	0.32
						1" Ice	4.96	4.96	0.35
						2" Ice	6.62	6.62	0.41
						4" Ice	9.94	9.94	0.53
***									
APXV18-209014-C w/ Mount Pipe	A	From Leg	2.00 0' 3'	0.0000	129'	No Ice	3.72	3.31	0.04
						1/2" Ice	4.13	4.02	0.07
						1" Ice	4.56	4.68	0.11
						2" Ice	5.51	6.07	0.21
						4" Ice	7.55	9.05	0.52
APXV18-209014-C w/ Mount Pipe	B	From Leg	2.00 0' 3'	0.0000	129'	No Ice	3.72	3.31	0.04
						1/2" Ice	4.13	4.02	0.07
						1" Ice	4.56	4.68	0.11
						2" Ice	5.51	6.07	0.21
						4" Ice	7.55	9.05	0.52
APXV18-209014-C w/ Mount Pipe	C	From Leg	2.00 0' 3'	0.0000	129'	No Ice	3.72	3.31	0.04
						1/2" Ice	4.13	4.02	0.07
						1" Ice	4.56	4.68	0.11
						2" Ice	5.51	6.07	0.21
						4" Ice	7.55	9.05	0.52
LGP 13901	A	From Leg	2.00 0' 3'	0.0000	129'	No Ice	0.59	0.28	0.01
						1/2" Ice	0.69	0.36	0.01
						1" Ice	0.81	0.46	0.02
						2" Ice	1.06	0.67	0.04
						4" Ice	1.68	1.19	0.09
LGP 13901	B	From Leg	2.00 0' 3'	0.0000	129'	No Ice	0.59	0.28	0.01
						1/2" Ice	0.69	0.36	0.01
						1" Ice	0.81	0.46	0.02
						2" Ice	1.06	0.67	0.04
						4" Ice	1.68	1.19	0.09
LGP 13901	C	From Leg	2.00 0' 3'	0.0000	129'	No Ice	0.59	0.28	0.01
						1/2" Ice	0.69	0.36	0.01
						1" Ice	0.81	0.46	0.02
						2" Ice	1.06	0.67	0.04
						4" Ice	1.68	1.19	0.09
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	2.00 0' 3'	0.0000	129'	No Ice	11.68	9.84	0.08
						1/2" Ice	12.40	11.37	0.17
						1" Ice	13.14	12.91	0.27
						2" Ice	14.60	15.27	0.51
						4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	2.00 0' 3'	0.0000	129'	No Ice	11.68	9.84	0.08
						1/2" Ice	12.40	11.37	0.17
						1" Ice	13.14	12.91	0.27
						2" Ice	14.60	15.27	0.51
						4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	2.00 0' 3'	0.0000	129'	No Ice	11.68	9.84	0.08
						1/2" Ice	12.40	11.37	0.17
						1" Ice	13.14	12.91	0.27
						2" Ice	14.60	15.27	0.51
						4" Ice	17.87	20.14	1.15
782 11066	A	From Leg	2.00	0.0000	129'	No Ice	0.17	0.10	0.00

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' 3'			1/2" Ice 1" Ice 2" Ice 4" Ice	0.23 0.30 0.47 0.90	0.15 0.21 0.35 0.75	0.00 0.01 0.01 0.05
782 11066	B	From Leg	2.00 0' 3'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.17 0.23 0.30 0.47 0.90	0.10 0.15 0.21 0.35 0.75	0.00 0.00 0.01 0.01 0.05
782 11066	C	From Leg	2.00 0' 3'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.17 0.23 0.30 0.47 0.90	0.10 0.15 0.21 0.35 0.75	0.00 0.00 0.01 0.01 0.05
Side Arm Mount [SO 104-3]	C	None		0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.30 4.13 4.96 6.62 9.94	3.30 4.13 4.96 6.62 9.94	0.29 0.32 0.35 0.41 0.53
***									
BXA-80080/6CF w/ Mount Pipe	A	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.14 8.79 9.41 10.68 13.32	5.60 6.78 7.67 9.48 13.30	0.05 0.11 0.18 0.34 0.81
BXA-80080/6CF w/ Mount Pipe	B	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.14 8.79 9.41 10.68 13.32	5.60 6.78 7.67 9.48 13.30	0.05 0.11 0.18 0.34 0.81
BXA-80080/6CF w/ Mount Pipe	C	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.14 8.79 9.41 10.68 13.32	5.60 6.78 7.67 9.48 13.30	0.05 0.11 0.18 0.34 0.81
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice	8.62 9.27 9.90 11.17 13.84	7.08 8.28 9.19 11.03 15.07	0.08 0.15 0.22 0.40 0.91

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			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.62 9.27 9.90 11.17 13.84	7.08 8.28 9.19 11.03 15.07	0.08 0.15 0.22 0.40 0.91
SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.62 9.27 9.90 11.17 13.84	7.08 8.28 9.19 11.03 15.07	0.08 0.15 0.22 0.40 0.91
RRH2X60-AWS	A	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-AWS	B	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-AWS	C	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2X60-PCS	A	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	B	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	C	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
DB-T1-6Z-8AB-0Z	A	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
DB-T1-6Z-8AB-0Z	B	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
(2) 4' x 2" Pipe Mount	A	From Leg	3.00 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07

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	3.11	3.11	0.17
						4" Ice			
(2) 4' x 2" Pipe Mount	B	From Leg	3.00 0' 0'	0.0000	120'	No Ice	0.79	0.79	0.03
						1/2" Ice	1.03	1.03	0.04
							1.28	1.28	0.04
						1" Ice	1.81	1.81	0.07
						2" Ice	3.11	3.11	0.17
						4" Ice			
(2) 4' x 2" Pipe Mount	C	From Leg	3.00 0' 0'	0.0000	120'	No Ice	0.79	0.79	0.03
						1/2" Ice	1.03	1.03	0.04
							1.28	1.28	0.04
						1" Ice	1.81	1.81	0.07
						2" Ice	3.11	3.11	0.17
						4" Ice			
(2) 6' x 2" Horizontal Mount Pipe	A	From Leg	3.00 0' 0'	0.0000	120'	No Ice	0.80	0.80	0.03
						1/2" Ice	1.22	1.22	0.17
							1.64	1.64	0.32
						1" Ice	2.53	2.53	0.65
						2" Ice	4.44	4.44	1.39
						4" Ice			
(2) 6' x 2" Horizontal Mount Pipe	B	From Leg	3.00 0' 0'	0.0000	120'	No Ice	0.80	0.80	0.03
						1/2" Ice	1.22	1.22	0.17
							1.64	1.64	0.32
						1" Ice	2.53	2.53	0.65
						2" Ice	4.44	4.44	1.39
						4" Ice			
(2) 6' x 2" Horizontal Mount Pipe	C	From Leg	3.00 0' 0'	0.0000	120'	No Ice	0.80	0.80	0.03
						1/2" Ice	1.22	1.22	0.17
							1.64	1.64	0.32
						1" Ice	2.53	2.53	0.65
						2" Ice	4.44	4.44	1.39
						4" Ice			
Side Arm Mount [SO 104-3]	C	None		0.0000	120'	No Ice	3.30	3.30	0.29
						1/2" Ice	4.13	4.13	0.32
							4.96	4.96	0.35
						1" Ice	6.62	6.62	0.41
						2" Ice	9.94	9.94	0.53
						4" Ice			
***									
***									
***									
FO150-3	A	From Leg	1.00 0' 0'	0.0000	80'	No Ice	1.09	1.09	0.00
						1/2" Ice	1.35	1.35	0.01
							1.62	1.62	0.02
						1" Ice	2.20	2.20	0.06
						2" Ice	3.61	3.61	0.17
						4" Ice			
6' x 2" Mount Pipe	A	From Leg	0.50 0' 0'	0.0000	80'	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
							2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
Pipe Mount [PM 601-1]	A	From Leg	0.50 0' 0'	0.0000	80'	No Ice	3.00	0.90	0.07
						1/2" Ice	3.74	1.12	0.08
							4.48	1.34	0.09
						1" Ice	5.96	1.78	0.12
						2" Ice	8.92	2.66	0.18
						4" Ice			
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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
MPRD2449	A	Paraboloid w/Radome	From Leg	1.00 0' 0'	0.0000		80'	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.69 3.98 4.27 4.84 6.00	0.04 0.06 0.08 0.12 0.20

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	149 - 111.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.49	-0.64	0.05
			Max. Mx	5	-5.05	-255.22	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-5.03	-0.09	255.21
			Max. Vy	5	14.42	-255.22	-0.01
			Max. Vx	8	14.49	-0.23	-255.01
			Max. Torque	7			0.89
L2	111.5 - 75.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.65	-0.35	-0.74
			Max. Mx	5	-9.55	-819.87	-2.06
			Max. My	2	-9.53	2.04	822.43
			Max. Vy	5	17.59	-819.87	-2.06
			Max. Vx	8	17.81	-2.25	-822.20
			Max. Torque	6			1.27
L3	75.25 - 39.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.24	0.04	-2.18
			Max. Mx	5	-15.64	-1480.26	-5.06
			Max. My	8	-15.63	-4.18	-1490.70
			Max. Vy	11	-20.34	1480.24	3.29
			Max. Vx	8	20.56	-4.18	-1490.70
			Max. Torque	6			1.27
L4	39.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.35	0.59	-4.22
			Max. Mx	11	-26.59	2466.92	4.54
			Max. My	8	-26.59	-6.60	-2487.58
			Max. Vy	11	-23.45	2466.92	4.54
			Max. Vx	8	23.66	-6.60	-2487.58
			Max. Torque	6			1.27

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	43.35	-0.01	-5.49
	Max. H_x	11	26.60	23.42	0.04
	Max. H_z	2	26.60	0.06	23.62
	Max. M_x	2	2484.29	0.06	23.62
	Max. M_z	5	2466.60	-23.42	-0.08
	Max. Torsion	6	1.27	-20.34	-11.87
	Min. Vert	1	26.60	0.00	0.00
	Min. H_x	5	26.60	-23.42	-0.08
	Min. H_z	8	26.60	-0.06	-23.64
	Min. M_x	8	-2487.58	-0.06	-23.64
	Min. M_z	11	-2466.92	23.42	0.04
	Min. Torsion	12	-1.26	20.31	11.83

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	26.60	0.00	0.00	0.60	0.16	0.00
Dead+Wind 0 deg - No Ice	26.60	-0.06	-23.62	-2484.29	6.93	0.89
Dead+Wind 30 deg - No Ice	26.60	11.67	-20.41	-2147.06	-1228.21	0.28
Dead+Wind 60 deg - No Ice	26.60	20.26	-11.73	-1233.81	-2132.70	-0.38
Dead+Wind 90 deg - No Ice	26.60	23.42	0.08	8.99	-2466.60	-0.94
Dead+Wind 120 deg - No Ice	26.60	20.34	11.87	1249.80	-2141.27	-1.27
Dead+Wind 150 deg - No Ice	26.60	11.79	20.50	2157.94	-1241.56	-1.25
Dead+Wind 180 deg - No Ice	26.60	0.06	23.64	2487.58	-6.60	-0.88
Dead+Wind 210 deg - No Ice	26.60	-11.69	20.45	2151.20	1230.18	-0.28
Dead+Wind 240 deg - No Ice	26.60	-20.28	11.77	1238.10	2134.85	0.38

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 270 deg - No Ice	26.60	-23.42	-0.04	-4.54	2466.92	0.93
Dead+Wind 300 deg - No Ice	26.60	-20.31	-11.83	-1245.50	2139.74	1.26
Dead+Wind 330 deg - No Ice	26.60	-11.77	-20.47	-2153.79	1240.23	1.25
Dead+Ice+Temp	43.35	0.00	0.00	4.22	0.59	0.00
Dead+Wind 0 deg+Ice+Temp	43.35	-0.01	-5.48	-601.49	1.57	0.23
Dead+Wind 30 deg+Ice+Temp	43.35	2.71	-4.74	-519.62	-299.75	0.09
Dead+Wind 60 deg+Ice+Temp	43.35	4.70	-2.73	-297.23	-520.24	-0.08
Dead+Wind 90 deg+Ice+Temp	43.35	5.44	0.01	5.68	-601.39	-0.22
Dead+Wind 120 deg+Ice+Temp	43.35	4.72	2.75	308.30	-521.63	-0.31
Dead+Wind 150 deg+Ice+Temp	43.35	2.73	4.76	529.95	-301.80	-0.32
Dead+Wind 180 deg+Ice+Temp	43.35	0.01	5.49	610.65	-0.37	-0.23
Dead+Wind 210 deg+Ice+Temp	43.35	-2.72	4.75	528.98	301.31	-0.09
Dead+Wind 240 deg+Ice+Temp	43.35	-4.71	2.73	306.62	521.85	0.08
Dead+Wind 270 deg+Ice+Temp	43.35	-5.44	-0.00	3.74	602.58	0.22
Dead+Wind 300 deg+Ice+Temp	43.35	-4.71	-2.74	-298.92	522.40	0.31
Dead+Wind 330 deg+Ice+Temp	43.35	-2.73	-4.75	-520.59	302.62	0.32
Dead+Wind 0 deg - Service	26.60	-0.02	-8.17	-860.65	2.50	0.31
Dead+Wind 30 deg - Service	26.60	4.04	-7.06	-743.77	-425.59	0.10
Dead+Wind 60 deg - Service	26.60	7.01	-4.06	-427.23	-739.08	-0.13
Dead+Wind 90 deg - Service	26.60	8.11	0.03	3.51	-854.81	-0.33
Dead+Wind 120 deg - Service	26.60	7.04	4.11	433.57	-742.06	-0.44
Dead+Wind 150 deg - Service	26.60	4.08	7.10	748.34	-430.23	-0.44
Dead+Wind 180 deg - Service	26.60	0.02	8.18	862.59	-2.19	-0.31
Dead+Wind 210 deg - Service	26.60	-4.05	7.08	745.99	426.48	-0.10
Dead+Wind 240 deg - Service	26.60	-7.02	4.07	429.51	740.03	0.13
Dead+Wind 270 deg - Service	26.60	-8.11	-0.01	-1.18	855.12	0.33
Dead+Wind 300 deg - Service	26.60	-7.03	-4.09	-431.29	741.73	0.44
Dead+Wind 330 deg - Service	26.60	-4.07	-7.08	-746.11	429.96	0.44

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-26.60	0.00	0.00	26.60	0.00	0.000%
2	-0.06	-26.60	-23.62	0.06	26.60	23.62	0.000%
3	11.67	-26.60	-20.41	-11.67	26.60	20.41	0.000%
4	20.26	-26.60	-11.73	-20.26	26.60	11.73	0.000%
5	23.42	-26.60	0.08	-23.42	26.60	-0.08	0.000%
6	20.34	-26.60	11.87	-20.34	26.60	-11.87	0.000%
7	11.79	-26.60	20.50	-11.79	26.60	-20.50	0.000%
8	0.06	-26.60	23.64	-0.06	26.60	-23.64	0.000%
9	-11.69	-26.60	20.45	11.69	26.60	-20.45	0.000%
10	-20.28	-26.60	11.77	20.28	26.60	-11.77	0.000%
11	-23.42	-26.60	-0.04	23.42	26.60	0.04	0.000%
12	-20.31	-26.60	-11.83	20.31	26.60	11.83	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
13	-11.77	-26.60	-20.47	11.77	26.60	20.47	0.000%
14	0.00	-43.35	0.00	-0.00	43.35	-0.00	0.000%
15	-0.01	-43.35	-5.48	0.01	43.35	5.48	0.000%
16	2.71	-43.35	-4.74	-2.71	43.35	4.74	0.000%
17	4.70	-43.35	-2.73	-4.70	43.35	2.73	0.000%
18	5.44	-43.35	0.01	-5.44	43.35	-0.01	0.000%
19	4.72	-43.35	2.75	-4.72	43.35	-2.75	0.000%
20	2.73	-43.35	4.76	-2.73	43.35	-4.76	0.000%
21	0.01	-43.35	5.49	-0.01	43.35	-5.49	0.000%
22	-2.72	-43.35	4.75	2.72	43.35	-4.75	0.000%
23	-4.71	-43.35	2.73	4.71	43.35	-2.73	0.000%
24	-5.44	-43.35	-0.00	5.44	43.35	0.00	0.000%
25	-4.71	-43.35	-2.74	4.71	43.35	2.74	0.000%
26	-2.73	-43.35	-4.75	2.73	43.35	4.75	0.000%
27	-0.02	-26.60	-8.17	0.02	26.60	8.17	0.000%
28	4.04	-26.60	-7.06	-4.04	26.60	7.06	0.000%
29	7.01	-26.60	-4.06	-7.01	26.60	4.06	0.000%
30	8.11	-26.60	0.03	-8.11	26.60	-0.03	0.000%
31	7.04	-26.60	4.11	-7.04	26.60	-4.11	0.000%
32	4.08	-26.60	7.10	-4.08	26.60	-7.10	0.000%
33	0.02	-26.60	8.18	-0.02	26.60	-8.18	0.000%
34	-4.05	-26.60	7.08	4.05	26.60	-7.08	0.000%
35	-7.02	-26.60	4.07	7.02	26.60	-4.07	0.000%
36	-8.11	-26.60	-0.01	8.11	26.60	0.01	0.000%
37	-7.03	-26.60	-4.09	7.03	26.60	4.09	0.000%
38	-4.07	-26.60	-7.08	4.07	26.60	7.08	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	0.00047293
3	Yes	5	0.00000001	0.00065303
4	Yes	5	0.00000001	0.00065391
5	Yes	4	0.00000001	0.00046109
6	Yes	5	0.00000001	0.00063856
7	Yes	5	0.00000001	0.00067202
8	Yes	4	0.00000001	0.00075060
9	Yes	5	0.00000001	0.00064524
10	Yes	5	0.00000001	0.00064509
11	Yes	4	0.00000001	0.00073689
12	Yes	5	0.00000001	0.00067144
13	Yes	5	0.00000001	0.00063726
14	Yes	4	0.00000001	0.00001619
15	Yes	5	0.00000001	0.00021229
16	Yes	5	0.00000001	0.00028918
17	Yes	5	0.00000001	0.00028840
18	Yes	5	0.00000001	0.00021272
19	Yes	5	0.00000001	0.00029146
20	Yes	5	0.00000001	0.00029637
21	Yes	5	0.00000001	0.00021482
22	Yes	5	0.00000001	0.00029137
23	Yes	5	0.00000001	0.00029120
24	Yes	5	0.00000001	0.00021249
25	Yes	5	0.00000001	0.00029117
26	Yes	5	0.00000001	0.00028731
27	Yes	4	0.00000001	0.00012818
28	Yes	5	0.00000001	0.00006456
29	Yes	5	0.00000001	0.00006451
30	Yes	4	0.00000001	0.00012802
31	Yes	5	0.00000001	0.00006172
32	Yes	5	0.00000001	0.00006848
33	Yes	4	0.00000001	0.00014659
34	Yes	5	0.00000001	0.00006303

35	Yes	5	0.00000001	0.00006279
36	Yes	4	0.00000001	0.00014606
37	Yes	5	0.00000001	0.00006803
38	Yes	5	0.00000001	0.00006155

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	38.605	32	2.2076	0.0046
L2	115.25 - 75.25	23.533	32	1.9819	0.0029
L3	79.75 - 39.75	10.898	32	1.3379	0.0015
L4	45 - 0	3.371	32	0.6861	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149'	FO150-3	32	38.605	2.2076	0.0046	28245
147'	4' x 2" Pipe Mount	32	37.679	2.2000	0.0045	28245
139'	7770.00 w/ Mount Pipe	32	33.992	2.1672	0.0041	14122
129'	APXV18-209014-C w/ Mount Pipe	32	29.464	2.1115	0.0036	7060
120'	BXA-80080/6CF w/ Mount Pipe	32	25.532	2.0357	0.0031	4868
80'	MPRD2449	32	10.971	1.3430	0.0015	2929

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	111.005	7	6.3576	0.0136
L2	115.25 - 75.25	67.728	7	5.7085	0.0084
L3	79.75 - 39.75	31.398	7	3.8558	0.0043
L4	45 - 0	9.719	7	1.9782	0.0016

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149'	FO150-3	7	111.005	6.3576	0.0136	10036
147'	4' x 2" Pipe Mount	7	108.348	6.3358	0.0132	10036
139'	7770.00 w/ Mount Pipe	7	97.762	6.2413	0.0119	5017
129'	APXV18-209014-C w/ Mount Pipe	7	84.762	6.0811	0.0104	2506
120'	BXA-80080/6CF w/ Mount Pipe	7	73.469	5.8631	0.0091	1726
80'	MPRD2449	7	31.607	3.8704	0.0044	1028

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	149 - 111.5 (1)	TP29.487x23x0.1875	37'6"	0'	0.0	38.694	17.0508	-5.03	659.77	0.008
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.2188	40'	0'	0.0	38.203	23.8745	-9.53	912.08	0.010
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	40'	0'	0.0	39.000	35.6152	-15.62	1388.99	0.011
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	45'	0'	0.0	39.000	55.9715	-26.59	2182.89	0.012

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	149 - 111.5 (1)	TP29.487x23x0.1875	255.23	25.374	38.694	0.656	0.00	0.000	38.694	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.2188	823.56	48.713	38.203	1.275	0.00	0.000	38.203	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	1492.33	51.033	39.000	1.309	0.00	0.000	39.000	0.000
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	2489.61	46.004	39.000	1.180	0.00	0.000	39.000	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	149 - 111.5 (1)	TP29.487x23x0.1875	14.49	0.850	26.000	0.065	0.84	0.041	26.000	0.002
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.2188	17.78	0.745	26.000	0.057	1.18	0.034	26.000	0.001
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	20.57	0.578	26.000	0.044	1.21	0.020	26.000	0.001
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	23.68	0.423	26.000	0.033	1.25	0.011	26.000	0.000

Pole Interaction Design Data

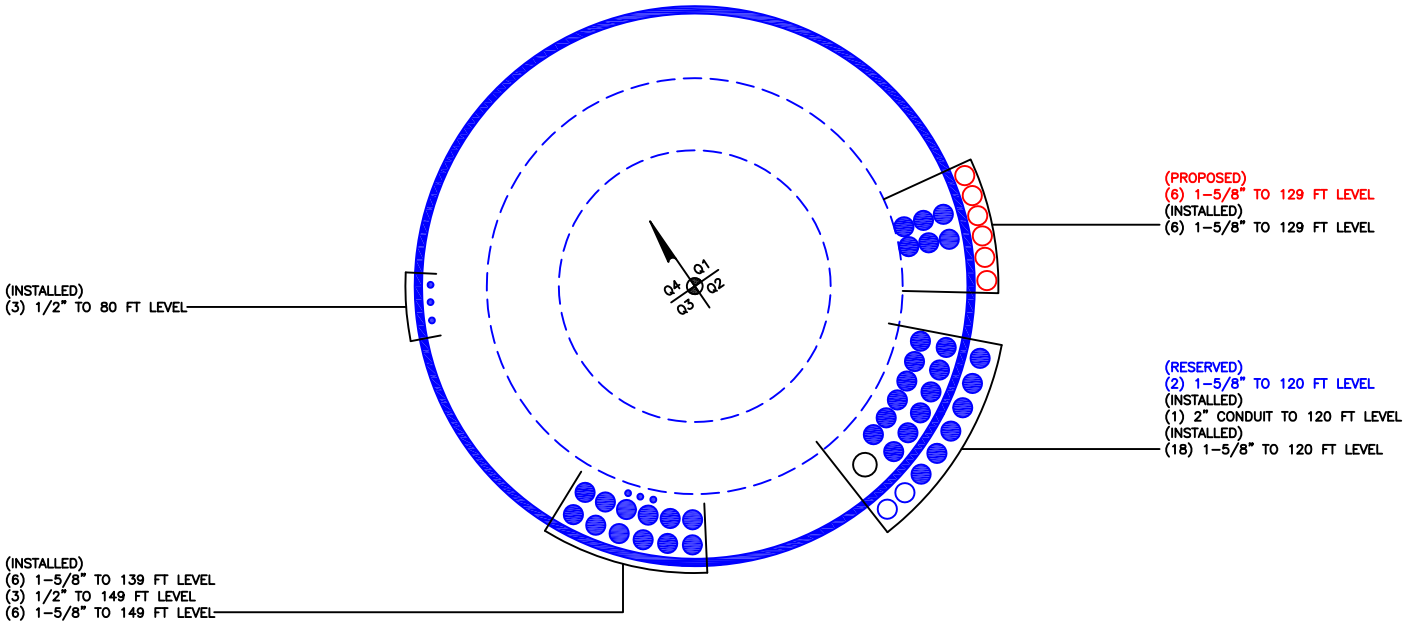
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 111.5 (1)	0.008	0.656	0.000	0.065	0.002	0.665 ✔	1.333	H1-3+VT ✔
L2	111.5 - 75.25 (2)	0.010	1.275	0.000	0.057	0.001	1.286 ✔	1.333	H1-3+VT ✔
L3	75.25 - 39.75 (3)	0.011	1.309	0.000	0.044	0.001	1.320 ✔	1.333	H1-3+VT ✔
L4	39.75 - 0 (4)	0.012	1.180	0.000	0.033	0.000	1.192 ✔	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	149 - 111.5	Pole	TP29.487x23x0.1875	1	-5.03	879.47	49.9	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-9.53	1215.80	96.5	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-15.62	1851.52	99.0	Pass
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-26.59	2909.79	89.4	Pass
							Summary	
						Pole (L3)	99.0	Pass
						RATING =	**99.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 845455 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *845455*
Site Name: *OXFORD-QUAKER FARM*
App #: *263999, Rev. 2*

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	54	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	2.75	in
Grade:	60	ksi
Clip Distance:	10	in

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

Pole Data		
Diam:	47.4	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2490	ft-kips
Unfactored Axial, P:	27	kips
Unfactored Shear, V:	24	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	182.2	Kips
Allowable Tension:	195.0	Kips
Anchor Rod Stress Ratio:	93.5%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	45.4	ksi
Allowable PL Bending Stress:	60.0	ksi
Base Plate Stress Ratio:	75.6%	**Pass**

PL Ref. Data	
Yield Line (in):	27.55
Max PL Length:	27.55

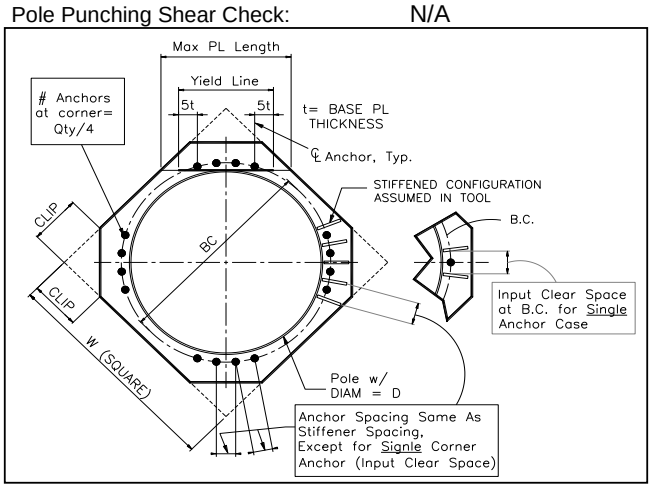
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

Monopole Pier and Pad Foundation

BU # : 845455
Site Name: OXFORD-QUAKER FARMS
App. Number: 263999 Rev. 2

TIA-222 Revision: F

Design Reactions		
Shear, **S**:	24	kips
Moment, **M**:	2490	ft-kips
Tower Height, **H**:	149	ft
Tower Weight, **Wt**:	27	kips
Base Diameter, **BD**:	3.95	ft

Foundation Dimensions		
Depth, **D**:	7	ft
Pad Width, **W**:	21.5	ft
Neglected Depth, **N**:	3	ft
Thickness, **T**:	3.00	ft
Pier Diameter, **Pd**:	7.00	ft
Ext. Above Grade, **E**:	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, **Cc**:	3.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.125	kcf
Ult. Bearing Capacity, Bc:	30.0	ksf
Angle of Friction, **Φ**:	36	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.55	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	11	
Pier Rebar Quanity, **mp**:	24	18
Pad Rebar Size, **Spad**:	10	
Pad Rebar Quanity, **mpad**:	21	7
Pier Tie Size, **St**:	5	4
Tie Quanity, **mt**:	10	5

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	7	5.45	**OK**
Overturning (ft-kips)	3567.04	2490.00	**69.8%**
Shear Capacity (kips)	148.77	24.00	**16.1%**
Bearing (ksf)	22.50	3.57	**15.9%**
Pad Shear - 1-way (kips)	686.04	319.21	**46.5%**
Pad Shear - 2-way (kips)	1944.15	91.38	**4.7%**
Pad Moment Capacity (k-ft)	3738.33	1008.81	**27.0%**
Pier Moment Capacity (k-ft)	4540.35	2598.00	**57.2%**

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = -27.00 kips

Pier Properties

Concrete:

Pier Diameter = 7.0 ft

Concrete Area = 5541.8 in^2

Reinforcement:

Clear Cover = 3.00 in

Cage Diameter = 6.38 ft

Bar Size = 11

Bar Diameter = 1.41 in

Bar Area = 1.56 in^2

Number of Bars = 24

Material Properties

Concrete compressive strength = 3000 psi

Reinforcement yield strength = 60000 psi

Modulus of elasticity = 29000 ksi

Reinforcement yield strain = 0.00207

Limiting compressive strain = 0.003

Seismic Properties

Seismic Zone = 1

Minimum Area of Steel

Required area of steel = 27.71 in^2

Provided area of steel = 37.44 in^2 **OK**

Axial Loading

Load factor = 1.3

Reduction factor = 0.9

Factored axial load = -39 kips

Neutral Axis

Distance from extreme edge to neutral axis = 14.31 in

Equivalent compression zone factor = 0.85

Distance from extreme edge to equivalent compression zone factor = 12.16 in

Distance from centroid to neutral axis = 27.69 in

Compression Zone

Area of steel in compression zone = 7.80 in^2

Angle from centroid of pier to intersection of equivalent compression zone and edge of pier = 44.73 deg

Area of concrete in compression = 495.20 in^2

Force in concrete = 0.85 * f`c * Acc = 1262.76 kips

Total reinforcement forces = -1223.76 kips

Factored axial load = -39.00 kips

Force in concrete = -1262.76 kips

Sum of the forces in concrete = 0.00 kips **OK**

Maximum Moment

First moment of the concrete area in compression about the centoid = 17217.35 in^3

Distance between centroid of concrete in compression and centroid of pier = 34.77 in

Moment of concrete in compression = 43904.24 in-kips

Total reinforcement moment = 34795.23 in-kips

Nominal moment strength of column = 78699.47 in-kips

Factored moment strength of column = 54484.25 in-kips

Maximum Allowable Moment = 4540.35 ft-kips

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in^2)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-27.69	-29.84	-0.005806	0.00	-60.00	-93.60
2	15.00	9.91	-17.78	-19.93	-0.003728	0.00	-60.00	-93.60
3	30.00	19.15	-8.54	-10.69	-0.001791	0.00	-51.95	-81.04
4	45.00	27.08	-0.61	-2.76	-0.000128	0.00	-3.72	-5.81
5	60.00	33.16	5.47	3.33	0.0011475	1.56	33.28	47.94
6	75.00	36.99	9.30	7.15	0.0019496	1.56	56.54	84.22
7	90.00	38.30	10.60	8.46	0.0022232	1.56	60.00	89.62
8	105.00	36.99	9.30	7.15	0.0019496	1.56	56.54	84.22
9	120.00	33.16	5.47	3.33	0.0011475	1.56	33.28	47.94
10	135.00	27.08	-0.61	-2.76	-0.000128	0.00	-3.72	-5.81
11	150.00	19.15	-8.54	-10.69	-0.001791	0.00	-51.95	-81.04
12	165.00	9.91	-17.78	-19.93	-0.003728	0.00	-60.00	-93.60
13	180.00	0.00	-27.69	-29.84	-0.005806	0.00	-60.00	-93.60
14	195.00	-9.91	-37.60	-39.75	-0.007884	0.00	-60.00	-93.60
15	210.00	-19.15	-46.84	-48.99	-0.00982	0.00	-60.00	-93.60
16	225.00	-27.08	-54.77	-56.92	-0.011483	0.00	-60.00	-93.60
17	240.00	-33.16	-60.86	-63.00	-0.012759	0.00	-60.00	-93.60
18	255.00	-36.99	-64.68	-66.83	-0.013561	0.00	-60.00	-93.60
19	270.00	-38.30	-65.99	-68.13	-0.013835	0.00	-60.00	-93.60
20	285.00	-36.99	-64.68	-66.83	-0.013561	0.00	-60.00	-93.60
21	300.00	-33.16	-60.86	-63.00	-0.012759	0.00	-60.00	-93.60
22	315.00	-27.08	-54.77	-56.92	-0.011483	0.00	-60.00	-93.60
23	330.00	-19.15	-46.84	-48.99	-0.00982	0.00	-60.00	-93.60
24	345.00	-9.91	-37.60	-39.75	-0.007884	0.00	-60.00	-93.60

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

T-Mobile Existing Facility

Site ID: CTNH211B

Oxford- Quaker Farms
85 Quaker Farm Road
Oxford, CT 06478

January 28, 2015

EBI Project Number: 62150650

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	42.64 %

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January 28, 2015

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

Emissions Analysis for Site: **CTNH211B – Oxford- Quaker Farms**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **85 Quaker Farm Road, Oxford, 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 **85 Quaker Farm Road, Oxford, 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 (AWS Band – 2100 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 (AWS Band – 2100 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 **RFS APXV18-209014** 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 **RFS APXV18-209014** 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 **132 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.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXV18-209014	Make / Model:	RFS APXV18-209014	Make / Model:	RFS APXV18-209014
Gain:	14.4 dBd	Gain:	14.4 dBd	Gain:	14.4 dBd
Height (AGL):	132	Height (AGL):	132	Height (AGL):	132
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	6,610.15	ERP (W):	6,610.15	ERP (W):	6,610.15
Antenna A1 MPE%	1.50	Antenna B1 MPE%	1.50	Antenna C1 MPE%	1.50
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):	132	Height (AGL):	132	Height (AGL):	132
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):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.42	Antenna B3 MPE%	0.42	Antenna C3 MPE%	0.42

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**5.75**
AT&T	14.90 %
Verizon Wireless	21.99 %
Site Total MPE %:	**42.64 %**

T-Mobile Sector 1 Total:	1.92 %
T-Mobile Sector 2 Total:	1.92 %
T-Mobile Sector 3 Total:	1.92 %
Site Total:	42.64 %

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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:	1.92 %
Sector 2:	1.92 %
Sector 3 :	1.92 %
T-Mobile Total:	5.75 %
Site Total:	42.64 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **42.64%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

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