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

August 26, 2015

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

RE: **T-Mobile-Exempt Modification - Crown Site BU: 806373**
T-Mobile Site ID: CT11066A
Located at: 4 Oliver Road, Enfield, CT 06082

Dear Ms. Bachman:

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

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **4 Oliver Road, Enfield, CT**. 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 additional 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. A Structural Modification Report confirming that the tower and foundation can support T-Mobile's proposed modifications is included as Exhibit-2.

5. The operation of the additional 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.

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). Please send approval/rejection letter to Attn: Kimberly Myl.

Sincerely,

Kimberly Myl
Real Estate Specialist

Enclosures

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

cc: The Honorable Scott R. Kaupin, Mayor
Enfield Town Hall
Office of the Mayor
820 Enfield Street
Enfield, CT 06082-2997

5676

CROWN CASTLE - ETA PROPERTY
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

32-61-1110

DATE 8/27/15

PAY TO THE ORDER OF Connecticut Siting Council $ 625.00

six hundred twenty-five & 00/100 DOLLARS

Security Features Included. Details on Back.

VALID FOR 180 DAYS

CHASE
JPMorgan Chase Bank, N.A.
www.Chase.com

TMO 700 zon.

FOR CT11066A_806373_340885_303539

⑈005676⑈ ⑆111000614⑆ 464638168⑈

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11066A
CROWN CASTLE BU #: 806373
SITE NAME: HRT 101 943232
4 OLIVER ROAD
ENFIELD, CT 06082
HARTFORD COUNTY

VICINITY MAP

FROM CLIFTON PARK, NY:

DEPART CORPORATE PARK DRIVE TOWARD ROUTE 9/US. TURN RIGHT ONTO ROUTE 9. MERGE ONTO I-90E TOWARD BOSTON. TAKE EXIT 4 TOWARD US-5/SPRINGFIELD/HOLYOKE. MERGE ONTO US-5 S. MERGE ONTO I-91 S. TAKE EXIT 46. TURN RIGHT ONTO KING ST/US-5 N. TURN RIGHT ONTO OLIVER RD. SITE WILL BE ON THE RIGHT.

ENGINEER
DEWBERRY ENGINEERS INC.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054

CONTACT: BRYAN HUFF
PHONE #: (973) 576-0147

CONSTRUCTION
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NJ 12065

CONTACT: PATRICIA PELON
PHONE #: (518) 373-3507

CONSULTANT TEAM

SITE NAME:
HRT 101 943232

SITE NUMBER:
CT11066A

TOWER OWNER:
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NJ 12065

APPLICANT/DEVELOPER:
T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054

COORDINATES:
LATITUDE: 41°-57'-36.2" N (NAD83)
LONGITUDE: 72°-35'-32.3" W (NAD83)
(PER CROWN CASTLE)

CONFIGURATION
702Cu

PROJECT SUMMARY

SITE ADDRESS:
4 OLIVER ROAD
ENFIELD, CT 06082
HARTFORD COUNTY

PROJECT DIRECTORY

- REMOVE AND REPLACE EXISTING ANTENNA MOUNT WITH (1) NEW ANTENNA MOUNT.
- INSTALL (3) NEW ANTENNAS.
- INSTALL (3) NEW RRU'S.
- REMOVE (6) EXISTING LINES OF COAX.
- RELOCATE (6) EXISTING ANTENNAS & (3) TMA'S TO NEW MOUNTS.

SCOPE OF WORK

A.D.A. COMPLIANCE:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET
G-1	GENERAL NOTES
C-1	COMPOUND PLAN & EQUIPMENT PLANS
C-2	ANTENNA LAYOUTS & ELEVATIONS
C-3	CONSTRUCTION DETAILS
E-1	GROUNDING NOTES & DETAILS

SHEET INDEX

T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11066A
HRT 101 943232

CONSTRUCTION DRAWINGS

0	08/14/15	ISSUED AS FINAL
A	08/11/15	ISSUED FOR REVIEW

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

JIANG YU
CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074597
SITE ADDRESS:	

4 OLIVER ROAD
ENFIELD, CT 06082
HARTFORD COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

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.

T-Mobile
T–MOBILE NORTHEAST LLC
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CROWN CASTLE
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11066A
HRT 101 943232

CONSTRUCTION DRAWINGS

0	08/14/15	ISSUED AS FINAL
A	08/11/15	ISSUED FOR REVIEW

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STATE OF CONNECTICUT
JIANG YU
No. 23222
LICENSED PROFESSIONAL ENGINEER
CONNECTICUT LICENSE NO. 23222
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DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074597
SITE ADDRESS:	

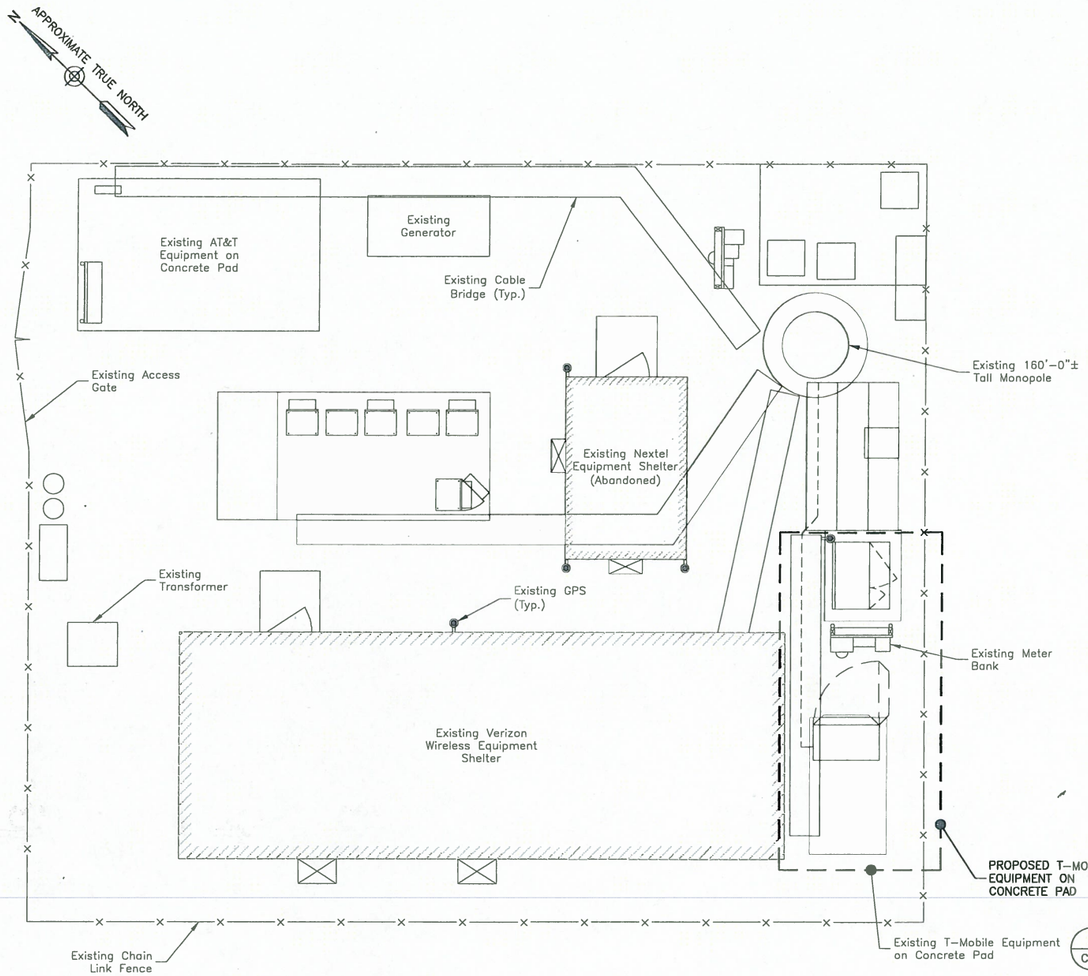
4 OLIVER ROAD
ENFIELD, CT 06082
HARTFORD COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

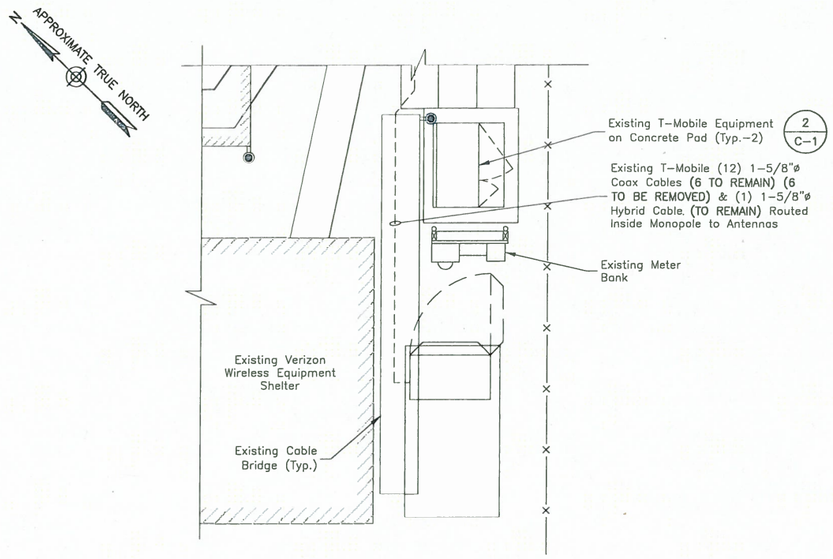
G–1



COMPOUND PLAN 1

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

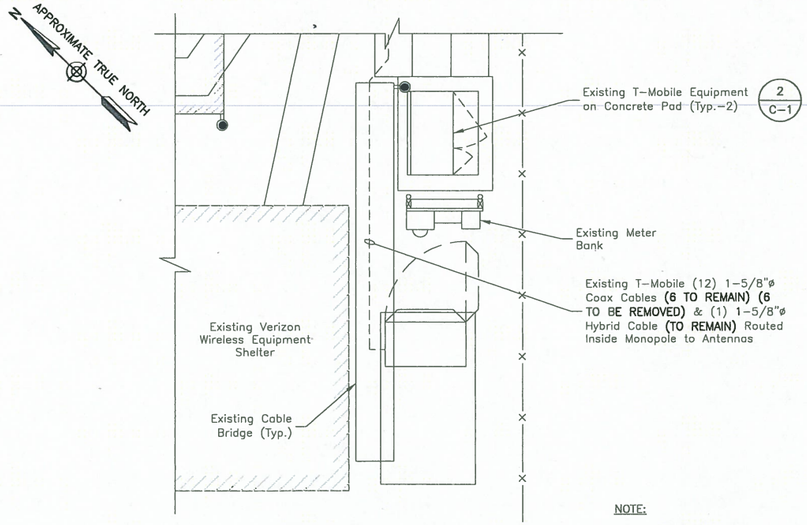
0' 5' 10'



EXISTING EQUIPMENT PLAN 2

SCALE: 1/8"=1' FOR 11"x17"
1/4"=1' FOR 22"x34"

0' 2' 4' 8'



NOTE:

1. NO EQUIPMENT IS PROPOSED AT GRADE.

PROPOSED EQUIPMENT PLAN 3

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

0' 1' 2' 4'

NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD AND COMPANY DATED JULY 23, 2015.

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STATE OF CONNECTICUT
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10/7/2022
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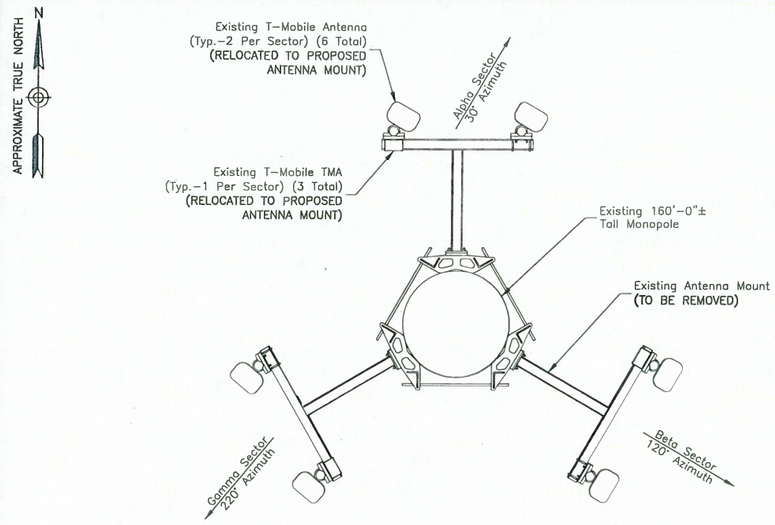
ENFIELD, CT 06082
HARTFORD COUNTY

SHEET TITLE

COMPOUND PLAN & EQUIPMENT PLANS

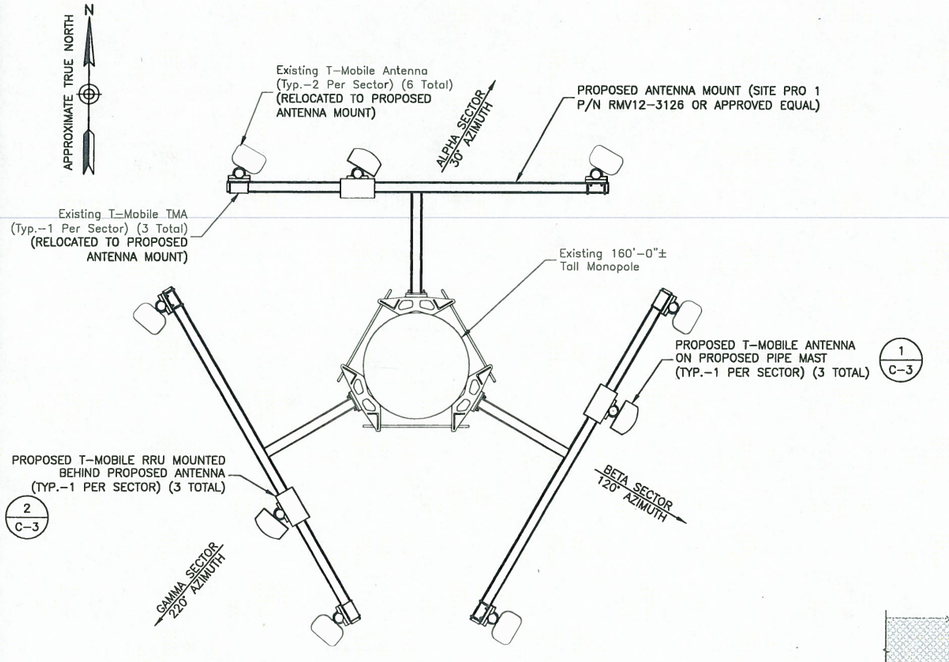
SHEET NUMBER

C-1



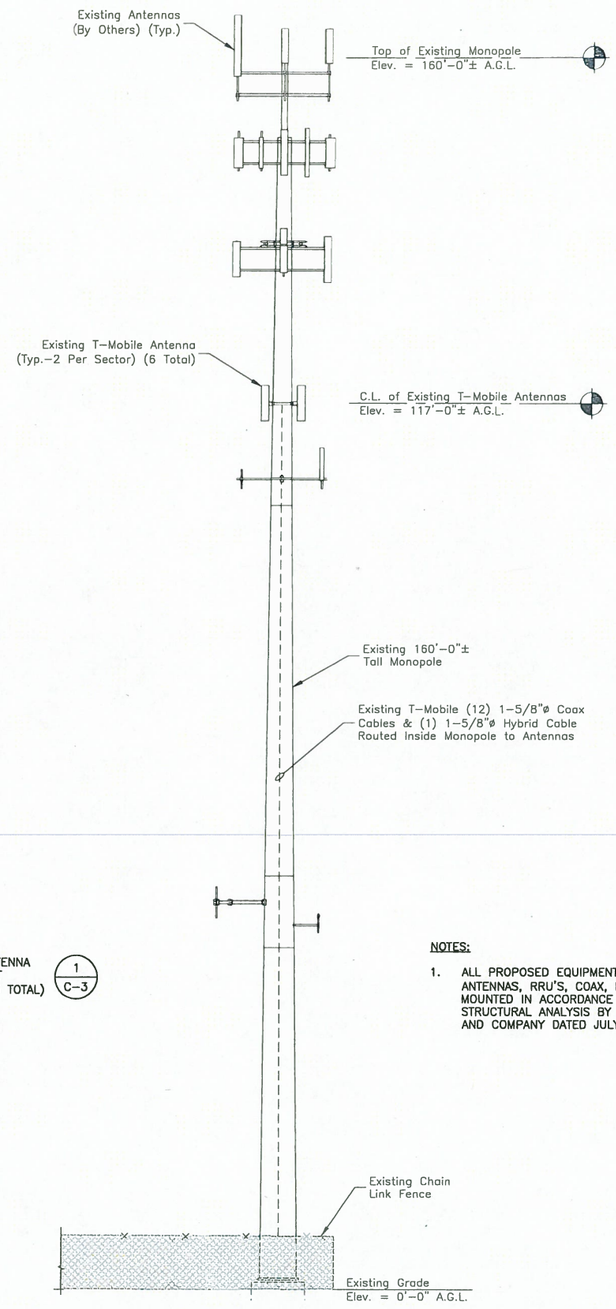
EXISTING ANTENNA LAYOUT 1

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT 2

SCALE: N.T.S.



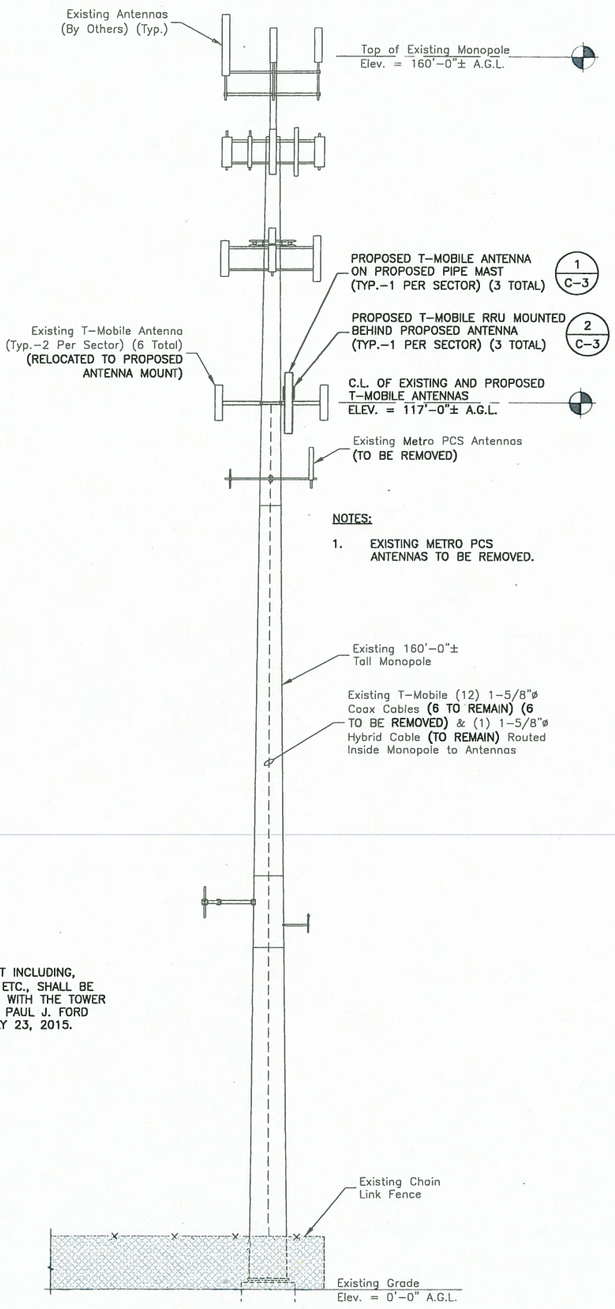
EXISTING ELEVATION 3

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

0' 10' 20'

NOTES:

1. ALL PROPOSED EQUIPMENT INCLUDING, ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD AND COMPANY DATED JULY 23, 2015.



PROPOSED ELEVATION 4

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

0' 10' 20'

NOTES:

1. EXISTING METRO PCS ANTENNAS TO BE REMOVED.

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SITE ADDRESS:	

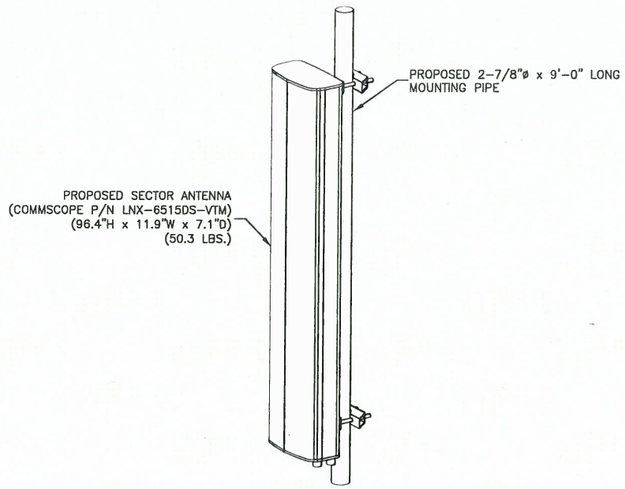
4 OLIVER ROAD
ENFIELD, CT 06082
HARTFORD COUNTY

SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

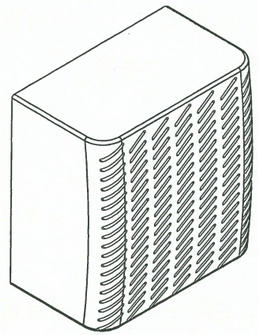
C-2



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.



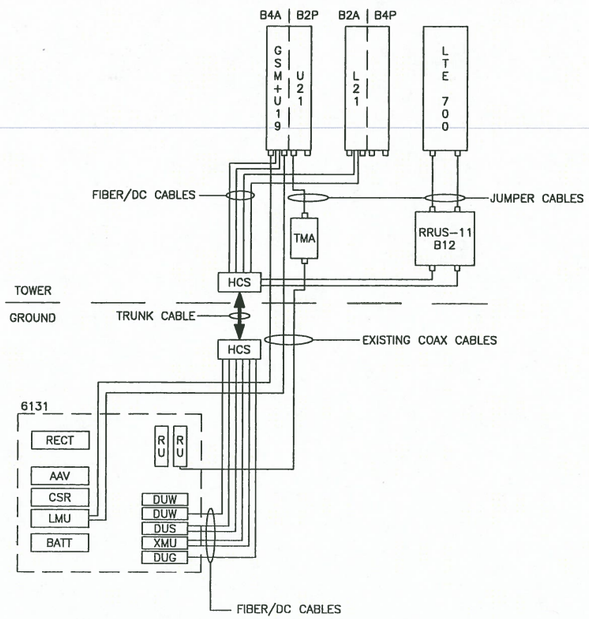
SPECIFICATIONS:
HEIGHT: 20.0"
WIDTH: 17.0"
DEPTH: 7.0"
WEIGHT: 50.7 LBS

ERICSSON RRUS-11 B12

RRU NOTES:

1. MOUNT EQUIPMENT WITH MANUFACTURER PROVIDED MOUNTING BRACKETS.
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.



SITE CONFIGURATION 702Cu (1)
SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX/HCS LENGTH	EXISTING HCS	RRH	
	EXISTING	PROPOSED	EXISTING	PROPOSED			EXISTING	PROPOSED
ALPHA	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN	(4) 1-5/8"ø	(2) 1-5/8"ø REMOVED	167'-0"	(1) 1-1/4"ø @ 167'-0"	–	–
	–	COMMSCOPE LNX-6515DS-VTM					–	–
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN					–	RRUS 11 B12
BETA	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN	(4) 1-5/8"ø	(2) 1-5/8"ø REMOVED	167'-0"		–	–
	–	COMMSCOPE LNX-6515DS-VTM					–	–
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN					–	RRUS 11 B12
GAMMA	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN	(4) 1-5/8"ø	(2) 1-5/8"ø REMOVED	167'-0"		–	–
	–	COMMSCOPE LNX-6515DS-VTM					–	–
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN					–	RRUS 11 B12

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STATE OF CONNECTICUT
JIANG YU
No. 0023222
LICENSED PROFESSIONAL ENGINEER
JIANG YU, PE
CONNECTICUT LICENSE NO. 0023222

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HARTFORD COUNTY

SHEET TITLE

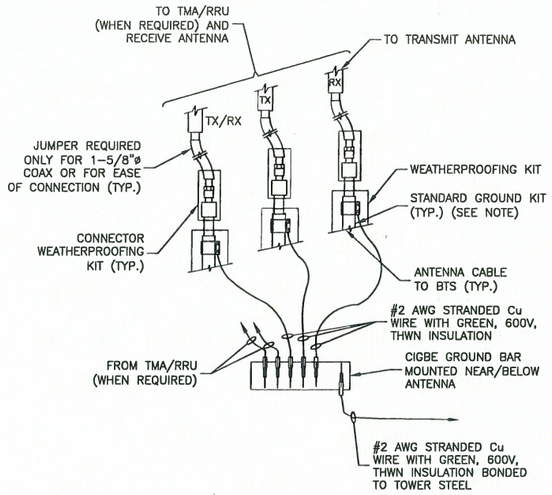
CONSTRUCTION DETAILS

SHEET NUMBER

C-3

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.

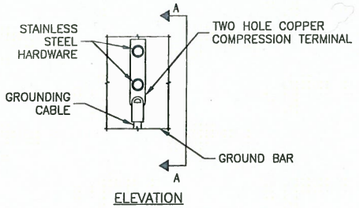


NOTE:

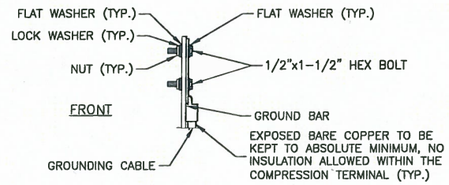
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)

SCALE: N.T.S. — 1



ELEVATION



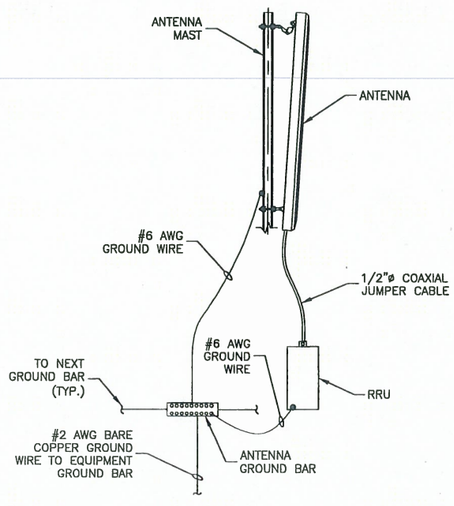
SECTION 'A-A'

NOTES:

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

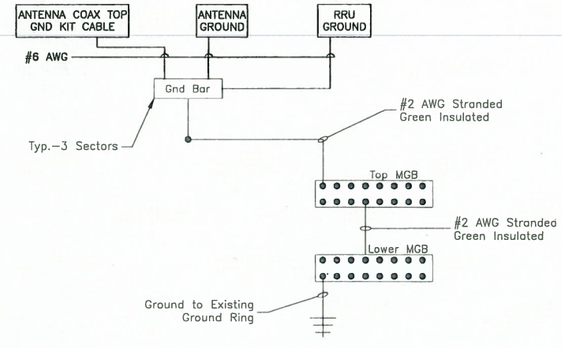
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL

SCALE: N.T.S. — 2



TYPICAL ANTENNA GROUNDING DETAIL

SCALE: N.T.S — 3



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

SCALE: N.T.S. — 4

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

CONNECTICUT LICENSE NO. 0023222

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REVIEWED BY:	BSH
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HARTFORD COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER

E-1

PAUL J. FORD & COMPANY

Date: **July 23, 2015**

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Charlotte, NC 28277
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Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11066A
	Carrier Site Name:	CT11066A_Enfield_I-91_X47
Crown Castle Designation:	**Crown Castle BU Number:**	806373
	Crown Castle Site Name:	HRT 101 943232
	Crown Castle JDE Job Number:	340885
	Crown Castle Work Order Number:	1093654
	Crown Castle Application Number:	303539 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37515-2351.001.7805
Site Data:	**4 Oliver Road, ENFIELD, Hartford County, CT**	
	Latitude *41° 57' 36.2"*, Longitude *-72° 35' 32.3"*	
	160 Foot - Monopole Tower	

Dear Sean Dempsey,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 809249, in accordance with application 303539, revision 1.

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

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

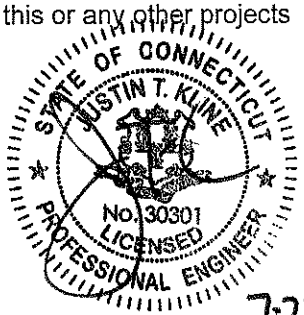
The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

This report is only valid if the equipment (antennas, coax, and mount) at the 106' level is removed prior to installing proposed loading.

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

Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer



7-23-15

tnxTower Report - version 6.1.4.1

Date: **July 23, 2015**

Sean Dempsey
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Charlotte, NC 28277
704.405.6565

Paul J. Ford and Company
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Columbus, OH 43215
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Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11066A
	Carrier Site Name:	CT11066A_Enfield_I-91_X47
Crown Castle Designation:	**Crown Castle BU Number:**	806373
	Crown Castle Site Name:	HRT 101 943232
	Crown Castle JDE Job Number:	340885
	Crown Castle Work Order Number:	1093654
	Crown Castle Application Number:	303539 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37515-2351.001.7805
Site Data:	**4 Oliver Road, ENFIELD, Hartford County, CT**	
	Latitude *41° 57' 36.2"*, Longitude *-72° 35' 32.3"*	
	160 Foot - Monopole Tower	

Dear Sean Dempsey,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 809249, in accordance with application 303539, revision 1.

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

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

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

This report is only valid if the equipment (antennas, coax, and mount) at the 106' level is removed prior to installing proposed loading.

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

Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft. monopole tower designed by Valmont in November of 1991. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.25 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
116.0	117.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	--	--	--
		3	ericsson	RRUS 11 B12			
	116.0	1	tower mounts	Site Pro1 - RMV12-396			

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
158.0	163.0	3	andrew	SBNH-1D6565C w/ Mount Pipe	1 2 12	3/8 3/4 1-5/8	1
		3	ericsson	RRUS-11			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	158.0	1	tower mounts	Platform Mount [LP 303-1]			
149.0	149.0	3	alcatel lucent	RRH2x40-AWS	12 1	7/8 1-5/8	1
		1	antel	BXA-185063/8CF w/ Mount Pipe			
		2	antel	BXA-185090/8CFx2 w/ Mount Pipe			
		1	antel	BXA-70063/6CF w/ Mount Pipe			
		1	antel	BXA-70063/6CFx4 w/ Mount Pipe			
		1	antel	BXA-70063/6CFx6 w/ Mount Pipe			
		2	antel	LPA-80063/4CF w/ Mount Pipe			
		4	antel	LPA-80080/4CF w/ Mount Pipe			
		3	kathrein	742 213 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 602-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
137.0	138.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	--	--	1
	137.0	1	tower mounts	Side Arm Mount [SO 102-3]			
	135.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
135.0	139.0	1	andrew	VHLP2.5-11	6 1 1 3	1/4 1/2 5/8 1-1/4	1
		1	dragonwave	HORIZON COMPACT			
	135.0	3	alcatel lucent	TD-RRH8x20-25			
		3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
		1	motorola	TIMING 2000			
		1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	samsung telecom	WIMAX DAP HEAD			
		1	tower mounts	Platform Mount [LP 602-1]			
116.0	117.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1 6	1-1/4 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		2	ericsson	KRY 112 144/1			
	116.0	1	ericsson	KRY 112 144/1			
		1	tower mounts	Side Arm Mount [SO 702-3]	6	1-1/4	3
106.0	108.0	3	andrew	ATM200-A20	1 6	5/16 7/8	3
		3	andrew	HBX-6516DS-VTM w/ Mount Pipe			
	106.0	1	tower mounts	T-Arm Mount [TA 602-3]			
50.0	50.0	1	symmetricom	58532A	1	1/2	2
		1	tower mounts	Pipe Mount [PM 601-1]			
47.0	48.0	1	lucent	KS24019-L112A	1	1/2	1
	47.0	1	tower mounts	Side Arm Mount [SO 701-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 07-07210G, 07/26/2007	821582	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 128355, 02/12/2013	3747614	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	SAC, 1991-16, 11/06/1991	821581	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 10614-91, 11/09/1991	822743	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) For existing modifications: monopole was modified in conformance with the referenced modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 150.5	Pole	TP20x20x0.25	1	-2.28	434.22	28.3	Pass
L2	150.5 - 150	Pole	TP20.3x20x0.25	2	-2.31	440.81	28.7	Pass
L3	150 - 119	Pole	TP26.6549x20.3x0.25	3	-8.34	1105.03	90.2	Pass
L4	119 - 110.75	Pole	TP28.3461x26.6549x0.3584	4	-11.03	1622.49	79.1	Pass
L5	110.75 - 97.17	Pole	TP31.13x28.3461x0.3876	5	-12.46	1854.30	85.1	Pass
L6	97.17 - 74.25	Pole	TP35.3294x29.3646x0.4925	6	-18.98	2771.12	88.6	Pass
L7	74.25 - 49.08	Pole	TP40.49x35.3294x0.4792	7	-23.67	3011.41	98.4	Pass
L8	49.08 - 37.75	Pole	TP42.0621x38.3178x0.5349	8	-29.85	3603.54	96.2	Pass
L9	37.75 - 0	Pole	TP49.8x42.0621x0.5589	9	-42.40	4606.70	93.8	Pass
							Summary	
						Pole (L7)	98.4	Pass
						Rating =	98.4	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.0	Pass
1	Base Plate	0	64.6	Pass
1	Base Foundation Structural Steel	0	68.5	Pass
1,2	Base Foundation Soil Interaction	0	83.9	Pass

Structure Rating (max from all components) =	**98.4%**

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Foundation Analysis Notes: According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software ‘PLS-Caisson’ (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report’s recommendation, the frost depth of the site or half of the caisson diameter.

4.1) Recommendations

This report is only valid if the equipment (antennas, coax, and mount) at the 106' level is removed prior to installing proposed loading.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Hartford County, Connecticut.
2) Basic wind speed of 80.00 mph.
3) Nominal ice thickness of 1.2500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 37.60 mph is used in combination with ice.
7) Temperature drop of 50.00 °F.
8) Deflections calculated using a wind speed of 50.00 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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	160.0000-150.5000	9.5000	0.00	Round	20.0000	20.0000	0.2500		A53-B-35 (35 ksi)
L2	150.5000-150.0000	0.5000	0.00	Round	20.0000	20.3000	0.2500		A53-B-35 (35 ksi)
L3	150.0000-119.0000	31.0000	0.00	12	20.3000	26.6549	0.2500	1.0000	A572-65 (65 ksi)
L4	119.0000-110.7500	8.2500	0.00	12	26.6549	28.3461	0.3584	1.4338	Reinf 62.80 ksi (63 ksi)
L5	110.7500-97.1700	13.5800	4.83	12	28.3461	31.1300	0.3876	1.5506	Reinf 62.43 ksi (62 ksi)
L6	97.1700-74.2500	27.7500	0.00	12	29.3646	35.3294	0.4925	1.9702	Reinf 62.71 ksi (63 ksi)
L7	74.2500-49.0800	25.1700	5.92	12	35.3294	40.4900	0.4792	1.9170	Reinf 62.89 ksi (63 ksi)
L8	49.0800-37.7500	17.2500	0.00	12	38.3177	42.0621	0.5349	2.1397	Reinf 62.99 ksi (63 ksi)
L9	37.7500-	37.7500		12	42.0621	49.8000	0.5589	2.2355	Reinf 65.00 ksi

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
	0.0000								(65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	20.0000	15.5116	756.4335	6.9832	10.0000	75.6434	1512.8671	7.7512	0.0000	0
	20.0000	15.5116	756.4335	6.9832	10.0000	75.6434	1512.8671	7.7512	0.0000	0
L2	20.0000	15.5116	756.4335	6.9832	10.0000	75.6434	1512.8671	7.7512	0.0000	0
	20.3000	15.7472	791.4264	7.0893	10.1500	77.9730	1582.8528	7.8689	0.0000	0
L3	21.0161	16.1403	828.1804	7.1779	10.5154	78.7588	1678.1181	7.9437	4.7704	19.082
	27.5952	21.2560	1891.6287	9.4530	13.8072	137.0026	3832.9527	10.4615	6.4735	25.894
L4	27.5952	30.3508	2678.8639	9.4141	13.8072	194.0187	5428.1045	14.9377	6.1829	17.249
	29.3461	32.3028	3229.6832	10.0196	14.6833	219.9562	6544.2137	15.8984	6.6361	18.514
L5	29.3461	34.8978	3481.8656	10.0091	14.6833	237.1310	7055.2038	17.1756	6.5579	16.917
	32.2281	38.3726	4628.9450	11.0058	16.1253	287.0603	9379.4975	18.8858	7.3040	18.842
L6	31.4753	45.7905	4872.1000	10.3362	15.2109	320.3041	9872.1954	22.5367	6.5497	13.298
	36.5757	55.2506	8558.5823	12.4716	18.3006	467.6655	17342.0082	27.1927	8.1483	16.543
L7	36.5757	53.7792	8337.0174	12.4764	18.3006	455.5585	16893.0574	26.4685	8.1839	17.077
	41.9183	61.7427	12616.1047	14.3239	20.9738	601.5168	25563.6485	30.3879	9.5670	19.963
L8	40.9998	65.0787	11858.0728	13.5263	19.8486	597.4263	24027.6703	32.0298	8.8356	16.518
	43.5459	71.5281	15744.4335	14.8667	21.7882	722.6144	31902.4907	35.2040	9.8390	18.393
L9	43.5459	74.6876	16420.9156	14.8581	21.7882	753.6626	33273.2269	36.7589	9.7749	17.49
	51.5568	88.6124	27424.3695	17.6283	25.7964	1063.1084	55569.2077	43.6123	11.8486	21.201

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 160.0000-150.5000				1	1	1		
L2 150.5000-150.0000				1	1	1		
L3 150.0000-119.0000				1	1	1		
L4 119.0000-110.7500				1	1	1		
L5 110.7500-97.1700				1	1	1		
L6 97.1700-74.2500				1	1	1		
L7 74.2500-49.0800				1	1	1		
L8 49.0800-37.7500				1	1	1		
L9 37.7500-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
FB-L98B-002-75000(3/8")	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	158.0000 - 0.0000	2	No Ice	0.0000	0.59
						1/2" Ice	0.0000	0.59
						1" Ice	0.0000	0.59
						2" Ice	0.0000	0.59
						4" Ice	0.0000	0.59
2" Conduit	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	1.16
						1/2" Ice	0.0000	1.16
						1" Ice	0.0000	1.16
						2" Ice	0.0000	1.16
						4" Ice	0.0000	1.16
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	158.0000 - 0.0000	9	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	158.0000 - 0.0000	3	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54
						4" Ice	0.9980	30.04
***								
LDF5-50A(7/8")	C	No	Inside Pole	149.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	149.0000 - 0.0000	1	No Ice	0.0000	1.30
						1/2" Ice	0.0000	1.30
						1" Ice	0.0000	1.30
						2" Ice	0.0000	1.30
						4" Ice	0.0000	1.30
***								
LDF1-50A(1/4")	C	No	Inside Pole	135.0000 - 0.0000	6	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	135.0000 - 0.0000	1	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.76
						1" Ice	0.0000	2.00
						2" Ice	0.0000	6.30
						4" Ice	0.0000	22.23
2" Conduit	C	No	CaAa (Out Of Face)	135.0000 - 0.0000	1	No Ice	0.1740	1.16
						1/2" Ice	0.2740	2.53
						1" Ice	0.3740	4.51
						2" Ice	0.5740	10.30
						4" Ice	0.9740	29.21
HB058-M12-XXXF(5/8")	C	No	Inside Pole	135.0000 - 0.0000	1	No Ice	0.0000	0.24
						1/2" Ice	0.0000	0.24
						1" Ice	0.0000	0.24
						2" Ice	0.0000	0.24
						4" Ice	0.0000	0.24
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	135.0000 - 0.0000	3	No Ice	0.0000	1.08
						1/2" Ice	0.0000	1.08
						1" Ice	0.0000	1.08
						2" Ice	0.0000	1.08
						4" Ice	0.0000	1.08
***								
AL7-50(1 5/8)	C	No	CaAa (Out Of Face)	116.0000 - 0.0000	6	No Ice	0.0000	0.52
						1/2" Ice	0.0000	2.02
						1" Ice	0.0000	4.14
						2" Ice	0.0000	10.20
						4" Ice	0.0000	29.65
MLE Hybrid	C	No	CaAa (Out Of	116.0000 - 0.0000	1	No Ice	0.0000	0.68

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
3Power/6Fiber RL 2(1 1/4")			Face)			1/2" Ice	0.0000	1.75
						1" Ice	0.0000	3.43
						2" Ice	0.0000	8.62
						4" Ice	0.0000	26.34
***								
***								
FLC 12-50J(1/2")	C	No	CaAa (Out Of Face)	50.0000 - 0.0000	1	No Ice	0.0000	0.17
						1/2" Ice	0.0000	0.87
						1" Ice	0.0000	2.17
						2" Ice	0.0000	6.62
						4" Ice	0.0000	22.85
***								
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	47.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
						2" Ice	0.0000	6.58
						4" Ice	0.0000	22.78
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	112.5000 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	120.2500 - 112.5000	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
						2" Ice	0.5694	0.00
						4" Ice	1.0139	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.0000-150.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.455	0.09
L2	150.5000-150.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.297	0.01
L3	150.0000-119.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	21.354	0.62
L4	119.0000-110.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.440	0.21
L5	110.7500-97.1700	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	12.693	0.36
L6	97.1700-74.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	21.423	0.61
L7	74.2500-49.0800	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	23.526	0.67
L8	49.0800-37.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	10.590	0.30
L9	37.7500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	35.284	1.01

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	160.0000-150.5000	A	1.505	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.229	0.70
L2	150.5000-150.0000	A	1.499	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.747	0.05
L3	150.0000-119.0000	A	1.479	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	54.003	3.22
L4	119.0000-110.7500	A	1.452	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.683	1.15
L5	110.7500-97.1700	A	1.434	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	32.604	2.09
L6	97.1700-74.2500	A	1.401	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	55.029	3.53
L7	74.2500-49.0800	A	1.347	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	58.174	3.60
L8	49.0800-37.7500	A	1.292	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	26.186	1.70
L9	37.7500-0.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	83.520	5.19

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.0000-150.5000	-0.4754	0.2745	-0.8256	0.4767
L2	150.5000-150.0000	-0.5700	0.3291	-0.9519	0.5496
L3	150.0000-119.0000	-0.6681	0.3857	-1.1341	0.6547
L4	119.0000-110.7500	-0.8409	0.4855	-1.4439	0.8336
L5	110.7500-97.1700	-0.8816	0.5090	-1.5101	0.8719
L6	97.1700-74.2500	-0.9052	0.5226	-1.5881	0.9169
L7	74.2500-49.0800	-0.9370	0.5410	-1.6655	0.9616
L8	49.0800-37.7500	-0.9525	0.5499	-1.7204	0.9933
L9	37.7500-0.0000	-0.9759	0.5634	-1.7606	1.0165

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
SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice	11.5561 12.2227 12.8929 14.2911 17.4280	9.7151 11.1857 12.5942 14.8689 19.6184	0.10 0.19 0.28 0.51 1.15

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			
SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5561 12.2227 12.8929 14.2911 17.4280	9.7151 11.1857 12.5942 14.8689 19.6184	0.10 0.19 0.28 0.51 1.15
SBNH-1D6565C w/ Mount Pipe	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5561 12.2227 12.8929 14.2911 17.4280	9.7151 11.1857 12.5942 14.8689 19.6184	0.10 0.19 0.28 0.51 1.15
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.2208 6.7144 7.2182 8.2568 10.4762	4.8204 5.5082 6.2127 7.6716 11.0613	0.09 0.14 0.21 0.36 0.76
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.2208 6.7144 7.2182 8.2568 10.4762	4.8204 5.5082 6.2127 7.6716 11.0613	0.09 0.14 0.21 0.36 0.76
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.2208 6.7144 7.2182 8.2568 10.4762	4.8204 5.5082 6.2127 7.6716 11.0613	0.09 0.14 0.21 0.36 0.76
(2) LGP21401	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP13519	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3379 0.4220 0.5147 0.7260 1.2523	0.2074 0.2804 0.3621 0.5513 1.0335	0.01 0.01 0.01 0.02 0.07
(2) LGP13519	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3379 0.4220 0.5147 0.7260 1.2523	0.2074 0.2804 0.3621 0.5513 1.0335	0.01 0.01 0.01 0.02 0.07
(2) LGP13519	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	0.3379 0.4220 0.5147 0.7260	0.2074 0.2804 0.3621 0.5513	0.01 0.01 0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	1.2523	1.0335	0.07
						4" Ice			
RRUS-11	A	From Leg	4.0000	0.0000	158.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2" Ice	3.4905	1.5510	0.07
			5.00				3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
RRUS-11	B	From Leg	4.0000	0.0000	158.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2" Ice	3.4905	1.5510	0.07
			5.00				3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
RRUS-11	C	From Leg	4.0000	0.0000	158.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2" Ice	3.4905	1.5510	0.07
			5.00				3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
DC6-48-60-18-8F	A	From Leg	4.0000	0.0000	158.0000	No Ice	1.4667	1.4667	0.02
			0.00			1/2" Ice	1.6667	1.6667	0.04
			5.00				1.8778	1.8778	0.06
						1" Ice	2.3333	2.3333	0.11
						2" Ice	3.3778	3.3778	0.24
						4" Ice			
Platform Mount [LP 303-1]	C	None		0.0000	158.0000	No Ice	14.6600	14.6600	1.25
						1/2" Ice	18.8700	18.8700	1.48
							23.0800	23.0800	1.71
						1" Ice	31.5000	31.5000	2.18
						2" Ice	48.3400	48.3400	3.10
						4" Ice			
***									
BXA-70063/6CFx6 w/ Mount Pipe	A	From Leg	4.0000	0.0000	149.0000	No Ice	7.9686	5.3981	0.04
			0.00			1/2" Ice	8.6091	6.5465	0.10
			0.00				9.2158	7.4089	0.17
						1" Ice	10.4591	9.1837	0.33
						2" Ice	13.0655	12.9333	0.79
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.0000	0.0000	149.0000	No Ice	7.9795	5.4071	0.04
			0.00			1/2" Ice	8.6208	6.5581	0.10
			0.00				9.2281	7.4216	0.17
						1" Ice	10.4727	9.1985	0.33
						2" Ice	13.0817	12.9523	0.79
						4" Ice			
BXA-70063/6CFx4 w/ Mount Pipe	C	From Leg	4.0000	0.0000	149.0000	No Ice	7.9686	5.3981	0.04
			0.00			1/2" Ice	8.6091	6.5465	0.10
			0.00				9.2158	7.4089	0.17
						1" Ice	10.4591	9.1837	0.33
						2" Ice	13.0655	12.9333	0.79
						4" Ice			
BXA-185063/8CF w/ Mount Pipe	A	From Leg	4.0000	0.0000	149.0000	No Ice	3.1811	2.9966	0.03
			0.00			1/2" Ice	3.5589	3.6145	0.06
			0.00				3.9627	4.2361	0.09
						1" Ice	4.8550	5.5293	0.19
						2" Ice	6.7735	8.4233	0.47
						4" Ice			
BXA-185090/8CFx2 w/ Mount Pipe	B	From Leg	4.0000	0.0000	149.0000	No Ice	3.1574	3.3303	0.03
			0.00			1/2" Ice	3.5312	3.9423	0.06
			0.00				3.9415	4.5633	0.10
						1" Ice	4.8273	5.8553	0.19
						2" Ice	6.7342	8.8407	0.49
						4" Ice			
BXA-185090/8CFx2 w/ Mount Pipe	C	From Leg	4.0000	0.0000	149.0000	No Ice	3.1574	3.3303	0.03
			0.00			1/2"	3.5312	3.9423	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
			0.00			Ice	3.9415	4.5633	0.10
						1" Ice	4.8273	5.8553	0.19
						2" Ice	6.7342	8.8407	0.49
						4" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	A	From Leg	4.0000	0.0000	149.0000	No Ice	7.2481	7.2599	0.04
			0.00			1/2"	7.7190	7.9574	0.10
			0.00			Ice	8.2003	8.6723	0.18
						1" Ice	9.1945	10.1556	0.34
						2" Ice	11.3199	13.3910	0.80
						4" Ice			
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	4.0000	0.0000	149.0000	No Ice	2.8561	7.2274	0.03
			0.00			1/2"	3.2195	7.9217	0.08
			0.00			Ice	3.5922	8.6338	0.13
						1" Ice	4.4498	10.1119	0.25
						2" Ice	6.3182	13.3391	0.61
						4" Ice			
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	4.0000	0.0000	149.0000	No Ice	2.8561	7.2274	0.03
			0.00			1/2"	3.2195	7.9217	0.08
			0.00			Ice	3.5922	8.6338	0.13
						1" Ice	4.4498	10.1119	0.25
						2" Ice	6.3182	13.3391	0.61
						4" Ice			
742 213 w/ Mount Pipe	A	From Leg	4.0000	0.0000	149.0000	No Ice	5.3729	4.6203	0.05
			0.00			1/2"	5.9502	6.0004	0.09
			0.00			Ice	6.5014	6.9816	0.15
						1" Ice	7.6106	8.8524	0.28
						2" Ice	9.9329	12.7940	0.68
						4" Ice			
742 213 w/ Mount Pipe	B	From Leg	4.0000	0.0000	149.0000	No Ice	5.3729	4.6203	0.05
			0.00			1/2"	5.9502	6.0004	0.09
			0.00			Ice	6.5014	6.9816	0.15
						1" Ice	7.6106	8.8524	0.28
						2" Ice	9.9329	12.7940	0.68
						4" Ice			
742 213 w/ Mount Pipe	C	From Leg	4.0000	0.0000	149.0000	No Ice	5.3729	4.6203	0.05
			0.00			1/2"	5.9502	6.0004	0.09
			0.00			Ice	6.5014	6.9816	0.15
						1" Ice	7.6106	8.8524	0.28
						2" Ice	9.9329	12.7940	0.68
						4" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.0000	0.0000	149.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.0000	0.0000	149.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.0000	0.0000	149.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
RRH2x40-AWS	A	From Leg	4.0000	0.0000	149.0000	No Ice	2.5217	1.5894	0.04
			0.00			1/2"	2.7530	1.7953	0.06
			0.00			Ice	2.9930	2.0098	0.08
						1" Ice	3.4990	2.4648	0.13
						2" Ice	4.6146	3.4785	0.28
						4" Ice			
RRH2x40-AWS	B	From Leg	4.0000	0.0000	149.0000	No Ice	2.5217	1.5894	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
			0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	2.7530 2.9930 3.4990 4.6146	1.7953 2.0098 2.4648 3.4785	0.06 0.08 0.13 0.28
RRH2x40-AWS	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5217 2.7530 2.9930 3.4990 4.6146	1.5894 1.7953 2.0098 2.4648 3.4785	0.04 0.06 0.08 0.13 0.28
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6000 5.9154 6.2395 6.9136 8.3654	2.3333 2.5580 2.7914 3.2840 4.3728	0.04 0.08 0.12 0.21 0.45
Platform Mount [LP 602-1]	C	None		0.0000	149.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.0300 38.7100 45.3900 58.7500 85.4700	32.0300 38.7100 45.3900 58.7500 85.4700	1.34 1.80 2.26 3.17 5.00
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	2.0000 0.00 -2.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	2.0000 0.00 -2.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	C	From Leg	2.0000 0.00 -2.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.0000 0.00 1.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.0000 0.00 1.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.0000 0.00 1.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
Side Arm Mount [SO 102-3]	C	None		0.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.0000 3.4800 3.9600 4.9200 6.8400	3.0000 3.4800 3.9600 4.9200 6.8400	0.08 0.11 0.14 0.20 0.32

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment ° °	Placement ft ft		C_AA_A Front ft^2 ft^2	C_AA_A Side ft^2 ft^2	Weight K K
						4" Ice			
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	7.4708 8.6564 9.5559 11.3884 15.5274	0.09 0.16 0.24 0.42 0.94
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1342 7.6618 8.1830 9.2563 11.5262	4.9591 5.7544 6.4723 8.0099 11.4120	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.0651 5.4798 5.9052 6.7881 8.7045	2.9834 3.5263 4.0859 5.3127 8.1308	0.05 0.08 0.13 0.23 0.54
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice	5.0651 5.4798 5.9052	2.9834 3.5263 4.0859	0.05 0.08 0.13

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	6.7881	5.3127	0.23
						2" Ice	8.7045	8.1308	0.54
						4" Ice			
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice	5.0651	2.9834	0.05
						1/2" Ice	5.4798	3.5263	0.08
							5.9052	4.0859	0.13
						1" Ice	6.7881	5.3127	0.23
						2" Ice	8.7045	8.1308	0.54
						4" Ice			
TIMING 2000	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice	0.1258	0.1258	0.00
						1/2" Ice	0.1771	0.1771	0.00
							0.2370	0.2370	0.01
						1" Ice	0.3827	0.3827	0.01
						2" Ice	0.7778	0.7778	0.05
						4" Ice			
WIMAX DAP HEAD	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice	1.8044	0.7778	0.03
						1/2" Ice	1.9877	0.9182	0.04
							2.1795	1.0673	0.06
						1" Ice	2.5891	1.3914	0.09
						2" Ice	3.5121	2.1432	0.20
						4" Ice			
WIMAX DAP HEAD	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice	1.8044	0.7778	0.03
						1/2" Ice	1.9877	0.9182	0.04
							2.1795	1.0673	0.06
						1" Ice	2.5891	1.3914	0.09
						2" Ice	3.5121	2.1432	0.20
						4" Ice			
WIMAX DAP HEAD	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice	1.8044	0.7778	0.03
						1/2" Ice	1.9877	0.9182	0.04
							2.1795	1.0673	0.06
						1" Ice	2.5891	1.3914	0.09
						2" Ice	3.5121	2.1432	0.20
						4" Ice			
HORIZON COMPACT	C	From Leg	4.0000 0.00 4.00	0.0000	135.0000	No Ice	0.8409	0.4295	0.01
						1/2" Ice	0.9658	0.5249	0.02
							1.0993	0.6289	0.03
						1" Ice	1.3922	0.8629	0.05
						2" Ice	2.0819	1.4345	0.12
						4" Ice			
Platform Mount [LP 602-1]	C	None		0.0000	135.0000	No Ice	32.0300	32.0300	1.34
						1/2" Ice	38.7100	38.7100	1.80
							45.3900	45.3900	2.26
						1" Ice	58.7500	58.7500	3.17
						2" Ice	85.4700	85.4700	5.00
						4" Ice			
***									
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice	6.8155	5.6334	0.11
						1/2" Ice	7.3373	6.4717	0.17
							7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice	6.8155	5.6334	0.11
						1/2" Ice	7.3373	6.4717	0.17
							7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice	6.8155	5.6334	0.11
						1/2" Ice	7.3373	6.4717	0.17
							7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
						4" Ice			
ERICSSON AIR 21 B2A	A	From Leg	4.0000	0.0000	116.0000	No Ice	6.8253	5.6424	0.11

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
B4P w/ Mount Pipe			0.00 1.00			1/2" Ice 1" Ice 2" Ice 4" Ice	7.3471 7.8631 8.9261 11.1755	6.4800 7.2567 8.8640 12.2932	0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81
KRY 112 144/1	A	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	B	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	C	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.6828 12.4043 13.1351 14.6007 17.8748	9.8418 11.3657 12.9138 15.2672 20.1392	0.08 0.17 0.27 0.51 1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.6828 12.4043 13.1351 14.6007 17.8748	9.8418 11.3657 12.9138 15.2672 20.1392	0.08 0.17 0.27 0.51 1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.6828 12.4043 13.1351 14.6007 17.8748	9.8418 11.3657 12.9138 15.2672 20.1392	0.08 0.17 0.27 0.51 1.15
RRUS 11 B12	A	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.3056 3.5497 3.8025 4.3340 5.5006	1.3611 1.5404 1.7284 2.1302 3.0377	0.05 0.07 0.10 0.15 0.31
RRUS 11 B12	B	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.3056 3.5497 3.8025 4.3340 5.5006	1.3611 1.5404 1.7284 2.1302 3.0377	0.05 0.07 0.10 0.15 0.31

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 11 B12	C	From Leg	4.0000 0.00 1.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.3056 3.5497 3.8025 4.3340 5.5006	1.3611 1.5404 1.7284 2.1302 3.0377	0.05 0.07 0.10 0.15 0.31
2.375" OD x 5' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1875 1.4956 1.8071 2.4580 3.9194	1.1875 1.4956 1.8071 2.4580 3.9194	0.02 0.03 0.04 0.08 0.20
2.375" OD x 5' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1875 1.4956 1.8071 2.4580 3.9194	1.1875 1.4956 1.8071 2.4580 3.9194	0.02 0.03 0.04 0.08 0.20
2.375" OD x 5' Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1875 1.4956 1.8071 2.4580 3.9194	1.1875 1.4956 1.8071 2.4580 3.9194	0.02 0.03 0.04 0.08 0.20
Site Pro1 - RMV12-396	C	None		0.0000	116.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5900 15.4400 19.2900 26.9900 42.3900	11.5900 15.4400 19.2900 26.9900 42.3900	0.77 0.99 1.21 1.64 2.50
***									
***									
58532A	B	From Leg	1.0000 0.00 0.00	0.0000	50.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2209 0.2897 0.3672 0.5481 1.0137	0.2209 0.2897 0.3672 0.5481 1.0137	0.00 0.00 0.01 0.02 0.06
Pipe Mount [PM 601-1]	B	None		0.0000	50.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.0000 3.7400 4.4800 5.9600 8.9200	0.9000 1.1200 1.3400 1.7800 2.6600	0.07 0.08 0.09 0.12 0.18
***									
KS24019-L112A	B	From Leg	3.0000 0.00 1.00	0.0000	47.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.1556 0.2247 0.3025 0.4840 0.9506	0.1556 0.2247 0.3025 0.4840 0.9506	0.01 0.01 0.01 0.02 0.06
Side Arm Mount [SO 701-1]	B	None		0.0000	47.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8500 1.1400 1.4300 2.0100 3.1700	1.6700 2.3400 3.0100 4.3500 7.0300	0.07 0.08 0.09 0.12 0.18

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Leg	4.0000 0.00 4.00	0.0000		135.0000	2.9167	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.6800 7.0700 7.4600 8.2300 9.7800	0.05 0.08 0.12 0.19 0.34

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 160.0000-150.5000	155.2500	1.556	25.50	15.833	A	0.000	15.833	15.833	100.00	0.000	0.000
					B	0.000	15.833		100.00	0.000	0.000
					C	0.000	15.833		100.00	0.000	4.455
L2 150.5000-150.0000	150.2494	1.542	25.26	0.840	A	0.000	0.840	0.840	100.00	0.000	0.000
					B	0.000	0.840		100.00	0.000	0.000
					C	0.000	0.840		100.00	0.000	0.297
L3 150.0000-119.0000	133.9278	1.492	24.43	60.650	A	0.000	60.650	60.650	100.00	0.000	0.000
					B	0.000	60.650		100.00	0.000	0.000
					C	0.000	60.650		100.00	0.000	21.354
L4 119.0000-110.7500	114.8327	1.428	23.40	18.907	A	0.000	18.907	18.907	100.00	0.000	0.000
					B	0.000	18.907		100.00	0.000	0.000
					C	0.000	18.907		100.00	0.000	7.440
L5 110.7500-97.1700	103.8541	1.388	22.73	33.654	A	0.000	33.654	33.654	100.00	0.000	0.000
					B	0.000	33.654		100.00	0.000	0.000
					C	0.000	33.654		100.00	0.000	12.693
L6 97.1700-74.2500	85.4237	1.312	21.50	62.774	A	0.000	62.774	62.774	100.00	0.000	0.000
					B	0.000	62.774		100.00	0.000	0.000
					C	0.000	62.774		100.00	0.000	21.423
L7 74.2500-49.0800	61.3795	1.194	19.56	79.516	A	0.000	79.516	79.516	100.00	0.000	0.000
					B	0.000	79.516		100.00	0.000	0.000
					C	0.000	79.516		100.00	0.000	23.526
L8 49.0800-37.7500	43.3581	1.081	17.71	38.553	A	0.000	38.553	38.553	100.00	0.000	0.000
					B	0.000	38.553		100.00	0.000	0.000
					C	0.000	38.553		100.00	0.000	10.590
L9 37.7500-0.0000	18.3450	1	16.38	144.491	A	0.000	144.491	144.491	100.00	0.000	0.000
					B	0.000	144.491		100.00	0.000	0.000
					C	0.000	144.491		100.00	0.000	35.284

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 160.0000-150.5000	155.2500	1.556	5.63	1.5053	18.217	A	0.000	18.217	18.217	100.00	0.000	0.000
						B	0.000	18.217		100.00	0.000	0.000
						C	0.000	18.217		100.00	0.000	11.229
L2 150.5000-150.0000	150.2494	1.542	5.58	1.4994	0.965	A	0.000	0.965	0.965	100.00	0.000	0.000
						B	0.000	0.965		100.00	0.000	0.000
						C	0.000	0.965		100.00	0.000	0.747
L3 150.0000-119.0000	133.9278	1.492	5.40	1.4788	68.291	A	0.000	68.291	68.291	100.00	0.000	0.000
						B	0.000	68.291		100.00	0.000	0.000
						C	0.000	68.291		100.00	0.000	54.003

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L4 119.0000-110.7500	114.8327	1.428	5.17	1.4518	20.903	A	0.000	20.903	20.903	100.00	0.000	0.000
						B	0.000	20.903		100.00	0.000	0.000
						C	0.000	20.903		100.00	0.000	19.683
L5 110.7500-97.1700	103.8541	1.388	5.02	1.4344	36.900	A	0.000	36.900	36.900	100.00	0.000	0.000
						B	0.000	36.900		100.00	0.000	0.000
						C	0.000	36.900		100.00	0.000	32.604
L6 97.1700-74.2500	85.4237	1.312	4.75	1.4011	68.254	A	0.000	68.254	68.254	100.00	0.000	0.000
						B	0.000	68.254		100.00	0.000	0.000
						C	0.000	68.254		100.00	0.000	55.029
L7 74.2500-49.0800	61.3795	1.194	4.32	1.3466	85.165	A	0.000	85.165	85.165	100.00	0.000	0.000
						B	0.000	85.165		100.00	0.000	0.000
						C	0.000	85.165		100.00	0.000	58.174
L8 49.0800-37.7500	43.3581	1.081	3.91	1.2916	41.096	A	0.000	41.096	41.096	100.00	0.000	0.000
						B	0.000	41.096		100.00	0.000	0.000
						C	0.000	41.096		100.00	0.000	26.186
L9 37.7500-0.0000	18.3450	1	3.62	1.2500	152.356	A	0.000	152.356	152.356	100.00	0.000	0.000
						B	0.000	152.356		100.00	0.000	0.000
						C	0.000	152.356		100.00	0.000	83.520

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 160.0000-150.5000	155.2500	1.556	9.96	15.833	A	0.000	15.833	15.833	100.00	0.000	0.000
					B	0.000	15.833		100.00	0.000	0.000
					C	0.000	15.833		100.00	0.000	4.455
L2 150.5000-150.0000	150.2494	1.542	9.87	0.840	A	0.000	0.840	0.840	100.00	0.000	0.000
					B	0.000	0.840		100.00	0.000	0.000
					C	0.000	0.840		100.00	0.000	0.297
L3 150.0000-119.0000	133.9278	1.492	9.54	60.650	A	0.000	60.650	60.650	100.00	0.000	0.000
					B	0.000	60.650		100.00	0.000	0.000
					C	0.000	60.650		100.00	0.000	21.354
L4 119.0000-110.7500	114.8327	1.428	9.14	18.907	A	0.000	18.907	18.907	100.00	0.000	0.000
					B	0.000	18.907		100.00	0.000	0.000
					C	0.000	18.907		100.00	0.000	7.440
L5 110.7500-97.1700	103.8541	1.388	8.88	33.654	A	0.000	33.654	33.654	100.00	0.000	0.000
					B	0.000	33.654		100.00	0.000	0.000
					C	0.000	33.654		100.00	0.000	12.693
L6 97.1700-74.2500	85.4237	1.312	8.40	62.774	A	0.000	62.774	62.774	100.00	0.000	0.000
					B	0.000	62.774		100.00	0.000	0.000
					C	0.000	62.774		100.00	0.000	21.423
L7 74.2500-49.0800	61.3795	1.194	7.64	79.516	A	0.000	79.516	79.516	100.00	0.000	0.000
					B	0.000	79.516		100.00	0.000	0.000
					C	0.000	79.516		100.00	0.000	23.526
L8 49.0800-37.7500	43.3581	1.081	6.92	38.553	A	0.000	38.553	38.553	100.00	0.000	0.000
					B	0.000	38.553		100.00	0.000	0.000
					C	0.000	38.553		100.00	0.000	10.590
L9 37.7500-0.0000	18.3450	1	6.40	144.491	A	0.000	144.491	144.491	100.00	0.000	0.000
					B	0.000	144.491		100.00	0.000	0.000
					C	0.000	144.491		100.00	0.000	35.284

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice

Comb. No.	Description
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	160 - 150.5	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	14	-7.23	0.54	0.10
			Max. Mx	11	-2.29	53.69	0.02
			Max. My	2	-2.28	0.04	53.75
			Max. Vy	5	5.07	-53.58	0.04
			Max. Vx	8	5.08	0.07	-53.62
			Max. Torque	11			-0.31
L2	150.5 - 150	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-7.32	0.58	0.08
			Max. Mx	11	-2.32	56.24	0.02
			Max. My	2	-2.31	0.05	56.29
			Max. Vy	5	5.11	-56.13	0.05
			Max. Vx	2	-5.12	0.05	56.29
			Max. Torque	11			-0.30
L3	150 - 119	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.21	4.40	-0.55
			Max. Mx	5	-8.42	-515.32	2.67
			Max. My	2	-8.34	-3.50	529.99
			Max. Vy	5	19.40	-515.32	2.67
			Max. Vx	2	-19.84	-3.50	529.99
			Max. Torque	8			-0.88
L4	119 - 110.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.62	5.64	-1.23
			Max. Mx	5	-11.12	-702.98	3.73
			Max. My	2	-11.03	-5.05	721.34

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	24.34	-702.98	3.73
			Max. Vx	2	-24.79	-5.05	721.34
			Max. Torque	8			-0.95
L5	110.75 - 97.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.53	7.18	-2.09
			Max. Mx	5	-12.54	-920.82	4.83
			Max. My	2	-12.46	-6.67	943.11
			Max. Vy	5	25.50	-920.82	4.83
			Max. Vx	2	-25.95	-6.67	943.11
			Max. Torque	13			1.04
L6	97.17 - 74.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-49.13	12.43	-5.04
			Max. Mx	5	-19.04	-1681.98	8.30
			Max. My	2	-18.98	-11.79	1716.81
			Max. Vy	5	29.36	-1681.98	8.30
			Max. Vx	2	-29.80	-11.79	1716.81
			Max. Torque	13			1.37
L7	74.25 - 49.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-56.88	16.26	-7.21
			Max. Mx	5	-23.71	-2269.74	10.66
			Max. My	8	-23.67	12.94	-2313.47
			Max. Vy	5	31.80	-2269.74	10.66
			Max. Vx	2	-32.24	-15.27	2313.26
			Max. Torque	13			1.60
L8	49.08 - 37.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-66.45	19.84	-9.33
			Max. Mx	5	-29.88	-2839.82	12.74
			Max. My	8	-29.85	15.59	-2891.54
			Max. Vy	5	34.19	-2839.82	12.74
			Max. Vx	2	-34.62	-18.37	2891.07
			Max. Torque	13			1.79
L9	37.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-84.92	27.91	-13.98
			Max. Mx	5	-42.40	-4206.49	17.15
			Max. My	8	-42.40	21.46	-4275.57
			Max. Vy	5	38.37	-4206.49	17.15
			Max. Vx	2	-38.79	-24.87	4274.44
			Max. Torque	13			2.27

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	84.92	-0.00	0.00
	Max. H_x	11	42.43	38.27	-0.11
	Max. H_z	2	42.43	-0.19	38.76
	Max. M_x	2	4274.44	-0.19	38.76
	Max. M_z	5	4206.49	-38.34	0.13
	Max. Torsion	13	2.27	19.11	33.51
	Min. Vert	2	42.43	-0.19	38.76
	Min. H_x	5	42.43	-38.34	0.13
	Min. H_z	8	42.43	0.13	-38.75
	Min. M_x	8	-4275.57	0.13	-38.75
	Min. M_z	11	-4202.68	38.27	-0.11
	Min. Torsion	7	-2.25	-19.05	-33.54

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	42.43	0.00	-0.00	1.41	2.98	-0.00
Dead+Wind 0 deg - No Ice	42.43	0.19	-38.76	-4274.44	-24.87	-1.91
Dead+Wind 30 deg - No Ice	42.43	19.28	-33.61	-3708.35	-2117.96	-1.38
Dead+Wind 60 deg - No Ice	42.43	33.24	-19.46	-2148.50	-3647.49	-0.50
Dead+Wind 90 deg - No Ice	42.43	38.34	-0.13	-17.15	-4206.49	0.51
Dead+Wind 120 deg - No Ice	42.43	33.19	19.21	2115.68	-3641.55	1.39
Dead+Wind 150 deg - No Ice	42.43	19.05	33.54	3700.40	-2085.14	2.25
Dead+Wind 180 deg - No Ice	42.43	-0.13	38.75	4275.57	21.45	2.08
Dead+Wind 210 deg - No Ice	42.43	-19.23	33.56	3704.13	2116.47	1.40
Dead+Wind 240 deg - No Ice	42.43	-33.18	19.43	2146.46	3645.11	0.52
Dead+Wind 270 deg - No Ice	42.43	-38.27	0.11	16.97	4202.68	-0.51
Dead+Wind 300 deg - No Ice	42.43	-33.15	-19.26	-2119.96	3640.98	-1.58
Dead+Wind 330 deg - No Ice	42.43	-19.11	-33.51	-3693.11	2098.94	-2.27
Dead+Ice+Temp	84.92	0.00	-0.00	13.98	27.91	-0.00
Dead+Wind 0 deg+Ice+Temp	84.92	0.05	-12.10	-1416.41	20.34	-0.93
Dead+Wind 30 deg+Ice+Temp	84.92	6.03	-10.49	-1226.52	-683.45	-0.62
Dead+Wind 60 deg+Ice+Temp	84.92	10.41	-6.07	-704.39	-1197.88	-0.15
Dead+Wind 90 deg+Ice+Temp	84.92	12.01	-0.03	8.93	-1386.03	0.36
Dead+Wind 120 deg+Ice+Temp	84.92	10.39	6.01	722.64	-1196.24	0.78
Dead+Wind 150 deg+Ice+Temp	84.92	5.97	10.47	1251.59	-674.43	1.08
Dead+Wind 180 deg+Ice+Temp	84.92	-0.03	12.10	1443.84	33.06	0.98
Dead+Wind 210 deg+Ice+Temp	84.92	-6.02	10.48	1252.60	737.38	0.63
Dead+Wind 240 deg+Ice+Temp	84.92	-10.39	6.06	731.08	1251.54	0.15
Dead+Wind 270 deg+Ice+Temp	84.92	-11.99	0.03	18.28	1439.29	-0.36
Dead+Wind 300 deg+Ice+Temp	84.92	-10.38	-6.02	-696.55	1250.42	-0.83
Dead+Wind 330 deg+Ice+Temp	84.92	-5.99	-10.46	-1222.31	732.59	-1.08
Dead+Wind 0 deg - Service	42.43	0.08	-15.14	-1672.16	-7.84	-0.75
Dead+Wind 30 deg - Service	42.43	7.53	-13.13	-1450.57	-827.07	-0.55
Dead+Wind 60 deg - Service	42.43	12.98	-7.60	-840.01	-1425.66	-0.20
Dead+Wind 90 deg - Service	42.43	14.97	-0.05	-5.83	-1644.41	0.20
Dead+Wind 120 deg - Service	42.43	12.97	7.51	828.91	-1423.31	0.55
Dead+Wind 150 deg - Service	42.43	7.44	13.10	1449.19	-814.20	0.89
Dead+Wind 180 deg - Service	42.43	-0.05	15.13	1674.17	10.29	0.82
Dead+Wind 210 deg - Service	42.43	-7.51	13.11	1450.67	830.27	0.55
Dead+Wind 240 deg - Service	42.43	-12.96	7.59	840.97	1428.51	0.21
Dead+Wind 270 deg - Service	42.43	-14.95	0.04	7.53	1646.69	-0.20
Dead+Wind 300 deg - Service	42.43	-12.95	-7.52	-828.82	1426.87	-0.62
Dead+Wind 330 deg - Service	42.43	-7.46	-13.09	-1444.57	823.39	-0.89

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	-42.43	0.00	-0.00	42.43	0.00	0.001%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
2	0.19	-42.43	-38.76	-0.19	42.43	38.76	0.009%
3	19.28	-42.43	-33.61	-19.28	42.43	33.61	0.000%
4	33.24	-42.43	-19.46	-33.24	42.43	19.46	0.000%
5	38.34	-42.43	-0.13	-38.34	42.43	0.13	0.009%
6	33.19	-42.43	19.21	-33.19	42.43	-19.21	0.000%
7	19.05	-42.43	33.54	-19.05	42.43	-33.54	0.000%
8	-0.13	-42.43	38.75	0.13	42.43	-38.75	0.002%
9	-19.23	-42.43	33.56	19.23	42.43	-33.56	0.000%
10	-33.18	-42.43	19.43	33.18	42.43	-19.43	0.000%
11	-38.27	-42.43	0.11	38.27	42.43	-0.11	0.009%
12	-33.15	-42.43	-19.26	33.15	42.43	19.26	0.000%
13	-19.11	-42.43	-33.51	19.11	42.43	33.51	0.000%
14	0.00	-84.92	0.00	-0.00	84.92	0.00	0.001%
15	0.05	-84.92	-12.10	-0.05	84.92	12.10	0.001%
16	6.03	-84.92	-10.49	-6.03	84.92	10.49	0.001%
17	10.41	-84.92	-6.07	-10.41	84.92	6.07	0.001%
18	12.01	-84.92	-0.03	-12.01	84.92	0.03	0.001%
19	10.40	-84.92	6.01	-10.39	84.92	-6.01	0.001%
20	5.97	-84.92	10.47	-5.97	84.92	-10.47	0.001%
21	-0.03	-84.92	12.10	0.03	84.92	-12.10	0.001%
22	-6.02	-84.92	10.48	6.02	84.92	-10.48	0.001%
23	-10.39	-84.92	6.06	10.39	84.92	-6.06	0.001%
24	-11.99	-84.92	0.03	11.99	84.92	-0.03	0.001%
25	-10.38	-84.92	-6.02	10.38	84.92	6.02	0.001%
26	-5.99	-84.92	-10.47	5.99	84.92	10.46	0.001%
27	0.08	-42.43	-15.14	-0.08	42.43	15.14	0.005%
28	7.53	-42.43	-13.13	-7.53	42.43	13.13	0.001%
29	12.98	-42.43	-7.60	-12.98	42.43	7.60	0.001%
30	14.98	-42.43	-0.05	-14.97	42.43	0.05	0.005%
31	12.97	-42.43	7.51	-12.97	42.43	-7.51	0.001%
32	7.44	-42.43	13.10	-7.44	42.43	-13.10	0.001%
33	-0.05	-42.43	15.14	0.05	42.43	-15.13	0.005%
34	-7.51	-42.43	13.11	7.51	42.43	-13.11	0.001%
35	-12.96	-42.43	7.59	12.96	42.43	-7.59	0.001%
36	-14.95	-42.43	0.04	14.95	42.43	-0.04	0.005%
37	-12.95	-42.43	-7.52	12.95	42.43	7.52	0.001%
38	-7.46	-42.43	-13.09	7.46	42.43	13.09	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	16	0.00007902	0.00010446
3	Yes	22	0.00000001	0.00012260
4	Yes	22	0.00000001	0.00012368
5	Yes	16	0.00007934	0.00012671
6	Yes	22	0.00000001	0.00012133
7	Yes	22	0.00000001	0.00011981
8	Yes	18	0.00001983	0.00008041
9	Yes	22	0.00000001	0.00012501
10	Yes	22	0.00000001	0.00012201
11	Yes	16	0.00007936	0.00011535
12	Yes	22	0.00000001	0.00012014
13	Yes	22	0.00000001	0.00012393
14	Yes	14	0.00000001	0.00004998
15	Yes	19	0.00005380	0.00014623
16	Yes	20	0.00000001	0.00013053
17	Yes	20	0.00000001	0.00013179
18	Yes	19	0.00005378	0.00014165
19	Yes	20	0.00000001	0.00013396
20	Yes	20	0.00000001	0.00013088
21	Yes	19	0.00005375	0.00014922
22	Yes	20	0.00000001	0.00014428
23	Yes	20	0.00000001	0.00014123

24	Yes	19	0.00005376	0.00014749
25	Yes	20	0.00000001	0.00013568
26	Yes	20	0.00000001	0.00014076
27	Yes	16	0.00008581	0.00005901
28	Yes	19	0.00000001	0.00009214
29	Yes	19	0.00000001	0.00009473
30	Yes	16	0.00008582	0.00005160
31	Yes	19	0.00000001	0.00009252
32	Yes	19	0.00000001	0.00008918
33	Yes	16	0.00008580	0.00007410
34	Yes	19	0.00000001	0.00009756
35	Yes	19	0.00000001	0.00009228
36	Yes	16	0.00008583	0.00005134
37	Yes	19	0.00000001	0.00009023
38	Yes	19	0.00000001	0.00009679

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 150.5	53.389	33	3.0962	0.0042
L2	150.5 - 150	47.261	33	3.0568	0.0041
L3	150 - 119	46.941	33	3.0529	0.0041
L4	119 - 110.75	28.790	33	2.4154	0.0024
L5	110.75 - 97.17	24.782	33	2.2214	0.0021
L6	102 - 74.25	20.903	33	2.0095	0.0018
L7	74.25 - 49.08	10.757	33	1.4388	0.0012
L8	55 - 37.75	5.844	33	1.0005	0.0008
L9	37.75 - 0	2.706	33	0.6988	0.0005

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.0000	SBNH-1D6565C w/ Mount Pipe	33	52.094	3.0911	0.0042	13231
149.0000	BXA-70063/6CFx6 w/ Mount Pipe	33	46.304	3.0441	0.0041	5744
139.0000	VHLP2.5-11	33	40.067	2.8921	0.0038	3391
137.0000	800MHz 2X50W RRH W/FILTER	33	38.857	2.8507	0.0036	3148
135.0000	APXVSPP18-C-A20 w/ Mount Pipe	33	37.663	2.8067	0.0035	2937
116.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	33	27.288	2.3446	0.0025	2068
50.0000	58532A	33	4.804	0.9049	0.0007	3025
47.0000	KS24019-L112A	33	4.226	0.8523	0.0006	2766

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 150.5	135.946	2	7.8903	0.0112
L2	150.5 - 150	120.361	2	7.7905	0.0107
L3	150 - 119	119.548	2	7.7806	0.0106
L4	119 - 110.75	73.386	8	6.1580	0.0061
L5	110.75 - 97.17	63.182	8	5.6641	0.0052
L6	102 - 74.25	53.304	8	5.1246	0.0044
L7	74.25 - 49.08	27.448	8	3.6709	0.0029

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L8	55 - 37.75	14.916	8	2.5534	0.0019
L9	37.75 - 0	6.908	8	1.7837	0.0013

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.0000	SBNH-1D6565C w/ Mount Pipe	2	132.652	7.8774	0.0111	5379
149.0000	BXA-70063/6CFx6 w/ Mount Pipe	2	117.927	7.7583	0.0106	2342
139.0000	VHLP2.5-11	8	102.067	7.3725	0.0099	1374
137.0000	800MHz 2X50W RRH W/FILTER	8	98.992	7.2673	0.0097	1274
135.0000	APXVSPP18-C-A20 w/ Mount Pipe	8	95.956	7.1555	0.0095	1187
116.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	8	69.561	5.9776	0.0065	828
50.0000	58532A	8	12.262	2.3096	0.0017	1190
47.0000	KS24019-L112A	8	10.788	2.1754	0.0016	1087

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	160 - 150.5 (1)	TP20x20x0.25	9.5000	0.0000	0.0	21.000	15.5116	-2.28	325.74	0.007
L2	150.5 - 150 (2)	TP20.3x20x0.25	0.5000	0.0000	0.0	21.000	15.7472	-2.31	330.69	0.007
L3	150 - 119 (3)	TP26.6549x20.3x0.25	31.0000	0.0000	0.0	39.000	21.2560	-8.34	828.98	0.010
L4	119 - 110.75 (4)	TP28.3461x26.6549x0.3584	8.2500	0.0000	0.0	37.680	32.3028	-11.03	1217.17	0.009
L5	110.75 - 97.17 (5)	TP31.13x28.3461x0.3876	13.5800	0.0000	0.0	37.458	37.1367	-12.46	1391.07	0.009
L6	97.17 - 74.25 (6)	TP35.3294x29.3646x0.4925	27.7500	0.0000	0.0	37.626	55.2506	-18.98	2078.86	0.009
L7	74.25 - 49.08 (7)	TP40.49x35.3294x0.4792	25.1700	0.0000	0.0	37.734	59.8697	-23.67	2259.12	0.010
L8	49.08 - 37.75 (8)	TP42.0621x38.3178x0.5349	17.2500	0.0000	0.0	37.794	71.5281	-29.85	2703.33	0.011
L9	37.75 - 0 (9)	TP49.8x42.0621x0.5589	37.7500	0.0000	0.0	39.000	88.6124	-42.40	3455.89	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	160 - 150.5 (1)	TP20x20x0.25	53.76	8.528	23.100	0.369	0.00	0.000	23.100	0.000
L2	150.5 - 150 (2)	TP20.3x20x0.25	56.31	8.666	23.100	0.375	0.00	0.000	23.100	0.000
L3	150 - 119 (3)	TP26.6549x20.3x0.25	530.00	46.422	39.000	1.190	0.00	0.000	39.000	0.000
L4	119 - 110.75 (4)	TP28.3461x26.6549x0.3584	721.36	39.355	37.680	1.044	0.00	0.000	37.680	0.000

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 $\frac{f_{by}}{F_{by}}$
L5	110.75 - 97.17 (5)	TP31.13x28.3461x0.3876	943.14	42.111	37.458	1.124	0.00	0.000	37.458	0.000
L6	97.17 - 74.25 (6)	TP35.3294x29.3646x0.4925	1716.85	44.053	37.626	1.171	0.00	0.000	37.626	0.000
L7	74.25 - 49.08 (7)	TP40.49x35.3294x0.4792	2313.51	49.105	37.734	1.301	0.00	0.000	37.734	0.000
L8	49.08 - 37.75 (8)	TP42.0621x38.3178x0.5349	2891.57	48.019	37.794	1.271	0.00	0.000	37.794	0.000
L9	37.75 - 0 (9)	TP49.8x42.0621x0.5589	4275.63	48.262	39.000	1.237	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	160 - 150.5 (1)	TP20x20x0.25	5.08	0.328	14.000	0.047	0.12	0.010	14.000	0.001
L2	150.5 - 150 (2)	TP20.3x20x0.25	5.13	0.326	14.000	0.047	0.12	0.009	14.000	0.001
L3	150 - 119 (3)	TP26.6549x20.3x0.25	19.84	0.933	26.000	0.073	0.71	0.030	26.000	0.001
L4	119 - 110.75 (4)	TP28.3461x26.6549x0.3584	24.79	0.767	25.120	0.062	0.79	0.020	25.120	0.001
L5	110.75 - 97.17 (5)	TP31.13x28.3461x0.3876	25.95	0.699	24.972	0.057	0.87	0.018	24.972	0.001
L6	97.17 - 74.25 (6)	TP35.3294x29.3646x0.4925	29.81	0.539	25.084	0.044	1.15	0.014	25.084	0.001
L7	74.25 - 49.08 (7)	TP40.49x35.3294x0.4792	32.23	0.538	25.156	0.043	1.52	0.015	25.156	0.001
L8	49.08 - 37.75 (8)	TP42.0621x38.3178x0.5349	34.61	0.484	25.196	0.039	1.67	0.013	25.196	0.001
L9	37.75 - 0 (9)	TP49.8x42.0621x0.5589	38.78	0.438	26.000	0.034	2.08	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	160 - 150.5 (1)	0.007	0.369	0.000	0.047	0.001	0.377 ✔	1.333	H1-3+VT ✔
L2	150.5 - 150 (2)	0.007	0.375	0.000	0.047	0.001	0.383 ✔	1.333	H1-3+VT ✔
L3	150 - 119 (3)	0.010	1.190	0.000	0.073	0.001	1.202 ✔	1.333	H1-3+VT ✔
L4	119 - 110.75 (4)	0.009	1.044	0.000	0.062	0.001	1.054 ✔	1.333	H1-3+VT ✔
L5	110.75 - 97.17 (5)	0.009	1.124	0.000	0.057	0.001	1.134 ✔	1.333	H1-3+VT ✔
L6	97.17 - 74.25 (6)	0.009	1.171	0.000	0.044	0.001	1.180 ✔	1.333	H1-3+VT ✔
L7	74.25 - 49.08 (7)	0.010	1.301	0.000	0.043	0.001	1.312 ✔	1.333	H1-3+VT ✔
L8	49.08 - 37.75 (8)	0.011	1.271	0.000	0.039	0.001	1.282 ✔	1.333	H1-3+VT ✔
L9	37.75 - 0 (9)	0.012	1.237	0.000	0.034	0.000	1.250 ✔	1.333	H1-3+VT ✔

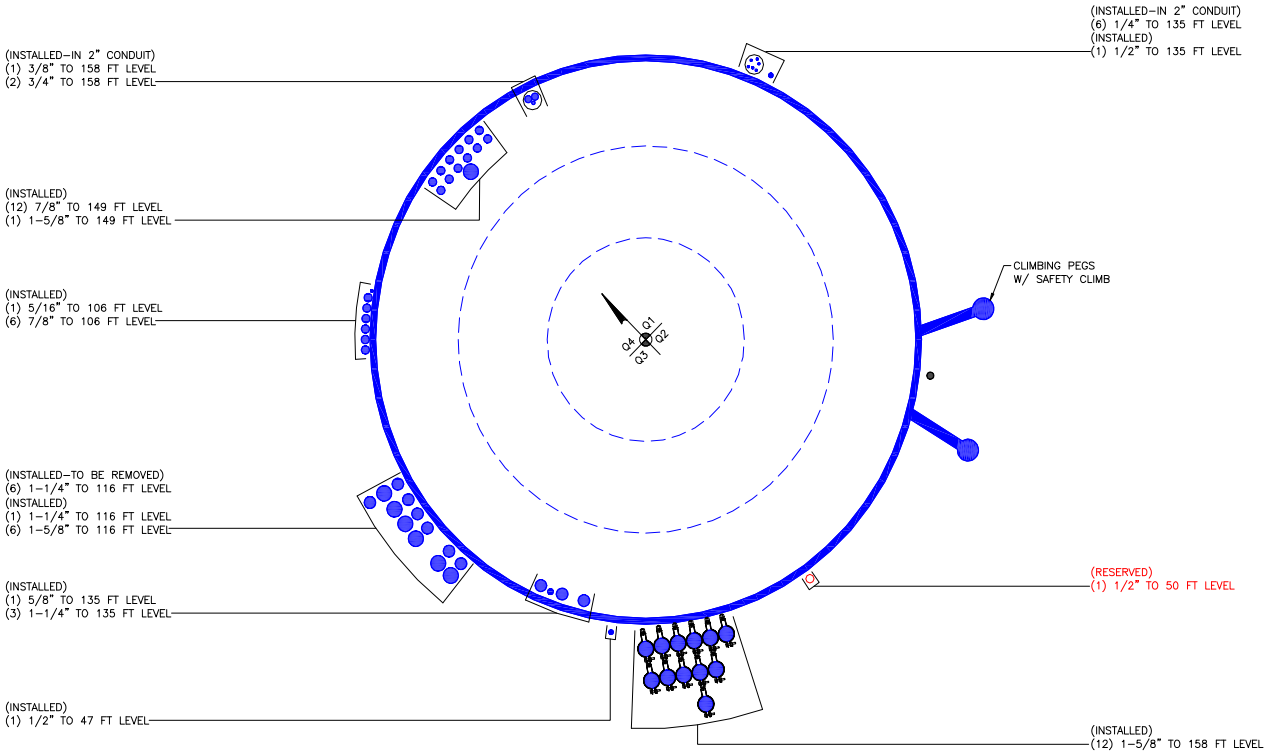
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	160 - 150.5	Pole	TP20x20x0.25	1	-2.28	434.22	28.3	Pass
L2	150.5 - 150	Pole	TP20.3x20x0.25	2	-2.31	440.81	28.7	Pass
L3	150 - 119	Pole	TP26.6549x20.3x0.25	3	-8.34	1105.03	90.2	Pass
L4	119 - 110.75	Pole	TP28.3461x26.6549x0.3584	4	-11.03	1622.49	79.1	Pass
L5	110.75 - 97.17	Pole	TP31.13x28.3461x0.3876	5	-12.46	1854.30	85.1	Pass
L6	97.17 - 74.25	Pole	TP35.3294x29.3646x0.4925	6	-18.98	2771.12	88.6	Pass
L7	74.25 - 49.08	Pole	TP40.49x35.3294x0.4792	7	-23.67	3011.41	98.4	Pass
L8	49.08 - 37.75	Pole	TP42.0621x38.3178x0.5349	8	-29.85	3603.54	96.2	Pass
L9	37.75 - 0	Pole	TP49.8x42.0621x0.5589	9	-42.40	4606.70	93.8	Pass
							Summary	
						Pole (L7)	98.4	Pass
						RATING =	**98.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

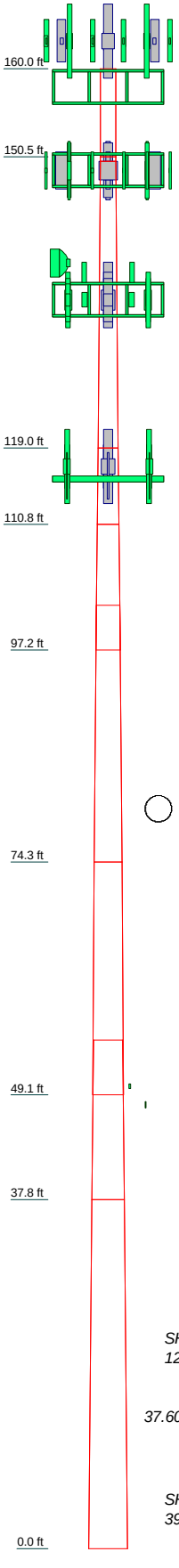

(INSTALLED-IN 2" CONDUIT)
(1) 3/8" TO 158 FT LEVEL
(2) 3/4" TO 158 FT LEVEL
(INSTALLED)
(12) 7/8" TO 149 FT LEVEL
(1) 1-5/8" TO 149 FT LEVEL
(INSTALLED)
(1) 5/16" TO 106 FT LEVEL
(6) 7/8" TO 106 FT LEVEL
(INSTALLED-TO BE REMOVED)
(6) 1-1/4" TO 116 FT LEVEL
(INSTALLED)
(1) 1-1/4" TO 116 FT LEVEL
(6) 1-5/8" TO 116 FT LEVEL
(INSTALLED)
(1) 5/8" TO 135 FT LEVEL
(3) 1-1/4" TO 135 FT LEVEL
(INSTALLED)
(1) 1/2" TO 47 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(6) 1/4" TO 135 FT LEVEL
(INSTALLED)
(1) 1/2" TO 135 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
Q1
Q2
Q3
Q4
(RESERVED)
(1) 1/2" TO 50 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 158 FT LEVEL

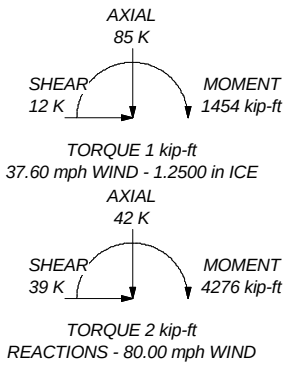
APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9
Length (ft)	9.5000	0.5000	31.0000	8.2500	13.5800	27.7500	25.1700	17.2500	37.7500
Number of Sides	1	1	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.2500	0.2500	0.3584	0.3876	0.4925	0.4792	0.5349	0.5589
Socket Length (ft)					4.8300				
Top Dia (in)	20.0000	20.0000	20.3000	26.6549	28.3461	29.3646	35.3294	38.3177	42.0621
Bot Dia (in)	20.0000	20.3000	26.6549	28.3461	31.1300	35.3294	40.4900	42.0621	49.8000
Grade	A53-B-35		A572-65	Reinf 62.80 ksi	Reinf 62.43 ksi	Reinf 62.71 ksi	Reinf 62.89 ksi	Reinf 62.99 ksi	Reinf 65.00 ksi
Weight (K)	0.5	0.0	2.0	0.9	1.7	4.8	4.9	4.0	10.5

29.3





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
SBNH-1D6565C w/ Mount Pipe	158	APXVSPP18-C-A20 w/ Mount Pipe	135
SBNH-1D6565C w/ Mount Pipe	158	APXVTM14-C-120 w/ Mount Pipe	135
SBNH-1D6565C w/ Mount Pipe	158	APXVTM14-C-120 w/ Mount Pipe	135
(2) 7770.00 w/ Mount Pipe	158	APXVTM14-C-120 w/ Mount Pipe	135
(2) 7770.00 w/ Mount Pipe	158	TD-RRH8x20-25	135
(2) 7770.00 w/ Mount Pipe	158	TD-RRH8x20-25	135
(2) LGP21401	158	TD-RRH8x20-25	135
(2) LGP21401	158	LLPX310R-V1 w/ Mount Pipe	135
(2) LGP21401	158	LLPX310R-V1 w/ Mount Pipe	135
(2) LGP13519	158	LLPX310R-V1 w/ Mount Pipe	135
(2) LGP13519	158	TIMING 2000	135
(2) LGP13519	158	WIMAX DAP HEAD	135
RRUS-11	158	WIMAX DAP HEAD	135
RRUS-11	158	WIMAX DAP HEAD	135
RRUS-11	158	HORIZON COMPACT	135
DC6-48-60-18-8F	158	Platform Mount [LP 602-1]	135
Platform Mount [LP 303-1]	158	VHLP2.5-11	135
BXA-70063/6CFx6 w/ Mount Pipe	149	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
BXA-70063/6CF w/ Mount Pipe	149		
BXA-70063/6CFx4 w/ Mount Pipe	149	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
BXA-185063/8CF w/ Mount Pipe	149		
BXA-185090/8CFx2 w/ Mount Pipe	149	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
BXA-185090/8CFx2 w/ Mount Pipe	149		
(2) LPA-80063/4CF w/ Mount Pipe	149	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
(2) LPA-80080/4CF w/ Mount Pipe	149		
(2) LPA-80080/4CF w/ Mount Pipe	149	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
742 213 w/ Mount Pipe	149	KRY 112 144/1	116
742 213 w/ Mount Pipe	149	KRY 112 144/1	116
742 213 w/ Mount Pipe	149	KRY 112 144/1	116
(2) FD9R6004/2C-3L	149	LNX-6515DS-VTM w/ Mount Pipe	116
(2) FD9R6004/2C-3L	149	LNX-6515DS-VTM w/ Mount Pipe	116
(2) FD9R6004/2C-3L	149	LNX-6515DS-VTM w/ Mount Pipe	116
RRH2x40-AWS	149	RRUS 11 B12	116
RRH2x40-AWS	149	RRUS 11 B12	116
RRH2x40-AWS	149	RRUS 11 B12	116
DB-T1-6Z-8AB-0Z	149	2.375" OD x 5' Mount Pipe	116
Platform Mount [LP 602-1]	149	2.375" OD x 5' Mount Pipe	116
800MHz 2X50W RRH W/FILTER	137	2.375" OD x 5' Mount Pipe	116
800MHz 2X50W RRH W/FILTER	137	Site Pro - RMV12-396	116
800MHz 2X50W RRH W/FILTER	137	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
PCS 1900MHz 4x45W-65MHz	137		
PCS 1900MHz 4x45W-65MHz	137	Pipe Mount [PM 601-1]	50
PCS 1900MHz 4x45W-65MHz	137	58532A	50
Side Arm Mount [SO 102-3]	137	Side Arm Mount [SO 701-1]	47
APXVSPP18-C-A20 w/ Mount Pipe	135	KS24019-L112A	47
APXV9ERR18-C-A20 w/ Mount Pipe	135		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi	Reinf 62.71 ksi	63 ksi	79 ksi
A572-65	65 ksi	80 ksi	Reinf 62.89 ksi	63 ksi	79 ksi
Reinf 62.80 ksi	63 ksi	79 ksi	Reinf 62.99 ksi	63 ksi	79 ksi
Reinf 62.43 ksi	62 ksi	79 ksi	Reinf 65.00 ksi	65 ksi	82 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 98.4%

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

Job: **160 ft Monopole / HRT 101 943232**		
Project: **PJF 37515-2351 / BU 806373**		
Client: Crown Castle	Drawn by: Joey Meinerding	App'd:
Code: TIA/EIA-222-F	Date: 07/23/15	Scale: NTS
Path: T:\375 Crown Castle\2015\37515-2351_806373_HRT 101 943232\37515-2351-001-7805_SA_1009564\37515-2351-001-7805_Reinforced.eri		Dwg No. E-1

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

v4.4 - Effective 7-12-13

Date: 7/23/2015
PJF Project: 37515-2351.001.7805
Client Ref. # 806373
Site Name: HRT 101 943232
Description: 160' Pole
Owner: Crown Castle
Engineer: JWM

Asymmetric Anchor Rod Analysis

Moment =	4276	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	42.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	39.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	19							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	58.06	0.00	3.98	183.36	178.94	178.94	0.00	195.00	91.8%
2	2.250	#18J A615 Gr 75	75	100	22.5	58.06	0.00	3.98	180.06	175.64	175.64	0.00	195.00	90.1%
3	2.250	#18J A615 Gr 75	75	100	45.0	58.06	0.00	3.98	178.94	174.52	174.52	0.00	195.00	89.5%
4	2.250	#18J A615 Gr 75	75	100	67.5	58.06	0.00	3.98	180.30	175.87	175.87	0.00	195.00	90.2%
5	2.250	#18J A615 Gr 75	75	100	90.0	58.06	0.00	3.98	182.92	178.50	178.50	0.00	195.00	91.5%
6	2.250	#18J A615 Gr 75	75	100	112.5	58.06	0.00	3.98	184.97	180.55	180.55	0.00	195.00	92.6%
7	2.250	#18J A615 Gr 75	75	100	135.0	58.06	0.00	3.98	185.11	180.69	180.69	0.00	195.00	92.7%
8	2.250	#18J A615 Gr 75	75	100	157.5	58.06	0.00	3.98	183.26	178.84	178.84	0.00	195.00	91.7%
9	2.250	#18J A615 Gr 75	75	100	180.0	58.06	0.00	3.98	180.61	176.19	176.19	0.00	195.00	90.4%
10	2.250	#18J A615 Gr 75	75	100	202.5	58.06	0.00	3.98	178.99	174.57	174.57	0.00	195.00	89.5%
11	2.250	#18J A615 Gr 75	75	100	225.0	58.06	0.00	3.98	179.76	175.34	175.34	0.00	195.00	89.9%
12	2.250	#18J A615 Gr 75	75	100	247.5	58.06	0.00	3.98	182.85	178.42	178.42	0.00	195.00	91.5%
13	2.250	#18J A615 Gr 75	75	100	270.0	58.06	0.00	3.98	186.75	182.33	182.33	0.00	195.00	93.5%
14	2.250	#18J A615 Gr 75	75	100	292.5	58.06	0.00	3.98	189.49	185.07	185.07	0.00	195.00	94.9%
15	2.250	#18J A615 Gr 75	75	100	315.0	58.06	0.00	3.98	189.68	185.26	185.26	0.00	195.00	95.0%
16	2.250	#18J A615 Gr 75	75	100	337.5	58.06	0.00	3.98	187.23	182.80	182.80	0.00	195.00	93.7%
17	2.250	A193 Gr B7	105	125	12.3	63.00	0.00	3.98	196.34	191.92	191.92	0.00	218.68	87.8%
18	2.250	A193 Gr B7	105	125	125.3	63.00	0.00	3.98	200.90	196.48	196.48	0.00	218.68	89.8%
19	2.250	A193 Gr B7	105	125	238.3	63.00	0.00	3.98	196.34	191.92	191.92	0.00	218.68	87.8%
								75.61						

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

TIA Rev F

Site Data

BU#: *806373*
Site Name: *HRT 101 943232*
App #:
Pole Manufacturer: *Other*

Reactions		
Moment:	3628.1	ft-kips
Axial:	35.4	kips
Shear:	32.8	kips

Reactions adjusted to account for additional anchor rods.

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	58.06	in

Plate Data		
Diam:	64.06	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	10.01	in

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

Pole Data		
Diam:	49.8	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

Maximum Rod Tension:	185.3	Kips	Rigid
Allowable Tension:	195.0	Kips	Service, ASD
Anchor Rod Stress Ratio:	95.0%	Pass	Fty*ASIF

Base Plate Results Flexural Check

Base Plate Stress:	38.7	ksi	Rigid
Allowable Plate Stress:	60.0	ksi	Service ASD
Base Plate Stress Ratio:	64.6%	Pass	0.75*Fy*ASIF
			Y.L. Length: 29.85

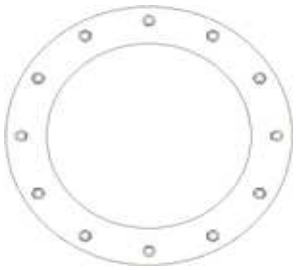
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

PAUL J. FORD & COMPANY
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Phone 614.221.6679 www.pauljford.com

Job Number: 37515-2351.001.7805
Site Number: 806373
Site Name: HRT 101 943232

By: JWM
Date: 7/23/2015

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

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	4276.0		k-ft
Shear, V =	39.0		kips
Axial Load, P =	42.0		kips
OTM =	4315.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

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

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	1	ft
Depth Below Grade =	24.5	ft
fc' =	3	ksi
εc =	0.003	in/in
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

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

Load Combinations Checked per TIA/EIA-222-F

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

Steel Parameters

Number of Bars =	36	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#4	
Side Clear Cover to Ties =	3	in

Soil Parameters

Water Table Depth =	4.00	ft
Depth to Ignore Soil =	3.50	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	110.0%
Maximum Steel Ratio =	105.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	4	120	0	28	Sand				4
2	1	125	0	42	Sand				5
3	19.5	127.4	0	42	Sand	17000			24.5
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	17.30	ft, from Grade	Shear, V =	39.00	kips
Bending Moment, M =	4989.70	k-ft, from COR	Resisting Shear, Va =	46.49	kips
Resisting Moment, Ma =	5947.97	k-ft, from COR			

MOMENT RATIO = 83.9% OK **SHEAR RATIO = 83.9% OK**

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	78.38	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	42.00	kips
Allowable Comp. Cap., Ca =	298.81	kips

COMPRESSION RATIO = 14.1% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	18.47	sq in	Axial Load, P =	75.08	kips @ 5.25 ft Below Grade
Actual Steel Area =	56.16	sq in	Moment, M =	4493.98	k-ft @ 5.25 ft Below Grade
			Allowable Moment, Ma =	6563.52	k-ft
Allowable Min Axial, Pa =	-2332.80	kips, Where Ma = 0 k-ft			
Allowable Max Axial, Pa =	6943.16	kips, Where Ma = 0 k-ft			

MOMENT RATIO = 68.5% OK

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *806373*
Site Name: *HRT 101 943232*
App #:

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

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	4	
Vert. Cage Diameter =	6.30	ft
Vert. Cage Diameter =	75.59	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	36	
As Total=	56.16	in^2
A s/ Aconc, Rho:	0.0101	1.01%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.01%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	9026.11	kips
at Mu=(ϕ=0.65)Mn=	5472.88	ft-kips
Max Tu, (φ=0.9) Tn =	3032.64	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	4493.98	ft-kips **(* Note)**
Max. Service Shaft P:	75.08	kips
Max Axial Force Type:	Comp.	

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

Load Factor	**Shaft Factored Loads**		
1.30	Mu:	5842.174	ft-kips
1.30	Pu:	97.604	kips

Material Properties

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

ACI 318 Code

Select Analysis ACI Code= 2002

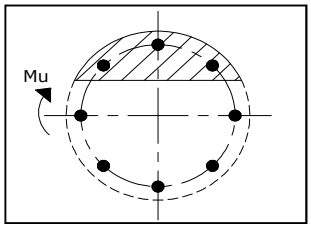
Seismic Properties

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

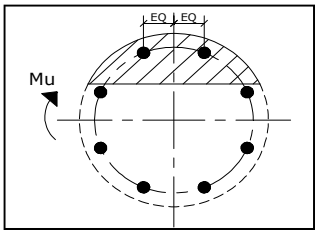
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**17.62**	in
Extreme Steel Strain, ϵt:	**0.0106**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	97.60	kips
Drilled Shaft Moment Capacity, φMn:	**8532.58**	ft-kips
Drilled Shaft Superimposed Mu:	**5842.17**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**68.5%**

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

T-Mobile Existing Facility

Site ID: CT11066A

CT11066A_Enfield_I-91_X47
4 Oliver Road
Enfield, CT 06082

August 13, 2015

EBI Project Number: 6215004333

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	66.96 %

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

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August 13, 2015

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

Emissions Analysis for Site: **CT11066A – CT11066A_Enfield_I-91_X47**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **4 Oliver Road, Enfield, 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 approximately 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 **4 Oliver Road, Enfield, 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 **Ericsson AIR21 B4A/B2P** & **B2A/B4P)** 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 **Ericsson AIR21 B4A/B2P**. 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 **117 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:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	117	Height (AGL):	117	Height (AGL):	117
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	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.36	Antenna B1 MPE%	1.36	Antenna C1 MPE%	1.36
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	117	Height (AGL):	117	Height (AGL):	117
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	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	1.36	Antenna B2 MPE%	1.36	Antenna C2 MPE%	1.36
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
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):	117	Height (AGL):	117	Height (AGL):	117
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%	0.54	Antenna B3 MPE%	0.54	Antenna C3 MPE%	0.54

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**9.79**
AT&T	12.74 %
Verizon Wireless	23.47 %
Clearwire	0.98 %
MetroPCS	10.82 %
Sprint	3.51 %
Nextel	2.03 %
XM Satellite Radio	1.17 %
PageNet	2.45 %
Site Total MPE %:	**66.96 %**

T-Mobile Sector 1 Total:	3.26 %
T-Mobile Sector 2 Total:	3.26 %
T-Mobile Sector 3 Total:	3.26 %
Site Total:	66.96 %

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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:	3.26 %
Sector 2:	3.26 %
Sector 3 :	3.26 %
T-Mobile Total:	9.79 %
Site Total:	66.96 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **66.96%** 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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Burlington, MA 01803