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

October 21, 2015

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

RE: **T-Mobile - Exempt Modification - Crown Site BU: 806362**
T-Mobile Site ID: CT11494B
Located at: 347 East Street, Wolcott, CT 06716

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 Thomas G. Dunn, Mayor, Town of Wolcott and Agostinho V. & Joanne Rodrigues as Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **347 East Street, Wolcott, 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

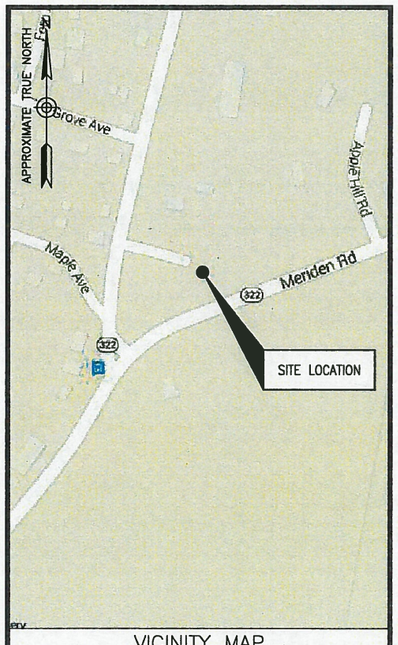
Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Thomas G. Dunn, Mayor, Town of Wolcott
Town of Wolcott
10 Kenea Avenue
Wolcott, CT 06716

Agostinho V. & Joanne Rodrigues
347 East Street
Wolcott, CT 06716

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11494B
CROWN CASTLE BU #: 806362
SITE NAME: NHV 108 943133
347 EAST STREET
WOLCOTT, CT 06716
NEW HAVEN COUNTY



VICINITY MAP

FROM PARSIPPANY, NJ:

DEPART SYLVAN WAY AND TAKE I-287 N TOWARD ALBANY. USE THE RIGHT 2 LANES TO MERGE ONTO I-287 E/I-87 S TOWARD TAPPAN ZEE BR. STAY ON I-87 S AND FOLLOW SIGNS FOR SAW MILL RIVER PKWY S/NEW YORK CITY. TAKE EXIT 8A FOR NY-119 TOWARD ELMSFORD. KEEP LEFT, FOLLOW SIGNS FOR SAW MILL RIVER PKWY N. MERGE ONTO SAW MILL RIVER PKWY N. KEEP LEFT, AND MERGE ONTO I-684 N. TAKE EXIT 9E AND MERGE ONTO I-84 E. TAKE EXIT 25A FOR AUSTIN RD. TURN LEFT ONTO AUSTIN RD. TURN RIGHT ONTO E MAIN ST. TURN LEFT ONTO BYAM RD. TURN RIGHT ONTO MUSSO VIEW AVE. TURN RIGHT ONTO STATE HWY 844. TURN LEFT ONTO CT-322 W. SITE WILL BE ON THE RIGHT.

CONSULTANT TEAM

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, NY 12065

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

PROJECT SUMMARY

SITE NAME:
NHV 108 943133

SITE NUMBER:
CT11494B

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

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

COORDINATES:
LATITUDE: 41°-33'-34.41" N (NAD83)
LONGITUDE: 72°-56'-49.1" W (NAD83)
(PER CROWN CASTLE)

CONFIGURATION
704Bu

PROJECT DIRECTORY

SITE ADDRESS:
347 EAST STREET
WOLCOTT, CT 06716
NEW HAVEN COUNTY

SCOPE OF WORK

- REPLACE & REPLACE (3) EXISTING ANTENNAS WITH (3) NEW ANTENNAS.
- INSTALL (3) NEW TMA'S.
- INSTALL (3) NEW BIAS TEE'S.
- INSTALL (3) NEW RRU'S ON A UNISTRUT RACK AT GRADE.

THIS DOCUMENT WAS DEVELOPED TO REFLECT A SPECIFIC SITE AND ITS SITE CONDITIONS AND IS NOT TO BE USED FOR ANOTHER SITE OR WHEN OTHER CONDITIONS PERTAIN. REUSE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

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

SHEET INDEX

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

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

CT11494B
NHV 108 943133

CONSTRUCTION DRAWINGS

0	10/21/15	ISSUED AS FINAL
A	10/16/15	ISSUED FOR REVIEW

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

STATE OF CONNECTICUT
JIANE TOMPKINS
No. 23222
LICENSED PROFESSIONAL ENGINEER

JIANE TOMPKINS, P.E.
CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074606
SITE ADDRESS:	

347 EAST STREET
WOLCOTT, CT 06716
NEW HAVEN 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·
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NHV 108 943133

CONSTRUCTION DRAWINGS

0	10/21/15	ISSUED AS FINAL
A	10/16/15	ISSUED FOR REVIEW

Dewberry®
Dewberry Engineers Inc.
600 PARSIPPANY ROAD
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STATE OF CONNECTICUT
JIANG YU
No 23222
LICENSED PROFESSIONAL ENGINEER
JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074606
SITE ADDRESS:	

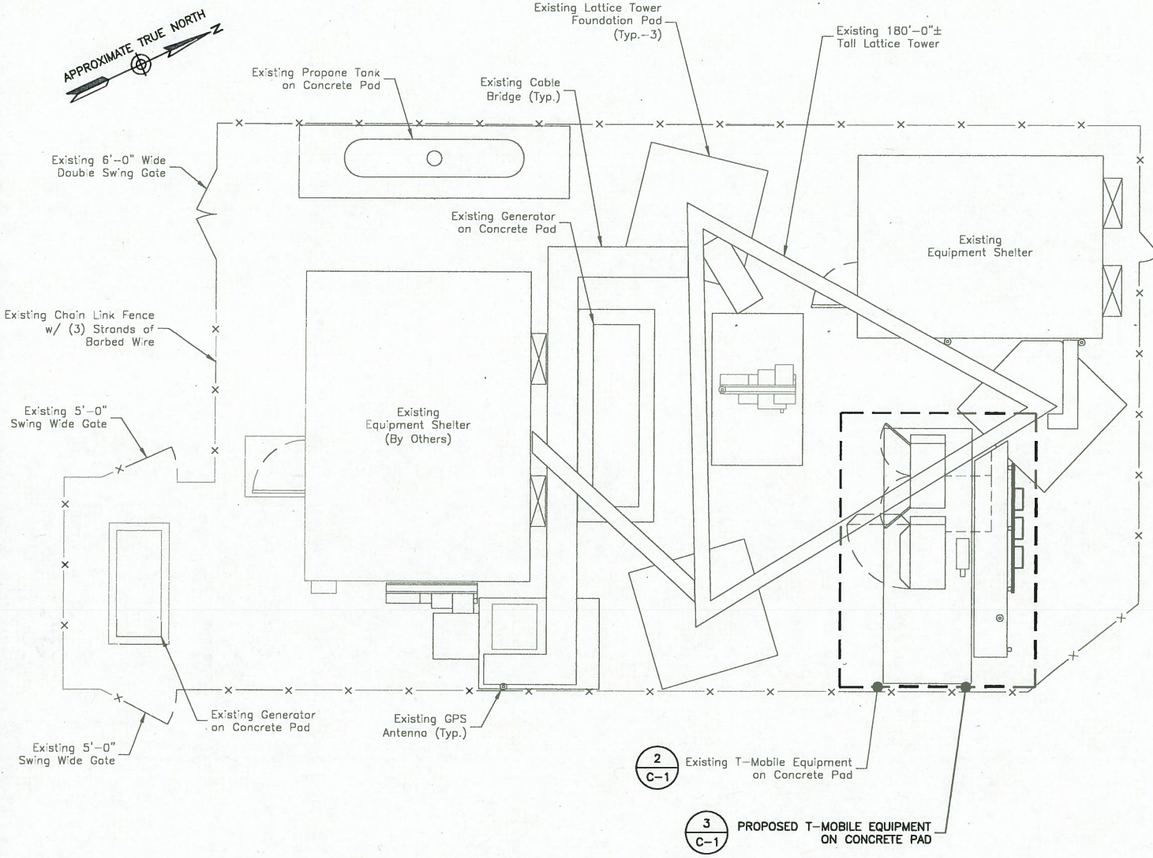
347 EAST STREET
WOLCOTT, CT 06716
NEW HAVEN COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

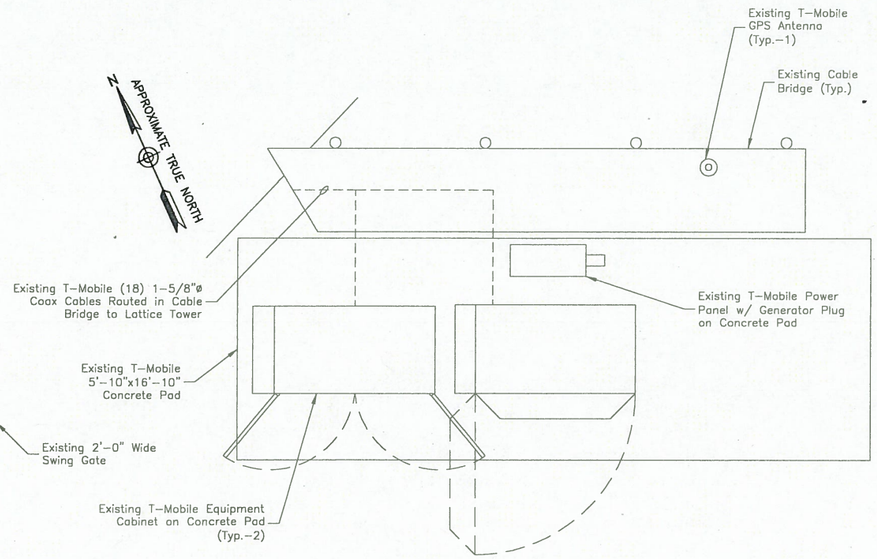
G–1



COMPOUND PLAN 1

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

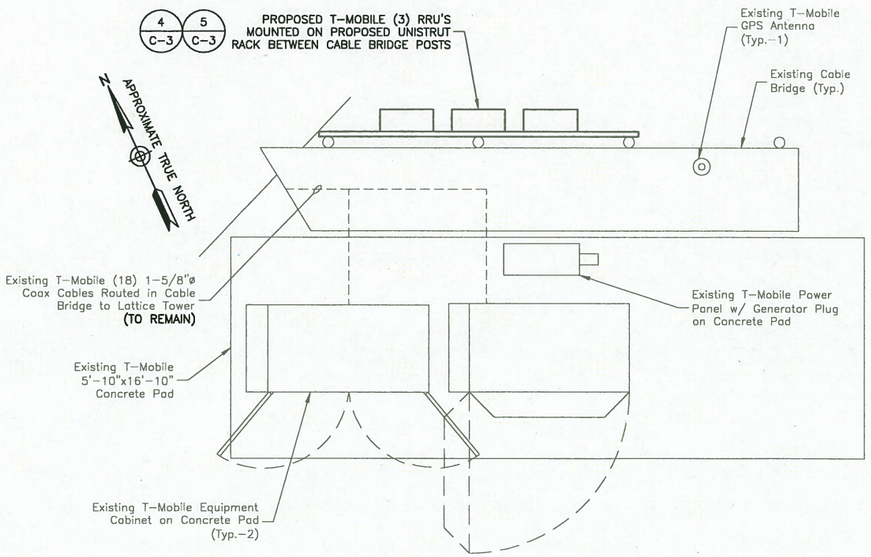
0' 5' 10'



EXISTING EQUIPMENT PLAN 2

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

0' 1' 2' 4'



PROPOSED EQUIPMENT PLAN 3

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

0' 1' 2' 4'

NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD & COMPANY DATED SEPTEMBER 21, 2015.

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JIANG YU, PE
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SITE ADDRESS:	

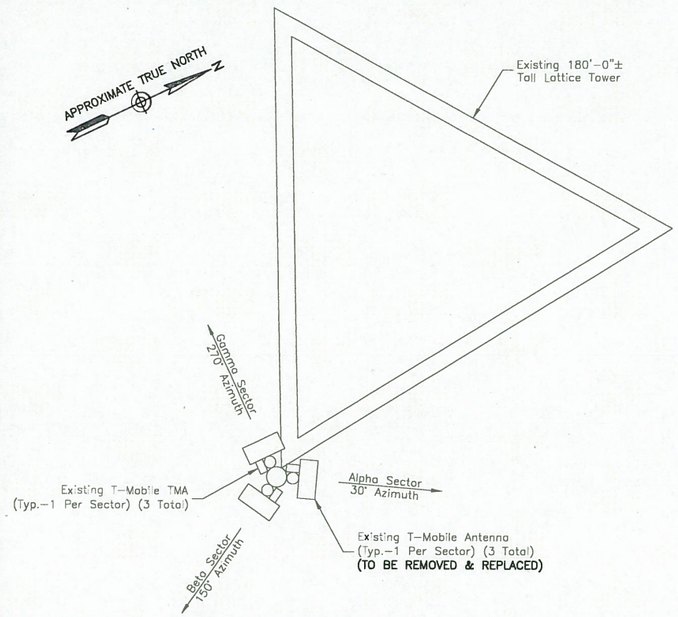
347 EAST STREET
WOLCOTT, CT 06716
NEW HAVEN COUNTY

SHEET TITLE

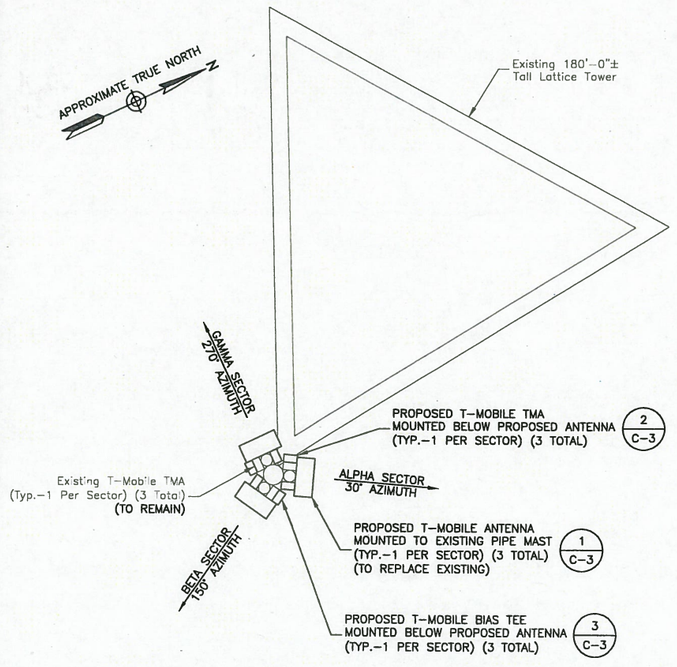
COMPOUND PLAN & EQUIPMENT PLANS

SHEET NUMBER

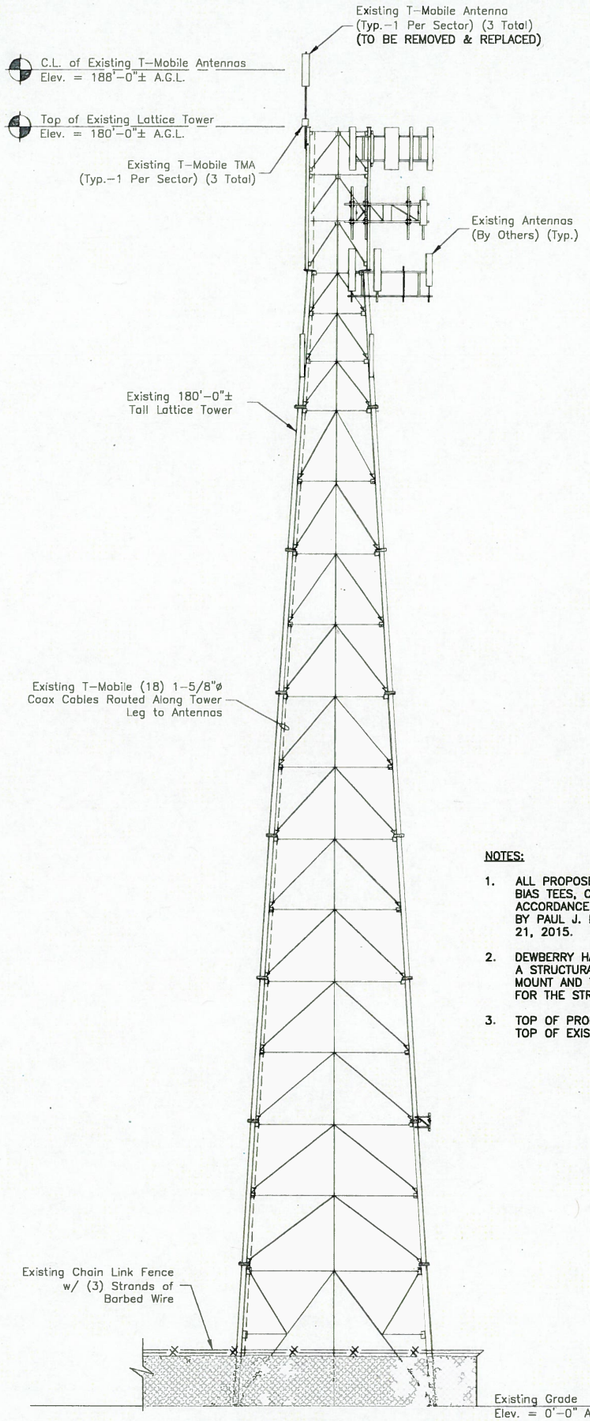
C-1



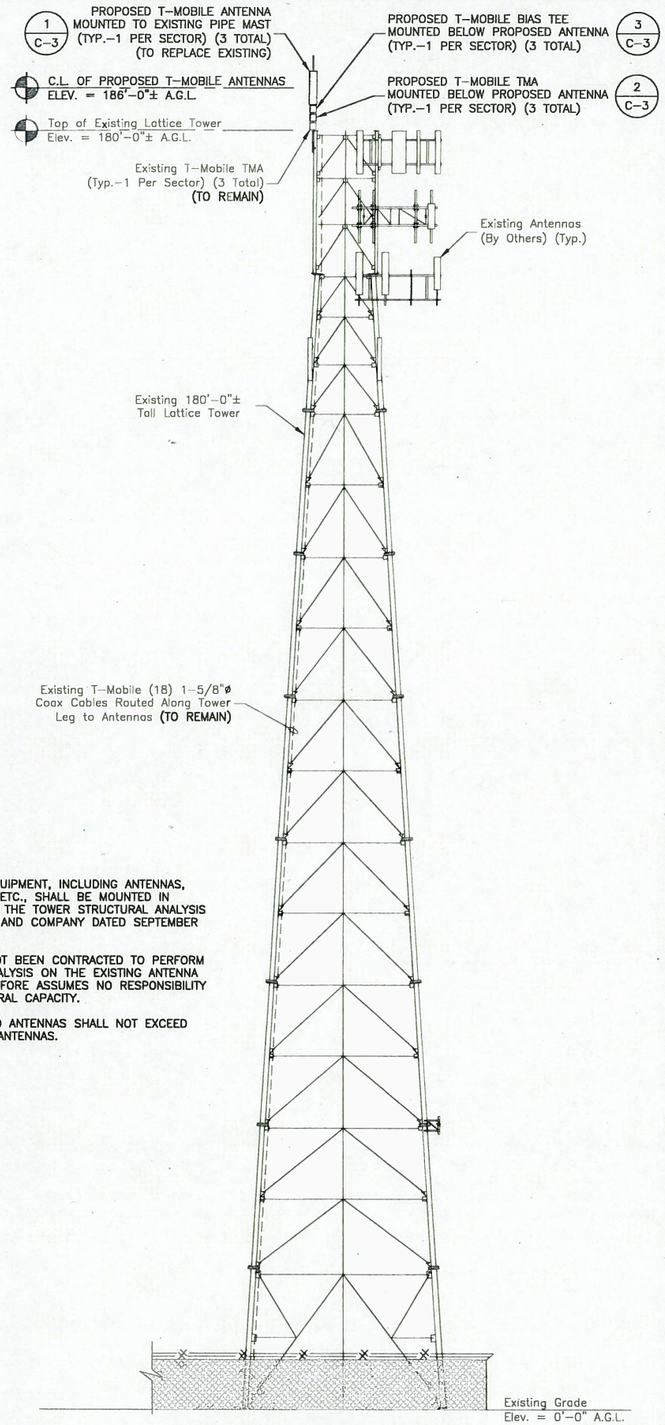
EXISTING ANTENNA LAYOUT (1)
SCALE: N.T.S.



EXISTING ANTENNA LAYOUT (1)
SCALE: N.T.S.



EXISTING ELEVATION (3)
SCALE: 3/64"=1' FOR 11"x17"
3/32"=1' FOR 22"x34"
0' 8' 16' 24'



PROPOSED ELEVATION (4)
SCALE: 3/64"=1' FOR 11"x17"
3/32"=1' FOR 22"x34"
0' 8' 16' 24'

NOTES:

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD AND COMPANY DATED SEPTEMBER 21, 2015.
2. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.
3. TOP OF PROPOSED ANTENNAS SHALL NOT EXCEED TOP OF EXISTING ANTENNAS.

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JIANG YU
No. 23222
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JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER THIS DOCUMENT.

DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074606
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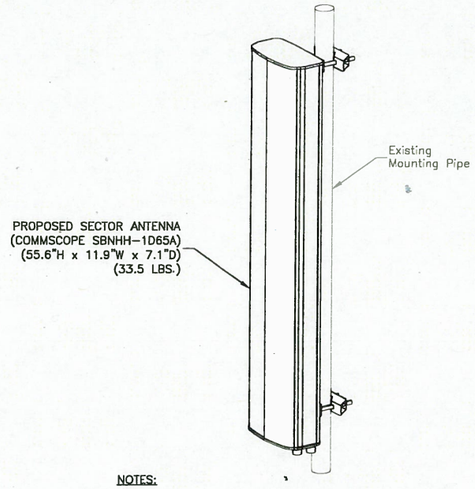
347 EAST STREET
WOLCOTT, CT 06716
NEW HAVEN COUNTY

SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

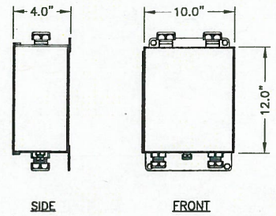
C-2



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.

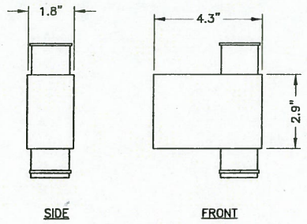


RFS/CELWAVE ATMAA1412D-1A20

NOTES:

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

DUAL-PORT TMA DETAIL (2)
SCALE: N.T.S.

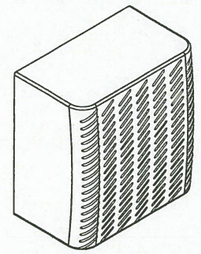


ANDREW ATBT-BOTTOM-24V

NOTES:

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

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



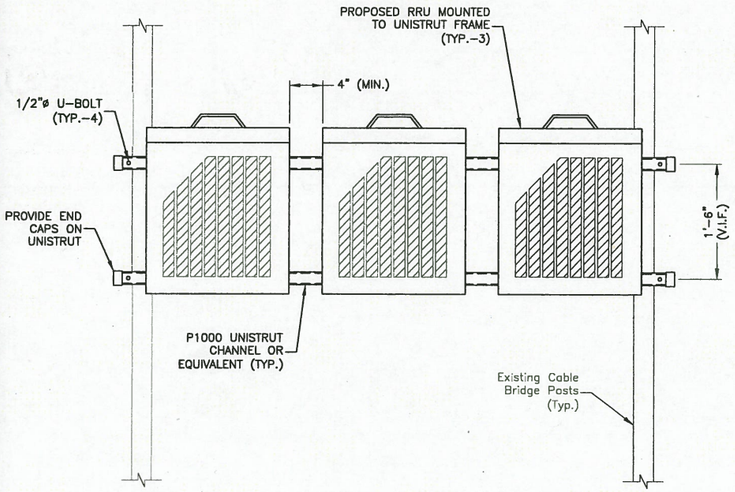
SPECIFICATIONS:
HEIGHT: 20.0"
WIDTH: 17.0"
DEPTH: 7.0"
WEIGHT: 50.7 LBS

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.

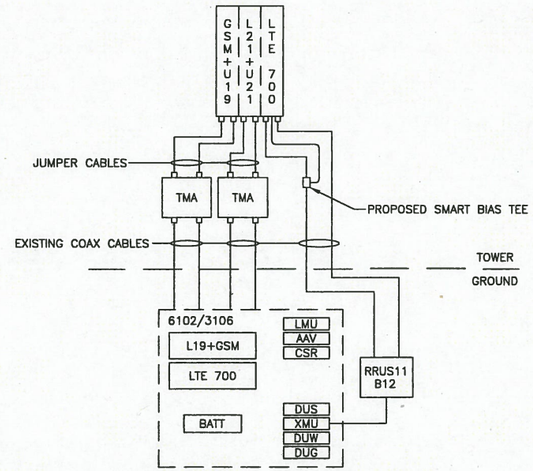
RRUS-11 - REMOTE RADIO UNIT (4)
SCALE: N.T.S.



NOTES:

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

RRU UNISTRUT RACK DETAIL (5)
SCALE: N.T.S



SITE CONFIGURATION 704Bu (6)
SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS				COAX		COAX LENGTH	RRU (AT GRADE)	TMA		BIAS TEE
	EXISTING	PROPOSED	AZIMUTH	C.L.	EXISTING	PROPOSED		PROPOSED	EXISTING	PROPOSED	PROPOSED
ALPHA	EXISTING AIR21 ANTENNA	COMMSCOPE SBNHH-1D65A	30°	186'-0"	(6) 1-5/8"ø	-	236'-0"	RRUS-11 B12	ATMAA1412D-1A20	ATMAA1412D-1A20	ATBT-BOTTOM-24V
BETA	EXISTING AIR21 ANTENNA	COMMSCOPE SBNHH-1D65A	150°	186'-0"	(6) 1-5/8"ø	-	236'-0"	RRUS-11 B12	ATMAA1412D-1A20	ATMAA1412D-1A20	ATBT-BOTTOM-24V
GAMMA	EXISTING AIR21 ANTENNA	COMMSCOPE SBNHH-1D65A	270°	186'-0"	(6) 1-5/8"ø	-	236'-0"	RRUS-11 B12	ATMAA1412D-1A20	ATMAA1412D-1A20	ATBT-BOTTOM-24V

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STATE OF CONNECTICUT
JIANG YU
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LICENSED
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347 EAST STREET
WOLCOTT, CT 06716
NEW HAVEN COUNTY

SHEET TITLE

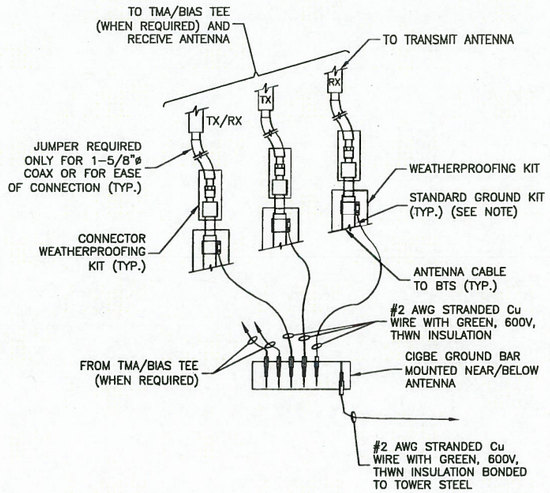
CONSTRUCTION DETAILS

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.

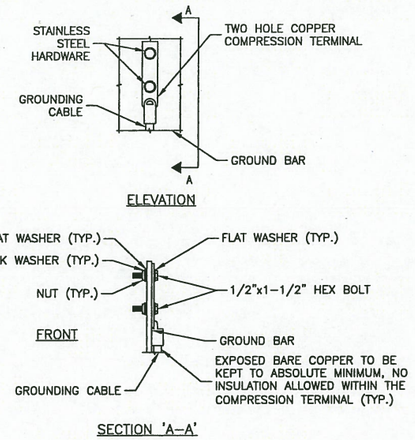


NOTE:

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) 1

SCALE: N.T.S.

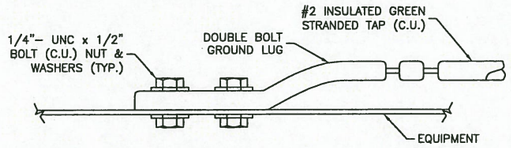


NOTES:

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

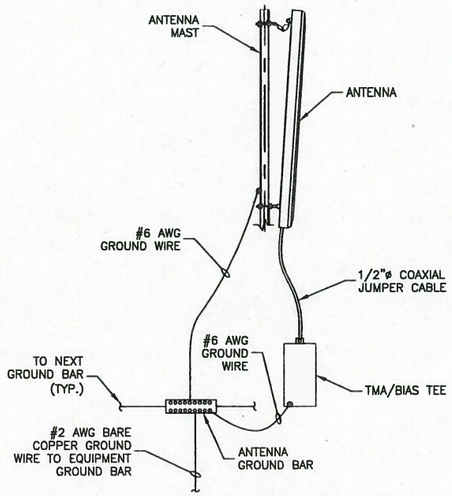
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL 2

SCALE: N.T.S.



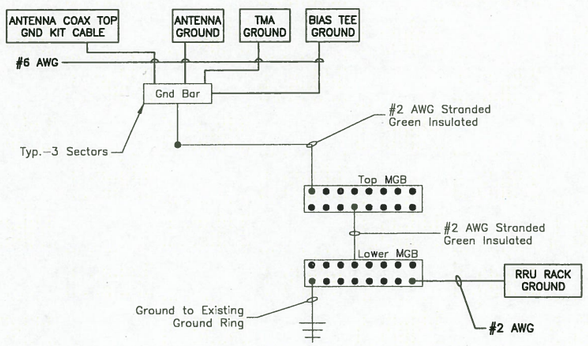
CONNECTION TO EQUIPMENT DETAIL 3

SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL 4

SCALE: N.T.S



NOTES:

1. BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.
3. SCHEMATIC GROUNDING DIAGRAM IS TYPICAL FOR EACH SECTOR.
4. VERIFY EXISTING GROUND SYSTEM IS INSTALLED PER T-MOBILE STANDARDS.

SCHEMATIC GROUNDING DIAGRAM 5

SCALE: N.T.S.

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DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074606
SITE ADDRESS:	

347 EAST STREET
WOLCOTT, CT 06716
NEW HAVEN COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER

E-1

PAUL J. FORD & COMPANY

Date: **September 21, 2015**

Cheryl Schultz
Crown Castle
3530 Toringdon WaySuite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad St Suite 600
Columbus, OH 43215
614-221-6679

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate** **Carrier Site Number:** CT11494B **Carrier Site Name:** CT494/CCastle-Wolcott-SST
Crown Castle Designation:	**Crown Castle BU Number:** 806362 **Crown Castle Site Name:** NHV 108 943133 **Crown Castle JDE Job Number:** 346075 **Crown Castle Work Order Number:** 1122497 **Crown Castle Application Number:** 310008 Rev. 4
Engineering Firm Designation:	**Paul J Ford and Company Project Number:** 37515-2681.002.8700
Site Data:	**INTERSECTION OF RTE 322/MERIDIAN RDWOLCOTT SITE, WOLCOTT, New Haven County, CT** **Latitude *41° 33' 34.41"*, Longitude *-72° 56' 49.1"*** **180 Foot - Self Support Tower**

Dear Cheryl Schultz,

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 827342, in accordance with application 310008, revision 4.

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:

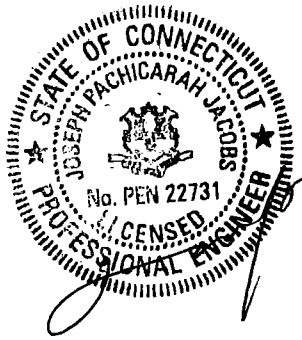
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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:

Christina Hedges, PE
Project Engineer



tnxTower Report - version 6.1.4.1

SEP 2 1 2015

Date: **September 21, 2015**

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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:

Christina Hedges, PE
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by ROHN in September of 1986. The tower was originally designed for a wind speed of 0 mph per EIA-222-C.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180.0	186.0	3	commscope	SBNHH-1D65A w/ Mount Pipe			
	182.0	3	commscope	ATBT-BOTTOM-24V			
		3	rfs celwave	ATMAA1412D-1A20			

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
180.0	188.0	3	ericsson	AIR 21 w/ Mount Pipe			3
	180.0	3	rfs celwave	ATMAA1412D-1A20			
		3	rfs celwave	ATMAA1412D-1A20	18	1 5/8	1
	177.0	1	tower mounts	18' x 3" Pipe Mount			
177.0	177.0	3	alcatel lucent	RRH2X60-AWS	2	1 5/8	2
		3	alcatel lucent	RRH2X60-PCS			
		3	alcatel lucent	RRH2x60-700			
		3	commscope	HBXX-6517DS-A2M w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		2	andrew	DB846F65ZAXY w/ Mount Pipe	12	1 5/8	1
		2	antel	LPA-80063/6CFx5 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		2	swedcom	SC-E 6014 rev2 w/ Mount Pipe			
		1	tower mounts	Sector Mount [SM 502-3]			
168.0	168.0	3	argus technologies	LLPX310R w/ Mount Pipe	3 1	5/16* 1/2*	1
		1	dragonwave	A-ANT-18G-2-C			
		3	samsung telecomm	FDD_R6_RRH			
		1	tower mounts	Pipe Mount [PM 602-3]			
158.0	160.0	1	ericsson	RRU-12			2

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		2	andrew	SBNH-1D6565C w/ Mount Pipe	1 2 12	3/8 3/4 1 1/4	1
		4	kmw comm	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave tech	7770.00 w/ Mount Pipe			
	158.0	6	adc	DUAL BAND 800/1900 FULL BAND MASTHEAD			
		3	comm comp inc.	DTMABP7819VG12A			
		2	ericsson	RRU-12			2
		3	ericsson	RRUS-11			1
		3	powerwave tech	7020.00			
		6	powerwave tech	LGP13519			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Sector Mount [SM 502-3]			
148.0	148.0	3	rfs	RFS APXV18-206517-C	6	1 5/8	1
		1	tower mounts	Pipe Mount [PM 602-3]			
40.0	40.0	1	gps	GPS_A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 306-1]			

Notes:
1) Existing Equipment
2) Future Equipment
3) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Drawing	Rohn, 9/5/86, 21917JC	529684	ccisites
Foundation Drawing	Rohn, 9/5/86, 21917JC	217670	ccisites
Soil Report	FDH, 2/4/08, 08-01300G	2303630	ccisites
Foundation Modification Drawing	All-Points Tech, 8/15/02, CT105680	903539	ccisites

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. 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 (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	180 - 160	Leg	Pipe 2.875" x 0.203" (2.5 STD)	3	-14157	41957	33.7	Pass
		Diagonal	Pipe 2.375" x 0.154" (2 STD)	11	-7150	16009	44.7	Pass
		Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	10	-3874	20287	19.1 22.7 (b)	Pass
		Top Girt	Pipe 1.9" x 0.145" (1.5 STD)	5	-1914	20343	9.4	Pass
		Inner Bracing	L 2 x 2 x 1/8	38	-33	5857	0.6	Pass
T2	160 - 140	Leg	Pipe 3.5" x 0.300" (3 XS)	42	-45977	84872	54.2	Pass
		Diagonal	Pipe 2.375" x 0.154" (2 STD)	48	-8742	13728	63.7	Pass
		Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	46	-5482	17348	31.6 31.9 (b)	Pass
		Inner Bracing	L 2 x 2 x 1/8	52	-6	4280	0.3	Pass
T3	140 - 120	Leg	Pipe 4.5" x 0.337" (4 XS)	81	-76310	140141	54.5	Pass
		Diagonal	Pipe 2.375" x 0.154" (2 STD)	87	-8273	11768	70.3	Pass
		Horizontal	Pipe 2.375" x 0.154" (2 STD)	85	-5715	24620	23.2 33.3 (b)	Pass
		Inner Bracing	L 2 x 2 x 1/8	91	-7	2926	0.4	Pass
T4	120 - 100	Leg	Pipe 5.5" x 0.375" (5 EH)	120	-98858	176093	56.1	Pass
		Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	126	-9601	14811	64.8	Pass
		Horizontal	Pipe 2.375" x 0.154" (2 STD)	124	-5782	20352	28.4 33.7 (b)	Pass
		Inner Bracing	L 2 x 2 x 1/8	131	-7	2204	0.4	Pass
T5	100 - 80	Leg	Pipe 5.5" x 0.375" (5 EH)	147	-122231	176032	69.4	Pass
		Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	153	-8545	12891	66.3	Pass
		Horizontal	Pipe 2.375" x 0.154" (2 STD)	151	-5631	14711	38.3	Pass
		Inner Bracing	L 2.5 x 2.5 x 3/16	157	-6	3460	0.5	Pass
T6	80 - 60	Leg	Pipe 6.625" x 0.340" (6 EHS)	174	-143396	213752	67.1	Pass
		Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	180	-8889	11383	78.1	Pass
		Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	178	-6225	25350	24.6 36.2 (b)	Pass
		Inner Bracing	L 3 x 3 x 3/16	185	-7	4540	0.5	Pass
T7	60 - 40	Leg	Pipe 6.625" x 0.432" (6 XS)	201	-164382	266292	61.7	Pass
		Diagonal	Pipe 2.875" x 0.276" (2.5 XS)	207	-9134	12532	72.9	Pass
		Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	205	-6630	19613	33.8 39.3 (b)	Pass
		Inner Bracing	L 3.5 x 3.5 x 1/4	211	-9	7430	0.5	Pass
T8	40 - 20	Leg	Pipe 6.625" x 0.432" (6 XS)	228	-184414	266264	69.3	Pass
		Diagonal	Pipe 3.5" x 0.216" (3 STD)	234	-8874	17132	51.8	Pass
		Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	232	-6654	15532	42.8	Pass
		Inner Bracing	L 3.5 x 3.5 x 1/4	238	-11	5917	0.5	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T9	20 - 0	Leg	Pipe 8.75" x 0.375" (8 EHS)	255	-194250	340215	57.1	Pass
		Diagonal	Pipe 3.5" x 0.216" (3 STD)	267	-13471	28988	46.5	Pass
		Horizontal	Pipe 3.5" x 0.216" (3 STD)	263	-7511	27794	27.0 30.4 (b)	Pass
		Redund Horz 1 Bracing	Rohn 1.5" x 11 ga	268	-3371	4884	69.0	Pass
		Redund Diag 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	269	-3029	3806	79.6	Pass
		Redund Hip 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	270	-40	10768	0.4	Pass
		Redund Hip Diagonal Bracing	Pipe 2.875" x 0.203" (2.5 STD)	282	-56	7099	0.8	Pass
		Inner Bracing	Pipe 3.5" x 0.216" (3 STD)	284	-12	19663	0.6	Pass
							Summary	
						Leg (T5)	69.4	Pass
						Diagonal (T6)	78.1	Pass
						Horizontal (T8)	42.8	Pass
						Top Girt (T1)	9.4	Pass
						Redund Horz 1 Bracing (T9)	69.0	Pass
						Redund Diag 1 Bracing (T9)	79.6	Pass
						Redund Hip 1 Bracing (T9)	0.4	Pass
						Redund Hip Diagonal Bracing (T9)	0.8	Pass
						Inner Bracing (T9)	0.6	Pass
						Bolt Checks	51.7	Pass
						Rating =	79.6	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
	Anchor Rods		49.4	Pass
	Base Foundation		56.6	Pass
	Base Foundation Soil Interaction		58.3	Pass
Structure Rating (max from all components) =				**79.6%**

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

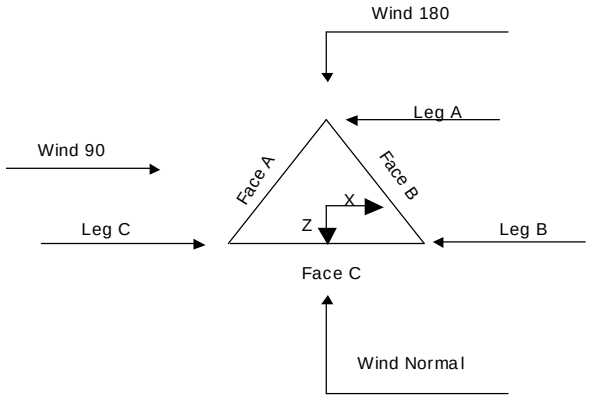
APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.50 ft at the top and 27.68 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

4) Tower is located in New Haven County, Connecticut.
5) Basic wind speed of 85.0 mph.
6) Nominal ice thickness of 0.750 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56 pcf.
9) A wind speed of 37.6 mph is used in combination with ice.
10) Deflections calculated using a wind speed of 50.0 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in tower member design is 1.333.
14) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	180.00-160.00		B054	8.50	1	20.00
T2	160.00-140.00	rohn mmw	C039	8.54	1	20.00

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Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T3	140.00-120.00	rohn mmw	D061	10.63	1	20.00
T4	120.00-100.00		E075	12.71	1	20.00
T5	100.00-80.00		F023	14.96	1	20.00
T6	80.00-60.00		G043	17.54	1	20.00
T7	60.00-40.00		H014	20.04	1	20.00
T8	40.00-20.00		J021	22.54	1	20.00
T9	20.00-0.00		K029	25.18	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	180.00-160.00	6.53	K Brace Down	No	Yes	5.000	0.000
T2	160.00-140.00	6.53	K Brace Down	No	Yes	5.000	0.000
T3	140.00-120.00	6.53	K Brace Down	No	Yes	5.000	0.000
T4	120.00-100.00	9.79	K Brace Down	No	Yes	5.000	0.000
T5	100.00-80.00	9.79	K Brace Down	No	Yes	5.000	0.000
T6	80.00-60.00	9.79	K Brace Down	No	Yes	5.000	0.000
T7	60.00-40.00	9.79	K Brace Down	No	Yes	5.000	0.000
T8	40.00-20.00	9.79	K Brace Down	No	Yes	5.000	0.000
T9	20.00-0.00	19.58	K1 Down	No	Yes	5.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T2 160.00-140.00	Pipe	Pipe 3.5" x 0.300" (3 XS)	A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T3 140.00-120.00	Pipe	Pipe 4.5" x 0.337" (4 XS)	A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T4 120.00-100.00	Pipe	Pipe 5.5" x 0.375" (5 EH)	A513-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T5 100.00-80.00	Pipe	Pipe 5.5" x 0.375" (5 EH)	A513-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T6 80.00-60.00	Pipe	Pipe 6.625" x 0.340" (6 EHS)	A513-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T7 60.00-40.00	Pipe	Pipe 6.625" x 0.432" (6 XS)	A513-50 (50 ksi)	Pipe	Pipe 2.875" x 0.276" (2.5 XS)	A618-50 (50 ksi)
T8 40.00-20.00	Pipe	Pipe 6.625" x 0.432" (6 XS)	A513-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)
T9 20.00-0.00	Pipe	Pipe 8.75" x 0.375" (8 EHS)	A500-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-160.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 1.9" x 0.145" (1.5 STD)	A618-50 (50 ksi)

Tower Elevation ft	*No. of Mid Girts*	*Mid Girt Type*	*Mid Girt Size*	*Mid Girt Grade*	*Horizontal Type*	*Horizontal Size*	*Horizontal Grade*
T2 160.00-140.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 1.9" x 0.145" (1.5 STD)	A618-50 (50 ksi)
T3 140.00-120.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T4 120.00-100.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T5 100.00-80.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T6 80.00-60.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T7 60.00-40.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T8 40.00-20.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T9 20.00-0.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Secondary Horizontal Type*	*Secondary Horizontal Size*	*Secondary Horizontal Grade*	*Inner Bracing Type*	*Inner Bracing Size*	*Inner Bracing Grade*
T1 180.00-160.00	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T2 160.00-140.00	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T3 140.00-120.00	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T4 120.00-100.00	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T5 100.00-80.00	Pipe		A618-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T6 80.00-60.00	Pipe		A618-50 (50 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T7 60.00-40.00	Pipe		A618-50 (50 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)
T8 40.00-20.00	Pipe		A618-50 (50 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)
T9 20.00-0.00	Pipe		A618-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A53-B-35 (35 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Redundant Bracing Grade*		*Redundant Type*	*Redundant Size*	*K Factor*
T9 20.00-0.00	A618-50 (50 ksi)	Horizontal (1)	Pipe	Rohn 1.5" x 11 ga	1
		Diagonal (1)	Pipe	Pipe 1.9" x 0.145" (1.5 STD)	1
		Hip (1)	Pipe		1
		Hip Diagonal		Pipe 1.9" x 0.145" (1.5 STD)	1
				Pipe 2.875" x 0.203" (2.5 STD)	

Tower Section Geometry *(cont'd)*

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
T1 180.00-160.00	0.00	0.250	A36 (36 ksi)	1	1	1.05	36.000	36.000
T2 160.00-140.00	0.00	0.250	A36 (36 ksi)	1	1	1.05	6.000	6.000
T3 140.00-120.00	0.00	0.375	A36 (36 ksi)	1	1	1.1	6.000	6.000
T4 120.00-100.00	0.00	0.375	A36 (36 ksi)	1	1	1.1	36.000	36.000
T5 100.00-80.00	0.00	0.375	A36 (36 ksi)	1	1	1.1	36.000	36.000
T6 80.00-60.00	0.00	0.375	A36 (36 ksi)	1	1	1.1	36.000	36.000
T7 60.00-40.00	0.00	0.375	A36 (36 ksi)	1	1	1.15	36.000	36.000
T8 40.00-20.00	0.00	0.375	A36 (36 ksi)	1	1	1.15	36.000	36.000
T9 20.00-0.00	0.00	0.375	A36 (36 ksi)	1	1	1.25	36.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
ft										
T1 180.00-160.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-80.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 80.00-60.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 60.00-40.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 40.00-20.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 20.00-0.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.00-160.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	0.75	0.000	1	0.000	0.75
T2 160.00-140.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T3 140.00-120.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T4 120.00-100.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	0.75	0.000	1	0.000	0.75
T5 100.00-80.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T6 80.00-60.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T7 60.00-40.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T8 40.00-20.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T9 20.00-0.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-160.00	Flange	0.750 A325N	4	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T2 160.00-140.00	Flange	0.875 A325N	4	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T3 140.00-120.00	Flange	1.000 A325N	4	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T4 120.00-100.00	Flange	1.000 A325N	4	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T5 100.00-80.00	Flange	1.000 A325N	6	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T6 80.00-60.00	Flange	1.000 A325N	6	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T7 60.00-40.00	Flange	1.000 A325N	6	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T8 40.00-20.00	Flange	1.000 A325N	8	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T9 20.00-0.00	Flange	1.000 A449	8	0.750 A325N	3	0.750 A325N	0	0.750 A325N	0	0.750 A325N	0	0.750 A325N	2	0.625 A325N	1

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
2 1/2" Rigid Conduit (2" EMT)	A	Yes	Ar (CfAe)	168.00 - 5.00	0.000	0.44	2	2	1.000 2.197	2.197		1.48
LDF7-50A(1-5/8")	A	Yes	Ar (CfAe)	148.00 - 5.00	0.000	0.4	6	3	0.520	1.980		0.82
1.5" flat Cable Ladder	A	Yes	Af (CfAe)	168.00 - 5.00	0.000	0.4	2	2	18.000 1.500	1.500	6.000	1.80

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Rail **												
561(1-5/8")	A	Yes	Ar (CfAe)	177.00 - 5.00	0.000	-0.4	14	3	2.000 1.625	1.625		1.35
LDF4-50A(1/2")	A	No	Ar (CfAe)	40.00 - 5.00	0.000	0.44	1	1	0.630	0.630		0.15
1.5" flat Cable Ladder Rail **	A	Yes	Af (CfAe)	177.00 - 5.00	0.000	-0.4	2	2	18.000 1.500	1.500	6.000	1.80
LCF158-50A(1-5/8")	C	Yes	Ar (CfAe)	158.00 - 5.00	-2.000	-0.4	30	12	0.270 0.520	1.980		0.80
LCF158-50A(1-5/8")	C	Yes	Ar (CfAe)	180.00 - 158.00	-3.000	-0.4	18	12	0.270 0.520	1.980		0.80
FB-L98B-002-75000(3/8")	C	Yes	Ar (CfAe)	158.00 - 5.00	0.000	-0.4	1	1	0.394	0.394		0.06
WR-VG86ST-BRD(3/4)	C	Yes	Ar (CfAe)	158.00 - 5.00	0.000	-0.4	2	2	0.774	0.774		0.59
1.5" flat Cable Ladder Rail	C	Yes	Af (CfAe)	173.00 - 5.00	0.000	-0.4	4	2	24.000 1.500	1.500	6.000	1.80

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
7983A(1/2")	A	No	CaAa (In Face)	168.00 - 5.00	0.000	0.44	1	No Ice	0.00	0.08
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
9207(5/16")	A	No	CaAa (In Face)	168.00 - 5.00	0.000	0.44	3	No Ice	0.00	0.06
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
ATMAA1412D-1A20	A	From Leg	0.25 0 0	0.000	180.00	No Ice	0.47	1.17	13
						1/2" Ice	0.57	1.31	21
						1" Ice	0.69	1.47	30
						2" Ice	0.95	1.81	56
						4" Ice	1.57	2.58	137
ATMAA1412D-1A20	B	From Leg	0.25 0 0	0.000	180.00	No Ice	0.47	1.17	13
						1/2" Ice	0.57	1.31	21
						1" Ice	0.69	1.47	30
						2" Ice	0.95	1.81	56
						4" Ice	1.57	2.58	137

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* lb
ATMAA1412D-1A20	C	From Leg	0.25 0 0	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	13 21 30 56 137
SBNHH-1D65A w/ Mount Pipe	A	From Leg	0.25 0 6	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.60 7.11 7.62 8.67 10.89	5.19 5.96 6.70 8.28 11.64	54 108 168 312 720
ATMAA1412D-1A20	A	From Leg	0.25 0 2	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	13 21 30 56 137
SBNHH-1D65A w/ Mount Pipe	B	From Leg	0.25 0 6	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.60 7.11 7.62 8.67 10.89	5.19 5.96 6.70 8.28 11.64	54 108 168 312 720
ATMAA1412D-1A20	B	From Leg	0.25 0 2	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	13 21 30 56 137
SBNHH-1D65A w/ Mount Pipe	C	From Leg	0.25 0 6	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.60 7.11 7.62 8.67 10.89	5.19 5.96 6.70 8.28 11.64	54 108 168 312 720
ATMAA1412D-1A20	C	From Leg	0.25 0 2	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	13 21 30 56 137
ATBT-BOTTOM-24V	A	From Leg	0.25 0 2	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.12 0.17 0.23 0.38 0.77	0.08 0.12 0.17 0.30 0.67	3 4 6 13 45
ATBT-BOTTOM-24V	B	From Leg	0.25 0 2	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.12 0.17 0.23 0.38 0.77	0.08 0.12 0.17 0.30 0.67	3 4 6 13 45
ATBT-BOTTOM-24V	C	From Leg	0.25 0 2	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.12 0.17 0.23 0.38 0.77	0.08 0.12 0.17 0.30 0.67	3 4 6 13 45
18' x 3" Pipe Mount	B	From Leg	0.00 0 -3	0.000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.40 7.23 9.08 12.83 18.77	5.40 7.23 9.08 12.83 18.77	500 539 589 725 1140

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* lb
**						4" Ice			
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	47 114 189 367 867
(2) LPA-80063/6CFx5 w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.55 11.21 11.84 13.13 15.83	10.65 11.91 12.88 14.89 19.13	52 144 245 475 1086
(2) SC-E 6014 rev2 w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.78 4.18 4.59 5.44 7.29	4.40 5.01 5.64 6.96 9.90	32 71 116 225 544
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	44 80 120 213 455
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	44 80 120 213 455
(2) RRH2x60-700	A	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	60 83 109 173 354
RRH2X60-AWS	A	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.19 2.40 2.61 3.07 4.09	1.43 1.61 1.80 2.21 3.13	44 60 79 125 259
RRH2X60-PCS	A	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	55 75 99 155 313
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	67 137 215 398 914
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.30 9.92 11.20 13.86	7.07 8.26 9.18 11.01 15.05	66 135 213 395 904
RRH2x60-700	B	From Leg	4.00 0 0	0.000	177.00	No Ice 1/2" Ice	3.96 4.27 4.60	1.82 2.08 2.36	60 83 109

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* *lb*
						1" Ice	5.27	2.96	173
						2" Ice	6.72	4.25	354
						4" Ice			
RRH2X60-AWS	B	From Leg	4.00 0 0	0.000	177.00	No Ice	2.19	1.43	44
						1/2" Ice	2.40	1.61	60
							2.61	1.80	79
						1" Ice	3.07	2.21	125
						2" Ice	4.09	3.13	259
						4" Ice			
RRH2X60-PCS	B	From Leg	4.00 0 0	0.000	177.00	No Ice	2.57	2.01	55
						1/2" Ice	2.79	2.22	75
							3.02	2.43	99
						1" Ice	3.52	2.89	155
						2" Ice	4.61	3.92	313
						4" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	177.00	No Ice	8.98	6.96	67
						1/2" Ice	9.65	8.18	137
							10.29	9.14	215
						1" Ice	11.59	11.02	398
						2" Ice	14.32	15.03	914
						4" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	177.00	No Ice	8.64	7.07	66
						1/2" Ice	9.30	8.26	135
							9.92	9.18	213
						1" Ice	11.20	11.01	395
						2" Ice	13.86	15.05	904
						4" Ice			
RRH2X60-AWS	C	From Leg	4.00 0 0	0.000	177.00	No Ice	2.19	1.43	44
						1/2" Ice	2.40	1.61	60
							2.61	1.80	79
						1" Ice	3.07	2.21	125
						2" Ice	4.09	3.13	259
						4" Ice			
RRH2X60-PCS	C	From Leg	4.00 0 0	0.000	177.00	No Ice	2.57	2.01	55
						1/2" Ice	2.79	2.22	75
							3.02	2.43	99
						1" Ice	3.52	2.89	155
						2" Ice	4.61	3.92	313
						4" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	177.00	No Ice	8.98	6.96	67
						1/2" Ice	9.65	8.18	137
							10.29	9.14	215
						1" Ice	11.59	11.02	398
						2" Ice	14.32	15.03	914
						4" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	177.00	No Ice	8.64	7.07	66
						1/2" Ice	9.30	8.26	135
							9.92	9.18	213
						1" Ice	11.20	11.01	395
						2" Ice	13.86	15.05	904
						4" Ice			
Sector Mount [SM 502-3]	C	None		0.000	177.00	No Ice	33.02	33.02	1673
						1/2" Ice	47.36	47.36	2224
							61.70	61.70	2775
						1" Ice	90.38	90.38	3876
						2" Ice	147.74	147.74	6080
						4" Ice			
**									
LLPX310R w/ Mount Pipe	A	From Leg	1.00 0 0	0.000	168.00	No Ice	4.96	2.85	44
						1/2" Ice	5.35	3.37	81
							5.75	3.90	123
						1" Ice	6.58	5.08	226
						2" Ice	8.37	7.84	529
						4" Ice			
FDD_R6_RRH	A	From Leg	1.00	0.000	168.00	No Ice	1.79	0.78	33

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* *lb*
			0 0			1/2" Ice 1" Ice 2" Ice 4" Ice	1.97 2.16 2.57 3.49	0.92 1.07 1.39 2.14	45 58 94 200
LLPX310R w/ Mount Pipe	B	From Leg	1.00 0 0	0.000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.96 5.35 5.75 6.58 8.37	2.85 3.37 3.90 5.08 7.84	44 81 123 226 529
FDD_R6_RRH	B	From Leg	1.00 0 0	0.000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.79 1.97 2.16 2.57 3.49	0.78 0.92 1.07 1.39 2.14	33 45 58 94 200
LLPX310R w/ Mount Pipe	C	From Leg	1.00 0 0	0.000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.96 5.35 5.75 6.58 8.37	2.85 3.37 3.90 5.08 7.84	44 81 123 226 529
FDD_R6_RRH	C	From Leg	1.00 0 0	0.000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.79 1.97 2.16 2.57 3.49	0.78 0.92 1.07 1.39 2.14	33 45 58 94 200
Pipe Mount [PM 602-3]	C	None		0.000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.68 9.50 11.32 14.96 22.24	7.68 9.50 11.32 14.96 22.24	279 353 427 576 873
**									
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	A	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	27 38 52 86 189
DTMABP7819VG12A	A	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	19 26 36 60 140
RRUS-11	A	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	48 68 92 150 310
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	74 139 212 385 874
7020.00	A	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.12 0.17 0.23 0.38 0.78	0.20 0.28 0.36 0.56 1.05	2 5 9 22 71

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* *lb*
						4" Ice			
7770.00 w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.22 6.71 7.22 8.26 10.48	4.82 5.51 6.21 7.67 11.06	86 143 208 356 761
(2) LGP13519	A	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	5 8 12 24 71
DC6-48-60-18-8F	A	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	19 37 57 105 239
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	B	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	27 38 52 86 189
(2) SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.56 12.22 12.89 14.29 17.43	9.72 11.19 12.59 14.87 19.62	97 185 284 514 1148
DTMABP7819VG12A	B	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	19 26 36 60 140
(2) RRUS-11	B	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	48 68 92 150 310
7020.00	B	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.12 0.17 0.23 0.38 0.78	0.20 0.28 0.36 0.56 1.05	2 5 9 22 71
7770.00 w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.22 6.71 7.22 8.26 10.48	4.82 5.51 6.21 7.67 11.06	86 143 208 356 761
(2) LGP13519	B	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	5 8 12 24 71
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	C	From Leg	4.00 0 0	0.000	158.00	No Ice 1/2" Ice 1" Ice	1.55 1.72 1.90 2.28	0.81 0.94 1.09 1.40	27 38 52 86

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* *lb*
						2" Ice	3.14	2.12	189
						4" Ice			
DTMABP7819VG12A	C	From Leg	4.00	0.000	158.00	No Ice	1.14	0.39	19
			0			1/2" Ice	1.28	0.49	26
			0				1.44	0.59	36
						1" Ice	1.77	0.83	60
						2" Ice	2.54	1.41	140
						4" Ice			
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.000	158.00	No Ice	8.50	6.30	74
			0			1/2" Ice	9.15	7.48	139
			2				9.77	8.37	212
						1" Ice	11.03	10.18	385
						2" Ice	13.68	14.02	874
						4" Ice			
7020.00	C	From Leg	4.00	0.000	158.00	No Ice	0.12	0.20	2
			0			1/2" Ice	0.17	0.28	5
			0				0.23	0.36	9
						1" Ice	0.38	0.56	22
						2" Ice	0.78	1.05	71
						4" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.000	158.00	No Ice	6.22	4.82	86
			0			1/2" Ice	6.71	5.51	143
			2				7.22	6.21	208
						1" Ice	8.26	7.67	356
						2" Ice	10.48	11.06	761
						4" Ice			
(2) LGP13519	C	From Leg	4.00	0.000	158.00	No Ice	0.34	0.21	5
			0			1/2" Ice	0.42	0.28	8
			0				0.51	0.36	12
						1" Ice	0.73	0.55	24
						2" Ice	1.25	1.03	71
						4" Ice			
RRU-12	A	From Leg	4.00	0.000	158.00	No Ice	3.67	1.49	50
			0			1/2" Ice	3.93	1.67	73
			2				4.19	1.87	100
						1" Ice	4.75	2.28	163
						2" Ice	5.96	3.21	336
						4" Ice			
(2) RRU-12	C	From Leg	4.00	0.000	158.00	No Ice	3.67	1.49	50
			0			1/2" Ice	3.93	1.67	73
			0				4.19	1.87	100
						1" Ice	4.75	2.28	163
						2" Ice	5.96	3.21	336
						4" Ice			
Sector Mount [SM 502-3]	C	None		0.000	158.00	No Ice	33.02	33.02	1673
						1/2" Ice	47.36	47.36	2224
							61.70	61.70	2775
						1" Ice	90.38	90.38	3876
						2" Ice	147.74	147.74	6080
						4" Ice			
**									
RFS APXV18-206517-C	A	From Leg	0.50	0.000	148.00	No Ice	5.17	3.04	26
			0			1/2" Ice	5.62	3.47	53
			0				6.08	3.91	85
						1" Ice	7.02	4.81	167
						2" Ice	9.12	6.70	404
						4" Ice			
RFS APXV18-206517-C	B	From Leg	0.50	0.000	148.00	No Ice	5.17	3.04	26
			0			1/2" Ice	5.62	3.47	53
			0				6.08	3.91	85
						1" Ice	7.02	4.81	167
						2" Ice	9.12	6.70	404
						4" Ice			
RFS APXV18-206517-C	C	From Leg	0.50	0.000	148.00	No Ice	5.17	3.04	26
			0			1/2" Ice	5.62	3.47	53

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0			Ice	6.08	3.91	85
						1" Ice	7.02	4.81	167
						2" Ice	9.12	6.70	404
						4" Ice			
Pipe Mount [PM 602-3]	C	None		0.000	148.00	No Ice	7.68	7.68	279
						1/2" Ice	9.50	9.50	353
						1" Ice	11.32	11.32	427
						2" Ice	14.96	14.96	576
						4" Ice	22.24	22.24	873
**									
GPS_A	A	From Leg	4.00 0 0	0.000	40.00	No Ice	0.30	0.30	1
						1/2" Ice	0.37	0.37	5
						1" Ice	0.46	0.46	10
						2" Ice	0.65	0.65	25
						4" Ice	1.15	1.15	79
Side Arm Mount [SO 306-1]	A	From Leg	2.00 0 0	0.000	40.00	No Ice	0.98	2.18	42
						1/2" Ice	1.70	3.80	62
						1" Ice	2.42	5.42	83
						2" Ice	3.86	8.66	123
						4" Ice	6.74	15.14	205
**									

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 lb
A-ANT-18G-2-C	A	Paraboloid w/Radome	From Leg	1.00 0 0	9.000		168.00	2.17	No Ice	3.72	30
									1/2" Ice	4.01	40
									1" Ice	4.30	50
									2" Ice	4.88	70
									4" Ice	6.04	110

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice

Comb. No.	Description
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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 Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	10	210658	22422	-12379
	Max. H_x	10	210658	22422	-12379
	Max. H_z	4	-175941	-19759	10864
	Min. Vert	4	-175941	-19759	10864
	Min. H_x	4	-175941	-19759	10864
	Min. H_z	10	210658	22422	-12379
Leg B	Max. Vert	6	211725	-22106	-13026
	Max. H_x	12	-175991	19432	11513
	Max. H_z	13	-151433	15628	11929
	Min. Vert	12	-175991	19432	11513
	Min. H_x	6	211725	-22106	-13026
	Min. H_z	7	185209	-18101	-13231
Leg A	Max. Vert	2	212172	720	25794
	Max. H_x	11	15499	3669	1452
	Max. H_z	2	212172	720	25794
	Min. Vert	8	-179834	-725	-22806
	Min. H_x	5	14766	-3656	1391
	Min. H_z	8	-179834	-725	-22806

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.78	32	0.192	0.060
T2	160 - 140	2.98	32	0.183	0.053
T3	140 - 120	2.22	32	0.158	0.037
T4	120 - 100	1.58	32	0.131	0.026
T5	100 - 80	1.06	32	0.107	0.019
T6	80 - 60	0.66	32	0.080	0.013
T7	60 - 40	0.37	32	0.056	0.009
T8	40 - 20	0.16	27	0.036	0.006
T9	20 - 0	0.04	27	0.016	0.003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	ATMAA1412D-1A20	32	3.78	0.192	0.060	611846
177.00	(2) DB846F65ZAXY w/ Mount Pipe	32	3.65	0.191	0.059	611846
168.00	A-ANT-18G-2-C	32	3.29	0.188	0.057	254936
158.00	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	32	2.90	0.181	0.052	115673
148.00	RFS APXV18-206517-C	32	2.51	0.169	0.044	52980
40.00	GPS_A	27	0.16	0.036	0.006	65510

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	10.81	7	0.548	0.173
T2	160 - 140	8.53	7	0.521	0.153
T3	140 - 120	6.36	2	0.452	0.108
T4	120 - 100	4.53	2	0.374	0.076
T5	100 - 80	3.06	2	0.305	0.055
T6	80 - 60	1.91	2	0.229	0.039
T7	60 - 40	1.06	2	0.159	0.026
T8	40 - 20	0.47	2	0.103	0.017
T9	20 - 0	0.12	2	0.047	0.008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	ATMAA1412D-1A20	7	10.81	0.548	0.173	261687
177.00	(2) DB846F65ZAXY w/ Mount Pipe	7	10.46	0.545	0.171	261687
168.00	A-ANT-18G-2-C	7	9.43	0.536	0.164	109036
158.00	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	7	8.30	0.516	0.149	45602
148.00	RFS APXV18-206517-C	7	7.20	0.484	0.126	18741
40.00	GPS_A	2	0.47	0.103	0.017	22904

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.750	4	2550	19439	0.131 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	2383	6443	0.370 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	1951	6443	0.303 ✔	1.333	Bolt Shear
T2	160	Leg	A325N	0.875	4	9607	26458	0.363 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	2914	6443	0.452 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	2741	6443	0.425 ✔	1.333	Bolt Shear
T3	140	Leg	A325N	1.000	4	16667	34557	0.482 ✔	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.625	3	2905	6443	0.451 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	2861	6443	0.444 ✔	1.333	Bolt Shear
T4	120	Leg	A325N	1.000	4	21754	34557	0.629 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	3278	6443	0.509 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	2891	6443	0.449 ✔	1.333	Bolt Shear
T5	100	Leg	A325N	1.000	6	17931	34558	0.519 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	2900	6443	0.450 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	2816	6443	0.437 ✔	1.333	Bolt Shear
T6	80	Leg	A325N	1.000	6	20934	34557	0.606 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	2969	6443	0.461 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	3112	6443	0.483 ✔	1.333	Bolt Shear
T7	60	Leg	A325N	1.000	6	23794	34557	0.689 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	3045	6443	0.473 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	3374	6443	0.524 ✔	1.333	Bolt Shear
T8	40	Leg	A325N	1.000	8	19804	34557	0.573 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	2958	6443	0.459 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	3433	6443	0.533 ✔	1.333	Bolt Shear
T9	20	Leg	A449	1.000	8	20497	31102	0.659 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.750	3	4490	9278	0.484 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.750	2	3756	9278	0.405 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	180 - 160	Pipe 2.875" x 0.203" (2.5 STD)	20.00	6.53	82.7 K=1.00	18.47	1.704	-14157	31476	0.450 ✔
T2	160 - 140	Pipe 3.5" x 0.300" (3 XS)	20.04	6.54	69.1 K=1.00	21.11	3.016	-45977	63670	0.722 ✔
T3	140 - 120	Pipe 4.5" x 0.337" (4 XS)	20.04	6.54	53.1 K=1.00	23.85	4.407	-76310	105132	0.726 ✔
T4	120 - 100	Pipe 5.5" x 0.375" (5 EH)	20.04	9.81	64.8 K=1.00	21.88	6.038	-98858	132103	0.748 ✔
T5	100 - 80	Pipe 5.5" x 0.375" (5 EH)	20.06	9.82	64.9 K=1.00	21.87	6.038	-122231	132057	0.926 ✔
T6	80 - 60	Pipe 6.625" x 0.340" (6 EHS)	20.05	9.82	52.9 K=1.00	23.89	6.713	-143396	160354	0.894 ✔
T7	60 - 40	Pipe 6.625" x 0.432" (6 XS)	20.05	9.82	53.7 K=1.00	23.77	8.405	-164382	199769	0.823 ✔
T8	40 - 20	Pipe 6.625" x 0.432" (6 XS)	20.06	9.82	53.7 K=1.00	23.77	8.405	-184414	199748	0.923 ✔
T9	20 - 0	Pipe 8.75" x 0.375" (8 EHS)	20.05	9.82	39.7 K=1.00	25.87	9.867	-194250	255225	0.761 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	Pipe 2.375" x 0.154" (2 STD)	7.80	7.58	115.6 K=1.00	11.18	1.075	-7150	12010	0.595 ✔
T2	160 - 140	Pipe 2.375" x 0.154" (2 STD)	8.42	8.19	124.8 K=1.00	9.58	1.075	-8742	10299	0.849 ✔
T3	140 - 120	Pipe 2.375" x 0.154" (2 STD)	9.11	8.84	134.8 K=1.00	8.22	1.075	-8273	8829	0.937 ✔
T4	120 - 100	Pipe 2.875" x 0.203" (2.5 STD)	12.33	11.95	151.3 K=1.00	6.52	1.704	-9601	11111	0.864 ✔
T5	100 - 80	Pipe 2.875" x 0.203" (2.5 STD)	13.15	12.81	162.2 K=1.00	5.67	1.704	-8545	9670	0.884 ✔
T6	80 - 60	Pipe 2.875" x 0.203" (2.5 STD)	14.01	13.63	172.6 K=1.00	5.01	1.704	-8889	8539	1.041 ✔
T7	60 - 40	Pipe 2.875" x 0.276" (2.5 XS)	14.93	14.57	189.2 K=1.00	4.17	2.254	-9134	9402	0.972 ✔
T8	40 - 20	Pipe 3.5" x 0.216" (3 STD)	15.95	15.60	160.9 K=1.00	5.77	2.228	-8874	12852	0.690 ✔
T9	20 - 0	Pipe 3.5" x 0.216" (3 STD)	23.99	11.99	123.7 K=1.00	9.76	2.228	-13471	21747	0.619 ✔

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	Pipe 1.9" x 0.145" (1.5 STD)	8.53	4.14	79.9 K=1.00	19.04	0.799	-3874	15219	0.255 ✔
T2	160 - 140	Pipe 1.9" x 0.145" (1.5 STD)	9.94	4.83	93.0 K=1.00	16.28	0.799	-5482	13014	0.421 ✔
T3	140 - 120	Pipe 2.375" x 0.154" (2 STD)	12.03	5.83	88.8 K=1.00	17.19	1.075	-5715	18470	0.309 ✔
T4	120 - 100	Pipe 2.375" x 0.154" (2 STD)	13.86	6.70	102.1 K=1.00	14.21	1.075	-5782	15268	0.379 ✔
T5	100 - 80	Pipe 2.375" x 0.154" (2 STD)	16.28	7.91	120.6 K=1.00	10.27	1.075	-5631	11036	0.510 ✔
T6	80 - 60	Pipe 2.875" x 0.203" (2.5 STD)	18.82	9.13	115.7 K=1.00	11.16	1.704	-6225	19017	0.327 ✔
T7	60 - 40	Pipe 2.875" x 0.203" (2.5 STD)	21.32	10.38	131.5 K=1.00	8.63	1.704	-6630	14714	0.451 ✔
T8	40 - 20	Pipe 2.875" x 0.203" (2.5 STD)	23.89	11.67	147.8 K=1.00	6.84	1.704	-6654	11652	0.571 ✔
T9	20 - 0	Pipe 3.5" x 0.216" (3 STD)	25.23	12.25	126.3 K=1.00	9.36	2.228	-7511	20850	0.360 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	Pipe 1.9" x 0.145" (1.5 STD)	8.50	4.13	79.6 K=1.00	19.09	0.799	-1914	15261	0.125 ✔

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	20 - 0	Rohn 1.5" x 11 ga	6.31	5.94	145.6 K=1.00	7.04	0.520	-3371	3664	0.920 ✔

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	20 - 0	Pipe 1.9" x 0.145" (1.5 STD)	11.33	10.61	204.5 K=1.00	3.57	0.799	-3029	2855	1.061 ✔

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	20 - 0	Pipe 1.9" x 0.145" (1.5 STD)	6.31	6.31	121.6 K=1.00	10.10	0.799	-40	8078	0.005 ✔

Redundant Hip Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	20 - 0	Pipe 2.875" x 0.203" (2.5 STD)	14.95	14.95	189.3 K=1.00	4.17	1.704	-56	7099	0.008* ✔

* DL controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L 2 x 2 x 1/8	4.25	4.25	128.3 K=1.00	9.07	0.484	-33	4394	0.008 ✔
T2	160 - 140	L 2 x 2 x 1/8	4.97	4.97	150.1 K=1.00	6.63	0.484	-6	3211	0.002 ✔
T3	140 - 120	L 2 x 2 x 1/8	6.01	6.01	181.5 K=1.00	4.53	0.484	-7	2195	0.003 ✔
T4	120 - 100	L 2 x 2 x 1/8	6.93	6.93	209.1 K=1.00	3.41	0.484	-7	1654	0.004 ✔
T5	100 - 80	L 2.5 x 2.5 x 3/16	8.14	8.14	197.3 K=1.00	3.84	0.902	-6	3460	0.002* ✔
T6	80 - 60	L 3 x 3 x 3/16	9.41	9.41	189.3	4.17	1.090	-7	4540	0.002*

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
					K=1.00					✔
T7	60 - 40	L 3.5 x 3.5 x 1/4	10.66	10.66	184.3	4.40	1.690	-9	7430	0.001*
					K=1.00					✔
T8	40 - 20	L 3.5 x 3.5 x 1/4	11.94	11.94	206.5	3.50	1.690	-11	5917	0.002*
					K=1.00					✔
T9	20 - 0	Pipe 3.5" x 0.216" (3 STD)	12.61	12.61	130.1	8.82	2.228	-12	19663	0.001*
					K=1.00					✔

* DL controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	Pipe 2.875" x 0.203" (2.5 STD)	20.00	6.53	82.7	30.00	1.704	10200	51122	0.200 ✔
T2	160 - 140	Pipe 3.5" x 0.300" (3 XS)	20.04	6.54	69.1	30.00	3.016	38429	90478	0.425 ✔
T3	140 - 120	Pipe 4.5" x 0.337" (4 XS)	20.04	6.54	53.1	30.00	4.407	66668	132223	0.504 ✔
T4	120 - 100	Pipe 5.5" x 0.375" (5 EH)	20.04	9.81	64.8	30.00	6.038	87015	181132	0.480 ✔
T5	100 - 80	Pipe 5.5" x 0.375" (5 EH)	20.06	9.82	64.9	30.00	6.038	107587	181132	0.594 ✔
T6	80 - 60	Pipe 6.625" x 0.340" (6 EHS)	20.05	9.82	52.9	30.00	6.713	125603	201398	0.624 ✔
T7	60 - 40	Pipe 6.625" x 0.432" (6 XS)	20.05	9.82	53.7	30.00	8.405	142763	252148	0.566 ✔
T8	40 - 20	Pipe 6.625" x 0.432" (6 XS)	20.06	9.82	53.7	30.00	8.405	158435	252148	0.628 ✔
T9	20 - 0	Pipe 8.75" x 0.375" (8 EHS)	20.05	9.82	39.7	30.00	9.867	166414	295997	0.562 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	Pipe 2.375" x 0.154" (2 STD)	7.80	7.58	115.6	30.00	1.075	7086	32236	0.220 ✔
T2	160 - 140	Pipe 2.375" x 0.154" (2 STD)	8.42	8.19	124.8	30.00	1.075	8663	32236	0.269 ✔
T3	140 - 120	Pipe 2.375" x 0.154" (2 STD)	8.65	8.38	127.8	30.00	1.075	8617	32236	0.267 ✔
T4	120 - 100	Pipe 2.875" x 0.203" (2.5 STD)	12.00	11.62	147.2	30.00	1.704	9681	51122	0.189 ✔
T5	100 - 80	Pipe 2.875" x 0.203" (2.5 STD)	12.74	12.39	157.0	30.00	1.704	8505	51122	0.166 ✔
T6	80 - 60	Pipe 2.875" x 0.203" (2.5 STD)	13.58	13.20	167.2	30.00	1.704	8632	51122	0.169 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T7	60 - 40	Pipe 2.875" x 0.276" (2.5 XS)	14.93	14.57	189.2	30.00	2.254	8682	67606	0.128 ✔
T8	40 - 20	Pipe 3.5" x 0.216" (3 STD)	15.45	15.10	155.7	30.00	2.228	8384	66854	0.125 ✔
T9	20 - 0	Pipe 3.5" x 0.216" (3 STD)	23.99	11.99	123.7	30.00	2.228	12846	66854	0.192 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	Pipe 1.9" x 0.145" (1.5 STD)	8.53	4.14	79.9	30.00	0.799	3902	23984	0.163 ✔
T2	160 - 140	Pipe 1.9" x 0.145" (1.5 STD)	9.94	4.83	93.0	30.00	0.799	5481	23984	0.229 ✔
T3	140 - 120	Pipe 2.375" x 0.154" (2 STD)	12.03	5.83	88.8	30.00	1.075	5722	32236	0.177 ✔
T4	120 - 100	Pipe 2.375" x 0.154" (2 STD)	13.86	6.70	102.1	30.00	1.075	5728	32236	0.178 ✔
T5	100 - 80	Pipe 2.375" x 0.154" (2 STD)	16.28	7.91	120.6	30.00	1.075	5581	32236	0.173 ✔
T6	80 - 60	Pipe 2.875" x 0.203" (2.5 STD)	18.82	9.13	115.7	30.00	1.704	6225	51122	0.122 ✔
T7	60 - 40	Pipe 2.875" x 0.203" (2.5 STD)	21.32	10.38	131.5	30.00	1.704	6748	51122	0.132 ✔
T8	40 - 20	Pipe 2.875" x 0.203" (2.5 STD)	23.89	11.67	147.8	30.00	1.704	6866	51122	0.134 ✔
T9	20 - 0	Pipe 3.5" x 0.216" (3 STD)	25.23	12.25	126.3	30.00	2.228	7425	66854	0.111 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	Pipe 1.9" x 0.145" (1.5 STD)	8.50	4.13	79.6	30.00	0.799	1917	23984	0.080 ✔

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	20 - 0	Rohn 1.5" x 11 ga	6.31	5.94	145.6	30.00	0.520	3371	15607	0.216 ✔

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	20 - 0	Pipe 1.9" x 0.145" (1.5 STD)	11.33	10.61	204.5	30.00	0.799	3029	23984	0.126 ✔

Redundant Hip Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	20 - 0	Pipe 2.875" x 0.203" (2.5 STD)	14.95	14.95	189.3	30.00	1.704	73	51122	0.001 ✔

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	180 - 160	L 2 x 2 x 1/8	4.25	4.25	81.4	21.60	0.484	33	10463	0.003 ✔
T2	160 - 140	L 2 x 2 x 1/8	4.29	4.29	82.3	21.60	0.484	5	10463	0.000 ✔
T3	140 - 120	L 2 x 2 x 1/8	5.33	5.33	102.2	21.60	0.484	5	10463	0.000 ✔
T4	120 - 100	L 2 x 2 x 1/8	6.38	6.38	122.2	21.60	0.484	2	10463	0.000 ✔
T5	100 - 80	L 2.5 x 2.5 x 3/16	7.51	7.51	115.7	21.60	0.902	0	19483	0.000 ✔

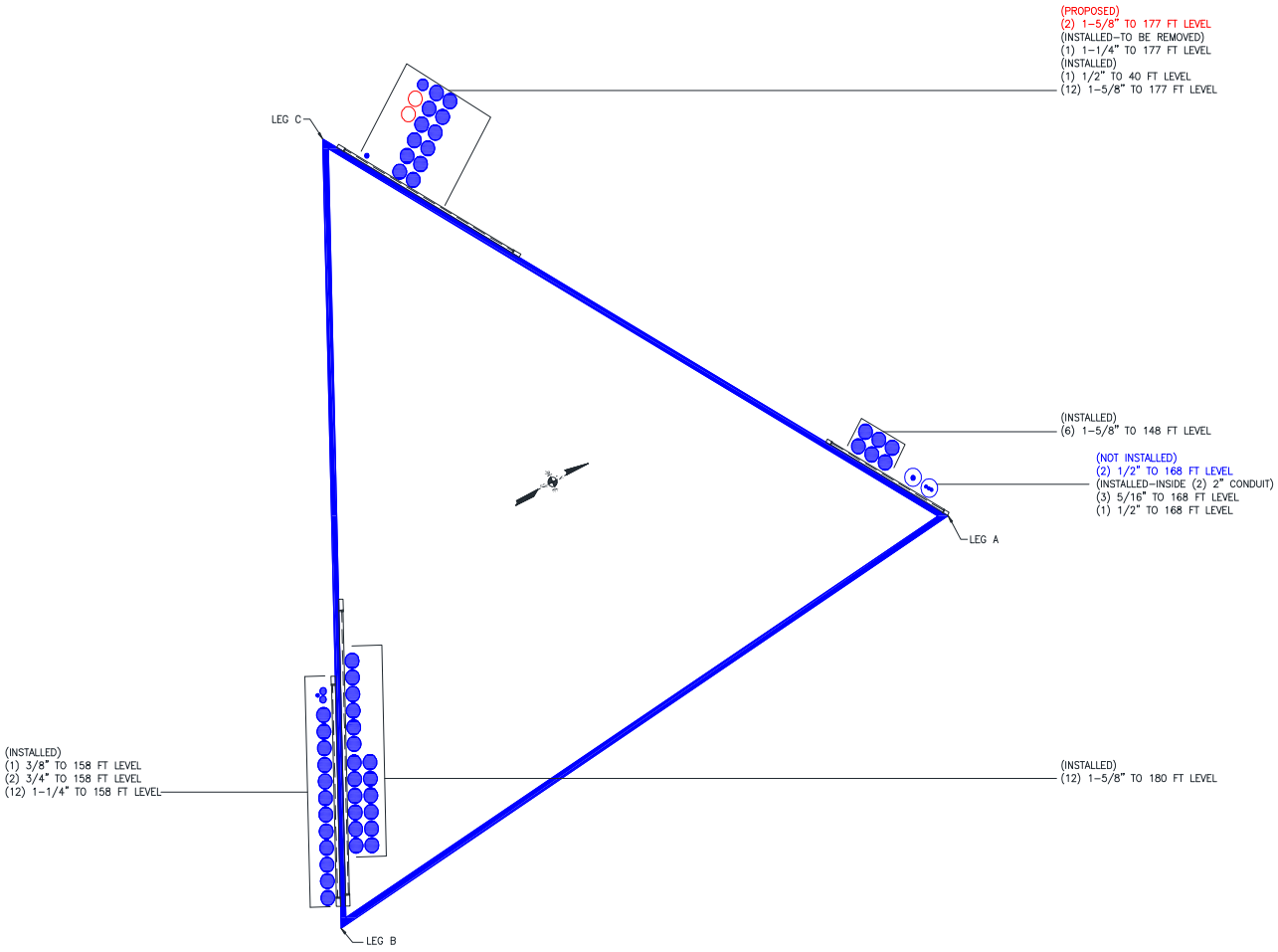
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	180 - 160	Leg	Pipe 2.875" x 0.203" (2.5 STD)	3	-14157	41957	33.7	Pass
		Diagonal	Pipe 2.375" x 0.154" (2 STD)	11	-7150	16009	44.7	Pass
		Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	10	-3874	20287	19.1 22.7 (b)	Pass
		Top Girt	Pipe 1.9" x 0.145" (1.5 STD)	5	-1914	20343	9.4	Pass
		Inner Bracing	L 2 x 2 x 1/8	38	-33	5857	0.6	Pass
T2	160 - 140	Leg	Pipe 3.5" x 0.300" (3 XS)	42	-45977	84872	54.2	Pass
		Diagonal	Pipe 2.375" x 0.154" (2 STD)	48	-8742	13728	63.7	Pass
		Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	46	-5482	17348	31.6 31.9 (b)	Pass
		Inner Bracing	L 2 x 2 x 1/8	52	-6	4280	0.3	Pass
T3	140 - 120	Leg	Pipe 4.5" x 0.337" (4 XS)	81	-76310	140141	54.5	Pass
		Diagonal	Pipe 2.375" x 0.154" (2 STD)	87	-8273	11768	70.3	Pass
		Horizontal	Pipe 2.375" x 0.154" (2 STD)	85	-5715	24620	23.2 33.3 (b)	Pass
		Inner Bracing	L 2 x 2 x 1/8	91	-7	2926	0.4	Pass
T4	120 - 100	Leg	Pipe 5.5" x 0.375" (5 EH)	120	-98858	176093	56.1	Pass
		Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	126	-9601	14811	64.8	Pass
		Horizontal	Pipe 2.375" x 0.154" (2 STD)	124	-5782	20352	28.4 33.7 (b)	Pass
		Inner Bracing	L 2 x 2 x 1/8	131	-7	2204	0.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T5	100 - 80	Leg	Pipe 5.5" x 0.375" (5 EH)	147	-122231	176032	69.4	Pass
		Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	153	-8545	12891	66.3	Pass
		Horizontal	Pipe 2.375" x 0.154" (2 STD)	151	-5631	14711	38.3	Pass
		Inner Bracing	L 2.5 x 2.5 x 3/16	157	-6	3460	0.5	Pass
T6	80 - 60	Leg	Pipe 6.625" x 0.340" (6 EHS)	174	-143396	213752	67.1	Pass
		Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	180	-8889	11383	78.1	Pass
		Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	178	-6225	25350	24.6 36.2 (b)	Pass
		Inner Bracing	L 3 x 3 x 3/16	185	-7	4540	0.5	Pass
T7	60 - 40	Leg	Pipe 6.625" x 0.432" (6 XS)	201	-164382	266292	61.7	Pass
		Diagonal	Pipe 2.875" x 0.276" (2.5 XS)	207	-9134	12532	72.9	Pass
		Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	205	-6630	19613	33.8 39.3 (b)	Pass
		Inner Bracing	L 3.5 x 3.5 x 1/4	211	-9	7430	0.5	Pass
T8	40 - 20	Leg	Pipe 6.625" x 0.432" (6 XS)	228	-184414	266264	69.3	Pass
		Diagonal	Pipe 3.5" x 0.216" (3 STD)	234	-8874	17132	51.8	Pass
		Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	232	-6654	15532	42.8	Pass
		Inner Bracing	L 3.5 x 3.5 x 1/4	238	-11	5917	0.5	Pass
T9	20 - 0	Leg	Pipe 8.75" x 0.375" (8 EHS)	255	-194250	340215	57.1	Pass
		Diagonal	Pipe 3.5" x 0.216" (3 STD)	267	-13471	28988	46.5	Pass
		Horizontal	Pipe 3.5" x 0.216" (3 STD)	263	-7511	27794	27.0 30.4 (b)	Pass
		Redund Horz 1 Bracing	Rohn 1.5" x 11 ga	268	-3371	4884	69.0	Pass
		Redund Diag 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	269	-3029	3806	79.6	Pass
		Redund Hip 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	270	-40	10768	0.4	Pass
		Redund Hip Diagonal Bracing	Pipe 2.875" x 0.203" (2.5 STD)	282	-56	7099	0.8	Pass
		Inner Bracing	Pipe 3.5" x 0.216" (3 STD)	284	-12	19663	0.6	Pass
							Summary	
							Leg (T5)	69.4	Pass
							Diagonal (T6)	78.1	Pass
							Horizontal (T8)	42.8	Pass
							Top Girt (T1)	9.4	Pass
							Redund Horz 1 Bracing (T9)	69.0	Pass
							Redund Diag 1 Bracing (T9)	79.6	Pass
							Redund Hip 1 Bracing (T9)	0.4	Pass
							Redund Hip Diagonal Bracing (T9)	0.8	Pass
							Inner Bracing (T9)	0.6	Pass
							Bolt Checks	51.7	Pass
							RATING =	**79.6**	**Pass**

APPENDIX B

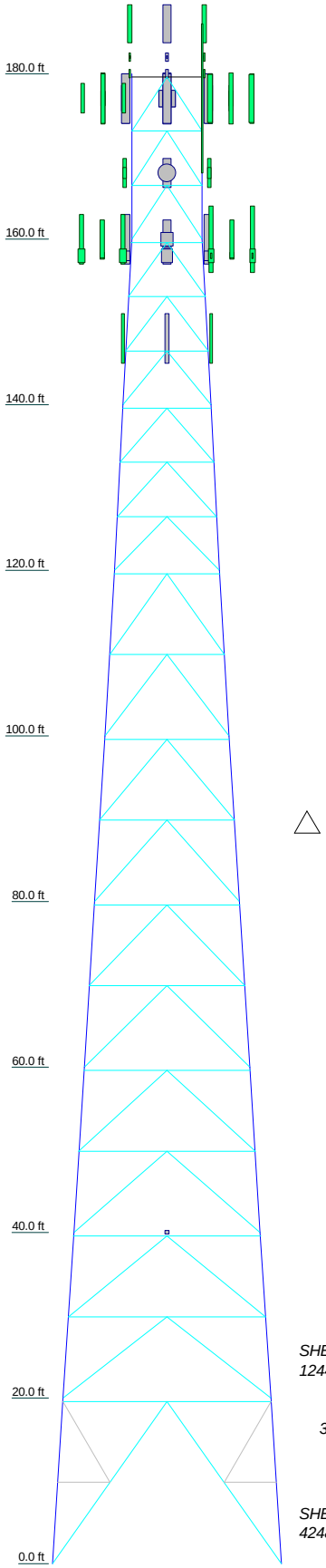
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	Pipe 8.75" x 0.375" (8 EHS)	Pipe 6.625" x 0.432" (6 XS)		Pipe 6.625" x 0.340" (6 EHS)	Pipe 5.5" x 0.375" (5 EH)		Pipe 4.5" x 0.337" (4 XS)	Pipe 3.5" x 0.300" (3 XS)	A
Leg Grade	A500-50			A513-50			A618-50		
Diagonals	Pipe 3.5" x 0.216" (3 STD)		Pipe 2.875" x 0.276" (2.5 XS)		Pipe 2.875" x 0.203" (2.5 STD)		Pipe 2.375" x 0.154" (2 STD)		
Diagonal Grade					A618-50				
Top Girts				N.A.					Pipe 1.9" x 0.145" (1.5 STD)
Horizontals	Pipe 3.5" x 0.216" (3 STD)		Pipe 2.875" x 0.203" (2.5 STD)			Pipe 2.375" x 0.154" (2 STD)			Pipe 1.9" x 0.145" (1.5 STD)
Red. Horizontals	Rohn 1.5" x 11 ga					N.A.			
Red. Diagonals	Pipe 1.9" x 0.145" (1.5 STD)					N.A.			
Red. Hips	Pipe 1.9" x 0.145" (1.5 STD)					N.A.			
Inner Bracing	Pipe 3.5" x 0.216" (3 STD)		L 3.5 x 3.5 x 1/4	L 3 x 3 x 3/16	L 2.5 x 2.5 x 3/16		L 2 x 2 x 1/8		
Face Width (ft)	27.6771		22.5417	17.5417	14.9583	12.7083	10.625	8.54167	8.5
# Panels @ (ft)	1 @ 19.5833			10 @ 9.79167				9 @ 6.52778	
Weight (lb)	29366.5	5669.4	5013.1	4774.0	3487.4	2886.5	2683.2	2137.9	1525.5	1189.3



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ATMAA1412D-1A20	180	FDD_R6_RRH	168
ATMAA1412D-1A20	180	Pipe Mount [PM 602-3]	168
ATMAA1412D-1A20	180	A-ANT-18G-2-C	168
SBNHH-1D65A w/ Mount Pipe	180	DTMABP7819VG12A	158
ATMAA1412D-1A20	180	RRUS-11	158
SBNHH-1D65A w/ Mount Pipe	180	(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	158
ATMAA1412D-1A20	180	7020.00	158
SBNHH-1D65A w/ Mount Pipe	180	7770.00 w/ Mount Pipe	158
ATMAA1412D-1A20	180	(2) LGP13519	158
ATBT-BOTTOM-24V	180	DC6-48-60-18-8F	158
ATBT-BOTTOM-24V	180	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	158
ATBT-BOTTOM-24V	180	(2) SBNH-1D6565C w/ Mount Pipe	158
18' x 3" Pipe Mount	180	DTMABP7819VG12A	158
(2) DB846F65ZAXY w/ Mount Pipe	177	(2) RRUS-11	158
(2) LPA-80063/6CFx5 w/ Mount Pipe	177	7020.00	158
(2) SC-E 6014 rev2 w/ Mount Pipe	177	7770.00 w/ Mount Pipe	158
DB-T1-6Z-8AB-0Z	177	(2) LGP13519	158
DB-T1-6Z-8AB-0Z	177	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	158
(2) RRH2x60-700	177	DTMABP7819VG12A	158
RRH2X60-AWS	177	(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	158
RRH2X60-PCS	177	7020.00	158
HBXX-6517DS-A2M w/ Mount Pipe	177	7770.00 w/ Mount Pipe	158
(3) SBNHH-1D65B w/ Mount Pipe	177	(2) LGP13519	158
RRH2x60-700	177	RRU-12	158
RRH2X60-AWS	177	(2) RRU-12	158
RRH2X60-PCS	177	Sector Mount [SM 502-3]	158
HBXX-6517DS-A2M w/ Mount Pipe	177	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	158
(2) SBNHH-1D65B w/ Mount Pipe	177	RFS APXV18-206517-C	148
RRH2X60-AWS	177	RFS APXV18-206517-C	148
RRH2X60-PCS	177	Pipe Mount [PM 602-3]	148
HBXX-6517DS-A2M w/ Mount Pipe	177	RFS APXV18-206517-C	148
SBNHH-1D65B w/ Mount Pipe	177	Side Arm Mount [SO 306-1]	40
Sector Mount [SM 502-3]	177	GPS_A	40
LLPX310R w/ Mount Pipe	168		
FDD_R6_RRH	168		
LLPX310R w/ Mount Pipe	168		
FDD_R6_RRH	168		
LLPX310R w/ Mount Pipe	168		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pipe 2.875" x 0.203" (2.5 STD)		

MATERIAL STRENGTH

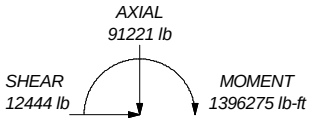
GRADE	Fy	Fu	GRADE	Fy	Fu
A618-50	50 ksi	70 ksi	A500-50	50 ksi	62 ksi
A513-50	50 ksi	66 ksi			

TOWER DESIGN NOTES

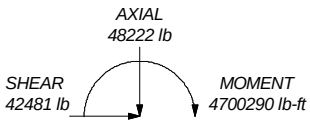
1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85.0 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.6 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.0 mph wind.
5. TOWER RATING: 79.6%

MAX. CORNER REACTIONS AT BASE:
DOWN: 212172 lb
SHEAR: 25804 lb

UPLIFT: -179834 lb
SHEAR: 22817 lb



TORQUE 6303 lb-ft
37.6 mph WIND - 0.750 in ICE



TORQUE 34873 lb-ft
REACTIONS - 85.0 mph WIND

Paul J Ford and Company
250 E. Broad St Suite 600
Columbus, OH 43215
Phone: 614-221-6679
FAX: 614-448-4105

Job: Existing 180' Tower, Wolcott, CT
Project: (PJF# 37515-2681) BU806362
Client: Crown Castle | Drawn by: chedges | App'd:
Code: TIA/EIA-222-F | Date: 09/21/15 | Scale: NTS
Path: T:\PJF_Crown Castle\2015\37515-2681_806362_NNV-108.943183\37515-2681.002.8700_SA_111224\37515-2681.002.eri | Dwg No. E-1

Foundation Loads:

Tower leg compression =	**212.17**	(kips)
Tower leg tension =	**179.83**	(kips)
Horizontal load at top of pier =	**25.804**	(kips)
Overturning moment at top of pier=	**0**	(ft-kips)

Design criteria:

Safety factor against overturning =	**1.5**	
Uplift safety factor: conc. weight =	**1.25**	
Uplift safety factor for soil weight =	**2**	

Soil Properties:

Soil density =	**100**	(pcf)
Allowable soil bearing =	**8**	(ksf)
Soil cone of uplift =	**40**	(degrees)
Uplift cone from top or bottom of ftg	**B**	("T" or "B")
Depth to water table =	**99**	(ft)

Dimensions:

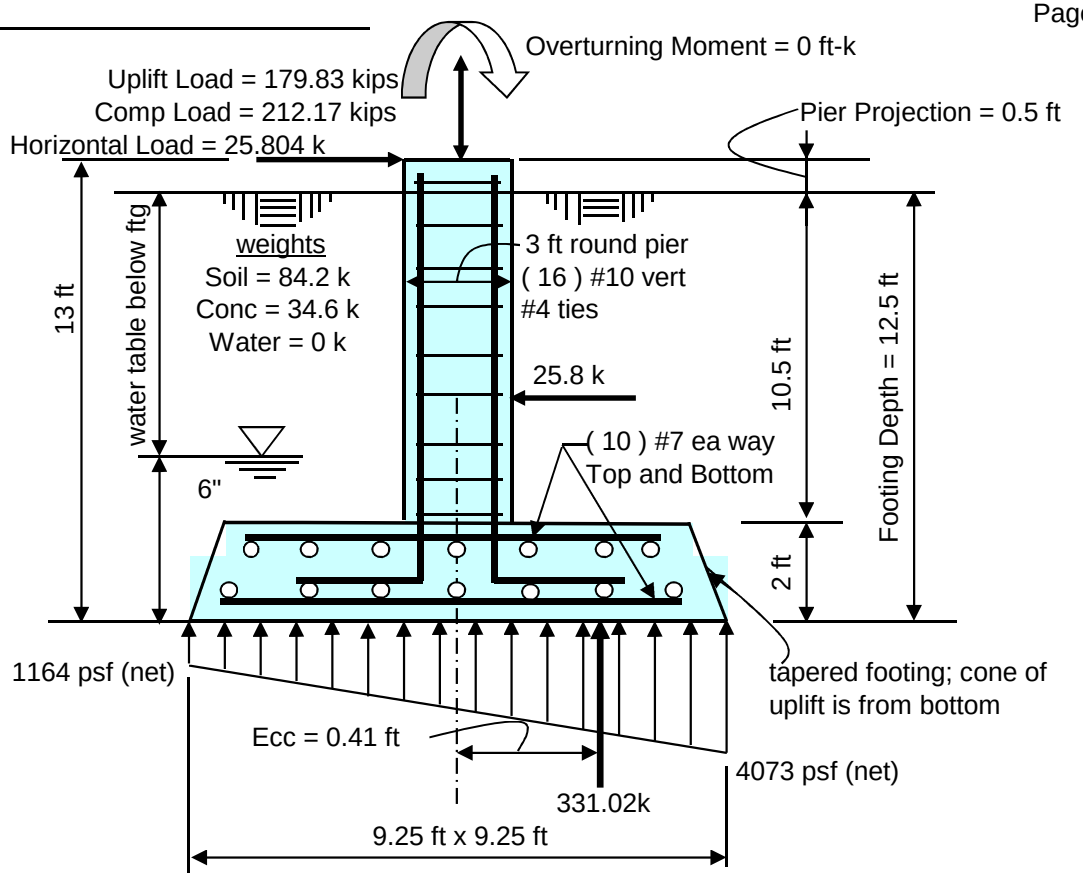
Pier shape (round or square)	**R**	("R" or "S")
Pier width =	**3**	(ft)
Pier height above grade =	**0.5**	(ft)
depth to bottom of footing =	**12.5**	(ft)
Footing thickness =	**2**	(ft)
Footing width =	**9.25**	(ft)
Footing length =	**9.25**	(ft)

Concrete:

Concrete strength =	**3**	(ksi)
Rebar strength =	**60**	(ksi)
ultimate load factor =	**1.3**	

Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#7**	bar
quantity of pad rebar =	**10**	(ea direction)
	Pier	
size of vert rebar in pier=	**#10**	bar
vertical rebar quantity =	**16**	
size of pier ties =	**#4**	bar
minimum cover over rebar =	**3**	inches
Total volume of concrete =	8.6	cu yd each
(Total volume of concrete =	25.7	cu yd for 3)



Summary of analysis results	
Maximum Net Soil Bearing = 4.073 ksf Allowable Net Soil Bearing = 8 ksf **Soil Bearing Stress Ratio = 0.51 Okay**	Ult Punching Shear Capacity = 641 kips Ult Punching Shear Force = 135 kips **Punching Shear Stress Ratio = 0.21 OK**
Net Ftg Uplift Resistance = 308.6 kips Uplift Force = 179.834 kips Net Uplift Safety Factor = 3.03 **Ratio to Required Safety factor = 0.58 OK**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 49 psi **Bending Shear Stress Ratio = 0.45 Okay**
Ftg Overturning Resistance = 1531 ft-kips Overturning Moment = 136 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 11.284 **Ratio = 0.13 Okay**	Pad Bending Moment Capacity= 514 ft-k Pad Bending Moment = 195 ft-k **Bending Moment Stress Ratio = 0.38 OK**
	Allow Tension in Pier Rebar = 41.54 ksi Calc Vert Rebar Tension = 23.51 ksi **Ratio = 0.566 Okay**

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

T-Mobile Existing Facility

Site ID: CT11494B

CT494/CCastle-Wolcott-SST
341 East Street
Wolcott, CT 06107

September 15, 2015

EBI Project Number: 6215004758

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	3.21 %

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

EBI Consulting
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September 15, 2015

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

Emissions Analysis for Site: **CT11494B – CT494/CCastle-Wolcott-SST**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **341 East Street, Wolcott, 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 **341 East Street, Wolcott, 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) 4 GSM / UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 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.

3) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

4) System losses of 2.11 dB were added to the calculations as the radios are proposed to be ground mounted. This loss comes from 205 feet of 1-5/8" coax cable on all RF paths.

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 **Commscope SBNHH-1D65A** for 1900 MHz (PCS), 2100 MHz (AWS) and 700 MHz. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Commscope SBNHH-1D65A** has a maximum gain of **14.7 dBd** at its main lobe at 1900 MHz and 2100 MHz and a maximum gain of **10.9 dBd** at its main lobe at 700 MHz. 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 **186 feet** above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope SBNHH-1D65A	Make / Model:	Commscope SBNHH-1D65A	Make / Model:	Commscope SBNHH-1D65A
Gain:	14.7 dBd / 10.9 dBd	Gain:	14.7 dBd / 10.9 dBd	Gain:	14.7 dBd / 10.9 dBd
Height (AGL):	186	Height (AGL):	186	Height (AGL):	186
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS) / 700 MHz	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS) / 700 MHz	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS) / 700 MHz
Channel Count	7	Channel Count	7	# PCS Channels:	7
Total TX Power:	270	Total TX Power:	270	# AWS Channels:	270
ERP (W):	4,584.29	ERP (W):	4,584.29	ERP (W):	4,584.29
Antenna A1 MPE%	0.54	Antenna B1 MPE%	0.54	Antenna C1 MPE%	0.54

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**0.54 %**
AT&T	0.60 %
Clearwire	0.07 %
MetroPCS	0.56 %
Verizon Wireless	1.44 %
Site Total MPE %:	**3.21 %**

T-Mobile Sector 1 Total:	0.54 %
T-Mobile Sector 2 Total:	0.54 %
T-Mobile Sector 3 Total:	0.54 %
Site Total:	3.21 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	**2**	**1089.31**	**186**	**2.42**	**2100**	**1000**	**0.24 %**
T-Mobile 700 MHz LTE	**1**	**227.05**	**186**	**0.25**	**700**	**467**	**0.05 %**
T-Mobile 1900 MHz (PCS) GSM / UMTS	**4**	**544.65**	**186**	**2.42**	**1900**	**1000**	**0.24 %**
						Total:	**0.54%**

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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:	0.54 %
Sector 2:	0.54 %
Sector 3 :	0.54 %
T-Mobile Per Sector Maximum:	0.54 %
Site Total:	3.21 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **3.21%** 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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