March 10, 2015

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

RE: T-Mobile-Exempt Modification - Crown Site BU: 803934

T-Mobile Site ID: CT11531C

Located at: 400 Main Street, Somers, CT 06071

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 Mrs. Lisa Pellegrini, First Selectman for the Town of Somers and Town of Somers, Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **400 Main Street, Somers, CT 06071**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to T-Mobile's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the R.C.S.A. § 16-50j-72(b)(2).

- 1. The proposed modifications will not result in an increase in the height of the existing tower. T-Mobile's replacement antennas will be located at the same elevation on the existing tower.
- 2. There will be no proposed modifications to the ground and no extension of boundaries.
- 3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

- 4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for T-Mobile's modified facility is included as Exhibit-3.
- 5. A Structural Modification Report confirming that the tower and foundation can support T-Mobile's proposed modifications is included as Exhibit-2.

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

Sincerely,

Jerry Feathers Real Estate Specialist

Enclosure

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

Tab 2: Exhibit-2: Structural Modification Report

Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Mrs. Lisa Pellegrini, First Selectman

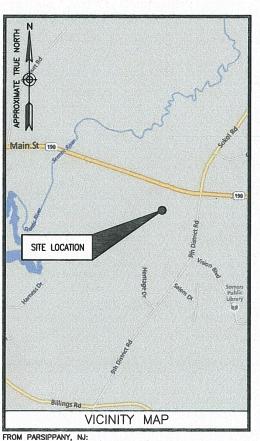
600 Main Street Somers, CT 06071

cc: Town of Somers c/o Treasurer

600 Main Street Somers, CT 06071

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11531C CROWN CASTLE BU #: 803934 SITE NAME: CT SOMERS FD CAC **400 MAIN STREET** SOMERS, CT 06071 **TOLLAND COUNTY**



DEPART SYLVAN WAY TOWARD CENTURY DR. TURN RIGHT ONTO US-202/LITTETON RD. TAKE RAMP LEFT FOR I-80 EAST. TAKE RAMP LEFT AND FOLLOW SIGNS FOR I-80 EAST. TAKE RAMP RAMP LETI AND FOLLOW SIGNS FOR 1-80 EAST. JAKE RAMP LEFT FOR 1-95 NORTH TOWARD G WASHINGTON B/NEW YORK. AT EXIT 1C, TAKE RAMP RIGHT FOR 1-87 NORTH TOWARD ALBANY, AT EXIT 4, TAKE RAMP RIGHT FOR CENTRAL PARK AVE TOWARD CROSS COUNTY PKWY. TAKE RAMP RIGHT FOR CROSS COUNTY PKWY EAST TOWARD HUTCHINSON PKWY. KEEP STRAIGHT ONTO HUTCHINSON RIVER PKWY. ROAD NAME STRAIGHT ONTO HOTCHINSON RIVER PRWY. ROAD NAME. CHANGES TO CT-15. N/MERRITT PRWY. AT EXIT 68N-E, TAKE RAMP RIGHT FOR I-91 NORTH TOWARD HARTFORD/MIDDLETOWN. AT EXIT 47E, TAKE RAMP RIGHT FOR CT-190 EAST TOWARD SOMERS/HAZARD/LLE. BEAR RIGHT ONTO CT-190/HAZARD AVE. ROAD NAME CHANGES TO MAIN ST. DESTINATION WILL BE ON

ENGINEER DEWBERRY ENGINEERS INC.

CONTACT: GREG NAWROTZKI PHONE #: (973) 576-9653

CONSTRUCTION CROWN CASTLE 500 WEST CUMMINGS PARK, SUITE 3600 WOBURN, MA 01801

> CONTACT: WARREN KELLEHER PHONE #: (781) 970-0055

CONSULTANT TEAM

704G

PROJECT SUMMARY

SITE NAME: CT SOMERS FD CAC

> SITE NUMBER: CT11531C

TOWER OWNER: CROWN CASTLE 500 WEST CUMMINGS PARK, SUITE 3600 WOBURN, MA 01801

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

> > COORDINATES:

LATITUDE: 41'-59'-1.48" N (NAD83) LONGITUDE: 72'-27'-56.87" W (NAD83) (PER CROWN CASTLE)

CONFIGURATION

SITE ADDRESS: 400 MAIN STREET SOMERS, CT 06071 TOLLAND COUNTY

PROJECT DIRECTORY

- INSTALL (3) NEW ANTENNAS.
- INSTALL (3) NEW BIAS TEES.
- INSTALL (6) NEW LINES OF COAX.
- INSTALL (1) NEW BBU CABINET AT GRADE.

SCOPE OF WORK

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.

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

4 SYLVAN WAY PARSIPPANY, NJ 07054



CROWN CASTLE 500 WEST CUMMINGS PARK, SUITE 3600 WOBURN, MA 01801

CT11531C CT SOMERS FD CAC

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Dewberry

Dewberry Engineers Inc.

600 PARSIPPANY ROAD SUITE 301 PARSIPPANY, NJ 07054 PHONE: 973.739.9400



DRAWN	BY:	JC

REVIEWED BY: BSH CHECKED BY: GHN

PROJECT NUMBER: 50066258

50071477 JOB NUMBER:

SITE ADDRESS:

400 MAIN STREET SOMERS, CT 06071 TOLLAND COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

|-1|

GENERAL NOTES:

- 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
- 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
- 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.
- ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
- DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
- 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
- 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.
- 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.
- 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
- 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:

- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION
- 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:
- B) CONFINED SPACE
- ELECTRICAL SAFETY
- D) TRENCHING & EXCAVATION.
- 3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
- IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- 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.
- 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
- 8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT
- 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.
- 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:

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
- 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.
- CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
- ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
- CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
- 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).
- 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 THINN OR THINN-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 8 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
- 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,
- 18. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
- 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.
- 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
- 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
- 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.
- 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:

- 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.
- 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.
- 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: CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:

- 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.
- 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
 - (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE

 - SUPPLIER'S PLANT,

 (8) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR
 THE CONCRETE GRADE SUPPLIED.

 FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
- 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.
- 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:

- 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
- 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 JZ.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
- BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"0) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
- 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.
- 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:

- VENIFICATION: CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T-MOBILE ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED. FIELD VERIFICATION
- COORDINATION OF WORK CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
- 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.

F Mobile

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



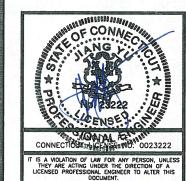
CROWN CASTLE 500 WEST CUMMINGS PARK, SUITE 3600 WOBURN, MA 01801

CT11531C CT SOMERS FD CAC

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Dewberry Engineers Inc. SUITE 301 PARSIPPANY N.I 07054 PHONE: 973,739,9400 FAX: 973.739.9710



DRAWN BY:	JC

50066258

REVIEWED BY: BSH

CHECKED BY: GHN PROJECT NUMBER:

JOB NUMBER: 50071477

SITE ADDRESS:

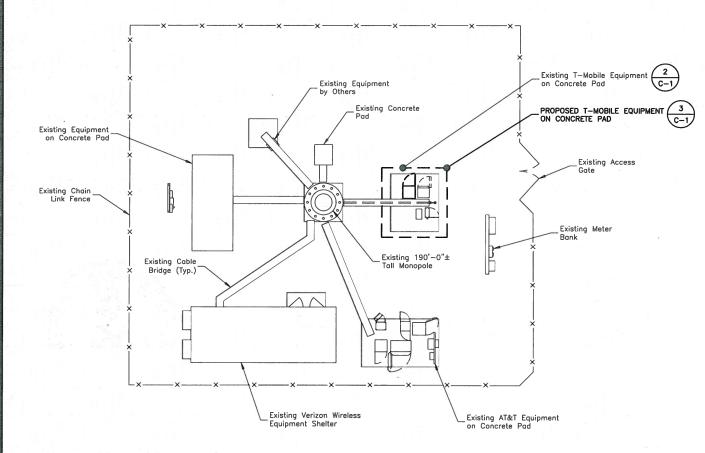
400 MAIN STREET SOMERS, CT 06071 TOLLAND COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

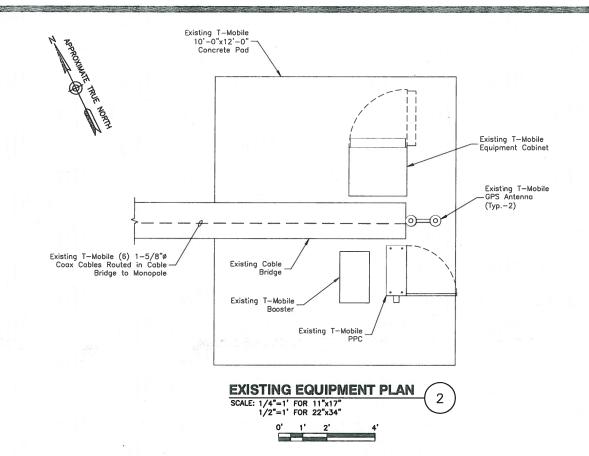


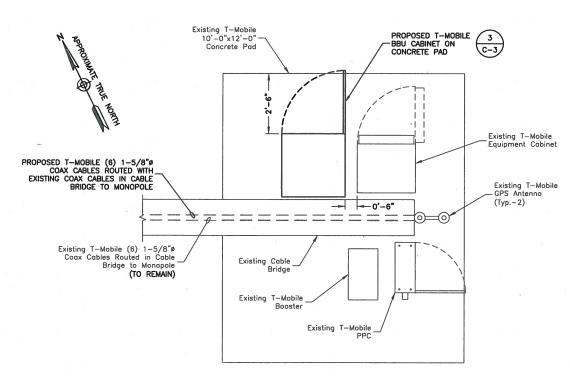




NOTES:

- 1. NORTH ARROW SHOWN AS APPROXIMATE.
- 2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
- ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY AERO SOLUTIONS, LLC DATED FEBRUARY 5, 2015.







T - Mobile

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



CROWN CASTLE 500 WEST CUMMINGS PARK, SUITE 3600 WOBURN, MA 01801

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Α	02/27/15	ISSUED FOR RE	MEW

Dewberry

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



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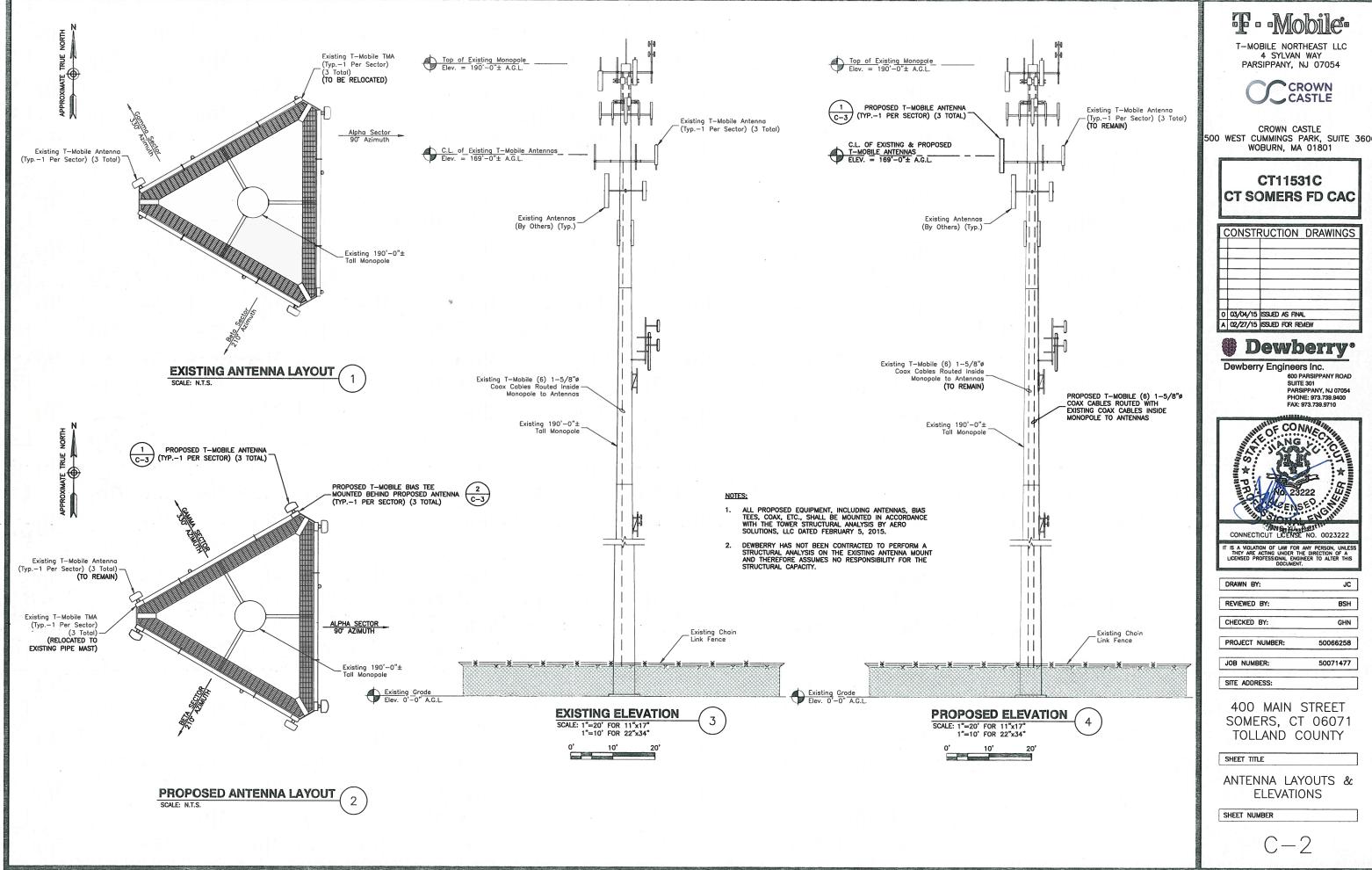
400 MAIN STREET SOMERS, CT 06071 TOLLAND COUNTY

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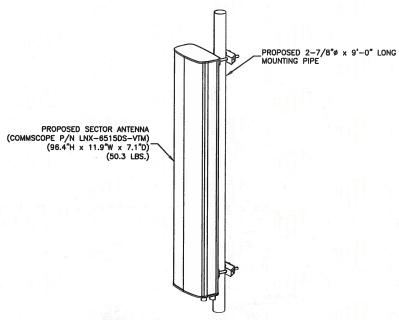
COMPOUND PLAN & EQUIPMENT PLANS

SHEET NUMBER

2 - 1



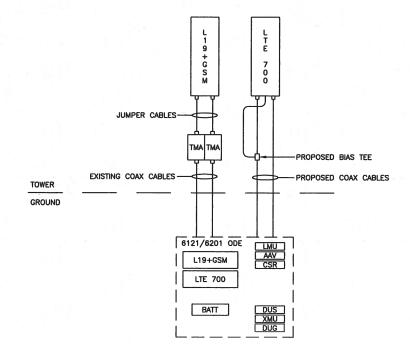
500 WEST CUMMINGS PARK, SUITE 3600



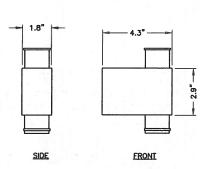
NOTES:

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





SITE CONFIGURATION 704G SCALE: N.T.S.

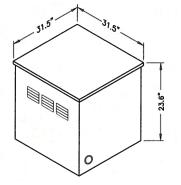


ANDREW ATBT-BOTTOM-24V

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 2



ALCATEL-LUCENT	F7RFo	RATTERY	BACKLIP	SYSTEM	

NOTE:

CONTRACTOR SHALL ANCHOR CABINET IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

MATERIAL:

CONCRETE STRUCTURAL STEEL ANCHOR:

3/8"ø HILTI KWIK BOLT 3 W/2-1/2" MIN. EMBED.

1/2"ø STRUCTURAL BOLTS

BBU CABINET DETAIL 3

		DESIGN CONFIGU	JRATION		
	ANTENNAS		cc)AX	COAX
	EXISTING	PROPOSED	EXISTING	PROPOSED	LENGTH
AL DUA	EMS RR90-17-02DP	EXISTING TO REMAIN	(2) 1 5 (9"4	(0) 1 5 (0"4	0401 011
ALPHA	_	COMMSCOPE LNX-6515DS-VTM	(2) 1-5/8"ø (2)	(2) 1-5/8"ø	219'-0"
DCTA	EMS RR90-17-02DP	EXISTING TO REMAIN	(2) 1 5/9"4	(2) 4 5 /0"4	040' 0"
BETA	_	COMMSCOPE LNX-6515DS-VTM	(2) 1-5/8"ø	(2) 1-5/8"ø	219'-0"
GAMMA	EMS RR90-17-02DP	EXISTING TO REMAIN	(2) 1 5/9"4	(a) 4 E (0°4	040' 0"
	<u> </u>	COMMSCOPE LNX-6515DS-VTM	(2) 1-5/8"ø	(2) 1-5/8"ø	219'-0"

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



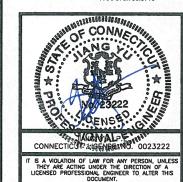
CROWN CASTLE 500 WEST CUMMINGS PARK, SUITE 3600 WOBURN, MA 01801

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		ISSUED AS FINAL	
Α	02/27/15	ISSUED FOR REVIEW	

Dewberry*

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



GHN PROJECT NUMBER: 50066258

JOB NUMBER: 50071477

SITE ADDRESS:

CHECKED BY:

400 MAIN STREET SOMERS, CT 06071 TOLLAND COUNTY

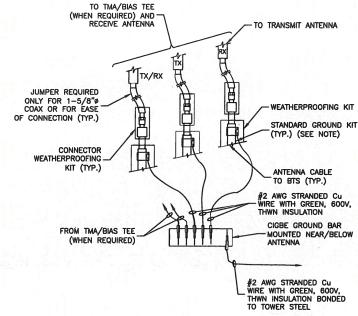
SHEET TITLE

CONSTRUCTION DETAILS

SHEET NUMBER

GROUNDING NOTES:

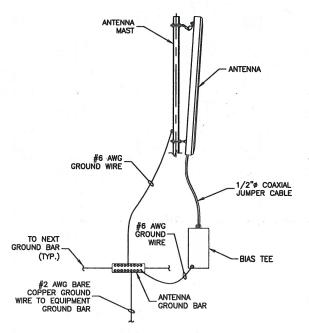
- THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY THE CONTRACTOR SHALL REVIEW AND INSPECT IN EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ). THE SITE-SPECIFIC (UL, LP, OR NFPA) LIGHTNING 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.
- 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.
- 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.
- 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.
- 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.
- 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
- 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.
- 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.
- 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
- 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.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
- 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.
- 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
- APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE)
 SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND
- 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 CONDUTS, 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 PROHIBITED BY LOCAL CODE) THE GROUND CONDUIT OF METALL 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



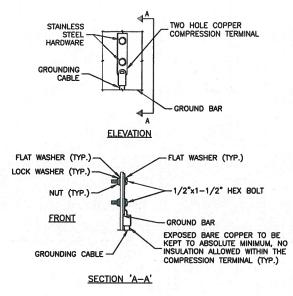
NOTE:

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)



TYPICAL ANTENNA **GROUNDING DETAIL** 3 SCALE: N.T.S

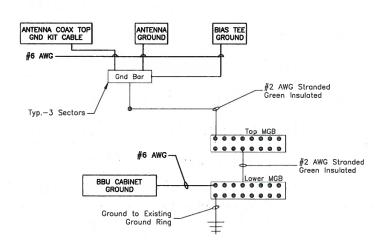


NOTES:

- 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**

SCALE: N.T.S.



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

SCHEMATIC GROUNDING DIAGRAM SCALE: N.T.S.

F · Mobile

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CROWN CASTLE 500 WEST CUMMINGS PARK, SUITE 3600 WOBURN, MA 01801

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

FAX: 973.739.9710 CONNECTICUT LICENSE NO. 0023222

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BSH

GHN CHECKED BY:

PROJECT NUMBER: 50066258 50071477

SITE ADDRESS:

400 MAIN STREET

SOMERS, CT 06071 TOLLAND COUNTY

SHEET TITLE

REVIEWED BY:

JOB NUMBER:

GROUNDING NOTES & DETAILS

SHEET NUMBER

E - 1

Date: February 05, 2015

Holly Haas Crown Castle 3530 Toringdon Way, Suite 300 Charlotte, NC 28277 AeroSolutions LLC
Optimizing Your Tower Infrastructure

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

Subject: Structural Analysis Report

Carrier Designation: T-Mobile Co-Locate

Carrier Site Number: CT11531C

Carrier Site Name: CT531/Crown - Somers

Crown Castle Designation: Crown Castle BU Number: 803934

Crown Castle Site Name: CT SOMERS FD CAC

Crown Castle JDE Job Number:322231Crown Castle Work Order Number:1004901Crown Castle Application Number:282534 Rev. 1

Engineering Firm Designation: Aero Solutions LLC Project Number: 003-15-0102

Site Data: 400 Main Street, Somers, Tolland County, CT

Latitude 41° 59' 1.48", Longitude -72° 27' 56.87"

187 Foot - Monopole Tower

Dear Holly Haas,

Aero Solutions LLC is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 753356, in accordance with application 282534, revision 1.

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

LC7: Existing + Reserved + Proposed Equipment

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

Sufficient Capacity

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile.

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

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

Structural analysis prepared by: Sina Erturk

Respectfully submitted by:

Shraddha Dharia, P.E. Structural Engineer CT PE#: PEN0028187



2.6.2015

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Table 4 - Documents Provided

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3.2) Assumptions

4) ANALYSIS RESULTS

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Table 6 – Tower Components vs. Capacity

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6) APPENDIX B

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7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 187 ft Monopole tower designed by Summit in April of 2001. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 38 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

	inting el (ft)	Elevation	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
			3	commscope	ATBT-BOTTOM-24V			
16	88.0	169.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	6	1-5/8"	

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		
	193.0	1	andrew	DB404L-B					
		3	alcatel lucent	TD-RRH8x20-25					
188.0	190.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	1 3	7/8" 1-1/4"	1		
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe		1-1/4			
	188.0	1	tower mounts	Platform Mount [LP-1201]					
		3	alcatel lucent	800MHz 2X50W RRH W/FILTER					
186.0	186.0 3		3.0 186.0		alcatel lucent	PCS 1900MHz 4x45W- 65MHz			1
		1	crown mounts	Side Arm Mount [SO 102-3]					
		3	alcatel lucent	RRH2X40-AWS					
181.0	181.0	3	alcatel lucent	RRH2x40 700			2		
101.0	101.0	1	crown mounts	Side Arm Mount [SO 102-3]			_		
		3	andrew	LNX-6513DS-A1M w/ Mount Pipe	1	1-5/8"	2		
170.0		2	antel	LPA-80063/4CF w/ Mount Pipe	10	1 5/0"	4		
178.0	179.0	4	antel	LPA-80080-4CF-EDIN-0 w/ Mount Pipe	18	1-5/8"	1		
		6	kathrein	742 213 w/ Mount Pipe			2		
		2	rfs celwave	DB-T1-6Z-8AB-0Z					

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	178.0	1	tower mounts	Platform Mount [LP-1201]			1
400.0	169.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe		4.5.00	
168.0		3	ericsson	KRY 112 71/1	6	1-5/8"	1
	168.0	1	tower mounts	Platform Mount [LP-1201]			
		1	crown mounts	T-Arm Mount [TA 601-3]			
		6	ericsson	RRUS-11			
		3	kathrein	800 10121 w/ Mount Pipe	1	3/8"	
160.0	160.0 6	6	powerwave technologies	LGP21401	2	3/4" 1-5/8"	1
		powerwave technologies	P65-17-XLH-RR w/ Mount Pipe		1 0/0		
		1	raycap	DC6-48-60-18-8F			
150.0	150.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8"	1
400.0	125.0	1	sinclair	SD212-SF2P2SNM Dipole	4	7/0"	
120.0	120.0	1	crown mounts	Side Arm Mount [SO 702-	1	7/8"	1
110.0	110.0	1	sinclair	SD110-SFXPASNM	1	1/2"	1
	82.0	1	telewave	ANT450D3			
81.0	81.0	1	crown mounts	Side Arm Mount [SO 309-	1	7/8"	1
48.0	48.0	1	crown mounts	Side Arm Mount [SO 701-	1	1/2"	1
		1	lucent	KS24019-L112A			

Notes:

1) 2) 3) Existing Equipment
Reserved Equipment

Equipment To Be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Manufacturer Antenna Model C		Feed Line Size (in)
188	188	12	generic	Panel Antennas (CaAa = 75 ft2)		
178	178	12	generic	Panel Antennas (CaAa = 75 ft2)		
168	168	12	generic	Panel Antennas (CaAa = 75 ft2)		
158	158	12	generic	Panel Antennas (CaAa = 75 ft2)		
148	148	12	generic	Panel Antennas (CaAa = 75 ft2)		
138	138	12	generic	Panel Antennas (CaAa = 75		

Mounting Level (ft)		Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
				ft2)		
128	128	12	generic	Panel Antennas (CaAa = 75 ft2)		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	URS Corporation	1095648	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit Manufacturing, LLC	1058248	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Manufacturing, LLC/PJF	419873	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.
- The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

1 4010 0		apaony (Gamm	· · · · · · · · · · · · · · · · · · ·					
Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	187 - 136	Pole	TP36.201x26x0.25	1	-13.391	1445.905	83.0	Pass
L2	136 - 89.5	Pole	TP45.003x34.801x0.375	2	-23.543	2690.300	91.5	Pass
L3	89.5 - 44.25	Pole	TP53.304x43.103x0.438	3	-37.255	3718.990	95.5	Pass
L4	44.25 - 0	Pole	TP61.28x51.079x0.5	4	-57.380	5014.559	92.9	Pass
							Summary	
						Pole (L3)	95.5	Pass
						Rating =	95.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component Elevation (ft)		% Capacity	Pass / Fail	
1	Anchor Rods	0	84.2	Pass	
1	Base Plate	0	63.8	Pass	
1	Base Foundation Soil Interaction	0	90.3	Pass	

Structure Rating (max from all components) = 95.5%
--

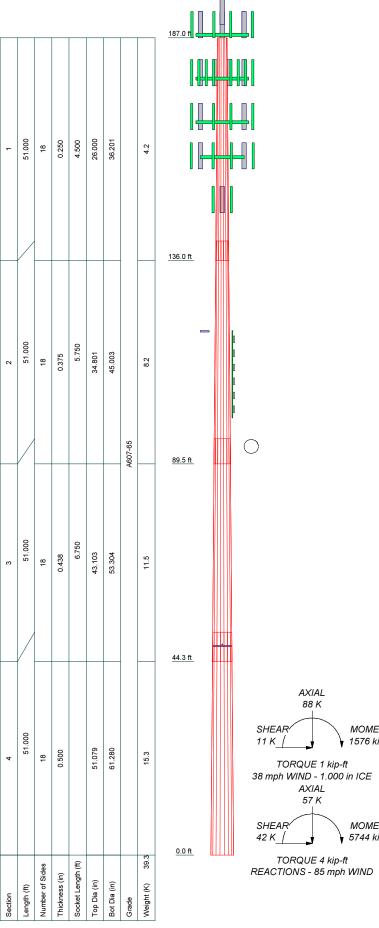
Notes:

4.1) Recommendations

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

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

APPENDIX A TNXTOWER OUTPUT



DESIGNED APPURTENANCE LOADING

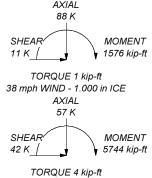
		TENANCE LOADING	
TYPE	ELEVATION	TYPE	ELEVATION
DB404L-B	188	RR90-17-02DP w/ Mount Pipe	168
APXVSPP18-C-A20 w/ Mount Pipe	188	KRY 112 71/1	168
APXVSPP18-C-A20 w/ Mount Pipe	188	LNX-6515DS-VTM w/ Mount Pipe	168
APXVSPP18-C-A20 w/ Mount Pipe	188	ATBT-BOTTOM-24V	168
APXVTM14-C-120 w/ Mount Pipe	188	RR90-17-02DP w/ Mount Pipe	168
APXVTM14-C-120 w/ Mount Pipe	188	KRY 112 71/1	168
APXVTM14-C-120 w/ Mount Pipe	188	LNX-6515DS-VTM w/ Mount Pipe	168
TD-RRH8x20-25	188	ATBT-BOTTOM-24V	168
TD-RRH8x20-25	188	RR90-17-02DP w/ Mount Pipe	168
TD-RRH8x20-25	188	KRY 112 71/1	168
Pipe Mount 2 x 8'	188	LNX-6515DS-VTM w/ Mount Pipe	168
Pipe Mount 2 x 8'	188	ATBT-BOTTOM-24V	168
Pipe Mount 2 x 8'	188	Platform Mount [LP-1201]	168
Platform Mount [LP-1201]	188	6' x 2" Mount Pipe	168
PCS 1900MHz 4x45W-65MHz	186	6' x 2" Mount Pipe	168
PCS 1900MHz 4x45W-65MHz	186	6' x 2" Mount Pipe	168
PCS 1900MHz 4x45W-65MHz	186	800 10121 w/ Mount Pipe	160
800MHz 2X50W RRH W/FILTER	186	800 10121 w/ Mount Pipe	160
800MHz 2X50W RRH W/FILTER	186	800 10121 w/ Mount Pipe	160
800MHz 2X50W RRH W/FILTER	186	P65-17-XLH-RR w/ Mount Pipe	160
Side Arm Mount [SO 102-3]	186	P65-17-XLH-RR w/ Mount Pipe	160
RRH2X40-AWS	181	P65-17-XLH-RR w/ Mount Pipe	160
RRH2X40-AWS	181	(2) RRUS-11	160
RRH2X40-AWS	181	(2) RRUS-11	160
RRH2x40 700	181	(2) RRUS-11	160
RRH2x40 700	181	(2) LGP21401	160
RRH2x40 700	181	(2) LGP21401	160
Side Arm Mount [SO 102-3]	181	(2) LGP21401	160
(2) 742 213 w/ Mount Pipe	178	DC6-48-60-18-8F	160
(2) 742 213 w/ Mount Pipe	178	T-Arm Mount [TA 601-3]	160
(2) 742 213 w/ Mount Pipe	178	APXV18-206517S-C w/ Mount Pipe	150
LNX-6513DS-A1M w/ Mount Pipe	178	APXV18-206517S-C w/ Mount Pipe	150
LNX-6513DS-A1M w/ Mount Pipe	178	APXV18-206517S-C w/ Mount Pipe	150
LNX-6513DS-A1M w/ Mount Pipe	178	SD212-SF2P2SNM Dipole	120
(2) LPA-80080-4CF-EDIN-0 w/ Mount	178	Side Arm Mount [SO 702-1]	120
Pipe		SD110-SFXPASNM	110
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	178	Pipe Mount 2 x 16'	110
(2) LPA-80063/4CF w/ Mount Pipe	178	ANT450D3	81
DB-T1-6Z-8AB-0Z	178	Side Arm Mount [SO 309-1]	81
	178	KS24019-L112A	48
DB-T1-6Z-8AB-0Z	178	Side Arm Mount [SO 701-1]	48
Platform Mount [LP-1201]	1/0		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

- 1. Tower is located in Tolland County, Connecticut.
- Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
- Deflections are based upon a 50 mph wind.
 TOWER RATING: 95.5%



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

^{Job:} BU#803934 CT SC	MERS FD CAC	
Project: Existing 187 ft. Mon	opole	
Client: Crown Castle	Drawn by: Serturk	App'd:
Code: TIA/EIA-222-F	Date: 02/05/15	Scale: NTS
Path:		Dwg No. E-

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- Tower is located in Tolland County, Connecticut. 4)
- Basic wind speed of 85 mph. 5)
- Nominal ice thickness of 1.000 in. 6)
- Ice thickness is considered to increase with height. 7)
- Ice density of 56.000 pcf.
- A wind speed of 38 mph is used in combination with ice. 9)
- Temperature drop of 50.000 °F. 10)
- Deflections calculated using a wind speed of 50 mph. 11)
- 12) A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section. 13)
- Stress ratio used in pole design is 1.333. 14)
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are 15) not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals **Use Moment Magnification**

- Use Code Stress Ratios
- Use Code Safety Factors Guys
 - Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination

Distribute Leg Loads As Uniform Assume Legs Pinned

- Assume Rigid Index Plate
- Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension
- Bypass Mast Stability Checks
- Use Azimuth Dish Coefficients
- Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption

Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation

- Consider Feedline Torque Include Angle Block Shear Check Poles
- Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	187.000- 136.000	51.000	4.500	18	26.000	36.201	0.250	1.000	A607-65 (65 ksi)
L2	136.000- 89.500	51.000	5.750	18	34.801	45.003	0.375	1.500	À607-65 (65 ksi)
L3	89.500-44.250	51.000	6.750	18	43.103	53.304	0.438	1.750	À607-65 (65 ksi)
L4	44.250-0.000	51.000		18	51.079	61.280	0.500	2.000	À607-65 (65 ksi)

Tapered Pole Properties

Conting	Tin Dio	Aroo	,	,		1/0	1	1+/0	147	14/4
Section	Lip Dia.	Area	1	I	C	1/C	J	II/Q	W	W/t
	in	in²	in⁴	in	in	in ³	in⁴	in²	in	

Section	Tip Dia.	Area	1	r	С	I/C	J	It/Q	W	w/t
	in	in ²	in⁴	in	in	in ³	in⁴	in²	in	
L1	26.401	20.433	1711.654	9.141	13.208	129.592	3425.561	10.218	4.136	16.544
	36.759	28.527	4658.191	12.763	18.390	253.299	9322.512	14.266	5.931	23.726
L2	36.252	40.975	6135.246	12.221	17.679	347.039	12278.566	20.492	5.465	14.573
	45.697	53.118	13365.891	15.843	22.862	584.646	26749.369	26.564	7.261	19.361
L3	44.936	59.246	13625.291	15.146	21.896	622.267	27268.510	29.629	6.816	15.58
	54.126	73.412	25921.737	18.768	27.078	957.284	51877.583	36.713	8.612	19.683
L4	53.238	80.269	25943.042	17.955	25.948	999.807	51920.220	40.142	8.110	16.22
	62.225	96.458	45019.064	21.577	31.130	1446.152	90097.366	48.238	9.905	19.811

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
L1 187.000-			1	1	1		
136.000							
L2 136.000-			1	1	1		
89.500							
L3 89.500-			1	1	1		
44.250							
L4 44.250-			1	1	1		
0.000							

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face	Allow	Component	Placement	Total	Number	Clear	Width or	Perimete	Weight
	or	Shield	Type		Number	Per Row	Spacing	Diamete	r	
	Leg			ft			in	r		klf
	_							in	in	

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or	Allow Shield	Component Type	Placement	Total Number		$C_A A_A$	Weight
	Leg	COIG	.,,,,	ft	140111001		f t² /ft	klf

HB114-1-0813U4-M5J(Α	No	CaAa (Out Of	187.000 - 8.000	1	No Ice	0.154	0.001
1 1/4")			Face)			1/2" Ice	0.254	0.002
						1" Ice	0.354	0.004
						2" Ice	0.554	0.010
						4" Ice	0.954	0.028
HB114-1-08U4-M5J(1	Α	No	Inside Pole	187.000 - 8.000	3	No Ice	0.000	0.001
1/4")						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001

LDF7-50A(1-5/8")	С	No	Inside Pole	178.000 - 8.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(С	No	CaAa (Out Of	178.000 - 8.000	1	No Ice	0.198	0.001
1-5/8)			Face)			1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.031
LDF7-50A(1-5/8")	С	No	CaAa (Out Of	178.000 - 8.000	6	No Ice	0.000	0.001
			Face)			1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030

Description	Face or	Allow Shield	Component Type	Placement	Total Number		$C_A A_A$	Weight
***	Leg	- Critora	.,,,,,	ft			ft²/ft	klf
HJ7-50A(1-5/8")	В	No	Inside Pole	168.000 - 8.000	6	No Ice	0.000	0.001
1107-50A(1-5/0)	Ь	INO	iliside i die	100.000 - 0.000	O	1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
AVA7-50(1-5/8)	В	No	Inside Pole	168.000 - 8.000	6	No Ice	0.000	0.001
AVA7-30(1-3/6)	ь	NO	IIISIUE FUIE	100.000 - 0.000	O	1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
***						T 100	0.000	0.001
LDF7-50A(1-5/8")	С	No	Inside Pole	160.000 - 5.000	6	No Ice	0.000	0.001
` ,						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
FB-L98B-002-75000(С	No	Inside Pole	160.000 - 5.000	1	No Ice	0.000	0.000
3/8")						1/2" Ice	0.000	0.000
,						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD(С	No	Inside Pole	160.000 - 5.000	2	No Ice	0.000	0.001
3/4)						1/2" Ice	0.000	0.001
,						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001

CR 50 1873(1-5/8")	Α	No	Inside Pole	150.000 - 8.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
***						4" Ice	0.000	0.001
HCC 78-50J(7/8")	Α	No	Inside Pole	120.000 - 8.000	1	No Ice	0.000	0.001
1100 70-300(770)		140	made i dic	120.000 - 0.000	•	1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
***						1 100	0.000	0.001
HCC12-50J(1/2")	В	No	Inside Pole	110.000 - 8.000	1	No Ice	0.000	0.000
,						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
***	_							
AVA5-50(7/8")	В	No	CaAa (Out Of	81.000 - 8.000	1	No Ice	0.110	0.000
			Face)			1/2" Ice	0.210	0.001
						1" Ice	0.310	0.003
						2" Ice	0.510	0.008
***						4" Ice	0.910	0.025
*** LDF4-50A(1/2")	В	No	CaAa (Out Of	48.000 - 8.000	1	No loo	0.063	0.000
LDF4-30A(1/Z)	D	INU	CaAa (Out Of Face)	40.000 - 6.000	ı	No Ice 1/2" Ice	0.063	0.000
			race)			1/2 ice 1" ice	0.163	0.001
						2" Ice		
						4" Ice	0.463 0.863	0.007 0.023
						4 100	0.003	0.023

Feed Line/Linear Appurtenances Section Areas

Tower Sectio	Tower Elevation	Face	A_R	A_F	C₄A₄ In Face	C _A A _A Out Face	Weight
n	ft		ft²	ft ²	ft ²	ft ²	K
L1	187.000-136.000	Α	0.000	0.000	0.000	7.854	0.296
		В	0.000	0.000	0.000	0.000	0.334

Tower	Tower	Face	A_R	A_F	$C_A A_A$	C_AA_A	Weight
Sectio	Elevation		- 2	- 2	In Face	Out Face	
n	ft		ft ²	ft ²	ft ²	ft ²	K
		С	0.000	0.000	0.000	8.316	0.822
L2	136.000-89.500	Α	0.000	0.000	0.000	7.161	0.454
		В	0.000	0.000	0.000	0.000	0.491
		С	0.000	0.000	0.000	9.207	1.033
L3	89.500-44.250	Α	0.000	0.000	0.000	6.968	0.450
		В	0.000	0.000	0.000	4.286	0.495
		С	0.000	0.000	0.000	8.959	1.005
L4	44.250-0.000	Α	0.000	0.000	0.000	5.582	0.361
		В	0.000	0.000	0.000	6.278	0.404
		С	0.000	0.000	0.000	7.177	0.823

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower	Tower Elevation	Face	Ice Thickness	A_R	A_F	C _A A _A In Face	C _A A _A Out Face	Weight
Sectio		or		e2	e2			
n	ft	Leg	in	ft ²	ft ²	ft⁴	ft ²	K
L1	187.000-136.000	Α	1.209	0.000	0.000	0.000	20.185	0.514
		В		0.000	0.000	0.000	0.000	0.334
		С		0.000	0.000	0.000	18.471	2.266
L2	136.000-89.500	Α	1.158	0.000	0.000	0.000	18.404	0.652
		В		0.000	0.000	0.000	0.000	0.491
		С		0.000	0.000	0.000	20.450	2.631
L3	89.500-44.250	Α	1.088	0.000	0.000	0.000	17.450	0.630
		В		0.000	0.000	0.000	13.667	0.629
		С		0.000	0.000	0.000	19.441	2.463
L4	44.250-0.000	Α	1.000	0.000	0.000	0.000	13.472	0.491
		В		0.000	0.000	0.000	22.057	0.599
		С		0.000	0.000	0.000	15.067	1.883

Feed Line Center of Pressure

Section	Elevation	CP _X	CPz	CP _X	CP _Z
	f t	in	in	lce in	lce in
L1	187.000-136.000	-0.194	-0.094	-0.353	-0.229
L2	136.000-89.500	-0.233	-0.075	-0.437	-0.202
L3	89.500-44.250	-0.119	-0.009	-0.119	-0.019
L4	44.250-0.000	-0.024	0.035	0.158	0.133

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weigh
	-		Vert ft ft ft	0	ft		ft ²	ft²	К
** DB404L-B	Α	From Leg	2.000 0.000 5.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.140 2.052 2.964 4.788 8.436	1.140 2.052 2.964 4.788 8.436	0.014 0.018 0.022 0.031 0.048
APXVSPP18-C-A20 w/ Mount Pipe	Α	From Leg	4.000 0.000 2.000	80.000	188.000	No Ice 1/2" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			Vert ft ft ft	٥	ft		ft²	ft ²	K
						1" Ice 2" Ice 4" Ice	11.031 13.679	10.844 14.851	0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe	В	From Leg	4.000 0.000 2.000	40.000	188.000	No Ice 1/2" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227
						1" Ice 2" Ice 4" Ice	11.031 13.679	10.844 14.851	0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe	С	From Leg	4.000 0.000 2.000	30.000	188.000	No Ice 1/2" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227
						1" Ice 2" Ice 4" Ice	11.031 13.679	10.844 14.851	0.406 0.909
APXVTM14-C-120 w/ Mount Pipe	Α	From Leg	4.000 0.000 2.000	80.000	188.000	No Ice 1/2" Ice 1" Ice	7.134 7.662 8.183 9.256	4.959 5.754 6.472 8.010	0.077 0.131 0.193 0.338
APXVTM14-C-120 w/	В	From Leg	4.000	40.000	188.000	2" Ice 4" Ice No Ice	11.526 7.134	11.412	0.752 0.077
Mount Pipe	_	209	0.000 2.000	.0.000		1/2" Ice 1" Ice 2" Ice	7.662 8.183 9.256 11.526	5.754 6.472 8.010 11.412	0.131 0.193 0.338 0.752
APXVTM14-C-120 w/ Mount Pipe	С	From Leg	4.000 0.000 2.000	30.000	188.000	4" Ice No Ice 1/2" Ice 1" Ice	7.134 7.662 8.183 9.256	4.959 5.754 6.472 8.010	0.077 0.131 0.193 0.338
TD-RRH8x20-25	Α	From Leg	4.000 0.000	80.000	188.000	2" Ice 4" Ice No Ice 1/2"	11.526 4.720 5.014	11.412 1.703 1.920	0.752 0.070 0.097
			2.000			lce 1" lce 2" lce 4" lce	5.316 5.948 7.314	2.145 2.622 3.680	0.128 0.201 0.397
TD-RRH8x20-25	В	From Leg	4.000 0.000 2.000	40.000	188.000	No Ice 1/2" Ice 1" Ice	4.720 5.014 5.316 5.948	1.703 1.920 2.145 2.622	0.070 0.097 0.128 0.201
TD-RRH8x20-25	С	From Leg	4.000 0.000 2.000	30.000	188.000	2" Ice 4" Ice No Ice 1/2" Ice	7.314 4.720 5.014 5.316	3.680 1.703 1.920 2.145	0.397 0.070 0.097 0.128
						1" Ice 2" Ice 4" Ice	5.948 7.314	2.622 3.680	0.201 0.397
Pipe Mount 2 x 8'	A	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.029 0.044 0.063 0.119 0.300
Pipe Mount 2 x 8'	В	From Leg	4.000 0.000 2.000	0.000	188.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.029 0.044 0.063 0.119 0.300
Pipe Mount 2 x 8'	С	From Leg	4.000 0.000	0.000	188.000	4" Ice No Ice 1/2"	1.900 2.728	1.900 2.728	0.029 0.044

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			Vert ft ft ft	٥	ft		ft ²	ft ²	К
			2.000			Ice 1" Ice 2" Ice 4" Ice	3.401 4.396 6.498	3.401 4.396 6.498	0.063 0.119 0.300
Platform Mount [LP-1201]	С	None		0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.100 26.800 30.500 37.900 52.700	23.100 26.800 30.500 37.900 52.700	2.100 2.500 2.900 3.700 5.300
PCS 1900MHz 4x45W- 65MHz	Α	From Leg	1.000 0.000 0.000	80.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
PCS 1900MHz 4x45W- 65MHz	В	From Leg	1.000 0.000 0.000	40.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
PCS 1900MHz 4x45W- 65MHz	С	From Leg	1.000 0.000 0.000	30.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
800MHz 2X50W RRH W/FILTER	Α	From Leg	1.000 0.000 0.000	80.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.401 2.613 2.833 3.300 4.337	2.254 2.460 2.675 3.132 4.148	0.064 0.086 0.111 0.172 0.338
800MHz 2X50W RRH W/FILTER	В	From Leg	1.000 0.000 0.000	40.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.401 2.613 2.833 3.300 4.337	2.254 2.460 2.675 3.132 4.148	0.064 0.086 0.111 0.172 0.338
800MHz 2X50W RRH W/FILTER	С	From Leg	1.000 0.000 0.000	30.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.401 2.613 2.833 3.300 4.337	2.254 2.460 2.675 3.132 4.148	0.064 0.086 0.111 0.172 0.338
Side Arm Mount [SO 102-3]	С	None		0.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.000 3.480 3.960 4.920 6.840	3.000 3.480 3.960 4.920 6.840	0.081 0.111 0.141 0.201 0.321
RRH2X40-AWS	Α	From Leg	1.000 0.000 0.000	30.000	181.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.522 2.753 2.993 3.499 4.615	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
RRH2X40-AWS	В	From Leg	1.000 0.000 0.000	30.000	181.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.522 2.753 2.993 3.499 4.615	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275

Description	Face or	Offset Type	Offsets: Horz	Azimuth Adjustmen	Placement		C _A A _A Front	C _A A _A Side	Weight
	Leg	, , , , ,	Lateral Vert	t			77077	O/GO	
			ft ft ft	0	ft		ft ²	ft ²	K
DDLIOVAG AMIC	С	From Log	1.000	30,000	101 000	4" Ice No Ice	2 522	1 500	0.044
RRH2X40-AWS	C	From Leg	1.000 0.000	30.000	181.000	1/2"	2.522 2.753	1.589 1.795	0.044 0.061
			0.000			Ice	2.993	2.010	0.082
						1" Ice 2" Ice 4" Ice	3.499 4.615	2.465 3.479	0.132 0.275
RRH2x40 700	Α	From Leg	1.000	30.000	181.000	No Ice	2.290	1.206	0.050
			0.000 0.000			1/2" Ice	2.493 2.705	1.363 1.529	0.067 0.086
			0.000			1" Ice	3.155	1.887	0.000
						2" Ice 4" Ice	4.158	2.706	0.271
RRH2x40 700	В	From Leg	1.000	30.000	181.000	No Ice	2.290	1.206	0.050
			0.000 0.000			1/2" Ice	2.493 2.705	1.363 1.529	0.067 0.086
			0.000			1" Ice	3.155	1.887	0.134
						2" Ice	4.158	2.706	0.271
DDU2v40 700	С	Erom Log	1 000	30.000	181.000	4" Ice No Ice	2.290	1.206	0.050
RRH2x40 700	C	From Leg	1.000 0.000	30.000	161.000	1/2"	2.493	1.206	0.050 0.067
			0.000			Ice	2.705	1.529	0.086
						1" Ice	3.155	1.887	0.134
						2" Ice 4" Ice	4.158	2.706	0.271
Side Arm Mount [SO 102-	С	None		0.000	181.000	No Ice	3.000	3.000	0.081
3]	_					1/2"	3.480	3.480	0.111
						Ice	3.960	3.960	0.141
						1" Ice 2" Ice	4.920 6.840	4.920 6.840	0.201 0.321
						4" Ice	0.040	0.040	0.021
** (2) 742 213 w/ Mount Pipe	Α	From Leg	4.000	30.000	178.000	No Ice	5.373	4.620	0.049
(2) 742 213 W/ WOUTH PIPE	A	FIOIII Leg	0.000	30.000	176.000	1/2"	5.950	6.000	0.049
			1.000			Ice	6.501	6.982	0.146
						1" Ice	7.611	8.852	0.277
						2" Ice 4" Ice	9.933	12.794	0.683
(2) 742 213 w/ Mount Pipe	В	From Leg	4.000	30.000	178.000	No Ice	5.373	4.620	0.049
			0.000			1/2"	5.950	6.000	0.094
			1.000			Ice 1" Ice	6.501 7.611	6.982 8.852	0.146 0.277
						2" Ice	9.933	12.794	0.683
						4" Ice			
(2) 742 213 w/ Mount Pipe	С	From Leg	4.000	30.000	178.000	No Ice	5.373	4.620	0.049
			0.000 1.000			1/2" Ice	5.950 6.501	6.000 6.982	0.094 0.146
			1.000			1" Ice	7.611	8.852	0.277
						2" Ice	9.933	12.794	0.683
LNX-6513DS-A1M w/	Α	From Leg	4.000	30.000	178.000	4" Ice No Ice	6.566	5.159	0.051
Mount Pipe		1 Tolli Log	0.000	30.000	170.000	1/2"	7.076	5.923	0.105
·			1.000			Ice	7.582	6.668	0.165
						1" Ice	8.626	8.236	0.308
						2" Ice 4" Ice	10.837	11.586	0.715
LNX-6513DS-A1M w/	В	From Leg	4.000	30.000	178.000	No Ice	6.566	5.159	0.051
Mount Pipe		,	0.000			1/2"	7.076	5.923	0.105
			1.000			Ice 1" Ice	7.582 8.626	6.668 8.236	0.165 0.308
						2" Ice	8.626 10.837	8.236 11.586	0.308
						4" Ice			
LNX-6513DS-A1M w/	С	From Leg	4.000	30.000	178.000	No Ice	6.566	5.159	0.051
Mount Pipe			0.000 1.000			1/2" Ice	7.076 7.582	5.923 6.668	0.105 0.165
			1.000			100	1.502	0.000	0.100

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			Vert ft ft ft	0	ft		ft ²	ft ²	K
			-			1" Ice 2" Ice 4" Ice	8.626 10.837	8.236 11.586	0.308 0.715
(2) LPA-80080-4CF-EDIN- 0 w/ Mount Pipe	Α	From Leg	4.000 0.000 1.000	30.000	178.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.856 3.220 3.592 4.450 6.318	7.227 7.922 8.634 10.112 13.339	0.030 0.076 0.128 0.253 0.613
(2) LPA-80080-4CF-EDIN- 0 w/ Mount Pipe	В	From Leg	4.000 0.000 1.000	30.000	178.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.856 3.220 3.592 4.450 6.318	7.227 7.922 8.634 10.112 13.339	0.030 0.076 0.128 0.253 0.613
(2) LPA-80063/4CF w/ Mount Pipe	С	From Leg	4.000 0.000 1.000	30.000	178.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	7.248 7.719 8.200 9.195 11.320	7.260 7.957 8.672 10.156 13.391	0.038 0.104 0.176 0.344 0.796
DB-T1-6Z-8AB-0Z	Α	From Leg	4.000 0.000 1.000	30.000	178.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
DB-T1-6Z-8AB-0Z	С	From Leg	4.000 0.000 1.000	30.000	178.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
Platform Mount [LP-1201]	С	None		0.000	178.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.100 26.800 30.500 37.900 52.700	23.100 26.800 30.500 37.900 52.700	2.100 2.500 2.900 3.700 5.300
RR90-17-02DP w/ Mount Pipe	Α	From Leg	4.000 0.000 1.000	-30.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.593 5.088 5.578 6.588 8.731	3.319 4.089 4.784 6.225 9.308	0.034 0.072 0.115 0.224 0.557
KRY 112 71/1	Α	From Leg	4.000 0.000 1.000	-30.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.681 0.802 0.932 1.219 1.896	0.450 0.559 0.677 0.939 1.566	0.013 0.018 0.025 0.044 0.111
LNX-6515DS-VTM w/ Mount Pipe	Α	From Leg	4.000 0.000 1.000	-30.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	0.083 0.173 0.273 0.506 1.151
ATBT-BOTTOM-24V	Α	From Leg	4.000 0.000 1.000	-30.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.121 0.172 0.232 0.377 0.771	0.075 0.119 0.172 0.303 0.668	0.003 0.004 0.006 0.013 0.045
RR90-17-02DP w/ Mount	В	From Leg	4.000	-30.000	168.000	4" Ice No Ice	4.593	3.319	0.034

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			ft ft ft	o	ft		ft ²	ft ²	K
Pipe			0.000			1/2"	5.088	4.089	0.072
			1.000			Ice	5.578	4.784	0.115
						1" Ice	6.588	6.225	0.224
						2" Ice 4" Ice	8.731	9.308	0.557
KRY 112 71/1	В	From Leg	4.000	-30.000	168.000	No Ice	0.681	0.450	0.013
			0.000			1/2"	0.802	0.559	0.018
			1.000			Ice	0.932	0.677	0.025
						1" Ice	1.219	0.939	0.044
						2" Ice	1.896	1.566	0.111
LNX-6515DS-VTM w/	В	From Leg	4.000	-30.000	168.000	4" Ice No Ice	11.683	9.842	0.083
Mount Pipe	ь	r rom Leg	0.000	-30.000	100.000	1/2"	12.404	11.366	0.003
Would Tipe			1.000			lce	13.135	12.914	0.173
			1.000			1" Ice	14.601	15.267	0.506
						2" Ice	17.875	20.139	1.151
						4" Ice			
ATBT-BOTTOM-24V	В	From Leg	4.000	-30.000	168.000	No Ice	0.121	0.075	0.003
			0.000			1/2"	0.172	0.119	0.004
			1.000			Ice	0.232	0.172	0.006
						1" Ice	0.377	0.303	0.013
						2" Ice 4" Ice	0.771	0.668	0.045
RR90-17-02DP w/ Mount	С	From Leg	4.000	-30.000	168.000	No Ice	4.593	3.319	0.034
Pipe	Ü	1 10111 LOG	0.000	00.000	100.000	1/2"	5.088	4.089	0.072
			1.000			Ice	5.578	4.784	0.115
						1" Ice	6.588	6.225	0.224
						2" Ice 4" Ice	8.731	9.308	0.557
KRY 112 71/1	С	From Leg	4.000	-30.000	168.000	No Ice	0.681	0.450	0.013
	•		0.000	00.000	.00.000	1/2"	0.802	0.559	0.018
			1.000			Ice	0.932	0.677	0.025
						1" Ice	1.219	0.939	0.044
						2" Ice 4" Ice	1.896	1.566	0.111
LNX-6515DS-VTM w/	С	From Leg	4.000	-30.000	168.000	No Ice	11.683	9.842	0.083
Mount Pipe			0.000			1/2"	12.404	11.366	0.173
			1.000			Ice	13.135	12.914	0.273
						1" Ice 2" Ice	14.601 17.875	15.267 20.139	0.506 1.151
						4" Ice	17.075	20.139	1.131
ATBT-BOTTOM-24V	С	From Leg	4.000	-30.000	168.000	No Ice	0.121	0.075	0.003
		_	0.000			1/2"	0.172	0.119	0.004
			1.000			Ice	0.232	0.172	0.006
						1" Ice	0.377	0.303	0.013
						2" Ice 4" Ice	0.771	0.668	0.045
Platform Mount [LP-1201]	С	None		0.000	168.000	No Ice	23.100	23.100	2.100
riadom mount [E. 1201]	Ü	110110		0.000	100.000	1/2"	26.800	26.800	2.500
						Ice	30.500	30.500	2.900
						1" Ice	37.900	37.900	3.700
						2" Ice	52.700	52.700	5.300
						4" Ice			
6' x 2" Mount Pipe	Α	From Leg	4.000	0.000	168.000	No Ice 1/2"	1.425	1.425	0.022
			0.000 0.000			lce	1.925 2.294	1.925 2.294	0.033 0.048
			0.000			1" Ice	3.060	3.060	0.040
						2" Ice	4.702	4.702	0.231
						4" Ice	v=	v=	
6' x 2" Mount Pipe	В	From Leg	4.000	0.000	168.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			0.000			lce	2.294	2.294	0.048
						1" Ice 2" Ice	3.060 4.702	3.060 4.702	0.090 0.231
						4" Ice	7.702	7.102	0.201

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			Vert ft ft ft	0	ft		ft ²	ft ²	K
6' x 2" Mount Pipe	С	From Leg	4.000 0.000 0.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
800 10121 w/ Mount Pipe	Α	From Leg	4.000 0.000 0.000	40.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.685 6.182 6.676 7.695 9.858	4.600 5.351 6.046 7.526 10.832	0.066 0.114 0.168 0.298 0.675
800 10121 w/ Mount Pipe	В	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.685 6.182 6.676 7.695 9.858	4.600 5.351 6.046 7.526 10.832	0.066 0.114 0.168 0.298 0.675
800 10121 w/ Mount Pipe	С	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.685 6.182 6.676 7.695 9.858	4.600 5.351 6.046 7.526 10.832	0.066 0.114 0.168 0.298 0.675
P65-17-XLH-RR w/ Mount Pipe	Α	From Leg	4.000 0.000 0.000	40.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.704 12.424 13.153 14.639 17.906	8.938 10.450 11.986 14.313 19.144	0.092 0.178 0.273 0.498 1.126
P65-17-XLH-RR w/ Mount Pipe	В	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.704 12.424 13.153 14.639 17.906	8.938 10.450 11.986 14.313 19.144	0.092 0.178 0.273 0.498 1.126
P65-17-XLH-RR w/ Mount Pipe	С	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.704 12.424 13.153 14.639 17.906	8.938 10.450 11.986 14.313 19.144	0.092 0.178 0.273 0.498 1.126
(2) RRUS-11	Α	From Leg	4.000 0.000 0.000	40.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
(2) RRUS-11	В	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
(2) RRUS-11	С	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
(2) LGP21401	Α	From Leg	4.000 0.000 0.000	40.000	160.000	No Ice 1/2" Ice 1" Ice	1.288 1.445 1.611 1.969	0.233 0.313 0.403 0.608	0.014 0.021 0.030 0.055

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			ft ft ft	٥	ft		ft ²	ft ²	К
						2" Ice 4" Ice	2.788	1.121	0.135
(2) LGP21401	В	From Leg	4.000 0.000 0.000	30.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
(2) LGP21401	С	From Leg	4.000 0.000 0.000	30.000	160.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
DC6-48-60-18-8F	Α	From Leg	4.000 0.000 0.000	40.000	160.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.567 2.798 3.038 3.543 4.658	2.567 2.798 3.038 3.543 4.658	0.019 0.041 0.067 0.129 0.299
T-Arm Mount [TA 601-3]	С	None		0.000	160.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.900 14.650 18.400 25.900 40.900	10.900 14.650 18.400 25.900 40.900	0.726 0.926 1.125 1.524 2.322
** APXV18-206517S-C w/ Mount Pipe	Α	From Leg	1.000 0.000 0.000	30.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.404 5.960 6.481 7.547 9.919	4.700 5.860 6.734 8.515 12.277	0.052 0.097 0.150 0.280 0.679
APXV18-206517S-C w/ Mount Pipe	В	From Leg	1.000 0.000 0.000	30.000	150.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.404 5.960 6.481 7.547 9.919	4.700 5.860 6.734 8.515 12.277	0.052 0.097 0.150 0.280 0.679
APXV18-206517S-C w/ Mount Pipe	С	From Leg	1.000 0.000 0.000	30.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.404 5.960 6.481 7.547 9.919	4.700 5.860 6.734 8.515 12.277	0.052 0.097 0.150 0.280 0.679
SD212-SF2P2SNM Dipole	Α	From Leg	6.000 0.000 5.000	90.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.510 5.510 6.510 8.510 12.510	4.510 5.510 6.510 8.510 12.510	0.048 0.062 0.077 0.106 0.163
Side Arm Mount [SO 702- 1]	A	From Face	3.000 0.000 0.000	90.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.000 1.000 1.000 1.000 1.000	1.430 2.050 2.670 3.910 6.390	0.027 0.038 0.049 0.071 0.115
SD110-SFXPASNM	В	From Leg	1.000 0.000 0.000	15.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.510 5.510 6.510 8.510 12.510	4.510 5.510 6.510 8.510 12.510	0.048 0.062 0.077 0.106 0.163

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement		C _A A _A Front	C _A A _A Side	Weight
			Vert ft ft ft	o	ft		ft ²	ft ²	K
Pipe Mount 2 x 16'	В	From Leg	0.500 0.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.808 5.436 7.081 10.421 15.464	3.808 5.436 7.081 10.421 15.464	0.060 0.088 0.127 0.235 0.581
ANT450D3	Α	From Leg	3.000 0.000 1.000	90.000	81.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.592 7.656 9.738 13.950 21.924	5.592 7.656 9.738 13.950 21.924	0.041 0.082 0.135 0.282 0.735
Side Arm Mount [SO 309- 1]	Α	From Leg	1.000 0.000 0.000	90.000	81.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.820 4.070 5.320 7.820 12.820	2.200 3.160 4.120 6.040 9.880	0.040 0.062 0.084 0.128 0.216
** KS24019-L112A	Α	From Leg	3.000 0.000 0.000	0.000	48.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.156 0.225 0.302 0.484 0.951	0.156 0.225 0.302 0.484 0.951	0.005 0.007 0.009 0.018 0.056
Side Arm Mount [SO 701- 1]	A	From Leg	1.500 0.000 0.000	0.000	48.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.850 1.140 1.430 2.010 3.170	1.670 2.340 3.010 4.350 7.030	0.065 0.079 0.093 0.121 0.177

Load Combinations

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

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

Maximum Member Forces

Sectio	Elevation	Component	Condition	Gov.	Force	Major Axis	Minor Axis
n	ft	Type		Load		Moment	Moment
No.				Comb.	K	kip-ft	kip-ft
L1	187 - 136	Pole	Max Tension	27	0.000	-0.000	-0.000
			Max. Compression	14	-30.777	3.253	-0.169
			Max. Mx	11	-13.391	854.329	-0.577
			Max. My	2	-13.615	-0.155	807.993
			Max. Vy	11	-26.347	854.329	-0.577
			Max. Vx	2	-25.190	-0.155	807.993
			Max. Torque	6			1.637
L2	136 - 89.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-45.191	5.937	-0.822
			Max. Mx	11	-23.543	2177.208	-2.338
			Max. My	2	-23.700	-1.768	2077.851
			Max. Vy	11	-32.136	2177.208	-2.338
			Max. Vx	2	-30.963	-1.768	2077.851
			Max. Torque	11			-3.203
L3	89.5 - 44.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-63.243	8.850	-1.212
			Max. Mx	11	-37.255	3720.400	-3.942
			Max. My	2	-37.339	-3.025	3568.182
			Max. Vy	11	-37.300	3720.400	-3.942
			Max. Vx	2	-36.116	-3.025	3568.182
			Max. Torque	11			-4.221
L4	44.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-87.969	11.439	-2.372
			Max. Mx	11	-57.380	5744.117	-5.845
			Max. My	2	-57.382	-4.470	5530.621
			Max. Vy	11	-41.821	5744.117	-5.845
			Max. Vx	2	-40.653	-4.470	5530.621
			Max. Torque	11			-4.452

Maximum Reactions

Location	Condition	Gov.	Vertical	Horizontal, X	Horizontal, Z
		Load	K	K	K
		Comb.			
Pole	Max. Vert	24	87.969	10.871	-0.004
	Max. H _x	11	57.411	41.778	-0.037
	Max. H _z	2	57.411	-0.037	40.612
	Max. M _x	2	5530.621	-0.037	40.612
	Max. M _z	5	5740.423	-41.778	0.037
	Max. Torsion	5	4.391	-41.778	0.037

	Load	K	1/	
		1 \	K	K
(Comb.			
Лin. Vert	1	57.411	0.000	0.000
Min. H _x	5	57.411	-41.778	0.037
Min. H _z	8	57.411	0.037	-40.612
Min. M _x	8 -	-5529.588	0.037	-40.612
Min. M _z	11 -	-5744.117	41.778	-0.037
n. Torsion	11	-4.434	41.778	-0.037
1	Min. H _z Min. M _x Min. M _z	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Min. H _z 8 57.411 Min. M _x 8 -5529.588 Min. M _z 11 -5744.117	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

Tower Mast Reaction Summary

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M₂	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	57.411	0.000	0.000	-0.485	1.770	0.000
Dead+Wind 0 deg - No Ice	57.411	0.037	-40.612	-5530.621	-4.470	0.052
Dead+Wind 30 deg - No Ice	57.411	20.922	-35.190	-4792.664	-2875.170	-2.120
Dead+Wind 60 deg - No Ice	57.411	36.200	-20.338	-2770.637	-4974.496	-3.739
Dead+Wind 90 deg - No Ice	57.411	41.778	-0.037	-6.806	-5740.423	-4.391
Dead+Wind 120 deg - No Ice	57.411	36.162	20.274	2758.724	-4968.181	-3.883
Dead+Wind 150 deg - No Ice	57.411	20.857	35.152	4785.362	-2864.206	-2.316
Dead+Wind 180 deg - No Ice	57.411	-0.037	40.612	5529.588	8.184	-0.093
Dead+Wind 210 deg - No Ice	57.411	-20.922	35.190	4791.641	2878.850	2.171
Dead+Wind 240 deg - No Ice	57.411	-36.200	20.338	2769.650	4978.165	3.832
Dead+Wind 270 deg - No Ice	57.411	-41.778	0.037	5.846	5744.117	4.434
Dead+Wind 300 deg - No Ice	57.411	-36.162	-20.274	-2759.694	4971.910	3.834
Dead+Wind 330 deg - No Ice	57.411	-20.857	-35.152	-4786.369	2867.946	2.225
Dead+Ice+Temp	87.969	-0.000	0.000	2.372	11.439	0.000
Dead+Wind 0	87.969	0.004	-10.635	-1518.501	10.617	0.041
deg+lce+Temp						
Dead+Wind 30	87.969	5.439	-9.212	-1315.252	-771.207	-0.649
deg+lce+Temp						
Dead+Wind 60	87.969	9.416	-5.321	-758.935	-1343.256	-1.165
deg+lce+Temp						
Dead+Wind 90	87.969	10.871	-0.004	1.378	-1552.256	-1.371
deg+lce+Temp						
Dead+Wind 120	87.969	9.412	5.314	761.965	-1342.215	-1.209
deg+lce+Temp						
Dead+Wind 150	87.969	5.432	9.208	1319.034	-769.408	-0.724
deg+lce+Temp						
Dead+Wind 180	87.969	-0.004	10.635	1523.314	12.688	-0.043
deg+lce+Temp						
Dead+Wind 210	87.969	-5.439	9.212	1320.064	794.502	0.651
deg+lce+Temp						
Dead+Wind 240	87.969	-9.416	5.321	763.754	1366.546	1.169
deg+lce+Temp						
Dead+Wind 270	87.969	-10.871	0.004	3.449	1575.550	1.373
deg+lce+Temp						
Dead+Wind 300	87.969	-9.412	-5.314	-757.137	1365.517	1.209
deg+lce+Temp				4044040		
Dead+Wind 330	87.969	-5.432	-9.208	-1314.213	792.715	0.721
deg+lce+Temp	F7 444	0.040	44.050	4047 440	0.000	0.000
Dead+Wind 0 deg - Service	57.411	0.013	-14.053	-1917.448	-0.330	0.022
Dead+Wind 30 deg - Service	57.411	7.239	-12.176	-1661.725	-995.474	-0.748
Dead+Wind 60 deg - Service	57.411	12.526	-7.038	-960.870	-1723.362	-1.319
Dead+Wind 90 deg - Service	57.411	14.456	-0.013	-2.708	-1988.964	-1.541
Dead+Wind 120 deg -	57.411	12.513	7.015	956.039	-1721.167	-1.352
Service	F7 444	7.047	10.100	1050 100	004.070	0.700
Dead+Wind 150 deg -	57.411	7.217	12.163	1658.496	-991.673	-0.798
Service	F7 444	0.040	44.050	4040 400	4.057	0.007
Dead+Wind 180 deg -	57.411	-0.013	14.053	1916.409	4.057	-0.027
Service	F7 444	7.000	40.470	4000 007	000 400	0.750
Dead+Wind 210 deg -	57.411	-7.239	12.176	1660.687	999.196	0.753
Service	F7 444	40.500	7.000	050.000	4707.000	4 000
Dead+Wind 240 deg -	57.411	-12.526	7.038	959.836	1727.083	1.330
Service	E7 444	44.450	0.040	4.070	1000 000	4 5 4 0
Dead+Wind 270 deg -	57.411	-14.456	0.013	1.678	1992.688	1.546

Load Combination	Vertical	Shear _x	Shearz	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft _	kip-ft
Service						
Dead+Wind 300 deg - Service	57.411	-12.513	-7.015	-957.071	1724.895	1.346
Dead+Wind 330 deg - Service	57.411	-7.217	-12.163	-1659.532	995.402	0.788

Solution Summary

	Sun	of Applied Force	20		Sum of Reactio	ine	
Load	PX	PY	PZ	PX	PY	PZ	% Error
Comb.	K	K	K	K	K	K	/6 LI10I
1	0.000	-57.411	0.000	0.000	57.411	0.000	0.000%
2	0.037	-57.411	-40.612	-0.037	57.411	40.612	0.000%
3	20.922	-57.411	-35.190	-20.922	57.411	35.190	0.000%
4	36.200	-57.411	-20.338	-36.200	57.411	20.338	0.000%
5	41.778	-57.411	-0.037	-41.778	57.411	0.037	0.000%
6	36.162	-57.411	20.274	-36.162	57.411	-20.274	0.000%
7	20.857	-57.411	35.152	-20.857	57.411	-35.152	0.000%
8	-0.037	-57.411	40.612	0.037	57.411	-40.612	0.000%
9	-20.922	-57.411	35.190	20.922	57.411	-35.190	0.000%
10	-36.200	-57.411	20.338	36.200	57.411	-20.338	0.000%
11	-41.778	-57.411	0.037	41.778	57.411	-0.037	0.000%
12	-36.162	-57.411	-20.274	36.162	57.411	20.274	0.000%
13	-20.857	-57.411	-35.152	20.857	57.411	35.152	0.000%
14	0.000	-87.969	0.000	0.000	87.969	-0.000	0.000%
15	0.004	-87.969	-10.635	-0.004	87.969	10.635	0.000%
16	5.439	-87.969	-9.212	-5.439	87.969	9.212	0.000%
17	9.416	-87.969	-5.321	-9.416	87.969	5.321	0.000%
18	10.871	-87.969	-0.004	-10.871	87.969	0.004	0.000%
19	9.412	-87.969	5.314	-9.412	87.969	-5.314	0.000%
20	5.432	-87.969	9.208	-5.432	87.969	-9.208	0.000%
21	-0.004	-87.969	10.635	0.004	87.969	-10.635	0.000%
22	-5.439	-87.969	9.212	5.439	87.969	-9.212	0.000%
23	-9.416	-87.969	5.321	9.416	87.969	-5.321	0.000%
24	-10.871	-87.969	0.004	10.871	87.969	-0.004	0.000%
25	-9.412	-87.969	-5.314	9.412	87.969	5.314	0.000%
26	-5.432	-87.969	-9.208	5.432	87.969	9.208	0.000%
27	0.013	-57.411	-14.053	-0.013	57.411	14.053	0.000%
28	7.239	-57.411	-12.176	-7.239	57.411	12.176	0.000%
29	12.526	-57.411	-7.038	-12.526	57.411	7.038	0.000%
30	14.456	-57.411	-0.013	-14.456	57.411	0.013	0.000%
31	12.513	-57.411	7.015	-12.513	57.411	-7.015	0.000%
32	7.217	-57.411	12.163	-7.217	57.411	-12.163	0.000%
33	-0.013	-57.411	14.053	0.013	57.411	-14.053	0.000%
34	-7.239	-57.411	12.176	7.239	57.411	-12.176	0.000%
35	-12.526	-57.411	7.038	12.526	57.411	-7.038	0.000%
36	-14.456	-57.411	0.013	14.456	57.411	-0.013	0.000%
37	-12.513	-57.411	-7.015	12.513	57.411	7.015	0.000%
38	-7.217	-57.411	-12.163	7.217	57.411	12.163	0.000%

Non-Linear Convergence Results

Load	Converged?	Number	Displacement	Force
Combination	-	of Cycles	Tolerance	Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00045331
3	Yes	6	0.0000001	0.00006741
4	Yes	6	0.0000001	0.00007102
5	Yes	5	0.0000001	0.00008130
6	Yes	6	0.0000001	0.00006668
7	Yes	6	0.0000001	0.00006925
8	Yes	4	0.0000001	0.00047243

9	Yes	6	0.0000001	0.00006959
10	Yes	6	0.0000001	0.00006691
11	Yes	5	0.0000001	0.00007321
12	Yes	6	0.0000001	0.00007083
13	Yes	6	0.0000001	0.00006732
14	Yes	4	0.0000001	0.00003894
15	Yes	5	0.0000001	0.00042321
16	Yes	5	0.0000001	0.00058941
17	Yes	5	0.0000001	0.00060606
18	Yes	5	0.0000001	0.00043423
19	Yes	5	0.0000001	0.00059405
20	Yes	5	0.0000001	0.00059545
21	Yes	5	0.0000001	0.00042415
22	Yes	5	0.0000001	0.00061214
23	Yes	5	0.0000001	0.00060807
24	Yes	5	0.0000001	0.00044233
25	Yes	5	0.0000001	0.00061727
26	Yes	5	0.0000001	0.00060269
27	Yes	4	0.0000001	0.00012897
28	Yes	5	0.0000001	0.00011510
29	Yes	5	0.0000001	0.00012853
30	Yes	4	0.0000001	0.00032430
31	Yes	5	0.0000001	0.00011360
32	Yes	5	0.0000001	0.00012098
33	Yes	4	0.0000001	0.00012958
34	Yes	5	0.0000001	0.00012262
35	Yes	5	0.0000001	0.00011481
36	Yes	4	0.0000001	0.00031549
37	Yes	5	0.0000001	0.00012820
38	Yes	5	0.0000001	0.00011519

Maximum Tower Deflections - Service Wind

Section	Elevation	Horz.	Gov.	Tilt	Twist
No.		Deflection	Load		
	ft	in	Comb.	0	0
L1	187 - 136	50.982	36	2.473	0.005
L2	140.5 - 89.5	28.445	36	1.997	0.003
L3	95.25 - 44.25	12.638	36	1.289	0.002
L4	51 - 0	3.549	36	0.638	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	0	0	ft
188.000	DB404L-B	36	50.982	2.473	0.005	30374
186.000	PCS 1900MHz 4x45W-65MHz	36	50.469	2.465	0.005	30374
181.000	RRH2X40-AWS	36	47.906	2.421	0.005	25311
178.000	(2) 742 213 w/ Mount Pipe	36	46.373	2.394	0.005	16874
168.000	RR90-17-02DP w/ Mount Pipe	36	41.322	2.302	0.004	7992
160.000	800 10121 w/ Mount Pipe	36	37.385	2.223	0.004	5623
150.000	APXV18-206517S-C w/ Mount	36	32.662	2.115	0.004	4102
	Pipe					
120.000	SD212-SF2P2SNM Dipole	36	20.433	1.693	0.003	3557
110.000	SD110-SFXPASNM	36	17.047	1.531	0.002	3721
81.000	ANT450D3	36	9.015	1.067	0.001	3762
48.000	KS24019-L112A	36	3.173	0.598	0.001	3567

Maximum Tower Deflections - Design Wind

Section	Elevation	Horz.	Gov.	Tilt	Twist
No.		Deflection	Load		
	ft	in	Comb.	0	0
L1	187 - 136	146.531	11	7.112	0.016
L2	140.5 - 89.5	81.844	11	5.746	0.009
L3	95.25 - 44.25	36.396	11	3.713	0.005
L4	51 - 0	10.226	11	1.839	0.002
	01 0	10.220		1.000	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	0	0	ft
188.000	DB404L-B	11	146.531	7.112	0.016	10851
186.000	PCS 1900MHz 4x45W-65MHz	11	145.059	7.086	0.016	10851
181.000	RRH2X40-AWS	11	137.704	6.961	0.015	9042
178.000	(2) 742 213 w/ Mount Pipe	11	133.305	6.884	0.014	6027
168.000	RR90-17-02DP w/ Mount Pipe	11	118.810	6.622	0.013	2852
160.000	800 10121 w/ Mount Pipe	11	107.512	6.396	0.012	2005
150.000	APXV18-206517S-C w/ Mount	11	93.953	6.083	0.010	1460
	Pipe					
120.000	SD212-SF2P2SNM Dipole	11	58.817	4.874	0.007	1255
110.000	SD110-SFXPASNM	11	49.081	4.407	0.007	1309
81.000	ANT450D3	11	25.965	3.072	0.004	1314
48.000	KS24019-L112A	11	9.144	1.723	0.002	1240

Compression Checks

			Pole I	Desig	n Dat	а				
Section No.	Elevation	Size	L	Lu	KI/r	Fa	Α	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in²	K	K	Pa
L1	187 - 136 (1)	TP36.201x26x0.25	51.000	0.000	0.0	39.000	27.813	-13.391	1084.700	0.012
L2	136 - 89.5 (2)	TP45.003x34.801x0.375	51.000	0.000	0.0	39.000	51.749	-23.543	2018.230	0.012
L3	89.5 - 44.25 (3)	TP53.304x43.103x0.438	51.000	0.000	0.0	39.000	71.537	-37.255	2789.940	0.013
L4	44.25 - 0 (4)	TP61.28x51.079x0.5	51.000	0.000	0.0	39.000	96.458	-57.380	3761.860	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
	187 - 136 (1)	TP36.201x26x0.25	854.32	42.587	39.000	1.092	0.000	0.000	39.000	$\frac{F_{by}}{0.000}$
	107 100 (1)	11 00.20 1/20/0.20	5	12.001	00.000	1.002	0.000	0.000	00.000	0.000
L2	136 - 89.5 (2)	TP45.003x34.801x0.375	2177.2	47.094	39.000	1.208	0.000	0.000	39.000	0.000
			80							
L3	89.5 - 44.25	TP53.304x43.103x0.438	3720.4	49.124	39.000	1.260	0.000	0.000	39.000	0.000
	(3)		00							
L4	44.25 - 0 (4)	TP61.28x51.079x0.5	5744.1	47.664	39.000	1.222	0.000	0.000	39.000	0.000
			17							

Section No.	Elevation	Size	Actual V	Actual f _v	Allow. F _v	Ratio f _v	Actual T	Actual f _{vt}	Allow. F _{vt}	Ratio f _{vt}
	ft		K	ksi	ksi	$\overline{F_{v}}$	kip-ft	ksi	ksi	F _{vt}
L1	187 - 136 (1)	TP36.201x26x0.25	26.347	0.947	26.000	0.073	1.498	0.036	26.000	0.001
L2	136 - 89.5 (2)	TP45.003x34.801x0.375	32.136	0.621	26.000	0.048	2.761	0.029	26.000	0.001
L3	89.5 - 44.25 (3)	TP53.304x43.103x0.438	37.300	0.521	26.000	0.040	4.214	0.027	26.000	0.001
L4	44.25 - 0 (4)	TP61.28x51.079x0.5	41.821	0.434	26.000	0.033	4.434	0.018	26.000	0.001

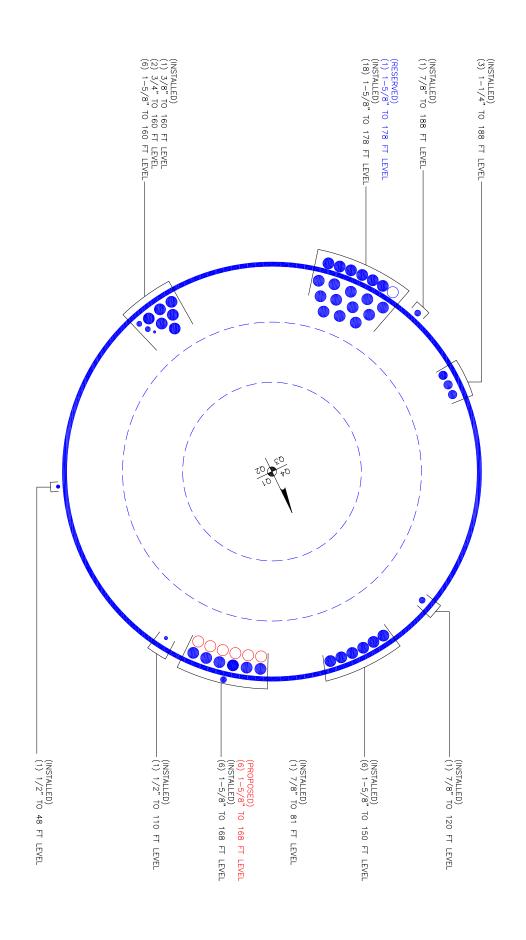
Pole Interaction Design Data

Section No.	Elevation	Ratio P	Ratio f _{bx}	Ratio f _{by}	Ratio f _v	Ratio f _{vt}	Comb. Stress	Allow. Stress	Criteria
	ft	P_a	F _{bx}	$\overline{F_{by}}$	F_{ν}	F_{vt}	Ratio	Ratio	
L1	187 - 136 (1)	0.012	1.092	0.000	0.073	0.001	1.106	1.333	H1-3+VT 🗸
L2	136 - 89.5 (2)	0.012	1.208	0.000	0.048	0.001	1.220	1.333	H1-3+VT 🗸
L3	89.5 - 44.25 (3)	0.013	1.260	0.000	0.040	0.001	1.273	1.333	H1-3+VT 🖊
L4	44.25 - 0 (4)	0.015	1.222	0.000	0.033	0.001	1.238	1.333	H1-3+VT 🗸

Section Capacity Table

Section	Elevation	Component	Size	Critical	Р	SF*P _{allow}	%	Pass
No.	ft	Type		Element	K	K	Capacity	Fail
L1	187 - 136	Pole	TP36.201x26x0.25	1	-13.391	1445.905	83.0	Pass
L2	136 - 89.5	Pole	TP45.003x34.801x0.375	2	-23.543	2690.300	91.5	Pass
L3	89.5 - 44.25	Pole	TP53.304x43.103x0.438	3	-37.255	3718.990	95.5	Pass
L4	44.25 - 0	Pole	TP61.28x51.079x0.5	4	-57.380	5014.559	92.9	Pass
							Summary	
						Pole (L3)	95.5	Pass
						RATING =	95.5	Pass

APPENDIX B BASE LEVEL DRAWING



APPENDIX C ADDITIONAL CALCULATIONS

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

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).

- 2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
- 3) Clear space between bottom of leveling nut and top of concrete not exceeding (1)*(Rod Diameter)

Site Data

BU#: 803934

Site Name: CT SOMERS FD CAC

App #: 282534 R1

Anchor Rod Data				
Qty:	24			
Diam:	2.25	in		
Rod Material:	A615-J			
Yield, Fy:	75	ksi		
Strength, Fu:	100	ksi		
Bolt Circle:	69	in		
Anchor Spacing:	6	in		

Base Reactions				
TIA Revision:	F			
Unfactored Moment, M:	5744.12027	ft-kips		
Unfactored Axial, P:	57.3796	kips		
Unfactored Shear, V:	41.820917	kips		

Anchor Rod Results

TIA F --> Maximum Rod Tension 164.1 Kips 195.0 Kips Allowable Tension: Anchor Rod Stress Ratio: 84.2% Pass

Plate Data				
W=Side:	70	in		
Thick:	3.25	in		
Grade:	55	ksi		
Clip Distance:	6	in		

Base Plate Results	Flexural Check
Base Plate Stress:	35.1 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	63.8% Pass

N/A - Unstiffened

Stiffener Results

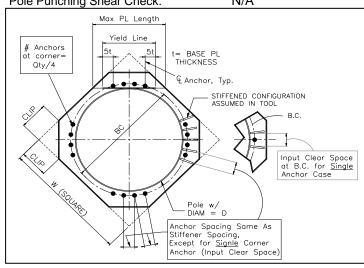
Horizontal Weld: N/A Vertical Weld: N/A Plate Flex+Shear, fb/Fb+(fv/Fv)^2: N/A Plate Tension+Shear, ft/Ft+(fv/Fv)^2: N/A Plate Comp. (AISC Bracket): N/A

Pole Results

Pole Punching Shear Check: N/A

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

Pole Data		
Diam:	61.28	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round



Stress Increase Factor			
ASD ASIF:	1.333		

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

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

Site Data

BU#: 803934

Site Name: CT SOMERS FD CAC

App #: 282534 R1

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

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	4	ft
Pad Thickness, T:	4	ft
Pad Width=Length, L:	31	ft
Pier Cross Section Shape:	Square	<pull down<="" td=""></pull>
Enter Pier Side Width:	31	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	961.00	ft^2
Pier Height:	0.50	ft
Soil (above pad) Height:	0.00	ft

Soil Parameters			
Unit Weight, γ:	120.0	pcf	
Ultimate Bearing Capacity, qn:	8.00	ksf	
Strength Reduct. factor, φ:	0.75		
Angle of Friction, Φ:	34.0	degrees	
Undrained Shear Strength, Cu:	0.00	ksf	
Allowable Bearing: φ*qn:	6.00	ksf	
Passive Pres. Coeff., Kp	3.54		

Farmer/Manager to the California and Lateral Calif			
Forces/Moments due to Wind and Lateral Soil			
Minimum of (φ*Ultimate Pad			
Passive Force, Vu):	56.5	kips	
Pad Force Location Above D:	1.33	ft	
φ(Passive Pressure Moment):	75.28	ft-kips	
Factored O.T. M(WL), "1.6W":		ft-kips	
Factored OT (MW-Msoil), M1	7933.35	ft-kips	

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	0.00	ft
Sum of Soil Wedges Wt:	0.00	kips
Soil Wedges ecc, K1:	0.00	ft
Ftg+Soil above Pad wt:	648.7	kips
Unfactored (Total ftg-soil Wt):	648.68	kips
1.2D. No Soil Wedges.	847.27	kips
0.9D. With Soil Wedges	635.45	kips

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

Monopole Base Reaction Forces			
TIA Revision:	F	<pull down<="" td=""></pull>	
Unfactored DL Axial, PD:	57.3796	kips	
Unfactored WL Axial, PW:	0	kips	
Unfactored WL Shear, V:	41.82092	kips	
Unfactored WL Moment, M:	5744.12	ft-kips	

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	68.85552	kips
0.90	0.9D+1.6W, Pu:	51.64164	kips
1.35	Vu:	56.45824	kips
1.35	Mu:	7754.562	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(<u>No Soil Wedges</u>) [Reaction+Conc+Soil]	847.27	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	7933.35	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 = 9.36 ft Orthogonal qu= 2.23 ksf qu/ϕ^*qn Ratio= 37.12% Pass

Diagonal Direction:

ecc2 = (0.707M1)/P1 = 6.62 ft Diagonal qu= 2.69 ksf qu/ ϕ *qn Ratio= **44.77%** Pass

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(<u>w/ Soil Wedges</u>) [Reaction+Conc+Soil]	635.45	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	7933.35	ft-kips

Orthogonal ecc3 = M2/P2 = 12.48 ft
Ortho Non Bearing Length,NBL= 24.97 ft
Orthogonal qu= 3.40 ksf
Diagonal qu= 3.57 ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100%			
Capacity Rating			
Actual M:	5744.12		
M Orthogonal:	6359.41	90.32%	Pass
M Diagonal:	6359.41	90.32%	Pass



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

T-Mobile Existing Facility

Site ID: CT11531C

Crown Somers 400 Main Street Somers, CT 06071

February 24, 2015

EBI Project Number: 6215001230

Site Compliance Summary		
Compliance Status: COMPLIANT		
Site total MPE% of		
FCC general public	43.39 %	
allowable limit:		



February 24, 2015

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

Emissions Analysis for Site: CT11531C – Crown Somers

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **400 Main Street**, **Somers**, **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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μ W/cm2). The number of μ W/cm² 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 (μ W/cm²). The general population exposure limit for the 700 MHz Band is 467 μ W/cm², and the general population exposure limit for the PCS and AWS bands is 1000 μ W/cm². 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 **400 Main Street**, **Somers**, **CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

- 1) 2 GSM channels (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.



- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the EMS RR90_17_02DP for 1900 MHz (PCS) channels and the Commscope LNX-6515DS-VTM for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The EMS RR90_17_02DP has a maximum gain of 14.4 dBd at its main lobe. The Commscope LNX-6515DS-VTM has a maximum gain of 14.6 dBd at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is **169 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:	В	Sector:	С
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	EMS RR90_17_02DP	Make / Model:	EMS RR90_17_02DP	Make / Model:	EMS RR90_17_02DP
Gain:	14.4 dBd	Gain:	14.4 dBd	Gain:	14.4 dBd
Height (AGL):	169	Height (AGL):	169	Height (AGL):	169
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	6,610.15	ERP (W):	6,610.15	ERP (W):	6,610.15
Antenna A1 MPE%	0.89	Antenna B1 MPE%	0.89	Antenna C1 MPE%	0.89
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Commscope LNX- 6515DS-VTM	Make / Model:	Commscope LNX- 6515DS-VTM	Make / Model:	Commscope LNX- 6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	169	Height (AGL):	169	Height (AGL):	169
Frequency Bands	700 Mhz	Frequency Bands	700 Mhz	Frequency Bands	700 Mhz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A2 MPE%	0.25	Antenna B2 MPE%	0.25	Antenna C2 MPE%	0.25

Site Composite MPE%			
Carrier	MPE%		
T-Mobile	3.44		
Sprint	1.42 %		
MetroPCS	3.03 %		
AT&T	14.67 %		
Verizon Wireless	15.66 %		
Town	5.17 %		
Site Total MPE %:	43.39 %		

T-Mobile Sector 1 Total:	1.15 %
T-Mobile Sector 2 Total:	1.15 %
T-Mobile Sector 3 Total:	1.15 %
Site Total:	43 39 %

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



Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.15 %
Sector 2:	1.15 %
Sector 3:	1.15 %
T-Mobile Total:	3.44 %
Site Total:	43.39 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **43.39**% 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

EBI Consulting

21 B Street

Burlington, MA 01803`