



January 15, 2016

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

RE: Notice of Exempt Modification for T-Mobile / L700 Crown Site BU: 876347

T-Mobile Site ID: CT11377C

53 Slater Street, Manchester, CT 06040

Latitude: 41° 48′ 18.0″/ Longitude: -72° 32′ 1.0″

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 133 foot level of the existing 155 foot monopole at 53 Slater Street in Manchester, CT. The tower is owned by Crown Castle and the property is owned by 121 Connecticut Avenue Associates, LLC. T-Mobile now intends to replace three (3) antennas and install three (3) RRU new 700MHz antennas. These antennas would be installed at the 133 foot level of the tower.

This facility was approved by the Town of Manchester in on August 17, 1998. This approval included the condition(s) that with modifications and the condition that a caveat addressing co-location requirements be submitted for staff review and filed on the land records by the applicant prior to any construction.

All site work approved by this special exception must be completed by August 17, 2003 (5 years from approval date). Failure to complete all work within the specified time period will result in automatic expiration of the approval.

This certificate must be recorded in the land records in the office of the town clerk before the special exception is lawfully effective.

This modification complies with the aforementioned conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Jay Moran, Mayor for the Town of Manchester and Thomas and 121 Connecticut Avenue Associates, LLC as the property owner.

- 1. The proposed modifications will not result in an increase in the height of the existing tower.
- 2. The proposed modifications will not require the extension of the site boundary.
- 3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
- 4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
- 5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Kimberly Myl.

Sincerely,

Kimberly Myl
Real Estate Specialist
Crown Castle
1200 MacArthur Boulevard, Suite 200
Mahwah, New Jersey 07430
201-236-9069
kimberly.myl@crowncastle.com

Attachments:

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

Tab 2: Exhibit-2: Structural Modification Report

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

 cc: The Honorable Jay Moran, Mayor for the Town of Manchester Manchester Board of Directors
 41 Center Street Manchester, CT 06045-0191 Melanie A. Bachman January 15, 2016 Page 2

> 121 Connecticut Avenue Associates, LLC Attn: Jean Burns 9 Lake Lane Ellington, CT 06029

VOL 2013 PG 259

TOWN OF MANCHESTER PLANNING AND ZONING COMMISSION



CERTIFICATE OF APPROVAL OF SPECIAL EXCEPTION

Owner of record:	Raglin Associates, c/o Sullivan Tile Dist.		
Property Address:	53 Slater Street		
Applicant:	Sprint Spectrum LP		
Regulation(s) cited	Article IV, Section 19.05	<u> </u>	

SPECIAL EXCEPTION GRANTED:

with modifications and the condition that a caveat addressing co-location requirements be submitted for staff review and filed on the land records by the applicant prior to any construction.

- * ALL SITE WORK APPROVED BY THIS SPECIAL EXCEPTION MUST BE COMPLETED BY AUGUST 17, 2003 (5 yrs. From approval date). FAILURE TO COMPLETE ALL WORK WITHIN THE SPECIFIED TIME PERIOD WILL RESULT IN AUTOMATIC EXPIRATION OF THE APPROVAL.
- * THIS CERTIFICATE MUST BE RECORDED IN THE LAND RECORDS IN THE OFFICE OF THE TOWN CLERK BEFORE THE SPECIAL EXCEPTION IS LAWFULLY EFFECTIVE.

CERTIFIED:

*DATE ADOPTED: August 17, 1998

FILE NO. S-147

Frank Caversa
Secretary

Secretary

Planning and Zoning Commission

Received for Record on

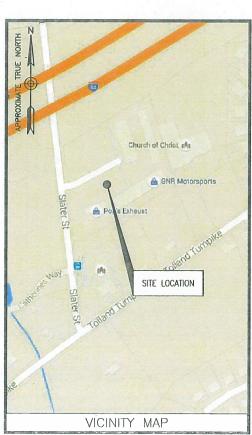
SEP 11 1998 at 2:43 PM

Joseph V. Camposeo, Town Clerk

II - Mobile®

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11377C
CROWN CASTLE BU #: 876347
SITE NAME: BUCKLAND MALL
53 SLATER STREET
MANCHESTER, CT 06040
HARTFORD COUNTY



FROM BLOOMFIELD, CT:

HEAD NORTHEAST ON GRIFFIN RD S TOWARD W NEWBERRY RD. TURN RIGHT ONTO DAY HILL RD. MERGE ONTO I-91 S. TAKE EXIT 35A FOR I-291 E TOWARD MANCHESTER. CONTINUE ONTO I-291 E. TAKE EXIT 5 FOR TOLLAND TURNPIKE. USE LEFT LANE TO TURN ONTO TOLLAND TURNPIKE. TURN LEFT ONTO SLATER STREET. SITE WILL BE ON THE RIGHT.

ENGINEER

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

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

CONSTRUCTION

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

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

CONSULTANT TEAM

SITE NAME: BUCKLAND MALL

SITE_NUMBER: CT11377C

TOWER OWNER:

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

APPLICANT/DEVELOPER: T-MOBILE NORTHEAST LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002

COORDINATES:

LATITUDE: 41'-48'-18.0" N (NAD83) LONGITUDE: 72'-32'-1.0" W (NAD83) (PER CROWN CASTLE)

CONFIGURATION

702Cc

PROJECT SUMMARY

PROJECT DIRECTORY

- REMOVE AND REPLACE (3) EXISTING ANTENNAS WITH (3) NEW ANTENNAS.
- INSTALL (3) NEW RRU'S.
- REMOVE (6) EXISTING LINES OF COAX.
- REMOVE EXISTING METROPCS ANTENNAS, MOUNTS AND COAX AT A CENTERLINE ELEVATION OF 103'-0"± A.G.L.
- REMOVE EXISTING IDEN MOUNT & PIPE MASTS AT A CENTERLINE ELEVATION OF 78'-0"± A.G.L.

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

SITE ADDRESS:	
53 SLATER STREET	
IANCHESTER, CT 06040	
HARTFORD COUNTY	

G-1	GENERAL NOTES
C-1	COMPOUND PLAN & EQUIPMENT PLANS
C-2	ANTENNA LAYOUTS & ELEVATIONS
C-3	CONSTRUCTION DETAILS
E-1	GROUNDING NOTES & DETAILS

DESCRIPTION

TITLE SHEET

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T-MOBILE NORTHEAST LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002



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

CT11377C BUCKLAND MALL

(CONST	RUCTION DRAWINGS
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0	01/14/16	ISSUED AS FINAL

Dewberry

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



DRAWN BY: RA

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

53 SLATER STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SHEET TITLE

SITE ADDRESS:

TITLE SHEET

SHEET NUMBER

T-1

GENERAL NOTES:

- 1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY: PROJECT MANAGEMENT - CROWN CASTLE CONTRACTOR — GENERAL CONTRACTOR (CONSTRUCTION)
 OWNER — T-MOBILE OEM - ORIGINAL EQUIPMENT MANUFACTURER
- 2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF PROJECT
- 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
- 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.
- 12. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
- 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.
- 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.
- 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
- SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

- 1. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION
- 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 TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO:
 - A) FALL PROTECTION B) CONFINED SPACE
- C) ELECTRICAL SAFETY
- D) TRENCHING & EXCAVATION.
- 3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
- 4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- 5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
- 6. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
- THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T-MOBILE SPECIFICATION FOR SITE SIGNAGE.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION FOLIPMENT
- 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.
- SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTION NOTES.
- 11. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
- 12. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL

ELECTRICAL INSTALLATION NOTES:

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

CONCRETE AND REINFORCING STEEL NOTES:

- 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.
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS. UNLESS NOTED OTHERWISE, A HIGHER STRENGTH (4000 PS) 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.
- 4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN

CONCRETE CAST AGAINST FARTH. CONCRETE EXPOSED TO EARTH OR WEATHER: #6 AND LARGER2 IN. #5 AND SMALLER & WWF.......1 1/2 IN. 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.
- YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER; CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC
 - (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE
 - SUPPLIER'S PLANT,

 (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR
 - THE CONCRETE GRADE SUPPLIED.
- FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
- AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
- 9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

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

CONSTRUCTION NOTES:

- 1. FIFLD VERIFICATION TRELD VERIFICATION: CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T-MOBILE ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
- CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
- CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.
- 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.



35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002



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

CT11377C **BUCKLAND MALL**

	CONSTR	RUCTION	DRAWINGS
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H			
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600 PARSIPPANY ROAD SUITE 301 PARSIPPANY, NJ 07054 PHONE: 973.739.9400 FAX: 973.739.9710



DRAWN	BY:	

REVIEWED BY: BSH

RA

GHN

PROJECT NUMBER 50066258

JOB NUMBER: 50078113

SITE ADDRESS

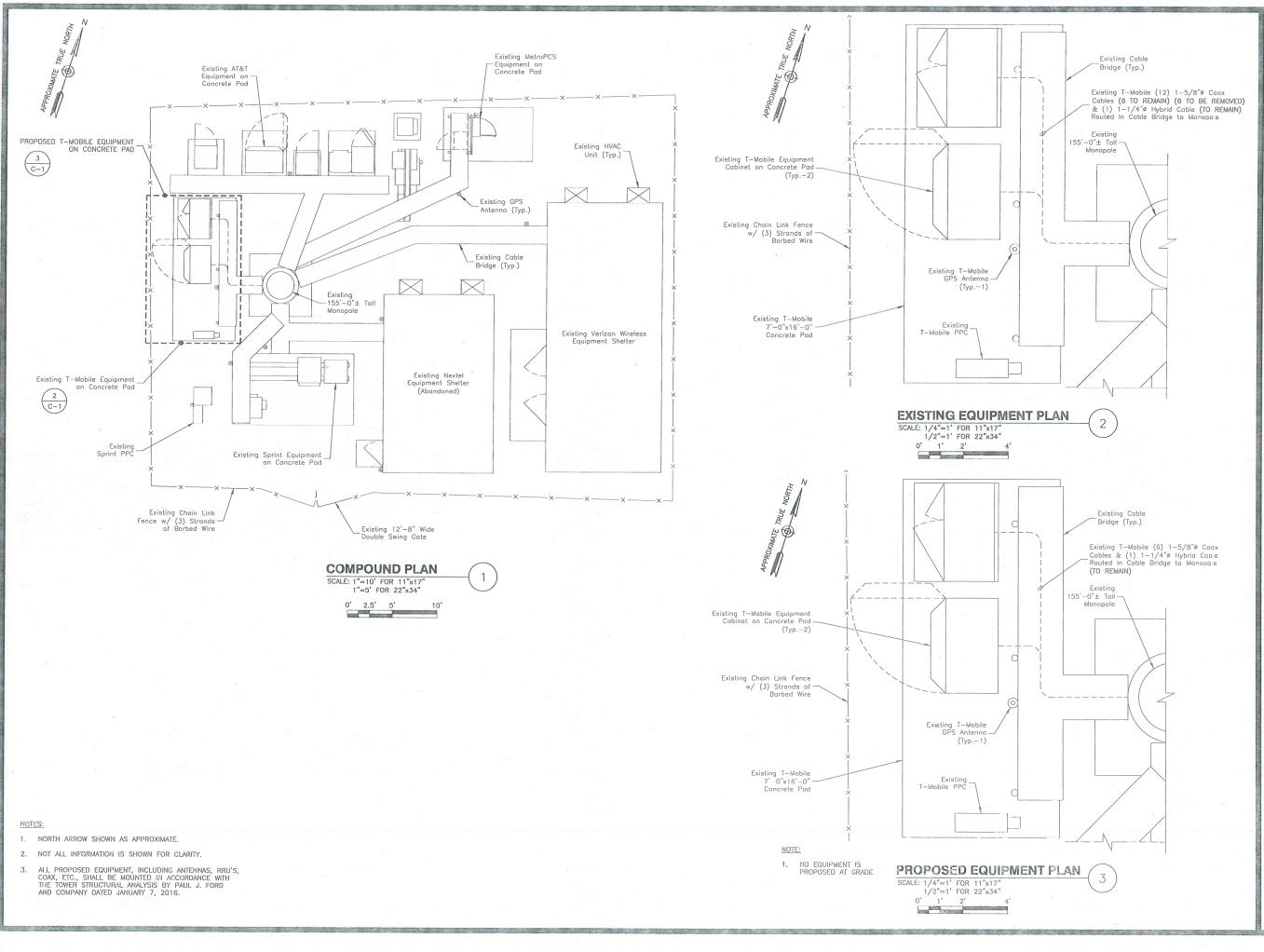
CHECKED BY

53 SLATER STREET MANCHESTER, CT 06040 HARTFORD COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER



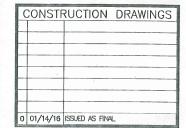
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T-MOBILE NORTHEAST LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002



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

CT11377C BUCKLAND MALL



Dewberry*

Dewberry Engineers Inc.

600 PARSIPPANY ROAD SUITE 301 PARSIPPANY, NJ 07054 PHONE: 973.739.9400 FAX: 973.739.9710



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DRAWN BY: RA

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

JOB NUMBER: 50078113

JOB NUMBER:

SITE ADDRESS:

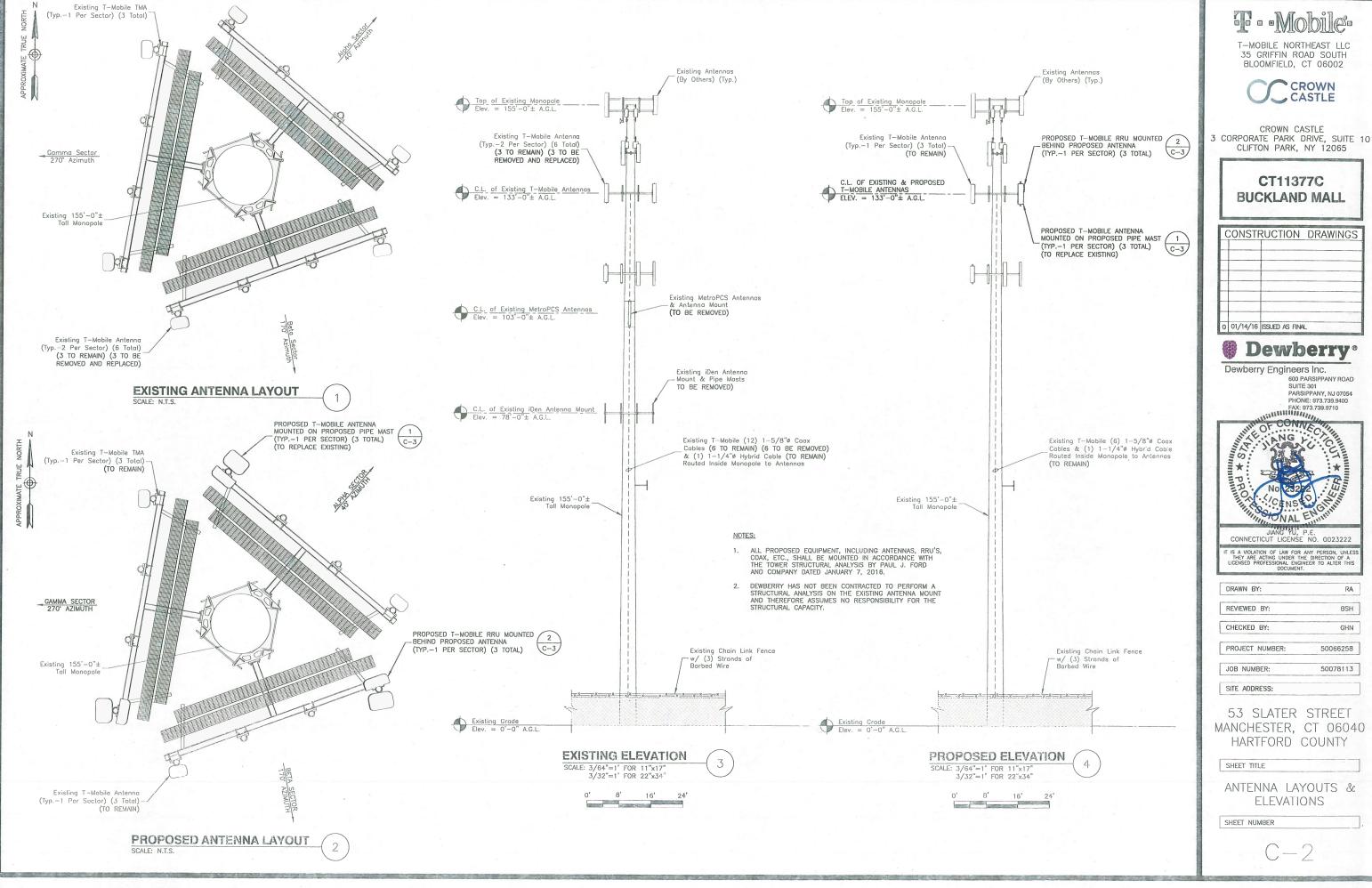
53 SLATER STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SHEET TITLE

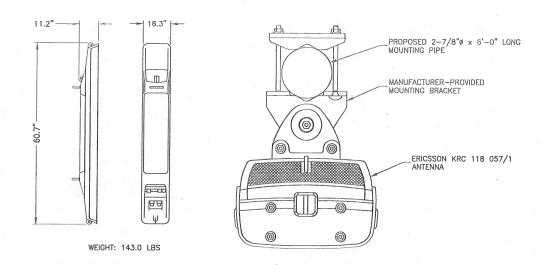
COMPOUND PLAN & EQUIPMENT PLANS

SHEET NUMBER

C-1



3 CORPORATE PARK DRIVE, SUITE 101

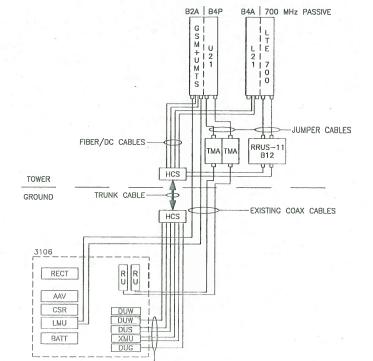


NOTES:

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



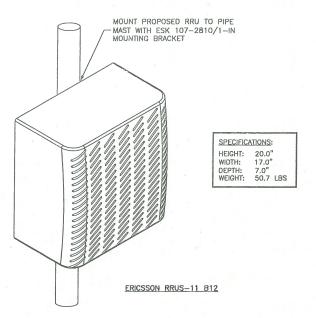




			DESIGN	CONFIG	URATION											
	ANTENNAS		CC	DAX	HYBRID	COAX/HYBRID	TMA	RRU								
	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	LENGTH	EXISTING	PROPOSED								
ALPHA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	(4) 4 5 /0"4	(2) 1-5/8"ø		1071 011	-	(1) RRUS-11 B12								
ALFIA	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN	(4) 1-5/8"ø	TO BE REMOVED		183'-0"	(1) KRY 112 144/1	·								
BETA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	(4) 1-5/8"ø	(4) 4 5 (0"4	/A) 1 E /0"d	(4) 1 E (0"d	(4) 1 E (0"d	/A) 1 E /0"d	/4) 1 E /0"d	(4) 4 5 (0"4	(A) 1 E (0"d	(2) 1-5/8"ø	(4) 1 4 /4"4	1071 011		(1) RRUS-11 B12
OCIA	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN		(1) 1-1/4"ø	183'-0"	(1) KRY 112 144/1										
GAMMA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	(A) 1 E (P"d	-5/8"ø (2) 1-5/8"ø TO BE REMOVED		183'-0"		(1) RRUS-11 B12								
ANIMA	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN	(4) 1-5/8 0				(1) KRY 112 144/1	7.—1								

SITE CONFIGURATION 702Cc SCALE: N.T.S.

- FIBER/DC CABLES



RRU NOTES:

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

RRUS-11 - REMOTE RADIO UNIT

			DESIGN	CONFIG	URATION															
	ANTENNAS		CC	DAX	HYBRID	COAX/HYBRID	TMA	RRU												
	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	LÉNGTH	EXISTING	PROPOSED												
ALPHA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	(4) 1-5/8"ø	(4) 1-5/8"ø				(1) RRUS-11 B12												
ALFIA	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN				183'-0"	(1) KRY 112 144/1	<u>-</u>												
BETA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	- (4) 1-5/8"ø	(4) 1-5/8"ø			- (4) 1-5/8"ø	- (4) 1-5/8"ø	- (4) 1-5/8"ø	- (4) 1-5/8"ø	(4) 1-5/8"ø	(4) 1-5/8"ø	- (4) 1-5/8"ø			(4) 4 5 (8"4 (2) 1-5/8"	(2) 1-5/8"ø TO BE (1) 1-1/4"ø			(1) RRUS-11 B12
BEIA	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN														TO BE REMOVED	(1) 1-1/4"ø	183'-0"	(1) KRY 112 144/1	
GAMMA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	(4) 4 5 (51)	(2)	(4) 1-5/8"ø (2) 1-5/8"ø TO BE			·	(1) RRUS-11 B12											
GAMMA	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN	(4) 1-5/8"ø	REMOVED		183'-0"	(1) KRY 112 144/1	7												

T · Mobile

T-MOBILE NORTHEAST LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002



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

> CT11377C **BUCKLAND MALL**

		CONST	RUCTION	DRAWINGS
	L			
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Dewberry Engineers Inc. 600 PARSIPPANY ROAD SUITE 301 PARSIPPANY, NJ 07054 PHONE: 973.739.9400



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER THIS DOCUMENT.

DRAWN BY:	F
REVIEWED BY:	BS
CHECKED BY:	GH
PROJECT NUMBER:	5006625

JOB NUMBER: 50078113 SITE ADDRESS:

53 SLATER STREET MANCHESTER, CT 06040 HARTFORD COUNTY

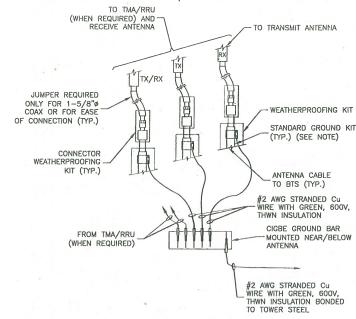
SHEET TITLE

CONSTRUCTION DETAILS

SHEET NUMBER

GROUNDING NOTES:

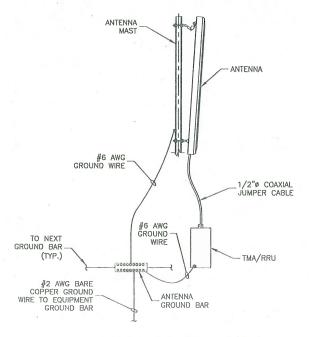
- 1. THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ). THE SITE—SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA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



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)
SCALE: N.T.S.



TYPICAL ANTENNA
GROUNDING DETAIL
SCALE: N.T.S

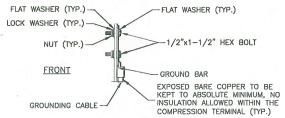
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STAINLESS
STEEL
HARDWARE
GROUNDING
CABLE

GROUND BAR
ELEVATION

WASHER (TYP.)

FLAT WASHER (TYP.)

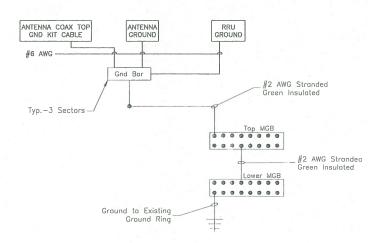


SECTION 'A-A'

NOTES:

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

TYPICAL GROUND BAR
MECHANICAL CONNECTION DETAIL
SCALE: N.T.S.



NOTES:

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

SCHEMATIC GROUNDING DIAGRAM

T · Mobile

T-MOBILE NORTHEAST LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002



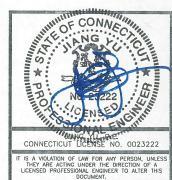
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11377C BUCKLAND MALL

	CONSTR	RUCTION	DRAWINGS
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Dewberry Engineers Inc. 600 PARSIPPANY ROAD SUITE 301 PARSIPPANY, NJ 07054 PHONE: 973.7393-900 FAX: 973.739.9710



DRAWN BY:	RA
REVIEWED BY:	BSH
KENICWED DI:	ВЭП
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50078113

53 SLATER STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SHEET TITLE

SITE ADDRESS:

GROUNDING NOTES & DETAILS

SHEET NUMBER

E-





Date: January 07, 2016

Jason Rouse Crown Castle 3530 Toringdon Way, Suite 300 Charlotte, NC 28277 704.405.6605

Paul J. Ford and Company 250 E. Broad Street, Suite 600 Columbus, OH 43215 614.221.6679 imeinerding@pifweb.com

Subject:

Structural Analysis Report

Carrier Designation:

T-Mobile Co-Locate Carrier Site Number: Carrier Site Name:

CT11377C

Sprint Manchester/slater

Crown Castle Designation:

Crown Castle BU Number:

876347

Crown Castle Site Name: Crown Castle JDE Job Number: BUCKLAND MALL 352348

Crown Castle Work Order Number: Crown Castle Application Number:

1174922 316283 Rev. 6

Engineering Firm Designation:

Paul J. Ford and Company Project Number: 37516-0064.002.7805

Site Data:

53 Slater Street, MANCHESTER, Hartford County, CT

Latitude 41° 48' 18", Longitude -72° 32' 1"

155 Foot - Monopole Tower

Dear Jason Rouse,

Paul J. Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 860900, in accordance with application 316283, revision 6.

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 structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Joey Meinerding, E.I. Structural Designer



Date: January 07, 2016

Jason Rouse Crown Castle 3530 Toringdon Way, Suite 300 Charlotte, NC 28277 704.405.6605 Paul J. Ford and Company 250 E. Broad Street, Suite 600 Columbus, OH 43215 614.221.6679

jmeinerding@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: T-Mobile Co-Locate

Carrier Site Number: CT11377C

Carrier Site Name: Sprint Manchester/slater

Crown Castle Designation: Crown Castle BU Number: 876347

Crown Castle Site Name: BUCKLAND MALL

Crown Castle JDE Job Number: 352348
Crown Castle Work Order Number: 1174922
Crown Castle Application Number: 316283 Rev. 6

Engineering Firm Designation: Paul J. Ford and Company Project Number: 37516-0064.002.7805

Site Data: 53 Slater Street, MANCHESTER, Hartford County, CT

Latitude 41° 48′ 18″, Longitude -72° 32′ 1″

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

Respectfully submitted by:

Joey Meinerding, E.I. Structural Designer

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- 3.1) Analysis Method
- 3.2) Assumptions

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tnxTower Output

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Base Level Drawing

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Additional Calculations

1) INTRODUCTION

This tower is a 155 ft. monopole tower designed by Summit in February of 2002. 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 the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

	Mounting Level (ft)	Elevetion	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note					
	133.0	133.0	3	ericsson	KRC 118 057/1 w/ Mount Pipe								
ĺ			3	ericsson	RRUS 11 B12								

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	
	155.0	3	alcatel lucent	TD-RRH8x20-25				
		3	argus technologies	LPX310R w/ Mount Pipe				
155.0		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe				
		155.0	3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe	3 5	5/16 1/2	
		3	samsung telecommunications	WIMAX DAP HEAD	1 1 3	5/8 3/4 1-1/4	1	
		1	tower mounts	Platform Mount [LP 713-1]				
	151.0	1	andrew	VHLP1-23				
		1	andrew	VHLP2-11				
	131.0	1	andrew	VHLP2.5-18				
		3	dragonwave	HORIZON COMPACT				
		3	alcatel lucent	800MHz 2X50W RRH W/FILTER				
153.0	153.0	3	alcatel lucent	PCS 1900MHz 4x45W- 65MHz			1	
		1	1 tower mounts Pipe Mount [PM 601-3]					
145.0	145.0	3	ericsson	RRUS 11			1	
145.0	143.0	1	tower mounts	Pipe Mount [PM 601-3]			'	

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note	
		3	ericsson	RRUS-11				
		3	kathrein	800 10121 w/ Mount Pipe				
		6	kathrein	860 10025				
143.0	143.0	143.0	3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	1 2	3/8 3/4	1
		6	powerwave technologies	LGP21401	6	1-1/4		
		1	raycap	DC6-48-60-18-8F				
		1	tower mounts	T-Arm Mount [TA 702-3]				
	133.0	3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	6	1-5/8	3	
133.0		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-1/4		
		3	ericsson	KRY 112 144/1	6	1-5/8	1	
		1	tower mounts	Platform Mount [LP 403-1]				
			3	alcatel lucent	RRH2X60-AWS			
					3	alcatel lucent	RRH2X60-PCS	
		3	alcatel lucent	RRH2x60-700	1	1-5/8	2	
		6	commscope	SBNHH-1D65B w/ Mount Pipe				
113.0	113.0	113.0	andrew	LNX-6512DS-T0M w/ Mount Pipe				
		3	antel	BXA-70063/6CFx2 w/ Mount Pipe	13	1-5/8	1	
		1	rfs celwave	DB-T1-6Z-8AB-0Z				
		1	tower mounts	Platform Mount [LP 1201-1]				
103.0	103.0	103.0 3 rfs celwave		APXV18-206517S-C w/ Mount Pipe	6	1-5/8	3	
		1	·			1-5/0		
78.0	78.0	1	tower mounts	Platform Mount [LP 303-1]			3	
60.0	60.0	1	tower mounts	Side Arm Mount [SO 701-1]	1	1/2	1	

Notes:

- Existing Equipment Reserved Equipment Equipment To Be Removed 1) 2) 3)

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 1204605EG1, 06/12/2012	1533476	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit/PJF, 3960/29298-597, 09/11/1998	1615406	CCISITES
4-TOWER MANUFACTURER DRAWINGS	SEA/PJF, A02-T0021, 02/18/2002	2068033	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.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	155 - 115.5	Pole	TP29.31x22x0.25	1	-8.35	1080.07	59.4	Pass
L2	115.5 - 79.25	Pole	TP35.51x28.11x0.31	2	-16.61	1772.22	89.3	Pass
L3	79.25 - 43.75	Pole	TP41.46x34.06x0.38	3	-24.21	2481.90	96.6	Pass
L4	43.75 - 0	Pole	TP48.8x39.73x0.44	4	-37.90	3491.31	95.8	Pass
						Summary		
						Pole (L3)	96.6	Pass
						Rating =	96.6	Pass

Table 5 - Tower Component Stresses vs. Capacity

Table 6 Tower Component Chroscos vor Capacity											
Notes	Component	Elevation (ft)	% Capacity	Pass / Fail							
1	Anchor Rods	0	89.1	Pass							
1	Base Plate	0	76.5	Pass							
1	Base Foundation Structural Steel	0	52.7	Pass							
1	Base Foundation Soil Interaction	0	83.5	Pass							

Structure Rating (max from all components) =	96.6%
--	-------

Notes:

4.1) Recommendations

The monopole and its foundation have 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

Tower Input Data

There is a pole section.

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

The following design criteria apply:

- 1) Tower is located in Hartford County, Connecticut.
- 2) Basic wind speed of 80.0 mph.
- 3) Nominal ice thickness of 1.00 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56 pcf.
- 6) A wind speed of 37.6 mph is used in combination with ice.
- 7) Temperature drop of 50 °F.
- 8) Deflections calculated using a wind speed of 50.0 mph.
- 9) A non-linear (P-delta) analysis was used.
- 10) Pressures are calculated at each section.
- 11) Stress ratio used in pole design is 1.333.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are 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 Špans 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	Section Length	Splice Length	Number of	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	fť	ft	Sides	in	in	in	in	
L1	155.00-115.50	39.50	3.75	18	22.00	29.31	0.25	1.00	A607-60 (60 ksi)
L2	115.50-79.25	40.00	4.50	18	28.11	35.51	0.31	1.25	A607-65 (65 ksi)
L3	79.25-43.75	40.00	5.25	18	34.06	41.46	0.38	1.50	À607-65 (65 ksi)
L4	43.75-0.00	49.00		18	39.73	48.80	0.44	1.75	À607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia.	Area	1	r	С	I/C	J	It/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	in ²	in	
L1	22.34	17.26	1031.48	7.72	11.18	92.29	2064.32	8.63	3.43	13.728
	29.76	23.06	2459.70	10.32	14.89	165.21	4922.63	11.53	4.72	18.873
L2	29.25	27.58	2692.83	9.87	14.28	188.55	5389.20	13.79	4.40	14.074
	36.06	34.92	5466.10	12.50	18.04	302.98	10939.40	17.46	5.70	18.241
L3	35.43	40.09	5745.80	11.96	17.30	332.11	11499.17	20.05	5.33	14.224
	42.10	48.90	10425.54	14.58	21.06	495.05	20864.80	24.45	6.64	17.697
L4	41.33	54.57	10646.61	13.95	20.19	527.44	21307.22	27.29	6.22	14.225
	49.55	67.16	19844.89	17.17	24.79	800.51	39715.89	33.59	7.82	17.872

Tower	Gusset	Gusset	Gusset Grade Adjust. Factor	Adjust.	Weight Mult.	Double Angle	Double Angle
Elevation	Area	Thickness	A_{f}	Factor		Stitch Bolt	Stitch Bolt
	(per face)			A_r		Spacing	Spacing
	_					Diagonals	Horizontals
ft	ft ²	in				in	in
L1 155.00-			1	1	1		
115.50							
L2 115.50-			1	1	1		
79.25							
L3 79.25-			1	1	1		
43.75							
L4 43.75-0.00			1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or	Allow Shield	Component Type	Placement	Total Number		$C_A A_A$	Weight
	Leg			ft			ft²/ft	plf
ATCB-B01-005(5/16)	С	No	Inside Pole	155.00 - 0.00	3	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
						2" Ice	0.00	0.07
						4" Ice	0.00	0.07
FSJ4-50B(1/2")	С	No	CaAa (Out Of	155.00 - 0.00	5	No Ice	0.00	0.14
			Face)			1/2" Ice	0.00	0.76
						1" Ice	0.00	2.00
						2" Ice	0.00	6.30
						4" Ice	0.00	22.23
2" Conduit	С	No	CaAa (Out Of	155.00 - 0.00	1	No Ice	0.00	1.16
			Face)			1/2" Ice	0.00	2.53
						1" Ice	0.00	4.51
						2" Ice	0.00	10.30
	_					4" Ice	0.00	29.21
2" Conduit	С	No	CaAa (Out Of	155.00 - 0.00	1	No Ice	0.17	1.16
			Face)			1/2" Ice	0.27	2.53
						1" Ice	0.37	4.51
						2" Ice	0.57	10.30
	_					4" Ice	0.97	29.21
9776(3/4")	С	No	Inside Pole	155.00 - 0.00	1	No Ice	0.00	0.31
						1/2" Ice	0.00	0.31
						1" Ice	0.00	0.31
						2" Ice	0.00	0.31
	_				_	4" Ice	0.00	0.31
HB058-M12-	С	No	Inside Pole	155.00 - 0.00	1	No Ice	0.00	0.24
XXXF(5/8")						1/2" Ice	0.00	0.24
						1" Ice	0.00	0.24
						2" Ice	0.00	0.24
1154444 00114 145 1/4	_			455.00 0.00	•	4" Ice	0.00	0.24
HB114-1-08U4-M5J(1	С	No	Inside Pole	155.00 - 0.00	3	No Ice	0.00	1.08
1/4")						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
						2" Ice	0.00	1.08
***						4" Ice	0.00	1.08
LDF6-50A(1-1/4")	С	No	Inside Pole	143.00 - 0.00	6	No Ice	0.00	0.66
LDI 0-30A(1-1/4)	O	140	molde i die	1-10.00 - 0.00	U	1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						, 100	0.00	0.00

Description	Face or	Allow Shield	Component Type	Placement	Total Number		$C_A A_A$	Weight
	Leg	01.1101.4	. , , , ,	ft			ft²/ft	plf
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
FB-L98B-002-75000(С	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	0.06
3/8")						1/2" Ice	0.00	0.06
,						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86ST-BRD(С	No	Inside Pole	143.00 - 0.00	2	No Ice	0.00	0.59
3/4)	Ū				_	1/2" Ice	0.00	0.59
3/ 1/						1" Ice	0.00	0.59
						2" Ice	0.00	0.59
						4" Ice	0.00	0.59
2" Conduit	С	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	1.16
2 Conduit	O	140	moide i die	143.00 - 0.00	'	1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
						2" Ice	0.00	1.16
						4" Ice		
***						4 ICE	0.00	1.16
HB114-21U3M12-	С	Nia	lasida Dala	422.00 0.00	4	No lee	0.00	4.00
	C	No	Inside Pole	133.00 - 0.00	1	No Ice	0.00	1.22
XXXF(1-1/4")						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
						2" Ice	0.00	1.22
						4" Ice	0.00	1.22
LCF158-50JA-A0(1	С	No	Inside Pole	133.00 - 0.00	6	No Ice	0.00	0.08
5/8")						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
						2" Ice	0.00	0.08
						4" Ice	0.00	0.08

561(1-5/8'')	С	No	Inside Pole	113.00 - 0.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35
HB158-1-08U8-S8J18(С	No	Inside Pole	113.00 - 0.00	1	No Ice	0.00	1.30
1-5/8)						1/2" Ice	0.00	1.30
•						1" Ice	0.00	1.30
						2" Ice	0.00	1.30
						4" Ice	0.00	1.30
HB158-1-08U8-S8J18(С	No	CaAa (Out Of	113.00 - 0.00	1	No Ice	0.20	1.30
1-5/8)	Ū		Face)		•	1/2" Ice	0.30	2.81
. 3/3/			1 400)			1" Ice	0.40	4.94
						2" Ice	0.60	11.02
						4" Ice	1.00	30.52
***						+ 100	1.00	30.32

LDF4-50A(1/2")	С	No	Inside Pole	60.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

Feed Line/Linear Appurtenances Section Areas

Tower Sectio	Tower Elevation	Face	A_R	A_F	C _A A _A In Face	C _A A _A Out Face	Weight
n	ft		ft ²	ft ²	ft ²	ft ²	K
L1	155.00-115.50	Α	0.000	0.000	0.000	0.000	0.00
		В	0.000	0.000	0.000	0.000	0.00
		С	0.000	0.000	0.000	6.873	0.48
L2	115.50-79.25	Α	0.000	0.000	0.000	0.000	0.00
		В	0.000	0.000	0.000	0.000	0.00
		С	0.000	0.000	0.000	12.990	1.18
L3	79.25-43.75	Α	0.000	0.000	0.000	0.000	0.00
		В	0.000	0.000	0.000	0.000	0.00
		С	0.000	0.000	0.000	13.206	1.21

Tower	Tower	Face	A_R	A_{F}	$C_A A_A$	$C_A A_A$	Weight
Sectio	Elevation				In Face	Out Face	
n	ft		ft ²	ft ²	ft ²	ft ²	K
L4	43.75-0.00	Α	0.000	0.000	0.000	0.000	0.00
		В	0.000	0.000	0.000	0.000	0.00
		С	0.000	0.000	0.000	16.275	1.49

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower	Tower	Face	Ice	A_R	A_F	$C_A A_A$	$C_A A_A$	Weight
Sectio	Elevation	or	Thickness	_		In Face	Out Face	
n	ft	Leg	in	ft ²	ft ²	ft ²	ft ²	K
L1	155.00-115.50	Α	1.184	0.000	0.000	0.000	0.000	0.00
		В		0.000	0.000	0.000	0.000	0.00
		С		0.000	0.000	0.000	16.224	1.35
L2	115.50-79.25	Α	1.138	0.000	0.000	0.000	0.000	0.00
		В		0.000	0.000	0.000	0.000	0.00
		С		0.000	0.000	0.000	29.562	2.14
L3	79.25-43.75	Α	1.077	0.000	0.000	0.000	0.000	0.00
		В		0.000	0.000	0.000	0.000	0.00
		С		0.000	0.000	0.000	29.367	2.09
L4	43.75-0.00	Α	1.000	0.000	0.000	0.000	0.000	0.00
		В		0.000	0.000	0.000	0.000	0.00
		С		0.000	0.000	0.000	35.128	2.48

Feed Line Center of Pressure

Section	Elevation	CP _X	CPz	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	155.00-115.50	-0.21	0.12	-0.42	0.24
L2	115.50-79.25	-0.41	0.24	-0.77	0.45
L3	79.25-43.75	-0.43	0.25	-0.81	0.47
L4	43.75-0.00	-0.44	0.25	-0.83	0.48

D :	_		
INCAPA	e Tower	\mathbf{I}	•
1 118(14)		1 020	•

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		ft²	ft ²	К
LPX310R w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.31 2.64 2.99 3.77 5.50	2.34 2.87 3.41 4.56 7.24	0.03 0.05 0.08 0.16 0.40
LPX310R w/ Mount Pipe	В	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.31 2.64 2.99 3.77 5.50	2.34 2.87 3.41 4.56 7.24	0.03 0.05 0.08 0.16 0.40
LPX310R w/ Mount Pipe	С	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.64 2.99 3.77 5.50	2.34 2.87 3.41 4.56 7.24	0.03 0.05 0.08 0.16 0.40

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	K
HORIZON COMPACT	Α	From Leg	4.00 0.00	0.000	155.00	4" Ice No Ice 1/2"	0.84 0.97	0.43 0.52	0.01 0.02
			-4.00			Ice 1" Ice 2" Ice 4" Ice	1.10 1.39 2.08	0.63 0.86 1.43	0.03 0.05 0.12
HORIZON COMPACT	В	From Leg	4.00 0.00 -4.00	0.000	155.00	No Ice 1/2" Ice	0.84 0.97 1.10	0.43 0.52 0.63	0.01 0.02 0.03
						1" Ice 2" Ice 4" Ice	1.39	0.86 1.43	0.05 0.12
HORIZON COMPACT	С	From Leg	4.00 0.00 -4.00	0.000	155.00	No Ice 1/2" Ice	0.84 0.97 1.10	0.43 0.52 0.63	0.01 0.02 0.03
						1" Ice 2" Ice 4" Ice	1.39 2.08	0.86 1.43	0.05 0.12
WIMAX DAP HEAD	Α	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice	1.80 1.99 2.18	0.78 0.92 1.07	0.03 0.04 0.06
MANANA Y DA DI LIFAD	Б	F==== 1 ==	4.00	0.000	455.00	1" Ice 2" Ice 4" Ice	2.59 3.51	1.39 2.14	0.09 0.20
WIMAX DAP HEAD	В	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
WIMAX DAP HEAD	С	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
APXVSPP18-C-A20 w/ Mount Pipe	Α	From Leg	4.00 0.00 0.00	0.000	155.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	В	From Leg	4.00 0.00 0.00	0.000	155.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	С	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVTM14-C-120 w/ Mount Pipe	Α	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	В	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	7.13 7.66 8.18 9.26	4.96 5.75 6.47 8.01	0.08 0.13 0.19 0.34

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	۰	ft		ft ²	ft ²	K
						2" Ice 4" Ice	11.53	11.41	0.75
APXVTM14-C-120 w/	С	From Leg	4.00	0.000	155.00	No Ice	7.13	4.96	0.08
Mount Pipe			0.00			1/2"	7.66	5.75	0.13
			0.00			Ice	8.18	6.47	0.19
						1" Ice	9.26	8.01	0.34
						2" Ice 4" Ice	11.53	11.41	0.75
TD-RRH8x20-25	Α	From Leg	4.00	0.000	155.00	No Ice	4.72	1.70	0.07
12 144 10/20 20	,,	i rom Log	0.00	0.000	100.00	1/2"	5.01	1.92	0.10
			0.00			Ice	5.32	2.15	0.13
						1" Ice	5.95	2.62	0.20
						2" Ice	7.31	3.68	0.40
TD DDH9v20 25	В	From Log	4.00	0.000	1EE 00	4" Ice	4.70	1.70	0.07
TD-RRH8x20-25	Ь	From Leg	4.00 0.00	0.000	155.00	No Ice 1/2"	4.72 5.01	1.70 1.92	0.07 0.10
			0.00			Ice	5.32	2.15	0.13
						1" Ice	5.95	2.62	0.20
						2" Ice	7.31	3.68	0.40
TD DD110 00 07	_					4" Ice	. ==	. = 0	
TD-RRH8x20-25	С	From Leg	4.00	0.000	155.00	No Ice	4.72	1.70	0.07
			0.00 0.00			1/2" Ice	5.01 5.32	1.92 2.15	0.10 0.13
			0.00			1" Ice	5.95	2.13	0.13
						2" Ice	7.31	3.68	0.40
						4" Ice			
Platform Mount [LP 713-1]	С	None		0.000	155.00	No Ice	31.27	31.27	1.51
						1/2''	39.68	39.68	1.93
						Ice 1" Ice	48.09 64.91	48.09 64.91	2.35 3.19
						2" Ice	98.55	98.55	4.86
						4" Ice	00.00	00.00	1.00

800MHz 2X50W RRH	Α	From Leg	1.00	0.000	153.00	No Ice	2.40	2.25	0.06
W/FILTER			0.00 0.00			1/2" Ice	2.61 2.83	2.46 2.68	0.09 0.11
			0.00			1" Ice	3.30	3.13	0.17
						2" Ice	4.34	4.15	0.34
						4" Ice			
800MHz 2X50W RRH	В	From Leg	1.00	0.000	153.00	No Ice	2.40	2.25	0.06
W/FILTER			0.00			1/2"	2.61	2.46	0.09
			0.00			Ice 1" Ice	2.83 3.30	2.68 3.13	0.11 0.17
						2" Ice	4.34	4.15	0.17
						4" Ice			
800MHz 2X50W RRH	С	From Leg	1.00	0.000	153.00	No Ice	2.40	2.25	0.06
W/FILTER			0.00			1/2"	2.61	2.46	0.09
			0.00			Ice	2.83	2.68	0.11
						1" Ice 2" Ice	3.30 4.34	3.13 4.15	0.17 0.34
						4" Ice	4.04	4.13	0.54
PCS 1900MHz 4x45W-	Α	From Leg	1.00	0.000	153.00	No Ice	2.71	2.61	0.06
65MHz		J	0.00			1/2"	2.95	2.85	0.08
			0.00			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice 4" Ice	4.86	4.74	0.35
PCS 1900MHz 4x45W-	В	From Leg	1.00	0.000	153.00	No Ice	2.71	2.61	0.06
65MHz	٦	. Tom Log	0.00	0.000	100.00	1/2"	2.95	2.85	0.08
··· · -			0.00			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
DCS 1000MU- 45/45/M	C	Erom Loc	1.00	0.000	152.00	4" Ice	2 74	2.64	0.06
PCS 1900MHz 4x45W- 65MHz	С	From Leg	1.00 0.00	0.000	153.00	No Ice 1/2"	2.71 2.95	2.61 2.85	0.06 0.08
OOIVII IZ			0.00			1/2	2.30	2.00	0.00

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	K
			0.00			Ice	3.20	3.09	0.11
						1" Ice 2" Ice 4" Ice	3.72 4.86	3.61 4.74	0.17 0.35
Pipe Mount [PM 601-3]	С	None		0.000	153.00	No Ice	4.39	4.39	0.20
						1/2" Ice	5.48 6.57	5.48 6.57	0.24 0.28
						1" Ice	8.75	8.75	0.36
***						2" Ice 4" Ice	13.11	13.11	0.53
RRUS 11	Α	From Leg	1.00	0.000	145.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			lce 1" lce	3.75 4.28	1.74 2.15	0.10 0.15
						2" Ice	5.44	3.05	0.31
RRUS 11	В	From Leg	1.00	0.000	145.00	4" Ice No Ice	3.26	1.38	0.05
KKU3 II	ь	Fioni Leg	0.00	0.000	145.00	1/2"	3.50	1.56	0.03
			0.00			Ice	3.75	1.74	0.10
						1" Ice 2" Ice	4.28 5.44	2.15 3.05	0.15 0.31
						4" Ice	5.44	3.03	0.51
RRUS 11	С	From Leg	1.00	0.000	145.00	No Ice	3.26	1.38	0.05
			0.00 0.00			1/2" Ice	3.50 3.75	1.56 1.74	0.07 0.10
						1" Ice	4.28	2.15	0.15
D: 14 . (D14.004.01	•			0.000	4.45.00	2" Ice 4" Ice	5.44	3.05	0.31
Pipe Mount [PM 601-3]	С	None		0.000	145.00	No Ice 1/2"	4.39 5.48	4.39 5.48	0.20 0.24
						Ice	6.57	6.57	0.28
						1" Ice 2" Ice	8.75 13.11	8.75 13.11	0.36 0.53
***						4" Ice	10.11	13.11	0.55
AM-X-CD-16-65-00T-RET	Α	From Leg	3.00	0.000	143.00	No Ice	8.50	6.30	0.07
w/ Mount Pipe			0.00 0.00			1/2" Ice	9.15 9.77	7.48 8.37	0.14 0.21
			0.00			1" Ice	11.03	10.18	0.38
						2" Ice 4" Ice	13.68	14.02	0.87
AM-X-CD-16-65-00T-RET	В	From Leg	3.00	0.000	143.00	No Ice	8.50	6.30	0.07
w/ Mount Pipe		· ·	0.00			1/2''	9.15	7.48	0.14
			0.00			lce 1" lce	9.77 11.03	8.37 10.18	0.21 0.38
						2" Ice	13.68	14.02	0.87
AM-X-CD-16-65-00T-RET	С	From Leg	3.00	0.000	143.00	4" Ice No Ice	8.50	6.30	0.07
w/ Mount Pipe			0.00	0.000	. 10.00	1/2"	9.15	7.48	0.14
			0.00			Ice 1" Ice	9.77 11.03	8.37 10.18	0.21 0.38
						2" Ice	13.68	14.02	0.36
000 40404/ \$4 55'	^	F==== !	0.00	0.000	440.00	4" Ice			
800 10121 w/ Mount Pipe	Α	From Leg	3.00 0.00	0.000	143.00	No Ice 1/2"	6.03 6.71	4.95 6.02	0.07 0.12
			0.00			Ice	7.30	6.81	0.18
						1" Ice	8.50	8.46	0.32
000 40404 w/ \$4 5'	_	From L.	2.00	0.000	440.00	2" Ice 4" Ice	11.04	12.10	0.73
800 10121 w/ Mount Pipe	В	From Leg	3.00 0.00	0.000	143.00	No Ice 1/2"	6.03 6.71	4.95 6.02	0.07 0.12
			0.00			Ice	7.30	6.81	0.18
						1" Ice	8.50	8.46	0.32
						2" Ice	11.04	12.10	0.73

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	0	ft		ft ²	ft ²	K
	_					4" Ice			
800 10121 w/ Mount Pipe	С	From Leg	3.00	0.000	143.00	No Ice	6.03	4.95	0.07
			0.00			1/2''	6.71	6.02	0.12
			0.00			Ice	7.30	6.81	0.18
						1" Ice	8.50 11.04	8.46	0.32
						2" Ice 4" Ice	11.04	12.10	0.73
(2) 860 10025	Α	From Leg	3.00	0.000	143.00	No Ice	0.16	0.13	0.00
			0.00			1/2"	0.22	0.19	0.00
			0.00			Ice	0.29	0.26	0.01
						1" Ice	0.47	0.43	0.01
						2" Ice	0.92	0.87	0.05
4-1	_					4" Ice			
(2) 860 10025	В	From Leg	3.00	0.000	143.00	No Ice	0.16	0.13	0.00
			0.00			1/2''	0.22	0.19	0.00
			0.00			Ice	0.29	0.26	0.01
						1" Ice	0.47	0.43	0.01
						2" Ice 4" Ice	0.92	0.87	0.05
(2) 860 10025	С	From Leg	3.00	0.000	143.00	No Ice	0.16	0.13	0.00
(2) 000 10020	Ū	i ioni Log	0.00	0.000	1 10.00	1/2"	0.22	0.19	0.00
			0.00			Ice	0.29	0.26	0.01
						1" Ice	0.47	0.43	0.01
						2" Ice	0.92	0.87	0.05
						4" Ice			
(2) LGP21401	Α	From Leg	3.00	0.000	143.00	No Ice	1.29	0.36	0.01
			0.00			1/2"	1.45	0.48	0.02
			0.00			Ice	1.61	0.60	0.03
						1" Ice	1.97	0.87	0.05
						2" Ice	2.79	1.52	0.14
(2) I CD21 401	В	From Log	2.00	0.000	142.00	4" Ice	1.20	0.26	0.01
(2) LGP21401	ь	From Leg	3.00 0.00	0.000	143.00	No Ice 1/2"	1.29 1.45	0.36 0.48	0.01 0.02
			0.00			Ice	1.61	0.60	0.02
			0.00			1" Ice	1.97	0.87	0.05
						2" Ice	2.79	1.52	0.14
						4" Ice			• • • • • • • • • • • • • • • • • • • •
(2) LGP21401	С	From Leg	3.00	0.000	143.00	No Ice	1.29	0.36	0.01
			0.00			1/2"	1.45	0.48	0.02
			0.00			Ice	1.61	0.60	0.03
						1" Ice	1.97	0.87	0.05
						2" Ice	2.79	1.52	0.14
55110.44						4" Ice			
RRUS-11	Α	From Leg	3.00	0.000	143.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.09
						1" Ice 2" Ice	4.27 5.43	2.14 3.04	0.15 0.31
						4" Ice	3.43	3.04	0.51
RRUS-11	В	From Leg	3.00	0.000	143.00	No Ice	3.25	1.37	0.05
	_		0.00	0.000		1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
	_					4" Ice			
RRUS-11	С	From Leg	3.00	0.000	143.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice 4" Ice	5.43	3.04	0.31
DC6-48-60-18-8F	Α	From Leg	3.00	0.000	143.00	No Ice	1.47	1.47	0.02
	- •		0.00	2.300	3.00	1/2"	1.67	1.67	0.04
			0.00			Ice	1.88	1.88	0.06
						1" Ice	2.33	2.33	0.11

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	K
						2" Ice 4" Ice	3.38	3.38	0.24
T-Arm Mount [TA 702-3]	С	None		0.000	143.00	No Ice	5.64	5.64	0.34
						1/2" Ice	6.55 7.46	6.55 7.46	0.43 0.52
						1" Ice 2" Ice	9.28 12.92	9.28 12.92	0.70 1.06
						4" Ice	12.92	12.32	1.00
*** ERICSSON AIR 21 B2A	Α	From Leg	4.00	0.000	133.00	No Ice	6.83	5.64	0.11
B4P w/ Mount Pipe		· ·	0.00			1/2''	7.35	6.48	0.17
			0.00			lce 1" lce	7.86 8.93	7.26 8.86	0.23 0.38
						2" Ice	11.18	12.29	0.81
EDICECON AID 24 D2A	В	From Log	4.00	0.000	122.00	4" Ice No Ice	6.00	F 6.4	0.11
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	В	From Leg	4.00 0.00	0.000	133.00	1/2"	6.83 7.35	5.64 6.48	0.11 0.17
•			0.00			Ice	7.86	7.26	0.23
						1" Ice 2" Ice	8.93 11.18	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B2A	С	From Leg	4.00	0.000	133.00	No Ice	6.83	5.64	0.11
B4P w/ Mount Pipe			0.00 0.00			1/2" Ice	7.35 7.86	6.48 7.26	0.17 0.23
						1" Ice	8.93	8.86	0.38
						2" Ice 4" Ice	11.18	12.29	0.81
KRY 112 144/1	Α	From Leg	4.00	0.000	133.00	No Ice	0.41	0.20	0.01
			0.00			1/2"	0.50	0.27	0.01
			0.00			lce 1" lce	0.59 0.81	0.35 0.53	0.02 0.03
						2" Ice	1.36	1.00	0.08
KRY 112 144/1	В	From Leg	4.00	0.000	133.00	4" Ice No Ice	0.41	0.20	0.01
	_		0.00			1/2"	0.50	0.27	0.01
			0.00			lce 1" lce	0.59	0.35	0.02 0.03
						2" Ice	0.81 1.36	0.53 1.00	0.03
VDV 440 4444	0	F	4.00	0.000	400.00	4" Ice	0.44	0.00	0.04
KRY 112 144/1	С	From Leg	4.00 0.00	0.000	133.00	No Ice 1/2"	0.41 0.50	0.20 0.27	0.01 0.01
			0.00			Ice	0.59	0.35	0.02
						1" Ice 2" Ice	0.81 1.36	0.53 1.00	0.03 0.08
						4" Ice	1.50	1.00	0.00
KRC 118 057/1 w/ Mount	Α	From Leg	4.00	0.000	133.00	No Ice	9.75	7.94	0.16
Pipe			0.00 0.00			1/2" Ice	10.29 10.84	8.83 9.65	0.24 0.33
						1" Ice	11.96	11.36	0.52
						2" Ice 4" Ice	14.31	14.98	1.05
KRC 118 057/1 w/ Mount	В	From Leg	4.00	0.000	133.00	No Ice	9.75	7.94	0.16
Pipe			0.00 0.00			1/2'' Ice	10.29 10.84	8.83 9.65	0.24 0.33
			0.00			1" Ice	11.96	11.36	0.52
						2" Ice	14.31	14.98	1.05
KRC 118 057/1 w/ Mount	С	From Leg	4.00	0.000	133.00	4" Ice No Ice	9.75	7.94	0.16
Pipe	-		0.00			1/2"	10.29	8.83	0.24
			0.00			lce 1" lce	10.84 11.96	9.65 11.36	0.33 0.52
						2" Ice	14.31	14.98	1.05
DDI 10 44 D40	Λ	From Las	4.00	0.000	122.00	4" Ice	2.24	1.00	
RRUS 11 B12	Α	From Leg	4.00 0.00	0.000	133.00	No Ice 1/2"	3.31 3.55	1.36 1.54	0.05 0.07

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	0	ft		ft ²	ft ²	K
			0.00			Ice	3.80	1.73	0.10
						1" Ice 2" Ice 4" Ice	4.33 5.50	2.13 3.04	0.15 0.31
RRUS 11 B12	В	From Leg	4.00	0.000	133.00	No Ice	3.31	1.36	0.05
		J	0.00			1/2"	3.55	1.54	0.07
			0.00			Ice	3.80	1.73	0.10
						1" Ice 2" Ice 4" Ice	4.33 5.50	2.13 3.04	0.15 0.31
RRUS 11 B12	С	From Leg	4.00	0.000	133.00	No Ice	3.31	1.36	0.05
		3	0.00			1/2"	3.55	1.54	0.07
			0.00			Ice	3.80	1.73	0.10
						1" Ice	4.33	2.13	0.15
(2) 2 275" OD v 5' Mount	٨		4.00	0.000	422.00	2" Ice 4" Ice	5.50	3.04	0.31
(2) 2.375" OD x 5' Mount Pipe	Α	From Leg	4.00 0.00	0.000	133.00	No Ice 1/2"	1.19 1.50	1.19 1.50	0.02 0.03
ripe			0.00			Ice	1.81	1.81	0.03
			0.00			1" Ice	2.46	2.46	0.08
						2" Ice 4" Ice	3.92	3.92	0.20
(2) 2.375" OD x 5' Mount	В	From Leg	4.00	0.000	133.00	No Ice	1.19	1.19	0.02
Pipe			0.00			1/2''	1.50	1.50	0.03
			0.00			lce 1" lce	1.81	1.81	0.04
						2" Ice 4" Ice	2.46 3.92	2.46 3.92	0.08 0.20
(2) 2.375" OD x 5' Mount	С	From Leg	4.00	0.000	133.00	No Ice	1.19	1.19	0.02
Pipe			0.00			1/2"	1.50	1.50	0.03
			0.00			Ice	1.81	1.81	0.04
						1" Ice 2" Ice 4" Ice	2.46 3.92	2.46 3.92	0.08 0.20
Platform Mount [LP 403-1]	С	None		0.000	133.00	No Ice	18.85	18.85	1.50
						1/2"	24.30	24.30	1.80
						Ice	29.75	29.75	2.09
						1" Ice	40.65	40.65	2.69
***						2" Ice 4" Ice	62.45	62.45	3.87
BXA-70063/6CFx2 w/	Α	From Leg	4.00	0.000	113.00	No Ice	7.97	5.40	0.04
Mount Pipe		3	0.00			1/2"	8.61	6.55	0.10
·			0.00			Ice	9.22	7.41	0.17
						1" Ice	10.46	9.18	0.33
DVA 70000/00Fv0 vv/	5	5	4.00	0.000	440.00	2" Ice 4" Ice	13.07	12.93	0.79
BXA-70063/6CFx2 w/	В	From Leg	4.00	0.000	113.00	No Ice	7.97	5.40	0.04
Mount Pipe			0.00 0.00			1/2'' Ice	8.61 9.22	6.55 7.41	0.10 0.17
			0.00			1" Ice	10.46	9.18	0.17
						2" Ice 4" Ice	13.07	12.93	0.79
BXA-70063/6CFx2 w/	С	From Leg	4.00	0.000	113.00	No Ice	7.97	5.40	0.04
Mount Pipe			0.00			1/2"	8.61	6.55	0.10
			0.00			Ice	9.22	7.41	0.17
						1" Ice	10.46	9.18	0.33
LNIV OF 1000 TOLL		E	4.00	0.000	440.00	2" Ice 4" Ice	13.07	12.93	0.79
LNX-6512DS-T0M w/	Α	From Leg	4.00	0.000	113.00	No Ice	5.85	4.55	0.05
Mount Pipe			0.00 0.00			1/2" Ice	6.31 6.77	5.23 5.91	0.09 0.15
			0.00			1" Ice	7.74	7.34	0.13
						2" Ice	9.80	10.46	0.65
						4" Ice			

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	۰	ft		ft ²	ft ²	К
LNX-6512DS-T0M w/	В	From Leg	4.00	0.000	113.00	No Ice	5.85	4.55	0.05
Mount Pipe			0.00			1/2"	6.31	5.23	0.09
			0.00			Ice	6.77	5.91	0.15
						1" Ice 2" Ice 4" Ice	7.74 9.80	7.34 10.46	0.28 0.65
LNX-6512DS-T0M w/	С	From Leg	4.00	0.000	113.00	No Ice	5.85	4.55	0.05
Mount Pipe			0.00			1/2"	6.31	5.23	0.09
			0.00			lce 1" lce	6.77	5.91	0.15
						2" Ice 4" Ice	7.74 9.80	7.34 10.46	0.28 0.65
DB-T1-6Z-8AB-0Z	Α	From Leg	4.00	0.000	113.00	No Ice	5.60	2.33	0.04
			0.00			1/2"	5.92	2.56	0.08
			0.00			lce 1" lce	6.24	2.79	0.12
						2" Ice 4" Ice	6.91 8.37	3.28 4.37	0.21 0.45
(2) SBNHH-1D65B w/	Α	From Leg	4.00	0.000	113.00	No Ice	8.64	7.07	0.07
Mount Pipe			0.00			1/2''	9.30	8.26	0.14
			0.00			Ice	9.92	9.18	0.21
						1" Ice 2" Ice	11.20 13.86	11.01 15.05	0.39 0.90
						4" Ice	13.00	13.03	0.90
(2) SBNHH-1D65B w/	В	From Leg	4.00	0.000	113.00	No Ice	8.64	7.07	0.07
Mount Pipe		3	0.00			1/2"	9.30	8.26	0.14
			0.00			Ice	9.92	9.18	0.21
						1" Ice	11.20	11.01	0.39
						2" Ice 4" Ice	13.86	15.05	0.90
(2) SBNHH-1D65B w/	С	From Leg	4.00	0.000	113.00	No Ice	8.64	7.07	0.07
Mount Pipe	O	1 Tolli Leg	0.00	0.000	113.00	1/2"	9.30	8.26	0.14
			0.00			Ice	9.92	9.18	0.21
						1" Ice	11.20	11.01	0.39
						2" Ice	13.86	15.05	0.90
RRH2X60-AWS	Α	From Log	4.00	0.000	113.00	4" Ice No Ice	2.10	1 12	0.04
RRHZX60-AVVS	А	From Leg	0.00	0.000	113.00	1/2"	2.19 2.40	1.43 1.61	0.04 0.06
			0.00			Ice	2.61	1.80	0.08
						1" Ice	3.07	2.21	0.13
						2" Ice	4.09	3.13	0.26
551101/00 111/0	_					4" Ice			
RRH2X60-AWS	В	From Leg	4.00 0.00	0.000	113.00	No Ice 1/2"	2.19 2.40	1.43 1.61	0.04 0.06
			0.00			Ice	2.61	1.80	0.08
			0.00			1" Ice	3.07	2.21	0.13
						2" Ice	4.09	3.13	0.26
	_					4" Ice			
RRH2X60-AWS	С	From Leg	4.00	0.000	113.00	No Ice	2.19	1.43	0.04
			0.00 0.00			1/2'' Ice	2.40 2.61	1.61 1.80	0.06 0.08
			0.00			1" Ice	3.07	2.21	0.00
						2" Ice	4.09	3.13	0.26
						4" Ice			
RRH2X60-PCS	Α	From Leg	4.00	0.000	113.00	No Ice	2.57	2.01	0.06
			0.00			1/2"	2.79	2.22	0.08
			0.00			Ice	3.02	2.43	0.10
						1" Ice 2" Ice	3.52 4.61	2.89 3.92	0.16 0.31
RRH2X60-PCS	В	From Leg	4.00	0.000	113.00	4" Ice No Ice	2.57	2.01	0.06
111112/100-1 OO	ی	i ioni Log	0.00	0.000	110.00	1/2"	2.79	2.22	0.08
			0.00			Ice	3.02	2.43	0.10
						1" Ice	3.52	2.89	0.16
						2" Ice	4.61	3.92	0.31

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	۰	ft		ft²	ft ²	K
RRH2X60-PCS	С	From Leg	4.00 0.00 0.00	0.000	113.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
RRH2x60-700	Α	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2x60-700	В	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH2x60-700	С	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
Platform Mount [LP 1201-1]	С	None		0.000	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.10 26.80 30.50 37.90 52.70	23.10 26.80 30.50 37.90 52.70	2.10 2.50 2.90 3.70 5.30
2.375" OD x 4' Mount Pipe	С	From Leg	3.00 0.00 0.00	0.000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.87 1.11 1.36 1.90 3.23	0.87 1.11 1.36 1.90 3.23	0.02 0.03 0.04 0.06 0.16
Side Arm Mount [SO 701-1]	С	None		0.000	60.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18

	Dishes												
Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter		Aperture Area	Weight		
				ft	۰	٥	ft	ft		ft ²	K		
VHLP1-23	Α	Paraboloid w/o	From	4.00	0.000		155.00	1.27	No Ice	1.28	0.01		
		Radome	Leg	0.00					1/2" Ice	1.45	0.02		
			-	-4.00					1" Ice	1.62	0.03		
									2" Ice	1.97	0.04		
									4" Ice	2.66	0.07		

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter		Aperture Area	Weight
				ft	۰	٥	ft	ft		ft ²	K
VHLP2.5-18	В	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 -4.00	0.000		155.00	2.92	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.68 7.07 7.46 8.23 9.78	0.05 0.08 0.12 0.19 0.34
VHLP2-11	С	Paraboloid w/o Radome	From Leg	4.00 0.00 -4.00	0.000		155.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.19

Tower Pressures - No Ice

 $G_H = 1.690$

Section	Z	K ₇	q_z	$A_{\rm G}$	F	A_F	A_R	A _{leq}	Leg	$C_A A_A$	$C_A A_A$
Elevation	-	12	ЧZ	, 16	a	71,-	איי	, rieg	%	In	Out
					С					Face	Face
ft	ft		psf	ft^2	е	ft ²	ft ²	ft ²		ft ²	ft ²
L1 155.00-	134.52	1.494	24	84.444	Α	0.000	84.444	84.444	100.00	0.000	0.000
115.50					В	0.000	84.444		100.00	0.000	0.000
					С	0.000	84.444		100.00	0.000	6.873
L2 115.50-	96.99	1.361	22	97.153	Α	0.000	97.153	97.153	100.00	0.000	0.000
79.25					В	0.000	97.153		100.00	0.000	0.000
					С	0.000	97.153		100.00	0.000	12.990
L3 79.25-	61.36	1.194	19	112.92	Α	0.000	112.927	112.927	100.00	0.000	0.000
43.75				7	В	0.000	112.927		100.00	0.000	0.000
					С	0.000	112.927		100.00	0.000	13.206
L4 43.75-0.00	21.22	1	16	163.16	Α	0.000	163.162	163.162	100.00	0.000	0.000
				2	В	0.000	163.162		100.00	0.000	0.000
					C	0.000	163.162		100.00	0.000	16.275

Tower Pressure - With Ice

 $G_H = 1.690$

Section Elevation	Z	K₂	qz	t₂	A_{G}	F a	A_F	A_R	A _{leg}	Leg %	C _A A _A In	$C_A A_A$ Out
ft	ft		psf	in	ft²	c e	ft ²	ft ²	ft ²		Face ft²	Face ft²
L1 155.00-	134.52	1.494	5	1.18	92.237	Α	0.000	92.237	92.237	100.00	0.000	0.000
115.50						В	0.000	92.237		100.00	0.000	0.000
						С	0.000	92.237		100.00	0.000	16.224
L2 115.50-	96.99	1.361	5	1.14	104.304	Α	0.000	104.304	104.304	100.00	0.000	0.000
79.25						В	0.000	104.304		100.00	0.000	0.000
						С	0.000	104.304		100.00	0.000	29.562
L3 79.25-43.75	61.36	1.194	4	1.08	119.661	Α	0.000	119.661	119.661	100.00	0.000	0.000
						В	0.000	119.661		100.00	0.000	0.000
						С	0.000	119.661		100.00	0.000	29.367
L4 43.75-0.00	21.22	1	4	1.00	171.017	Α	0.000	171.017	171.017	100.00	0.000	0.000
						В	0.000	171.017		100.00	0.000	0.000
						С	0.000	171.017		100.00	0.000	35.128

Tower Pressure - Service

Section	Z	K_Z	q_z	A_G	F	A_F	A_R	A_{leg}	Leg	$C_A A_A$	$C_A A_A$
Elevation					а				%	In	Out
				_	С	_	_	_		Face	Face
ft	ft		psf	ft ²	е	ft ²	ft ²	ft^2		ft ²	ft ²
L1 155.00-	134.52	1.494	10	84.444	Α	0.000	84.444	84.444	100.00	0.000	0.000
115.50					В	0.000	84.444		100.00	0.000	0.000
					С	0.000	84.444		100.00	0.000	6.873
L2 115.50-	96.99	1.361	9	97.153	Α	0.000	97.153	97.153	100.00	0.000	0.000
79.25					В	0.000	97.153		100.00	0.000	0.000
					С	0.000	97.153		100.00	0.000	12.990
L3 79.25-	61.36	1.194	8	112.92	Α	0.000	112.927	112.927	100.00	0.000	0.000
43.75				7	В	0.000	112.927		100.00	0.000	0.000
					С	0.000	112.927		100.00	0.000	13.206
L4 43.75-0.00	21.22	1	6	163.16	Α	0.000	163.162	163.162	100.00	0.000	0.000
				2	В	0.000	163.162		100.00	0.000	0.000
					С	0.000	163.162		100.00	0.000	16.275

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+Ice+Temp	
17	Dead+Wind 60 deg+Ice+Temp	
18	Dead+Wind 90 deg+Ice+Temp	
19	Dead+Wind 120 deg+Ice+Temp	
20	Dead+Wind 150 deg+Ice+Temp	
21	Dead+Wind 180 deg+lce+Temp	
22	Dead+Wind 210 deg+Ice+Temp	
23	Dead+Wind 240 deg+Ice+Temp	
24	Dead+Wind 270 deg+Ice+Temp	
25	Dead+Wind 300 deg+lce+Temp	
26	Dead+Wind 330 deg+Ice+Temp	
27	Dead+Wind 0 deg - Service	
28	Dead+Wind 30 deg - Service	
29	Dead+Wind 60 deg - Service	
30	Dead+Wind 90 deg - Service	
31	Dead+Wind 120 deg - Service	
32	Dead+Wind 150 deg - Service	
33	Dead+Wind 180 deg - Service	
34	Dead+Wind 210 deg - Service	
35	Dead+Wind 240 deg - Service	
36	Dead+Wind 270 deg - Service	
37	Dead+Wind 300 deg - Service	
38	Dead+Wind 330 deg - Service	

Maximum	Member	Forces
Maxilliulli	Member	LOI CE2

Sectio	Elevation	Component	Condition	Gov.	Force	Major Axis	Minor Axis
n	ft	Type		Load		Moment	Moment
No.				Comb.	K	kip-ft	kip-ft

Sectio n	Elevation ft	Component Type	Condition	Gov. Load	Force	Major Axis Moment	Minor Axis Moment
No.				Comb.	<u> </u>	kip-ft	kip-ft
L1	155 - 115.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	14	-19.19	1	-1
			Max. Mx	5	-8.36	-368	1
			Max. My	2	-8.36	-1	366
			Max. Vy	5	14.86	-368	1
			Max. Vx	2	-14.81	-1	366
			Max. Torque	3			-1
L2	115.5 - 79.25	Pole	Max Tension	1	0.00	0	0
			Max. Compression	14	-33.66	2	-1
			Max. Mx	11	-16.62	1103	8
			Max. My	2	-16.61	-2	1103
			Max. Vy	5	23.03	-1102	2
			Max. Vx	2	-23.11	-2	1103
			Max. Torque	3			-1
L3	79.25 - 43.75	Pole	Max Tension	1	0.00	0	0
			Max. Compression	14	-43.59	4	-2
			Max. Mx	11	-24.21	1949	11
			Max. My	2	-24.21	-2	1953
			Max. Vy	5	25.64	-1949	4
			Max. Vx	2	-25.73	-2	1953
			Max. Torque	5			0
L4	43.75 - 0	Pole	Max Tension	1	0.00	0	0
			Max. Compression	14	-60.43	6	-3
			Max. Mx	11	-37.90	3278	17
			Max. My	2	-37.90	-3	3285
			Max. Vy	5	28.47	-3277	5
			Max. Vx	2	-28.56	-3	3285
			Max. Torque	5			0

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	60.43	-0.00	0.00
1 010	Max. H _x	11	37.93	28.44	0.11
	Max. H _z	2	37.93	-0.03	28.52
	Max. M _x	2	3285	-0.03	28.52
	Max. M _z	5	3277	-28.44	0.04
	Max. Torsion	5	0	-28.44	0.04
	Min. Vert	2	37.93	-0.03	28.52
	Min. H _x	5	37.93	-28.44	0.04
	Min. H _z	8	37.93	-0.09	-28.47
	Min. M _x	8	-3277	-0.09	-28.47
	Min. M _z	11	-3278	28.44	0.11
	Min. Torsion	3	0	-14.33	24.62

Tower Mast Reaction Summary

Load	Vertical	Shear _x	Shearz	Overturning	Overturning	Torque
Combination				Moment, M_x	Moment, M_z	
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	37.93	-0.00	0.00	0	1	0
Dead+Wind 0 deg - No Ice	37.93	0.03	-28.52	-3285	-3	0
Dead+Wind 30 deg - No Ice	37.93	14.33	-24.62	-2832	-1655	0
Dead+Wind 60 deg - No Ice	37.93	24.68	-14.19	-1632	-2846	0
Dead+Wind 90 deg - No Ice	37.93	28.44	-0.04	-5	-3277	0
Dead+Wind 120 deg - No Ice	37.93	24.72	14.18	1630	-2851	0
Dead+Wind 150 deg - No Ice	37.93	14.21	24.63	2834	-1636	0

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 180 deg - No Ice	37.93	0.09	28.47	3277	-13	0
Dead+Wind 210 deg - No Ice	37.93	-14.11	24.69	2843	1622	0
Dead+Wind 240 deg - No Ice	37.93	-24.65	14.17	1628	2843	0
Dead+Wind 270 deg - No Ice	37.93	-28.44	-0.11	-17	3278	0
Dead+Wind 300 deg - No Ice	37.93	-24.64	-14.27	-1644	2841	0
Dead+Wind 330 deg - No Ice	37.93	-14.29	-24.64	-2835	1651	0
Dead+Ice+Temp	60.43	0.00	-0.00	3	6	0
Dead+Wind 0	60.43	0.01	-8.14	-991	4	0
deg+lce+Temp						
Dead+Wind 30	60.43	4.09	-7.03	-854	-495	0
deg+lce+Temp						
Dead+Wind 60	60.43	7.05	-4.05	-491	-855	0
deg+lce+Temp						
Dead+Wind 90	60.43	8.12	-0.01	1	-986	0
deg+lce+Temp						
Dead+Wind 120	60.43	7.06	4.05	496	-857	0
deg+lce+Temp						
Dead+Wind 150	60.43	4.06	7.03	860	-489	0
deg+lce+Temp						
Dead+Wind 180	60.43	0.02	8.13	994	2	0
deg+lce+Temp	001.10	0.02	00		_	· ·
Dead+Wind 210	60.43	-4.03	7.05	863	497	0
deg+lce+Temp						•
Dead+Wind 240	60.43	-7.04	4.05	496	866	0
deg+lce+Temp						•
Dead+Wind 270	60.43	-8.12	-0.03	-2	997	0
deg+lce+Temp	001.10	0	0.00	_		· ·
Dead+Wind 300	60.43	-7.04	-4.07	-494	865	0
deg+lce+Temp						
Dead+Wind 330	60.43	-4.08	-7.03	-855	505	0
deg+lce+Temp						
Dead+Wind 0 deg - Service	37.93	0.01	-11.14	-1285	-1	0
Dead+Wind 30 deg - Service	37.93	5.60	-9.62	-1108	-647	0
Dead+Wind 60 deg - Service	37.93	9.64	-5.54	-638	-1113	0
Dead+Wind 90 deg - Service	37.93	11.11	-0.01	-2	-1282	0
Dead+Wind 120 deg -	37.93	9.65	5.54	638	-1115	0
Service						
Dead+Wind 150 deg -	37.93	5.55	9.62	1109	-640	0
Service						
Dead+Wind 180 deg -	37.93	0.03	11.12	1283	-5	0
Service	0.100	0.00	=	.200	· ·	ŭ
Dead+Wind 210 deg -	37.93	-5.51	9.64	1113	635	0
Service	0.100	0.0.	0.0 .		000	ŭ
Dead+Wind 240 deg -	37.93	-9.63	5.53	638	1113	0
Service	0.100	0.00	0.00	000		ŭ
Dead+Wind 270 deg -	37.93	-11.11	-0.04	-6	1283	0
Service	07.00		0.04	o o	1200	O
Dead+Wind 300 deg -	37.93	-9.62	-5.57	-643	1112	0
Service	07.00	0.02	0.07	0.10	1112	O
Dead+Wind 330 deg -	37.93	-5.58	-9.62	-1109	647	0
Service	01.00	0.00	0.02	1130	0.11	Ū

Solution Summary

	Sun	n of Applied Force	es		Sum of Reaction	ns	
Load	PX	PY	PZ	PX	PY	PZ	% Error
Comb.	K	K	K	K	K	K	
1	0.00	-37.93	0.00	0.00	37.93	-0.00	0.000%
2	0.03	-37.93	-28.53	-0.03	37.93	28.52	0.007%
3	14.33	-37.93	-24.62	-14.33	37.93	24.62	0.000%
4	24.68	-37.93	-14.19	-24.68	37.93	14.19	0.000%
5	28.44	-37.93	-0.04	-28.44	37.93	0.04	0.007%
6	24.72	-37.93	14.18	-24.72	37.93	-14.18	0.000%
7	14.21	-37.93	24.63	-14.21	37.93	-24.63	0.000%
8	0.09	-37.93	28.47	-0.09	37.93	-28.47	0.007%
9	-14.11	-37.93	24.69	14.11	37.93	-24.69	0.000%

	Sun	of Applied Force	es		Sum of Reactio	ns	
Load	PX	PY	PZ	PX	PY	PZ	% Error
Comb.	K	K	K	K	K	K	
10	-24.65	-37.93	14.17	24.65	37.93	-14.17	0.000%
11	-28.44	-37.93	-0.11	28.44	37.93	0.11	0.007%
12	-24.64	-37.93	-14.27	24.64	37.93	14.27	0.000%
13	-14.29	-37.93	-24.64	14.29	37.93	24.64	0.000%
14	0.00	-60.43	0.00	-0.00	60.43	0.00	0.001%
15	0.01	-60.43	-8.14	-0.01	60.43	8.14	0.002%
16	4.09	-60.43	-7.03	-4.09	60.43	7.03	0.001%
17	7.05	-60.43	-4.05	-7.05	60.43	4.05	0.001%
18	8.12	-60.43	-0.01	-8.12	60.43	0.01	0.002%
19	7.06	-60.43	4.05	-7.06	60.43	-4.05	0.001%
20	4.06	-60.43	7.03	-4.06	60.43	-7.03	0.001%
21	0.02	-60.43	8.13	-0.02	60.43	-8.13	0.002%
22	-4.03	-60.43	7.05	4.03	60.43	-7.05	0.001%
23	-7.04	-60.43	4.05	7.04	60.43	-4.05	0.001%
24	-8.12	-60.43	-0.03	8.12	60.43	0.03	0.002%
25	-7.04	-60.43	-4.07	7.04	60.43	4.07	0.001%
26	-4.08	-60.43	-7.03	4.08	60.43	7.03	0.001%
27	0.01	-37.93	-11.14	-0.01	37.93	11.14	0.003%
28	5.60	-37.93	-9.62	-5.60	37.93	9.62	0.001%
29	9.64	-37.93	-5.54	-9.64	37.93	5.54	0.001%
30	11.11	-37.93	-0.01	-11.11	37.93	0.01	0.003%
31	9.65	-37.93	5.54	-9.65	37.93	-5.54	0.002%
32	5.55	-37.93	9.62	-5.55	37.93	-9.62	0.001%
33	0.03	-37.93	11.12	-0.03	37.93	-11.12	0.003%
34	-5.51	-37.93	9.64	5.51	37.93	-9.64	0.001%
35	-9.63	-37.93	5.53	9.63	37.93	-5.53	0.001%
36	-11.11	-37.93	-0.04	11.11	37.93	0.04	0.003%
37	-9.63	-37.93	-5.57	9.62	37.93	5.57	0.001%
38	-5.58	-37.93	-9.62	5.58	37.93	9.62	0.001%

Non-Linear Convergence Results

Converged?	Number	Displacement	Force
3 1		Tolerance	Tolerance
Yes	6	0.0000001	0.0000001
Yes	15	0.00007013	0.00009673
Yes	20	0.0000001	0.00006688
Yes	20	0.0000001	0.00006598
Yes	15	0.00007015	0.00010371
Yes	20	0.0000001	0.00006588
Yes	20	0.0000001	0.00006573
Yes	15	0.00007017	0.00010341
Yes	19	0.0000001	0.00014897
Yes	19	0.0000001	0.00015000
Yes	15	0.00007014	0.00010413
Yes	20	0.0000001	0.00006646
Yes	20	0.0000001	0.00006625
Yes		0.0000001	0.00001340
Yes	16	0.00010003	0.00011865
Yes	17	0.0000001	0.00010375
Yes	17	0.0000001	0.00010303
Yes		0.00010005	0.00011810
			0.00010393
			0.00010307
Yes		0.00010002	0.00011896
Yes		0.0000001	0.00010480
			0.00010503
Yes	16	0.00010003	0.00011949
Yes	17	0.0000001	0.00010484
Yes			0.00010530
Yes		0.00007536	0.00005031
Yes		0.0000001	0.00013115
Yes	16	0.0000001	0.00012799
Yes			0.00005064
Yes	16	0.0000001	0.00012731
	Yes	of Cycles Yes 6 Yes 15 Yes 20 Yes 20 Yes 15 Yes 20 Yes 20 Yes 19 Yes 19 Yes 20 Yes 20 Yes 20 Yes 16 Yes 17 Yes 16 Yes 17 Yes 16 Yes 17 Yes 17 Yes 16 Yes 17 Yes 16 Yes 17 Yes 17 Yes 16 Yes 17 Yes 16 Yes 16 Yes 16 Yes 16 Yes 16 Yes 16 Yes 16 <t< td=""><td>of Cycles Tolerance Yes 6 0.00000001 Yes 15 0.00007013 Yes 20 0.00000001 Yes 20 0.00000001 Yes 15 0.0007015 Yes 20 0.00000001 Yes 20 0.00000001 Yes 15 0.00007017 Yes 19 0.00000001 Yes 19 0.00000001 Yes 15 0.0007014 Yes 20 0.00000001 Yes 20 0.00000001 Yes 20 0.00000001 Yes 20 0.00000001 Yes 9 0.00000001 Yes 16 0.00010003 Yes 17 0.00000001 Yes 17 0.00000001 Yes 16 0.00010005 Yes 17 0.00000001 Yes 16 0.00010002 Yes <</td></t<>	of Cycles Tolerance Yes 6 0.00000001 Yes 15 0.00007013 Yes 20 0.00000001 Yes 20 0.00000001 Yes 15 0.0007015 Yes 20 0.00000001 Yes 20 0.00000001 Yes 15 0.00007017 Yes 19 0.00000001 Yes 19 0.00000001 Yes 15 0.0007014 Yes 20 0.00000001 Yes 20 0.00000001 Yes 20 0.00000001 Yes 20 0.00000001 Yes 9 0.00000001 Yes 16 0.00010003 Yes 17 0.00000001 Yes 17 0.00000001 Yes 16 0.00010005 Yes 17 0.00000001 Yes 16 0.00010002 Yes <

32	Yes	16	0.0000001	0.00012747
33	Yes	15	0.00007536	0.00005026
34	Yes	16	0.0000001	0.00012583
35	Yes	16	0.0000001	0.00012711
36	Yes	15	0.00007537	0.00005026
37	Yes	16	0.0000001	0.00012942
38	Yes	16	0.0000001	0.00012830

Maximum Tower Deflections - Service Wind

Section	Elevation	Horz.	Gov.	Tilt	Twist
No.		Deflection	Load		
	ft	in	Comb.	0	٥
L1	155 - 115.5	48.36	31	2.659	0.003
L2	119.25 - 79.25	29.26	31	2.334	0.001
L3	83.75 - 43.75	14.22	27	1.635	0.000
L4	49 - 0	4.81	27	0.908	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	0	0	ft
155.00	LPX310R w/ Mount Pipe	31	48.36	2.659	0.003	24104
153.00	800MHz 2X50W RRH W/FILTER	31	47.25	2.647	0.003	24104
151.00	VHLP1-23	31	46.14	2.634	0.003	24104
145.00	RRUS 11	31	42.82	2.594	0.002	12051
143.00	AM-X-CD-16-65-00T-RET w/ Mount Pipe	31	41.73	2.579	0.002	10043
133.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	31	36.32	2.497	0.002	5477
113.00	BXA-70063/6CFx2 w/ Mount Pipe	27	26.26	2.235	0.001	3248
60.00	2.375" OD x 4' Mount Pipe	27	7.15	1.130	0.000	2407

Maximum Tower Deflections - Design Wind

Section	Elevation	Horz.	Gov.	Tilt	Twist
No.		Deflection	Load		
	ft	in	Comb.	0	٥
L1	155 - 115.5	123.23	2	6.784	0.007
L2	119.25 - 79.25	74.65	2	5.957	0.002
L3	83.75 - 43.75	36.31	2	4.174	0.001
L4	49 - 0	12.27	2	2.318	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	۰	۰	ft
155.00	LPX310R w/ Mount Pipe	2	123.23	6.784	0.007	9696
153.00	800MHz 2X50W RRH W/FILTER	2	120.41	6.751	0.007	9696
151.00	VHLP1-23	2	117.59	6.719	0.006	9696
145.00	RRUS 11	2	109.15	6.617	0.005	4847
143.00	AM-X-CD-16-65-00T-RET w/	2	106.36	6.580	0.005	4038
	Mount Pipe					

Elevation	Appurtenance	Gov.	Deflection	Tilt	Twist	Radius of
		Load				Curvature
ft		Comb.	in	٥	0	ft
133.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	92.61	6.370	0.004	2200
113.00	BXA-70063/6CFx2 w/ Mount Pipe	2	67.01	5.704	0.002	1299
60.00	2.375" OD x 4' Mount Pipe	2	18.26	2.885	0.000	947

Compression Checks

	Pole Design Data									
Section No.	Elevation	Size	L	Lu	KI/r	F _a	Α	Actual P	Allow. Pa	Ratio P
	ft		ft	ft		ksi	in ²	K	ĸ	Pa
L1	155 - 115.5 (1)	TP29.31x22x0.25	39.50	0.00	0.0	36.00	22.51	-8.35	810.25	0.010
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	40.00	0.00	0.0	39.00	34.09	-16.61	1329.50	0.012
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	40.00	0.00	0.0	39.00	47.74	-24.21	1861.89	0.013
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	49.00	0.00	0.0	39.00	67.16	-37.90	2619.14	0.014

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}
L1	155 - 115.5 (1)	TP29.31x22x0.25	368	28.09	36.00	0.780	0	0.00	36.00	0.000
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	1105	45.92	39.00	1.177	0	0.00	39.00	0.000
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	1953	49.68	39.00	1.274	0	0.00	39.00	0.000
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	3285	49.25	39.00	1.263	0	0.00	39.00	0.000

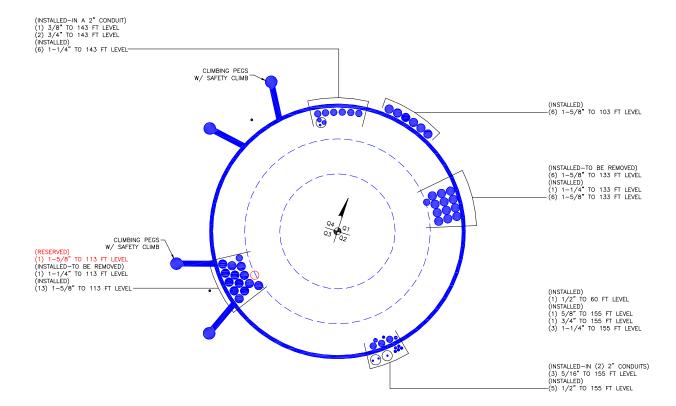
Pole Shear Design Data										
Section No.	Elevation	Size	Actual V	Actual f _v	Allow. F _v	Ratio f _v	Actual T	Actual f _{vt}	Allow. F _{vt}	Ratio f _{vt}
	ft		K	ksi	ksi	$\overline{F_{v}}$	kip-ft	ksi	ksi	F _{vt}
L1	155 - 115.5 (1)	TP29.31x22x0.25	14.88	0.66	24.00	0.055	0	0.00	24.00	0.000
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	23.08	0.68	26.00	0.052	0	0.01	26.00	0.000
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	25.70	0.54	26.00	0.041	0	0.00	26.00	0.000
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	28.56	0.43	26.00	0.033	0	0.00	26.00	0.000

Pole Interaction Design Data

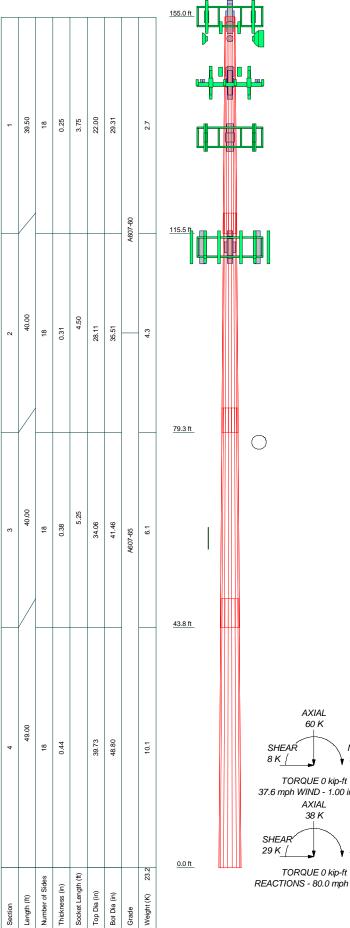
Section No.	Elevation	Ratio P	Ratio f _{bx}	Ratio f _{by}	Ratio f _v	Ratio f _{vt}	Comb. Stress	Allow. Stress	Criteria
, , , ,	ft	P_a	F_{bx}	F_{by}	$\frac{F_{v}}{F_{v}}$	F_{vt}	Ratio	Ratio	
L1	155 - 115.5 (1)	0.010	0.780	0.000	0.055	0.000	0.791	1.333	H1-3+VT 🖊
L2	115.5 - 79.25 (2)	0.012	1.177	0.000	0.052	0.000	1.191	1.333	H1-3+VT 🖊
L3	79.25 - 43.75 (3)	0.013	1.274	0.000	0.041	0.000	1.287	1.333	H1-3+VT 🖊
L4	43.75 - 0 (4)	0.014	1.263	0.000	0.033	0.000	1.277	1.333	H1-3+VT 🖊

Section Capacity Table								
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
L1	155 - 115.5	Pole	TP29.31x22x0.25	1	-8.35	1080.07	59.4	Pass
L2	115.5 - 79.25	Pole	TP35.51x28.11x0.31	2	-16.61	1772.22	89.3	Pass
L3	79.25 - 43.75	Pole	TP41.46x34.06x0.38	3	-24.21	2481.90	96.6	Pass
L4	43.75 - 0	Pole	TP48.8x39.73x0.44	4	-37.90	3491.31	95.8	Pass
							Summary	
						Pole (L3)	96.6	Pass
						RATING =	96.6	Pass

APPENDIX B BASE LEVEL DRAWING



APPENDIX C ADDITIONAL CALCULATIONS



DESIGNED APPURTENANCE LOADING

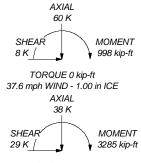
TYPE	ELEVATION	TYPE	ELEVATION
LPX310R w/ Mount Pipe	155	T-Arm Mount [TA 702-3]	143
LPX310R w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
		•	
LPX310R w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
HORIZON COMPACT	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
HORIZON COMPACT	155	KRY 112 144/1	133
HORIZON COMPACT	155	KRY 112 144/1	133
WIMAX DAP HEAD	155	KRY 112 144/1	133
WIMAX DAP HEAD	155	KRC 118 057/1 w/ Mount Pipe	133
WIMAX DAP HEAD	155	KRC 118 057/1 w/ Mount Pipe	133
APXVSPP18-C-A20 w/ Mount Pipe	155	KRC 118 057/1 w/ Mount Pipe	133
APXVSPP18-C-A20 w/ Mount Pipe	155	RRUS 11 B12	133
APXVSPP18-C-A20 w/ Mount Pipe	155	RRUS 11 B12	133
APXVTM14-C-120 w/ Mount Pipe	155	RRUS 11 B12	133
APXVTM14-C-120 w/ Mount Pipe	155	(2) 2.375" OD x 5' Mount Pipe	133
APXVTM14-C-120 w/ Mount Pipe	155	(2) 2.375" OD x 5' Mount Pipe	133
TD-RRH8x20-25	155	(2) 2.375" OD x 5' Mount Pipe	133
TD-RRH8x20-25	155	Platform Mount [LP 403-1]	133
TD-RRH8x20-25	155	ERICSSON AIR 21 B2A B4P w/ Mount	133
Platform Mount [LP 713-1]	155	Pipe	
VHLP1-23	155	ERICSSON AIR 21 B2A B4P w/ Mount	133
VHLP2.5-18	155	Pipe	
VHLP2-11	155	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	133
PCS 1900MHz 4x45W-65MHz	153	LNX-6512DS-T0M w/ Mount Pipe	113
PCS 1900MHz 4x45W-65MHz	153		113
PCS 1900MHz 4x45W-65MHz	153	LNX-6512DS-T0M w/ Mount Pipe	-
Pipe Mount [PM 601-3]	153	LNX-6512DS-T0M w/ Mount Pipe	113
800MHz 2X50W RRH W/FILTER	153	DB-T1-6Z-8AB-0Z	113
800MHz 2X50W RRH W/FILTER	153	(2) SBNHH-1D65B w/ Mount Pipe	113
800MHz 2X50W RRH W/FILTER	153	(2) SBNHH-1D65B w/ Mount Pipe	113
Pipe Mount [PM 601-3]	145	(2) SBNHH-1D65B w/ Mount Pipe	113
RRUS 11	145	RRH2X60-AWS	113
RRUS 11	145	RRH2X60-AWS	113
RRUS 11	145	RRH2X60-AWS	113
800 10121 w/ Mount Pipe	143	RRH2X60-PCS	113
800 10121 w/ Mount Pipe	143	RRH2X60-PCS	113
800 10121 w/ Mount Pipe	143	RRH2X60-PCS	113
(2) 860 10025	143	RRH2x60-700	113
(2) 860 10025	143	RRH2x60-700	113
(2) 860 10025	143	RRH2x60-700	113
(2) LGP21401	143	Platform Mount [LP 1201-1]	113
(2) LGP21401	143	BXA-70063/6CFx2 w/ Mount Pipe	113
(2) LGP21401	143	BXA-70063/6CFx2 w/ Mount Pipe	113
RRUS-11	-	BXA-70063/6CFx2 w/ Mount Pipe	113
RRUS-11	143	Side Arm Mount [SO 701-1]	60
	143	2.375" OD x 4' Mount Pipe	60
RRUS-11	143	_	•
DC6-48-60-18-8F	143		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

TOWER DESIGN NOTES

- Tower is located in Hartford County, Connecticut.
 Tower designed for a 80.0 mph basic wind in accordance with the TIA/EIA-222-F Standard.
 Tower is also designed for a 37.6 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
 Deflections are based upon a 50.0 mph wind.
 TOWER RATING: 96.6%



REACTIONS - 80.0 mph WIND

	Paul J. Ford and Company
$\square R$	250 E. Broad Street, Suite 600
	Columbus, OH 43215
	Phone: 614.221.6679
- 1	EAY: 614 448 4105

Job: 155 ft Monopole / Buckland Mall					
Project: PJF 37515-1587 / BU 876347					
Client: Crown Castle	Drawn by: Joey Meinerding	App'd:			
Code: TIA/EIA-222-F	Date: 01/07/16	Scale: NT			
Path:	SI I'VAT AND MATT 1975-45 AND 4 AND 7975 OA 4474097975-45 AND 4 AND 7975	Dwg No. E-			

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

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

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

Site Data

BU#: 876347 Site Name: Buckland Mall App #:

And	Anchor Rod Data					
Qty:	16					
Diam:	2.25	in				
Rod Material:	A615-J					
Yield, Fy:	75	ksi				
Strength, Fu:	100	ksi				
Bolt Circle:	56	in				
Anchor Spacing:	6	in				

Plate Data					
W=Side:	55	in			
Thick:	3.25	in			
Grade:	50	ksi			
Clip Distance:	10	in			

Stiffener Da	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:	48.8	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Base Reactions								
TIA Revision:	F							
Unfactored Moment, M:	3285	ft-kips						
Unfactored Axial, P:	38	kips						
Unfactored Shear, V:	29	kips						

Anchor Rod Results

TIA F --> Maximum Rod Tension 173.6 Kips
Allowable Tension: 195.0 Kips
Anchor Rod Stress Ratio: 89.1% Pass

Base Plate Results	Flexural Check
Base Plate Stress:	38.2 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	76.5% Pass

PL Ref. Data					
Yield Line (in):					
28.98					
Max PL Length:					
28.98					

Analysis date: 1/7/2016

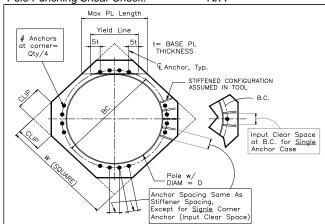
N/A - Unstiffened

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



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

Foundation Loads:

Pole weight or tower leg compression = 38 (kips)

Horizontal load at top of pier = 29 (kips)

Overturning moment at top of pier = 3285 (ft-kips)

Design criteria:

Safety factor against overturning = 2

Soil Properties:

Soil density = 105 (pcf)
Allowable soil bearing = 15 (ksf)
Depth to water table = 99 (ft)

Dimensions:

Pier shape (round or square) ("R" or "S") Pier width = (ft) 0.5 (ft) Pier height above grade = depth to bottom of footing = 10 (ft) Footing thickness = 3 (ft) Footing width = 23 (ft) Footing length = (ft) 23

Concrete:

Concrete strength = $\frac{3}{60}$ (ksi) Rebar strength = $\frac{60}{1.3}$ (ksi) ultimate load factor = $\frac{1.3}{1.3}$

Reinforcing Steel:

minimum cover over rebar = $\frac{\underline{Pad}}{3}$ inches size of pad rebar = $\frac{\#9}{3}$ bar quantity of pad rebar = $\frac{3}{3}$ (ea direction)

Reinforcing Steel:

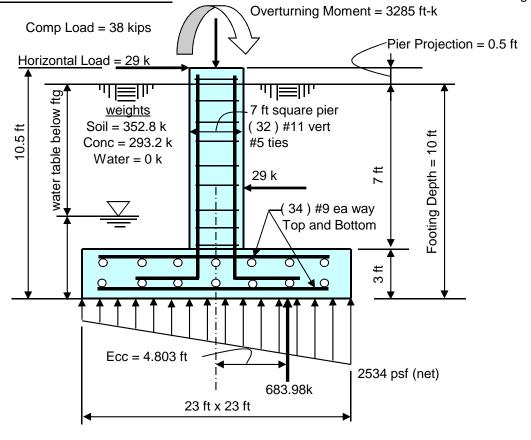
size of vert rebar in pier=

vertical rebar quantity = 32

size of pier ties = #5 bar

minimum cover over rebar = 3 inches

Total volume of concrete = 72.4 cu yd



Summary of analysis results								
Maximum Net Soil Bearing = 2.534 ksf Allowable Net Soil Bearing = 15 ksf Soil Bearing Stress Ratio = 0.17 Okay	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 35 psi Bending Shear Stress Ratio = 0.32 Okay							
Ftg Overturning Resistance = 7866 ft-kips Overturning Moment = 3285 ft-kips Required Overturning Safety Factor = 2 Overturning Safety Factor = 2.394 Ratio = 0.84 Okay	Pad Bending Moment Capacity= 4569 ft-k Pad Bending Moment = 1323 ft-k Bending Moment Stress Ratio = 0.29 OK							

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General Information:

File Name: T:\375_Crown_Castle\2016\37516-0064_876347_BUCKLAND MALL\37516...\37516-0064.002.7805.col

Project: 37516-0064.002.7805

Column: Code: ACI 318-02

Engineer: JWM Units: English

Run Option: Investigation

Slenderness: Not considered

Run Axis: X-axis

Column Type: Structural

Material Properties:

f'c = 3 ksiEc = 3122.02 ksi fy = 60 ksi Es = 29000 ksi

Ultimate strain = 0.003 in/in

Beta1 = 0.85

Section: =======

Rectangular: Width = 84 in

Depth = 84 in

Gross section area, Ag = 7056 in^2

 $Ix = 4.14893e + 006 in^4$

 $Iy = 4.14893e + 006 in^4$

rx = 24.2487 in

ry = 24.2487 in Yo = 0 in

Xo = 0 in

Reinforcement: _____

Bar Set: ASTM A615

		Diam (in)	Area (in^2) S:	ize	Diam (in)	Area	(in^2)	Si	ize	Diam (in) Area	(in^2)
#	3	0.38	0.1	 1 #	4	0.50		0.20	#		0.6	3	0.31
#	6	0.75						0.60		8	1.0)	0.79
#	9	1.13	1.0	0 #	10	1.27		1.27	#	11	1.4	1	1.56
#	14	1.69	2.2	5 #	18	2.26		4.00					

Confinement: Tied; #5 ties with #11 bars, #5 with larger bars.

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Rectangular

Pattern: All Sides Equal (Cover to transverse reinforcement)

Total steel area: As = 49.92 in^2 at rho = 0.71% (Note: rho < 1.0%)

Minimum clear spacing = 8.01 in

32 #11 Cover = 3 in

Factored Loads and Moments with Corresponding Capacities: ______

Pu Mux PhiMnx PhiMn/Mu NA depth Dt depth eps_t kip k-ft k-ft in in 38.00 4553.25 8634.73 1.896 8.71 79.67 0.02444 0.900

*** End of output ***



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

T-Mobile Existing Facility

Site ID: CT11377C

Sprint Manchester/ Slater 55 Slater Street Manchester, CT 06040

January 13, 2016

EBI Project Number: 6216000299

Site Compliance Summary							
Compliance Status:	COMPLIANT						
Site total MPE% of FCC general public allowable limit:	10.77 %						



January 13, 2016

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

Emissions Analysis for Site: CT11377C – Sprint Manchester/ Slater

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **55 Slater Street**, **Manchester**, **CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (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 1900 MHz (PCS) and 2100 MHz (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 **55 Slater Street**, **Manchester**, **CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

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



- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Ericsson AIR21 B4A/B12P** for 2100 MHz (AWS) and 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B2A/B4P** has a maximum gain of **15.9 dBd** at its main lobe. The **Ericsson AIR21 B4A/B12P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz and has a maximum gain of **13.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is **133 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

G .	_	G .	5	G .	C
Sector:	A	Sector:	В	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21	Make / Model:	Ericsson AIR21	Make / Model:	Ericsson AIR21
Make / Model:	B2A/B4P	Make / Model:	B2A/B4P	Make / Model:	B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	133	Height (AGL):	133	Height (AGL):	133
E	1900 MHz(PCS) /	E D 1-	1900 MHz(PCS) /	Engage Dan da	1900 MHz(PCS) /
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.04	Antenna B1 MPE%	1.04	Antenna C1 MPE%	1.04
Antenna #:	2	Antenna #:	2	Antenna #:	2
26.1 /26.1.1	Ericsson AIR21	361 /36 11	Ericsson AIR21	361 /36 11	Ericsson AIR21
Make / Model:	B4A/B12P	Make / Model:	B4A/B12P	Make / Model:	B4A/B12P
Gain:	15.9 / 13.6 dBd	Gain:	15.9 / 13.6 dBd	Gain:	15.9 / 13.6 dBd
Height (AGL):	133	Height (AGL):	133	Height (AGL):	133
F D 1	2100 MHz (AWS) /	E D 1	2100 MHz (AWS) /	E D 1	2100 MHz (AWS) /
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	150	Total TX Power(W):	150	Total TX Power(W):	150
ERP (W):	5,355.80	ERP (W):	5,355.80	ERP (W):	5,355.80
Antenna A2 MPE%	1.37	Antenna B2 MPE%	1.37	Antenna C2 MPE%	1.37

Site Composite MPE%				
Carrier	MPE%			
T-Mobile	2.41			
Nextel	1.10 %			
Sprint	0.34 %			
Clearwire	0.09 %			
AT&T	0.80 %			
MetroPCS	1.29 %			
Verizon Wireless	4.74 %			
Site Total MPE %:	10.77 %			

T-Mobile Sector 1 Total:	2.41 %
T-Mobile Sector 2 Total:	2.41 %
T-Mobile Sector 3 Total:	2.41 %
Site Total:	10.77 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (µW/cm²)	Frequency (MHz)	Allowable MPE (µW/cm²)	Calculated % MPE
T-Mobile 2100 MHz (AWS) UMTS	2	1167.14	133	5.20	2100	1000	0.52 %
T-Mobile 1900 MHz (PCS) GSM/UMTS	2	1167.14	133	5.20	1900	1000	0.52 %
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	133	10.41	2100	1000	1.04 %
T-Mobile 700 MHz LTE	1	687.26	133	1.53	700	467	0.33 %
						Total:	2.41 %

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Summary

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

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

T-Mobile Sector	Power Density Value (%)			
Sector 1:	2.41 %			
Sector 2:	2.41 %			
Sector 3:	2.41 %			
T-Mobile Total:	2.41 %			
Site Total:	10.77 %			
Site Compliance Status:	COMPLIANT			

The anticipated composite MPE value for this site assuming all carriers present is **10.77%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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