



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

October 19, 2015

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

RE: T-Mobile - Exempt Modification - Crown Site BU: 876321
T-Mobile Site ID: CTNH107A
Located at: 150 North Main Street, Branford, CT 06405

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of T-Mobile. T-Mobile is making modifications to certain existing sites in its Connecticut system in order to implement their 700MHz technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies (“R.C.S.A.”), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to The Honorable James B. Cosgrove, First Selectman, Town of Branford and Nancy Anderson, Irene M. Maculaitis Living Trust as Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **150 North Main Street, Branford, CT**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to T-Mobile’s operations at the site (Exhibit-3).

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

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

Melanie A. Bachman

October 19, 2015

Page 2

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

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

Sincerely,



Kimberly Myl
Real Estate Specialist

Enclosures

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

Tab 2: Exhibit-2: Structural Modification Report

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

cc: The Honorable James B. Cosgrove, First Selectman, Town of Branford
Town of Branford
1019 Main Street
Branford, CT 06405

Irene M. Maculaitis Living Trust
Attn: Nancy Anderson
52 Twin Lakes Road
North Branford, CT 06471

7220

CROWN CASTLE - ETA PROPERTY

3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

DATE 10/19/15

32-61-1110

PAY
TO THE
ORDER OF

Connecticut Siting Council

1 \$ 625.00

Six hundred twenty-five and 00/100

DOLLARS

 Security Features
Included.
Details on back.

*Mobile
zoning*



JPMorgan Chase Bank, N.A.
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VALID FOR 180 DAYS

FOR 874321 346381 CTNH107A

Wendy C. Smith

MP

⑈007220⑈ ⑆11000614⑆

464638118⑈

GENERAL NOTES:

- 1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY: PROJECT MANAGEMENT - CROWN CASTLE... 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...

SITE WORK GENERAL NOTES:

- 1. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION. 2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES...

ELECTRICAL INSTALLATION NOTES:

- 1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES. 2. CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT...

CONCRETE AND REINFORCING STEEL NOTES:

- 1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE. 2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS...

STRUCTURAL STEEL NOTES:

- 1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM-A-36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. 2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC...

CONSTRUCTION NOTES:

- 1. FIELD VERIFICATION: CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T-MOBILE ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED. 2. COORDINATION OF WORK: CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT...



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



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

CTNH107A
BRANFORD BANM
TOWER

CONSTRUCTION DRAWINGS

Table with 2 columns: Date, Description. Row 1: 10/19/15 ISSUED AS FINAL. Row 2: 10/16/15 ISSUED FOR REVIEW.



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



DRAWN BY: NRC

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

JOB NUMBER: 50074614

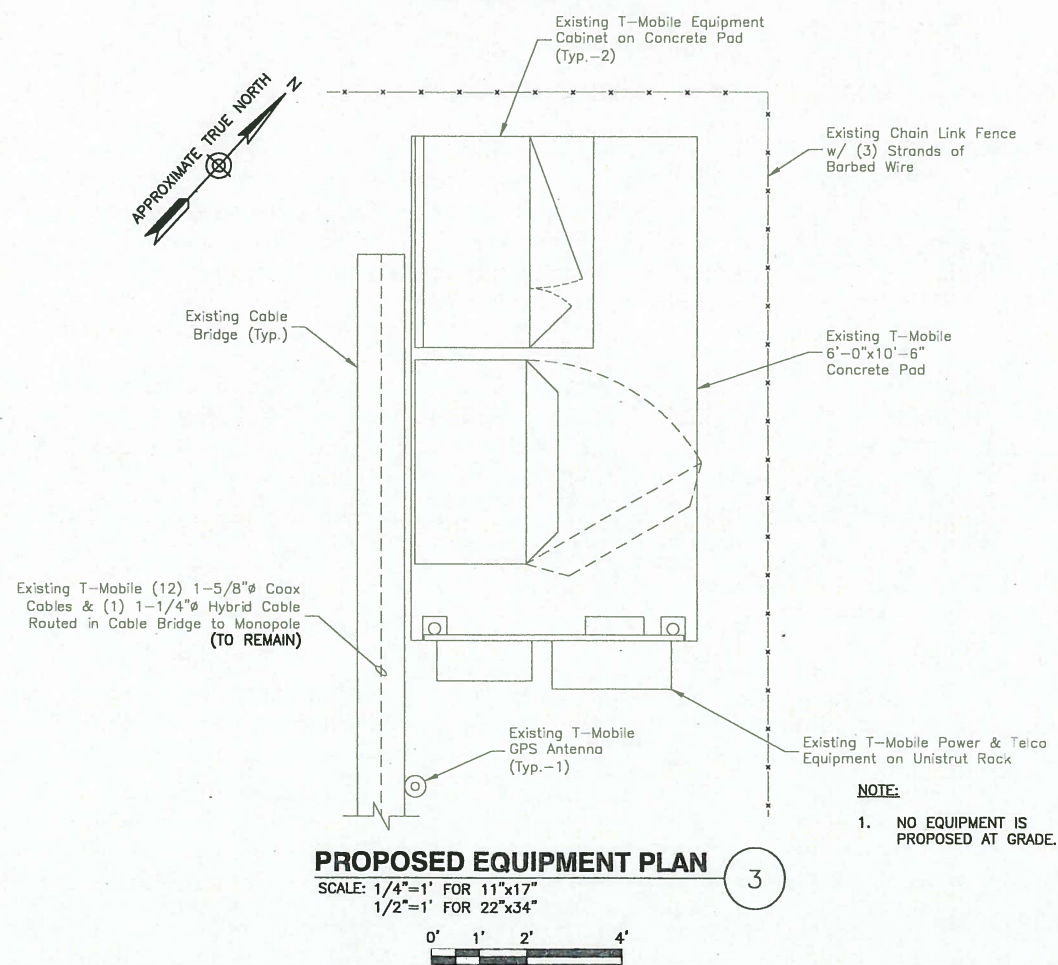
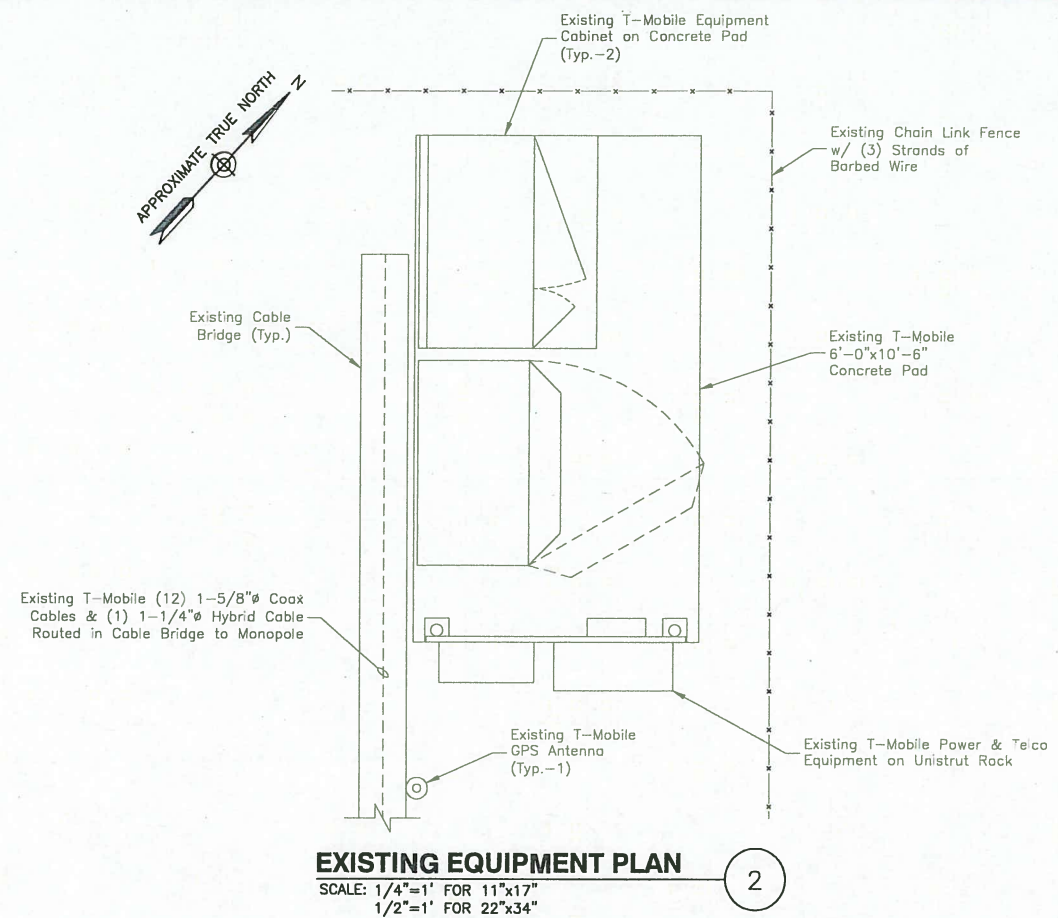
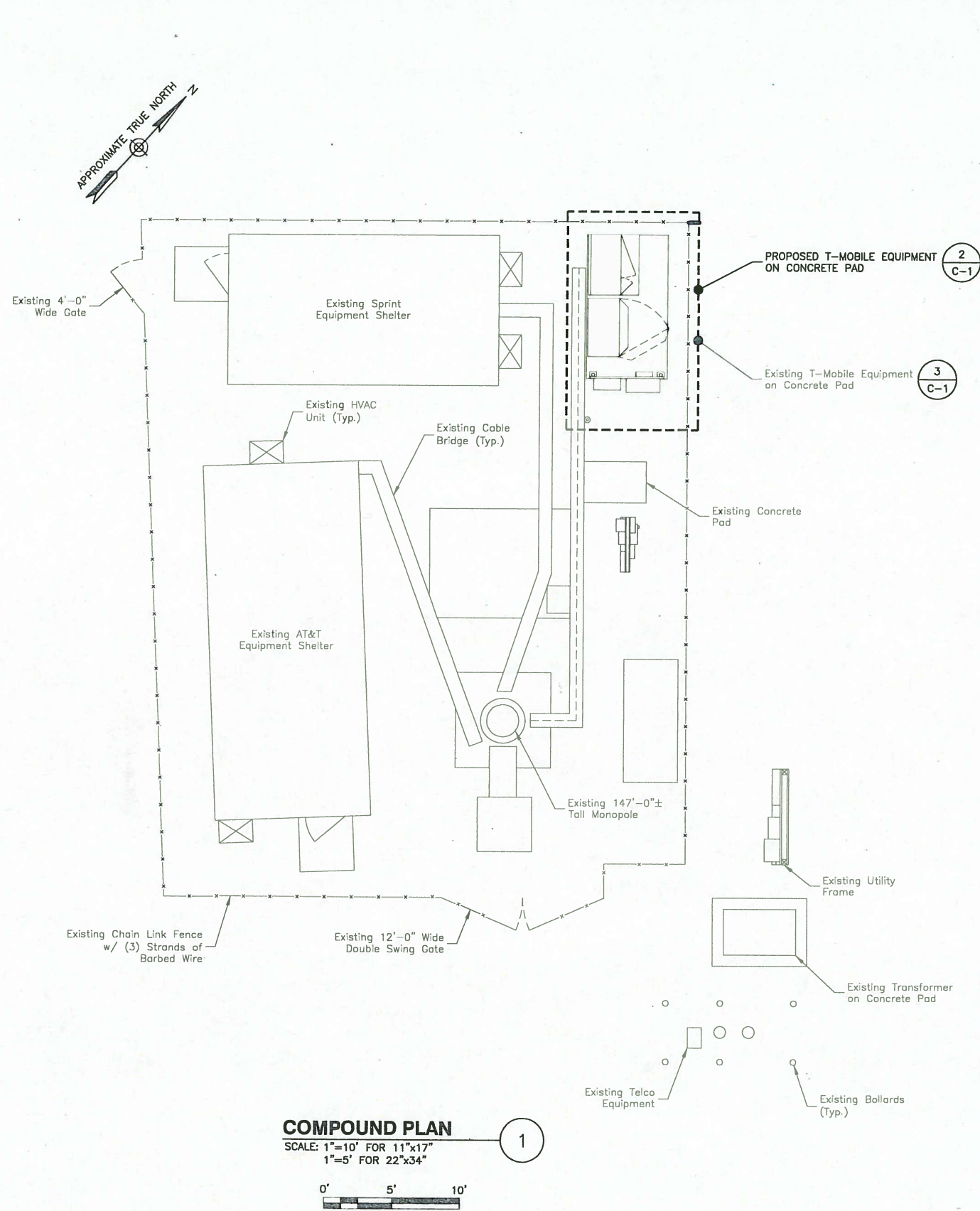
SITE ADDRESS:

150 NORTH MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER



- NOTES:**
- NORTH ARROW SHOWN AS APPROXIMATE.
 - NOT ALL INFORMATION IS SHOWN FOR CLARITY.
 - ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY MORRISON HERSHFELD DATED SEPTEMBER 28, 2015.

T-Mobile

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

CROWN CASTLE

CROWN CASTLE
 3 CORPORATE PARK DRIVE, SUITE 101
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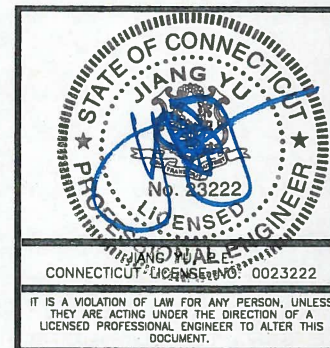
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 BRANFORD BANM
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CONSTRUCTION DRAWINGS

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150 NORTH MAIN STREET
 BRANFORD, CT 06405
 NEW HAVEN COUNTY

SHEET TITLE

COMPOUND PLAN &
 EQUIPMENT PLANS

SHEET NUMBER

C-1

**CTNH107A
BRANFORD BANM
TOWER**

CONSTRUCTION DRAWINGS

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JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222
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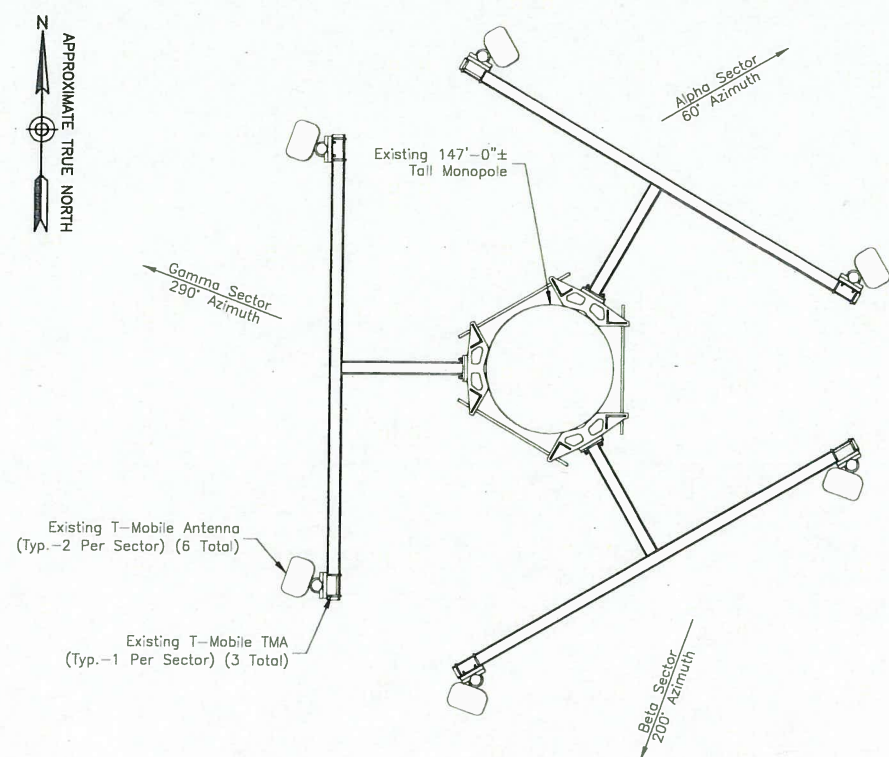
SITE ADDRESS:

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BRANFORD, CT 06405
NEW HAVEN COUNTY

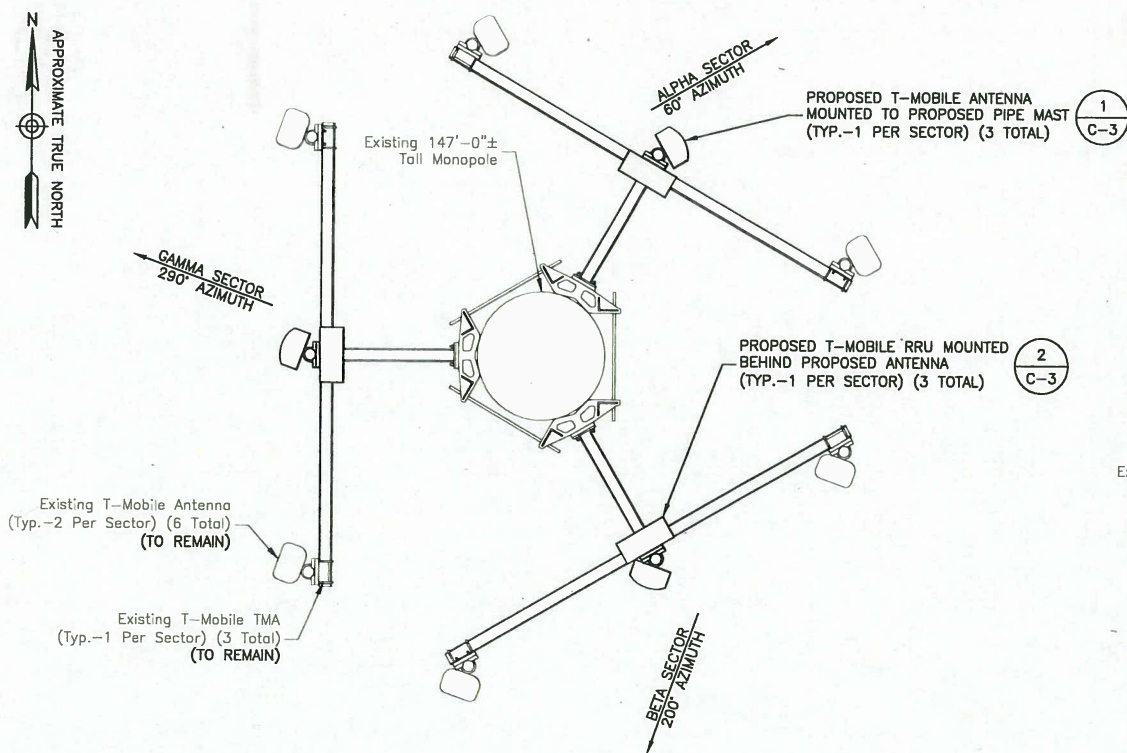
SHEET TITLE

ANTENNA LAYOUTS &
ELEVATIONS

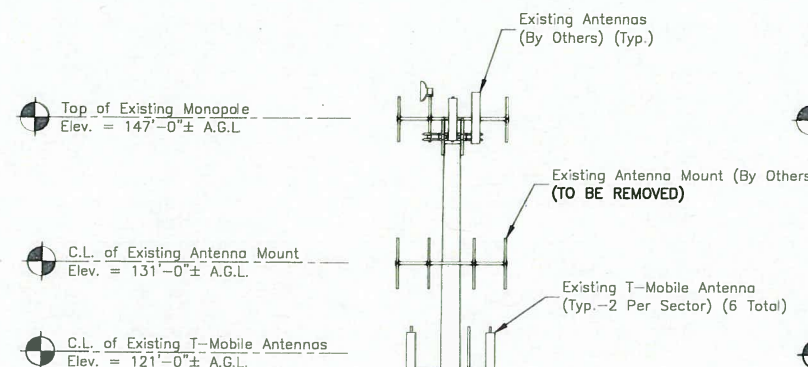
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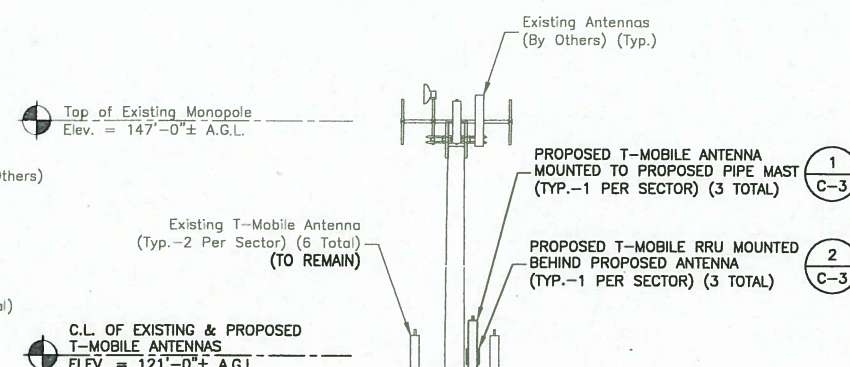
EXISTING ANTENNA LAYOUT
SCALE: N.T.S. (1)



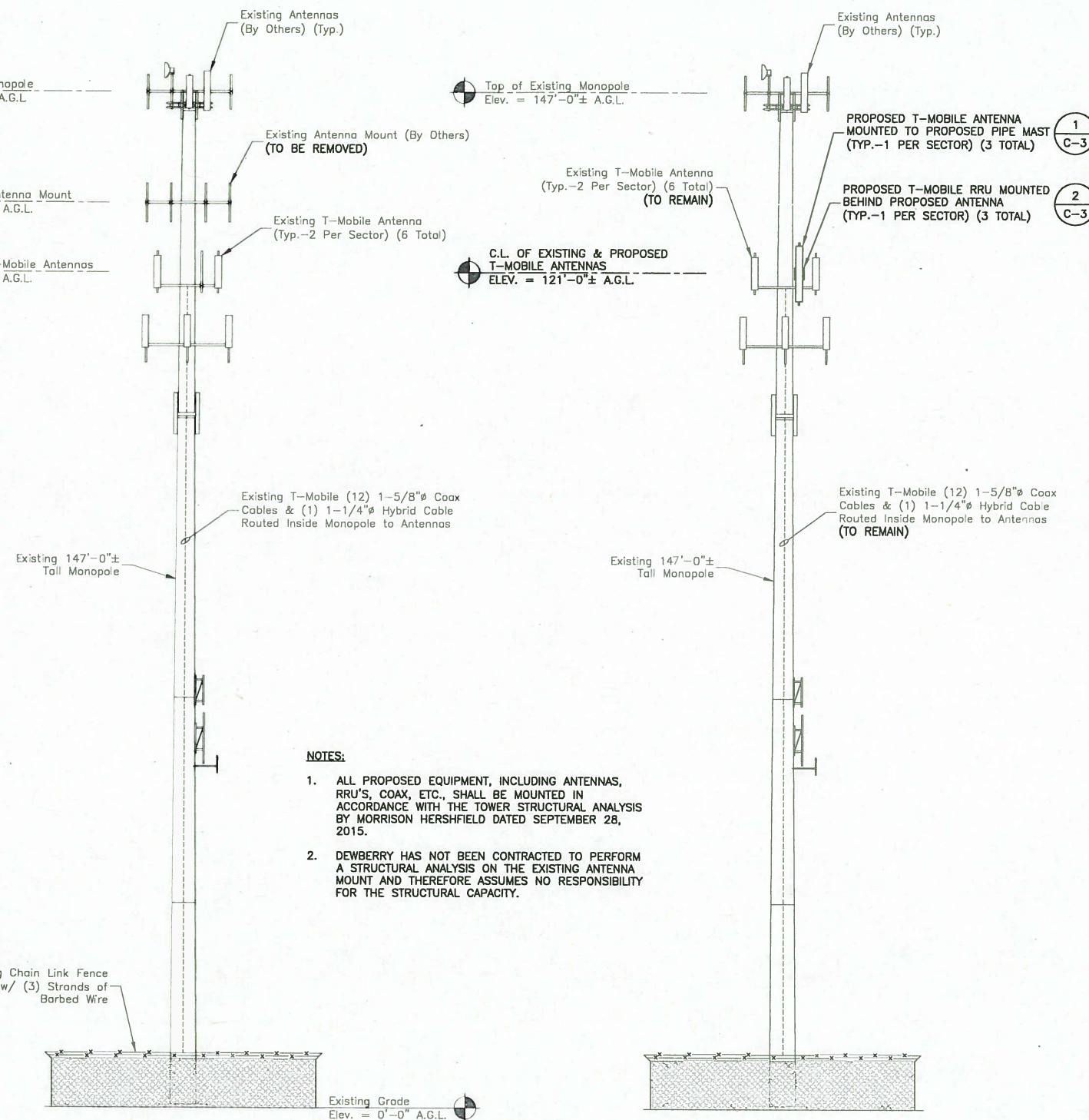
PROPOSED ANTENNA LAYOUT
SCALE: N.T.S. (2)



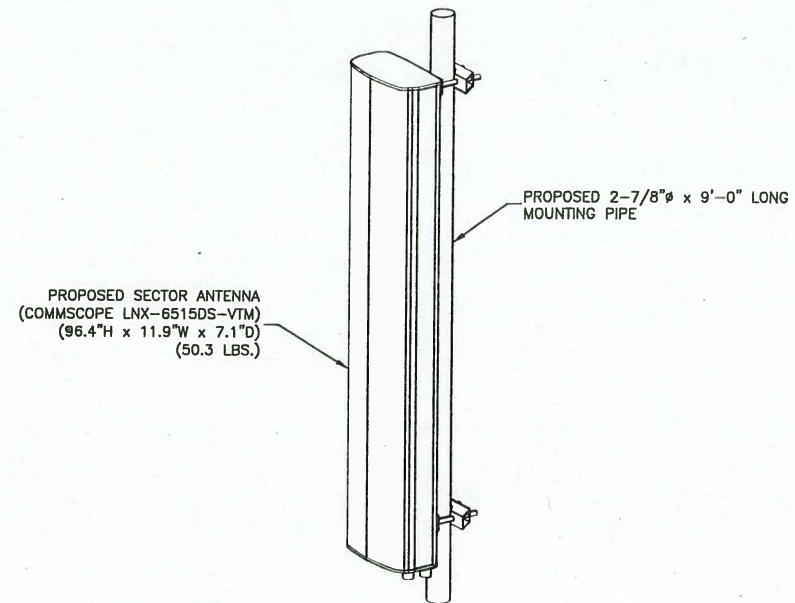
EXISTING ELEVATION
SCALE: 3/64"=1' FOR 11"x17"
3/32"=1' FOR 22"x34"
0' 8' 16' 24'
(3)



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



- NOTES:**
1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY MORRISON HERSHFIELD DATED SEPTEMBER 28, 2015.
 2. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.

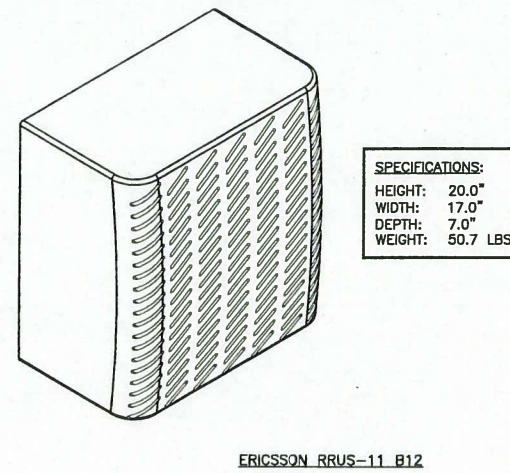


NOTES:

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

ISOMETRIC ANTENNA DETAIL
SCALE: N.T.S.

1



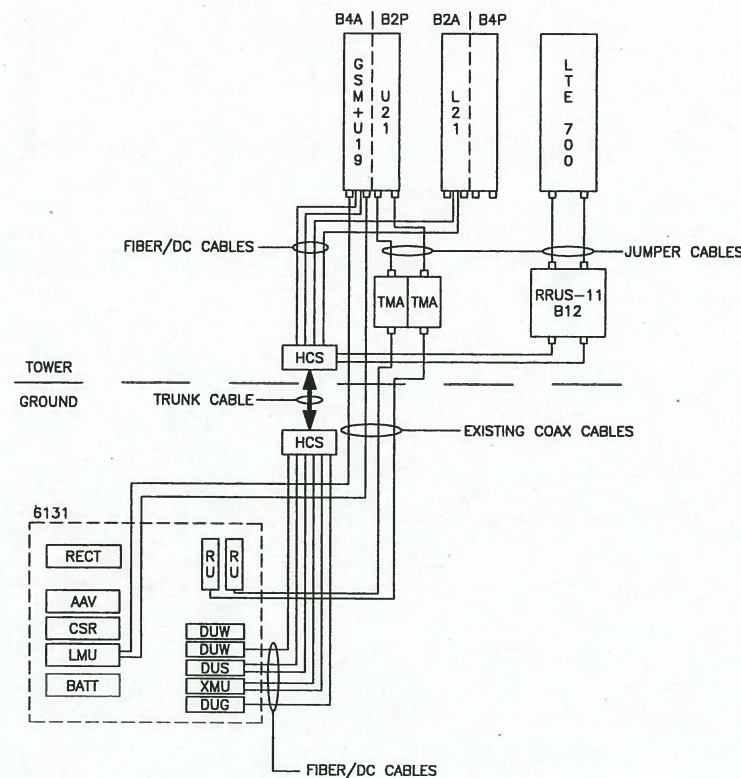
ERICSSON RRUS-11 B12

RRU NOTES:

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

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

2



SITE CONFIGURATION 702Cu

SCALE: N.T.S.

3

DESIGN CONFIGURATION								
ANTENNAS	EXISTING	PROPOSED	COAX		COAX LENGTH	EXISTING HYBRID	RRH	
			EXISTING	PROPOSED			EXISTING	PROPOSED
ALPHA	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN					-	-
	-	COMMSCOPE LNX-6515DS-VTM	(4) 1-5/8"φ	-	171'-0"		-	RRUS-11 B12
BETA	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN					-	-
	-	COMMSCOPE LNX-6515DS-VTM	(4) 1-5/8"φ	-	171'-0"	(1) 1-1/4"φ @ 171'-0"	-	RRUS-11 B12
GAMMA	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN					-	-
	-	COMMSCOPE LNX-6515DS-VTM	(4) 1-5/8"φ	-	171'-0"		-	RRUS-11 B12
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN					-	-

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**CTNH107A
BRANFORD BANM
TOWER**

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PARSIPPANY, NJ 07054
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SITE ADDRESS:

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BRANFORD, CT 06405
NEW HAVEN COUNTY

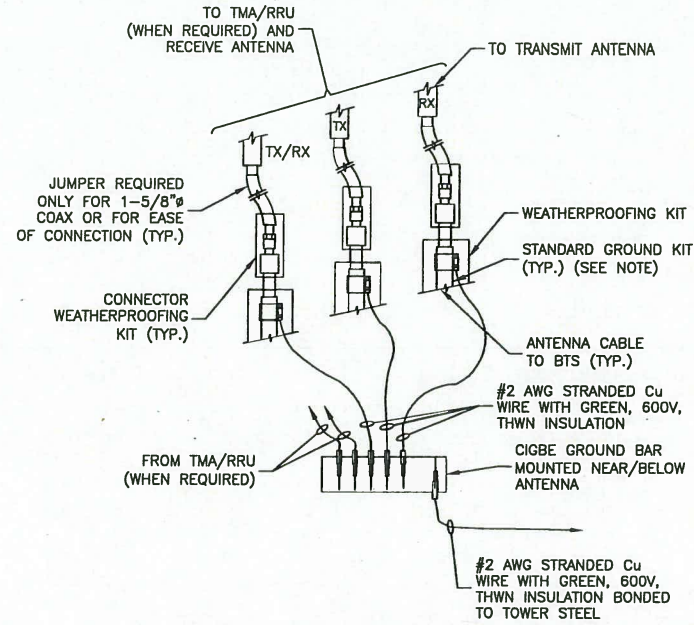
SHEET TITLE

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.
3. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. USE OF OTHER METHODS MUST BE PRE-APPROVED BY THE ENGINEER IN WRITING.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS ON TOWER SITES AND 10 OHMS OR LESS ON ROOFTOP SITES. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.
5. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
6. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
7. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO TRANSMISSION EQUIPMENT.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.
11. EACH INTERIOR TRANSMISSION CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH 6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRE UNLESS NOTED OTHERWISE IN THE DETAILS. EACH OUTDOOR CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER WIRE UNLESS NOTED OTHERWISE IN THE DETAILS.
12. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
13. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM T-MOBILE MARKET REPRESENTATIVE.
14. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTOR'S STRUCTURAL ENGINEER.
15. ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.
16. ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTORS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP TRANSMISSION EQUIPMENT AND STRUCTURAL STEEL.
17. COAX BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO-HOLE MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.
18. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
19. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
20. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
21. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
22. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.



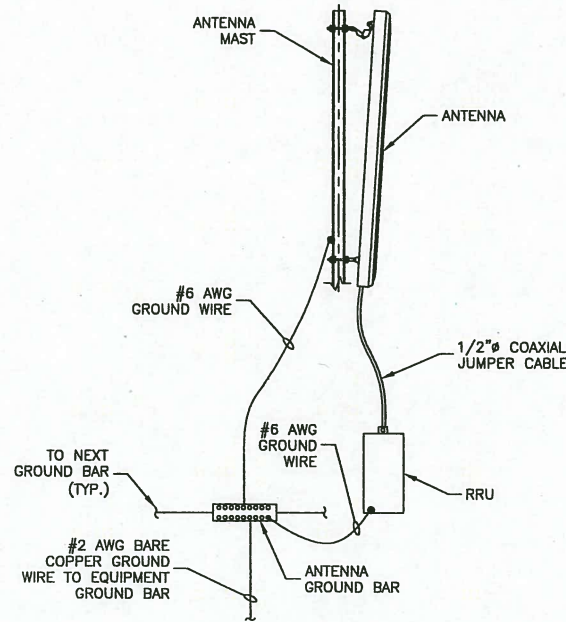
NOTE:

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

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)

SCALE: N.T.S.

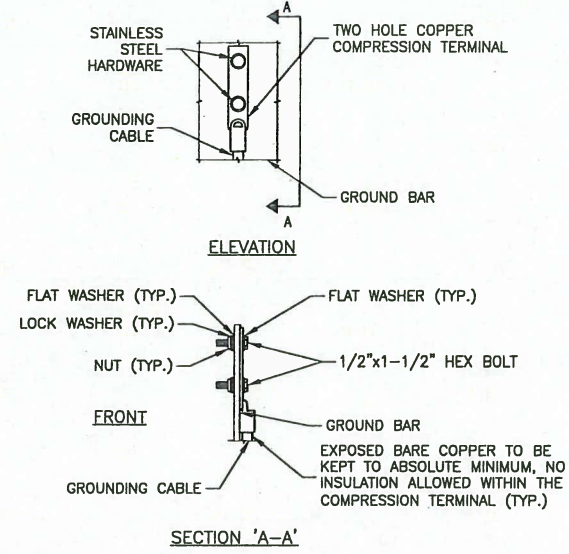
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TYPICAL ANTENNA GROUNDING DETAIL

SCALE: N.T.S.

3



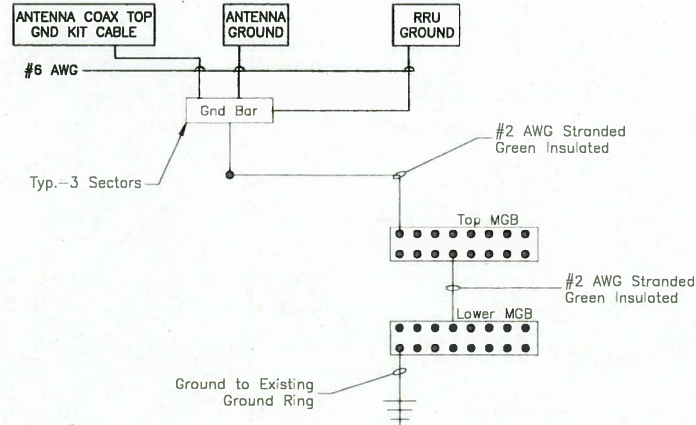
NOTES:

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

TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL

SCALE: N.T.S.

2



NOTES:

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

SCHEMATIC GROUNDING DIAGRAM

SCALE: N.T.S.

4

T-Mobile

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4 SYLVAN WAY
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STATE OF CONNECTICUT
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JOB NUMBER:	50074614
SITE ADDRESS:	

150 NORTH MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY

SHEET TITLE

GROUNDING NOTES
& DETAILS

SHEET NUMBER



MORRISON HERSHFIELD

Morrison Hershfield
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
(770) 379-8500

Date: **October 09, 2015**

Ms. Holly Haas
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Subject: Structural Analysis Report

Carrier Designation:	T-Mobile Co-Locate	
	Carrier Site Number:	CTNH107A
	Carrier Site Name:	NH107/Global/Cherry Hill
Crown Castle Designation:	Crown Castle BU Number:	876321
	Crown Castle Site Name:	Branford Banm Tower
	Crown Castle JDE Job Number:	346381
	Crown Castle Work Order Number:	1132873
	Crown Castle Application Number:	310056 Rev. 3
Engineering Firm Designation:	Morrison Hershfield Project Number:	CN4-479R1 / 6160004
Site Data:	150 North Main Street, Branford, New Haven County, CT 06405	
	Latitude 41° 17' 19", Longitude -72° 48' 49.9"	
	147 Foot - Monopole Tower	

Dear Ms. Haas,

Morrison Hershfield 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 833880, in accordance with application 310056, revision 3.

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

LC5: Existing + Proposed for current applicant	Sufficient Capacity
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.	

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

We at *Morrison Hershfield* 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:



G. Lance Cooke, P. E. (CT License No. PEN.0028133)
Senior Engineer

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1) INTRODUCTION

This tower is a 147 ft Summit monopole tower designed by Paul J. Ford and Company, in March of 1999. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

Multiple modifications have been performed for this tower by Paul J. Ford and Company in 2009 and 2012 and by Aero Solutions in 2013. Modifications consisted of addition of channel reinforcement, transition stiffeners, anchor bolts and step pegs with ladder plates. All these modifications have been considered in this analysis based on the Post Modification Inspection Reports by Paul J. Ford and Company, Tower Engineering Professionals and SGS.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 38 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
119.0	121.0	3	Andrew	LNx-6515DS-VTM w/ pipe mount	-	-	-
		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
147.0	149.0	1	Andrew	VHLP2-18	6 3	1/2 1-1/4	1
		2	Dragonwave	A-ANT-23G-2-C			
	147.0	3	RFS / Celwave	APXVTM14-C-120 w/ pipe mount			
		2	RFS / Celwave	APXVSP18-C-A20 w/ pipe mount			
		1	Powerwave Technologies	P40-16-XLPP-RR-A w/ Mount Pipe			
		3	Alcatel Lucent	TD-RRH8x20-25			
		9	RFS / Celwave	ACU-A20-N			
		1	-	Platform Mount [LP 1201-1]			
145.0	146.0	3	Alcatel Lucent	800 External Notch Filter	-	-	1
		3	Alcatel Lucent	800MHz RRH			
	145.0	3	-	Side Arm Mount [SO 102-1]			
	143.0	3	Alcatel Lucent	1900MHz RRH (65MHz)			
131.0	131.0	1	-	Platform Mount [LP 1201-1]	-	-	2
119.0	122.0	3	Ericsson	KRY 112 144/1	12 1	1-5/8 1-1/4	1
	121.0	3	Ericsson	AIR 21 B2A B4P w/ pipe mount			
		3	Ericsson	AIR 21 B4A B2P w/ pipe mount			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
119.0	119.0	3	-	T-Arm Mount [TA 602-1]	-	-	1
		-	-	-	1	3/8	2
110.0	113.0	1	KMW Communications	AM-X-CD-14-65-00T-RET w/ pipe mount	12 2 1 1	1-1/4 5/8 3/8 2C	1
		2	Ericsson	RRUS-11			
	112.0	6	Powerwave Technologies	7770.00 w/ pipe mount			
		2	Kathrein	800-10764 w/ pipe mount			
		4	Ericsson	RRUS-11			
		12	Powerwave Technologies	LGP2140X			
		6	Powerwave Technologies	7020.00			
	1	Raycap	DC6-48-60-18-8F				
	110.0	1	-	Platform Mount [LP 1201-1]			
100.0	100.0	3	RFS / Celwave	APXV18-206517S-C w/ pipe mount	6	1-5/8	1
60.0	60.0	1	-	Side Arm Mount [SO 309-1]	-	-	1
53.0	54.0	1	GPS	GPS_A	1	1/2	1
	53.0	1	-	Side Arm Mount [SO 701-1]			
49.0	50.0	1	Alcatel Lucent	KS24019-L112A	1	1/2	1
	49.0	1	-	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing equipment that is to remain on the tower.
- 2) The existing equipment is to be removed and has not been considered in the calculations for this analysis.

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
147.0	147.0	1	-	5/8" Lightning Rod	-	-
		12	Decibel	DB980H PCS		
		1	-	14' Low Profile Platform		
130.0	130.0	12	Decibel	DB980H PCS	-	-
		1	-	14' Low Profile Platform		
110.0	110.0	12	Allgon	7129.16	-	-
		1	-	14' Low Profile Platform		
90.0	90.0	2	-	PG100F0093	-	-
		1	-	PG1N0F0091		
		3	-	6' Clamp Stiff Arm		
50.0	50.0	1	-	GPS Antenna w/ Mount	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P. E., P. C., Dated 10/08/1996	2135657	CCISITES
4-POST-MODIFICATION INSPECTION	Paul J. Ford and Company, Job # 41709-0058, Dated 06/15/2009	2448190	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals, Inc., Job # 128359, Dated 03/06/2013	3890848	CCISITES
4-POST-MODIFICATION INSPECTION	Sinnott Gering and Schmitt Towers, Inc., Job # 130357, Dated 12/09/2013	4699667	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Paul J. Ford and Company, Job # 29299-111, Dated 03/15/1999	1613620	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Paul J. Ford and Company, Job # 29299-111, Dated 03/15/1999	1614568	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford and Company, Job # A41709-0058, Dated 05/08/2009	2431042	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford and Company, Job # 004120582, Dated 09/06/2012	3316256	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Aero Solutions LLC, Dated 07/23/2013	4988798	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Paul J. Ford and Company, Job # 37513-2417 R2, Dated 03/28/2014	4762596	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Morrison Hershfield, Job # CN4-479, Dated 09/28/2015	5911632	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) The tower and structures were built in accordance with the manufacturer's specifications and applicable ANSI/TIA/EIA standards.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) The foundation was properly designed and constructed for the original design loads.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
147 - 137	Pole	TP23.75x22x0.25	Pole	15.1	Pass
137 - 127	Pole	TP25.5x23.75x0.25	Pole	28.2	Pass
127 - 117	Pole	TP27.25x25.5x0.25	Pole	42.9	Pass
117 - 107	Pole	TP29x27.25x0.25	Pole	63.3	Pass
107 - 103.25	Pole	TP30.313x29x0.25	Pole	71.4	Pass
103.25 - 93.25	Pole	TP30.907x29.157x0.3125	Pole	70.0	Pass
93.25 - 83.25	Pole	TP32.657x30.907x0.3125	Pole	83.0	Pass
83.25 - 73.25	Pole	TP34.406x32.657x0.3125	Pole	94.0	Pass
73.25 - 69.58	Pole	TP35.048x34.406x0.3125	Pole	97.6	Pass
69.58 - 69.33	Pole + Reinf.	TP35.092x35.048x0.4375	Reinf. 3 Tension Rupture	82.9	Pass
69.33 - 63.75	Pole + Reinf.	TP36.9x35.092x0.4313	Reinf. 3 Tension Rupture	87.9	Pass
63.75 - 58	Pole	TP36.45x35.444x0.375	Pole	93.7	Pass
58 - 57.83	Pole	TP36.479x36.45x0.375	Pole	93.8	Pass
57.83 - 57.58	Pole + Reinf.	TP36.523x36.479x0.4375	Reinf. 5 Tension Rupture	91.6	Pass
57.58 - 50.58	Pole + Reinf.	TP37.748x36.523x0.4375	Reinf. 5 Tension Rupture	96.8	Pass
50.58 - 50.33	Pole + Reinf.	TP37.792x37.748x0.55	Reinf. 2 Tension Rupture	80.7	Pass
50.33 - 50.17	Pole + Reinf.	TP37.821x37.792x0.55	Reinf. 2 Tension Rupture	80.8	Pass
50.17 - 49.92	Pole + Reinf.	TP37.865x37.821x0.4875	Reinf. 2 Tension Rupture	89.5	Pass
49.92 - 39.92	Pole + Reinf.	TP39.614x37.865x0.4875	Reinf. 2 Tension Rupture	96.0	Pass
39.92 - 34.5	Pole + Reinf.	TP41.481x39.614x0.4813	Reinf. 2 Tension Rupture	99.2	Pass
34.5 - 28.25	Pole + Reinf.	TP40.906x39.812x0.5188	Reinf. 4 Tension Rupture	95.1	Pass
28.25 - 24.08	Pole + Reinf.	TP41.635x40.906x0.5125	Reinf. 4 Tension Rupture	97.1	Pass
24.08 - 23.83	Pole + Reinf.	TP41.679x41.635x0.625	Reinf. 1 Tension Rupture	85.9	Pass
23.83 - 13.83	Pole + Reinf.	TP43.429x41.679x0.6125	Reinf. 1 Tension Rupture	90.1	Pass
13.83 - 3.83	Pole + Reinf.	TP45.179x43.429x0.6	Reinf. 1 Tension Rupture	94.0	Pass
3.83 - 0	Pole + Reinf.	TP45.85x45.179x0.6	Reinf. 1 Tension Rupture	95.4	Pass
				Summary	
			Pole	97.6	Pass
			Reinforcement	99.2	Pass
			Overall	99.2	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	94.5	Pass
1	Base Plate	0	76.8	Pass
1	Foundation Bearing	0	93.0	Pass
1	Foundation Overturning	0	95.7	Pass
Structure Rating (max from all components) =				99.2%

Notes:

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

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A
TNXTOWER OUTPUT

DESIGNED APPURTENANCE LOADING

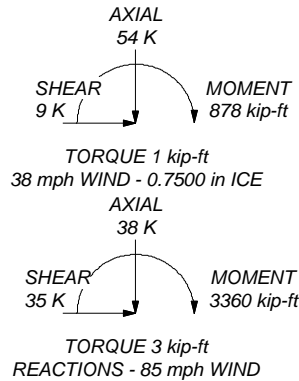
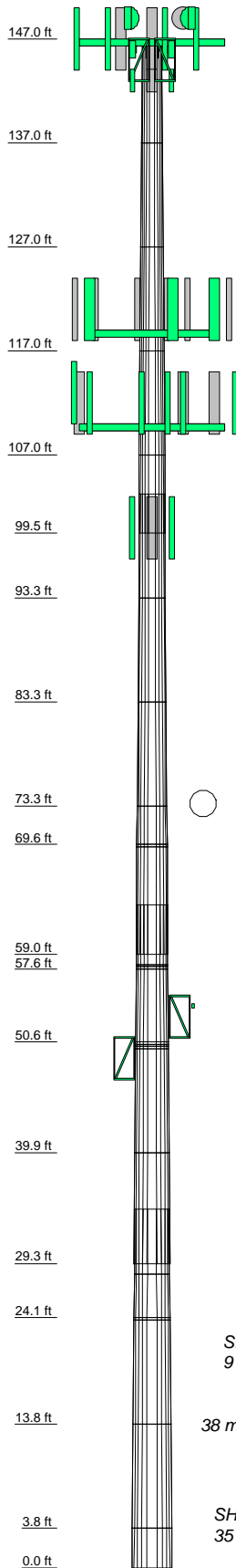
TYPE	ELEVATION	TYPE	ELEVATION
APXVSP18-C-A20 w/ pipe mount	147	KRY 112 144/1	119
APXVSP18-C-A20 w/ pipe mount	147	T-Arm Mount [TA 602-1]	119
APXVTM14-C-120 w/ pipe mount	147	T-Arm Mount [TA 602-1]	119
APXVTM14-C-120 w/ pipe mount	147	LNx-6515DS-VTM w/ pipe mount	119
APXVTM14-C-120 w/ pipe mount	147	LNx-6515DS-VTM w/ pipe mount	119
P40-16-XLPP-RR-A w/ Mount Pipe	147	LNx-6515DS-VTM w/ pipe mount	119
(3) ACU-A20-N	147	LNx-6515DS-VTM w/ pipe mount	119
(3) ACU-A20-N	147	RRUS 11 B12	119
(3) ACU-A20-N	147	RRUS 11 B12	119
TD-RRH8x20-25	147	RRUS 11 B12	119
TD-RRH8x20-25	147	AIR 21 B2A B4P w/ pipe mount	119
TD-RRH8x20-25	147	AIR 21 B2A B4P w/ pipe mount	119
(2) 5' x 2" Pipe Mount	147	AIR 21 B2A B4P w/ pipe mount	119
(3) 5' x 2" Pipe Mount	147	800-10764 w/ pipe mount	110
(3) 5' x 2" Pipe Mount	147	800-10764 w/ pipe mount	110
Platform Mount [LP 1201-1]	147	AM-X-CD-14-65-00T-RET w/ pipe mount	110
A-ANT-23G-2-C	147	(2) 7020.00	110
A-ANT-23G-2-C	147	(2) 7020.00	110
VHLP2-18	147	(2) 7020.00	110
1900MHz RRH (65MHz)	145	(4) LGP2140X	110
1900MHz RRH (65MHz)	145	(4) LGP2140X	110
1900MHz RRH (65MHz)	145	(4) LGP2140X	110
800 External Notch Filter	145	(2) RRUS-11	110
800 External Notch Filter	145	(2) RRUS-11	110
800 External Notch Filter	145	(2) RRUS-11	110
6' x 2" Mount Pipe	145	DC6-48-60-18-8F	110
6' x 2" Mount Pipe	145	Platform Mount [LP 1201-1]	110
6' x 2" Mount Pipe	145	(2) 7770.00 w/ pipe mount	110
Side Arm Mount [SO 102-1]	145	(2) 7770.00 w/ pipe mount	110
Side Arm Mount [SO 102-1]	145	(2) 7770.00 w/ pipe mount	110
Side Arm Mount [SO 102-1]	145	APXV18-206517S-C w/ pipe mount	100
800MHz RRH	145	APXV18-206517S-C w/ pipe mount	100
800MHz RRH	145	APXV18-206517S-C w/ pipe mount	100
800MHz RRH	145	Side Arm Mount [SO 309-1]	60
AIR 21 B4A B2P w/ pipe mount	119	GPS_A	53
AIR 21 B4A B2P w/ pipe mount	119	Side Arm Mount [SO 701-1]	53
AIR 21 B4A B2P w/ pipe mount	119	Side Arm Mount [SO 701-1]	49
KRY 112 144/1	119	KS24019-L112A	49
KRY 112 144/1	119		

MATERIAL STRENGTH


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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98%



Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
Length (ft)	10'	10'	10'	10'	76"	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'		
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12		
Thickness (in)	0.2500	0.2500	0.2500	0.2500	0.2500	0.3125	0.3125	0.3125	0.3125	0.3125	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.4313	0.6000		
Socket Length (ft)					39'						49'																	
Top Dia (in)	22.0000	23.7501	25.5002	27.2503	29.0004	29.1567	30.9066	30.9066	32.6565	34.4064	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	41.6790	43.4291	
Bot Dia (in)	23.7501	25.5002	27.2503	29.0004	30.3130	30.9066	32.6565	34.4064	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	35.0918	41.6790	43.4291
Grade																												
Weight (K)	0.6	0.7	0.7	0.8	0.6	1.0	1.1	1.1	1.1	1.1	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7



Morrison Hershfield
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
Phone: (770) 379-8500
FAX: (770) 379-8501

Job: **CN4-479R1 / 6160004**

Project: **876321 / Branford Bann Tower**

Client: **Crown Castle USA** | Drawn by: **KSH** | App'd: _____

Code: **TIA/EIA-222-F** | Date: **10/09/15** | Scale: **NTS**

Path: _____ | Dwg No. **E-1**

Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in New Haven County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

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 Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Apurt. 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 <div style="background-color: #e0e0e0; text-align: center; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	---	--

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	147'-137'	10'	0'	12	22.0000	23.7501	0.2500	1.0000	A607-60 (60 ksi)
L2	137'-127'	10'	0'	12	23.7501	25.5002	0.2500	1.0000	A607-60 (60 ksi)
L3	127'-117'	10'	0'	12	25.5002	27.2503	0.2500	1.0000	A607-60 (60 ksi)
L4	117'-107'	10'	0'	12	27.2503	29.0004	0.2500	1.0000	A607-60 (60 ksi)
L5	107'-99'6"	7'6"	3'9"	12	29.0004	30.3130	0.2500	1.0000	A607-60 (60 ksi)
L6	99'6"-93'3"	10'	0'	12	29.1567	30.9066	0.3125	1.2500	A607-65 (65 ksi)
L7	93'3"-83'3"	10'	0'	12	30.9066	32.6565	0.3125	1.2500	A607-65 (65 ksi)
L8	83'3"-73'3"	10'	0'	12	32.6565	34.4064	0.3125	1.2500	A607-65 (65 ksi)
L9	73'3"-69'6-31/32"	3'8-1/32"	0'	12	34.4064	35.0480	0.3125	1.2500	A607-65 (65 ksi)
L10	69'6-31/32"-69'3-31/32"	3"	0'	12	35.0480	35.0918	0.4375	1.7500	A607-65 (65 ksi)
L11	69'3-31/32"-59'	10'3-31/32"	4'9"	12	35.0918	36.9000	0.4313	1.7250	A607-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L12	59'-58'	5'9"	0'	12	35.4438	36.4500	0.3750	1.5000	(65 ksi) A607-65
L13	58'-57'9-31/32"	2-1/32"	0'	12	36.4500	36.4792	0.3750	1.5000	(65 ksi) A607-65
L14	57'9-31/32"- 57'6-31/32"	3"	0'	12	36.4792	36.5229	0.4375	1.7500	(65 ksi) A607-65
L15	57'6-31/32"- 50'6-31/32"	7'	0'	12	36.5229	37.7479	0.4375	1.7500	(65 ksi) A607-65
L16	50'6-31/32"- 50'3-31/32"	3"	0'	12	37.7479	37.7916	0.5500	2.2000	(65 ksi) A607-65
L17	50'3-31/32"- 50'2-1/32"	2-1/32"	0'	12	37.7916	37.8208	0.5500	2.2000	(65 ksi) A607-65
L18	50'2-1/32"- 49'11-1/32"	3"	0'	12	37.8208	37.8645	0.4875	1.9500	(65 ksi) A607-65
L19	49'11-1/32"- 39'11-1/32"	10'	0'	12	37.8645	39.6144	0.4875	1.9500	(65 ksi) A607-65
L20	39'11-1/32"- 29'3"	10'8-1/32"	5'3"	12	39.6144	41.4810	0.4813	1.9250	(65 ksi) A607-65
L21	29'3"-28'3"	6'3"	0'	12	39.8123	40.9061	0.5188	2.0750	(65 ksi) A607-65
L22	28'3"- 24'31/32"	4'2-1/32"	0'	12	40.9061	41.6353	0.5125	2.0500	(65 ksi) A607-65
L23	24'31/32"-23'9- 31/32"	3"	0'	12	41.6353	41.6790	0.6250	2.5000	(65 ksi) A607-65
L24	23'9-31/32"- 13'9-31/32"	10'	0'	12	41.6790	43.4291	0.6125	2.4500	(65 ksi) A607-65
L25	13'9-31/32"- 3'9-31/32"	10'	0'	12	43.4291	45.1791	0.6000	2.4000	(65 ksi) A607-65
L26	3'9-31/32"-0'	3'9-31/32"		12	45.1791	45.8500	0.6000	2.4000	(65 ksi) A607-65

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	22.7761	17.5087	1057.2060	7.7865	11.3960	92.7699	2142.1860	8.6173	5.2260	20.904
	24.5879	18.9176	1333.4946	8.4130	12.3026	108.3917	2702.0215	9.3107	5.6950	22.78
L2	24.5879	18.9176	1333.4946	8.4130	12.3026	108.3917	2702.0215	9.3107	5.6950	22.78
	26.3998	20.3264	1654.1574	9.0396	13.2091	125.2285	3351.7714	10.0040	6.1641	24.656
L3	26.3998	20.3264	1654.1574	9.0396	13.2091	125.2285	3351.7714	10.0040	6.1641	24.656
	28.2116	21.7353	2022.4992	9.6661	14.1157	143.2805	4098.1317	10.6974	6.6331	26.532
L4	28.2116	21.7353	2022.4992	9.6661	14.1157	143.2805	4098.1317	10.6974	6.6331	26.532
	30.0234	23.1441	2441.8246	10.2927	15.0222	162.5475	4947.7986	11.3908	7.1021	28.408
L5	30.0234	23.1441	2441.8246	10.2927	15.0222	162.5475	4947.7986	11.3908	7.1021	28.408
	31.3823	24.2007	2791.7645	10.7626	15.7021	177.7952	5656.8718	11.9109	7.4539	29.816
L6	30.8646	29.0245	3082.2497	10.3262	15.1032	204.0796	6245.4735	14.2850	6.9765	22.325
	31.9969	30.7853	3677.9444	10.9527	16.0096	229.7334	7452.5126	15.1516	7.4455	23.826
L7	31.9969	30.7853	3677.9444	10.9527	16.0096	229.7334	7452.5126	15.1516	7.4455	23.826
	33.8085	32.5462	4345.8339	11.5792	16.9161	256.9057	8805.8377	16.0182	7.9144	25.326
L8	33.8085	32.5462	4345.8339	11.5792	16.9161	256.9057	8805.8377	16.0182	7.9144	25.326
	35.6201	34.3070	5090.0474	12.2056	17.8225	285.5965	10313.816	16.8849	8.3834	26.827
L9	35.6201	34.3070	5090.0474	12.2056	17.8225	285.5965	10313.816	16.8849	8.3834	26.827
	36.2844	34.9526	5382.8680	12.4353	18.1549	296.4970	10907.150	17.2026	8.5554	27.377
L10	36.2844	34.9526	5382.8680	12.4353	18.1549	296.4970	10907.150	17.2026	8.5554	27.377
	36.3297	48.8192	7483.2546	12.4062	18.1775	411.6758	15163.102	24.0273	8.2321	18.816
L11	36.3297	48.8192	7483.2546	12.4062	18.1775	411.6758	15163.102	24.0273	8.2321	18.816
	38.2017	50.6414	8596.7355	13.0558	19.1142	449.7565	17419.316	24.9242	8.7334	20.251
L12	37.5547	42.3456	6647.1547	12.5546	18.3599	362.0477	13468.937	20.8412	8.4939	22.651

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
	37.7358	43.5606	7235.8923	12.9148	18.8811	383.2347	14661.8795	21.4392	8.7636	23.37
L13	37.7358	43.5606	7235.8923	12.9148	18.8811	383.2347	14661.8795	21.4392	8.7636	23.37
	37.7660	43.5958	7253.4598	12.9253	18.8962	383.8579	14697.4760	21.4565	8.7714	23.39
L14	37.7660	50.7737	8418.4981	12.9029	18.8962	445.5125	17058.1595	24.9893	8.6039	19.666
	37.8113	50.8353	8449.1908	12.9186	18.9189	446.6012	17120.3512	25.0196	8.6156	19.693
L15	37.8113	50.8353	8449.1908	12.9186	18.9189	446.6012	17120.3512	25.0196	8.6156	19.693
	39.0795	52.5610	9339.1665	13.3571	19.5534	477.6239	18923.6832	25.8689	8.9439	20.443
L16	39.0795	65.8774	11634.7832	13.3168	19.5534	595.0264	23575.2252	32.4229	8.6424	15.714
	39.1247	65.9549	11675.8820	13.3325	19.5761	596.4370	23658.5024	32.4610	8.6542	15.735
L17	39.1247	65.9549	11675.8820	13.3325	19.5761	596.4370	23658.5024	32.4610	8.6542	15.735
	39.1549	66.0065	11703.3239	13.3429	19.5912	597.3780	23714.1071	32.4864	8.6620	15.749
L18	39.1549	58.6039	10425.6743	13.3653	19.5912	532.1624	21125.2427	28.8430	8.8295	18.112
	39.2002	58.6726	10462.3683	13.3810	19.6138	533.4183	21199.5946	28.8768	8.8412	18.136
L19	39.2002	58.6726	10462.3683	13.3810	19.6138	533.4183	21199.5946	28.8768	8.8412	18.136
	41.0119	61.4195	12001.7184	14.0074	20.5203	584.8714	24318.7353	30.2288	9.3102	19.098
L20	41.0119	60.6417	11853.5287	14.0097	20.5203	577.6498	24018.4628	29.8460	9.3269	19.381
	42.9443	63.5342	13631.8937	14.6779	21.4872	634.4205	27621.9124	31.2696	9.8272	20.42
L21	42.1679	65.6350	12934.9152	14.0671	20.6228	627.2152	26209.6450	32.3035	9.2794	17.888
	42.3491	67.4620	14045.4431	14.4587	21.1894	662.8539	28459.8756	33.2027	9.5726	18.453
L22	42.3491	66.6595	13882.6640	14.4609	21.1894	655.1717	28130.0410	32.8078	9.5893	18.711
	43.1040	67.8629	14648.1603	14.7220	21.5671	679.1909	29681.1441	33.4000	9.7848	19.092
L23	43.1040	82.5332	17717.4019	14.6817	21.5671	821.5023	35900.2596	40.6203	9.4833	15.173
	43.1493	82.6212	17774.1674	14.6973	21.5897	823.2692	36015.2819	40.6637	9.4950	15.192
L24	43.1493	80.9935	17434.5996	14.7018	21.5897	807.5410	35327.2256	39.8625	9.5285	15.557
	44.9611	84.4450	19759.8735	15.3283	22.4963	878.3623	40038.8609	41.5613	9.9975	16.322
L25	44.9611	82.7458	19373.5688	15.3328	22.4963	861.1903	39256.1028	40.7250	10.0310	16.718
	46.7729	86.1269	21846.8293	15.9593	23.4028	933.5135	44267.5992	42.3890	10.5000	17.5
L26	46.7729	86.1269	21846.8293	15.9593	23.4028	933.5135	44267.5992	42.3890	10.5000	17.5
	47.4674	87.4230	22848.0333	16.1995	23.7503	962.0103	46296.3099	43.0269	10.6798	17.8

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 147'-137'				1	1	1		
L2 137'-127'				1	1	1		
L3 127'-117'				1	1	1		
L4 117'-107'				1	1	1		
L5 107'-99'6"				1	1	1		

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_r	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
ft	ft ²	in						
L6 99'6"-93'3"				1	1	1		
L7 93'3"-83'3"				1	1	1		
L8 83'3"-73'3"				1	1	1		
L9 73'3"-69'6-31/32"				1	1	1		
L10 69'6-31/32"-69'3-31/32"				1	1	0.97102		
L11 69'3-31/32"-59'				1	1	0.977779		
L12 59'-58'				1	1	1		
L13 58'-57'9-31/32"				1	1	1		
L14 57'9-31/32"-57'6-31/32"				1	1	1.0312		
L15 57'6-31/32"-50'6-31/32"				1	1	1.02548		
L16 50'6-31/32"-50'3-31/32"				1	1	1.00616		
L17 50'3-31/32"-50'2-1/32"				1	1	1.0059		
L18 50'2-1/32"-49'11-1/32"				1	1	0.983021		
L19 49'11-1/32"-39'11-1/32"				1	1	0.973459		
L20 39'11-1/32"-29'3"				1	1	0.981055		
L21 29'3"-28'3"				1	1	1.02899		
L22 28'3"-24'31/32"				1	1	1.03805		
L23 24'31/32"-23'9-31/32"				1	1	1.00355		
L24 23'9-31/32"-13'9-31/32"				1	1	1.01107		
L25 13'9-31/32"-3'9-31/32"				1	1	1.01995		
L26 3'9-31/32"-0'				1	1	1.01564		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		$C_A A_A$ ft ² /ft	Weight plf
Climbing Rungs w/ Ladder Plates	B	No	CaAa (Out Of Face)	147' - 12'3-31/32"	1	No Ice	0.09	3.50
						1/2" Ice	0.26	6.00
						1" Ice	0.43	8.50
						2" Ice	0.78	13.50
						4" Ice	1.48	23.50
Safety Line 3/8"	B	No	CaAa (Out Of Face)	147' - 12'3-31/32"	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
Unknown Conduit to	A	No	CaAa (Out Of	147' - 4'	2	No Ice	0.00	0.66

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		CAAA ft ² /ft	Weight plf
Top			Face)			1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78

LDF4-50A(1/2")	A	No	CaAa (Out Of Face)	147' - 4'	6	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
LDF4-50A(1/2")	A	No	CaAa (Out Of Face)	53' - 4'	1	No Ice	0.06	0.15
						1/2" Ice	0.16	0.84
						1" Ice	0.26	2.14
						2" Ice	0.46	6.58
						4" Ice	0.86	22.78
LDF4-50A(1/2")	A	No	CaAa (Out Of Face)	49' - 4'	1	No Ice	0.06	0.15
						1/2" Ice	0.16	0.84
						1" Ice	0.26	2.14
						2" Ice	0.46	6.58
						4" Ice	0.86	22.78
LDF6-50A(1-1/4")	A	No	Inside Pole	147' - 1'6"	3	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66

LDF7-50A(1 5/8")	B	No	Inside Pole	119' - 10'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
HB114-1-0813U4-M5J(1 1/4")	B	No	CaAa (Out Of Face)	119' - 10'	1	No Ice	0.15	1.20
						1/2" Ice	0.25	2.45
						1" Ice	0.35	4.30
						2" Ice	0.55	9.85
						4" Ice	0.95	28.27

LDF7-50A(1 5/8")	C	No	CaAa (Out Of Face)	100' - 8'	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1 5/8")	C	No	CaAa (Out Of Face)	100' - 8'	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04

LDF6-50A(1-1/4")	C	No	Inside Pole	110' - 8'	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF4.5-50(5/8")	C	No	Inside Pole	110' - 8'	2	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
LDF2-50(3/8")	C	No	Inside Pole	110' - 8'	1	No Ice	0.00	0.08
						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
2" Conduit	C	No	Inside Pole	110' - 8'	1	No Ice	0.00	1.22
						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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight
							ft ² /ft	plf
MP304 Reinforcement	A	No	CaAa (Out Of Face)	52' - 6"	1	No Ice	0.27	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.60	0.00
						2" Ice	0.94	0.00
						4" Ice	1.60	0.00
MP304 Reinforcement	B	No	CaAa (Out Of Face)	52' - 6"	1	No Ice	0.27	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.60	0.00
						2" Ice	0.94	0.00
						4" Ice	1.60	0.00
MP304 Reinforcement	C	No	CaAa (Out Of Face)	52' - 6"	1	No Ice	0.27	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.60	0.00
						2" Ice	0.94	0.00
						4" Ice	1.60	0.00
MP303 Reinforcement	A	No	CaAa (Out Of Face)	59' - 52'	1	No Ice	0.26	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.59	0.00
						2" Ice	0.93	0.00
						4" Ice	1.59	0.00
MP303 Reinforcement	B	No	CaAa (Out Of Face)	59' - 52'	1	No Ice	0.26	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.59	0.00
						2" Ice	0.93	0.00
						4" Ice	1.59	0.00
MP303 Reinforcement	C	No	CaAa (Out Of Face)	59' - 52'	1	No Ice	0.26	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.59	0.00
						2" Ice	0.93	0.00
						4" Ice	1.59	0.00
MP304 Reinforcement	A	No	CaAa (Out Of Face)	71' - 61'	1	No Ice	0.27	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.60	0.00
						2" Ice	0.94	0.00
						4" Ice	1.60	0.00
MP304 Reinforcement	B	No	CaAa (Out Of Face)	71' - 61'	1	No Ice	0.27	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.60	0.00
						2" Ice	0.94	0.00
						4" Ice	1.60	0.00
MP304 Reinforcement	C	No	CaAa (Out Of Face)	71' - 61'	1	No Ice	0.27	0.00
						1/2" Ice	0.43	0.00
						1" Ice	0.60	0.00
						2" Ice	0.94	0.00
						4" Ice	1.60	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Sectio n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	147'-137'	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	1.236	0.04
		C	0.000	0.000	0.000	0.000	0.00
L2	137'-127'	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	1.236	0.04
		C	0.000	0.000	0.000	0.000	0.00
L3	127'-117'	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	1.544	0.06
		C	0.000	0.000	0.000	0.000	0.00
L4	117'-107'	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	2.776	0.15
		C	0.000	0.000	0.000	0.000	0.03
L5	107'-99'6"	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	2.082	0.11
		C	0.000	0.000	0.000	0.099	0.07
L6	99'6"-93'3"	A	0.000	0.000	0.000	0.000	0.03

Tower Sectio n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
		B	0.000	0.000	0.000	1.735	0.09
		C	0.000	0.000	0.000	1.238	0.09
L7	93'3"-83'3"	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	2.776	0.15
		C	0.000	0.000	0.000	1.980	0.14
L8	83'3"-73'3"	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	2.776	0.15
		C	0.000	0.000	0.000	1.980	0.14
L9	73'3"-69'6-31/32"	A	0.000	0.000	0.000	0.380	0.02
		B	0.000	0.000	0.000	1.398	0.05
		C	0.000	0.000	0.000	1.106	0.05
L10	69'6-31/32"-69'3-31/32"	A	0.000	0.000	0.000	0.067	0.00
		B	0.000	0.000	0.000	0.136	0.00
		C	0.000	0.000	0.000	0.117	0.00
L11	69'3-31/32"-59'	A	0.000	0.000	0.000	2.236	0.04
		B	0.000	0.000	0.000	5.105	0.15
		C	0.000	0.000	0.000	4.282	0.15
L12	59'-58'	A	0.000	0.000	0.000	0.262	0.00
		B	0.000	0.000	0.000	0.540	0.01
		C	0.000	0.000	0.000	0.460	0.01
L13	58'-57'9-31/32"	A	0.000	0.000	0.000	0.044	0.00
		B	0.000	0.000	0.000	0.090	0.00
		C	0.000	0.000	0.000	0.077	0.00
L14	57'9-31/32"-57'6-31/32"	A	0.000	0.000	0.000	0.065	0.00
		B	0.000	0.000	0.000	0.135	0.00
		C	0.000	0.000	0.000	0.115	0.00
L15	57'6-31/32"-50'6-31/32"	A	0.000	0.000	0.000	1.995	0.03
		B	0.000	0.000	0.000	3.786	0.10
		C	0.000	0.000	0.000	3.229	0.10
L16	50'6-31/32"-50'3-31/32"	A	0.000	0.000	0.000	0.083	0.00
		B	0.000	0.000	0.000	0.136	0.00
		C	0.000	0.000	0.000	0.117	0.00
L17	50'3-31/32"-50'2-1/32"	A	0.000	0.000	0.000	0.055	0.00
		B	0.000	0.000	0.000	0.091	0.00
		C	0.000	0.000	0.000	0.078	0.00
L18	50'2-1/32"-49'11-1/32"	A	0.000	0.000	0.000	0.083	0.00
		B	0.000	0.000	0.000	0.136	0.00
		C	0.000	0.000	0.000	0.117	0.00
L19	49'11-1/32"-39'11-1/32"	A	0.000	0.000	0.000	3.885	0.04
		B	0.000	0.000	0.000	5.459	0.15
		C	0.000	0.000	0.000	4.663	0.14
L20	39'11-1/32"-29'3"	A	0.000	0.000	0.000	4.206	0.05
		B	0.000	0.000	0.000	5.823	0.16
		C	0.000	0.000	0.000	4.974	0.15
L21	29'3"-28'3"	A	0.000	0.000	0.000	0.394	0.00
		B	0.000	0.000	0.000	0.546	0.01
		C	0.000	0.000	0.000	0.466	0.01
L22	28'3"-24'31/32"	A	0.000	0.000	0.000	1.643	0.02
		B	0.000	0.000	0.000	2.275	0.06
		C	0.000	0.000	0.000	1.943	0.06
L23	24'31/32"-23'9-31/32"	A	0.000	0.000	0.000	0.099	0.00
		B	0.000	0.000	0.000	0.136	0.00
		C	0.000	0.000	0.000	0.117	0.00
L24	23'9-31/32"-13'9-31/32"	A	0.000	0.000	0.000	3.943	0.04
		B	0.000	0.000	0.000	5.459	0.15
		C	0.000	0.000	0.000	4.663	0.14
L25	13'9-31/32"-3'9-31/32"	A	0.000	0.000	0.000	3.922	0.04
		B	0.000	0.000	0.000	3.459	0.05
		C	0.000	0.000	0.000	3.838	0.08
L26	3'9-31/32"-0'	A	0.000	0.000	0.000	0.894	0.00
		B	0.000	0.000	0.000	0.894	0.00
		C	0.000	0.000	0.000	0.894	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	147'-137'	A	0.893	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	0.000	6.130	0.09
		C		0.000	0.000	0.000	0.000	0.00
L2	137'-127'	A	0.886	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	0.000	6.088	0.09
		C		0.000	0.000	0.000	0.000	0.00
L3	127'-117'	A	0.877	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	0.000	6.701	0.12
		C		0.000	0.000	0.000	0.000	0.00
L4	117'-107'	A	0.868	0.000	0.000	0.000	0.000	0.19
		B		0.000	0.000	0.000	9.270	0.23
		C		0.000	0.000	0.000	0.000	0.03
L5	107'-99'6"	A	0.860	0.000	0.000	0.000	0.000	0.14
		B		0.000	0.000	0.000	6.905	0.17
		C		0.000	0.000	0.000	0.185	0.08
L6	99'6"-93'3"	A	0.853	0.000	0.000	0.000	0.000	0.12
		B		0.000	0.000	0.000	5.754	0.14
		C		0.000	0.000	0.000	2.312	0.20
L7	93'3"-83'3"	A	0.844	0.000	0.000	0.000	0.000	0.19
		B		0.000	0.000	0.000	9.087	0.22
		C		0.000	0.000	0.000	3.668	0.32
L8	83'3"-73'3"	A	0.832	0.000	0.000	0.000	0.000	0.19
		B		0.000	0.000	0.000	8.996	0.22
		C		0.000	0.000	0.000	3.644	0.32
L9	73'3"-69'6-31/32"	A	0.823	0.000	0.000	0.000	0.769	0.07
		B		0.000	0.000	0.000	4.043	0.08
		C		0.000	0.000	0.000	2.098	0.12
L10	69'6-31/32"-69'3-31/32"	A	0.820	0.000	0.000	0.000	0.135	0.00
		B		0.000	0.000	0.000	0.358	0.01
		C		0.000	0.000	0.000	0.226	0.01
L11	69'3-31/32"-59'	A	0.812	0.000	0.000	0.000	4.492	0.19
		B		0.000	0.000	0.000	13.637	0.23
		C		0.000	0.000	0.000	8.217	0.33
L12	59'-58'	A	0.803	0.000	0.000	0.000	0.532	0.02
		B		0.000	0.000	0.000	1.417	0.02
		C		0.000	0.000	0.000	0.893	0.03
L13	58'-57'9-31/32"	A	0.802	0.000	0.000	0.000	0.088	0.00
		B		0.000	0.000	0.000	0.234	0.00
		C		0.000	0.000	0.000	0.148	0.01
L14	57'9-31/32"-57'6-31/32"	A	0.802	0.000	0.000	0.000	0.132	0.00
		B		0.000	0.000	0.000	0.352	0.01
		C		0.000	0.000	0.000	0.222	0.01
L15	57'6-31/32"-50'6-31/32"	A	0.796	0.000	0.000	0.000	4.233	0.13
		B		0.000	0.000	0.000	9.805	0.15
		C		0.000	0.000	0.000	6.197	0.22
L16	50'6-31/32"-50'3-31/32"	A	0.789	0.000	0.000	0.000	0.188	0.00
		B		0.000	0.000	0.000	0.350	0.01
		C		0.000	0.000	0.000	0.222	0.01
L17	50'3-31/32"-50'2-1/32"	A	0.789	0.000	0.000	0.000	0.125	0.00
		B		0.000	0.000	0.000	0.233	0.00
		C		0.000	0.000	0.000	0.148	0.01
L18	50'2-1/32"-49'11-1/32"	A	0.788	0.000	0.000	0.000	0.188	0.00
		B		0.000	0.000	0.000	0.350	0.01
		C		0.000	0.000	0.000	0.222	0.01
L19	49'11-1/32"-39'11-1/32"	A	0.778	0.000	0.000	0.000	9.450	0.20
		B		0.000	0.000	0.000	13.873	0.22
		C		0.000	0.000	0.000	8.814	0.31
L20	39'11-1/32"-29'3"	A	0.754	0.000	0.000	0.000	10.105	0.21
		B		0.000	0.000	0.000	14.520	0.23
		C		0.000	0.000	0.000	9.265	0.32
L21	29'3"-28'3"	A	0.750	0.000	0.000	0.000	0.947	0.02
		B		0.000	0.000	0.000	1.361	0.02
		C		0.000	0.000	0.000	0.869	0.03
L22	28'3"-24'31/32"	A	0.750	0.000	0.000	0.000	3.935	0.08
		B		0.000	0.000	0.000	5.653	0.09
		C		0.000	0.000	0.000	3.610	0.12

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A _R	A _F	C _A A _A In Face	C _A A _A Out Face	Weight
n	ft		in	ft ²	ft ²	ft ²	ft ²	K
L23	24'31/32"-23'9-31/32"	A	0.750	0.000	0.000	0.000	0.236	0.00
		B		0.000	0.000	0.000	0.339	0.01
		C		0.000	0.000	0.000	0.217	0.01
L24	23'9-31/32"-13'9-31/32"	A	0.750	0.000	0.000	0.000	9.444	0.20
		B		0.000	0.000	0.000	13.568	0.21
		C		0.000	0.000	0.000	8.664	0.30
L25	13'9-31/32"-3'9-31/32"	A	0.750	0.000	0.000	0.000	9.373	0.19
		B		0.000	0.000	0.000	7.150	0.06
		C		0.000	0.000	0.000	7.214	0.17
L26	3'9-31/32"-0'	A	0.750	0.000	0.000	0.000	1.728	0.00
		B		0.000	0.000	0.000	1.728	0.00
		C		0.000	0.000	0.000	1.728	0.00

Feed Line Center of Pressure

Section	Elevation	CP _X	CP _Z	CP _X Ice	CP _Z Ice
	ft	in	in	in	in
L1	147'-137'	0.1508	0.0871	0.5689	0.3285
L2	137'-127'	0.1515	0.0875	0.5778	0.3336
L3	127'-117'	0.1884	0.1088	0.6364	0.3674
L4	117'-107'	0.3225	0.1862	0.8263	0.4771
L5	107'-99'6"	0.3070	0.1953	0.8076	0.4925
L6	99'6"-93'3"	0.0871	0.3003	0.4566	0.6178
L7	93'3"-83'3"	0.0877	0.3024	0.4587	0.6233
L8	83'3"-73'3"	0.0884	0.3048	0.4629	0.6312
L9	73'3"-69'6-31/32"	0.0813	0.2805	0.4056	0.5543
L10	69'6-31/32"-69'3-31/32"	0.0719	0.2480	0.3381	0.4625
L11	69'3-31/32"-59'	0.0752	0.2594	0.3595	0.4929
L12	59'-58'	0.0730	0.2519	0.3437	0.4711
L13	58'-57'9-31/32"	0.0731	0.2521	0.3418	0.4699
L14	57'9-31/32"-57'6-31/32"	0.0731	0.2521	0.3419	0.4701
L15	57'6-31/32"-50'6-31/32"	0.0731	0.2286	0.3387	0.4077
L16	50'6-31/32"-50'3-31/32"	0.0725	0.1838	0.3313	0.2922
L17	50'3-31/32"-50'2-1/32"	0.0725	0.1838	0.3314	0.2923
L18	50'2-1/32"-49'11-1/32"	0.0725	0.1839	0.3314	0.2924
L19	49'11-1/32"-39'11-1/32"	0.0721	0.1229	0.3228	0.1392
L20	39'11-1/32"-29'3"	0.0730	0.1184	0.3237	0.1271
L21	29'3"-28'3"	0.0732	0.1187	0.3247	0.1275
L22	28'3"-24'31/32"	0.0734	0.1190	0.3255	0.1281
L23	24'31/32"-23'9-31/32"	0.0736	0.1194	0.3270	0.1287
L24	23'9-31/32"-13'9-31/32"	0.0741	0.1201	0.3304	0.1301
L25	13'9-31/32"-3'9-31/32"	-0.0379	-0.0326	-0.0057	-0.1978
L26	3'9-31/32"-0'	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement	C _A A _A Front	C _A A _A Side	Weight	
			ft	°	ft	ft ²	ft ²	K	
APXVSP18-C-A20 w/ pipe mount	A	From Leg	4.00 -3'	0.0000	147'	No Ice 1/2"	8.50 9.15	6.95 8.13	0.09 0.16

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			Horz	Lateral	Vert					
APXVSP18-C-A20 w/ pipe mount	B	From Leg	4.00 6' 0'		0.0000	147'	Ice 1" Ice 2" Ice 4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	9.77 11.03 13.68 14.85 8.50 9.15 9.77 11.03 13.68 14.85	9.02 10.84 14.85 6.95 8.13 9.02 10.84 14.85	0.23 0.41 0.92 0.09 0.16 0.23 0.41 0.92
APXV14-C-120 w/ pipe mount	A	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.21 7.77 8.31 9.42 11.77	5.03 5.89 6.63 8.20 11.67	0.09 0.15 0.21 0.36 0.78
APXV14-C-120 w/ pipe mount	B	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.21 7.77 8.31 9.42 11.77	5.03 5.89 6.63 8.20 11.67	0.09 0.15 0.21 0.36 0.78
APXV14-C-120 w/ pipe mount	C	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.21 7.77 8.31 9.42 11.77	5.03 5.89 6.63 8.20 11.67	0.09 0.15 0.21 0.36 0.78
P40-16-XLPP-RR-A w/ Mount Pipe	C	From Leg	4.00 6' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	9.37 9.91 10.45 11.56 13.89	4.83 5.57 6.27 7.80 11.11	0.07 0.14 0.21 0.37 0.82
(3) ACU-A20-N	A	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	B	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	C	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	0.00 0.00 0.00 0.01 0.04
TD-RRH8x20-25	A	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.32 4.60 4.89 5.50 6.82	1.41 1.61 1.83 2.28 3.30	0.07 0.09 0.12 0.18 0.36
TD-RRH8x20-25	B	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.32 4.60 4.89 5.50 6.82	1.41 1.61 1.83 2.28 3.30	0.07 0.09 0.12 0.18 0.36
TD-RRH8x20-25	C	From Leg	4.00		0.0000	147'	No Ice	4.32	1.41	0.07

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight
			Horz	Lateral					
						1/2"	4.60	1.61	0.09
						Ice	4.89	1.83	0.12
						1" Ice	5.50	2.28	0.18
						2" Ice	6.82	3.30	0.36
						4" Ice			
(2) 5' x 2" Pipe Mount	A	From Leg	4.00	0.0000	147'	No Ice	1.00	1.00	0.03
			0'			1/2"	1.39	1.39	0.04
			0'			Ice	1.70	1.70	0.05
						1" Ice	2.35	2.35	0.08
						2" Ice	3.78	3.78	0.20
						4" Ice			
(3) 5' x 2" Pipe Mount	B	From Leg	4.00	0.0000	147'	No Ice	1.00	1.00	0.03
			0'			1/2"	1.39	1.39	0.04
			0'			Ice	1.70	1.70	0.05
						1" Ice	2.35	2.35	0.08
						2" Ice	3.78	3.78	0.20
						4" Ice			
(3) 5' x 2" Pipe Mount	C	From Leg	4.00	0.0000	147'	No Ice	1.00	1.00	0.03
			0'			1/2"	1.39	1.39	0.04
			0'			Ice	1.70	1.70	0.05
						1" Ice	2.35	2.35	0.08
						2" Ice	3.78	3.78	0.20
						4" Ice			
Platform Mount [LP 1201-1]	C	None		0.0000	147'	No Ice	23.10	23.10	2.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90
						1" Ice	37.90	37.90	3.70
						2" Ice	52.70	52.70	5.30
						4" Ice			

800MHz RRH	A	From Leg	1.25	0.0000	145'	No Ice	2.49	2.07	0.05
			0'			1/2"	2.71	2.27	0.07
			1'			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			
800MHz RRH	B	From Leg	1.25	0.0000	145'	No Ice	2.49	2.07	0.05
			0'			1/2"	2.71	2.27	0.07
			1'			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			
800MHz RRH	C	From Leg	1.25	0.0000	145'	No Ice	2.49	2.07	0.05
			0'			1/2"	2.71	2.27	0.07
			1'			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			
1900MHz RRH (65MHz)	A	From Leg	1.25	0.0000	145'	No Ice	2.71	2.61	0.06
			0'			1/2"	2.95	2.84	0.08
			-2'			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
1900MHz RRH (65MHz)	B	From Leg	1.25	0.0000	145'	No Ice	2.71	2.61	0.06
			0'			1/2"	2.95	2.84	0.08
			-2'			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
1900MHz RRH (65MHz)	C	From Leg	1.25	0.0000	145'	No Ice	2.71	2.61	0.06
			0'			1/2"	2.95	2.84	0.08
			-2'			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral	Vert						ft
			ft	ft	ft	°	ft	ft ²	ft ²	K	
800 External Notch Filter	A	From Leg	1.00	0'	1'	0.0000	145'	4" Ice			
								No Ice	0.77	0.37	0.01
								1/2" Ice	0.89	0.46	0.02
								1" Ice	1.02	0.56	0.02
								2" Ice	1.30	0.79	0.04
								4" Ice	1.97	1.34	0.11
800 External Notch Filter	B	From Leg	1.00	0'	1'	0.0000	145'	No Ice	0.77	0.37	0.01
								1/2" Ice	0.89	0.46	0.02
								1" Ice	1.02	0.56	0.02
								2" Ice	1.30	0.79	0.04
								4" Ice	1.97	1.34	0.11
								800 External Notch Filter	C	From Leg	1.00
								1/2" Ice	0.89	0.46	0.02
								1" Ice	1.02	0.56	0.02
								2" Ice	1.30	0.79	0.04
								4" Ice	1.97	1.34	0.11
6' x 2" Mount Pipe	A	From Leg	0.75	0'	0'	0.0000	145'	No Ice	1.43	1.43	0.02
								1/2" Ice	1.92	1.92	0.03
								1" Ice	2.29	2.29	0.05
								2" Ice	3.06	3.06	0.09
								4" Ice	4.70	4.70	0.23
								6' x 2" Mount Pipe	B	From Leg	0.75
								1/2" Ice	1.92	1.92	0.03
								1" Ice	2.29	2.29	0.05
								2" Ice	3.06	3.06	0.09
								4" Ice	4.70	4.70	0.23
6' x 2" Mount Pipe	C	From Leg	0.75	0'	0'	0.0000	145'	No Ice	1.43	1.43	0.02
								1/2" Ice	1.92	1.92	0.03
								1" Ice	2.29	2.29	0.05
								2" Ice	3.06	3.06	0.09
								4" Ice	4.70	4.70	0.23
								Side Arm Mount [SO 102-1]	A	From Leg	0.50
1/2" Ice	1.74	1.75	0.04								
1" Ice	1.98	2.00	0.04								
2" Ice	2.46	2.50	0.07								
4" Ice	3.42	3.50	0.11								
Side Arm Mount [SO 102-1]	B	From Leg	0.50	0'	0'	0.0000	145'				
								1/2" Ice	1.74	1.75	0.04
								1" Ice	1.98	2.00	0.04
								2" Ice	2.46	2.50	0.07
								4" Ice	3.42	3.50	0.11
								Side Arm Mount [SO 102-1]	C	From Leg	0.50
1/2" Ice	1.74	1.75	0.04								
1" Ice	1.98	2.00	0.04								
2" Ice	2.46	2.50	0.07								
4" Ice	3.42	3.50	0.11								
AIR 21 B2A B4P w/ pipe mount	A	From Face	4.00	-6'	2'	0.0000	119'				
								1/2" Ice	7.46	6.64	0.18
								1" Ice	8.00	7.44	0.24
								2" Ice	9.10	9.09	0.40
								4" Ice	11.44	12.59	0.83
								AIR 21 B2A B4P w/ pipe mount	B	From Face	4.00
1/2" Ice	7.46	6.64	0.18								

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral						ft
			ft	ft	°	ft	ft ²	ft ²	K	
				2'						
						Ice	8.00	7.44	0.24	
						1" Ice	9.10	9.09	0.40	
						2" Ice	11.44	12.59	0.83	
						4" Ice				
AIR 21 B2A B4P w/ pipe mount	C	From Face	4.00		0.0000	119'	No Ice	6.90	5.74	0.12
			-6'				1/2"	7.46	6.64	0.18
			2'				Ice	8.00	7.44	0.24
							1" Ice	9.10	9.09	0.40
							2" Ice	11.44	12.59	0.83
							4" Ice			
AIR 21 B4A B2P w/ pipe mount	A	From Face	4.00		0.0000	119'	No Ice	6.90	5.74	0.12
			6'				1/2"	7.46	6.64	0.18
			2'				Ice	8.00	7.44	0.24
							1" Ice	9.10	9.09	0.40
							2" Ice	11.44	12.59	0.83
							4" Ice			
AIR 21 B4A B2P w/ pipe mount	B	From Face	4.00		0.0000	119'	No Ice	6.90	5.74	0.12
			6'				1/2"	7.46	6.64	0.18
			2'				Ice	8.00	7.44	0.24
							1" Ice	9.10	9.09	0.40
							2" Ice	11.44	12.59	0.83
							4" Ice			
AIR 21 B4A B2P w/ pipe mount	C	From Face	4.00		0.0000	119'	No Ice	6.90	5.74	0.12
			6'				1/2"	7.46	6.64	0.18
			2'				Ice	8.00	7.44	0.24
							1" Ice	9.10	9.09	0.40
							2" Ice	11.44	12.59	0.83
							4" Ice			
KRY 112 144/1	A	From Face	4.00		0.0000	119'	No Ice	0.41	0.19	0.01
			0'				1/2"	0.50	0.26	0.01
			3'				Ice	0.60	0.33	0.02
							1" Ice	0.82	0.51	0.03
							2" Ice	1.36	0.97	0.08
							4" Ice			
KRY 112 144/1	B	From Face	4.00		0.0000	119'	No Ice	0.41	0.19	0.01
			0'				1/2"	0.50	0.26	0.01
			3'				Ice	0.60	0.33	0.02
							1" Ice	0.82	0.51	0.03
							2" Ice	1.36	0.97	0.08
							4" Ice			
KRY 112 144/1	C	From Face	4.00		0.0000	119'	No Ice	0.41	0.19	0.01
			0'				1/2"	0.50	0.26	0.01
			3'				Ice	0.60	0.33	0.02
							1" Ice	0.82	0.51	0.03
							2" Ice	1.36	0.97	0.08
							4" Ice			
T-Arm Mount [TA 602-1]	A	From Face	2.00		0.0000	119'	No Ice	7.28	3.02	0.26
			0'				1/2"	9.52	4.20	0.33
			0'				Ice	11.76	5.38	0.40
							1" Ice	16.24	7.74	0.55
							2" Ice	25.20	12.46	0.83
							4" Ice			
T-Arm Mount [TA 602-1]	B	From Face	2.00		0.0000	119'	No Ice	7.28	3.02	0.26
			0'				1/2"	9.52	4.20	0.33
			0'				Ice	11.76	5.38	0.40
							1" Ice	16.24	7.74	0.55
							2" Ice	25.20	12.46	0.83
							4" Ice			
T-Arm Mount [TA 602-1]	C	From Face	2.00		0.0000	119'	No Ice	7.28	3.02	0.26
			0'				1/2"	9.52	4.20	0.33
			0'				Ice	11.76	5.38	0.40
							1" Ice	16.24	7.74	0.55
							2" Ice	25.20	12.46	0.83
							4" Ice			
LNX-6515DS-VTM w/ pipe	A	From Face	4.00		0.0000	119'	No Ice	11.72	10.28	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
mount			-2' 2'			1/2" Ice 13.15 1" Ice 14.61 2" Ice 17.87 4" Ice	11.81 13.16 15.49 20.37	0.20 0.31 0.55 1.20
LNx-6515DS-VTM w/ pipe mount	B	From Face	4.00 -2' 2'	0.0000	119'	No Ice 1/2" Ice 13.15 1" Ice 14.61 2" Ice 17.87 4" Ice	10.28 11.81 13.16 15.49 20.37	0.11 0.20 0.31 0.55 1.20
LNx-6515DS-VTM w/ pipe mount	C	From Face	4.00 -2' 2'	0.0000	119'	No Ice 1/2" Ice 13.15 1" Ice 14.61 2" Ice 17.87 4" Ice	10.28 11.81 13.16 15.49 20.37	0.11 0.20 0.31 0.55 1.20
RRUS 11 B12	A	From Face	4.00 0' 2'	0.0000	119'	No Ice 1/2" Ice 3.80 1" Ice 4.33 2" Ice 5.50 4" Ice	1.36 1.54 1.73 2.13 3.04	0.06 0.08 0.10 0.16 0.32
RRUS 11 B12	B	From Face	4.00 0' 2'	0.0000	119'	No Ice 1/2" Ice 3.80 1" Ice 4.33 2" Ice 5.50 4" Ice	1.36 1.54 1.73 2.13 3.04	0.06 0.08 0.10 0.16 0.32
RRUS 11 B12	C	From Face	4.00 0' 2'	0.0000	119'	No Ice 1/2" Ice 3.80 1" Ice 4.33 2" Ice 5.50 4" Ice	1.36 1.54 1.73 2.13 3.04	0.06 0.08 0.10 0.16 0.32

(2) 7770.00 w/ pipe mount	A	From Leg	4.00 -2' 2'	0.0000	110'	No Ice 1/2" Ice 7.30 1" Ice 8.38 2" Ice 10.69 4" Ice	4.35 5.20 5.92 7.41 10.76	0.06 0.11 0.16 0.30 0.68
(2) 7770.00 w/ pipe mount	B	From Leg	4.00 -2' 2'	0.0000	110'	No Ice 1/2" Ice 7.30 1" Ice 8.38 2" Ice 10.69 4" Ice	4.35 5.20 5.92 7.41 10.76	0.06 0.11 0.16 0.30 0.68
(2) 7770.00 w/ pipe mount	C	From Leg	4.00 -2' 2'	0.0000	110'	No Ice 1/2" Ice 7.30 1" Ice 8.38 2" Ice 10.69 4" Ice	4.35 5.20 5.92 7.41 10.76	0.06 0.11 0.16 0.30 0.68
800-10764 w/ pipe mount	A	From Leg	4.00 6' 2'	0.0000	110'	No Ice 1/2" Ice 7.36 1" Ice 8.34 2" Ice 10.40 4" Ice	4.58 5.24 5.91 7.33 10.59	0.06 0.11 0.17 0.30 0.69
800-10764 w/ pipe mount	B	From Leg	4.00 6' 2'	0.0000	110'	No Ice 1/2" Ice 7.36 1" Ice 8.34 2" Ice 10.40 4" Ice	4.58 5.24 5.91 7.33 10.59	0.06 0.11 0.17 0.30 0.69

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
AM-X-CD-14-65-00T-RET w/ pipe mount	C	From Leg	4.00	6'	0.0000	110'	4" Ice			
							No Ice	5.74	4.02	0.06
							1/2"	6.20	4.63	0.11
							Ice	6.66	5.28	0.16
							1" Ice	7.62	6.68	0.28
(2) 7020.00	A	From Leg	4.00	0'	0.0000	110'	2" Ice	9.67	9.74	0.64
							4" Ice			
							No Ice	0.40	0.20	0.00
							1/2"	0.49	0.27	0.01
							Ice	0.59	0.36	0.01
(2) 7020.00	B	From Leg	4.00	0'	0.0000	110'	1" Ice	0.81	0.55	0.02
							2" Ice	1.37	1.04	0.07
							4" Ice			
							No Ice	0.40	0.20	0.00
							1/2"	0.49	0.27	0.01
(2) 7020.00	C	From Leg	4.00	0'	0.0000	110'	Ice	0.59	0.36	0.01
							1" Ice	0.81	0.55	0.02
							2" Ice	1.37	1.04	0.07
							4" Ice			
							No Ice	0.40	0.20	0.00
(4) LGP2140X	A	From Leg	4.00	0'	0.0000	110'	1/2"	0.49	0.27	0.01
							Ice	0.59	0.36	0.01
							1" Ice	0.81	0.55	0.02
							2" Ice	1.37	1.04	0.07
							4" Ice			
(4) LGP2140X	B	From Leg	4.00	0'	0.0000	110'	No Ice	1.26	0.38	0.01
							1/2"	1.42	0.49	0.02
							Ice	1.58	0.62	0.03
							1" Ice	1.94	0.89	0.05
							2" Ice	2.75	1.54	0.13
(4) LGP2140X	C	From Leg	4.00	0'	0.0000	110'	4" Ice			
							No Ice	1.26	0.38	0.01
							1/2"	1.42	0.49	0.02
							Ice	1.58	0.62	0.03
							1" Ice	1.94	0.89	0.05
(2) RRUS-11	A	From Leg	4.00	0'	0.0000	110'	2" Ice	2.75	1.54	0.13
							4" Ice			
							No Ice	2.94	1.25	0.06
							1/2"	3.17	1.41	0.07
							Ice	3.41	1.59	0.10
(2) RRUS-11	B	From Leg	4.00	0'	0.0000	110'	1" Ice	3.91	1.96	0.15
							2" Ice	5.02	2.82	0.30
							4" Ice			
							No Ice	2.94	1.25	0.06
							1/2"	3.17	1.41	0.07
(2) RRUS-11	C	From Leg	4.00	0'	0.0000	110'	Ice	3.41	1.59	0.10
							1" Ice	3.91	1.96	0.15
							2" Ice	5.02	2.82	0.30
							4" Ice			
							No Ice	2.94	1.25	0.06
DC6-48-60-18-8F	A	From Leg	1.00	0'	0.0000	110'	1/2"	3.17	1.41	0.07
							Ice	3.41	1.59	0.10
							1" Ice	3.91	1.96	0.15
							2" Ice	5.02	2.82	0.30
							4" Ice			
			3'				No Ice	1.60	1.60	0.03
							1/2"	1.81	1.81	0.05
							Ice	2.02	2.02	0.07
							1" Ice	2.49	2.49	0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
						2" Ice	3.56	3.56	0.27
						4" Ice			
Platform Mount [LP 1201-1]	C	None		0.0000	110'	No Ice	23.10	23.10	2.10
						1/2" Ice	26.80	26.80	2.50
						1" Ice	30.50	30.50	2.90
						2" Ice	37.90	37.90	3.70
						4" Ice	52.70	52.70	5.30

APXV18-206517S-C w/ pipe mount	A	From Leg	1.00 0' 0'	0.0000	100'	No Ice	5.40	4.70	0.06
						1/2" Ice	5.96	5.86	0.11
						1" Ice	6.48	6.73	0.16
						2" Ice	7.55	8.51	0.29
						4" Ice	9.92	12.28	0.69
APXV18-206517S-C w/ pipe mount	B	From Leg	1.00 0' 0'	0.0000	100'	No Ice	5.40	4.70	0.06
						1/2" Ice	5.96	5.86	0.11
						1" Ice	6.48	6.73	0.16
						2" Ice	7.55	8.51	0.29
						4" Ice	9.92	12.28	0.69
APXV18-206517S-C w/ pipe mount	C	From Leg	1.00 0' 0'	0.0000	100'	No Ice	5.40	4.70	0.06
						1/2" Ice	5.96	5.86	0.11
						1" Ice	6.48	6.73	0.16
						2" Ice	7.55	8.51	0.29
						4" Ice	9.92	12.28	0.69

Side Arm Mount [SO 309-1]	A	From Leg	1.50 0' 0'	0.0000	60'	No Ice	2.82	2.20	0.04
						1/2" Ice	4.07	3.16	0.06
						1" Ice	5.32	4.12	0.08
						2" Ice	7.82	6.04	0.13
						4" Ice	12.82	9.88	0.22

GPS_A	B	From Leg	3.00 0' 1'	0.0000	53'	No Ice	0.30	0.30	0.00
						1/2" Ice	0.37	0.37	0.00
						1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
Side Arm Mount [SO 701-1]	B	From Leg	1.50 0' 0'	0.0000	53'	No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18

KS24019-L112A	C	From Leg	3.00 0' 1'	0.0000	49'	No Ice	0.16	0.16	0.01
						1/2" Ice	0.22	0.22	0.01
						1" Ice	0.30	0.30	0.01
						2" Ice	0.48	0.48	0.02
						4" Ice	0.95	0.95	0.06
Side Arm Mount [SO 701-1]	C	From Leg	1.50 0' 0'	0.0000	49'	No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				Horz Lateral	Vert						
				ft	°	°	ft	ft	ft ²	K	
A-ANT-23G-2-C	A	Paraboloid w/Shroud (HP)	From Leg	4.00	0.0000	147'	2.17	No Ice	3.72	0.03	
				3'	1" Ice			4.01	0.05		
				2'	1" Ice			4.30	0.07		
					2" Ice			4.88	0.11		
					4" Ice			6.04	0.19		
A-ANT-23G-2-C	B	Paraboloid w/Shroud (HP)	From Leg	4.00	0.0000	147'	2.17	No Ice	3.72	0.03	
				3'	1" Ice			4.01	0.05		
				2'	1" Ice			4.30	0.07		
					2" Ice			4.88	0.11		
					4" Ice			6.04	0.19		
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	4.00	-60.0000	147'	2.16	No Ice	3.66	0.03	
				-6'	1/2" Ice			3.95	0.05		
				2'	1" Ice			4.25	0.07		
					2" Ice			4.88	0.10		
					4" Ice			6.27	0.17		

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	147 - 137	Pole	Max Tension	14	0.00	-0.00	0.00
			Max. Compression	14	-7.06	1.41	-0.69
			Max. Mx	11	-3.65	63.02	-0.11
			Max. My	8	-3.65	0.00	-63.51
			Max. Vy	11	-6.98	63.02	-0.11
			Max. Vx	2	-7.03	0.95	62.76
L2	137 - 127	Pole	Max. Torque	2			3.34
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-8.30	1.34	-0.56
			Max. Mx	11	-4.31	138.26	-0.01
			Max. My	8	-4.31	-0.09	-139.12
			Max. Vy	11	-8.08	138.26	-0.01
L3	127 - 117	Pole	Max. Vx	2	-8.13	1.49	138.47
			Max. Torque	2			3.33
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.32	1.26	-0.42
			Max. Mx	11	-6.68	240.79	0.09
			Max. My	8	-6.67	-0.19	-242.04
L4	117 - 107	Pole	Max. Vy	11	-13.67	240.79	0.09
			Max. Vx	2	-13.72	2.03	241.48
			Max. Torque	2			3.31
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.99	1.09	-0.16
			Max. Mx	11	-10.42	404.14	0.15
L5	107 - 99.5	Pole	Max. My	8	-10.41	-0.18	-405.63
			Max. Vy	11	-19.44	404.14	0.15
			Max. Vx	2	-19.49	2.50	405.29
			Max. Torque	2			3.29
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.61	1.05	-0.12
L6	99.5 - 93.25	Pole	Max. Mx	11	-10.84	477.85	0.19
			Max. My	8	-10.83	-0.23	-479.51
			Max. Vy	11	-19.89	477.85	0.19
			Max. Vx	2	-19.94	2.71	479.19
			Max. Torque	2			3.05
			Max Tension	1	0.00	0.00	0.00
L7	93.25 - 83.25	Pole	Max. Compression	14	-23.49	1.07	-0.08
			Max. Mx	11	-12.65	687.89	0.28
			Max. My	8	-12.64	-0.33	-689.97
			Max. Vy	11	-21.89	687.89	0.28
			Max. Vx	2	-21.93	3.30	689.70
			Max. Torque	2			3.03
L8	83.25 - 73.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.87	1.31	-0.10
			Max. Mx	11	-15.82	1151.15	0.45
			Max. My	8	-15.82	-0.51	-1154.08
			Max. Vy	11	-24.45	1151.15	0.45
			Max. Vx	2	-24.50	4.49	1153.85
L9	73.25 - 69.5833	Pole	Max. Torque	2			3.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.70	1.36	-0.11
			Max. Mx	11	-16.45	1241.68	0.48
			Max. My	8	-16.44	-0.55	-1244.76
			Max. Vy	11	-24.95	1241.68	0.48
			Max. Vx	2	-25.00	4.70	1244.54
			Max. Torque	2			2.99

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L10	69.5833 - 69.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.77	1.36	-0.11
			Max. Mx	11	-16.51	1247.92	0.48
			Max. My	8	-16.51	-0.55	-1251.01
			Max. Vy	11	-24.98	1247.92	0.48
			Max. Vx	2	-25.03	4.72	1250.79
L11	69.3333 - 59	Pole	Max. Torque	2			2.99
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.28	1.43	-0.12
			Max. Mx	11	-17.67	1389.77	0.53
			Max. My	8	-17.67	-0.61	-1393.10
			Max. Vy	11	-25.84	1389.77	0.53
L12	59 - 58	Pole	Max. Vx	2	-25.89	5.04	1392.88
			Max. Torque	2			2.99
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.80	1.50	0.10
			Max. Mx	11	-19.57	1541.25	0.69
			Max. My	2	-19.56	5.37	1544.78
L13	58 - 57.8333	Pole	Max. Vy	11	-26.88	1541.25	0.69
			Max. Vx	2	-26.95	5.37	1544.78
			Max. Torque	2			2.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.84	1.51	0.10
			Max. Mx	11	-19.62	1545.73	0.69
L14	57.8333 - 57.5833	Pole	Max. My	2	-19.61	5.38	1549.27
			Max. Vy	11	-26.89	1545.73	0.69
			Max. Vx	2	-26.96	5.38	1549.27
			Max. Torque	2			2.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.91	1.51	0.10
L15	57.5833 - 50.5833	Pole	Max. Mx	11	-19.67	1552.46	0.69
			Max. My	2	-19.67	5.40	1556.01
			Max. Vy	11	-26.93	1552.46	0.69
			Max. Vx	2	-27.00	5.40	1556.01
			Max. Torque	2			2.97
			Max Tension	1	0.00	0.00	0.00
L16	50.5833 - 50.3333	Pole	Max. Compression	14	-35.03	1.34	-0.05
			Max. Mx	11	-21.35	1744.61	0.62
			Max. My	8	-21.35	-0.88	-1748.90
			Max. Vy	11	-28.05	1744.61	0.62
			Max. Vx	2	-28.13	5.60	1748.74
			Max. Torque	2			2.97
L17	50.3333 - 50.1667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.12	1.34	-0.05
			Max. Mx	11	-21.43	1751.63	0.62
			Max. My	8	-21.43	-0.88	-1755.94
			Max. Vy	11	-28.08	1751.63	0.62
			Max. Vx	2	-28.16	5.61	1755.77
L18	50.1667 - 49.9167	Pole	Max. Torque	2			2.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.17	1.34	-0.05
			Max. Mx	11	-21.48	1756.30	0.62
			Max. My	8	-21.47	-0.88	-1760.63
			Max. Vy	11	-28.10	1756.30	0.62
L18	50.1667 - 49.9167	Pole	Max. Vx	2	-28.19	5.62	1760.47
			Max. Torque	2			2.77
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.25	1.35	-0.05
			Max. Mx	11	-21.54	1763.33	0.62
			Max. My	8	-21.53	-0.88	-1767.68
L18	50.1667 - 49.9167	Pole	Max. Vy	11	-28.14	1763.33	0.62
			Max. Vx	2	-28.23	5.63	1767.52
			Max. Torque	2			2.77
			Max. Vy	11	-28.14	1763.33	0.62

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L19	49.9167 - 39.9167	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.44	1.74	-0.18
			Max. Mx	11	-24.11	2052.78	0.58
			Max. My	8	-24.11	-0.78	-2057.97
			Max. Vy	11	-29.69	2052.78	0.58
			Max. Vx	2	-29.79	6.36	2057.60
			Max. Torque	2			2.95
L20	39.9167 - 29.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.15	1.81	-0.16
			Max. Mx	11	-25.52	2215.57	0.62
			Max. My	8	-25.52	-0.84	-2221.27
			Max. Vy	11	-30.44	2215.57	0.62
			Max. Vx	2	-30.54	6.67	2220.90
			Max. Torque	2			2.94
L21	29.25 - 28.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.60	1.89	-0.15
			Max. Mx	11	-28.36	2408.78	0.67
			Max. My	8	-28.36	-0.91	-2415.06
			Max. Vy	11	-31.39	2408.78	0.67
			Max. Vx	2	-31.49	7.01	2414.70
			Max. Torque	2			2.92
L22	28.25 - 24.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-45.05	1.94	-0.13
			Max. Mx	11	-29.59	2540.70	0.71
			Max. My	8	-29.59	-0.95	-2547.38
			Max. Vy	11	-31.96	2540.70	0.71
			Max. Vx	2	-32.06	7.24	2547.03
			Max. Torque	2			2.92
L23	24.0833 - 23.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-45.15	1.95	-0.13
			Max. Mx	11	-29.69	2548.70	0.71
			Max. My	8	-29.69	-0.95	-2555.39
			Max. Vy	11	-31.98	2548.70	0.71
			Max. Vx	2	-32.08	7.25	2555.04
			Max. Torque	2			2.92
L24	23.8333 - 13.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-49.11	2.08	-0.10
			Max. Mx	11	-33.08	2875.45	0.79
			Max. My	8	-33.08	-1.06	-2883.09
			Max. Vy	11	-33.39	2875.45	0.79
			Max. Vx	2	-33.49	7.80	2882.74
			Max. Torque	2			2.92
L25	13.8333 - 3.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.90	2.23	0.08
			Max. Mx	11	-36.42	3215.75	0.92
			Max. My	8	-36.42	-1.14	-3224.23
			Max. Vy	11	-34.69	3215.75	0.92
			Max. Vx	2	-34.79	8.36	3224.00
			Max. Torque	2			2.91
L26	3.8333 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-54.22	2.23	0.08
			Max. Mx	11	-37.67	3349.55	0.96
			Max. My	8	-37.67	-1.19	-3358.37
			Max. Vy	11	-35.15	3349.55	0.96
			Max. Vx	2	-35.25	8.57	3358.18
			Max. Torque	2			2.91

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	54.22	-0.00	-9.13
	Max. H _x	11	37.69	35.13	0.01
	Max. H _z	2	37.69	0.05	35.23
	Max. M _x	2	3358.18	0.05	35.23
	Max. M _z	5	3341.85	-35.09	0.00
	Max. Torsion	2	2.91	0.05	35.23
	Min. Vert	1	37.69	0.00	0.00
	Min. H _x	5	37.69	-35.09	0.00
	Min. H _z	8	37.69	-0.01	-35.22
	Min. M _x	8	-3358.37	-0.01	-35.22
	Min. M _z	11	-3349.55	35.13	0.01
	Min. Torsion	7	-2.56	-17.50	-30.50

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	37.69	0.00	0.00	0.79	0.39	0.00
Dead+Wind 0 deg - No Ice	37.69	-0.05	-35.23	-3358.18	8.57	-2.91
Dead+Wind 30 deg - No Ice	37.69	17.55	-30.54	-2912.74	-1671.52	-1.60
Dead+Wind 60 deg - No Ice	37.69	30.37	-17.69	-1690.74	-2892.26	-0.48
Dead+Wind 90 deg - No Ice	37.69	35.09	-0.00	0.39	-3341.85	1.05
Dead+Wind 120 deg - No Ice	37.69	30.32	17.67	1689.61	-2884.09	2.00
Dead+Wind 150 deg - No Ice	37.69	17.50	30.50	2909.09	-1664.50	2.56
Dead+Wind 180 deg - No Ice	37.69	0.01	35.22	3358.37	-1.19	2.49
Dead+Wind 210 deg - No Ice	37.69	-17.51	30.56	2917.54	1667.10	1.54
Dead+Wind 240 deg - No Ice	37.69	-30.40	17.66	1687.56	2897.69	0.02
Dead+Wind 270 deg - No Ice	37.69	-35.13	-0.01	-0.97	3349.55	-1.02
Dead+Wind 300 deg - No Ice	37.69	-30.36	-17.70	-1691.28	2890.82	-2.03
Dead+Wind 330 deg - No Ice	37.69	-17.54	-30.53	-2912.26	1670.53	-2.90
Dead+Ice+Temp	54.22	-0.00	0.00	-0.08	2.23	-0.00
Dead+Wind 0 deg+Ice+Temp	54.22	-0.01	-9.13	-877.15	4.24	-0.53
Dead+Wind 30 deg+Ice+Temp	54.22	4.55	-7.92	-760.74	-434.27	-0.19
Dead+Wind 60 deg+Ice+Temp	54.22	7.87	-4.58	-441.48	-753.11	0.05
Dead+Wind 90 deg+Ice+Temp	54.22	9.10	-0.00	-0.21	-870.46	0.35
Dead+Wind 120 deg+Ice+Temp	54.22	7.86	4.58	440.61	-751.16	0.48
Dead+Wind 150 deg+Ice+Temp	54.22	4.54	7.91	759.30	-432.56	0.52
Dead+Wind 180 deg+Ice+Temp	54.22	0.00	9.13	876.65	2.01	0.44
Dead+Wind 210 deg+Ice+Temp	54.22	-4.54	7.92	761.32	437.75	0.18
Dead+Wind 240 deg+Ice+Temp	54.22	-7.88	4.58	440.18	758.90	-0.16
Dead+Wind 270 deg+Ice+Temp	54.22	-9.11	-0.00	-0.46	876.78	-0.34
Dead+Wind 300 deg+Ice+Temp	54.22	-7.87	-4.59	-441.54	757.26	-0.50
Dead+Wind 330 deg+Ice+Temp	54.22	-4.55	-7.92	-760.59	438.50	-0.60
Dead+Wind 0 deg - Service	37.69	-0.02	-12.19	-1163.00	3.25	-1.02
Dead+Wind 30 deg - Service	37.69	6.07	-10.57	-1008.67	-578.87	-0.56
Dead+Wind 60 deg - Service	37.69	10.51	-6.12	-585.27	-1001.83	-0.17
Dead+Wind 90 deg - Service	37.69	12.14	-0.00	0.68	-1157.59	0.37
Dead+Wind 120 deg - Service	37.69	10.49	6.12	585.95	-998.98	0.70
Dead+Wind 150 deg -	37.69	6.06	10.55	1008.47	-576.43	0.89

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
Service						
Dead+Wind 180 deg - Service	37.69	0.00	12.19	1164.15	-0.13	0.87
Dead+Wind 210 deg - Service	37.69	-6.06	10.57	1011.41	577.89	0.54
Dead+Wind 240 deg - Service	37.69	-10.52	6.11	585.24	1004.26	0.01
Dead+Wind 270 deg - Service	37.69	-12.16	-0.00	0.21	1160.81	-0.36
Dead+Wind 300 deg - Service	37.69	-10.50	-6.12	-585.45	1001.87	-0.71
Dead+Wind 330 deg - Service	37.69	-6.07	-10.57	-1008.49	579.08	-1.02

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-37.69	0.00	0.00	37.69	0.00	0.000%
2	-0.05	-37.69	-35.23	0.05	37.69	35.23	0.000%
3	17.55	-37.69	-30.54	-17.55	37.69	30.54	0.000%
4	30.37	-37.69	-17.69	-30.37	37.69	17.69	0.000%
5	35.09	-37.69	-0.00	-35.09	37.69	0.00	0.000%
6	30.32	-37.69	17.67	-30.32	37.69	-17.67	0.000%
7	17.50	-37.69	30.50	-17.50	37.69	-30.50	0.000%
8	0.01	-37.69	35.22	-0.01	37.69	-35.22	0.000%
9	-17.51	-37.69	30.56	17.51	37.69	-30.56	0.000%
10	-30.40	-37.69	17.66	30.40	37.69	-17.66	0.000%
11	-35.13	-37.69	-0.01	35.13	37.69	0.01	0.000%
12	-30.36	-37.69	-17.70	30.36	37.69	17.70	0.000%
13	-17.54	-37.69	-30.53	17.54	37.69	30.53	0.000%
14	0.00	-54.22	0.00	0.00	54.22	-0.00	0.000%
15	-0.01	-54.22	-9.13	0.01	54.22	9.13	0.000%
16	4.55	-54.22	-7.92	-4.55	54.22	7.92	0.000%
17	7.87	-54.22	-4.58	-7.87	54.22	4.58	0.000%
18	9.10	-54.22	-0.00	-9.10	54.22	0.00	0.000%
19	7.86	-54.22	4.58	-7.86	54.22	-4.58	0.000%
20	4.54	-54.22	7.91	-4.54	54.22	-7.91	0.000%
21	0.00	-54.22	9.13	-0.00	54.22	-9.13	0.000%
22	-4.54	-54.22	7.92	4.54	54.22	-7.92	0.000%
23	-7.88	-54.22	4.58	7.88	54.22	-4.58	0.000%
24	-9.11	-54.22	-0.00	9.11	54.22	0.00	0.000%
25	-7.87	-54.22	-4.59	7.87	54.22	4.59	0.000%
26	-4.55	-54.22	-7.92	4.55	54.22	7.92	0.000%
27	-0.02	-37.69	-12.19	0.02	37.69	12.19	0.000%
28	6.07	-37.69	-10.57	-6.07	37.69	10.57	0.000%
29	10.51	-37.69	-6.12	-10.51	37.69	6.12	0.000%
30	12.14	-37.69	-0.00	-12.14	37.69	0.00	0.000%
31	10.49	-37.69	6.12	-10.49	37.69	-6.12	0.000%
32	6.06	-37.69	10.55	-6.06	37.69	-10.55	0.000%
33	0.00	-37.69	12.19	-0.00	37.69	-12.19	0.000%
34	-6.06	-37.69	10.57	6.06	37.69	-10.57	0.000%
35	-10.52	-37.69	6.11	10.52	37.69	-6.11	0.000%
36	-12.16	-37.69	-0.00	12.16	37.69	0.00	0.000%
37	-10.50	-37.69	-6.12	10.50	37.69	6.12	0.000%
38	-6.07	-37.69	-10.57	6.07	37.69	10.57	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 137	35.424	34	2.0960	0.0137
L2	137 - 127	31.055	34	2.0704	0.0106
L3	127 - 117	26.784	34	2.0034	0.0082

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	117 - 107	22.688	34	1.9039	0.0063
L5	107 - 99.5	18.841	34	1.7632	0.0047
L6	103.25 - 93.25	17.482	34	1.6981	0.0042
L7	93.25 - 83.25	14.053	34	1.5549	0.0034
L8	83.25 - 73.25	11.000	34	1.3570	0.0026
L9	73.25 - 69.5833	8.383	34	1.1400	0.0019
L10	69.5833 - 69.3333	7.539	34	1.0569	0.0017
L11	69.3333 - 59	7.484	34	1.0528	0.0017
L12	63.75 - 58	6.308	34	0.9580	0.0014
L13	58 - 57.8333	5.188	34	0.8919	0.0013
L14	57.8333 - 57.5833	5.157	34	0.8884	0.0013
L15	57.5833 - 50.5833	5.111	34	0.8839	0.0013
L16	50.5833 - 50.3333	3.909	34	0.7553	0.0010
L17	50.3333 - 50.1667	3.870	34	0.7516	0.0010
L18	50.1667 - 49.9167	3.843	34	0.7491	0.0010
L19	49.9167 - 39.9167	3.804	34	0.7450	0.0010
L20	39.9167 - 29.25	2.420	34	0.5766	0.0007
L21	34.5 - 28.25	1.819	34	0.4835	0.0006
L22	28.25 - 24.0833	1.221	34	0.4216	0.0005
L23	24.0833 - 23.8333	0.885	34	0.3500	0.0004
L24	23.8333 - 13.8333	0.866	34	0.3465	0.0004
L25	13.8333 - 3.8333	0.292	34	0.2020	0.0002
L26	3.8333 - 0	0.022	34	0.0557	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149'	A-ANT-23G-2-C	34	35.424	2.0960	0.0157	23137
147'	APXVSP18-C-A20 w/ pipe mount	34	35.424	2.0960	0.0157	23137
145'	800MHz RRH	34	34.547	2.0926	0.0150	23137
119'	AIR 21 B2A B4P w/ pipe mount	34	23.490	1.9263	0.0076	5298
110'	(2) 7770.00 w/ pipe mount	34	19.963	1.8116	0.0059	3696
100'	APXV18-206517S-C w/ pipe mount	34	16.334	1.6500	0.0045	4175
60'	Side Arm Mount [SO 309-1]	34	5.567	0.9230	0.0016	4088
53'	GPS_A	34	4.303	0.7969	0.0013	3180
49'	KS24019-L112A	34	3.663	0.7294	0.0011	3395

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 137	101.844	9	6.0269	0.0393
L2	137 - 127	89.312	9	5.9561	0.0306
L3	127 - 117	77.056	9	5.7656	0.0236
L4	117 - 107	65.295	9	5.4811	0.0179
L5	107 - 99.5	54.242	9	5.0778	0.0134
L6	103.25 - 93.25	50.335	9	4.8907	0.0120
L7	93.25 - 83.25	40.474	9	4.4791	0.0097
L8	83.25 - 73.25	31.692	9	3.9098	0.0074
L9	73.25 - 69.5833	24.157	9	3.2854	0.0054
L10	69.5833 -	21.728	9	3.0461	0.0048

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
	69.3333				
L11	69.3333 - 59	21.569	9	3.0343	0.0047
L12	63.75 - 58	18.182	9	2.7613	0.0041
L13	58 - 57.8333	14.956	9	2.5711	0.0037
L14	57.8333 - 57.5833	14.866	9	2.5609	0.0036
L15	57.5833 - 50.5833	14.733	9	2.5478	0.0036
L16	50.5833 - 50.3333	11.270	9	2.1775	0.0029
L17	50.3333 - 50.1667	11.156	9	2.1668	0.0029
L18	50.1667 - 49.9167	11.081	9	2.1597	0.0029
L19	49.9167 - 39.9167	10.968	9	2.1477	0.0029
L20	39.9167 - 29.25	6.978	9	1.6626	0.0021
L21	34.5 - 28.25	5.244	9	1.3942	0.0016
L22	28.25 - 24.0833	3.522	9	1.2158	0.0014
L23	24.0833 - 23.8333	2.551	9	1.0094	0.0011
L24	23.8333 - 13.8333	2.499	9	0.9992	0.0011
L25	13.8333 - 3.8333	0.843	9	0.5827	0.0006
L26	3.8333 - 0	0.065	9	0.1607	0.0002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149'	A-ANT-23G-2-C	9	101.844	6.0269	0.0449	8426
147'	APXVSP18-C-A20 w/ pipe mount	9	101.844	6.0269	0.0449	8426
145'	800MHz RRH	9	99.328	6.0179	0.0428	8426
119'	AIR 21 B2A B4P w/ pipe mount	9	67.598	5.5454	0.0217	1886
110'	(2) 7770.00 w/ pipe mount	9	57.465	5.2165	0.0169	1309
100'	APXV18-206517S-C w/ pipe mount	9	47.034	4.7524	0.0128	1473
60'	Side Arm Mount [SO 309-1]	9	16.049	2.6607	0.0044	1426
53'	GPS_A	9	12.404	2.2972	0.0036	1107
49'	KS24019-L112A	9	10.560	2.1028	0.0032	1182

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	% Capacity	Pass Fail
L1	147 - 137	Pole	TP23.75x22x0.25	Pole	15.1	Pass
L2	137 - 127	Pole	TP25.5x23.75x0.25	Pole	28.2	Pass
L3	127 - 117	Pole	TP27.25x25.5x0.25	Pole	42.9	Pass
L4	117 - 107	Pole	TP29x27.25x0.25	Pole	63.3	Pass
L5	107 - 103.25	Pole	TP30.313x29x0.25	Pole	71.4	Pass
L6	103.25 - 93.25	Pole	TP30.907x29.157x0.3125	Pole	70.0	Pass
L7	93.25 - 83.25	Pole	TP32.657x30.907x0.3125	Pole	83.0	Pass
L8	83.25 - 73.25	Pole	TP34.406x32.657x0.3125	Pole	94.0	Pass
L9	73.25 - 69.58	Pole	TP35.048x34.406x0.3125	Pole	97.6	Pass
L10	69.58 - 69.33	Pole + Reinf.	TP35.092x35.048x0.4375	Reinf. 3 Tension Rupture	82.9	Pass
L11	69.33 - 63.75	Pole + Reinf.	TP36.9x35.092x0.4313	Reinf. 3 Tension Rupture	87.9	Pass
L12	63.75 - 58	Pole	TP36.45x35.444x0.375	Pole	93.7	Pass
L13	58 - 57.83	Pole	TP36.479x36.45x0.375	Pole	93.8	Pass
L14	57.83 - 57.58	Pole + Reinf.	TP36.523x36.479x0.4375	Reinf. 5 Tension Rupture	91.6	Pass
L15	57.58 - 50.58	Pole + Reinf.	TP37.748x36.523x0.4375	Reinf. 5 Tension Rupture	96.8	Pass
L16	50.58 - 50.33	Pole + Reinf.	TP37.792x37.748x0.55	Reinf. 2 Tension Rupture	80.7	Pass
L17	50.33 - 50.17	Pole + Reinf.	TP37.821x37.792x0.55	Reinf. 2 Tension Rupture	80.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	% Capacity	Pass Fail
L18	50.17 - 49.92	Pole + Reinf.	TP37.865x37.821x0.4875	Reinf. 2 Tension Rupture	89.5	Pass
L19	49.92 - 39.92	Pole + Reinf.	TP39.614x37.865x0.4875	Reinf. 2 Tension Rupture	96.0	Pass
L20	39.92 - 34.5	Pole + Reinf.	TP41.481x39.614x0.4813	Reinf. 2 Tension Rupture	99.2	Pass
L21	34.5 - 28.25	Pole + Reinf.	TP40.906x39.812x0.5188	Reinf. 4 Tension Rupture	95.1	Pass
L22	28.25 - 24.08	Pole + Reinf.	TP41.635x40.906x0.5125	Reinf. 4 Tension Rupture	97.1	Pass
L23	24.08 - 23.83	Pole + Reinf.	TP41.679x41.635x0.625	Reinf. 1 Tension Rupture	85.9	Pass
L24	23.83 - 13.83	Pole + Reinf.	TP43.429x41.679x0.6125	Reinf. 1 Tension Rupture	90.1	Pass
L25	13.83 - 3.83	Pole + Reinf.	TP45.179x43.429x0.6	Reinf. 1 Tension Rupture	94.0	Pass
L26	3.83 - 0	Pole + Reinf.	TP45.85x45.179x0.6	Reinf. 1 Tension Rupture	95.4	Pass
Summary						
Pole (L9)					97.6	Pass
Reinforcement (L20)					99.2	Pass
RATING =					99.2	Pass

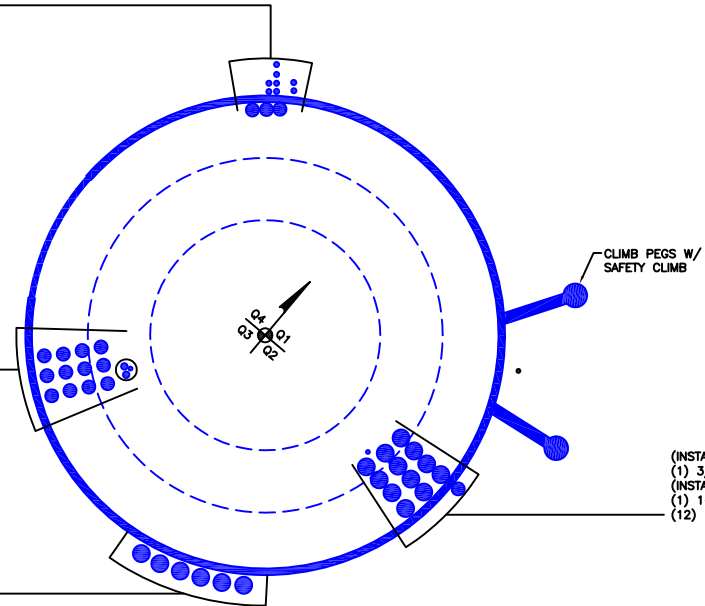
APPENDIX B
BASE LEVEL DRAWING



(INSTALLED)
(6) 1/2" TO 147 FT LEVEL
(INSTALLED)
(1) 1/2" TO 53 FT LEVEL
(INSTALLED)
(1) 1/2" TO 49 FT LEVEL
(3) 1-1/4" TO 147 FT LEVEL

(INSTALLED-IN 2" CONDUIT)
(1) 3/8" TO 110 FT LEVEL
(2) 5/8" TO 110 FT LEVEL
(INSTALLED)
(1) 1/2" TO 53 FT LEVEL
(12) 1-1/4" TO 110 FT LEVEL

(INSTALLED)
(6) 1-5/8" TO 100 FT LEVEL



(INSTALLED-TO-BE-REMOVED)
(1) 3/8" TO 119 FT LEVEL
(INSTALLED)
(1) 1-1/4" TO 119 FT LEVEL
(12) 1-5/8" TO 119 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

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

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

Site Data

BU#: 876321
 Site Name: Branford Banm Tower
 App #: 310056, Rev. 3

Anchor Rod Data

Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, F_y :	75	ksi
Strength, F_u :	100	ksi
Bolt Circle:	54	in
Anchor Spacing:	6	in

Plate Data

W=Side:	54	in
Thick:	3.5	in
Grade:	50	ksi
Clip Distance:	8	in

Stiffener Data (Welding at both sides)

Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	45.85	in
Thick:	0.6	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round

Stress Increase Factor

ASD ASIF:	1.333	
-----------	-------	--

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

Base Reactions

TIA Revision:	F	
Unfactored Moment, M:	3360	ft-kips
Unfactored Axial, P:	38	kips
Unfactored Shear, V:	35	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension: 184.3 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 94.5% **Pass**

Base Plate Results

Base Plate Stress: 38.4 ksi
 Allowable PL Bending Stress: 50.0 ksi
 Base Plate Stress Ratio: 76.8% **Pass**

Flexural Check

PL Ref. Data

Yield Line (in):	30.52
Max PL Length:	30.52

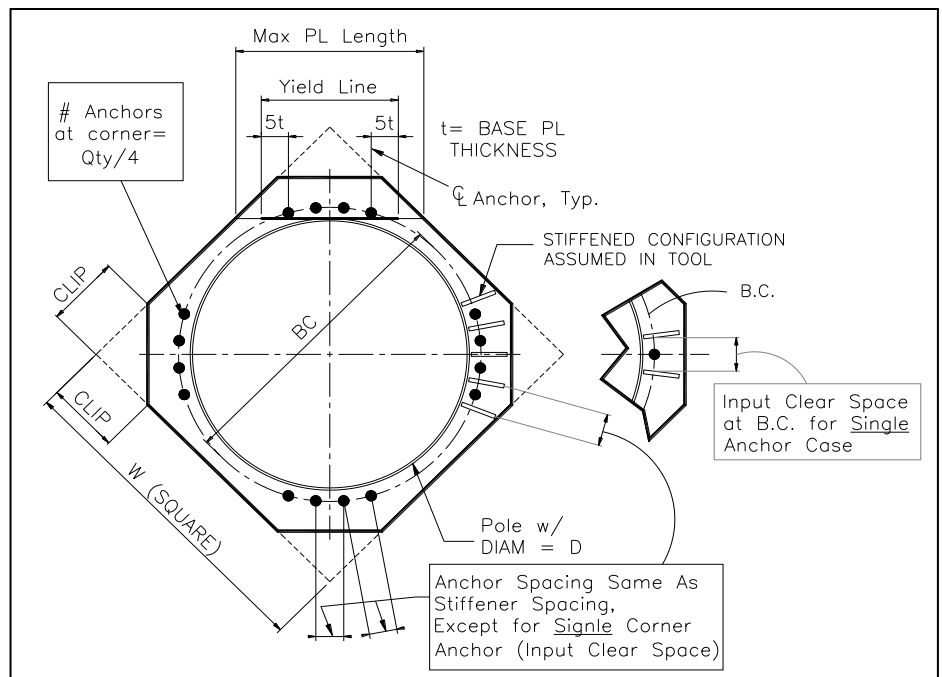
N/A - Unstiffened

Stiffener Results

Horizontal Weld: N/A
 Vertical Weld: N/A
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: N/A
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: N/A
 Plate Comp. (AISC Bracket): N/A

Pole Results

Pole Punching Shear Check: N/A





MORRISON HERSHFIELD

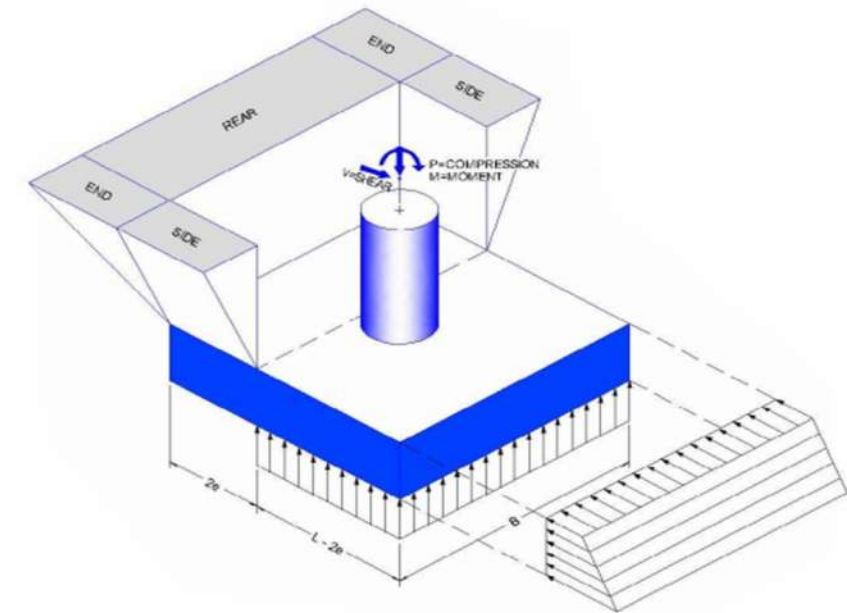
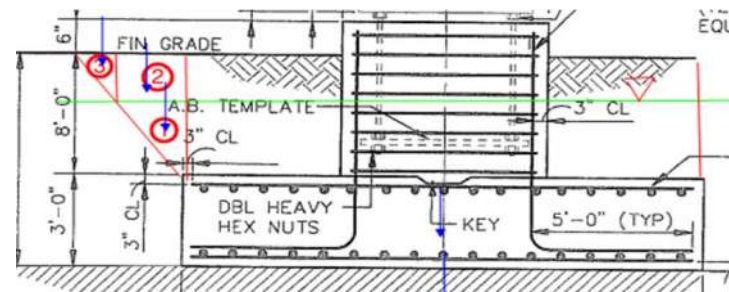
Project:	CN4-479R1 / 6160004	Client:	Crown Castle
Site Name:	Branford Banm Tower	Site ID:	876321
Des. By:	KSH	Ck. By:	TH
Date:	10/9/2015	page:	1 OF 1
Base Reactions Forces			
TIA Revision =	F		
Unfactored DL Axial, PD=	38	kips	
Unfactored WL Axial, PW=	0	kips	
Unfactored WL Shear, V=	35	kips	
Unfactored WL Moment, M=	3360	ft-kips	
Pad and Pier Data			
Base PL Dist. Above Pier=	0	in	
Pier Dist. Above Grade=	6	in	
Pad Bearing Depth, D=	11	ft	
Pad Thickness, T=	3	ft	
Pad Width=Length, L=	20.5	ft	
Pier Cross Section Shape=	Square		
Enter Pier Diameter=	7	ft	
Concrete Density=	150	pcf	
Pier Cross Section Area=	49.00	ft ²	
Pier Height=	8.5	ft	
Soil (above pad) Height=	8	ft	
Water Unit Weight=	62.4	pcf	
Soil Parameters			
Unit Weight, γ =	125	pcf	
Allowable Gross Bearing *=	6.00	ksf ^s	
Soil Pull-Out Angle for Overturning, ϕ =	30	degrees	
Ground Water Depth=	3	ft	
Bearing Results:			
Applied Bearing =	7.44	ksf	
Capacity =	93.0%	Pass	
OTM Results:			
FoS =	1.57		
Capacity =	95.7%	Pass	

^sNote: Allowable bearing pressure of 6 ksf has been assumed for the foundation bearing on bed rock.

Length at GWT	2.89	ft
Length at grade	4.62	ft
Width for part 3	1.73	ft

Part	Volume, ft ³	Unit wt, kcf	Weight, Kips	Moment Arm, ft	Resisting Moment, k-ft
Concrete Dry	171.50	0.1500	25.73	10.25	263.68
Concrete Wet	1505.75	0.0876	131.90	10.25	1352.01
Direct Overburden Dry	1113.75	0.1250	139.22	10.25	1426.99
Direct Overburden Wet	1856.25	0.0650	120.66	10.25	1236.73
1-1 Rear-end wet	147.95	0.0650	9.62	21.46	206.39
1-2 Rear-end dry	177.54	0.1250	22.19	21.94	486.97
1-3 Rear-end dry	53.26	0.1250	6.66	23.96	159.54
2-1 Near-side wet	8.33	0.0650	0.54	12.24	6.63
2-2 Near-side dry	76.30	0.1250	9.54	12.24	116.74
2-3 Near-side dry	42.92	0.1250	5.37	12.24	65.67
3-1 Far-side wet	8.33	0.0650	0.54	12.24	6.63
3-2 Far-side dry	76.16	0.1250	9.52	12.24	116.52
3-3 Far-side dry	42.84	0.1250	5.35	12.24	65.54
Reaction from tnx, P =			38.00	10.25	389.50
					5899.54

Overtuning Moment **3762.50** k-ft
 Weight of soil+conc. (no wedges) 455.50 kips
 Eccentricity 8.26 ft



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

T-Mobile Existing Facility

Site ID: CTNH107A

**NH107/ Global/ Cherry Hill
150 North Main Street
Branford, CT 06405**

September 24, 2015

EBI Project Number: 6215004884

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	7.59 %

September 24, 2015

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

Emissions Analysis for Site: **CTNH107A – NH107/ Global/ Cherry Hill**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **150 North Main Street, Branford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS and AWS bands is 1000 $\mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **150 North Main Street, Branford, 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 / UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **Ericsson AIR21 (B4A/B2P & B2A/B4P)** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 (B4A/B2P & B2A/B4P)** have a maximum gain of **15.9 dBd** at their main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is **121 feet** above ground level (AGL).
- 9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	121	Height (AGL):	121	Height (AGL):	121
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.27	Antenna B1 MPE%	1.27	Antenna C1 MPE%	1.27
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	121	Height (AGL):	121	Height (AGL):	121
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	1.27	Antenna B2 MPE%	1.27	Antenna C2 MPE%	1.27
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	121	Height (AGL):	121	Height (AGL):	121
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.50	Antenna B3 MPE%	0.50	Antenna C3 MPE%	0.50

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	3.04 %
AT&T	3.00 %
MetroPCS	0.49 %
PageNet	0.10 %
Cingular UMTS	0.15 %
Nextel	0.42 %
Clearwire	0.09 %
Sprint	0.30 %
Site Total MPE %:	7.59 %

T-Mobile Sector 1 Total:	3.04 %
T-Mobile Sector 2 Total:	3.04 %
T-Mobile Sector 3 Total:	3.04 %
Site Total:	7.59 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	121	12.69	2100	1000	1.27 %
T-Mobile 700 MHz LTE	1	865.21	121	2.35	700	467	0.50 %
T-Mobile 1900 MHz (PCS) GSM/UMTS	2	1167.14	121	6.35	1900	1000	0.63 %
T-Mobile 2100 MHz (AWS) UMTS	2	1167.14	121	6.35	2100	1000	0.63 %
						Total:	3.04%

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	3.04 %
Sector 2:	3.04 %
Sector 3 :	3.04 %
T-Mobile Per Sector Maximum:	3.04 %
Site Total:	7.59 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **7.59%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



Scott Heffernan
RF Engineering Director

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Burlington, MA 01803