



Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

January 15, 2016

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

RE: Notice of Exempt Modification for T-Mobile / L700 Crown Site BU: 876347
T-Mobile Site ID: CT11377C
53 Slater Street, Manchester, CT 06040
Latitude: 41° 48' 18.0"/ Longitude: -72° 32' 1.0"

Dear Ms. Bachman:

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

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

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

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

This modification complies with the aforementioned conditions.

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

The Foundation for a Wireless World.

CrownCastle.com

Melanie A. Bachman

January 15, 2016

Page 2

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

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

Sincerely,

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

Attachments:

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

Tab 2: Exhibit-2: Structural Modification Report

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

cc: The Honorable Jay Moran, Mayor for the Town of Manchester
Manchester Board of Directors
41 Center Street
Manchester, CT 06045-0191

Melanie A. Bachman
January 15, 2016
Page 2

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

VOL 2013 PG 259

TOWN OF MANCHESTER
PLANNING AND ZONING COMMISSION



CERTIFICATE OF APPROVAL OF SPECIAL EXCEPTION

Owner of record: Raglin Associates, c/o Sullivan Tile Dist.

Property Address: 53 Slater Street

Applicant: Sprint Spectrum LP

Regulation(s) cited: Article IV, Section 19.05

SPECIAL EXCEPTION GRANTED:

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

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

CERTIFIED:

Frank Davera

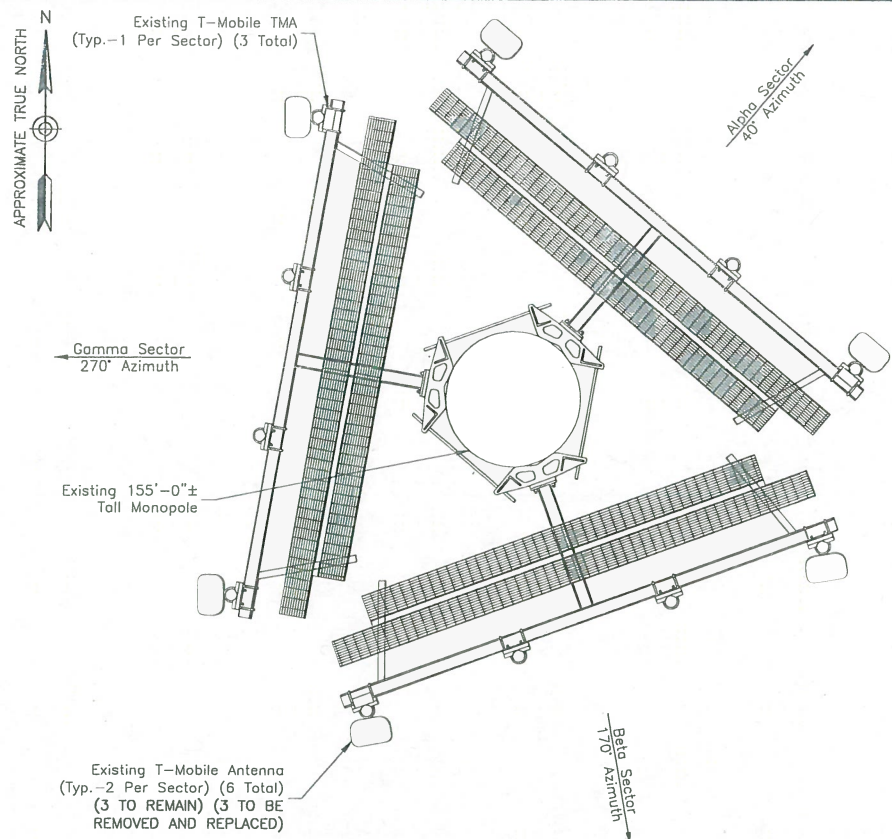
Secretary
Planning and Zoning Commission

Received for Record on
SEP 11 1998 at 2:43 P.M.

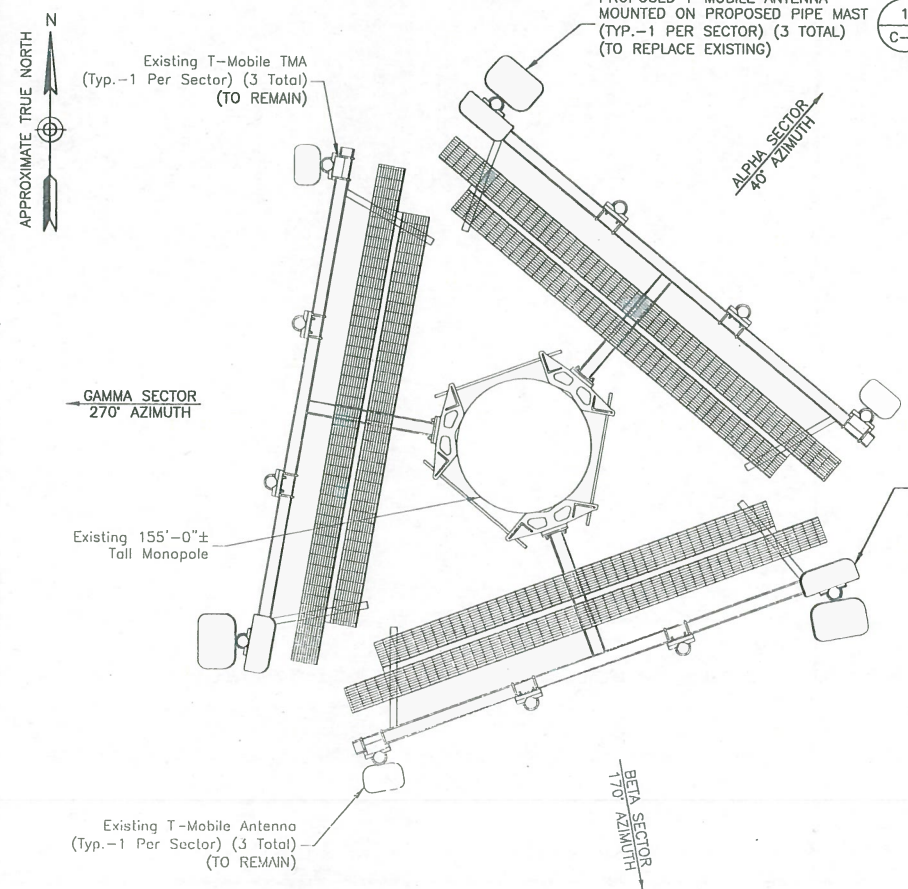
Joseph V. Campos
Joseph V. Campos, Town Clerk

*DATE ADOPTED: August 17, 1998

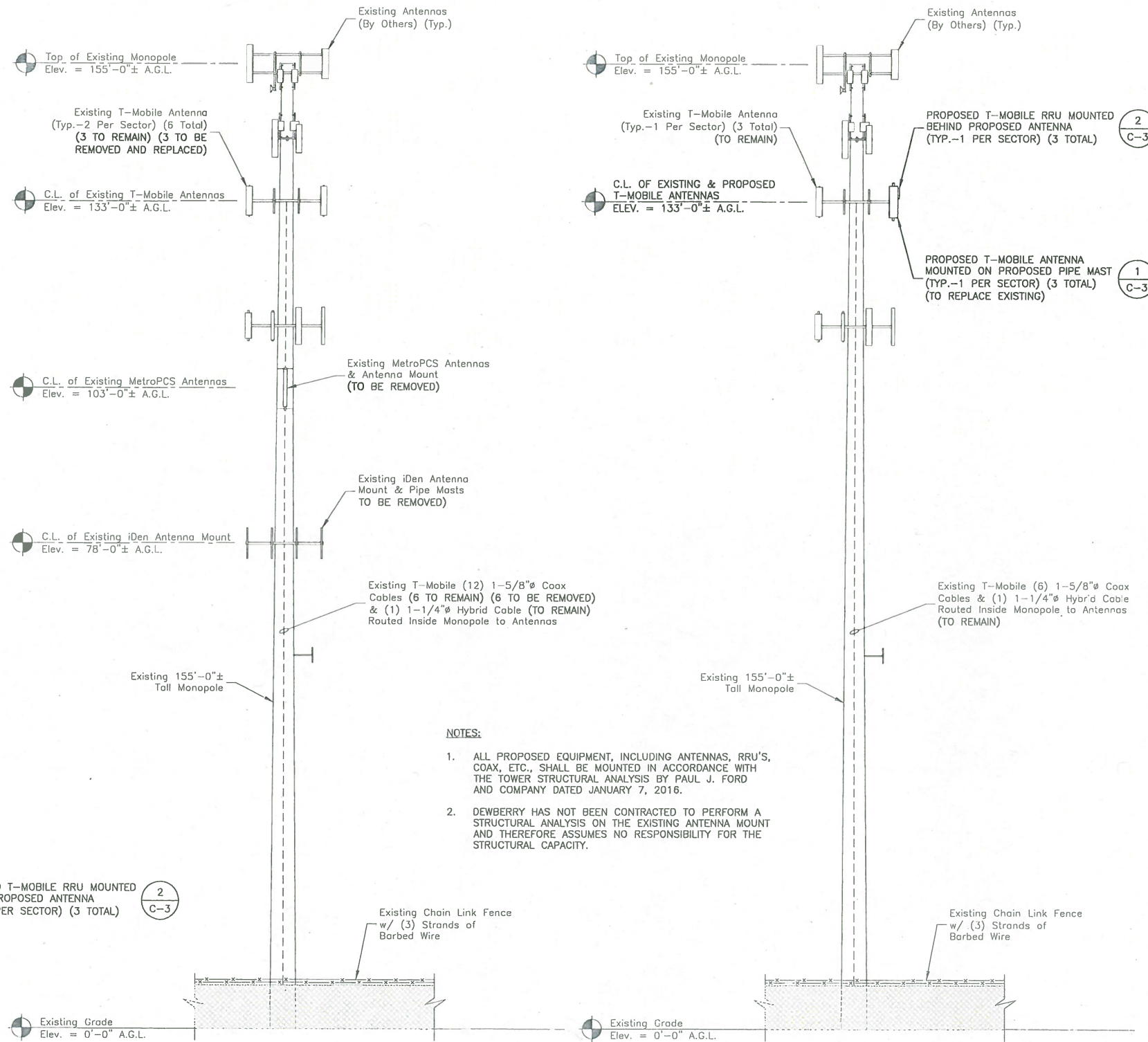
FILE NO. S-147



EXISTING ANTENNA LAYOUT
SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT
SCALE: N.T.S.



NOTES:

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD AND COMPANY DATED JANUARY 7, 2016.
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.

EXISTING ELEVATION

SCALE: 3/64"=1' FOR 11"x17"
3/32"=1' FOR 22"x34"



PROPOSED ELEVATION

SCALE: 3/64"=1' FOR 11"x17"
3/32"=1' FOR 22"x34"



T-Mobile

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

CROWN CASTLE

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

**CT11377C
BUCKLAND MALL**

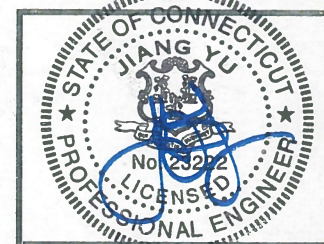
CONSTRUCTION DRAWINGS

01/14/16 ISSUED AS FINAL

Dewberry

Dewberry Engineers Inc.

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



JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222

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

DRAWN BY: RA

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

JOB NUMBER: 50078113

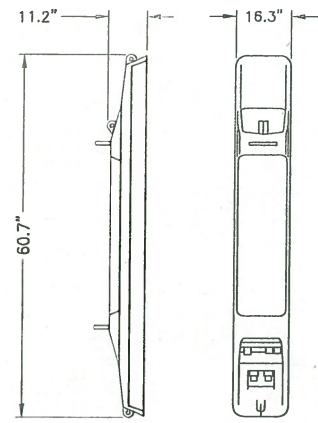
SITE ADDRESS:

53 SLATER STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

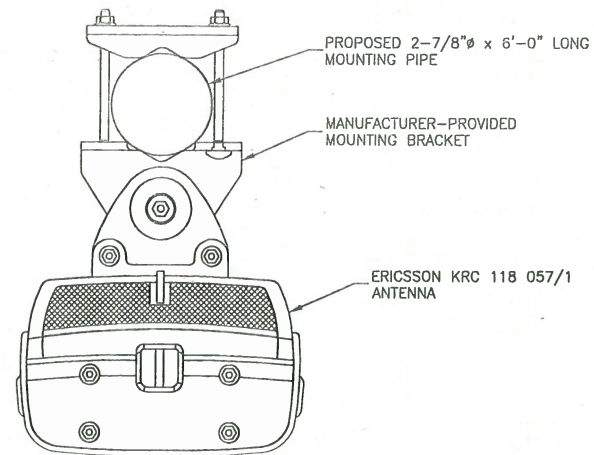
SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER



WEIGHT: 143.0 LBS

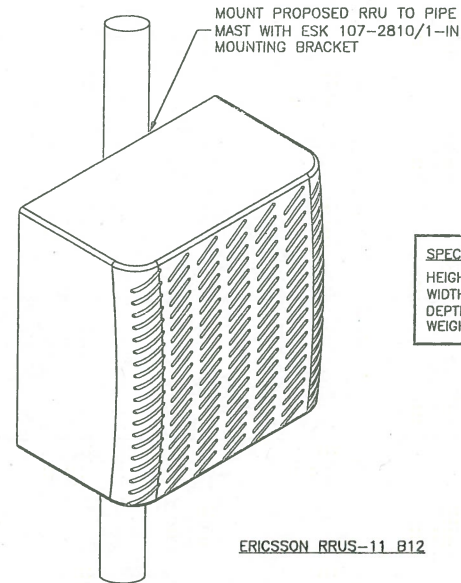


NOTES:

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.

ANTENNA DETAIL
SCALE: N.T.S.

1



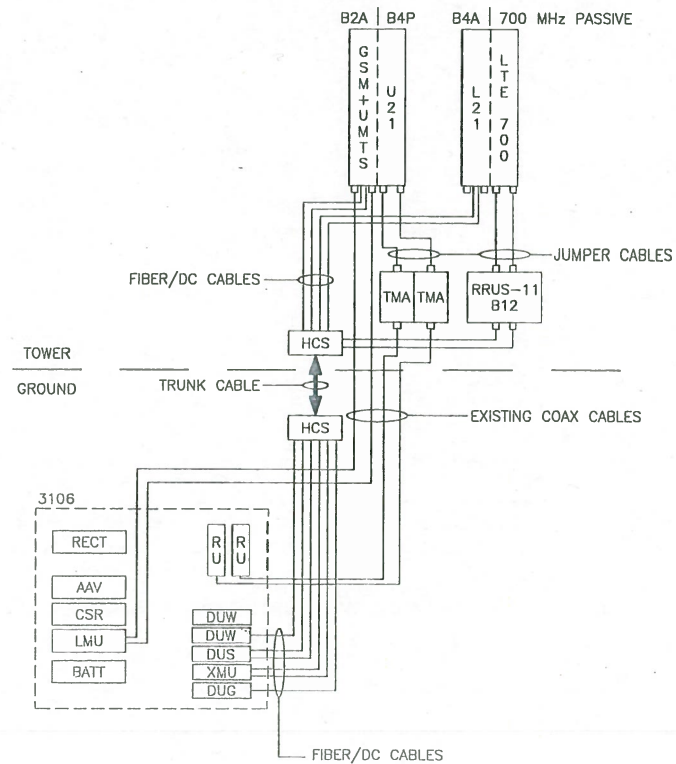
SPECIFICATIONS:
HEIGHT: 20.0"
WIDTH: 17.0"
DEPTH: 7.0"
WEIGHT: 50.7 LBS

RRU NOTES:

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

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

2



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

3

DESIGN CONFIGURATION							
ANTENNAS	COAX		HYBRID	COAX/HYBRID LENGTH	TMA	RRU	
	EXISTING	PROPOSED			EXISTING	PROPOSED	
ALPHA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	(4) 1-5/8"ø	(2) 1-5/8"ø TO BE REMOVED	-	(1) RRUS-11 B12	
	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN			(1) KRY 112 144/1	-	
BETA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	(4) 1-5/8"ø	(2) 1-5/8"ø TO BE REMOVED	-	(1) RRUS-11 B12	
	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN		(1) 1-1/4"ø	(1) KRY 112 144/1	-	
GAMMA	ERICSSON AIR 21 B4A B2P	ERICSSON KRC 118 057/1	(4) 1-5/8"ø	(2) 1-5/8"ø TO BE REMOVED	-	(1) RRUS-11 B12	
	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN			(1) KRY 112 144/1	-	

T-Mobile

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

CROWN CASTLE

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3 CORPORATE PARK DRIVE, SUITE 101
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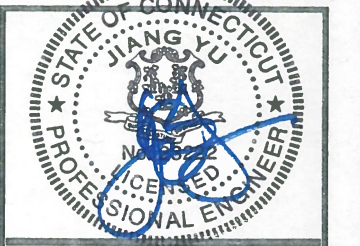
**CT11377C
BUCKLAND MALL**

CONSTRUCTION DRAWINGS

0	01/14/16	ISSUED AS FINAL
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Dewberry

Dewberry Engineers Inc.
600 PARSIPPANY ROAD
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PARSIIPPANY, NJ 07054
PHONE: 973.739.8400
FAX: 973.739.9710



JIANG YU, P.E.
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REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

JOB NUMBER: 50078113

SITE ADDRESS:

53 SLATER STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SHEET TITLE

CONSTRUCTION
DETAILS

SHEET NUMBER

C-3



Date: January 07, 2016

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

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

Subject: Structural Analysis Report

Carrier Designation: *T-Mobile Co-Locate*
Carrier Site Number: CT11377C
Carrier Site Name: Sprint Manchester/slater

Crown Castle Designation:
Crown Castle BU Number: 876347
Crown Castle Site Name: BUCKLAND MALL
Crown Castle JDE Job Number: 352348
Crown Castle Work Order Number: 1174922
Crown Castle Application Number: 316283 Rev. 6

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

Site Data: 53 Slater Street, MANCHESTER, Hartford County, CT
Latitude 41° 48' 18", Longitude -72° 32' 1"
155 Foot - Monopole Tower

Dear Jason Rouse,

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

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

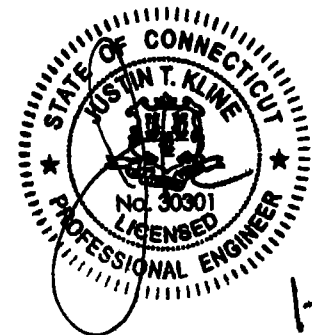
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

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

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

Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer



1-8-16

Date: **January 07, 2016**

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

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
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TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 – Section Capacity (Summary)

Table 5 – Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 155 ft. monopole tower designed by Summit in February of 2002. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

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

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
155.0	155.0	3	alcatel lucent	TD-RRH8x20-25	3 5 1 1 3	5/16 1/2 5/8 3/4 1-1/4	1
		3	argus technologies	LPX310R w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	samsung telecommunications	WIMAX DAP HEAD			
		1	tower mounts	Platform Mount [LP 713-1]			
	151.0	1	andrew	VHLP1-23			
		1	andrew	VHLP2-11			
		1	andrew	VHLP2.5-18			
		3	dragonwave	HORIZON COMPACT			
153.0	153.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	--	--	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Pipe Mount [PM 601-3]			
145.0	145.0	3	ericsson	RRUS 11	--	--	1
		1	tower mounts	Pipe Mount [PM 601-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
143.0	143.0	3	ericsson	RRUS-11	1 2 6	3/8 3/4 1-1/4	1
		3	kathrein	800 10121 w/ Mount Pipe			
		6	kathrein	860 10025			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	T-Arm Mount [TA 702-3]			
133.0	133.0	3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	6	1-5/8	3
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-1/4	1
		3	ericsson	KRY 112 144/1	6	1-5/8	
		1	tower mounts	Platform Mount [LP 403-1]			
113.0	113.0	3	alcatel lucent	RRH2X60-AWS	1	1-5/8	2
		3	alcatel lucent	RRH2X60-PCS			
		3	alcatel lucent	RRH2x60-700			
		6	commscope	SBNHH-1D65B w/ Mount Pipe	13	1-5/8	1
		3	andrew	LNx-6512DS-TOM w/ Mount Pipe			
		3	antel	BXA-70063/6CFx2 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
1	tower mounts	Platform Mount [LP 1201-1]					
103.0	103.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	3
		1	tower mounts	Pipe Mount [PM 601-3]			
78.0	78.0	1	tower mounts	Platform Mount [LP 303-1]	--	--	3
60.0	60.0	1	tower mounts	Side Arm Mount [SO 701-1]	1	1/2	1

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

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

3.1) Analysis Method

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

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

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

Table 5 - Tower Component Stresses vs. Capacity

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

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

Notes:

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

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

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

- 1) Tower is located in Hartford County, Connecticut.
- 2) Basic wind speed of 80.0 mph.
- 3) Nominal ice thickness of 1.00 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56 pcf.
- 6) A wind speed of 37.6 mph is used in combination with ice.
- 7) Temperature drop of 50 °F.
- 8) Deflections calculated using a wind speed of 50.0 mph.
- 9) A non-linear (P-delta) analysis was used.
- 10) Pressures are calculated at each section.
- 11) Stress ratio used in pole design is 1.333.
- 12) 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 Appurt.
Autocalc Torque Arm Areas
SR Members Have Cut Ends
Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing
Use TIA-222-G Tension Splice
Capacity Exemption | Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
✓ Consider Feedline Torque
Include Angle Block Shear Check
Poles
✓ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets |
|--|--|---|

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	155.00-115.50	39.50	3.75	18	22.00	29.31	0.25	1.00	A607-60 (60 ksi)
L2	115.50-79.25	40.00	4.50	18	28.11	35.51	0.31	1.25	A607-65 (65 ksi)
L3	79.25-43.75	40.00	5.25	18	34.06	41.46	0.38	1.50	A607-65 (65 ksi)
L4	43.75-0.00	49.00		18	39.73	48.80	0.44	1.75	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
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Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	22.34	17.26	1031.48	7.72	11.18	92.29	2064.32	8.63	3.43	13.728
	29.76	23.06	2459.70	10.32	14.89	165.21	4922.63	11.53	4.72	18.873
L2	29.25	27.58	2692.83	9.87	14.28	188.55	5389.20	13.79	4.40	14.074
	36.06	34.92	5466.10	12.50	18.04	302.98	10939.40	17.46	5.70	18.241
L3	35.43	40.09	5745.80	11.96	17.30	332.11	11499.17	20.05	5.33	14.224
	42.10	48.90	10425.54	14.58	21.06	495.05	20864.80	24.45	6.64	17.697
L4	41.33	54.57	10646.61	13.95	20.19	527.44	21307.22	27.29	6.22	14.225
	49.55	67.16	19844.89	17.17	24.79	800.51	39715.89	33.59	7.82	17.872

Tower 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 155.00-115.50				1	1	1		
L2 115.50-79.25				1	1	1		
L3 79.25-43.75				1	1	1		
L4 43.75-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _A A _A	Weight
				ft		ft ² /ft	plf
ATCB-B01-005(5/16)	C	No	Inside Pole	155.00 - 0.00	3	No Ice	0.07
						1/2" Ice	0.07
						1" Ice	0.07
						2" Ice	0.07
						4" Ice	0.07
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	155.00 - 0.00	5	No Ice	0.14
						1/2" Ice	0.76
						1" Ice	2.00
						2" Ice	6.30
						4" Ice	22.23
2" Conduit	C	No	CaAa (Out Of Face)	155.00 - 0.00	1	No Ice	1.16
						1/2" Ice	2.53
						1" Ice	4.51
						2" Ice	10.30
						4" Ice	29.21
2" Conduit	C	No	CaAa (Out Of Face)	155.00 - 0.00	1	No Ice	1.16
						1/2" Ice	2.53
						1" Ice	4.51
						2" Ice	10.30
						4" Ice	29.21
9776(3/4")	C	No	Inside Pole	155.00 - 0.00	1	No Ice	0.31
						1/2" Ice	0.31
						1" Ice	0.31
						2" Ice	0.31
						4" Ice	0.31
HB058-M12-XXXF(5/8")	C	No	Inside Pole	155.00 - 0.00	1	No Ice	0.24
						1/2" Ice	0.24
						1" Ice	0.24
						2" Ice	0.24
						4" Ice	0.24
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	155.00 - 0.00	3	No Ice	1.08
						1/2" Ice	1.08
						1" Ice	1.08
						2" Ice	1.08
						4" Ice	1.08
*** LDF6-50A(1-1/4")	C	No	Inside Pole	143.00 - 0.00	6	No Ice	0.66
						1/2" Ice	0.66
						1" Ice	0.66

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight
						ft ² /ft	plf	
FB-L98B-002-75000(3/8")	C	No	Inside Pole	143.00 - 0.00	1	2" Ice	0.00	0.66
						4" Ice	0.00	0.66
						No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	143.00 - 0.00	2	4" Ice	0.00	0.06
						No Ice	0.00	0.59
						1/2" Ice	0.00	0.59
						1" Ice	0.00	0.59
						2" Ice	0.00	0.59
						4" Ice	0.00	0.59
2" Conduit	C	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	1.16
						1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
						2" Ice	0.00	1.16
						4" Ice	0.00	1.16

HB114-21U3M12-XXXF(1-1/4")	C	No	Inside Pole	133.00 - 0.00	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

LCF158-50JA-A0(1 5/8")	C	No	Inside Pole	133.00 - 0.00	6	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

561(1-5/8")	C	No	Inside Pole	113.00 - 0.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35

HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	113.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
						2" Ice	0.00	1.30
						4" Ice	0.00	1.30

HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	113.00 - 0.00	1	No Ice	0.20	1.30
						1/2" Ice	0.30	2.81
						1" Ice	0.40	4.94
						2" Ice	0.60	11.02
						4" Ice	1.00	30.52

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

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R	A _F	C _A A _A In Face	C _A A _A Out Face	Weight
			ft ²	ft ²	ft ²	ft ²	K
L1	155.00-115.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.873	0.48
L2	115.50-79.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	12.990	1.18
L3	79.25-43.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	13.206	1.21

Tower Section n	Tower Elevation ft	Face	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
L4	43.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.275	1.49

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	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	155.00-115.50	A	1.184	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	16.224	1.35
L2	115.50-79.25	A	1.138	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	29.562	2.14
L3	79.25-43.75	A	1.077	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	29.367	2.09
L4	43.75-0.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	35.128	2.48

Feed Line Center of Pressure

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
LPX310R w/ Mount Pipe	A	From Leg	4.00	0.000	155.00	No Ice	2.31	2.34	0.03
			0.00			1/2"	2.64	2.87	0.05
			0.00			Ice	2.99	3.41	0.08
						1" Ice	3.77	4.56	0.16
						2" Ice	5.50	7.24	0.40
LPX310R w/ Mount Pipe	B	From Leg	4.00	0.000	155.00	No Ice	2.31	2.34	0.03
			0.00			1/2"	2.64	2.87	0.05
			0.00			Ice	2.99	3.41	0.08
						1" Ice	3.77	4.56	0.16
						2" Ice	5.50	7.24	0.40
LPX310R w/ Mount Pipe	C	From Leg	4.00	0.000	155.00	No Ice	2.31	2.34	0.03
			0.00			1/2"	2.64	2.87	0.05
			0.00			Ice	2.99	3.41	0.08
						1" Ice	3.77	4.56	0.16
						2" Ice	5.50	7.24	0.40

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral	Vert					
HORIZON COMPACT	A	From Leg	4.00	0.000	155.00	4" Ice	0.84	0.43	0.01	
			0.00			No Ice	0.97	0.52	0.02	
			-4.00			1/2" Ice	1.10	0.63	0.03	
						1" Ice	1.39	0.86	0.05	
						2" Ice	2.08	1.43	0.12	
HORIZON COMPACT	B	From Leg	4.00	0.000	155.00	4" Ice	0.84	0.43	0.01	
			0.00			No Ice	0.97	0.52	0.02	
			-4.00			1/2" Ice	1.10	0.63	0.03	
						1" Ice	1.39	0.86	0.05	
						2" Ice	2.08	1.43	0.12	
HORIZON COMPACT	C	From Leg	4.00	0.000	155.00	4" Ice	0.84	0.43	0.01	
			0.00			No Ice	0.97	0.52	0.02	
			-4.00			1/2" Ice	1.10	0.63	0.03	
						1" Ice	1.39	0.86	0.05	
						2" Ice	2.08	1.43	0.12	
WIMAX DAP HEAD	A	From Leg	4.00	0.000	155.00	4" Ice	1.80	0.78	0.03	
			0.00			No Ice	1.99	0.92	0.04	
			0.00			1/2" Ice	2.18	1.07	0.06	
						1" Ice	2.59	1.39	0.09	
						2" Ice	3.51	2.14	0.20	
WIMAX DAP HEAD	B	From Leg	4.00	0.000	155.00	4" Ice	1.80	0.78	0.03	
			0.00			No Ice	1.99	0.92	0.04	
			0.00			1/2" Ice	2.18	1.07	0.06	
						1" Ice	2.59	1.39	0.09	
						2" Ice	3.51	2.14	0.20	
WIMAX DAP HEAD	C	From Leg	4.00	0.000	155.00	4" Ice	1.80	0.78	0.03	
			0.00			No Ice	1.99	0.92	0.04	
			0.00			1/2" Ice	2.18	1.07	0.06	
						1" Ice	2.59	1.39	0.09	
						2" Ice	3.51	2.14	0.20	
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.000	155.00	4" Ice	8.50	6.95	0.08	
			0.00			No Ice	9.15	8.13	0.15	
			0.00			1/2" Ice	9.77	9.02	0.23	
						1" Ice	11.03	10.84	0.41	
						2" Ice	13.68	14.85	0.91	
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.000	155.00	4" Ice	8.50	6.95	0.08	
			0.00			No Ice	9.15	8.13	0.15	
			0.00			1/2" Ice	9.77	9.02	0.23	
						1" Ice	11.03	10.84	0.41	
						2" Ice	13.68	14.85	0.91	
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.000	155.00	4" Ice	8.50	6.95	0.08	
			0.00			No Ice	9.15	8.13	0.15	
			0.00			1/2" Ice	9.77	9.02	0.23	
						1" Ice	11.03	10.84	0.41	
						2" Ice	13.68	14.85	0.91	
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00	0.000	155.00	4" Ice	7.13	4.96	0.08	
			0.00			No Ice	7.66	5.75	0.13	
			0.00			1/2" Ice	8.18	6.47	0.19	
						1" Ice	9.26	8.01	0.34	
						2" Ice	11.53	11.41	0.75	
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00	0.000	155.00	4" Ice	7.13	4.96	0.08	
			0.00			No Ice	7.66	5.75	0.13	
			0.00			1/2" Ice	8.18	6.47	0.19	
						1" Ice	9.26	8.01	0.34	
						2" Ice	11.53	11.41	0.75	

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral	Vert						ft
			ft	ft	ft	°	ft	ft ²	ft ²	K	
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00	0.00	0.00	0.000	155.00	2" Ice	11.53	11.41	0.75
								4" Ice			
								No Ice	7.13	4.96	0.08
								1/2" Ice	7.66	5.75	0.13
								1" Ice	8.18	6.47	0.19
TD-RRH8x20-25	A	From Leg	4.00	0.00	0.00	0.000	155.00	1" Ice	9.26	8.01	0.34
								2" Ice	11.53	11.41	0.75
								4" Ice			
								No Ice	4.72	1.70	0.07
								1/2" Ice	5.01	1.92	0.10
TD-RRH8x20-25	B	From Leg	4.00	0.00	0.00	0.000	155.00	Ice	5.32	2.15	0.13
								1" Ice	5.95	2.62	0.20
								2" Ice	7.31	3.68	0.40
								4" Ice			
								No Ice	4.72	1.70	0.07
TD-RRH8x20-25	C	From Leg	4.00	0.00	0.00	0.000	155.00	1/2" Ice	5.01	1.92	0.10
								Ice	5.32	2.15	0.13
								1" Ice	5.95	2.62	0.20
								2" Ice	7.31	3.68	0.40
								4" Ice			
Platform Mount [LP 713-1]	C	None			0.000	155.00	No Ice	31.27	31.27	1.51	
							1/2" Ice	39.68	39.68	1.93	
							Ice	48.09	48.09	2.35	
							1" Ice	64.91	64.91	3.19	
							2" Ice	98.55	98.55	4.86	
*** 800MHz 2X50W RRH W/FILTER	A	From Leg	1.00	0.00	0.00	0.000	153.00	4" Ice			
								No Ice	2.40	2.25	0.06
								1/2" Ice	2.61	2.46	0.09
								Ice	2.83	2.68	0.11
								1" Ice	3.30	3.13	0.17
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00	0.00	0.00	0.000	153.00	2" Ice	4.34	4.15	0.34
								4" Ice			
								No Ice	2.40	2.25	0.06
								1/2" Ice	2.61	2.46	0.09
								Ice	2.83	2.68	0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00	0.00	0.00	0.000	153.00	1" Ice	3.30	3.13	0.17
								2" Ice	4.34	4.15	0.34
								4" Ice			
								No Ice	2.40	2.25	0.06
								1/2" Ice	2.61	2.46	0.09
PCS 1900MHz 4x45W- 65MHz	A	From Leg	1.00	0.00	0.00	0.000	153.00	Ice	2.83	2.68	0.11
								1" Ice	3.30	3.13	0.17
								2" Ice	4.34	4.15	0.34
								4" Ice			
								No Ice	2.71	2.61	0.06
PCS 1900MHz 4x45W- 65MHz	B	From Leg	1.00	0.00	0.00	0.000	153.00	1/2" Ice	2.95	2.85	0.08
								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			
PCS 1900MHz 4x45W- 65MHz	C	From Leg	1.00	0.00	0.00	0.000	153.00	No Ice	2.71	2.61	0.06
								1/2" Ice	2.95	2.85	0.08
								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 ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
			Horz ft	Lateral ft						
				0.00						
Pipe Mount [PM 601-3]	C	None			0.000	153.00	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			
							No Ice	4.39	4.39	0.20
							1/2"	5.48	5.48	0.24
							Ice	6.57	6.57	0.28
							1" Ice	8.75	8.75	0.36
2" Ice	13.11	13.11	0.53							
4" Ice										

RRUS 11	A	From Leg		1.00 0.00 0.00	0.000	145.00	No Ice	3.26	1.38	0.05
							1/2"	3.50	1.56	0.07
							Ice	3.75	1.74	0.10
							1" Ice	4.28	2.15	0.15
							2" Ice	5.44	3.05	0.31
							4" Ice			
							No Ice	3.26	1.38	0.05
							1/2"	3.50	1.56	0.07
Ice	3.75	1.74	0.10							
1" Ice	4.28	2.15	0.15							
2" Ice	5.44	3.05	0.31							
4" Ice										
RRUS 11	B	From Leg		1.00 0.00 0.00	0.000	145.00	No Ice	3.26	1.38	0.05
							1/2"	3.50	1.56	0.07
							Ice	3.75	1.74	0.10
							1" Ice	4.28	2.15	0.15
							2" Ice	5.44	3.05	0.31
							4" Ice			
							No Ice	3.26	1.38	0.05
							1/2"	3.50	1.56	0.07
Ice	3.75	1.74	0.10							
1" Ice	4.28	2.15	0.15							
2" Ice	5.44	3.05	0.31							
4" Ice										
RRUS 11	C	From Leg		1.00 0.00 0.00	0.000	145.00	No Ice	3.26	1.38	0.05
							1/2"	3.50	1.56	0.07
							Ice	3.75	1.74	0.10
							1" Ice	4.28	2.15	0.15
							2" Ice	5.44	3.05	0.31
							4" Ice			
							No Ice	3.26	1.38	0.05
							1/2"	3.50	1.56	0.07
Ice	3.75	1.74	0.10							
1" Ice	4.28	2.15	0.15							
2" Ice	5.44	3.05	0.31							
4" Ice										
Pipe Mount [PM 601-3]	C	None			0.000	145.00	No Ice	4.39	4.39	0.20
							1/2"	5.48	5.48	0.24
							Ice	6.57	6.57	0.28
							1" Ice	8.75	8.75	0.36
							2" Ice	13.11	13.11	0.53
							4" Ice			
							No Ice	4.39	4.39	0.20
							1/2"	5.48	5.48	0.24
Ice	6.57	6.57	0.28							
1" Ice	8.75	8.75	0.36							
2" Ice	13.11	13.11	0.53							
4" Ice										

AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg		3.00 0.00 0.00	0.000	143.00	No Ice	8.50	6.30	0.07
							1/2"	9.15	7.48	0.14
							Ice	9.77	8.37	0.21
							1" Ice	11.03	10.18	0.38
							2" Ice	13.68	14.02	0.87
							4" Ice			
							No Ice	8.50	6.30	0.07
							1/2"	9.15	7.48	0.14
Ice	9.77	8.37	0.21							
1" Ice	11.03	10.18	0.38							
2" Ice	13.68	14.02	0.87							
4" Ice										
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg		3.00 0.00 0.00	0.000	143.00	No Ice	8.50	6.30	0.07
							1/2"	9.15	7.48	0.14
							Ice	9.77	8.37	0.21
							1" Ice	11.03	10.18	0.38
							2" Ice	13.68	14.02	0.87
							4" Ice			
							No Ice	8.50	6.30	0.07
							1/2"	9.15	7.48	0.14
Ice	9.77	8.37	0.21							
1" Ice	11.03	10.18	0.38							
2" Ice	13.68	14.02	0.87							
4" Ice										
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg		3.00 0.00 0.00	0.000	143.00	No Ice	8.50	6.30	0.07
							1/2"	9.15	7.48	0.14
							Ice	9.77	8.37	0.21
							1" Ice	11.03	10.18	0.38
							2" Ice	13.68	14.02	0.87
							4" Ice			
							No Ice	8.50	6.30	0.07
							1/2"	9.15	7.48	0.14
Ice	9.77	8.37	0.21							
1" Ice	11.03	10.18	0.38							
2" Ice	13.68	14.02	0.87							
4" Ice										
800 10121 w/ Mount Pipe	A	From Leg		3.00 0.00 0.00	0.000	143.00	No Ice	6.03	4.95	0.07
							1/2"	6.71	6.02	0.12
							Ice	7.30	6.81	0.18
							1" Ice	8.50	8.46	0.32
							2" Ice	11.04	12.10	0.73
							4" Ice			
							No Ice	6.03	4.95	0.07
							1/2"	6.71	6.02	0.12
Ice	7.30	6.81	0.18							
1" Ice	8.50	8.46	0.32							
2" Ice	11.04	12.10	0.73							
4" Ice										
800 10121 w/ Mount Pipe	B	From Leg		3.00 0.00 0.00	0.000	143.00	No Ice	6.03	4.95	0.07
							1/2"	6.71	6.02	0.12
							Ice	7.30	6.81	0.18
							1" Ice	8.50	8.46	0.32
							2" Ice	11.04	12.10	0.73
							4" Ice			
							No Ice	6.03	4.95	0.07
							1/2"	6.71	6.02	0.12
Ice	7.30	6.81	0.18							
1" Ice	8.50	8.46	0.32							
2" Ice	11.04	12.10	0.73							
4" Ice										

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral						ft
							ft ²	ft ²	K	
800 10121 w/ Mount Pipe	C	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	6.03	4.95	0.07
							1/2" Ice	6.71	6.02	0.12
							1" Ice	7.30	6.81	0.18
							2" Ice	8.50	8.46	0.32
(2) 860 10025	A	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	0.16	0.13	0.00
							1/2" Ice	0.22	0.19	0.00
							1" Ice	0.29	0.26	0.01
							2" Ice	0.47	0.43	0.01
(2) 860 10025	B	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	0.16	0.13	0.00
							1/2" Ice	0.22	0.19	0.00
							1" Ice	0.29	0.26	0.01
							2" Ice	0.47	0.43	0.01
(2) 860 10025	C	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	0.16	0.13	0.00
							1/2" Ice	0.22	0.19	0.00
							1" Ice	0.29	0.26	0.01
							2" Ice	0.47	0.43	0.01
(2) LGP21401	A	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	1.29	0.36	0.01
							1/2" Ice	1.45	0.48	0.02
							1" Ice	1.61	0.60	0.03
							2" Ice	1.97	0.87	0.05
(2) LGP21401	B	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	1.29	0.36	0.01
							1/2" Ice	1.45	0.48	0.02
							1" Ice	1.61	0.60	0.03
							2" Ice	1.97	0.87	0.05
(2) LGP21401	C	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	1.29	0.36	0.01
							1/2" Ice	1.45	0.48	0.02
							1" Ice	1.61	0.60	0.03
							2" Ice	1.97	0.87	0.05
RRUS-11	A	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	3.25	1.37	0.05
							1/2" Ice	3.49	1.55	0.07
							1" Ice	3.74	1.74	0.09
							2" Ice	4.27	2.14	0.15
RRUS-11	B	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	3.25	1.37	0.05
							1/2" Ice	3.49	1.55	0.07
							1" Ice	3.74	1.74	0.09
							2" Ice	4.27	2.14	0.15
RRUS-11	C	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	3.25	1.37	0.05
							1/2" Ice	3.49	1.55	0.07
							1" Ice	3.74	1.74	0.09
							2" Ice	4.27	2.14	0.15
DC6-48-60-18-8F	A	From Leg	3.00	0.00	0.00	143.00	4" Ice			
							No Ice	1.47	1.47	0.02
							1/2" Ice	1.67	1.67	0.04
							1" Ice	1.88	1.88	0.06
							1" Ice	2.33	2.33	0.11

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement		C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral						
T-Arm Mount [TA 702-3]	C	None			0.000	143.00	2" Ice	3.38	3.38	0.24
							4" Ice			
							No Ice	5.64	5.64	0.34
							1/2" Ice	6.55	6.55	0.43
							1" Ice	7.46	7.46	0.52
							2" Ice	9.28	9.28	0.70
*** ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice	6.83	5.64	0.11	
						1/2" Ice	7.35	6.48	0.17	
						1" Ice	7.86	7.26	0.23	
						2" Ice	8.93	8.86	0.38	
						4" Ice	11.18	12.29	0.81	
						ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000
1/2" Ice	7.35	6.48	0.17							
1" Ice	7.86	7.26	0.23							
2" Ice	8.93	8.86	0.38							
4" Ice	11.18	12.29	0.81							
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	133.00					
						1/2" Ice	7.35	6.48	0.17	
						1" Ice	7.86	7.26	0.23	
						2" Ice	8.93	8.86	0.38	
						4" Ice	11.18	12.29	0.81	
						KRY 112 144/1	A	From Leg	4.00 0.00 0.00	0.000
1/2" Ice	0.50	0.27	0.01							
1" Ice	0.59	0.35	0.02							
2" Ice	0.81	0.53	0.03							
4" Ice	1.36	1.00	0.08							
KRY 112 144/1	B	From Leg	4.00 0.00 0.00	0.000	133.00					
						1/2" Ice	0.50	0.27	0.01	
						1" Ice	0.59	0.35	0.02	
						2" Ice	0.81	0.53	0.03	
						4" Ice	1.36	1.00	0.08	
						KRY 112 144/1	C	From Leg	4.00 0.00 0.00	0.000
1/2" Ice	0.50	0.27	0.01							
1" Ice	0.59	0.35	0.02							
2" Ice	0.81	0.53	0.03							
4" Ice	1.36	1.00	0.08							
KRC 118 057/1 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	133.00					
						1/2" Ice	10.29	8.83	0.24	
						1" Ice	10.84	9.65	0.33	
						2" Ice	11.96	11.36	0.52	
						4" Ice	14.31	14.98	1.05	
						KRC 118 057/1 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000
1/2" Ice	10.29	8.83	0.24							
1" Ice	10.84	9.65	0.33							
2" Ice	11.96	11.36	0.52							
4" Ice	14.31	14.98	1.05							
KRC 118 057/1 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	133.00					
						1/2" Ice	10.29	8.83	0.24	
						1" Ice	10.84	9.65	0.33	
						2" Ice	11.96	11.36	0.52	
						4" Ice	14.31	14.98	1.05	
						RRUS 11 B12	A	From Leg	4.00 0.00	0.000
1/2" Ice	3.55	1.54	0.07							

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz Lateral	Vert						ft
				0.00						
						Ice	3.80	1.73	0.10	
						1" Ice	4.33	2.13	0.15	
						2" Ice	5.50	3.04	0.31	
						4" Ice				
RRUS 11 B12	B	From Leg	4.00	0.00	0.000	133.00	No Ice	3.31	1.36	0.05
			0.00				1/2"	3.55	1.54	0.07
			0.00				Ice	3.80	1.73	0.10
							1" Ice	4.33	2.13	0.15
							2" Ice	5.50	3.04	0.31
							4" Ice			
RRUS 11 B12	C	From Leg	4.00	0.00	0.000	133.00	No Ice	3.31	1.36	0.05
			0.00				1/2"	3.55	1.54	0.07
			0.00				Ice	3.80	1.73	0.10
							1" Ice	4.33	2.13	0.15
							2" Ice	5.50	3.04	0.31
							4" Ice			
(2) 2.375" OD x 5' Mount Pipe	A	From Leg	4.00	0.00	0.000	133.00	No Ice	1.19	1.19	0.02
			0.00				1/2"	1.50	1.50	0.03
			0.00				Ice	1.81	1.81	0.04
							1" Ice	2.46	2.46	0.08
							2" Ice	3.92	3.92	0.20
							4" Ice			
(2) 2.375" OD x 5' Mount Pipe	B	From Leg	4.00	0.00	0.000	133.00	No Ice	1.19	1.19	0.02
			0.00				1/2"	1.50	1.50	0.03
			0.00				Ice	1.81	1.81	0.04
							1" Ice	2.46	2.46	0.08
							2" Ice	3.92	3.92	0.20
							4" Ice			
(2) 2.375" OD x 5' Mount Pipe	C	From Leg	4.00	0.00	0.000	133.00	No Ice	1.19	1.19	0.02
			0.00				1/2"	1.50	1.50	0.03
			0.00				Ice	1.81	1.81	0.04
							1" Ice	2.46	2.46	0.08
							2" Ice	3.92	3.92	0.20
							4" Ice			
Platform Mount [LP 403-1]	C	None			0.000	133.00	No Ice	18.85	18.85	1.50
							1/2"	24.30	24.30	1.80
							Ice	29.75	29.75	2.09
							1" Ice	40.65	40.65	2.69
							2" Ice	62.45	62.45	3.87
							4" Ice			

BXA-70063/6CFx2 w/ Mount Pipe	A	From Leg	4.00	0.00	0.000	113.00	No Ice	7.97	5.40	0.04
			0.00				1/2"	8.61	6.55	0.10
			0.00				Ice	9.22	7.41	0.17
							1" Ice	10.46	9.18	0.33
							2" Ice	13.07	12.93	0.79
							4" Ice			
BXA-70063/6CFx2 w/ Mount Pipe	B	From Leg	4.00	0.00	0.000	113.00	No Ice	7.97	5.40	0.04
			0.00				1/2"	8.61	6.55	0.10
			0.00				Ice	9.22	7.41	0.17
							1" Ice	10.46	9.18	0.33
							2" Ice	13.07	12.93	0.79
							4" Ice			
BXA-70063/6CFx2 w/ Mount Pipe	C	From Leg	4.00	0.00	0.000	113.00	No Ice	7.97	5.40	0.04
			0.00				1/2"	8.61	6.55	0.10
			0.00				Ice	9.22	7.41	0.17
							1" Ice	10.46	9.18	0.33
							2" Ice	13.07	12.93	0.79
							4" Ice			
LNX-6512DS-T0M w/ Mount Pipe	A	From Leg	4.00	0.00	0.000	113.00	No Ice	5.85	4.55	0.05
			0.00				1/2"	6.31	5.23	0.09
			0.00				Ice	6.77	5.91	0.15
							1" Ice	7.74	7.34	0.28
							2" Ice	9.80	10.46	0.65
							4" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz Lateral	Vert						ft
LNx-6512DS-T0M w/ Mount Pipe	B	From Leg	4.00	0.00	0.000	113.00	No Ice	5.85	4.55	0.05
							1/2" Ice	6.31	5.23	0.09
							Ice	6.77	5.91	0.15
							1" Ice	7.74	7.34	0.28
							2" Ice	9.80	10.46	0.65
LNx-6512DS-T0M w/ Mount Pipe	C	From Leg	4.00	0.00	0.000	113.00	No Ice	5.85	4.55	0.05
							1/2" Ice	6.31	5.23	0.09
							Ice	6.77	5.91	0.15
							1" Ice	7.74	7.34	0.28
							2" Ice	9.80	10.46	0.65
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.00	0.000	113.00	No Ice	5.60	2.33	0.04
							1/2" Ice	5.92	2.56	0.08
							Ice	6.24	2.79	0.12
							1" Ice	6.91	3.28	0.21
							2" Ice	8.37	4.37	0.45
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.00	0.000	113.00	No Ice	8.64	7.07	0.07
							1/2" Ice	9.30	8.26	0.14
							Ice	9.92	9.18	0.21
							1" Ice	11.20	11.01	0.39
							2" Ice	13.86	15.05	0.90
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.00	0.000	113.00	No Ice	8.64	7.07	0.07
							1/2" Ice	9.30	8.26	0.14
							Ice	9.92	9.18	0.21
							1" Ice	11.20	11.01	0.39
							2" Ice	13.86	15.05	0.90
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.00	0.000	113.00	No Ice	8.64	7.07	0.07
							1/2" Ice	9.30	8.26	0.14
							Ice	9.92	9.18	0.21
							1" Ice	11.20	11.01	0.39
							2" Ice	13.86	15.05	0.90
RRH2X60-AWS	A	From Leg	4.00	0.00	0.000	113.00	No Ice	2.19	1.43	0.04
							1/2" Ice	2.40	1.61	0.06
							Ice	2.61	1.80	0.08
							1" Ice	3.07	2.21	0.13
							2" Ice	4.09	3.13	0.26
RRH2X60-AWS	B	From Leg	4.00	0.00	0.000	113.00	No Ice	2.19	1.43	0.04
							1/2" Ice	2.40	1.61	0.06
							Ice	2.61	1.80	0.08
							1" Ice	3.07	2.21	0.13
							2" Ice	4.09	3.13	0.26
RRH2X60-AWS	C	From Leg	4.00	0.00	0.000	113.00	No Ice	2.19	1.43	0.04
							1/2" Ice	2.40	1.61	0.06
							Ice	2.61	1.80	0.08
							1" Ice	3.07	2.21	0.13
							2" Ice	4.09	3.13	0.26
RRH2X60-PCS	A	From Leg	4.00	0.00	0.000	113.00	No Ice	2.57	2.01	0.06
							1/2" Ice	2.79	2.22	0.08
							Ice	3.02	2.43	0.10
							1" Ice	3.52	2.89	0.16
							2" Ice	4.61	3.92	0.31
RRH2X60-PCS	B	From Leg	4.00	0.00	0.000	113.00	No Ice	2.57	2.01	0.06
							1/2" Ice	2.79	2.22	0.08
							Ice	3.02	2.43	0.10
							1" Ice	3.52	2.89	0.16
							2" Ice	4.61	3.92	0.31

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz Lateral	Vert						ft
RRH2X60-PCS	C	From Leg	4.00	0.00	0.000	113.00	4" Ice			
							No Ice	2.57	2.01	0.06
							1/2"	2.79	2.22	0.08
							Ice	3.02	2.43	0.10
							1" Ice	3.52	2.89	0.16
RRH2x60-700	A	From Leg	4.00	0.00	0.000	113.00	2" Ice	4.61	3.92	0.31
							4" Ice			
							No Ice	3.96	1.82	0.06
							1/2"	4.27	2.08	0.08
							Ice	4.60	2.36	0.11
RRH2x60-700	B	From Leg	4.00	0.00	0.000	113.00	1" Ice	5.27	2.96	0.17
							2" Ice	6.72	4.25	0.35
							4" Ice			
							No Ice	3.96	1.82	0.06
							1/2"	4.27	2.08	0.08
RRH2x60-700	C	From Leg	4.00	0.00	0.000	113.00	Ice	4.60	2.36	0.11
							1" Ice	5.27	2.96	0.17
							2" Ice	6.72	4.25	0.35
							4" Ice			
							No Ice	3.96	1.82	0.06
Platform Mount [LP 1201-1]	C	None	0.00	0.000	113.00	1/2"	4.27	2.08	0.08	
						Ice	4.60	2.36	0.11	
						1" Ice	5.27	2.96	0.17	
						2" Ice	6.72	4.25	0.35	
						4" Ice				
2.375" OD x 4' Mount Pipe	C	From Leg	3.00	0.00	0.000	60.00	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
Side Arm Mount [SO 701-1]	C	None	0.00	0.000	60.00	4" Ice				
						No Ice	0.85	1.67	0.07	
						1/2"	1.14	2.34	0.08	
						Ice	1.43	3.01	0.09	
						1" Ice	2.01	4.35	0.12	
						2" Ice	3.17	7.03	0.18	
						4" Ice				

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
VHLP1-23	A	Paraboloid w/o Radome	From Leg	4.00	0.00	0.000	°	155.00	1.27	No Ice	1.28	0.01
										1/2" Ice	1.45	0.02
										1" Ice	1.62	0.03
										2" Ice	1.97	0.04
										4" Ice	2.66	0.07

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

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 155.00-115.50	134.52	1.494	24	84.444	A	0.000	84.444	84.444	100.00	0.000	0.000
					B	0.000	84.444	84.444	100.00	0.000	0.000
					C	0.000	84.444	84.444	100.00	0.000	6.873
L2 115.50-79.25	96.99	1.361	22	97.153	A	0.000	97.153	97.153	100.00	0.000	0.000
					B	0.000	97.153	97.153	100.00	0.000	0.000
					C	0.000	97.153	97.153	100.00	0.000	12.990
L3 79.25-43.75	61.36	1.194	19	112.927	A	0.000	112.927	112.927	100.00	0.000	0.000
					B	0.000	112.927	112.927	100.00	0.000	0.000
					C	0.000	112.927	112.927	100.00	0.000	13.206
L4 43.75-0.00	21.22	1	16	163.162	A	0.000	163.162	163.162	100.00	0.000	0.000
					B	0.000	163.162	163.162	100.00	0.000	0.000
					C	0.000	163.162	163.162	100.00	0.000	16.275

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 155.00-115.50	134.52	1.494	5	1.18	92.237	A	0.000	92.237	92.237	100.00	0.000	0.000
						B	0.000	92.237	92.237	100.00	0.000	0.000
						C	0.000	92.237	92.237	100.00	0.000	16.224
L2 115.50-79.25	96.99	1.361	5	1.14	104.304	A	0.000	104.304	104.304	100.00	0.000	0.000
						B	0.000	104.304	104.304	100.00	0.000	0.000
						C	0.000	104.304	104.304	100.00	0.000	29.562
L3 79.25-43.75	61.36	1.194	4	1.08	119.661	A	0.000	119.661	119.661	100.00	0.000	0.000
						B	0.000	119.661	119.661	100.00	0.000	0.000
						C	0.000	119.661	119.661	100.00	0.000	29.367
L4 43.75-0.00	21.22	1	4	1.00	171.017	A	0.000	171.017	171.017	100.00	0.000	0.000
						B	0.000	171.017	171.017	100.00	0.000	0.000
						C	0.000	171.017	171.017	100.00	0.000	35.128

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_z	q_z psf	A_G ft ²	Face	A_F ft ²	A_R ft ²	A_{leg} ft ²	Leg %	C_{AA} In Face ft ²	C_{AA} Out Face ft ²
L1 155.00-115.50	134.52	1.494	10	84.444	A	0.000	84.444	84.444	100.00	0.000	0.000
					B	0.000	84.444	100.00	0.000	0.000	
					C	0.000	84.444	100.00	0.000	6.873	
L2 115.50-79.25	96.99	1.361	9	97.153	A	0.000	97.153	97.153	100.00	0.000	0.000
					B	0.000	97.153	100.00	0.000	0.000	
					C	0.000	97.153	100.00	0.000	12.990	
L3 79.25-43.75	61.36	1.194	8	112.927	A	0.000	112.927	112.927	100.00	0.000	0.000
					B	0.000	112.927	100.00	0.000	0.000	
					C	0.000	112.927	100.00	0.000	13.206	
L4 43.75-0.00	21.22	1	6	163.162	A	0.000	163.162	163.162	100.00	0.000	0.000
					B	0.000	163.162	100.00	0.000	0.000	
					C	0.000	163.162	100.00	0.000	16.275	

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

Maximum Reactions

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

Tower Mast Reaction Summary

Load 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	37.93	-0.00	0.00	0	1	0
Dead+Wind 0 deg - No Ice	37.93	0.03	-28.52	-3285	-3	0
Dead+Wind 30 deg - No Ice	37.93	14.33	-24.62	-2832	-1655	0
Dead+Wind 60 deg - No Ice	37.93	24.68	-14.19	-1632	-2846	0
Dead+Wind 90 deg - No Ice	37.93	28.44	-0.04	-5	-3277	0
Dead+Wind 120 deg - No Ice	37.93	24.72	14.18	1630	-2851	0
Dead+Wind 150 deg - No Ice	37.93	14.21	24.63	2834	-1636	0

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

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	-37.93	0.00	0.00	37.93	-0.00	0.000%
2	0.03	-37.93	-28.53	-0.03	37.93	28.52	0.007%
3	14.33	-37.93	-24.62	-14.33	37.93	24.62	0.000%
4	24.68	-37.93	-14.19	-24.68	37.93	14.19	0.000%
5	28.44	-37.93	-0.04	-28.44	37.93	0.04	0.007%
6	24.72	-37.93	14.18	-24.72	37.93	-14.18	0.000%
7	14.21	-37.93	24.63	-14.21	37.93	-24.63	0.000%
8	0.09	-37.93	28.47	-0.09	37.93	-28.47	0.007%
9	-14.11	-37.93	24.69	14.11	37.93	-24.69	0.000%

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

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.0000001	0.0000001
2	Yes	15	0.00007013	0.00009673
3	Yes	20	0.0000001	0.00006688
4	Yes	20	0.0000001	0.00006598
5	Yes	15	0.00007015	0.00010371
6	Yes	20	0.0000001	0.00006588
7	Yes	20	0.0000001	0.00006573
8	Yes	15	0.00007017	0.00010341
9	Yes	19	0.0000001	0.00014897
10	Yes	19	0.0000001	0.00015000
11	Yes	15	0.00007014	0.00010413
12	Yes	20	0.0000001	0.00006646
13	Yes	20	0.0000001	0.00006625
14	Yes	9	0.0000001	0.00001340
15	Yes	16	0.00010003	0.00011865
16	Yes	17	0.0000001	0.00010375
17	Yes	17	0.0000001	0.00010303
18	Yes	16	0.00010005	0.00011810
19	Yes	17	0.0000001	0.00010393
20	Yes	17	0.0000001	0.00010307
21	Yes	16	0.00010002	0.00011896
22	Yes	17	0.0000001	0.00010480
23	Yes	17	0.0000001	0.00010503
24	Yes	16	0.00010003	0.00011949
25	Yes	17	0.0000001	0.00010484
26	Yes	17	0.0000001	0.00010530
27	Yes	15	0.00007536	0.00005031
28	Yes	16	0.0000001	0.00013115
29	Yes	16	0.0000001	0.00012799
30	Yes	15	0.00007538	0.00005064
31	Yes	16	0.0000001	0.00012731

32	Yes	16	0.00000001	0.00012747
33	Yes	15	0.00007536	0.00005026
34	Yes	16	0.00000001	0.00012583
35	Yes	16	0.00000001	0.00012711
36	Yes	15	0.00007537	0.00005026
37	Yes	16	0.00000001	0.00012942
38	Yes	16	0.00000001	0.00012830

Maximum Tower Deflections - Service Wind

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

Critical Deflections and Radius of Curvature - Service Wind

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

Maximum Tower Deflections - Design Wind

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

Critical Deflections and Radius of Curvature - Design Wind

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

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

Compression Checks

Pole Design Data

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

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
L1	155 - 115.5 (1)	TP29.31x22x0.25	368	28.09	36.00	0.780	0	0.00	36.00	0.000
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	1105	45.92	39.00	1.177	0	0.00	39.00	0.000
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	1953	49.68	39.00	1.274	0	0.00	39.00	0.000
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	3285	49.25	39.00	1.263	0	0.00	39.00	0.000

Pole Shear Design Data

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

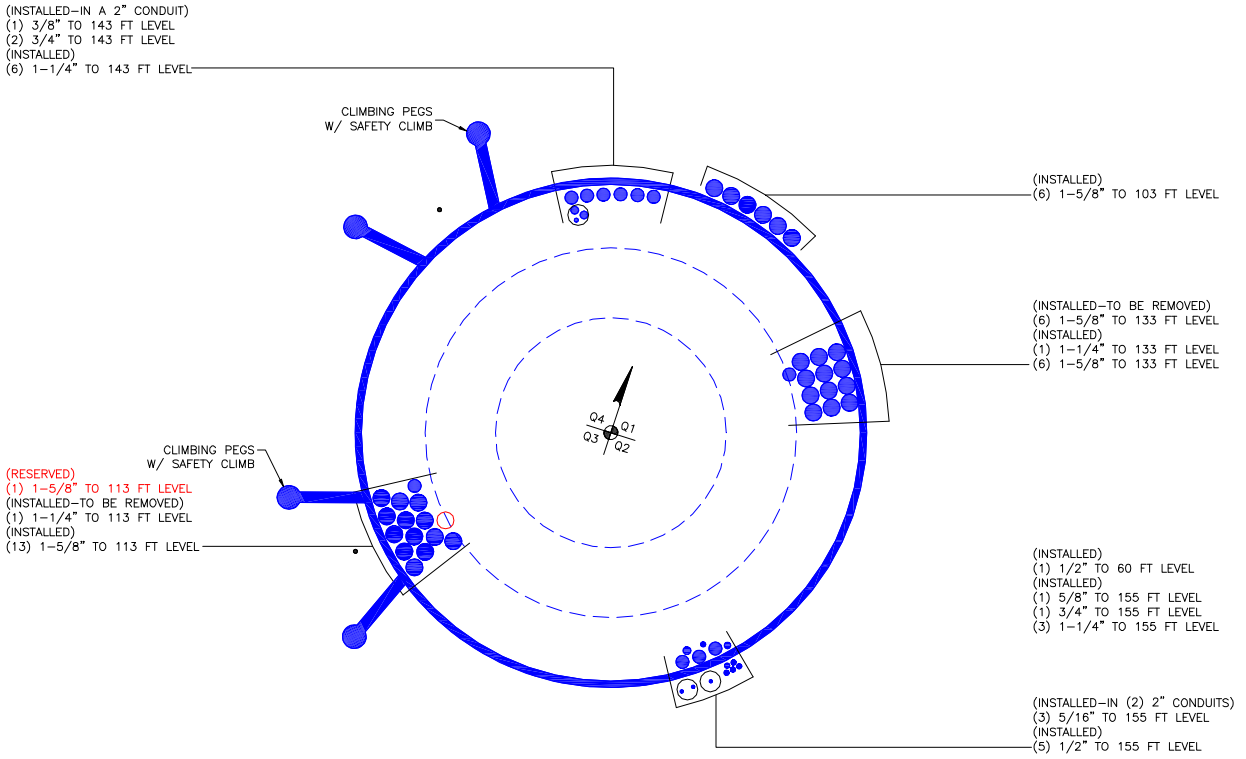
Pole Interaction Design Data

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

Section Capacity Table

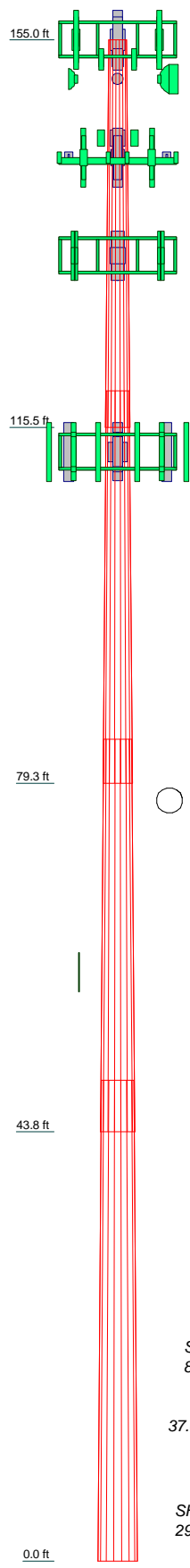
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
L1	155 - 115.5	Pole	TP29.31x22x0.25	1	-8.35	1080.07	59.4	Pass
L2	115.5 - 79.25	Pole	TP35.51x28.11x0.31	2	-16.61	1772.22	89.3	Pass
L3	79.25 - 43.75	Pole	TP41.46x34.06x0.38	3	-24.21	2481.90	96.6	Pass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

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Section	1	2	3	4
Length (ft)	39.50	40.00	40.00	49.00
Number of Sides	18	18	18	18
Thickness (in)	0.25	0.31	0.38	0.44
Socket Length (ft)	3.75	4.50	5.25	39.73
Top Dia (in)	22.00	28.11	34.06	48.80
Bot Dia (in)	29.31	35.51	41.46	48.80
Grade	A607-60	A607-60	A607-65	A607-65
Weight (K)	2.7	4.3	6.1	10.1



DESIGNED APPURTENANCE LOADING

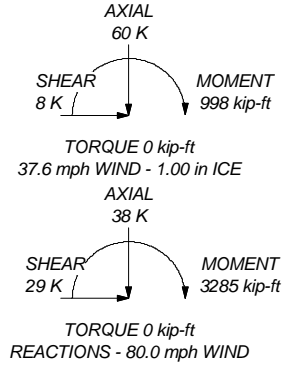
TYPE	ELEVATION	TYPE	ELEVATION
LPX310R w/ Mount Pipe	155	T-Arm Mount [TA 702-3]	143
LPX310R w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
LPX310R w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
HORIZON COMPACT	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
HORIZON COMPACT	155	KRY 112 144/1	133
HORIZON COMPACT	155	KRY 112 144/1	133
WIMAX DAP HEAD	155	KRY 112 144/1	133
WIMAX DAP HEAD	155	KRC 118 057/1 w/ Mount Pipe	133
WIMAX DAP HEAD	155	KRC 118 057/1 w/ Mount Pipe	133
APXVSP18-C-A20 w/ Mount Pipe	155	KRC 118 057/1 w/ Mount Pipe	133
APXVSP18-C-A20 w/ Mount Pipe	155	RRUS 11 B12	133
APXVSP18-C-A20 w/ Mount Pipe	155	RRUS 11 B12	133
APXVTM14-C-120 w/ Mount Pipe	155	RRUS 11 B12	133
APXVTM14-C-120 w/ Mount Pipe	155	(2) 2.375" OD x 5' Mount Pipe	133
APXVTM14-C-120 w/ Mount Pipe	155	(2) 2.375" OD x 5' Mount Pipe	133
TD-RRH8x20-25	155	(2) 2.375" OD x 5' Mount Pipe	133
TD-RRH8x20-25	155	Platform Mount [LP 403-1]	133
TD-RRH8x20-25	155	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	133
Platform Mount [LP 713-1]	155	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	133
VHLP2.5-18	155	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	133
VHLP2-11	155	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	133
PCS 1900MHz 4x45W-65MHz	153	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	133
PCS 1900MHz 4x45W-65MHz	153	LNX-6512DS-T0M w/ Mount Pipe	113
PCS 1900MHz 4x45W-65MHz	153	LNX-6512DS-T0M w/ Mount Pipe	113
PCS 1900MHz 4x45W-65MHz	153	LNX-6512DS-T0M w/ Mount Pipe	113
Pipe Mount [PM 601-3]	153	DB-T1-6Z-8AB-0Z	113
800MHz 2X50W RRH W/FILTER	153	(2) SBNHH-1D65B w/ Mount Pipe	113
800MHz 2X50W RRH W/FILTER	153	(2) SBNHH-1D65B w/ Mount Pipe	113
800MHz 2X50W RRH W/FILTER	153	(2) SBNHH-1D65B w/ Mount Pipe	113
800MHz 2X50W RRH W/FILTER	153	(2) SBNHH-1D65B w/ Mount Pipe	113
Pipe Mount [PM 601-3]	145	RRH2X60-AWS	113
RRUS 11	145	RRH2X60-AWS	113
RRUS 11	145	RRH2X60-AWS	113
RRUS 11	145	RRH2X60-AWS	113
800 10121 w/ Mount Pipe	143	RRH2X60-PCS	113
800 10121 w/ Mount Pipe	143	RRH2X60-PCS	113
800 10121 w/ Mount Pipe	143	RRH2X60-PCS	113
(2) 860 10025	143	RRH2x60-700	113
(2) 860 10025	143	RRH2x60-700	113
(2) 860 10025	143	RRH2x60-700	113
(2) LGP21401	143	Platform Mount [LP 1201-1]	113
(2) LGP21401	143	BXA-70063/6CFX2 w/ Mount Pipe	113
(2) LGP21401	143	BXA-70063/6CFX2 w/ Mount Pipe	113
RRUS-11	143	BXA-70063/6CFX2 w/ Mount Pipe	113
RRUS-11	143	Side Arm Mount [SO 701-1]	60
RRUS-11	143	2.375" OD x 4' Mount Pipe	60
DC6-48-60-18-8F	143		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

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



Paul J. Ford and Company 250 E. Broad Street, Suite 600 Columbus, OH 43215 Phone: 614.221.6679 FAX: 614.448.4105	Job: 155 ft Monopole / Buckland Mall Project: PJF 37515-1587 / BU 876347	
	Client: Crown Castle Code: TIA/EIA-222-F Path:	Drawn by: Joey Meinering Date: 01/07/16

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#:	876347	
Site Name:	Buckland Mall	
App #:		
Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	56	in
Anchor Spacing:	6	in

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

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

Pole Data		
Diam:	48.8	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

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:	3285	ft-kips
Unfactored Axial, P:	38	kips
Unfactored Shear, V:	29	kips

Anchor Rod Results

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

Base Plate Results

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

Flexural Check

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

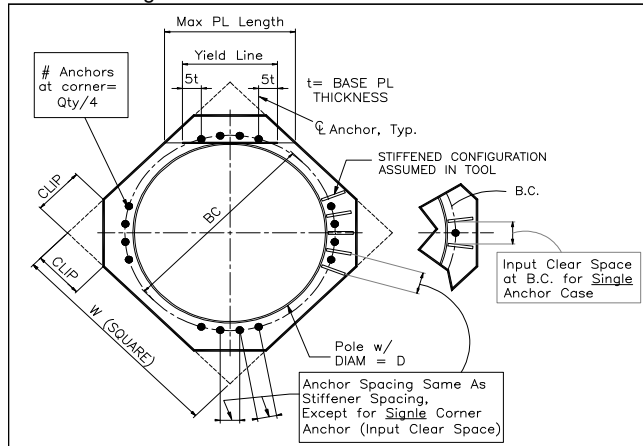
N/A - Unstiffened

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



Foundation Loads:

Pole weight or tower leg compression = 38 (kips)
 Horizontal load at top of pier = 29 (kips)
 Overturning moment at top of pier = 3285 (ft-kips)

Design criteria:

Safety factor against overturning = 2

Soil Properties:

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

Dimensions:

Pier shape (round or square) = S ("R" or "S")
 Pier width = 7 (ft)
 Pier height above grade = 0.5 (ft)
 depth to bottom of footing = 10 (ft)
 Footing thickness = 3 (ft)
 Footing width = 23 (ft)
 Footing length = 23 (ft)

Concrete:

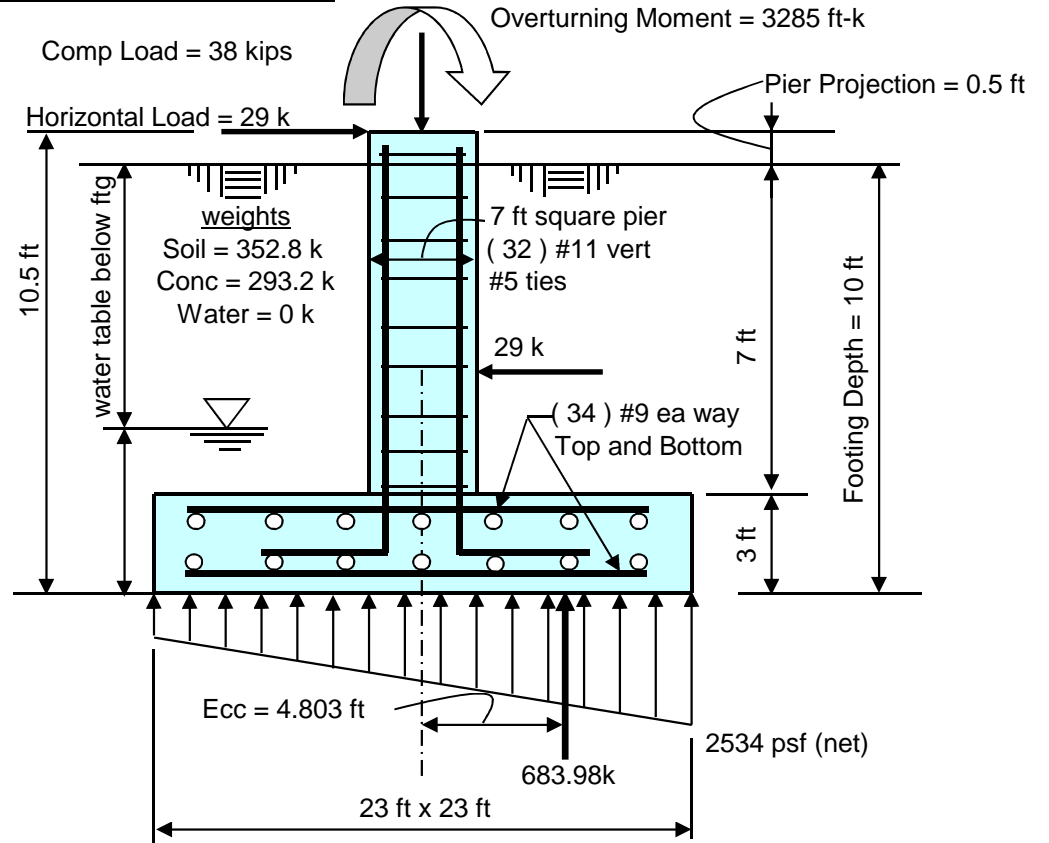
Concrete strength = 3 (ksi)
 Rebar strength = 60 (ksi)
 ultimate load factor = 1.3

Reinforcing Steel:

Pad
 minimum cover over rebar = 3 inches
 size of pad rebar = #9 bar
 quantity of pad rebar = 34 (ea direction)

Reinforcing Steel:

Pier
 size of vert rebar in pier = #11 bar
 vertical rebar quantity = 32
 size of pier ties = #5 bar
 minimum cover over rebar = 3 inches
 Total volume of concrete = 72.4 cu yd



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

```

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                        spColumn v4.80 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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General Information:

=====

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

Project: 37516-0064.002.7805

Column:

Engineer: JWM

Code: ACI 318-02

Units: English

Run Option: Investigation

Slenderness: Not considered

Run Axis: X-axis

Column Type: Structural

Material Properties:

=====

f'c = 3 ksi

fy = 60 ksi

Ec = 3122.02 ksi

Es = 29000 ksi

Ultimate strain = 0.003 in/in

Beta1 = 0.85

Section:

=====

Rectangular: Width = 84 in

Depth = 84 in

Gross section area, Ag = 7056 in²Ix = 4.14893e+006 in⁴Iy = 4.14893e+006 in⁴

rx = 24.2487 in

ry = 24.2487 in

Xo = 0 in

Yo = 0 in

Reinforcement:

=====

Bar Set: ASTM A615

Size	Diam (in)	Area (in ²)	Size	Diam (in)	Area (in ²)	Size	Diam (in)	Area (in ²)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

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

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

Layout: Rectangular

Pattern: All Sides Equal (Cover to transverse reinforcement)

Total steel area: As = 49.92 in² at rho = 0.71% (Note: rho < 1.0%)

Minimum clear spacing = 8.01 in

32 #11 Cover = 3 in

Factored Loads and Moments with Corresponding Capacities:

=====

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	38.00	4553.25	8634.73	1.896	8.71	79.67	0.02444	0.900

*** End of output ***

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

T-Mobile Existing Facility

Site ID: CT11377C

**Sprint Manchester/ Slater
55 Slater Street
Manchester, CT 06040**

January 13, 2016

EBI Project Number: 6216000299

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

January 13, 2016

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

Emissions Analysis for Site: **CT11377C – Sprint Manchester/ Slater**

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

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 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 $467 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (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 **55 Slater Street, Manchester, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

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

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
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):	133	Height (AGL):	133	Height (AGL):	133
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(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.04	Antenna B1 MPE%	1.04	Antenna C1 MPE%	1.04
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B4A/B12P	Make / Model:	Ericsson AIR21 B4A/B12P	Make / Model:	Ericsson AIR21 B4A/B12P
Gain:	15.9 / 13.6 dBd	Gain:	15.9 / 13.6 dBd	Gain:	15.9 / 13.6 dBd
Height (AGL):	133	Height (AGL):	133	Height (AGL):	133
Frequency Bands	2100 MHz (AWS) / 700 MHz	Frequency Bands	2100 MHz (AWS) / 700 MHz	Frequency Bands	2100 MHz (AWS) / 700 MHz
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	150	Total TX Power(W):	150	Total TX Power(W):	150
ERP (W):	5,355.80	ERP (W):	5,355.80	ERP (W):	5,355.80
Antenna A2 MPE%	1.37	Antenna B2 MPE%	1.37	Antenna C2 MPE%	1.37

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

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

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

Summary

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

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

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

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

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



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