CONSTRUCTION SERVICES

of Branford, LLC

April 16, 2015

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

RE: **Notice of Exempt Modification to an existing 169' monopole tower located at 300 Governors Highway, South Windsor, Connecticut**

Latitude: 41 50 0.4 / Longitude: 72 36 11

Dear Ms. Bachman:

Crown Castle International ("Crown") intends to perform work to reinforce the structural integrity of the existing 169'-foot monopole tower facility which it owns at the premises known as 300 Governors Highway, South Windsor, Connecticut ("Facility"). This proposed installation constitutes an exempt modification pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes Section 16-50g et seq. and Connecticut Agencies Regs § 16-50j-72(b)(2). Pursuant to R.C.S.A. 16-50j-73, Crown is providing notice to M. Saud Anwar, Mayor of the Town of South Windsor.

Under the Council's regulations (Conn. Agencies Regs. Sec 16-50j-72(b)), Crown's plans do not constitute a modification subject to the Council's review because Crown will not change the height of the Tower, will not extend the boundaries of the compound, will not increase the noise levels at the site, and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

Tower

The Facility consists of a one hundred sixty nine foot (169') foot high monopole tower located at 300 Governor's Highway, South Windsor, Connecticut. The Tower is owned by Crown. The tower currently supports Verizon Wireless antennas at the one hundred eleven foot (111') centerline AGL, Clearwire at the one hundred twenty eight foot (128') centerline, MetroPCS at the one hundred thirty eight foot (138') centerline, Sprint at the one hundred forty eight foot (148') centerline, AT&T at the one hundred fifty six foot centerline (156'), and T-Mobile at the one hundred sixty five foot (165') centerline. The antenna locations are set forth on Drawing S-4 of the attached drawings in Exhibit A.

(203) 488-0712 • FAX (203) 481-1135 • 1-800-870-0106 63-3 North Branford Rd. Branford, CT 06405-2848
www.csofb.com

Structural Analysis

A structural analysis of the Tower was prepared by Paul J. Ford and Company and is attached hereto as Exhibit B. The report indicates that the Tower, with the proposed reinforcements is adequate to support the proposed loading.

The present request does not include any antenna or other RF work and as such, will not adversely impact the health and safety of the surrounding community or the people working on the Tower.

Conclusion

Crown's proposal does not constitute a modification subject to the Council's jurisdiction because:

Crown will not increase the height of the Tower;

Will not extend the boundaries of the site;

Will not increase the noise levels at the existing facility by six decibels or more; and

The total radio frequency electromagnetic radiation power density will stay within all applicable standards.

Respectfully submitted,
Crown Castle

By_____
Raymond J. Lemley, consultant
Ray@cnwsllc.net
203-499-8631

cc: South Windsor Mayor, Honorable M. Saud Anwar
South Windsor Building Official, Christopher Dougan
Property Owner, Electron Technologies Corporation

EXHIBIT A

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **December 08, 2014**

Adam Winters
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
724.416.2000

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

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119615
	Carrier Site Name:	South Windsor 2 CT
Crown Castle Designation:	**Crown Castle BU Number:**	828054
	Crown Castle Site Name:	South Windsor/Rt 5
	Crown Castle JDE Job Number:	303667
	Crown Castle Work Order Number:	928841
	Crown Castle Application Number:	261426 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1535.002.7700
Site Data:	**300 Governors Highway, South Windsor, Hartford County, CT** **Latitude *41° 50' 0.4"*, Longitude *-72° 36' 11"*** **169 Foot - Monopole Tower**	

Dear Adam Winters,

Paul J Ford and Company is pleased to submit this **"Structural Modification 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 705471, in accordance with application 261426, revision 0.

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:

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

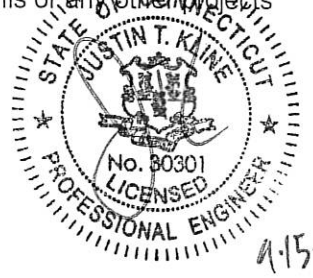
The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

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

We at *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:

Bob Koors, E.I.
Structural Designer



tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 169 ft Monopole tower designed by EEI in January 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 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
111.0	111.0	3	alcatel lucent	RRH2X60-AWS	2	1-5/8	-
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		6	andrew	LNX-6514DS-A1M w/ Mount Pipe			
		2	rfs celwave	DB-B1-6C-12AB-0Z			

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
165.0	165.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	2	1-5/8	2
		3	ericsson	RRUS 11 B12			
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	11	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		1	tower mounts	Platform Mount [LP 712-1]			
156.0	156.0	3	communication components inc.	DTMABP7819VG12A	12	1-5/8	1
		6	css	DUO1417-8686 w/ Mount Pipe			
		3	ericsson	RRUS 11			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 712-1]			
148.0	148.0	3	andrew	932LG65VTE-B w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Side Arm Mount [SO 102-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
138.0	138.0	3	rfs celwave	APXV18-206517-A	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
128.0	128.0	3	argus technologies	LLPX310R w/ Mount Pipe	3 6 1	1/4 1/2 5/16	1
		3	dragonwave	A-ANT-18G-2-C			
		3	dragonwave	HORIZON DUO			
		3	samsung telecommunications	WIMAX DAP HEAD			
		1	tower mounts	Side Arm Mount [SO 701-3]			
111.0	111.0	3	antel	BXA-171063-12BF w/ Mount Pipe	-	-	3
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80063/6CF w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 303-1]	18	1-5/8	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	TEP, 47923.6344, 11/20/2014	5406393	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2012712.97, 06/29/2012	3773024	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 103179, 12/03/2010	3773025	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 6255 REV 1, 03/10/2000	3436661	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 99-1371 REV. 1, 01/31/2000	3436681	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) Monopole was fabricated and installed in accordance with the manufacturer's specifications.
2) Monopole has been properly maintained in accordance with manufacturer's specifications.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was modified in conformance with the referenced modification drawings.
5) Monopole will be reinforced in conformance with the attached proposed modification 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	169 - 133.33	Pole	TP22.31x15.5x0.25	1	-5.89	883.79	68.7	Pass
L2	133.33 - 111	Pole	TP26.0013x21.1743x0.3125	2	-9.63	1324.63	91.8	Pass
L3	111 - 101.5	Pole	TP27.7884x26.0013x0.5508	3	-13.73	1962.51	78.1	Pass
L4	101.5 - 101	Pole	TP27.8825x27.7884x0.9838	4	-13.90	2956.35	54.0	Pass
L5	101 - 87.83	Pole	TP30.36x27.8825x0.6941	5	-16.27	2244.03	81.1	Pass
L6	87.83 - 81.8	Pole	TP30.8702x28.1572x0.7414	6	-20.20	2506.80	86.0	Pass
L7	81.8 - 43.33	Pole	TP38.11x30.8702x0.8207	7	-32.00	3894.23	76.7	Pass
L8	43.33 - 37.4	Pole	TP38.4726x35.4655x0.8018	8	-35.70	3787.03	84.8	Pass
L9	37.4 - 9	Pole	TP43.8089x38.4726x0.7411	9	-49.12	4193.84	92.3	Pass
L10	9 - 7	Pole	TP44.1847x43.8089x0.7763	10	-49.99	4435.25	88.3	Pass
L11	7 - 0	Pole	TP45.5x44.1847x0.7254	11	-52.91	4272.57	94.5	Pass
							Summary	
						Pole (L11)	94.5	Pass
						Rating =	94.5	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation	0	83.8	Pass

Structure Rating (max from all components) =	94.5%

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

4.1) Recommendations

Monopole will be reinforced in conformance with the attached proposed modification drawings.

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:

4) Tower is located in Hartford County, Connecticut.
5) Basic wind speed of 80 mph.
6) Nominal ice thickness of 1.0000 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.00 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.333.
15) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice	
	Capacity Exemption	

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	169.00-133.33	35.67	3.33	18	15.5000	22.3100	0.2500	1.0000	A572-65 (65 ksi)
L2	133.33-111.00	25.66	0.00	18	21.1743	26.0013	0.3125	1.2500	A572-65 (65 ksi)
L3	111.00-101.50	9.50	0.00	18	26.0013	27.7884	0.5508	2.2032	Reinf 51.53 ksi (52 ksi)
L4	101.50-101.00	0.50	0.00	18	27.7884	27.8825	0.9838	3.9350	Reinf 44.01 ksi (44 ksi)
L5	101.00-87.83	13.17	4.33	18	27.8825	30.3600	0.6941	2.7765	Reinf 44.14 ksi (44 ksi)
L6	87.83-81.80	10.36	0.00	18	28.1572	30.8702	0.7414	2.9654	Reinf 44.21 ksi (44 ksi)
L7	81.80-43.33	38.47	5.33	18	30.8702	38.1100	0.8207	3.2829	Reinf 51.51 ksi (52 ksi)
L8	43.33-37.40	11.26	0.00	18	35.4655	38.4726	0.8018	3.2070	Reinf 51.56 ksi (52 ksi)
L9	37.40-9.00	28.40	0.00	18	38.4726	43.8089	0.7411	2.9644	Reinf 51.76 ksi (52 ksi)

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
L10	9.00-7.00	2.00	0.00	18	43.8089	44.1847	0.7763	3.1050	Reinf 51.85 ksi (52 ksi)
L11	7.00-0.00	7.00		18	44.1847	45.5000	0.7254	2.9016	Reinf 51.82 ksi (52 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
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152
	22.6542	17.5046	1076.2196	7.8313	11.3335	94.9593	2153.8554	8.7540	3.4866	13.946
L2	22.1370	20.6922	1137.7494	7.4059	10.7565	105.7730	2276.9958	10.3481	3.1767	10.165
	26.4024	25.4801	2124.3514	9.1195	13.2087	160.8301	4251.4980	12.7425	4.0262	12.884
L3	26.4024	44.4936	3641.0595	9.0349	13.2087	275.6569	7286.9099	22.2510	3.6068	6.548
	28.2171	47.6179	4463.1990	9.6694	14.1165	316.1684	8932.2708	23.8135	3.9214	7.119
L4	28.2171	83.6955	7597.3301	9.5157	14.1165	538.1871	15204.6570	41.8557	3.1594	3.212
	28.3126	83.9892	7677.5902	9.5491	14.1643	542.0379	15365.2828	42.0026	3.1759	3.228
L5	28.3126	59.9005	5594.1515	9.6519	14.1643	394.9471	11195.6639	29.9560	3.6856	5.31
	30.8284	65.3589	7267.0217	10.5314	15.4229	471.1845	14543.6055	32.6857	4.1217	5.938
L6	29.7430	64.5115	6126.0035	9.7326	14.3038	428.2766	12260.0678	32.2619	3.6509	4.925
	31.3464	70.8954	8130.5575	10.6957	15.6821	518.4625	16271.8133	35.4545	4.1284	5.569
L7	31.3464	78.2788	8930.0666	10.6676	15.6821	569.4449	17871.8836	39.1468	3.9887	4.86
	38.6979	97.1384	17064.6083	13.2377	19.3599	881.4418	34151.6708	48.5784	5.2629	6.412
L8	37.4580	88.2117	13391.0154	12.3056	18.0165	743.2659	26799.6511	44.1142	4.8308	6.025
	39.0661	95.8643	17187.2229	13.3732	19.5441	879.4074	34397.0611	47.9413	5.3601	6.685
L9	39.0661	88.7540	15963.7322	13.3947	19.5441	816.8059	31948.4699	44.3855	5.4668	7.377
	44.4847	101.3063	23739.9529	15.2891	22.2549	1066.7278	47511.1435	50.6628	6.4060	8.644
L10	44.4847	106.0260	24805.3956	15.2766	22.2549	1114.6022	49643.4307	53.0231	6.3442	8.173
	44.8663	106.9519	25460.9566	15.4100	22.4458	1134.3286	50955.4154	53.4861	6.4103	8.258
L11	44.8663	100.0602	23876.1895	15.4281	22.4458	1063.7246	47783.7959	50.0396	6.4998	8.96
	46.2019	103.0885	26110.2706	15.8950	23.1140	1129.6301	52254.8977	51.5541	6.7313	9.28

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 169.00-133.33				1	1	1		
L2 133.33-111.00				1	1	1		
L3 111.00-101.50				1	1	1		
L4 101.50-101.00				1	1	1		
L5 101.00-87.83				1	1	1		
L6 87.83-				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
81.80								
L7 81.80-43.33				1	1	1		
L8 43.33-37.40				1	1	1		
L9 37.40-9.00				1	1	1		
L10 9.00-7.00				1	1	1		
L11 7.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	C	No	Inside Pole	165.00 - 0.00	4	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
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	165.00 - 0.00	4	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
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	165.00 - 0.00	2	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
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	165.00 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	2.37
						1" Ice	0.00	4.28
						2" Ice	0.00	9.93
						4" Ice	0.00	28.56
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	165.00 - 0.00	2	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
**								
LDF7-50A(1-5/8")	C	No	Inside Pole	156.00 - 0.00	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
**								
LDF7-50A(1-5/8")	C	No	Inside Pole	148.00 - 0.00	6	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
**								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of	138.00 - 0.00	6	No Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			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
**								
LDF1-50A(1/4")	C	No	Inside Pole	128.00 - 0.00	3	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
						4" Ice	0.00	0.06
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	128.00 - 0.00	2	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")	C	No	Inside Pole	128.00 - 0.00	4	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
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	0.00 - 0.00	2	No Ice	0.24	0.72
						1/2" Ice	0.34	2.48
						1" Ice	0.44	4.84
						2" Ice	0.64	11.41
						4" Ice	1.04	31.87
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	0.00 - 0.00	2	No Ice	0.00	0.72
						1/2" Ice	0.00	2.48
						1" Ice	0.00	4.84
						2" Ice	0.00	11.41
						4" Ice	0.00	31.87
**								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	111.00 - 0.00	16	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
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	111.00 - 0.00	2	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
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	111.00 - 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
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	111.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	2.81
						1" Ice	0.00	4.94
						2" Ice	0.00	11.02
						4" Ice	0.00	30.52
**								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	104.00 - 0.00	2	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
**								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	113.50 - 104.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	169.00-133.33	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	12.541	0.66
L2	133.33-111.00	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	9.259	0.70
L3	111.00-101.50	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	11.613	0.47
L4	101.50-101.00	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	0.703	0.02
L5	101.00-87.83	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	18.526	0.65
L6	87.83-81.80	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	8.482	0.30
L7	81.80-43.33	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	54.114	1.89
L8	43.33-37.40	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	8.342	0.29
L9	37.40-9.00	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	39.949	1.39
L10	9.00-7.00	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	2.813	0.10
L11	7.00-0.00	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	9.847	0.34

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_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	169.00-133.33	A	1.199	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	27.737	2.17
L2	133.33-111.00	A	1.170	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	20.640	2.41
L3	111.00-101.50	A	1.151	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	25.612	2.03
L4	101.50-101.00	A	1.144	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	1.530	0.11
L5	101.00-87.83	A	1.134	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	40.104	2.76
L6	87.83-81.80	A	1.120	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	18.362	1.26
L7	81.80-43.33	A	1.079	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	114.088	7.60
L8	43.33-37.40	A	1.024	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	17.586	1.17
L9	37.40-9.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	80.972	5.11
L10	9.00-7.00	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	5.702	0.36
L11	7.00-0.00	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	19.958	1.26

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	169.00-133.33	-0.3809	0.2199	-0.6359	0.3672
L2	133.33-111.00	-0.4474	0.2583	-0.7706	0.4449
L3	111.00-101.50	-1.0289	0.5940	-1.5322	0.8846
L4	101.50-101.00	-1.1375	0.6567	-1.6551	0.9556
L5	101.00-87.83	-1.1568	0.6679	-1.6958	0.9791
L6	87.83-81.80	-1.1705	0.6758	-1.7272	0.9972
L7	81.80-43.33	-1.2269	0.7083	-1.8394	1.0620
L8	43.33-37.40	-1.2620	0.7286	-1.9246	1.1112
L9	37.40-9.00	-1.2957	0.7481	-1.9698	1.1373
L10	9.00-7.00	-1.3206	0.7625	-2.0316	1.1729
L11	7.00-0.00	-1.3276	0.7665	-2.0490	1.1830

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.17	5.63 6.47 7.25 8.85 12.28	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	6.82 7.34 7.85	5.63 6.47 7.25	0.11 0.17 0.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1" Ice	8.92	8.85	0.38
							2" Ice	11.17	12.28	0.81
							4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Face	4.00	0.00	0.000	165.00	No Ice	6.82	5.63	0.11
			0.00				1/2" Ice	7.34	6.47	0.17
			0.00				1" Ice	7.85	7.25	0.23
							2" Ice	8.92	8.85	0.38
							4" Ice	11.17	12.28	0.81
KRY 112 144/1	A	From Face	4.00	0.00	0.000	165.00	No Ice	0.41	0.20	0.01
			0.00				1/2" Ice	0.50	0.27	0.01
			0.00				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 Face	4.00	0.00	0.000	165.00	No Ice	0.41	0.20	0.01
			0.00				1/2" Ice	0.50	0.27	0.01
			0.00				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 Face	4.00	0.00	0.000	165.00	No Ice	0.41	0.20	0.01
			0.00				1/2" Ice	0.50	0.27	0.01
			0.00				1" Ice	0.59	0.35	0.02
							2" Ice	0.81	0.53	0.03
							4" Ice	1.36	1.00	0.08
LNX-6515DS-VTM w/ Mount Pipe	A	From Face	4.00	0.00	0.000	165.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Face	4.00	0.00	0.000	165.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Face	4.00	0.00	0.000	165.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
RRUS 11 B12	A	From Face	4.00	0.00	0.000	165.00	No Ice	3.31	1.36	0.05
			0.00				1/2" Ice	3.55	1.54	0.07
			0.00				1" Ice	3.80	1.73	0.10
							2" Ice	4.33	2.13	0.15
							4" Ice	5.50	3.04	0.31
RRUS 11 B12	B	From Face	4.00	0.00	0.000	165.00	No Ice	3.31	1.36	0.05
			0.00				1/2" Ice	3.55	1.54	0.07
			0.00				1" Ice	3.80	1.73	0.10
							2" Ice	4.33	2.13	0.15
							4" Ice	5.50	3.04	0.31
RRUS 11 B12	C	From Face	4.00	0.00	0.000	165.00	No Ice	3.31	1.36	0.05
			0.00				1/2" Ice	3.55	1.54	0.07
			0.00				1" Ice	3.80	1.73	0.10
							2" Ice	4.33	2.13	0.15
							4" Ice	5.50	3.04	0.31
Platform Mount [LP 712-1]	C	None			0.000	165.00	No Ice	24.53	24.53	1.34
							1/2" Ice	29.94	29.94	1.65

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							Ice	35.35	35.35	1.96
							1" Ice	46.17	46.17	2.58
							2" Ice	67.81	67.81	3.82
							4" Ice			
8-ft Ladder	C	None			0.000	165.00	No Ice	5.00	5.00	0.04
							1/2"	6.00	6.00	0.07
							Ice	7.00	7.00	0.08
							1" Ice	9.00	9.00	0.11
							2" Ice	13.00	13.00	0.15
							4" Ice			
**										
(2) DUO1417-8686 w/ Mount Pipe	A	From Face	4.00	0.00	0.000	156.00	No Ice	6.77	5.39	0.04
			0.00				1/2"	7.24	6.07	0.09
			0.00				Ice	7.72	6.76	0.16
							1" Ice	8.70	8.20	0.30
							2" Ice	10.81	11.35	0.71
							4" Ice			
(2) DUO1417-8686 w/ Mount Pipe	B	From Face	4.00	0.00	0.000	156.00	No Ice	6.77	5.39	0.04
			0.00				1/2"	7.24	6.07	0.09
			0.00				Ice	7.72	6.76	0.16
							1" Ice	8.70	8.20	0.30
							2" Ice	10.81	11.35	0.71
							4" Ice			
(2) DUO1417-8686 w/ Mount Pipe	C	From Face	4.00	0.00	0.000	156.00	No Ice	6.77	5.39	0.04
			0.00				1/2"	7.24	6.07	0.09
			0.00				Ice	7.72	6.76	0.16
							1" Ice	8.70	8.20	0.30
							2" Ice	10.81	11.35	0.71
							4" Ice			
7770.00 w/ Mount Pipe	A	From Face	4.00	0.00	0.000	156.00	No Ice	6.22	4.82	0.09
			0.00				1/2"	6.71	5.51	0.14
			0.00				Ice	7.22	6.21	0.21
							1" Ice	8.26	7.67	0.36
							2" Ice	10.48	11.06	0.76
							4" Ice			
7770.00 w/ Mount Pipe	B	From Face	4.00	0.00	0.000	156.00	No Ice	6.22	4.82	0.09
			0.00				1/2"	6.71	5.51	0.14
			0.00				Ice	7.22	6.21	0.21
							1" Ice	8.26	7.67	0.36
							2" Ice	10.48	11.06	0.76
							4" Ice			
7770.00 w/ Mount Pipe	C	From Face	4.00	0.00	0.000	156.00	No Ice	6.22	4.82	0.09
			0.00				1/2"	6.71	5.51	0.14
			0.00				Ice	7.22	6.21	0.21
							1" Ice	8.26	7.67	0.36
							2" Ice	10.48	11.06	0.76
							4" Ice			
DTMABP7819VG12A	A	From Face	4.00	0.00	0.000	156.00	No Ice	1.14	0.39	0.02
			0.00				1/2"	1.28	0.49	0.03
			0.00				Ice	1.44	0.59	0.04
							1" Ice	1.77	0.83	0.06
							2" Ice	2.54	1.41	0.14
							4" Ice			
DTMABP7819VG12A	B	From Face	4.00	0.00	0.000	156.00	No Ice	1.14	0.39	0.02
			0.00				1/2"	1.28	0.49	0.03
			0.00				Ice	1.44	0.59	0.04
							1" Ice	1.77	0.83	0.06
							2" Ice	2.54	1.41	0.14
							4" Ice			
DTMABP7819VG12A	C	From Face	4.00	0.00	0.000	156.00	No Ice	1.14	0.39	0.02
			0.00				1/2"	1.28	0.49	0.03
			0.00				Ice	1.44	0.59	0.04
							1" Ice	1.77	0.83	0.06
							2" Ice	2.54	1.41	0.14
							4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 11	A	From Face	4.00 0.00 0.00	0.000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.10 0.15 0.31
RRUS 11	B	From Face	4.00 0.00 0.00	0.000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.10 0.15 0.31
RRUS 11	C	From Face	4.00 0.00 0.00	0.000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.10 0.15 0.31
2.375" OD x 6' Mount Pipe	A	From Face	4.00 0.00 0.00	0.000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.03 0.04 0.05 0.09 0.23
2.375" OD x 6' Mount Pipe	B	From Face	4.00 0.00 0.00	0.000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.03 0.04 0.05 0.09 0.23
2.375" OD x 6' Mount Pipe	C	From Face	4.00 0.00 0.00	0.000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.03 0.04 0.05 0.09 0.23
Platform Mount [LP 712-1]	C	None		0.000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
**									
932LG65VTE-B w/ Mount Pipe	A	From Face	2.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.49 4.95 5.42 6.38 8.42	4.79 5.50 6.23 7.72 10.94	0.04 0.08 0.13 0.25 0.61
932LG65VTE-B w/ Mount Pipe	B	From Face	2.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.49 4.95 5.42 6.38 8.42	4.79 5.50 6.23 7.72 10.94	0.04 0.08 0.13 0.25 0.61
932LG65VTE-B w/ Mount Pipe	C	From Face	2.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.49 4.95 5.42 6.38 8.42	4.79 5.50 6.23 7.72 10.94	0.04 0.08 0.13 0.25 0.61
Side Arm Mount [SO 102-3]	C	None		0.000	148.00	No Ice 1/2" Ice 1" Ice	3.00 3.48 3.96 4.92	3.00 3.48 3.96 4.92	0.08 0.11 0.14 0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	6.84	6.84	0.32
						4" Ice			
**									
APXV18-206517-A	A	From Face	1.00	0.000	138.00	No Ice	5.17	3.04	0.03
			0.00			1/2"	5.62	3.47	0.05
			0.00			Ice	6.08	3.91	0.09
						1" Ice	7.02	4.81	0.17
						2" Ice	9.12	6.70	0.40
						4" Ice			
APXV18-206517-A	B	From Face	1.00	0.000	138.00	No Ice	5.17	3.04	0.03
			0.00			1/2"	5.62	3.47	0.05
			0.00			Ice	6.08	3.91	0.09
						1" Ice	7.02	4.81	0.17
						2" Ice	9.12	6.70	0.40
						4" Ice			
APXV18-206517-A	C	From Face	1.00	0.000	138.00	No Ice	5.17	3.04	0.03
			0.00			1/2"	5.62	3.47	0.05
			0.00			Ice	6.08	3.91	0.09
						1" Ice	7.02	4.81	0.17
						2" Ice	9.12	6.70	0.40
						4" Ice			
Pipe Mount [PM 601-3]	C	None		0.000	138.00	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			
**									
LLPX310R w/ Mount Pipe	A	From Face	4.00	0.000	128.00	No Ice	4.96	2.85	0.04
			0.00			1/2"	5.35	3.37	0.08
			0.00			Ice	5.75	3.90	0.12
						1" Ice	6.58	5.08	0.23
						2" Ice	8.37	7.84	0.53
						4" Ice			
LLPX310R w/ Mount Pipe	B	From Face	4.00	0.000	128.00	No Ice	4.96	2.85	0.04
			0.00			1/2"	5.35	3.37	0.08
			0.00			Ice	5.75	3.90	0.12
						1" Ice	6.58	5.08	0.23
						2" Ice	8.37	7.84	0.53
						4" Ice			
LLPX310R w/ Mount Pipe	C	From Face	4.00	0.000	128.00	No Ice	4.96	2.85	0.04
			0.00			1/2"	5.35	3.37	0.08
			0.00			Ice	5.75	3.90	0.12
						1" Ice	6.58	5.08	0.23
						2" Ice	8.37	7.84	0.53
						4" Ice			
WIMAX DAP HEAD	A	From Face	4.00	0.000	128.00	No Ice	1.80	0.78	0.03
			0.00			1/2"	1.99	0.92	0.04
			0.00			Ice	2.18	1.07	0.06
						1" Ice	2.59	1.39	0.09
						2" Ice	3.51	2.14	0.20
						4" Ice			
WIMAX DAP HEAD	B	From Face	4.00	0.000	128.00	No Ice	1.80	0.78	0.03
			0.00			1/2"	1.99	0.92	0.04
			0.00			Ice	2.18	1.07	0.06
						1" Ice	2.59	1.39	0.09
						2" Ice	3.51	2.14	0.20
						4" Ice			
WIMAX DAP HEAD	C	From Face	4.00	0.000	128.00	No Ice	1.80	0.78	0.03
			0.00			1/2"	1.99	0.92	0.04
			0.00			Ice	2.18	1.07	0.06
						1" Ice	2.59	1.39	0.09
						2" Ice	3.51	2.14	0.20
						4" Ice			
HORIZON DUO	A	From Face	4.00	0.000	128.00	No Ice	0.55	0.34	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	0.65	0.43	0.01
			0.00			Ice	0.76	0.52	0.02
						1" Ice	1.00	0.73	0.04
						2" Ice	1.60	1.25	0.10
						4" Ice			
HORIZON DUO	B	From Face	4.00	0.000	128.00	No Ice	0.55	0.34	0.01
			0.00			1/2"	0.65	0.43	0.01
			0.00			Ice	0.76	0.52	0.02
						1" Ice	1.00	0.73	0.04
						2" Ice	1.60	1.25	0.10
						4" Ice			
HORIZON DUO	C	From Face	4.00	0.000	128.00	No Ice	0.55	0.34	0.01
			0.00			1/2"	0.65	0.43	0.01
			0.00			Ice	0.76	0.52	0.02
						1" Ice	1.00	0.73	0.04
						2" Ice	1.60	1.25	0.10
						4" Ice			
2.375" OD x 6' Mount Pipe	A	From Face	4.00	0.000	128.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
2.375" OD x 6' Mount Pipe	B	From Face	4.00	0.000	128.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
2.375" OD x 6' Mount Pipe	C	From Face	4.00	0.000	128.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
Side Arm Mount [SO 701-3]	C	None		0.000	128.00	No Ice	2.83	2.83	0.20
						1/2"	3.92	3.92	0.24
						Ice	5.01	5.01	0.28
						1" Ice	7.19	7.19	0.36
						2" Ice	11.55	11.55	0.53
						4" Ice			
**									
(3) LNX-6514DS-A1M w/ Mount Pipe	A	From Face	4.00	0.000	111.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			0.00			Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Face	4.00	0.000	111.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			0.00			Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
LNX-6514DS-A1M w/ Mount Pipe	C	From Face	4.00	0.000	111.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			0.00			Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	A	From Face	4.00	0.000	111.00	No Ice	8.98	6.96	0.07
			0.00			1/2"	9.65	8.18	0.14
			0.00			Ice	10.29	9.14	0.21
						1" Ice	11.59	11.02	0.40
						2" Ice	14.32	15.03	0.91

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							4" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
(3) HBXX-6517DS-A2M w/ Mount Pipe	C	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
RRH2X60-PCS	A	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	B	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	C	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
RRH2X60-AWS	A	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	2.16 2.44 2.73 3.34 4.66	0.06 0.08 0.11 0.18 0.37
RRH2X60-AWS	B	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	2.16 2.44 2.73 3.34 4.66	0.06 0.08 0.11 0.18 0.37
RRH2X60-AWS	C	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	2.16 2.44 2.73 3.34 4.66	0.06 0.08 0.11 0.18 0.37
(2) DB-B1-6C-12AB-0Z	C	From Face	4.00 0.00 0.00		0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.92 4.20 4.48 5.07 6.35	2.56 2.79 3.04 3.56 4.70	0.03 0.06 0.09 0.17 0.37
Platform Mount [LP 303-1]	C	None			0.000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10

**

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
A-ANT-18G-2-C	A	Paraboloid w/Radome	From Leg	4.00 0.00 0.00	0.000		128.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.04 0.05 0.07 0.11
A-ANT-18G-2-C	B	Paraboloid w/Radome	From Leg	4.00 0.00 0.00	0.000		128.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.04 0.05 0.07 0.11
A-ANT-18G-2-C	C	Paraboloid w/Radome	From Leg	4.00 0.00 0.00	0.000		128.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.04 0.05 0.07 0.11

**

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 169.00-133.33	150.24	1.542	25.25	56.195	A	0.000	56.195	56.195	100.00	0.000	0.000
					B	0.000	56.195		100.00	0.000	0.000
					C	0.000	56.195		100.00	0.000	12.541
L2 133.33-111.00	121.84	1.452	23.80	44.476	A	0.000	44.476	44.476	100.00	0.000	0.000
					B	0.000	44.476		100.00	0.000	0.000
					C	0.000	44.476		100.00	0.000	9.259
L3 111.00-101.50	106.20	1.396	22.88	21.292	A	0.000	21.292	21.292	100.00	0.000	0.000
					B	0.000	21.292		100.00	0.000	0.000
					C	0.000	21.292		100.00	0.000	11.613
L4 101.50-101.00	101.25	1.378	22.57	1.160	A	0.000	1.160	1.160	100.00	0.000	0.000
					B	0.000	1.160		100.00	0.000	0.000
					C	0.000	1.160		100.00	0.000	0.703
L5 101.00-87.83	94.32	1.35	22.12	31.961	A	0.000	31.961	31.961	100.00	0.000	0.000
					B	0.000	31.961		100.00	0.000	0.000
					C	0.000	31.961		100.00	0.000	18.526
L6 87.83-81.80	84.79	1.309	21.45	15.116	A	0.000	15.116	15.116	100.00	0.000	0.000
					B	0.000	15.116		100.00	0.000	0.000
					C	0.000	15.116		100.00	0.000	8.482
L7 81.80-43.33	62.32	1.199	19.56	110.569	A	0.000	110.569	110.569	100.00	0.000	0.000
					B	0.000	110.569		100.00	0.000	0.000
					C	0.000	110.569		100.00	0.000	54.114
L8 43.33-37.40	40.34	1.059	17.35	18.621	A	0.000	18.621	18.621	100.00	0.000	0.000
					B	0.000	18.621		100.00	0.000	0.000
					C	0.000	18.621		100.00	0.000	8.342
L9 37.40-9.00	22.89	1	16.38	97.367	A	0.000	97.367	97.367	100.00	0.000	0.000
					B	0.000	97.367		100.00	0.000	0.000
					C	0.000	97.367		100.00	0.000	39.949
L10 9.00-7.00	8.00	1	16.38	7.333	A	0.000	7.333	7.333	100.00	0.000	0.000
					B	0.000	7.333		100.00	0.000	0.000
					C	0.000	7.333		100.00	0.000	2.813
L11 7.00-0.00	3.48	1	16.38	26.158	A	0.000	26.158	26.158	100.00	0.000	0.000
					B	0.000	26.158		100.00	0.000	0.000
					C	0.000	26.158		100.00	0.000	9.847

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 169.00-133.33	150.24	1.542	5.58	1.1995	63.326	A	0.000	63.326	63.326	100.00	0.000	0.000
						B	0.000	63.326		100.00	0.000	0.000
						C	0.000	63.326		100.00	0.000	27.737
L2 133.33-111.00	121.84	1.452	5.26	1.1697	48.940	A	0.000	48.940	48.940	100.00	0.000	0.000
						B	0.000	48.940		100.00	0.000	0.000
						C	0.000	48.940		100.00	0.000	20.640
L3 111.00-101.50	106.20	1.396	5.05	1.1506	23.114	A	0.000	23.114	23.114	100.00	0.000	0.000
						B	0.000	23.114		100.00	0.000	0.000
						C	0.000	23.114		100.00	0.000	25.612
L4 101.50-101.00	101.25	1.378	4.99	1.1440	1.255	A	0.000	1.255	1.255	100.00	0.000	0.000
						B	0.000	1.255		100.00	0.000	0.000
						C	0.000	1.255		100.00	0.000	1.530
L5 101.00-87.83	94.32	1.35	4.89	1.1343	34.450	A	0.000	34.450	34.450	100.00	0.000	0.000
						B	0.000	34.450		100.00	0.000	0.000
						C	0.000	34.450		100.00	0.000	40.104
L6 87.83-81.80	84.79	1.309	4.74	1.1199	16.256	A	0.000	16.256	16.256	100.00	0.000	0.000
						B	0.000	16.256		100.00	0.000	0.000
						C	0.000	16.256		100.00	0.000	18.362
L7 81.80-43.33	62.32	1.199	4.32	1.0793	117.489	A	0.000	117.489	117.489	100.00	0.000	0.000
						B	0.000	117.489		100.00	0.000	0.000
						C	0.000	117.489		100.00	0.000	114.088
L8 43.33-37.40	40.34	1.059	3.83	1.0244	19.687	A	0.000	19.687	19.687	100.00	0.000	0.000
						B	0.000	19.687		100.00	0.000	0.000
						C	0.000	19.687		100.00	0.000	17.586
L9 37.40-9.00	22.89	1	3.62	1.0000	102.100	A	0.000	102.100	102.100	100.00	0.000	0.000
						B	0.000	102.100		100.00	0.000	0.000
						C	0.000	102.100		100.00	0.000	80.972
L10 9.00-7.00	8.00	1	3.62	1.0000	7.666	A	0.000	7.666	7.666	100.00	0.000	0.000
						B	0.000	7.666		100.00	0.000	0.000
						C	0.000	7.666		100.00	0.000	5.702
L11 7.00-0.00	3.48	1	3.62	1.0000	27.325	A	0.000	27.325	27.325	100.00	0.000	0.000
						B	0.000	27.325		100.00	0.000	0.000
						C	0.000	27.325		100.00	0.000	19.958

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 169.00-133.33	150.24	1.542	9.86	56.195	A	0.000	56.195	56.195	100.00	0.000	0.000
					B	0.000	56.195		100.00	0.000	0.000
					C	0.000	56.195		100.00	0.000	12.541
L2 133.33-111.00	121.84	1.452	9.30	44.476	A	0.000	44.476	44.476	100.00	0.000	0.000
					B	0.000	44.476		100.00	0.000	0.000
					C	0.000	44.476		100.00	0.000	9.259
L3 111.00-101.50	106.20	1.396	8.94	21.292	A	0.000	21.292	21.292	100.00	0.000	0.000
					B	0.000	21.292		100.00	0.000	0.000
					C	0.000	21.292		100.00	0.000	11.613
L4 101.50-101.00	101.25	1.378	8.82	1.160	A	0.000	1.160	1.160	100.00	0.000	0.000
					B	0.000	1.160		100.00	0.000	0.000
					C	0.000	1.160		100.00	0.000	0.703
L5 101.00-	94.32	1.35	8.64	31.961	A	0.000	31.961	31.961	100.00	0.000	0.000

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
87.83					B	0.000	31.961		100.00	0.000	0.000
					C	0.000	31.961		100.00	0.000	18.526
L6 87.83-81.80	84.79	1.309	8.38	15.116	A	0.000	15.116	15.116	100.00	0.000	0.000
					B	0.000	15.116		100.00	0.000	0.000
					C	0.000	15.116		100.00	0.000	8.482
L7 81.80-43.33	62.32	1.199	7.64	110.569	A	0.000	110.569	110.569	100.00	0.000	0.000
					B	0.000	110.569		100.00	0.000	0.000
					C	0.000	110.569		100.00	0.000	54.114
L8 43.33-37.40	40.34	1.059	6.78	18.621	A	0.000	18.621	18.621	100.00	0.000	0.000
					B	0.000	18.621		100.00	0.000	0.000
					C	0.000	18.621		100.00	0.000	8.342
L9 37.40-9.00	22.89	1	6.40	97.367	A	0.000	97.367	97.367	100.00	0.000	0.000
					B	0.000	97.367		100.00	0.000	0.000
					C	0.000	97.367		100.00	0.000	39.949
L10 9.00-7.00	8.00	1	6.40	7.333	A	0.000	7.333	7.333	100.00	0.000	0.000
					B	0.000	7.333		100.00	0.000	0.000
					C	0.000	7.333		100.00	0.000	2.813
L11 7.00-0.00	3.48	1	6.40	26.158	A	0.000	26.158	26.158	100.00	0.000	0.000
					B	0.000	26.158		100.00	0.000	0.000
					C	0.000	26.158		100.00	0.000	9.847

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	169 - 133.33	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	14	-15.40	1.39	-0.82
			Max. Mx	11	-5.89	263.58	-0.14
			Max. My	8	-5.89	0.19	-263.51
			Max. Vy	11	-12.66	263.58	-0.14
			Max. Vx	8	12.66	0.19	-263.51
			Max. Torque	13			0.07
L2	133.33 - 111	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22.57	3.57	-2.11
			Max. Mx	11	-9.64	633.96	-0.68
			Max. My	2	-9.63	0.48	633.59
			Max. Vy	11	-15.75	633.96	-0.68
			Max. Vx	2	-15.77	0.48	633.59
			Max. Torque	9			-0.21
L3	111 - 101.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.05	5.52	-4.35
			Max. Mx	11	-13.74	838.82	-1.43
			Max. My	8	-13.73	0.81	-839.30
			Max. Vy	11	-22.06	838.82	-1.43
			Max. Vx	2	-22.21	0.65	839.11
			Max. Torque	5			-1.26
L4	101.5 - 101	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.31	5.63	-4.42
			Max. Mx	11	-13.92	849.87	-1.46
			Max. My	8	-13.91	0.83	-850.40
			Max. Vy	11	-22.12	849.87	-1.46
			Max. Vx	2	-22.27	0.66	850.22
			Max. Torque	5			-1.27
L5	101 - 87.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-36.40	7.55	-5.54
			Max. Mx	11	-16.28	1050.13	-1.89
			Max. My	8	-16.27	1.19	-1051.42
			Max. Vy	11	-23.14	1050.13	-1.89
			Max. Vx	2	-23.29	0.88	1051.38
			Max. Torque	5			-1.32
L6	87.83 - 81.8	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.54	9.87	-6.89
			Max. Mx	11	-20.21	1297.05	-2.39
			Max. My	2	-20.20	1.15	1299.35
			Max. Vy	11	-24.41	1297.05	-2.39
			Max. Vx	2	-24.56	1.15	1299.35
			Max. Torque	5			-1.38
L7	81.8 - 43.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-60.40	17.84	-11.53
			Max. Mx	11	-32.01	2164.97	-4.10
			Max. My	2	-32.00	2.18	2170.35
			Max. Vy	11	-27.89	2164.97	-4.10
			Max. Vx	2	-28.04	2.18	2170.35
			Max. Torque	12			1.66
L8	43.33 - 37.4	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-68.69	20.64	-13.16
			Max. Mx	11	-37.97	2486.28	-4.69
			Max. My	2	-37.97	2.55	2492.68
			Max. Vy	11	-29.04	2486.28	-4.69
			Max. Vx	2	-29.19	2.55	2492.68
			Max. Torque	12			1.78
L9	37.4 - 9	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-84.47	27.67	-17.23
			Max. Mx	11	-49.13	3341.80	-6.23
			Max. My	2	-49.12	3.63	3350.49
			Max. Vy	11	-31.17	3341.80	-6.23
			Max. Vx	2	-31.32	3.63	3350.49
			Max. Torque	12			2.09
L10	9 - 7	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-85.66	28.18	-17.52
			Max. Mx	11	-49.99	3404.33	-6.34

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-49.99	3.71	3413.17
			Max. Vy	11	-31.31	3404.33	-6.34
			Max. Vx	2	-31.46	3.71	3413.17
			Max. Torque	12			2.11
L11	7 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-89.74	30.00	-18.57
			Max. Mx	11	-52.91	3625.45	-6.73
			Max. My	2	-52.91	4.00	3634.80
			Max. Vy	11	-31.81	3625.45	-6.73
			Max. Vx	2	-31.96	4.00	3634.80
			Max. Torque	12			2.19

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	89.74	-0.00	0.00
	Max. H_x	11	52.92	31.79	-0.03
	Max. H_z	2	52.92	-0.01	31.94
	Max. M_x	2	3634.80	-0.01	31.94
	Max. M_z	5	3615.54	-31.79	-0.01
	Max. Torsion	12	2.19	27.50	15.94
	Min. Vert	2	52.92	-0.01	31.94
	Min. H_x	5	52.92	-31.79	-0.01
	Min. H_z	8	52.92	0.01	-31.89
	Min. M_x	8	-3634.31	0.01	-31.89
	Min. M_z	11	-3625.45	31.79	-0.03
	Min. Torsion	6	-2.19	-27.54	-15.96

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	52.92	0.00	-0.00	3.11	4.68	-0.00
Dead+Wind 0 deg - No Ice	52.92	0.01	-31.94	-3634.80	4.00	-1.33
Dead+Wind 30 deg - No Ice	52.92	15.89	-27.66	-3147.45	-1804.00	-0.41
Dead+Wind 60 deg - No Ice	52.92	27.51	-15.95	-1813.27	-3127.29	0.86
Dead+Wind 90 deg - No Ice	52.92	31.79	0.01	4.99	-3615.54	1.90
Dead+Wind 120 deg - No Ice	52.92	27.54	15.96	1821.72	-3132.45	2.19
Dead+Wind 150 deg - No Ice	52.92	15.91	27.63	3150.43	-1807.04	1.90
Dead+Wind 180 deg - No Ice	52.92	-0.01	31.89	3634.31	5.73	1.33
Dead+Wind 210 deg - No Ice	52.92	-15.92	27.64	3151.29	1818.27	0.41
Dead+Wind 240 deg - No Ice	52.92	-27.55	15.98	1823.22	3143.04	-0.86
Dead+Wind 270 deg - No Ice	52.92	-31.79	0.03	6.73	3625.45	-1.90
Dead+Wind 300 deg - No Ice	52.92	-27.50	-15.94	-1811.76	3136.14	-2.19
Dead+Wind 330 deg - No Ice	52.92	-15.87	-27.65	-3146.58	1812.22	-1.90
Dead+Ice+Temp	89.74	0.00	-0.00	18.57	30.00	-0.00
Dead+Wind 0 deg+Ice+Temp	89.74	0.00	-9.86	-1137.08	29.98	-0.66
Dead+Wind 30 deg+Ice+Temp	89.74	4.91	-8.54	-982.18	-545.16	-0.27
Dead+Wind 60 deg+Ice+Temp	89.74	8.50	-4.92	-558.44	-966.12	0.26
Dead+Wind 90 deg+Ice+Temp	89.74	9.83	0.00	19.20	-1121.35	0.72
Dead+Wind 120 deg+Ice+Temp	89.74	8.51	4.93	596.42	-967.59	0.92
Dead+Wind 150 deg+Ice+Temp	89.74	4.92	8.53	1018.62	-546.08	0.88

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+Wind 180 deg+Ice+Temp	89.74	-0.00	9.85	1172.50	30.33	0.66
Dead+Wind 210 deg+Ice+Temp	89.74	-4.92	8.53	1018.79	606.70	0.27
Dead+Wind 240 deg+Ice+Temp	89.74	-8.51	4.93	596.72	1028.07	-0.26
Dead+Wind 270 deg+Ice+Temp	89.74	-9.83	0.01	19.56	1181.64	-0.72
Dead+Wind 300 deg+Ice+Temp	89.74	-8.50	-4.92	-558.13	1026.25	-0.92
Dead+Wind 330 deg+Ice+Temp	89.74	-4.91	-8.54	-982.00	605.16	-0.88
Dead+Wind 0 deg - Service	52.92	0.00	-12.48	-1419.92	4.54	-0.52
Dead+Wind 30 deg - Service	52.92	6.20	-10.80	-1229.34	-702.78	-0.16
Dead+Wind 60 deg - Service	52.92	10.74	-6.23	-707.39	-1220.46	0.34
Dead+Wind 90 deg - Service	52.92	12.42	0.00	3.93	-1411.38	0.75
Dead+Wind 120 deg - Service	52.92	10.76	6.24	714.68	-1222.52	0.86
Dead+Wind 150 deg - Service	52.92	6.21	10.79	1234.47	-703.97	0.74
Dead+Wind 180 deg - Service	52.92	-0.00	12.45	1423.68	5.21	0.52
Dead+Wind 210 deg - Service	52.92	-6.22	10.80	1234.84	714.33	0.16
Dead+Wind 240 deg - Service	52.92	-10.76	6.24	715.27	1232.61	-0.34
Dead+Wind 270 deg - Service	52.92	-12.42	0.01	4.61	1421.12	-0.75
Dead+Wind 300 deg - Service	52.92	-10.74	-6.23	-706.80	1229.87	-0.86
Dead+Wind 330 deg - Service	52.92	-6.20	-10.80	-1229.04	711.96	-0.74

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-52.92	0.00	-0.00	52.92	0.00	0.001%
2	0.01	-52.92	-31.94	-0.01	52.92	31.94	0.005%
3	15.89	-52.92	-27.66	-15.89	52.92	27.66	0.000%
4	27.51	-52.92	-15.95	-27.51	52.92	15.95	0.000%
5	31.79	-52.92	0.01	-31.79	52.92	-0.01	0.005%
6	27.54	-52.92	15.96	-27.54	52.92	-15.96	0.000%
7	15.91	-52.92	27.63	-15.91	52.92	-27.63	0.000%
8	-0.01	-52.92	31.89	0.01	52.92	-31.89	0.005%
9	-15.92	-52.92	27.64	15.92	52.92	-27.64	0.000%
10	-27.55	-52.92	15.98	27.55	52.92	-15.98	0.000%
11	-31.79	-52.92	0.03	31.79	52.92	-0.03	0.002%
12	-27.50	-52.92	-15.94	27.50	52.92	15.94	0.000%
13	-15.87	-52.92	-27.65	15.87	52.92	27.65	0.000%
14	0.00	-89.74	0.00	-0.00	89.74	0.00	0.001%
15	0.00	-89.74	-9.86	-0.00	89.74	9.86	0.001%
16	4.91	-89.74	-8.54	-4.91	89.74	8.54	0.000%
17	8.50	-89.74	-4.93	-8.50	89.74	4.92	0.000%
18	9.83	-89.74	0.00	-9.83	89.74	-0.00	0.001%
19	8.51	-89.74	4.93	-8.51	89.74	-4.93	0.000%
20	4.92	-89.74	8.53	-4.92	89.74	-8.53	0.000%
21	-0.00	-89.74	9.85	0.00	89.74	-9.85	0.001%
22	-4.92	-89.74	8.53	4.92	89.74	-8.53	0.000%
23	-8.51	-89.74	4.93	8.51	89.74	-4.93	0.000%
24	-9.83	-89.74	0.01	9.83	89.74	-0.01	0.001%
25	-8.50	-89.74	-4.92	8.50	89.74	4.92	0.000%
26	-4.91	-89.74	-8.54	4.91	89.74	8.54	0.000%
27	0.00	-52.92	-12.48	-0.00	52.92	12.48	0.004%
28	6.21	-52.92	-10.81	-6.20	52.92	10.80	0.001%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
29	10.74	-52.92	-6.23	-10.74	52.92	6.23	0.001%
30	12.42	-52.92	0.00	-12.42	52.92	-0.00	0.004%
31	10.76	-52.92	6.24	-10.76	52.92	-6.24	0.001%
32	6.21	-52.92	10.79	-6.21	52.92	-10.79	0.001%
33	-0.00	-52.92	12.46	0.00	52.92	-12.45	0.004%
34	-6.22	-52.92	10.80	6.22	52.92	-10.80	0.001%
35	-10.76	-52.92	6.24	10.76	52.92	-6.24	0.001%
36	-12.42	-52.92	0.01	12.42	52.92	-0.01	0.004%
37	-10.74	-52.92	-6.23	10.74	52.92	6.23	0.001%
38	-6.20	-52.92	-10.80	6.20	52.92	10.80	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000331
2	Yes	17	0.00005709	0.00008432
3	Yes	22	0.00000001	0.00013605
4	Yes	22	0.00000001	0.00013439
5	Yes	17	0.00005713	0.00014937
6	Yes	22	0.00000001	0.00013939
7	Yes	22	0.00000001	0.00013481
8	Yes	17	0.00005709	0.00008732
9	Yes	22	0.00000001	0.00013757
10	Yes	22	0.00000001	0.00013900
11	Yes	18	0.00002933	0.00008189
12	Yes	22	0.00000001	0.00013379
13	Yes	22	0.00000001	0.00013859
14	Yes	13	0.00000001	0.00007072
15	Yes	19	0.00005360	0.00011284
16	Yes	20	0.00000001	0.00009242
17	Yes	20	0.00000001	0.00009220
18	Yes	19	0.00005363	0.00011160
19	Yes	20	0.00000001	0.00009833
20	Yes	20	0.00000001	0.00009524
21	Yes	19	0.00005355	0.00011623
22	Yes	20	0.00000001	0.00010343
23	Yes	20	0.00000001	0.00010352
24	Yes	19	0.00005354	0.00011706
25	Yes	20	0.00000001	0.00009697
26	Yes	20	0.00000001	0.00010027
27	Yes	16	0.00011716	0.00005733
28	Yes	18	0.00000001	0.00014875
29	Yes	18	0.00000001	0.00014461
30	Yes	16	0.00011720	0.00007141
31	Yes	19	0.00000001	0.00008376
32	Yes	18	0.00000001	0.00014543
33	Yes	16	0.00011715	0.00005771
34	Yes	19	0.00000001	0.00008108
35	Yes	19	0.00000001	0.00008313
36	Yes	16	0.00011717	0.00007221
37	Yes	18	0.00000001	0.00014347
38	Yes	19	0.00000001	0.00008284

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 133.33	51.44	34	2.997	0.003

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	136.66 - 111	32.11	34	2.529	0.002
L3	111 - 101.5	20.34	34	1.786	0.002
L4	101.5 - 101	16.98	34	1.593	0.002
L5	101 - 87.83	16.81	34	1.587	0.002
L6	92.16 - 81.8	14.01	34	1.433	0.001
L7	81.8 - 43.33	11.04	34	1.284	0.001
L8	48.66 - 37.4	3.99	34	0.755	0.001
L9	37.4 - 9	2.35	34	0.612	0.001
L10	9 - 7	0.13	34	0.140	0.000
L11	7 - 0	0.08	34	0.110	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	34	48.93	2.958	0.003	13495
156.00	(2) DUO1417-8686 w/ Mount Pipe	34	43.33	2.863	0.003	5190
148.00	932LG65VTE-B w/ Mount Pipe	34	38.51	2.753	0.002	3212
138.00	APXV18-206517-A	34	32.83	2.560	0.002	2194
128.00	A-ANT-18G-2-C	34	27.69	2.290	0.002	2010
111.00	(3) LNX-6514DS-A1M w/ Mount Pipe	34	20.34	1.786	0.002	1971

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 133.33	130.72	2	7.625	0.007
L2	136.66 - 111	81.70	9	6.437	0.006
L3	111 - 101.5	51.80	9	4.550	0.005
L4	101.5 - 101	43.24	9	4.058	0.004
L5	101 - 87.83	42.82	9	4.042	0.004
L6	92.16 - 81.8	35.70	9	3.652	0.004
L7	81.8 - 43.33	28.14	9	3.271	0.003
L8	48.66 - 37.4	10.16	9	1.924	0.002
L9	37.4 - 9	5.98	9	1.560	0.001
L10	9 - 7	0.34	9	0.358	0.000
L11	7 - 0	0.21	9	0.281	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	124.35	7.528	0.007	5464
156.00	(2) DUO1417-8686 w/ Mount Pipe	2	110.15	7.285	0.006	2099
148.00	932LG65VTE-B w/ Mount Pipe	9	97.93	7.007	0.006	1297
138.00	APXV18-206517-A	9	83.53	6.518	0.006	884
128.00	A-ANT-18G-2-C	9	70.48	5.830	0.006	805
111.00	(3) LNX-6514DS-A1M w/ Mount Pipe	9	51.80	4.550	0.005	783

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	169 - 133.33 (1)	TP22.31x15.5x0.25	35.67	0.00	0.0	39.00	17.0001	-5.89	663.01	0.009
L2	133.33 - 111 (2)	TP26.0013x21.1743x0.3125	25.66	0.00	0.0	39.00	25.4801	-9.63	993.72	0.010
L3	111 - 101.5 (3)	TP27.7884x26.0013x0.5508	9.50	0.00	0.0	30.92	47.6179	-13.73	1472.25	0.009
L4	101.5 - 101 (4)	TP27.8825x27.7884x0.9838	0.50	0.00	0.0	26.41	83.9892	-13.90	2217.82	0.006
L5	101 - 87.83 (5)	TP30.36x27.8825x0.6941	13.17	0.00	0.0	26.48	63.5643	-16.27	1683.44	0.010
L6	87.83 - 81.8 (6)	TP30.8702x28.1572x0.7414	10.36	0.00	0.0	26.53	70.8954	-20.20	1880.57	0.011
L7	81.8 - 43.33 (7)	TP38.11x30.8702x0.8207	38.47	0.00	0.0	30.91	94.5254	-32.00	2921.40	0.011
L8	43.33 - 37.4 (8)	TP38.4726x35.4655x0.8018	11.26	0.00	0.0	30.94	91.8341	-35.70	2840.98	0.013
L9	37.4 - 9 (9)	TP43.8089x38.4726x0.7411	28.40	0.00	0.0	31.06	101.3060	-49.12	3146.17	0.016
L10	9 - 7 (10)	TP44.1847x43.8089x0.7763	2.00	0.00	0.0	31.11	106.9520	-49.99	3327.27	0.015
L11	7 - 0 (11)	TP45.5x44.1847x0.7254	7.00	0.00	0.0	31.09	103.0890	-52.91	3205.23	0.017

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	169 - 133.33 (1)	TP22.31x15.5x0.25	263.64	35.33	39.00	0.906	0.00	0.00	39.00	0.000
L2	133.33 - 111 (2)	TP26.0013x21.1743x0.3125	634.42	47.34	39.00	1.214	0.00	0.00	39.00	0.000
L3	111 - 101.5 (3)	TP27.7884x26.0013x0.5508	840.33	31.89	30.92	1.032	0.00	0.00	30.92	0.000
L4	101.5 - 101 (4)	TP27.8825x27.7884x0.9838	851.45	18.85	26.41	0.714	0.00	0.00	26.41	0.000
L5	101 - 87.83 (5)	TP30.36x27.8825x0.6941	1052.68	28.36	26.48	1.071	0.00	0.00	26.48	0.000
L6	87.83 - 81.8 (6)	TP30.8702x28.1572x0.7414	1300.75	30.11	26.53	1.135	0.00	0.00	26.53	0.000
L7	81.8 - 43.33 (7)	TP38.11x30.8702x0.8207	2172.37	31.25	30.91	1.011	0.00	0.00	30.91	0.000
L8	43.33 - 37.4 (8)	TP38.4726x35.4655x0.8018	2323.44	34.58	30.94	1.118	0.00	0.00	30.94	0.000
L9	37.4 - 9 (9)	TP43.8089x38.4726x0.7411	3353.59	37.73	31.06	1.215	0.00	0.00	31.06	0.000
L10	9 - 7 (10)	TP44.1847x43.8089x0.7763	3416.34	36.14	31.11	1.162	0.00	0.00	31.11	0.000
L11	7 - 0 (11)	TP45.5x44.1847x0.7254	3638.23	38.65	31.09	1.243	0.00	0.00	31.09	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	169 - 133.33 (1)	TP22.31x15.5x0.25	12.66	0.74	26.00	0.057	0.00	0.00	26.00	0.000
L2	133.33 - 111 (2)	TP26.0013x21.1743x0.3125	15.78	0.62	26.00	0.048	0.00	0.00	26.00	0.000
L3	111 - 101.5 (3)	TP27.7884x26.0013x0.5508	22.17	0.47	20.61	0.045	0.24	0.00	20.61	0.000
L4	101.5 - 101 (4)	TP27.8825x27.7884x0.9838	22.26	0.27	17.60	0.030	0.23	0.00	17.60	0.000
L5	101 - 87.83 (5)	TP30.36x27.8825x0.6941	23.26	0.37	17.66	0.041	0.18	0.00	17.66	0.000
L6	87.83 - 81.8 (6)	TP30.8702x28.1572x0.7414	24.53	0.35	17.68	0.039	0.12	0.00	17.68	0.000
L7	81.8 - 43.33 (7)	TP38.11x30.8702x0.8207	28.00	0.30	20.60	0.029	0.10	0.00	20.60	0.000
L8	43.33 - 37.4 (8)	TP38.4726x35.4655x0.8018	28.75	0.31	20.62	0.030	0.14	0.00	20.62	0.000
L9	37.4 - 9 (9)	TP43.8089x38.4726x0.7411	31.28	0.31	20.70	0.030	0.35	0.00	20.70	0.000
L10	9 - 7 (10)	TP44.1847x43.8089x0.7763	31.42	0.29	20.74	0.028	0.36	0.00	20.74	0.000
L11	7 - 0 (11)	TP45.5x44.1847x0.7254	31.92	0.31	20.73	0.030	0.41	0.00	20.73	0.000

Pole Interaction Design Data

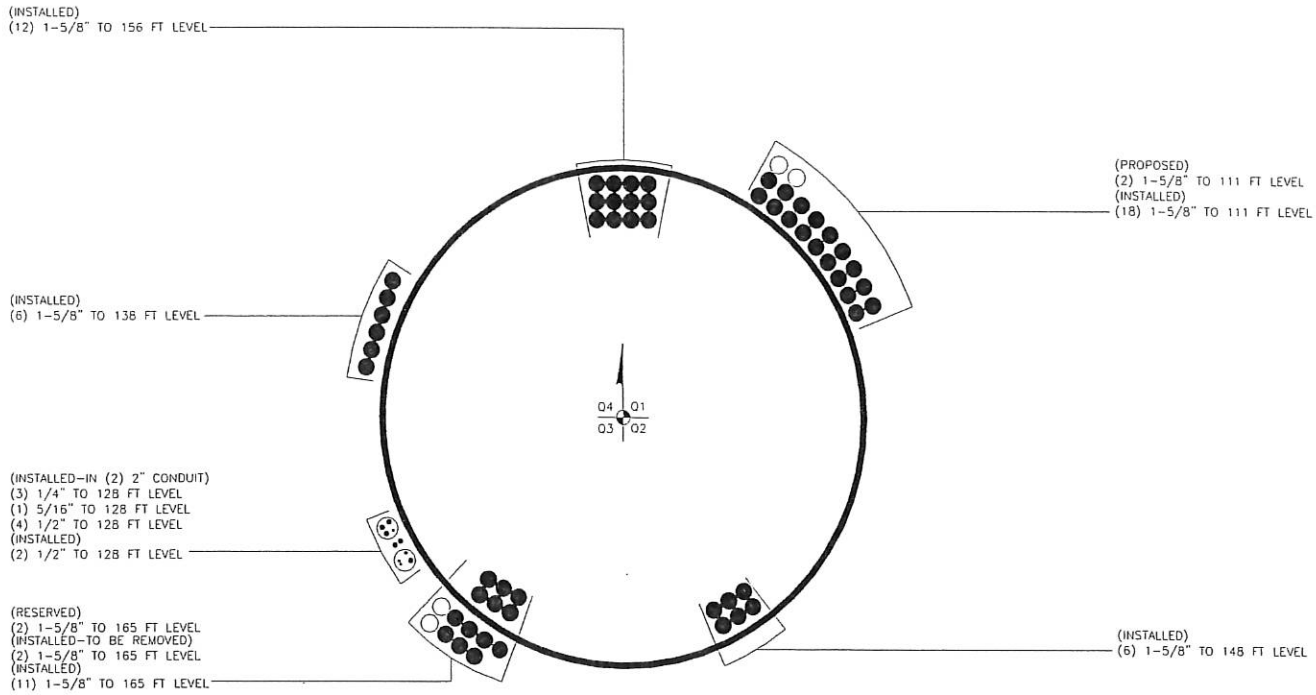
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 133.33 (1)	0.009	0.906	0.000	0.057	0.000	0.916 ✓	1.333	H1-3+VT ✓
L2	133.33 - 111 (2)	0.010	1.214	0.000	0.048	0.000	1.224 ✓	1.333	H1-3+VT ✓
L3	111 - 101.5 (3)	0.009	1.032	0.000	0.045	0.000	1.041 ✓	1.333	H1-3+VT ✓
L4	101.5 - 101 (4)	0.006	0.714	0.000	0.030	0.000	0.720 ✓	1.333	H1-3+VT ✓
L5	101 - 87.83 (5)	0.010	1.071	0.000	0.041	0.000	1.081 ✓	1.333	H1-3+VT ✓
L6	87.83 - 81.8 (6)	0.011	1.135	0.000	0.039	0.000	1.146 ✓	1.333	H1-3+VT ✓
L7	81.8 - 43.33 (7)	0.011	1.011	0.000	0.029	0.000	1.022 ✓	1.333	H1-3+VT ✓
L8	43.33 - 37.4 (8)	0.013	1.118	0.000	0.030	0.000	1.131 ✓	1.333	H1-3+VT ✓
L9	37.4 - 9 (9)	0.016	1.215	0.000	0.030	0.000	1.231 ✓	1.333	H1-3+VT ✓
L10	9 - 7 (10)	0.015	1.162	0.000	0.028	0.000	1.177 ✓	1.333	H1-3+VT ✓
L11	7 - 0 (11)	0.017	1.243	0.000	0.030	0.000	1.260 ✓	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	169 - 133.33	Pole	TP22.31x15.5x0.25	1	-5.89	883.79	68.7	Pass
L2	133.33 - 111	Pole	TP26.0013x21.1743x0.3125	2	-9.63	1324.63	91.8	Pass
L3	111 - 101.5	Pole	TP27.7884x26.0013x0.5508	3	-13.73	1962.51	78.1	Pass
L4	101.5 - 101	Pole	TP27.8825x27.7884x0.9838	4	-13.90	2956.35	54.0	Pass
L5	101 - 87.83	Pole	TP30.36x27.8825x0.6941	5	-16.27	2244.03	81.1	Pass
L6	87.83 - 81.8	Pole	TP30.8702x28.1572x0.7414	6	-20.20	2506.80	86.0	Pass
L7	81.8 - 43.33	Pole	TP38.11x30.8702x0.8207	7	-32.00	3894.23	76.7	Pass
L8	43.33 - 37.4	Pole	TP38.4726x35.4655x0.8018	8	-35.70	3787.03	84.8	Pass
L9	37.4 - 9	Pole	TP43.8089x38.4726x0.7411	9	-49.12	4193.84	92.3	Pass
L10	9 - 7	Pole	TP44.1847x43.8089x0.7763	10	-49.99	4435.25	88.3	Pass
L11	7 - 0	Pole	TP45.5x44.1847x0.7254	11	-52.91	4272.57	94.5	Pass
							Summary	
						Pole (L11)	94.5	Pass
						RATING =	**94.5**	**Pass**

APPENDIX B

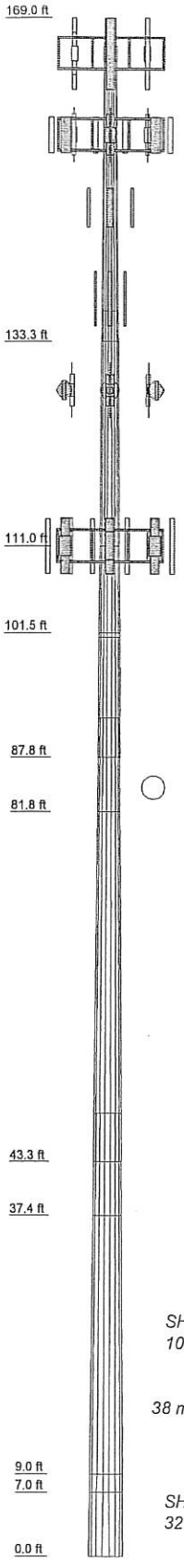
BASE LEVEL DRAWING

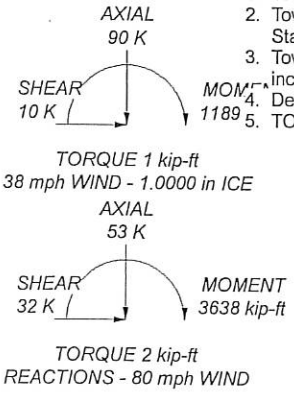

(INSTALLED)
(12) 1-5/8" TO 156 FT LEVEL
(PROPOSED)
(2) 1-5/8" TO 111 FT LEVEL
(INSTALLED)
(18) 1-5/8" TO 111 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 138 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED-IN (2) 2" CONDUIT)
(3) 1/4" TO 128 FT LEVEL
(1) 5/16" TO 128 FT LEVEL
(4) 1/2" TO 128 FT LEVEL
(INSTALLED)
(2) 1/2" TO 128 FT LEVEL
(RESERVED)
(2) 1-5/8" TO 165 FT LEVEL
(INSTALLED-TO BE REMOVED)
(2) 1-5/8" TO 165 FT LEVEL
(INSTALLED)
(11) 1-5/8" TO 165 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 148 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Section	11	10	9	8	7	6	5	4	3	2	1
Length (ft)	7.00	2.00	28.40	11.26	38.47	10.36	13.17	0.50	9.50	25.66	35.67
Number of Sides	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.7254	0.7763	0.7411	0.8018	0.8207	0.7414	0.6941	0.9838	0.5508	0.3125	0.2500
Socket Length (ft)					5.33		4.33			3.33	
Top Dia (in)	44.1847	43.8089	38.4726	35.4655	30.8702	28.1572	27.8825	27.7884	26.0013	21.1743	15.5000
Bot Dia (in)	45.5000	44.1847	43.8089	38.4726	38.1100	30.8702	30.3600	27.8825	27.7884	26.0013	22.3100
Grade	Reinf 51.53 ksi		Reinf 51.76 ksi	Reinf 51.56 ksi	Reinf 51.51 ksi	Reinf 44.21 ksi	Reinf 44.14 ksi	Reinf 44.01 ksi	Reinf 51.53 ksi	A572-65	
Weight (K)	38.0	2.4	0.7	9.2	3.5	11.5	2.4	2.8	0.1	1.5	2.0	1.8





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	932LG65VTE-B w/ Mount Pipe	148
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	932LG65VTE-B w/ Mount Pipe	148
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	Side Arm Mount [SO 102-3]	148
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	165	APXV18-206517-A	138
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	165	APXV18-206517-A	138
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	165	APXV18-206517-A	138
KRY 112 144/1	165	Pipe Mount [PM 601-3]	138
KRY 112 144/1	165	LLPX310R w/ Mount Pipe	128
KRY 112 144/1	165	LLPX310R w/ Mount Pipe	128
LNX-6515DS-VTM w/ Mount Pipe	165	LLPX310R w/ Mount Pipe	128
LNX-6515DS-VTM w/ Mount Pipe	165	WIMAX DAP HEAD	128
LNX-6515DS-VTM w/ Mount Pipe	165	WIMAX DAP HEAD	128
RRUS 11 B12	165	WIMAX DAP HEAD	128
RRUS 11 B12	165	HORIZON DUO	128
RRUS 11 B12	165	HORIZON DUO	128
Platform Mount [LP 712-1]	165	HORIZON DUO	128
8-ft Ladder	165	2.375" OD x 6' Mount Pipe	128
(2) DUO1417-8686 w/ Mount Pipe	156	2.375" OD x 6' Mount Pipe	128
(2) DUO1417-8686 w/ Mount Pipe	156	2.375" OD x 6' Mount Pipe	128
(2) DUO1417-8686 w/ Mount Pipe	156	Side Arm Mount [SO 701-3]	128
7770.00 w/ Mount Pipe	156	A-ANT-18G-2-C	128
7770.00 w/ Mount Pipe	156	A-ANT-18G-2-C	128
7770.00 w/ Mount Pipe	156	A-ANT-18G-2-C	128
DTMABP7819VG12A	156	HBXX-6517DS-A2M w/ Mount Pipe	111
DTMABP7819VG12A	156	(2) HBXX-6517DS-A2M w/ Mount Pipe	111
DTMABP7819VG12A	156	(3) HBXX-6517DS-A2M w/ Mount Pipe	111
RRUS 11	156	RRH2X60-PCS	111
RRUS 11	156	RRH2X60-PCS	111
RRUS 11	156	RRH2X60-PCS	111
2.375" OD x 6' Mount Pipe	156	RRH2X60-AWS	111
2.375" OD x 6' Mount Pipe	156	RRH2X60-AWS	111
2.375" OD x 6' Mount Pipe	156	RRH2X60-AWS	111
Platform Mount [LP 712-1]	156	(2) DB-B1-6C-12AB-0Z	111
932LG65VTE-B w/ Mount Pipe	148	Platform Mount [LP 303-1]	111
		(3) LNX-6514DS-A1M w/ Mount Pipe	111
		(2) LNX-6514DS-A1M w/ Mount Pipe	111
		LNX-6514DS-A1M w/ Mount Pipe	111

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 51.51 ksi	52 ksi	65 ksi
Reinf 51.53 ksi	52 ksi	65 ksi	Reinf 51.56 ksi	52 ksi	65 ksi
Reinf 44.01 ksi	44 ksi	56 ksi	Reinf 51.76 ksi	52 ksi	65 ksi
Reinf 44.14 ksi	44 ksi	56 ksi	Reinf 51.85 ksi	52 ksi	65 ksi
Reinf 44.21 ksi	44 ksi	56 ksi	Reinf 51.82 ksi	52 ksi	65 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 94.5%

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.44105

Job: *165-Ft Monopole / South Windsor/Rt 5*		
Project: *37513-1535 / BU# 828054*		
Client: Crown Castle	Drawn by: Robert Koors	App'd:
Code: TIA/EIA-222-F	Date: 12/09/14	Scale: NTS
Path: T:\375 Crown Castle\3513\37513-1535 BU 828054\WO 928841 BU 828054 - 009 SD\[37513-1535 002 7700_CROWN Reinforced.eri		Dwg No.

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

v4.4 - Effective 7-12-13

Date: 12/9/2014
PJF Project: 37513-1535.002.7700
Client Ref.# 828054
Site Name: South Windsor/RT 5
Description: MICROPILES
Owner: Crown Castle
Engineer: RMK

Asymmetric Anchor Rod Analysis

Moment =	3734	k-ft	TIA Ref.	F	Location =	Base Plate	
Axial =	53.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	32.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	6						

** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. **

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1					0.0	117.50	5.51	5.51	263.06	245.40	263.06	306.30	306.30	85.9%
2					60.0	117.50	5.51	5.51	263.06	245.40	263.06	306.30	306.30	85.9%
3					120.0	117.50	5.51	5.51	263.06	245.40	263.06	306.30	306.30	85.9%
4					180.0	117.50	5.51	5.51	263.06	245.40	263.06	306.30	306.30	85.9%
5					240.0	117.50	5.51	5.51	263.06	245.40	263.06	306.30	306.30	85.9%
6					300.0	117.50	5.51	5.51	263.06	245.40	263.06	306.30	306.30	85.9%
								33.06						

EXHIBIT B

37513-1535.002 R1.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #828054; SOUTH WINDSOR/RT 5

APP: 261426 REV. 0; WO: 928841

SITE ADDRESS

300 GOVERNORS HIGHWAY
SOUTH WINDSOR, CONNECTICUT 06074
HARTFORD COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
MOD PM: JERRY BRUNO AT JERRY.BRUNO.CONTRACTOR@CROWNCASTLE.COM
PH: (781) 970-0069

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 80 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 1 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1535.002.7700), DATED 12-9-2014.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING
FIELD WELDED MICROPILE BRACKETS
FOUNDATION AUGMENTATION: MICROPILES
REMOVAL OF BASE STIFFENERS ON FLATS #1, 4, 7, 10, 13 & 16
REMOVAL OF BOLTS NEAR BASE FLATS #1, 7, 10 & 16 (20 TOTAL)

1

SHEET INDEX

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED PROFESSIONAL ENGINEER
9.15.15

1 12-29-2014 : MODIFIED REINFORCING ELEMENTS LIST

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	TITLE SHEET
CHECKED BY: R.M.K.	
APPROVED BY: JTK	T-1
DATE: 12-9-2014	

CROWN CASTLE PROJECT: BU #828054; SOUTH WINDSOR/RT 5; SOUTH WINDSOR, CONNECTICUT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F-1996 BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   A. GENERAL:
      (1.) PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
   C. CONCRETE TESTING PER ACI - (NOT REQUIRED)
   D. STRUCTURAL STEEL
      (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
      (2.) CHECK MILL CERTIFICATIONS.
      (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
      (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
      (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
      (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
      (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
      (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
   E. WELDING:
      (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
      (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
      (3.) APPROVE FIELD WELDING SEQUENCE.
         (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
      (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
         (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
         (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
         (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
         (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
         (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
         (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
         (H.) REVIEW THE REPORTS BY TESTING LABS.
         (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
         (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
         (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   F. REPORTS:
      (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

4-15-15

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

1 12-29-2014

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	GENERAL NOTES
CHECKED BY: R.M.K.	
APPROVED BY: JTK	S-1
DATE: 12-9-2014	

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
   (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
   (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
   (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).

B. BY THE AMERICAN WELDING SOCIETY (AWS):
   (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
   (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"

2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
   (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
   (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT - (NOT REQUIRED)

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

I. TOUCH UP OF GALVANIZING

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.2: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

4-15-15

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

1 12-29-2014

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	GENERAL NOTES
CHECKED BY: R.M.K.	
APPROVED BY: JTK	S-2
DATE: 12-9-2014	

AJAX BOLT NOTE SHEET: REV. 1.5, 5-12-2014

NOTES:
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH RED DURABLE SQUIRT MEDIA EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY APPLIED BOLTING TECHNOLOGY PRODUCTS' INC.:

PART NUMBER: 2DTIM208MGAFSIF

DESCRIPTION: P.C. 8.8 DTI SQUIRTER WASHER WITH RED DURABLE SQUIRT MEDIA DESIGNED SPECIFICALLY FOR THE AJAX M20 ONESIDE BOLT. FINISH SHALL BE ZINC GALVANIZED AS PROVIDED BY THE DTI MANUFACTURER.

DISTRIBUTOR CONTACT DETAILS:
ALLFASTENERS
15401 COMMERCE PARK DR.
BROOKPARK, OHIO 44142
PHONE: 440-232-6060
E-MAIL: SALES@ALLFASTENERS.COM

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

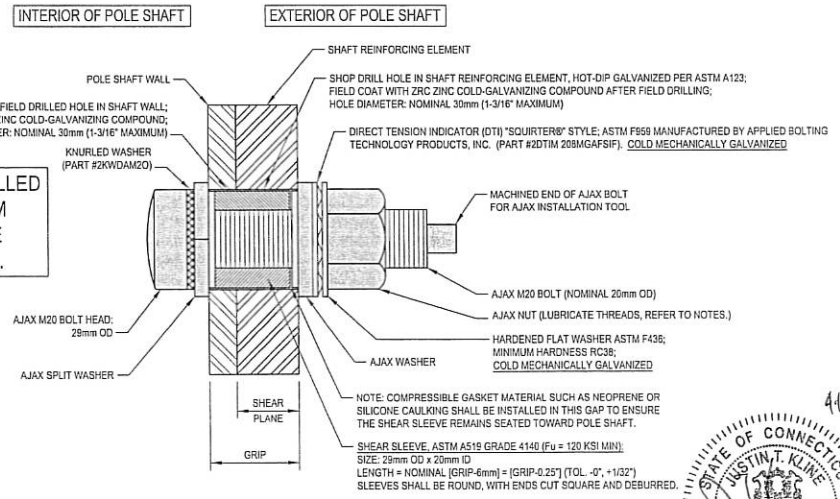
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1 / S-3

4-15-15

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

1 12-29-2014

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-1535.002.7700 R1
DRAWN BY: B.M.S.
CHECKED BY: R.M.K.
APPROVED BY: JTK
DATE: 12-9-2014
AJAX BOLT DETAIL
S-3

7513-1535.002 R1.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	18-SIDED POLYGON
TAPER:	0.187898 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A871 GRADE 60
ANCHOR RODS:	2 1/4"ø #18J ASTM A615 GRADE 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	35.67	0.2500	40.00	15.500	22.310
2	48.83	0.3125	52.00	21.174	30.360
3	48.83	0.3750	64.00	26.921	38.110
4	48.66	0.3750		36.357	45.500

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

MODIFICATIONS:

(A) INSTALL NEW MICROPILE AT EXISTING POLE BASE. SEE SHEETS S-6 TO S-9.

(B) INSTALL NEW MICROPILE BRACKETS AT BASE PLATE. SEE SHEET S-6 TO S-9.

(C) INSTALL NEW SHAFT REINFORCING. SEE CHART ON SHEET S-5.

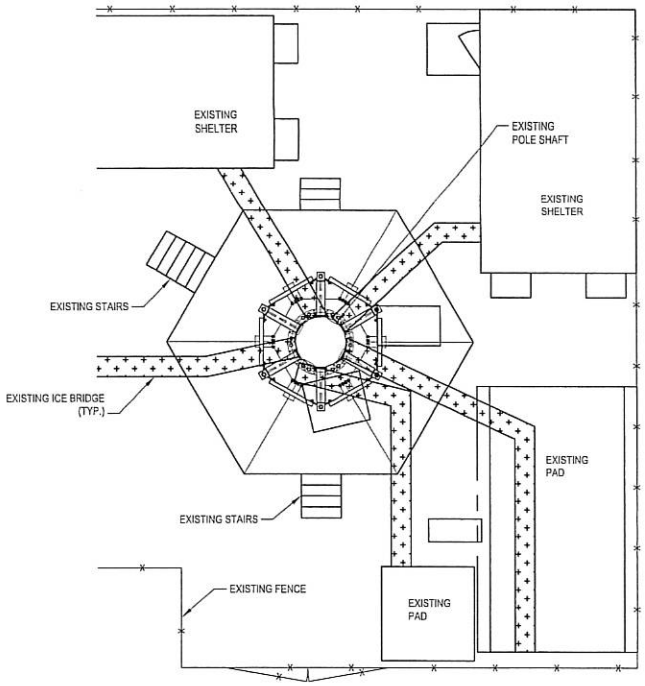
(D) REMOVE EXISTING STIFFENERS ON FLATS #1, 4, 7, 10, 13 & 16 FOR INSTALLATION OF AB1. SEE SHEET S-6.

(E) REMOVE LOWER BOLTS ON FLATS #1, 7, 10 & 16 (20 TOTAL) FOR INSTALLATION OF AB1. SEE SHEET S-6.

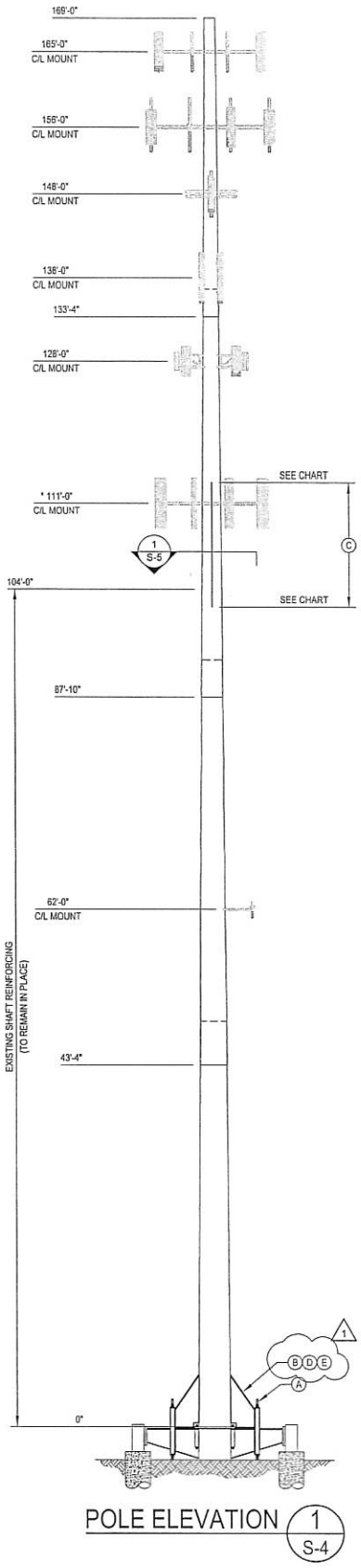
1

SITE COORDINATION REQUIRED: PRIOR TO CONSTRUCTION CONTRACTOR SHALL COORDINATE AND FIELD VERIFY LOCATION OF REQUIRED NEW FOUNDATION RELATIVE TO EXISTING SITE EQUIPMENT AND CONSTRAINTS.IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE MEANS AND METHODS OF SHORING AND/OR RELOCATION OF GROUND BASED EQUIPMENT THAT WILL BE AFFECTED BY THE PROPOSED ENVELOPE OF THE CURRENT FOUNDATION MOD DESIGN. PLEASE CONTACT THE EOR IF DESIGN INPUT OR NECESSARY CHANGES TO THE DESIGN ARE NEEDED. IF THE DESIGN IS FEASIBLE, BUT THE CONTRACTOR HAS A PREFERENCE TO INSTALL A DIFFERENT OPTION TO ACCOMMODATE ALTERNATE TECHNIQUES OR SUBCONTRACTOR LIMITATIONS - IT IS EXPECTED THAT THESE ISSUES WILL BE ADDRESSED AT THE TIME OF BIDDING. ANY CHANGES TO ORIGINAL DESIGN WILL REQUIRE FURTHER ENGINEERING - CONTRACTOR IS EXPECTED TO BUDGET ACCORDINGLY.

* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING



PARTIAL SITE PLAN 2 / S-4



POLE ELEVATION 1 / S-4

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
4/15/15

1 12-29-2014: REVISED MODIFICATION LIST

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

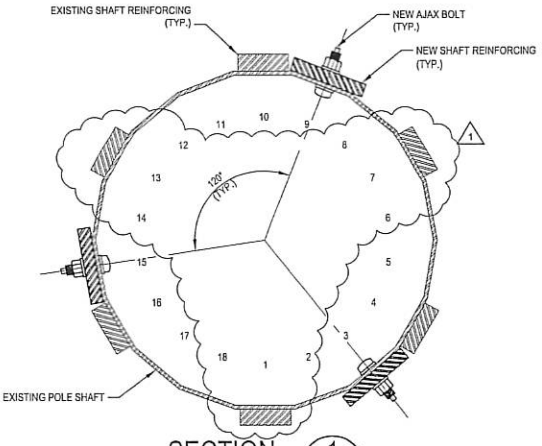
PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	MONOPOLE PROFILE
CHECKED BY: R.M.K.	
APPROVED BY: JTK	S-4
DATE: 12-9-2014	

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE										
BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
98' - 6"	113' - 6"	F3, F9 & F15	CCI-AFP-06010015	15' - 0"	3	27	81	10	10	16"	919 LBS.
							81				919 LBS.

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
3.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6.) ALL SHIMS SHALL BE ASTM A-36.



SECTION 1 / S-5

CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712; 7,849,659; 8,424,269 AND PATENT PENDING

1 12-29-2014 : REVISED EXISTING SHAFT REINFORCING LAYOUT

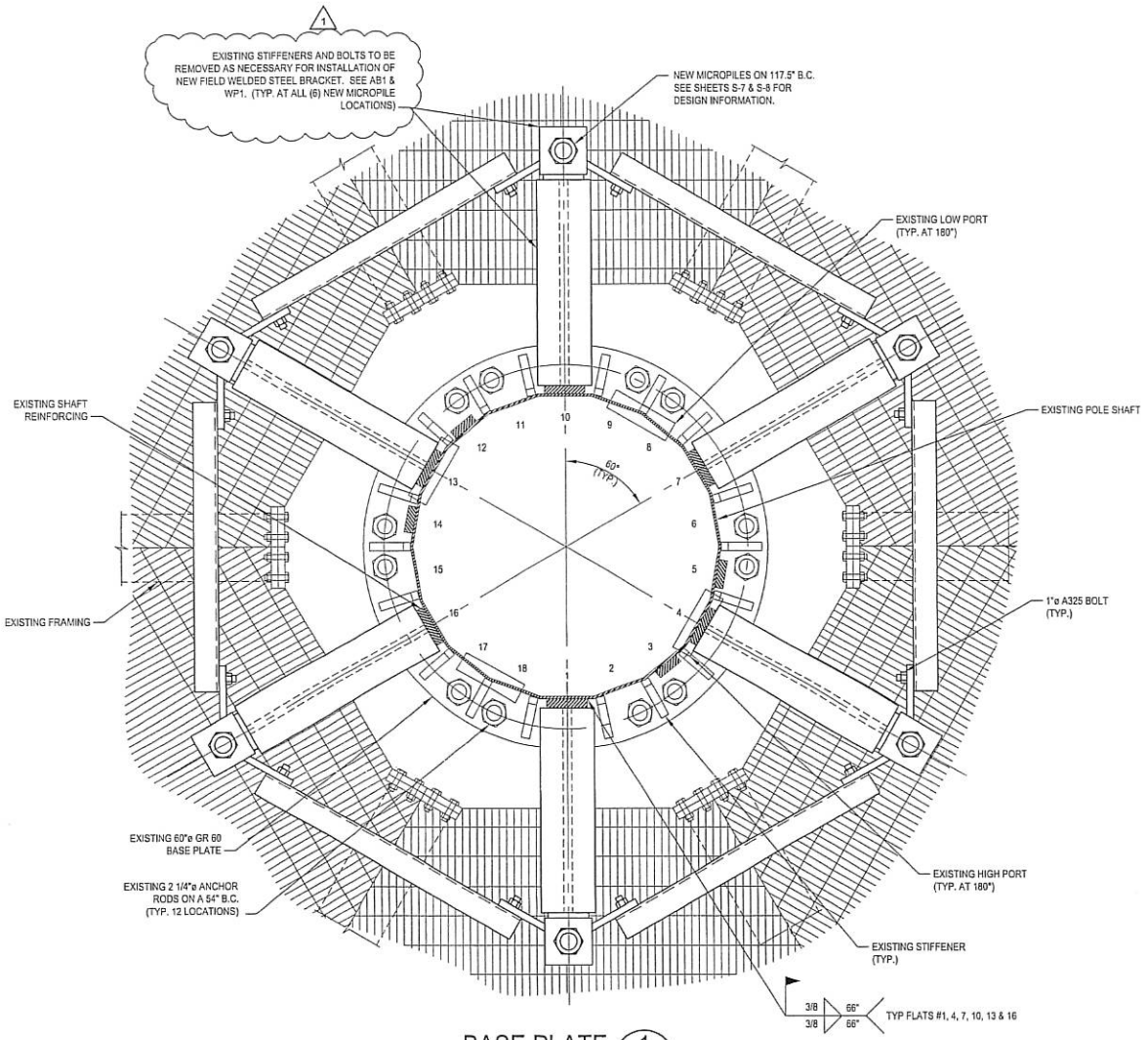
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

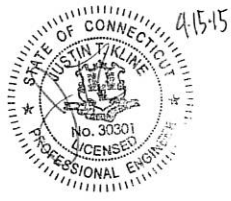
PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	SHAFT REINFORCING CHART AND DETAILS
CHECKED BY: R.M.K.	
APPROVED BY: JTK	S-5
DATE: 12-9-2014	



BASE PLATE 1 / S-6

EXISTING PLATFORM TO BE CUT OUT AT MICROPILE LOCATIONS TO ALLOW FOR ROOM TO INSTALL MICROPILES AND BRACKETS



1 12-29-2014 : REVISED NOTE

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

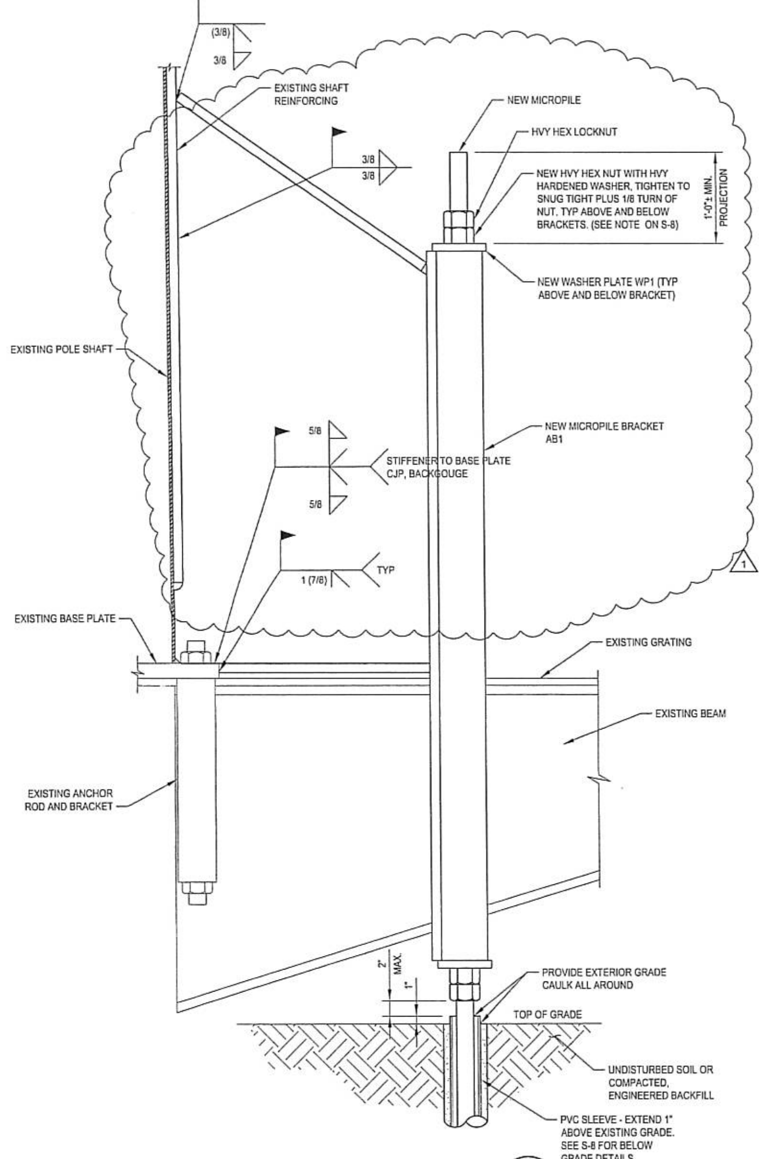
CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

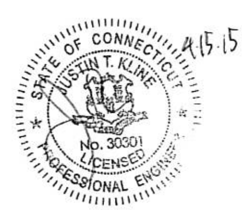
PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	BASE PLATE DETAILS
CHECKED BY: R.M.K.	
APPROVED BY: JTK	S-6
DATE: 12-9-2014	

7513-1535.002 R1.DWG



NEW BRACKET DETAIL 1 / S-7



1 12-29-2014: REVISED BRACKET DETAIL

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	MICROPILE BRACKET DETAILS
CHECKED BY: R.M.K.	
APPROVED BY: JTK	S-7
DATE: 12-9-2014	

513-1535.002 R1.DWG

* THE DESIGN REQUIRES MICROPILES FOR THE LISTED CAPACITY IN TENSION AND COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR/MICROPILE INSTALLER IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND GROUT DIAMETER ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CURRENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

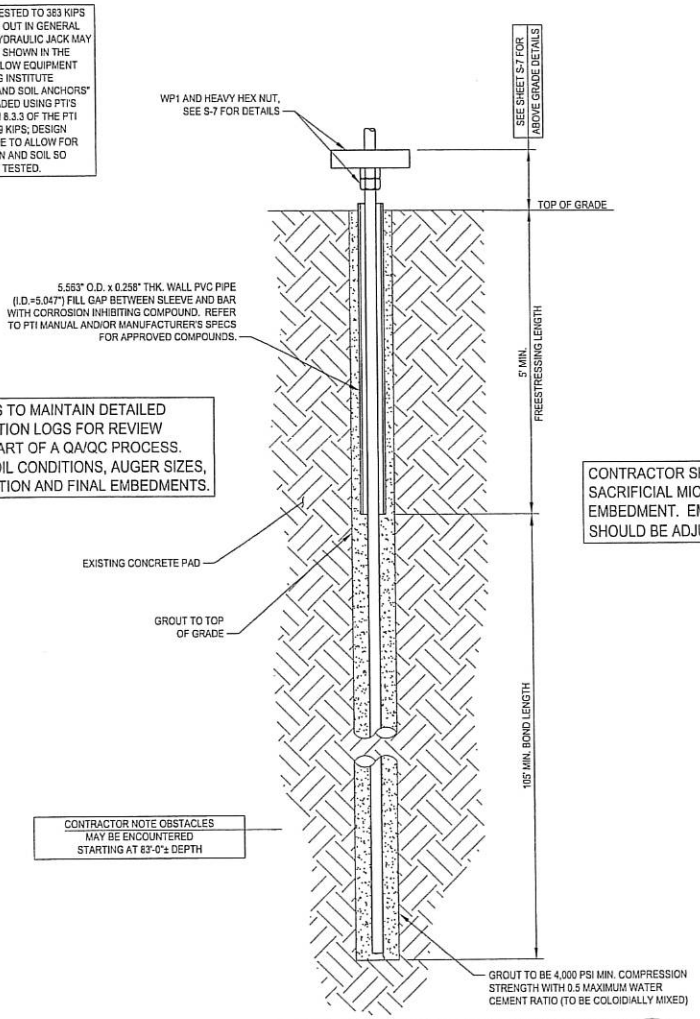
MICROPILE NOTES:

1. ALL BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CONTECH SYSTEMS OR OWNER/EOR APPROVED EQUIVALENT.
2. ALL BAR, NUTS AND BEARING PLATES SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE AND PIPE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS.
6. FOUNDATION DESIGN BASED ON GEOTECHNICAL REPORT BY TEP, #47923.6344 DATED NOVEMBER 20, 2014.
7. ASSUMED CONSTRUCTION SEQUENCE IS AS FOLLOWS:
   1. INSTALL SACRIFICIAL PILE.
   2. PERFORM SACRIFICIAL TESTING.
   3. INSTALL MICROPILE FROM GRADE.
   4. PERFORM MICROPILE TESTING.
8. CONTRACTOR TO DETERMINE SEQUENCE FOR INSTALLATION OF ANCHOR BRACKET.

DRILLER/INSTALLER SOIL DESIGN PARAMETERS			
LAYER THICKNESS	BORING LOG	ULTIMATE GROUT BOND VALUES	AUGER/CORE HOLE DESIGN SIZE
5'-0"±	SILTY SANDS	IGNORE / SLEEVE	175 mm / N/A
5'-0"±	SILTY SANDS	20 PSI	175 mm / 8.858"
70'-0"±	SOFT CLAY / SILTY CLAY	5 PSI	175 mm / 7.874"
5'-0"±	SOFT CLAY / SILTY CLAY	10 PSI	175 mm / 7.874"
25'-0"±	VERY DENSE SAND GRAVEL	55 PSI	175 mm / 9.842"

MICROPILE TESTING REQUIREMENTS

A MINIMUM OF (2) IN-PLACE MICROPILE IS TO BE TESTED TO 383 KIPS IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 6.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DESIGN GUIDE; ALIGNMENT LOAD, AL, SHALL BE 29 KIPS; DESIGN LOAD, DL, IS 288 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED.



MICROPILE INSTALLER IS TO MAINTAIN DETAILED DRILLING AND INSTALLATION LOGS FOR REVIEW BEFORE TESTING AS APART OF A QA/QC PROCESS. LOGS SHOULD SHOW SOIL CONDITIONS, AUGER SIZES, GROUT USED PER LOCATION AND FINAL EMBEDMENTS.

CONTRACTOR SHALL INSTALL ONE SACRIFICIAL MICROPILE TO VERIFY EMBEDMENT. EMBEDMENT DEPTHS SHOULD BE ADJUSTED ACCORDINGLY.

PROPOSED ANCHOR DESIGN PARAMETERS (TYPICAL)

1 / S-8

PILE DESIGN PARAMETER SCHEDULE						
PARAMETER / OPTIONS	MICROPILE	PILE CAPACITY øPn (kips)	EXTENSION ABOVE GRADE	FREESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	TOTAL LENGTH
MICROPILE	103/78 *	305.3	10' MIN.	5' MIN.	105' MIN.	120' MIN.

* DESIGN BASED ON A CONTECH 103/78 MICROPILE W/ A 175 mm AUGER BIT W/ A 175 mm ADAPTOR THAT WILL PROVIDE A MINIMUM AVERAGE GROUT DIAMETER OF 6.66"

1 12-29-2014

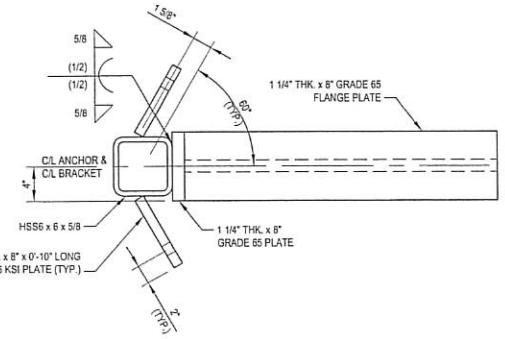
STATE OF CONNECTICUT JUSTIN T. KLINE No. 30301 LICENSED PROFESSIONAL ENGINEER 4.15.15

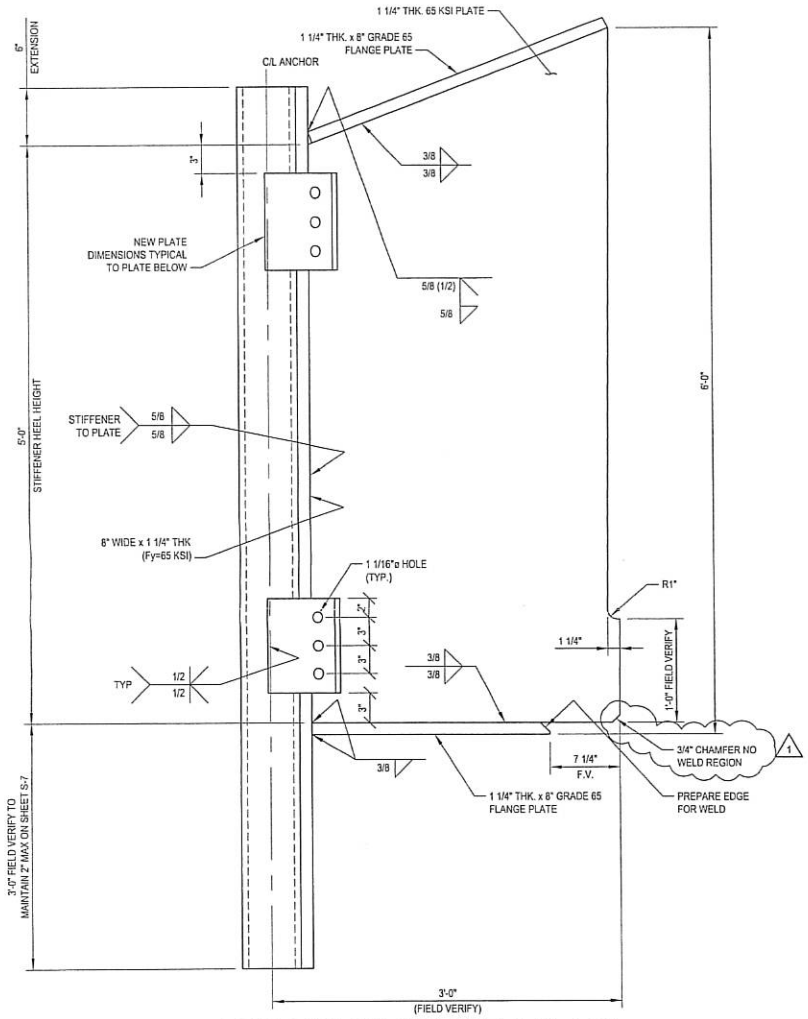
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

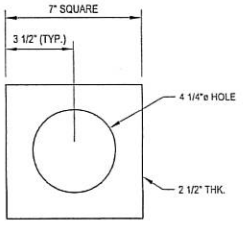
PROJECT: 37513-1535.002.7700 R1
DRAWN BY: B.M.S.
CHECKED BY: R.M.K.
APPROVED BY: JTK
DATE: 12-9-2014
MICROPILE DETAILS
S-8





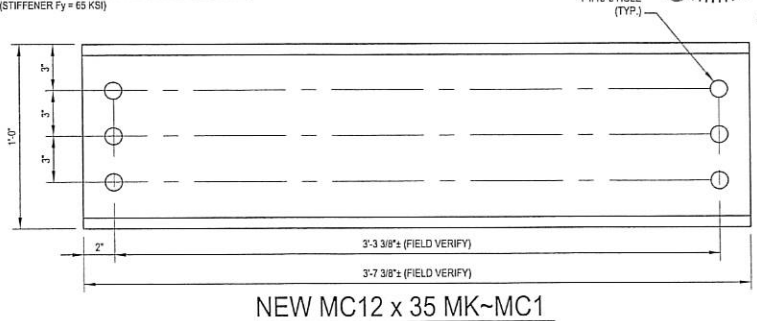
NEW ANCHOR BRACKET MK~AB1

(6 REQUIRED) (TUBE Fy = 46 KSI) (STIFFENER Fy = 65 KSI)



WASHER PLATE MK~WP1

(12 REQUIRED) (Fy = 50 KSI)



NEW MC12 x 35 MK~MC1

(12 REQUIRED) (MC Fy = 36 KSI)

1 12-29-2014 : ADDED CHAMFER

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED PROFESSIONAL ENGINEER

4.15.15

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679
www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	MICROPILE MISC DETAILS
CHECKED BY: R.M.K.	
APPROVED BY: JTK	S-9
DATE: 12-9-2014	

MODIFICATION INSPECTION NOTES:

GENERAL
THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS..

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR
THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR
THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AN DENG-SOW-10007.

RECOMMENDATIONS
THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI
IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S
IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS
CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

PHOTOGRAPHS
BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

MI CHECKLIST	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
X	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
X	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

4-15-15
STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

1 12-29-2014

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-1535.002.7700 R1

DRAWN BY: B.M.S.	MI CHECKLIST
CHECKED BY: R.M.K.	
APPROVED BY: JHC	S-10
DATE: 12-9-2014	