ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

January 24, 2014

Via Federal Express

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

Re: **Request of Cellco Partnership d/b/a Verizon Wireless for an Order to Approve the Shared Use of an Existing Tower at 90 Industrial Park Road, Middletown, Connecticut**

Dear Ms. Bachman:

Pursuant to Connecticut General Statutes ("C.G.S.") §16-50aa, as amended, Cellco Partnership d/b/a Verizon Wireless ("Cellco") hereby requests an order from the Connecticut Siting Council ("Council") to approve the shared use, by Cellco, of an existing telecommunications tower, owned by Crown Castle ("Crown"), at 90 Industrial Park Road in Middletown, Connecticut. Cellco requests that the Council find that the proposed shared use of the Crown tower satisfies the criteria of C.G.S § 16-50aa and issue an order approving the proposed shared use. A copy of this letter is being sent to Middletown's Mayor Daniel Drew and Philip Armetta, the owner of the property where the tower is located.

Background

The existing Crown facility consists of a 185-foot monopole tower located within a fenced compound. The tower is currently being shared by T-Mobile, AT&T and Metro PCS. Equipment associated with the existing carriers' antennas is located near the base of the tower.

Cellco is licensed by the Federal Communications Commission ("FCC") to provide wireless services throughout the State of Connecticut. Cellco and Crown have agreed to the proposed shared use of the 90 Industrial Park Road tower pursuant to mutually acceptable terms and conditions, and Crown has authorized Cellco to apply for all necessary permits and approvals that may be required to share the existing tower. (*See* Owner's authorization letter included in Attachment 1).

Cellco proposes to install a total of twelve (12) antennas at the 155-foot level on the tower. Equipment associated with Cellco's antennas and a propane-fueled back-up generator will be located inside a 12' x 24' shelter installed near the base of the tower within the existing fenced compound. Included in Attachment 2 are Cellco's Project Plans showing the location of all site improvements.

C.G.S. § 16-50aa(c)(1) provides that, upon written request for approval of a proposed shared use, "if the council finds that the proposed shared use of the facility is technically, legally, environmentally and economically feasible and meets public safety concerns, the council shall issue an order approving such shared use." Cellco respectfully submits that the shared use of the tower satisfies these criteria.

A. Technical Feasibility. The existing tower, with certain modifications, would be capable of supporting Cellco's antennas. The proposed shared use of this tower is, therefore, technically feasible. A Structural Modification Report is included in Attachment 3.

B. Legal Feasibility. Under C.G.S. § 16-50aa, the Council has been authorized to issue orders approving the shared use of an existing tower such as the Crown tower in Middletown. This authority complements the Council's prior-existing authority under C.G.S. § 16-50p to issue orders approving the construction of new towers that are subject to the Council's jurisdiction. In addition, § 16-50x(a) directs the Council to "give such consideration to other state laws and municipal regulations as it shall deem appropriate" in ruling on requests for the shared use of existing tower facilities. Under the statutory authority vested in the Council, an order by the Council approving the requested shared use would permit the Applicant to obtain a building permit for the proposed installations.

C. Environmental Feasibility. The proposed shared use of the Crown tower would have a minimal environmental effect, for the following reasons:

1. The proposed installation of twelve (12) antennas at the 155-foot level on the existing 185-foot tower would have an insignificant incremental visual impact on the area around the existing tower. Cellco's shelter would be located within the limits of the existing fenced facility compound. Cellco's shared use of this tower would therefore, not cause any significant change or alteration in the physical or environmental characteristics of the site.

2. Noise associated with the equipment shelter's air conditioning ("A/C") units was evaluated for compliance with State and/or local noise standards. According to the Noise Compliance Study included in Attachment 4 ("Study"), noise from the shelter's A/C units will not exceed State and/or local noise limits. Noise associated with Cellco's emergency back-up generator is exempt from State and local noise limits.

3. Operation of Cellco's antennas at this site would not exceed the RF emissions standards adopted by the Federal Communications Commission ("FCC"). Included in Attachment 5 of the filing is a cumulative RF Emissions calculation (General Power Density table) which demonstrates that following the installation of Cellco's antennas, the facility will continue to operate well within the FCC limits.

4. Under ordinary operating conditions, the proposed installation would not require the use of any water or sanitary facilities and would not generate air emissions or discharges to water bodies or sanitary facilities. After construction is complete the proposed installation would not generate any increased traffic to the Crown facility other than periodic (monthly) maintenance visits to the cell site.

The proposed use of this 90 Industrial Park Road facility would, therefore, have a minimal environmental effect, and is environmentally feasible.

D. Economic Feasibility. As previously mentioned, Crown and Cellco have entered into a lease for the shared use of the existing tower on mutually

agreeable terms. The proposed tower sharing is, therefore, economically feasible. (*See* Attachment 1).

E. Public Safety Concerns. As discussed above, the tower, with certain modifications, is structurally capable of supporting Cellco's full array of twelve (12) antennas and related equipment and all existing antennas and equipment on the tower today. Cellco is not aware of any public safety concerns relative to the proposed sharing of the existing Crown tower. In fact, the provision of new and improved wireless service through shared use of the existing tower is expected to enhance the safety and welfare of area residents and members of the general public traveling through Middletown.

Conclusion

For the reasons discussed above, the proposed shared use of the existing Crown tower at 90 Industrial Park Road satisfies the criteria stated in C.G.S. § 16-50aa and advances the General Assembly's and the Council's goal of preventing the unnecessary proliferation of towers in Connecticut. The Applicant, therefore, respectfully requests that the Council issue an order approving the proposed shared use of the Crown tower.

Thank you for your consideration of this matter.

Very truly yours,

Kenneth C. Baldwin

Enclosures
Copy to:
Daniel Drew, Mayor
Philip Armetta
Sandy M. Carter

ATTACHMENT 1

CROWN CASTLE

3530 Toringdon Way
Suite 300
Charlotte, NC 28277

Tel: 704-405-6523
Fax: 724-416-6153

December 16, 2013

RE: Crown Castle Letter of Authorization (LOA)

Crown Castle, does hereby authorize **Verizon Wireless ("Verizon")** and its authorized contractors/agents to act as "Applicant" in the processing of all applications, permits, research and other related activities associated with the processing, planning, design review, permitting, entitlement and construction of additional equipment, antennas and site improvements for the Crown Castle existing wireless communications facility described as follows:

Customer Site Name:	**Middletown NW CT**	**Crown Castle Site ID Number:**	**825983**
Site Address:	**90 Industrial Park Road Middletown, CT 06457**	**Crown Castle Site Name:**	**Middleton_1**

This authorization is fully contingent upon **Verizon's** authorized contractors/agents' compliance with the following conditions:

1. Crown Castle must review the application prior to submittal. Crown Castle must be provided all applications, narratives, drawings and attachments at least 72 hours in advance of their submittal to the locality. Use of email and electronic attachments is encouraged. A Crown Castle Zoning Subject Matter Expert (SME) will review and provide written comment to the customer within 48 hours of receipt of a complete set of application materials. If Crown Castle indicates that changes are required, submissions shall be altered in accordance with Crown Castle comments prior to submission to the locality. Verification of corrections should also be accomplished via emails and attachments.
2. In no event may **Verizon** encourage, suggest, participate in, or permit the imposition of any restrictions or additional obligations whatsoever on the tower site or Crown Castle's current or future use or ability to license space at the tower site as part of or in exchange for obtaining any approval, permit, exception or variance.
3. A copy of the final permit and/or a written summary of the zoning/entitlement decision rendered by the locality and any/all conditions placed on that decision shall be communicated in detail to Crown Castle well within the appeal period provided by the locality (typically 10-15 days).
4. All conditions of approval pertinent to the construction of the proposed project must be included in the construction drawings for the project. The conditions of approval pertinent to the construction of the project shall be copied verbatim from the zoning permit approval language, and shall be present in the drawings prior to submission for building permits and contractor bidding. Crown Castle shall verify the inclusion of appropriate conditions of approval in the construction drawing redline process.
5. Crown Castle will provide a Notice To Proceed (NTP) to construction to the customer upon receipt of the final approved zoning permit and the approved Building Permit.

By Crown Castle:

Signature: Sarah Brown

Printed Name: **Sarah Brown**

Title: **Real Estate Specialist**

Date: **December 16, 2013**

ATTACHMENT 2

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

MIDDLETOWN NW
90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 90 INDUSTRIAL PARK ROAD, MIDDLETOWN, CONNECTICUT

1.	Head east on E River Dr toward Darlin St	0.1 mi
2.	Turn right onto Darlin St	331 ft
3.	Turn right onto the Connecticut 2 W ramp to Downtown Hartford	0.1 mi
4.	Merge onto CT-2 W	0.5 mi
5.	Turn left onto Columbus Blvd	0.3 mi
6.	Turn left to merge onto Conlin-Whitehead Hwy/Whitehead Hwy	0.2 mi
7.	Keep right at the fork, follow signs for I-91 S/New Haven and merge onto I-91 S	11.8 mi
8.	Take exit 21 for CT-372 toward Cromwell/Berlin	0.4 mi
9.	Merge onto Industrial Park Rd, Destination will be on the left	1.4 mi

GENERAL NOTES

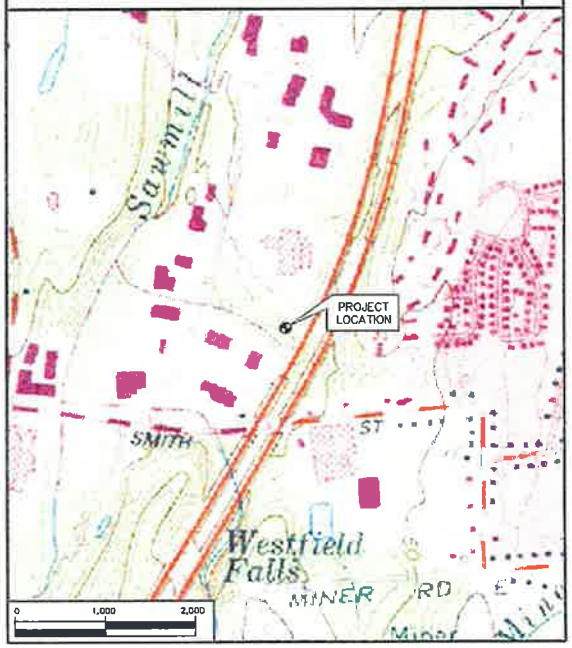
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF A 12'-x24' PREFABRICATED WIRELESS EQUIPMENT SHELTER ON A CONCRETE FOUNDATION LOCATED WITHIN THE EXISTING WIRELESS COMMUNICATIONS FENCED COMPOUND AREA.
2. A 1000 GAL. PROPANE TANK ATOP CONCRETE PAD AT GRADE WILL INSTALLED ADJACENT TO THE EXISTING FENCED COMPOUND AREA.
3. A TOTAL OF TWELVE (12) DIRECTIONAL PANEL ANTENNAS ARE TO BE MOUNTED AT A CENTERLINE ELEVATION OF ±155' ON THE EXISTING 185' TALL MONOPOLE TOWER.
4. ELECTRIC AND TELCO UTILITIES SHALL BE ROUTED UNDERGROUND TO THE PROPOSED EQUIPMENT SHELTER FROM AN EXISTING UTILITY BACKBOARD LOCATED WITHIN TO THE FENCED COMPOUND.

VICINITY MAP

SCALE: 1" = 2000'



PROJECT SUMMARY

SITE NAME:	MIDDLETOWN NW
SITE ADDRESS:	90 INDUSTRIAL PARK ROAD MIDDLETOWN, CT 06457
LESSEE/TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	SANDY CARTER CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD ROAD BRANFORD, CT 06405 (203) 488-0580
TOWER COORDINATES:	LATITUDE 41°-35'-08.33" LONGITUDE 72°-42'-50.32" GROUND ELEVATION: 78'± A.M.S.L. GROUND ELEVATION TAKEN FROM 'TERRAIN NAVIGATOR' TOPOGRAPHY SOFTWARE.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	0
C-1	ELEVATION, PLAN AND ANTENNA CONFIG.	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/03/14	CLT	DMD	ISSUED FOR CSC - CLIENT REVIEW

Cellco Partnership d.b.a. verizon wireless

CENTEK engineering
Centered on Solutions
www.CentekEng.com
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405

Cellco Partnership d/b/a Verizon Wireless

MIDDLETOWN NW

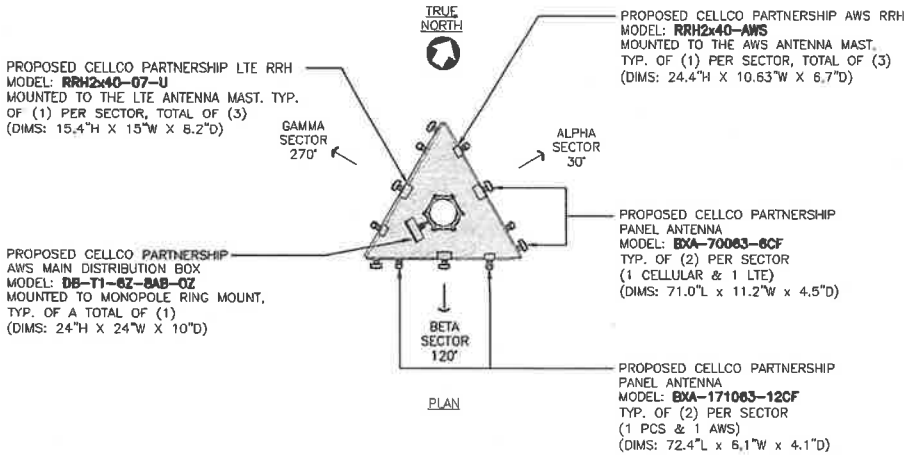
90 INDUSTRIAL PARK RD
MIDDLETOWN, CT 06457

DATE: 01/02/14
SCALE: AS NOTED
JOB NO. 13132.000

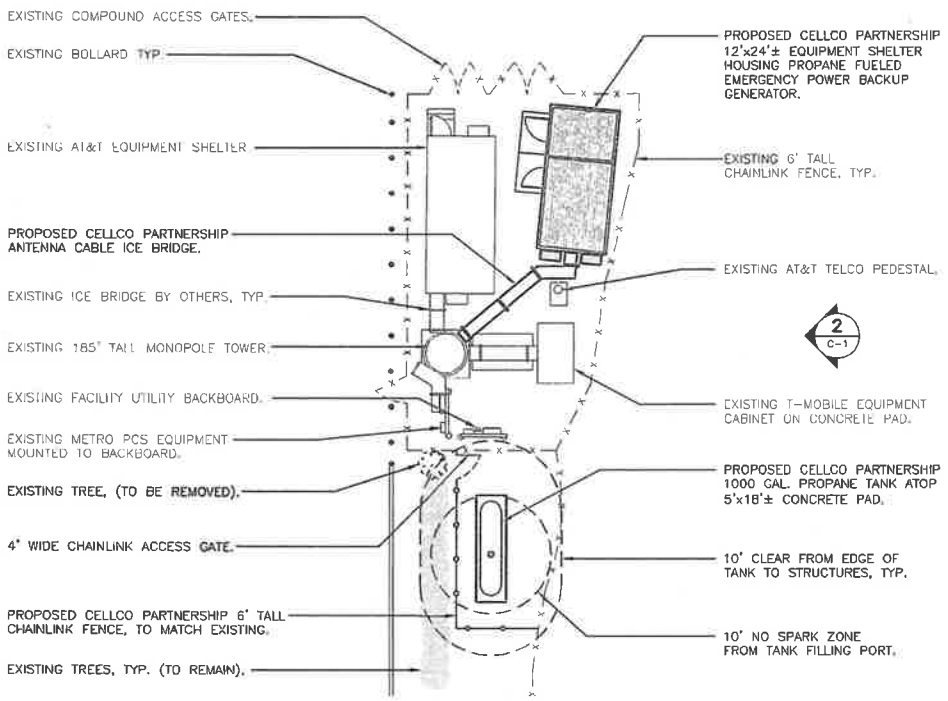
TITLE SHEET

T-1

DWG. 1 OF 2



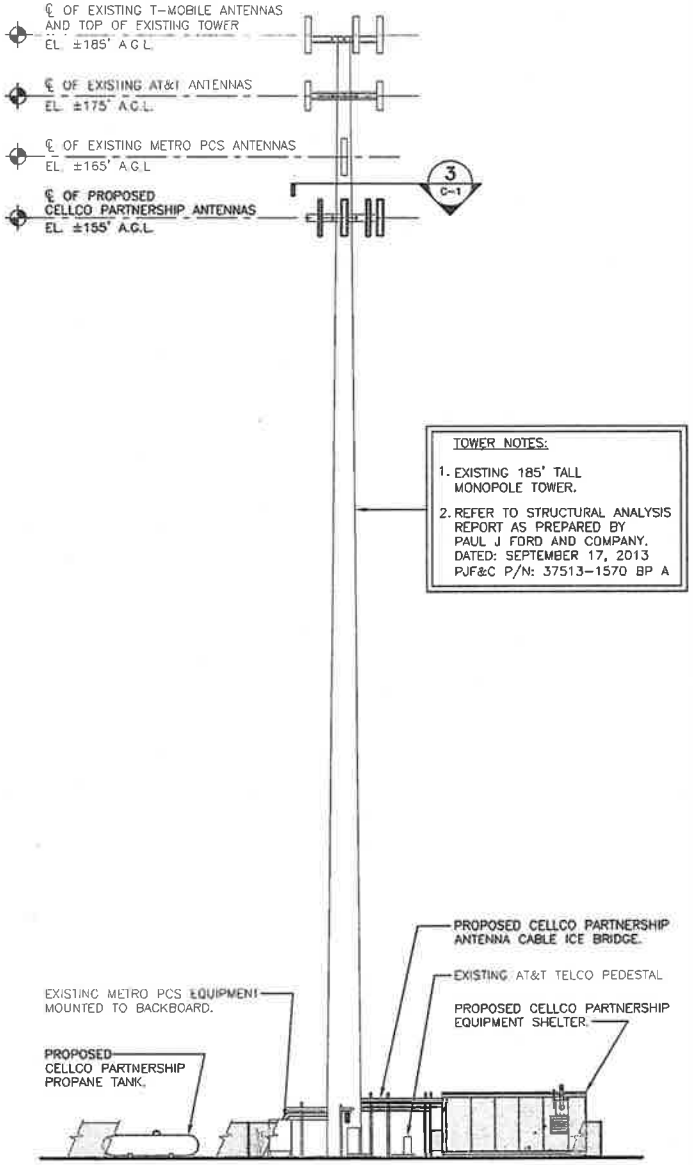
3 C-1 **ANTENNA MOUNTING CONFIGURATION**
NOT TO SCALE



1 C-1 **COMPOUND PLAN** SCALE: 1" = 30'

APPROXIMATE NORTH

GRAPHIC SCALE
0 15 30
(IN FEET)
1 inch = 30 ft.



2 C-1 **NORTHEAST ELEVATION** SCALE: 1" = 30'

GRAPHIC SCALE
0 15 30
(IN FEET)
1 inch = 30 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/03/14	CLT	DMD	ISSUED FOR CSC - CLIENT REVIEW

Cellco Partnership d.b.a. verizon wireless

CENTEK engineering
Centered on Solutions℠
www.CentekEng.com
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405

Cellco Partnership d/b/a Verizon Wireless
MIDDLETOWN NW
90 INDUSTRIAL PARK RD
MIDDLETOWN, CT 06457

DATE: 01/02/14
SCALE: AS NOTED
JOB NO. 13132.000

ELEVATION, PLAN AND ANTENNA CONFIG.

C-1
DWG. 2 OF 2

ATTACHMENT 3

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

Date: **September 17, 2013**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534

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

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119681
	Carrier Site Name:	Middletown NW CT
Crown Castle Designation:	**Crown Castle BU Number:**	825983
	Crown Castle Site Name:	MIDDLETOWN_1
	Crown Castle JDE Job Number:	236900
	Crown Castle Work Order Number:	649747
	Crown Castle Application Number:	188916 Rev. 6
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1570 BP A
Site Data:	**90 Industrial Park Road, Middletown, Middlesex County, CT** **Latitude *41° 35' 8.124"*, Longitude *-72° 42' 49.867"*** **185 Foot - Monopole Tower**	

Dear Steve Tuttle,

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 577622, in accordance with application 188916, revision 6.

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

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 the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 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 and referenced drawings, dated 8/14/12, 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:

John J. Woolley, E.I. BKK
Structural Designer

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

tnxTower Report - version 6.1.3.1

SEP 19 2013

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

Date: **September 17, 2013**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534

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

Subject: Structural Modification Report

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Respectfully submitted by:

John J. Woolley, E.I.
Structural Designer

tnxTower Report - version 6.1.3.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 185 ft Monopole tower designed by FRED A. NUDD CORPORATION in May of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
155.0	155.0	3	alcatel lucent	RRH2X40-07-U	2	1-5/8	-
		3	alcatel lucent	RRH2X40-AWS			
		6	antel	BXA-171063-12CF-EDIN-2 w/ Mount Pipe			
		6	antel	BXA-70063-6CF-EDIN-2 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 301-1]			

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
185.0	185.0	3	andrew	ETW190VS12UB	21	1-5/8	1
		1	andrew	HP2-102			
		9	ericsson	AIR 21 w/ Mount Pipe			
		3	ericsson	AIR 33 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Sector Mount [SM 802-3]			
175.0	175.0	6	communication components inc.	DTMABP7819VG12A	1 2	3/8 3/4	2
		6	ericsson	RRUS-11			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
		1	raycap	DC6-48-60-18-8F			
		6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-1/4	1
		1	tower mounts	Sector Mount [SM 802-3]			
165.0	165.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			

Notes:
1) Existing Equipment
2) Reserved Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti, 3/27/1998	3473514	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Nudd, 98-5980, 5/1/1998	3880469	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Nudd, 98-5980, 5/1/1998	3473517	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	All-Points Tech, CT107572, 4/26/2005	3879955	CCISITES
4-TOWER PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-1570 BP, 8/14/2013	3954032	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.3.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) The Nudd manufacturer's drawings specify an anchor rod that does not exist. From experience with Nudd monopoles, the anchors are likely A36 standard anchors and have been assumed as such.
5) Monopole will be reinforced in conformance with the referenced modification drawings dated 8/14/2013.
6) 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	185 - 180	Pole	TP18x18x0.1875	1	-2.141	361.254	23.1	Pass
L2	180 - 153	Pole	TP26.8088x18x0.25	2	-8.232	718.182	97.1	Pass
L3	153 - 151.833	Pole	TP27.1894x26.8088x0.3625	3	-8.404	1051.792	70.2	Pass
L4	151.833 - 151	Pole	TP27.4613x27.1894x0.5246	4	-8.564	1527.325	50.6	Pass
L5	151 - 130	Pole	TP34.3125x27.4613x0.3802	5	-11.187	1328.220	90.2	Pass
L6	130 - 120.667	Pole	TP36.844x31.9209x0.4447	6	-14.795	1750.722	89.0	Pass
L7	120.667 - 115	Pole	TP38.6875x36.844x0.4776	7	-16.132	1934.076	87.1	Pass
L8	115 - 114	Pole	TP39.0125x38.6875x0.5402	8	-16.400	2248.011	76.1	Pass
L9	114 - 95	Pole	TP45.1875x39.0125x0.4463	9	-19.551	2065.883	95.3	Pass
L10	95 - 91	Pole	TP45.8125x42.3448x0.5294	10	-23.739	2592.778	85.1	Pass
L11	91 - 90	Pole	TP46.1391x45.8125x0.465	11	-24.015	2297.212	96.6	Pass
L12	90 - 61.5	Pole	TP55.4461x46.1391x0.5299	12	-33.586	3147.320	87.3	Pass
L13	61.5 - 58	Pole	TP56.5891x55.4461x0.5263	13	-34.868	3165.902	88.8	Pass
L14	58 - 40	Pole	TP61.6875x56.5891x0.5788	14	-42.368	3628.093	87.4	Pass
L15	40 - 33	Pole	TP63.9583x61.6875x0.5704	15	-45.418	3910.529	84.2	Pass
L16	33 - 28	Pole	TP65.5804x63.9583x0.595	16	-47.742	4047.974	83.5	Pass
L17	28 - 0	Pole	TP73.8125x65.5804x0.5758	17	-61.294	4154.028	93.8	Pass
							Summary	
						Pole (L2)	97.1	Pass
						Rating =	97.1	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	72.2	Pass
1	Base Plate	0	52.0	Pass
1	Base Foundation	0	87.1	Pass

Structure Rating (max from all components) =	97.1%

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

4.1) Recommendations

-Install the proposed modification as per the referenced PJF drawings, dated 8/14/12 (CCISITES Doc # 3954032)
-Install modification per the attached 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:

1) Tower is located in Middlesex County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice density of 56.000 pcf.
5) A wind speed of 38 mph is used in combination with ice.
6) Temperature drop of 50.000 °F.
7) Deflections calculated using a wind speed of 50 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) 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	185.000-180.000	5.000	0.000	12	18.0000	18.0000	0.1875	0.7500	A36M-42 (42 ksi)
L2	180.000-153.000	27.000	0.000	12	18.0000	26.8088	0.2500	1.0000	A36M-42 (42 ksi)
L3	153.000-151.833	1.167	0.000	12	26.8088	27.1894	0.3625	1.4499	Reinf 42.00 ksi (42 ksi)
L4	151.833-151.000	0.833	0.000	12	27.1894	27.4613	0.5246	2.0983	Reinf 41.97 ksi (42 ksi)
L5	151.000-130.000	21.000	5.000	12	27.4613	34.3125	0.3802	1.5206	Reinf 42.00 ksi (42 ksi)
L6	130.000-120.667	14.333	0.000	12	31.9209	36.8440	0.4447	1.7787	Reinf 42.00 ksi (42 ksi)
L7	120.667-115.000	5.667	0.000	12	36.8440	38.6875	0.4776	1.9105	Reinf 41.15 ksi (41 ksi)
L8	115.000-114.000	1.000	0.000	12	38.6875	39.0125	0.5402	2.1608	Reinf 42.00 ksi (42 ksi)
L9	114.000-95.000	19.000	6.000	12	39.0125	45.1875	0.4463	1.7854	Reinf 42.00 ksi (42 ksi)
L10	95.000-91.000	10.000	0.000	12	42.3448	45.8125	0.5293	2.1174	Reinf 42.00 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
L11	91.000-90.000	1.000	0.000	12	45.8125	46.1391	0.4650	1.8600	(42 ksi) Reinf 42.00 ksi
L12	90.000-61.500	28.500	0.000	12	46.1391	55.4461	0.5299	2.1194	(42 ksi) Reinf 42.00 ksi
L13	61.500-58.000	3.500	0.000	12	55.4461	56.5891	0.5263	2.1054	(42 ksi) Reinf 41.66 ksi
L14	58.000-40.000	18.000	0.000	12	56.5891	61.6875	0.5788	2.3152	(42 ksi) Reinf 39.83 ksi
L15	40.000-33.000	7.000	0.000	12	61.6875	63.9583	0.5704	2.2814	(40 ksi) Reinf 42.00 ksi
L16	33.000-28.000	5.000	0.000	12	63.9583	65.5804	0.5950	2.3800	(42 ksi) Reinf 40.65 ksi
L17	28.000-0.000	28.000		12	65.5804	73.8125	0.5758	2.3032	(41 ksi) Reinf 38.25 ksi (38 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	18.6350	10.7543	435.5296	6.3769	9.3240	46.7106	882.5011	5.2929	4.3215	23.048
	18.6350	10.7543	435.5296	6.3769	9.3240	46.7106	882.5011	5.2929	4.3215	23.048
L2	18.6350	14.2888	574.6149	6.3545	9.3240	61.6275	1164.3256	7.0325	4.1540	16.616
	27.7545	21.3798	1924.8847	9.5080	13.8869	138.6112	3900.3383	10.5225	6.5147	26.059
L3	27.7545	30.8669	2755.5460	9.4678	13.8869	198.4273	5583.4833	15.1917	6.2133	17.142
	28.1485	31.3111	2876.2480	9.6040	14.0841	204.2195	5828.0583	15.4104	6.3153	17.423
L4	28.1485	45.0408	4087.6060	9.5460	14.0841	290.2283	8282.5980	22.1677	5.8809	11.211
	28.4300	45.5000	4213.9101	9.6433	14.2249	296.2342	8538.5243	22.3937	5.9537	11.35
L5	28.4300	33.1504	3103.1778	9.6950	14.2249	218.1507	6287.8796	16.3156	6.3408	16.679
	35.5229	41.5371	6104.4940	12.1478	17.7739	343.4532	12369.3598	20.4433	8.1769	21.509
L6	34.8249	45.0689	5699.3931	11.2685	16.5350	344.6858	11548.5156	22.1815	7.3631	16.559
	38.1438	52.1180	8813.7607	13.0310	19.0852	461.8110	17859.0686	25.6509	8.6825	19.526
L7	38.1438	55.9304	9441.3633	13.0192	19.0852	494.6952	19130.7618	27.5272	8.5942	17.993
	40.0522	58.7656	10951.1594	13.6791	20.0401	546.4616	22190.0179	28.9226	9.0882	19.028
L8	40.0522	66.3563	12325.2437	13.6567	20.0401	615.0283	24974.2852	32.6586	8.9205	16.513
	40.3887	66.9216	12642.9539	13.7731	20.2085	625.6263	25618.0523	32.9368	9.0076	16.674
L9	40.3887	55.4279	10522.6912	13.8067	20.2085	520.7068	21321.8253	27.2799	9.2592	20.745
	46.7815	64.3027	16429.6893	16.0173	23.4071	701.9098	33291.0048	31.6478	10.9141	24.452
L10	45.9926	71.2747	15907.2598	14.9699	21.9346	725.2127	32232.4211	35.0793	9.9298	18.758
	47.4286	77.1854	20202.0122	16.2114	23.7309	851.2966	40934.7537	37.9883	10.8591	20.514
L11	47.4286	67.8974	17821.5622	16.2344	23.7309	750.9863	36111.3167	33.4170	11.0316	23.724
	47.7667	68.3863	18209.3555	16.3513	23.9000	761.8967	36897.0910	33.6577	11.1191	23.913
L12	47.7667	77.8146	20661.0510	16.3281	23.9000	864.4779	41864.8909	38.2980	10.9453	20.657
	57.4020	93.6935	36065.9307	19.6600	28.7211	1255.7305	73079.3535	46.1131	13.4396	25.365
L13	57.4020	93.0788	35833.8815	19.6613	28.7211	1247.6511	72609.1589	45.8106	13.4490	25.552
	58.5853	95.0159	38118.0515	20.0705	29.3131	1300.3745	77237.5066	46.7639	13.7553	26.134
L14	58.5853	104.3883	41799.6948	20.0517	29.3131	1425.9716	84697.5140	51.3768	13.6147	23.522

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
	63.8636	113.8905	54284.9546	21.8769	31.9541	1698.8403	109996.0354	56.0534	14.9811	25.883
L15	63.8636	112.2433	53514.6328	21.8799	31.9541	1674.7332	108435.1547	55.2427	15.0037	26.306
	66.2145	116.4137	59704.0792	22.6929	33.1304	1802.0927	120976.6510	57.2953	15.6123	27.373
L16	66.2145	121.3998	62212.8161	22.6841	33.1304	1877.8158	126060.0321	59.7493	15.5462	26.128
	67.8938	124.5075	67113.8995	23.2648	33.9706	1975.6450	135990.9560	61.2788	15.9809	26.858
L17	67.8938	120.5234	65004.7289	23.2716	33.9706	1913.5570	131717.2044	59.3179	16.0324	27.844
	76.4163	135.7864	92960.7852	26.2187	38.2349	2431.3087	188363.7538	66.8299	18.2386	31.675

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 185.000-180.000				1	1	1		
L2 180.000-153.000				1	1	1		
L3 153.000-151.833				1	1	1		
L4 151.833-151.000				1	1	1		
L5 151.000-130.000				1	1	1		
L6 130.000-120.667				1	1	1		
L7 120.667-115.000				1	1	1		
L8 115.000-114.000				1	1	1		
L9 114.000-95.000				1	1	1		
L10 95.000-91.000				1	1	1		
L11 91.000-90.000				1	1	1		
L12 90.000-61.500				1	1	1		
L13 61.500-58.000				1	1	1		
L14 58.000-40.000				1	1	1		
L15 40.000-33.000				1	1	1		
L16 33.000-28.000				1	1	1		
L17 28.000-0.000				1	1	1		

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 klf
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	185.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	185.000 - 0.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8")	C	No	Inside Pole	185.000 - 0.000	15	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF6-50A(1-1/4")	C	No	Inside Pole	175.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
FB-L98-002-XXX(3/8)	C	No	Inside Pole	175.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	175.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF7-50A(1-5/8")	C	No	Inside Pole	165.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	155.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
Aero MP3-04	C	No	CaAa (Out Of Face)	53.330 - 38.330	1	No Ice	0.269	0.000
						1/2" Ice	0.380	0.000
						1" Ice	0.491	0.000
Aero MP3-05	C	No	CaAa (Out Of Face)	123.330 - 88.330	1	No Ice	0.348	0.000
						1/2" Ice	0.400	0.000
						1" Ice	0.657	0.000
Aero MP3-04	C	No	CaAa (Out Of Face)	153.750 - 123.330	1	No Ice	0.269	0.000
						1/2" Ice	0.380	0.000
						1" Ice	0.491	0.000
Aero MP3-08	C	No	CaAa (Out Of Face)	37.000 - 0.000	1	No Ice	0.467	0.000
						1/2" Ice	0.578	0.000
						1" Ice	0.689	0.000
Aero MP3-06	C	No	CaAa (Out Of Face)	93.250 - 37.000	1	No Ice	0.434	0.000
						1/2" Ice	0.545	0.000
						1" Ice	0.657	0.000
Aero MP3-04	C	No	CaAa (Out Of Face)	98.250 - 93.250	1	No Ice	0.269	0.000
						1/2" Ice	0.380	0.000
						1" Ice	0.491	0.000
Aero MP3-03	C	No	CaAa (Out Of Face)	132.500 - 112.500	1	No Ice	0.262	0.000
						1/2" Ice	0.374	0.000
						1" Ice	0.485	0.000
Aero MP3-03	C	No	CaAa (Out Of Face)	154.500 - 149.500	1	No Ice	0.262	0.000
						1/2" Ice	0.374	0.000
						1" Ice	0.485	0.000

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	185.000-180.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.990	0.086
L2	180.000-153.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	5.941	0.731
L3	153.000-151.833	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.851	0.040
L4	151.833-151.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.608	0.028
L5	151.000-130.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	10.857	0.712
L6	130.000-120.667	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	7.018	0.316

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
L7	120.667-115.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.580	0.192
L8	115.000-114.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.808	0.034
L9	114.000-95.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	11.638	0.644
L10	95.000-91.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.631	0.136
L11	91.000-90.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.980	0.034
L12	90.000-61.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	18.602	0.966
L13	61.500-58.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	2.213	0.119
L14	58.000-40.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	14.968	0.610
L15	40.000-33.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	5.005	0.237
L16	33.000-28.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.323	0.170
L17	28.000-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	18.611	0.949

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	185.000-180.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	1.740	0.163
L2	180.000-153.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	10.366	1.148
L3	153.000-151.833	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	1.415	0.058
L4	151.833-151.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	1.011	0.041
L5	151.000-130.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	18.174	1.037
L6	130.000-120.667	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	11.566	0.461
L7	120.667-115.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	7.398	0.280
L8	115.000-114.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	1.305	0.049
L9	114.000-95.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	18.710	0.938

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
L10	95.000-91.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	5.620	0.197
L11	91.000-90.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	1.477	0.049
L12	90.000-61.500	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	27.929	1.407
L13	61.500-58.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	3.322	0.173
L14	58.000-40.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	22.890	0.889
L15	40.000-33.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	7.500	0.346
L16	33.000-28.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.907	0.247
L17	28.000-0.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	27.477	1.382

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	185.000-180.000	-0.2272	0.1312	-0.3437	0.1984
L2	180.000-153.000	-0.2605	0.1504	-0.3988	0.2302
L3	153.000-151.833	-0.7156	0.4132	-0.9880	0.5704
L4	151.833-151.000	-0.7177	0.4144	-0.9924	0.5730
L5	151.000-130.000	-0.5605	0.3236	-0.8136	0.4697
L6	130.000-120.667	-0.7785	0.4494	-1.1000	0.6351
L7	120.667-115.000	-0.8354	0.4823	-1.1659	0.6731
L8	115.000-114.000	-0.8402	0.4851	-1.1762	0.6791
L9	114.000-95.000	-0.6790	0.3920	-0.9740	0.5623
L10	95.000-91.000	-0.9506	0.5488	-1.2978	0.7493
L11	91.000-90.000	-1.0139	0.5853	-1.3532	0.7813
L12	90.000-61.500	-0.7326	0.4230	-1.0067	0.5812
L13	61.500-58.000	-0.7234	0.4177	-1.0022	0.5786
L14	58.000-40.000	-0.9267	0.5351	-1.2908	0.7452
L15	40.000-33.000	-0.8163	0.4713	-1.1315	0.6533
L16	33.000-28.000	-0.7688	0.4438	-1.0579	0.6108
L17	28.000-0.000	-0.7748	0.4473	-1.0708	0.6182

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
***									
(3) AIR 21 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	6.738 7.246 7.753	5.668 6.491 7.261	0.111 0.168 0.231

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
						1" Ice			
(3) AIR 21 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.738 7.246 7.753	5.668 6.491 7.261	0.111 0.168 0.231
(3) AIR 21 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.738 7.246 7.753	5.668 6.491 7.261	0.111 0.168 0.231
AIR 33 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.458 6.934 7.416	5.742 6.489 7.229	0.127 0.183 0.245
AIR 33 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.458 6.934 7.416	5.742 6.489 7.229	0.127 0.183 0.245
AIR 33 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.458 6.934 7.416	5.742 6.489 7.229	0.127 0.183 0.245
ETW190VS12UB	A	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	0.664 0.778 0.901	0.367 0.461 0.564	0.015 0.020 0.026
ETW190VS12UB	B	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	0.664 0.778 0.901	0.367 0.461 0.564	0.015 0.020 0.026
ETW190VS12UB	C	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	0.664 0.778 0.901	0.367 0.461 0.564	0.015 0.020 0.026
DC6-48-60-18-8F	A	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	2.567 2.798 3.038	2.567 2.798 3.038	0.019 0.041 0.067
Sector Mount [SM 802-3]	C	None		0.000	185.000	No Ice 1/2" Ice 1" Ice	24.410 31.390 38.370	24.410 31.390 38.370	0.930 1.362 1.794
****									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	10.000	175.000	No Ice 1/2" Ice 1" Ice	6.119 6.626 7.128	4.254 5.014 5.711	0.055 0.103 0.157
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	10.000	175.000	No Ice 1/2" Ice 1" Ice	6.119 6.626 7.128	4.254 5.014 5.711	0.055 0.103 0.157
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	10.000	175.000	No Ice 1/2" Ice 1" Ice	6.119 6.626 7.128	4.254 5.014 5.711	0.055 0.103 0.157
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	23.000	175.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.304 7.479 8.368	0.074 0.139 0.212
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	22.000	175.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.304 7.479 8.368	0.074 0.139 0.212
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	14.000	175.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.304 7.479 8.368	0.074 0.139 0.212

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
						1" Ice			
(2) RRUS-11	A	From Leg	4.000 0.000 0.000	23.000	175.000	No Ice 1/2" Ice 1" Ice	3.249 3.491 3.741	1.373 1.551 1.738	0.048 0.068 0.092
(2) RRUS-11	B	From Leg	4.000 0.000 0.000	22.000	175.000	No Ice 1/2" Ice 1" Ice	3.249 3.491 3.741	1.373 1.551 1.738	0.048 0.068 0.092
(2) RRUS-11	C	From Leg	4.000 0.000 0.000	14.000	175.000	No Ice 1/2" Ice 1" Ice	3.249 3.491 3.741	1.373 1.551 1.738	0.048 0.068 0.092
(2) LGP13519	A	From Leg	4.000 0.000 0.000	23.000	175.000	No Ice 1/2" Ice 1" Ice	0.338 0.422 0.515	0.207 0.280 0.362	0.005 0.008 0.012
(2) LGP13519	B	From Leg	4.000 0.000 0.000	22.000	175.000	No Ice 1/2" Ice 1" Ice	0.338 0.422 0.515	0.207 0.280 0.362	0.005 0.008 0.012
(2) LGP13519	C	From Leg	4.000 0.000 0.000	14.000	175.000	No Ice 1/2" Ice 1" Ice	0.338 0.422 0.515	0.207 0.280 0.362	0.005 0.008 0.012
(2) DTMABP7819VG12A	A	From Leg	4.000 0.000 0.000	23.000	175.000	No Ice 1/2" Ice 1" Ice	1.139 1.284 1.437	0.391 0.488 0.595	0.019 0.026 0.036
(2) DTMABP7819VG12A	B	From Leg	4.000 0.000 0.000	22.000	175.000	No Ice 1/2" Ice 1" Ice	1.139 1.284 1.437	0.391 0.488 0.595	0.019 0.026 0.036
(2) DTMABP7819VG12A	C	From Leg	4.000 0.000 0.000	14.000	175.000	No Ice 1/2" Ice 1" Ice	1.139 1.284 1.437	0.391 0.488 0.595	0.019 0.026 0.036
DC6-48-60-18-8F	B	From Leg	4.000 0.000 0.000	22.000	175.000	No Ice 1/2" Ice 1" Ice	2.567 2.798 3.038	2.567 2.798 3.038	0.019 0.041 0.067
Sector Mount [SM 802-3]	C	None		0.000	175.000	No Ice 1/2" Ice 1" Ice	24.410 31.390 38.370	24.410 31.390 38.370	0.930 1.362 1.794
****									
742 213 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	30.000	165.000	No Ice 1/2" Ice 1" Ice	5.373 5.950 6.501	4.620 6.000 6.982	0.049 0.094 0.146
742 213 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	30.000	165.000	No Ice 1/2" Ice 1" Ice	5.373 5.950 6.501	4.620 6.000 6.982	0.049 0.094 0.146
742 213 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	30.000	165.000	No Ice 1/2" Ice 1" Ice	5.373 5.950 6.501	4.620 6.000 6.982	0.049 0.094 0.146
Pipe Mount [PM 601-3]	C	None		0.000	165.000	No Ice 1/2" Ice 1" Ice	4.390 5.480 6.570	4.390 5.480 6.570	0.195 0.237 0.280
****									
(2) BXA-70063-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	155.000	No Ice 1/2"	7.969 8.609	5.801 6.953	0.042 0.103

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
			0.000				Ice	9.216	7.819	0.171
							1" Ice			
(2) BXA-70063-6CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000		0.000	155.000	No Ice	7.969	5.801	0.042
			0.000				1/2"	8.609	6.953	0.103
			0.000				Ice	9.216	7.819	0.171
							1" Ice			
(2) BXA-70063-6CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000		0.000	155.000	No Ice	7.969	5.801	0.042
			0.000				1/2"	8.609	6.953	0.103
			0.000				Ice	9.216	7.819	0.171
							1" Ice			
(2) BXA-171063-12CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000		0.000	155.000	No Ice	5.029	5.289	0.041
			0.000				1/2"	5.583	6.459	0.087
			0.000				Ice	6.103	7.348	0.140
							1" Ice			
(2) BXA-171063-12CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000		0.000	155.000	No Ice	5.029	5.289	0.041
			0.000				1/2"	5.583	6.459	0.087
			0.000				Ice	6.103	7.348	0.140
							1" Ice			
(2) BXA-171063-12CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000		0.000	155.000	No Ice	5.029	5.289	0.041
			0.000				1/2"	5.583	6.459	0.087
			0.000				Ice	6.103	7.348	0.140
							1" Ice			
RRH2X40-AWS	A	From Leg	4.000		0.000	155.000	No Ice	2.603	2.023	0.042
			0.000				1/2"	2.840	2.244	0.062
			0.000				Ice	3.085	2.474	0.084
							1" Ice			
RRH2X40-AWS	B	From Leg	4.000		0.000	155.000	No Ice	2.603	2.023	0.042
			0.000				1/2"	2.840	2.244	0.062
			0.000				Ice	3.085	2.474	0.084
							1" Ice			
RRH2X40-AWS	C	From Leg	4.000		0.000	155.000	No Ice	2.603	2.023	0.042
			0.000				1/2"	2.840	2.244	0.062
			0.000				Ice	3.085	2.474	0.084
							1" Ice			
RRH2X40-07-U	A	From Leg	4.000		0.000	155.000	No Ice	2.246	1.228	0.050
			0.000				1/2"	2.447	1.385	0.067
			0.000				Ice	2.657	1.551	0.086
							1" Ice			
RRH2X40-07-U	B	From Leg	4.000		0.000	155.000	No Ice	2.246	1.228	0.050
			0.000				1/2"	2.447	1.385	0.067
			0.000				Ice	2.657	1.551	0.086
							1" Ice			
RRH2X40-07-U	C	From Leg	4.000		0.000	155.000	No Ice	2.246	1.228	0.050
			0.000				1/2"	2.447	1.385	0.067
			0.000				Ice	2.657	1.551	0.086
							1" Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.000		0.000	155.000	No Ice	5.600	2.333	0.044
			0.000				1/2"	5.915	2.558	0.080
			0.000				Ice	6.240	2.791	0.120
							1" Ice			
Platform Mount [LP 301-1]	C	None			0.000	155.000	No Ice	30.100	30.100	1.589
							1/2"	40.800	40.800	2.029
							Ice	51.500	51.500	2.470
							1" Ice			
***										

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 ft^2	Weight K
HP2-102	A	Paraboloid w/Shroud (HP)	From Leg	1.000 0.000 0.000	0.000		185.000	2.000	No Ice 1/2" Ice 1" Ice	3.140 3.410 3.680	0.025 0.040 0.060

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 185.000-180.000	182.500	1.63	0.030	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	0.990
L2 180.000-153.000	165.615	1.586	0.029	50.410	A	0.000	50.410	50.410	100.00	0.000	0.000
					B	0.000	50.410		100.00	0.000	0.000
					C	0.000	50.410		100.00	0.000	5.941
L3 153.000-151.833	152.415	1.548	0.029	2.625	A	0.000	2.625	2.625	100.00	0.000	0.000
					B	0.000	2.625		100.00	0.000	0.000
					C	0.000	2.625		100.00	0.000	0.851
L4 151.833-151.000	151.416	1.545	0.029	1.898	A	0.000	1.898	1.898	100.00	0.000	0.000
					B	0.000	1.898		100.00	0.000	0.000
					C	0.000	1.898		100.00	0.000	0.608
L5 151.000-130.000	140.112	1.512	0.028	54.052	A	0.000	54.052	54.052	100.00	0.000	0.000
					B	0.000	54.052		100.00	0.000	0.000
					C	0.000	54.052		100.00	0.000	10.857
L6 130.000-120.667	125.263	1.464	0.027	27.410	A	0.000	27.410	27.410	100.00	0.000	0.000
					B	0.000	27.410		100.00	0.000	0.000
					C	0.000	27.410		100.00	0.000	7.018
L7 120.667-115.000	117.810	1.438	0.027	17.834	A	0.000	17.834	17.834	100.00	0.000	0.000
					B	0.000	17.834		100.00	0.000	0.000
					C	0.000	17.834		100.00	0.000	4.580
L8 115.000-114.000	114.499	1.427	0.026	3.237	A	0.000	3.237	3.237	100.00	0.000	0.000
					B	0.000	3.237		100.00	0.000	0.000
					C	0.000	3.237		100.00	0.000	0.808
L9 114.000-95.000	104.268	1.389	0.026	66.658	A	0.000	66.658	66.658	100.00	0.000	0.000
					B	0.000	66.658		100.00	0.000	0.000
					C	0.000	66.658		100.00	0.000	11.638
L10 95.000-91.000	92.990	1.344	0.025	15.040	A	0.000	15.040	15.040	100.00	0.000	0.000
					B	0.000	15.040		100.00	0.000	0.000
					C	0.000	15.040		100.00	0.000	3.631
L11 91.000-90.000	90.499	1.334	0.025	3.831	A	0.000	3.831	3.831	100.00	0.000	0.000
					B	0.000	3.831		100.00	0.000	0.000
					C	0.000	3.831		100.00	0.000	0.980
L12 90.000-61.500	75.315	1.266	0.023	120.632	A	0.000	120.632	120.632	100.00	0.000	0.000
					B	0.000	120.632		100.00	0.000	0.000
					C	0.000	120.632		100.00	0.000	18.602
L13 61.500-58.000	59.744	1.185	0.022	16.338	A	0.000	16.338	16.338	100.00	0.000	0.000
					B	0.000	16.338		100.00	0.000	0.000
					C	0.000	16.338		100.00	0.000	2.213
L14 58.000-40.000	48.871	1.119	0.021	88.707	A	0.000	88.707	88.707	100.00	0.000	0.000
					B	0.000	88.707		100.00	0.000	0.000
					C	0.000	88.707		100.00	0.000	14.968
L15 40.000-33.000	36.479	1.029	0.019	36.647	A	0.000	36.647	36.647	100.00	0.000	0.000
					B	0.000	36.647		100.00	0.000	0.000
					C	0.000	36.647		100.00	0.000	5.005
L16 33.000-28.000	30.490	1	0.018	26.987	A	0.000	26.987	26.987	100.00	0.000	0.000
					B	0.000	26.987		100.00	0.000	0.000
					C	0.000	26.987		100.00	0.000	3.323
L17 28.000-0.000	13.724	1	0.018	162.625	A	0.000	162.625	162.625	100.00	0.000	0.000
					B	0.000	162.625		100.00	0.000	0.000
					C	0.000	162.625		100.00	0.000	18.611

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	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 185.000-180.000	182.500	1.63	0.006	0.7500	8.125	A	0.000	8.125	8.125	100.00	0.000	0.000
						B	0.000	8.125		100.00	0.000	0.000
						C	0.000	8.125		100.00	0.000	1.740
L2 180.000-153.000	165.615	1.586	0.006	0.7500	53.785	A	0.000	53.785	53.785	100.00	0.000	0.000
						B	0.000	53.785		100.00	0.000	0.000
						C	0.000	53.785		100.00	0.000	10.366
L3 153.000-151.833	152.415	1.548	0.006	0.7500	2.771	A	0.000	2.771	2.771	100.00	0.000	0.000
						B	0.000	2.771		100.00	0.000	0.000
						C	0.000	2.771		100.00	0.000	1.415
L4 151.833-151.000	151.416	1.545	0.006	0.7500	2.002	A	0.000	2.002	2.002	100.00	0.000	0.000
						B	0.000	2.002		100.00	0.000	0.000
						C	0.000	2.002		100.00	0.000	1.011
L5 151.000-130.000	140.112	1.512	0.005	0.7500	56.677	A	0.000	56.677	56.677	100.00	0.000	0.000
						B	0.000	56.677		100.00	0.000	0.000
						C	0.000	56.677		100.00	0.000	18.174
L6 130.000-120.667	125.263	1.464	0.005	0.7500	28.576	A	0.000	28.576	28.576	100.00	0.000	0.000
						B	0.000	28.576		100.00	0.000	0.000
						C	0.000	28.576		100.00	0.000	11.566
L7 120.667-115.000	117.810	1.438	0.005	0.7500	18.542	A	0.000	18.542	18.542	100.00	0.000	0.000
						B	0.000	18.542		100.00	0.000	0.000
						C	0.000	18.542		100.00	0.000	7.398
L8 115.000-114.000	114.499	1.427	0.005	0.7500	3.362	A	0.000	3.362	3.362	100.00	0.000	0.000
						B	0.000	3.362		100.00	0.000	0.000
						C	0.000	3.362		100.00	0.000	1.305
L9 114.000-95.000	104.268	1.389	0.005	0.7500	69.033	A	0.000	69.033	69.033	100.00	0.000	0.000
						B	0.000	69.033		100.00	0.000	0.000
						C	0.000	69.033		100.00	0.000	18.710
L10 95.000-91.000	92.990	1.344	0.005	0.7500	15.540	A	0.000	15.540	15.540	100.00	0.000	0.000
						B	0.000	15.540		100.00	0.000	0.000
						C	0.000	15.540		100.00	0.000	5.620
L11 91.000-90.000	90.499	1.334	0.005	0.7500	3.956	A	0.000	3.956	3.956	100.00	0.000	0.000
						B	0.000	3.956		100.00	0.000	0.000
						C	0.000	3.956		100.00	0.000	1.477
L12 90.000-61.500	75.315	1.266	0.005	0.7500	124.195	A	0.000	124.195	124.195	100.00	0.000	0.000
						B	0.000	124.195		100.00	0.000	0.000
						C	0.000	124.195		100.00	0.000	27.929
L13 61.500-58.000	59.744	1.185	0.004	0.7500	16.776	A	0.000	16.776	16.776	100.00	0.000	0.000
						B	0.000	16.776		100.00	0.000	0.000
						C	0.000	16.776		100.00	0.000	3.322
L14 58.000-40.000	48.871	1.119	0.004	0.7500	90.957	A	0.000	90.957	90.957	100.00	0.000	0.000
						B	0.000	90.957		100.00	0.000	0.000
						C	0.000	90.957		100.00	0.000	22.890
L15 40.000-33.000	36.479	1.029	0.004	0.7500	37.522	A	0.000	37.522	37.522	100.00	0.000	0.000
						B	0.000	37.522		100.00	0.000	0.000
						C	0.000	37.522		100.00	0.000	7.500
L16 33.000-28.000	30.490	1	0.004	0.7500	27.612	A	0.000	27.612	27.612	100.00	0.000	0.000
						B	0.000	27.612		100.00	0.000	0.000
						C	0.000	27.612		100.00	0.000	4.907
L17 28.000-0.000	13.724	1	0.004	0.7500	166.125	A	0.000	166.125	166.125	100.00	0.000	0.000
						B	0.000	166.125		100.00	0.000	0.000
						C	0.000	166.125		100.00	0.000	27.477

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	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 185.000-180.000	182.500	1.63	0.010	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	0.990
L2 180.000-153.000	165.615	1.586	0.010	50.410	A	0.000	50.410	50.410	100.00	0.000	0.000
					B	0.000	50.410		100.00	0.000	0.000
					C	0.000	50.410		100.00	0.000	5.941
L3 153.000-151.833	152.415	1.548	0.010	2.625	A	0.000	2.625	2.625	100.00	0.000	0.000
					B	0.000	2.625		100.00	0.000	0.000
					C	0.000	2.625		100.00	0.000	0.851
L4 151.833-151.000	151.416	1.545	0.010	1.898	A	0.000	1.898	1.898	100.00	0.000	0.000
					B	0.000	1.898		100.00	0.000	0.000
					C	0.000	1.898		100.00	0.000	0.608
L5 151.000-130.000	140.112	1.512	0.010	54.052	A	0.000	54.052	54.052	100.00	0.000	0.000
					B	0.000	54.052		100.00	0.000	0.000
					C	0.000	54.052		100.00	0.000	10.857
L6 130.000-120.667	125.263	1.464	0.009	27.410	A	0.000	27.410	27.410	100.00	0.000	0.000
					B	0.000	27.410		100.00	0.000	0.000
					C	0.000	27.410		100.00	0.000	7.018
L7 120.667-115.000	117.810	1.438	0.009	17.834	A	0.000	17.834	17.834	100.00	0.000	0.000
					B	0.000	17.834		100.00	0.000	0.000
					C	0.000	17.834		100.00	0.000	4.580
L8 115.000-114.000	114.499	1.427	0.009	3.237	A	0.000	3.237	3.237	100.00	0.000	0.000
					B	0.000	3.237		100.00	0.000	0.000
					C	0.000	3.237		100.00	0.000	0.808
L9 114.000-95.000	104.268	1.389	0.009	66.658	A	0.000	66.658	66.658	100.00	0.000	0.000
					B	0.000	66.658		100.00	0.000	0.000
					C	0.000	66.658		100.00	0.000	11.638
L10 95.000-91.000	92.990	1.344	0.009	15.040	A	0.000	15.040	15.040	100.00	0.000	0.000
					B	0.000	15.040		100.00	0.000	0.000
					C	0.000	15.040		100.00	0.000	3.631
L11 91.000-90.000	90.499	1.334	0.009	3.831	A	0.000	3.831	3.831	100.00	0.000	0.000
					B	0.000	3.831		100.00	0.000	0.000
					C	0.000	3.831		100.00	0.000	0.980
L12 90.000-61.500	75.315	1.266	0.008	120.632	A	0.000	120.632	120.632	100.00	0.000	0.000
					B	0.000	120.632		100.00	0.000	0.000
					C	0.000	120.632		100.00	0.000	18.602
L13 61.500-58.000	59.744	1.185	0.008	16.338	A	0.000	16.338	16.338	100.00	0.000	0.000
					B	0.000	16.338		100.00	0.000	0.000
					C	0.000	16.338		100.00	0.000	2.213
L14 58.000-40.000	48.871	1.119	0.007	88.707	A	0.000	88.707	88.707	100.00	0.000	0.000
					B	0.000	88.707		100.00	0.000	0.000
					C	0.000	88.707		100.00	0.000	14.968
L15 40.000-33.000	36.479	1.029	0.007	36.647	A	0.000	36.647	36.647	100.00	0.000	0.000
					B	0.000	36.647		100.00	0.000	0.000
					C	0.000	36.647		100.00	0.000	5.005
L16 33.000-28.000	30.490	1	0.006	26.987	A	0.000	26.987	26.987	100.00	0.000	0.000
					B	0.000	26.987		100.00	0.000	0.000
					C	0.000	26.987		100.00	0.000	3.323
L17 28.000-0.000	13.724	1	0.006	162.625	A	0.000	162.625	162.625	100.00	0.000	0.000
					B	0.000	162.625		100.00	0.000	0.000
					C	0.000	162.625		100.00	0.000	18.611

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

Comb. No.	Description
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	185 - 180	Pole	Max Tension	14	0.000	-0.000	0.000
			Max. Compression	14	-4.621	0.069	0.307
			Max. Mx	11	-2.149	28.890	0.142
			Max. My	2	-2.141	0.010	29.314
			Max. Vy	11	-6.007	28.890	0.142
			Max. Vx	8	6.110	0.019	-29.264
			Max. Torque	11			-0.838
L2	180 - 153	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-16.581	0.752	-0.348
			Max. Mx	11	-8.255	366.769	-0.929
			Max. My	8	-8.244	1.630	-370.540
			Max. Vy	11	-21.092	366.769	-0.929
			Max. Vx	8	21.152	1.630	-370.540
			Max. Torque	12			-0.930
L3	153 - 151.833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-16.792	0.777	-0.362
			Max. Mx	11	-8.427	391.479	-1.057
			Max. My	8	-8.416	1.783	-395.317
			Max. Vy	11	-21.267	391.479	-1.057
			Max. Vx	8	21.326	1.783	-395.317
			Max. Torque	5			0.486
L4	151.833 - 151	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-16.984	0.795	-0.372
			Max. Mx	11	-8.587	409.257	-1.148
			Max. My	8	-8.577	1.893	-413.142
			Max. Vy	11	-21.397	409.257	-1.148
			Max. Vx	8	21.456	1.893	-413.142
			Max. Torque	5			0.480
L5	151 - 130	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.216	1.156	-0.581

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	11	-11.206	770.155	-2.918
			Max. My	8	-11.198	3.997	-774.955
			Max. Vy	11	-23.773	770.155	-2.918
			Max. Vx	8	23.832	3.997	-774.955
			Max. Torque	5			0.475
L6	130 - 120.667	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-24.460	1.508	-0.785
			Max. Mx	11	-14.812	1128.819	-4.512
			Max. My	8	-14.805	5.894	-1134.436
			Max. Vy	11	-26.283	1128.819	-4.512
			Max. Vx	8	26.343	5.894	-1134.436
			Max. Torque	4			0.409
L7	120.667 - 115	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-26.050	1.664	-0.875
			Max. Mx	11	-16.148	1280.685	-5.145
			Max. My	8	-16.141	6.648	-1286.623
			Max. Vy	11	-27.324	1280.685	-5.145
			Max. Vx	8	27.384	6.648	-1286.623
			Max. Torque	3			0.424
L8	115 - 114	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-26.363	1.693	-0.891
			Max. Mx	11	-16.416	1308.103	-5.257
			Max. My	8	-16.409	6.782	-1314.098
			Max. Vy	11	-27.512	1308.103	-5.257
			Max. Vx	8	27.572	6.782	-1314.098
			Max. Torque	3			0.432
L9	114 - 95	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.103	2.092	-1.122
			Max. Mx	11	-19.564	1680.587	-6.716
			Max. My	8	-19.559	8.521	-1687.312
			Max. Vy	11	-29.829	1680.587	-6.716
			Max. Vx	8	29.888	8.521	-1687.312
			Max. Torque	8			-0.508
L10	95 - 91	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-34.832	2.408	-1.305
			Max. Mx	11	-23.752	1989.059	-7.841
			Max. My	8	-23.747	9.863	-1996.345
			Max. Vy	11	-31.860	1989.059	-7.841
			Max. Vx	8	31.919	9.863	-1996.345
			Max. Torque	8			-0.636
L11	91 - 90	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-35.157	2.441	-1.324
			Max. Mx	11	-24.027	2021.018	-7.954
			Max. My	8	-24.022	9.997	-2028.360
			Max. Vy	11	-32.062	2021.018	-7.954
			Max. Vx	8	32.121	9.997	-2028.360
			Max. Torque	8			-0.654
L12	90 - 61.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-46.261	3.498	-1.935
			Max. Mx	11	-33.595	3011.509	-11.178
			Max. My	8	-33.591	13.851	-3020.430
			Max. Vy	11	-37.600	3011.509	-11.178
			Max. Vx	8	37.659	13.851	-3020.430
			Max. Torque	8			-0.998
L13	61.5 - 58	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-47.740	3.641	-2.018
			Max. Mx	11	-34.876	3144.289	-11.575
			Max. My	8	-34.873	14.326	-3153.401
			Max. Vy	11	-38.280	3144.289	-11.575
			Max. Vx	8	38.339	14.326	-3153.401
			Max. Torque	8			-1.040
L14	58 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-56.326	4.419	-2.468
			Max. Mx	11	-42.373	3865.196	-13.616
			Max. My	8	-42.371	16.771	-3875.284
			Max. Vy	11	-41.864	3865.196	-13.616
			Max. Vx	8	41.923	16.771	-3875.284

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	7			-1.338
L15	40 - 33	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-59.813	4.741	-2.653
			Max. Mx	11	-45.422	4162.775	-14.410
			Max. My	8	-45.420	17.723	-4173.239
			Max. Vy	11	-43.166	4162.775	-14.410
			Max. Vx	8	43.225	17.723	-4173.239
			Max. Torque	7			-1.446
L16	33 - 28	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-62.459	4.977	-2.790
			Max. Mx	11	-47.746	4380.891	-14.977
			Max. My	8	-47.744	18.404	-4391.622
			Max. Vy	11	-44.084	4380.891	-14.977
			Max. Vx	8	44.142	18.404	-4391.622
			Max. Torque	7			-1.518
L17	28 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-77.905	6.404	-3.615
			Max. Mx	11	-61.294	5689.552	-18.144
			Max. My	8	-61.294	22.212	-5701.751
			Max. Vy	11	-49.475	5689.552	-18.144
			Max. Vx	8	49.532	22.212	-5701.751
			Max. Torque	7			-1.951

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	77.905	-0.000	0.000
	Max. H_x	11	61.304	49.462	-0.105
	Max. H_z	2	61.304	-0.123	49.480
	Max. M_x	2	5692.467	-0.123	49.480
	Max. M_z	5	5686.268	-49.462	0.140
	Max. Torsion	13	1.931	24.605	42.806
	Min. Vert	8	61.304	0.123	-49.519
	Min. H_x	5	61.304	-49.462	0.140
	Min. H_z	8	61.304	0.123	-49.519
	Min. M_x	8	-5701.751	0.123	-49.519
	Min. M_z	11	-5689.552	49.462	-0.105
	Min. Torsion	7	-1.951	-24.615	-42.847

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	61.304	-0.000	0.000	0.888	1.611	0.000
Dead+Wind 0 deg - No Ice	61.304	0.123	-49.480	-5692.467	-18.926	-1.857
Dead+Wind 30 deg - No Ice	61.304	24.818	-42.929	-4943.003	-2856.337	-1.287
Dead+Wind 60 deg - No Ice	61.304	42.885	-24.882	-2870.166	-4932.008	-0.408
Dead+Wind 90 deg - No Ice	61.304	49.462	-0.140	-22.994	-5686.268	0.576
Dead+Wind 120 deg - No Ice	61.304	42.751	24.706	2843.508	-4909.339	1.506
Dead+Wind 150 deg - No Ice	61.304	24.615	42.847	4932.007	-2822.508	1.951
Dead+Wind 180 deg - No Ice	61.304	-0.123	49.519	5701.751	22.212	1.858
Dead+Wind 210 deg - No Ice	61.304	-24.828	42.970	4952.529	2861.397	1.267
Dead+Wind 240 deg - No Ice	61.304	-42.873	24.919	2879.111	4933.146	0.351
Dead+Wind 270 deg - No Ice	61.304	-49.462	0.105	18.144	5689.552	-0.576
Dead+Wind 300 deg - No Ice	61.304	-42.762	-24.669	-2834.562	4914.770	-1.451
Dead+Wind 330 deg - No Ice	61.304	-24.605	-42.806	-4922.480	2824.018	-1.931
Dead+Ice+Temp	77.905	0.000	-0.000	3.615	6.404	0.000
Dead+Wind 0	77.905	0.024	-11.207	-1336.776	2.527	-0.566

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
deg+Ice+Temp						
Dead+Wind 30 deg+Ice+Temp	77.905	5.618	-9.720	-1159.755	-665.620	-0.373
Dead+Wind 60 deg+Ice+Temp	77.905	9.710	-5.632	-671.451	-1154.550	-0.088
Dead+Wind 90 deg+Ice+Temp	77.905	11.203	-0.028	-1.107	-1332.639	0.220
Dead+Wind 120 deg+Ice+Temp	77.905	9.684	5.598	673.425	-1149.980	0.491
Dead+Wind 150 deg+Ice+Temp	77.905	5.578	9.705	1164.856	-658.936	0.613
Dead+Wind 180 deg+Ice+Temp	77.905	-0.024	11.216	1345.912	10.707	0.567
Dead+Wind 210 deg+Ice+Temp	77.905	-5.620	9.729	1168.945	679.254	0.369
Dead+Wind 240 deg+Ice+Temp	77.905	-9.708	5.640	680.508	1167.303	0.076
Dead+Wind 270 deg+Ice+Temp	77.905	-11.203	0.020	7.073	1345.873	-0.220
Dead+Wind 300 deg+Ice+Temp	77.905	-9.686	-5.590	-664.367	1163.694	-0.479
Dead+Wind 330 deg+Ice+Temp	77.905	-5.576	-9.696	-1155.666	671.771	-0.608
Dead+Wind 0 deg - Service	61.304	0.043	-17.121	-1970.289	-5.477	-0.644
Dead+Wind 30 deg - Service	61.304	8.587	-14.854	-1710.723	-987.813	-0.446
Dead+Wind 60 deg - Service	61.304	14.838	-8.609	-993.087	-1706.428	-0.142
Dead+Wind 90 deg - Service	61.304	17.115	-0.049	-7.370	-1967.651	0.198
Dead+Wind 120 deg - Service	61.304	14.792	8.549	985.034	-1698.564	0.521
Dead+Wind 150 deg - Service	61.304	8.517	14.825	1708.090	-976.094	0.676
Dead+Wind 180 deg - Service	61.304	-0.043	17.135	1974.694	8.768	0.644
Dead+Wind 210 deg - Service	61.304	-8.590	14.868	1715.211	991.722	0.440
Dead+Wind 240 deg - Service	61.304	-14.834	8.622	997.370	1708.977	0.123
Dead+Wind 270 deg - Service	61.304	-17.115	0.036	6.875	1970.942	-0.198
Dead+Wind 300 deg - Service	61.304	-14.796	-8.536	-980.751	1702.598	-0.502
Dead+Wind 330 deg - Service	61.304	-8.514	-14.811	-1703.602	978.768	-0.669

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	0.000	-61.304	0.000	0.000	61.304	-0.000	0.000%
2	0.123	-61.304	-49.485	-0.123	61.304	49.480	0.007%
3	24.818	-61.304	-42.929	-24.818	61.304	42.929	0.000%
4	42.885	-61.304	-24.882	-42.885	61.304	24.882	0.000%
5	49.468	-61.304	-0.140	-49.462	61.304	0.140	0.007%
6	42.751	-61.304	24.706	-42.751	61.304	-24.706	0.000%
7	24.615	-61.304	42.847	-24.615	61.304	-42.847	0.000%
8	-0.123	-61.304	49.525	0.123	61.304	-49.519	0.007%
9	-24.828	-61.304	42.970	24.828	61.304	-42.970	0.000%
10	-42.874	-61.304	24.919	42.873	61.304	-24.919	0.000%
11	-49.468	-61.304	0.105	49.462	61.304	-0.105	0.007%
12	-42.762	-61.304	-24.669	42.762	61.304	24.669	0.000%
13	-24.605	-61.304	-42.806	24.605	61.304	42.806	0.000%
14	0.000	-77.905	0.000	-0.000	77.905	0.000	0.000%
15	0.024	-77.905	-11.207	-0.024	77.905	11.207	0.000%
16	5.618	-77.905	-9.720	-5.618	77.905	9.720	0.000%
17	9.710	-77.905	-5.632	-9.710	77.905	5.632	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
18	11.203	-77.905	-0.028	-11.203	77.905	0.028	0.000%
19	9.684	-77.905	5.598	-9.684	77.905	-5.598	0.000%
20	5.578	-77.905	9.705	-5.578	77.905	-9.705	0.000%
21	-0.024	-77.905	11.216	0.024	77.905	-11.216	0.000%
22	-5.620	-77.905	9.729	5.620	77.905	-9.729	0.000%
23	-9.708	-77.905	5.640	9.708	77.905	-5.640	0.000%
24	-11.203	-77.905	0.020	11.203	77.905	-0.020	0.000%
25	-9.686	-77.905	-5.590	9.686	77.905	5.590	0.000%
26	-5.576	-77.905	-9.696	5.576	77.905	9.696	0.000%
27	0.043	-61.304	-17.123	-0.043	61.304	17.121	0.003%
28	8.588	-61.304	-14.854	-8.587	61.304	14.854	0.001%
29	14.839	-61.304	-8.610	-14.838	61.304	8.609	0.001%
30	17.117	-61.304	-0.049	-17.115	61.304	0.049	0.003%
31	14.793	-61.304	8.549	-14.792	61.304	-8.549	0.001%
32	8.517	-61.304	14.826	-8.517	61.304	-14.825	0.001%
33	-0.043	-61.304	17.137	0.043	61.304	-17.135	0.003%
34	-8.591	-61.304	14.869	8.590	61.304	-14.868	0.001%
35	-14.835	-61.304	8.623	14.834	61.304	-8.622	0.001%
36	-17.117	-61.304	0.036	17.115	61.304	-0.036	0.003%
37	-14.797	-61.304	-8.536	14.796	61.304	8.536	0.001%
38	-8.514	-61.304	-14.812	8.514	61.304	14.811	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00008729	0.00009331
3	Yes	17	0.00000001	0.00012425
4	Yes	17	0.00000001	0.00012633
5	Yes	13	0.00008731	0.00009756
6	Yes	17	0.00000001	0.00012376
7	Yes	17	0.00000001	0.00012205
8	Yes	13	0.00008728	0.00013013
9	Yes	17	0.00000001	0.00012721
10	Yes	17	0.00000001	0.00012555
11	Yes	13	0.00008730	0.00008694
12	Yes	17	0.00000001	0.00012245
13	Yes	17	0.00000001	0.00012375
14	Yes	6	0.00000001	0.00001947
15	Yes	16	0.00000001	0.00007452
16	Yes	16	0.00000001	0.00007922
17	Yes	16	0.00000001	0.00007920
18	Yes	16	0.00000001	0.00007419
19	Yes	16	0.00000001	0.00007899
20	Yes	16	0.00000001	0.00007920
21	Yes	16	0.00000001	0.00007506
22	Yes	16	0.00000001	0.00008040
23	Yes	16	0.00000001	0.00008026
24	Yes	16	0.00000001	0.00007497
25	Yes	16	0.00000001	0.00007934
26	Yes	16	0.00000001	0.00007929
27	Yes	13	0.00009074	0.00004029
28	Yes	14	0.00000001	0.00008362
29	Yes	14	0.00000001	0.00008779
30	Yes	13	0.00009072	0.00003926
31	Yes	14	0.00000001	0.00008554
32	Yes	14	0.00000001	0.00008203
33	Yes	13	0.00009074	0.00004136
34	Yes	14	0.00000001	0.00008946
35	Yes	14	0.00000001	0.00008553
36	Yes	13	0.00009072	0.00003914
37	Yes	14	0.00000001	0.00008318
38	Yes	14	0.00000001	0.00008644

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 180	30.130	34	1.777	0.004
L2	180 - 153	28.275	34	1.761	0.003
L3	153 - 151.833	19.164	34	1.398	0.001
L4	151.833 - 151	18.824	34	1.383	0.001
L5	151 - 130	18.584	34	1.375	0.001
L6	135 - 120.667	14.351	34	1.148	0.000
L7	120.667 - 115	11.110	34	0.992	0.000
L8	115 - 114	9.972	34	0.925	0.000
L9	114 - 95	9.780	34	0.915	0.000
L10	101 - 91	7.503	34	0.759	0.000
L11	91 - 90	5.978	34	0.687	0.000
L12	90 - 61.5	5.835	34	0.676	0.000
L13	61.5 - 58	2.586	34	0.420	0.000
L14	58 - 40	2.288	34	0.391	0.000
L15	40 - 33	1.063	34	0.260	0.000
L16	33 - 28	0.718	34	0.211	0.000
L17	28 - 0	0.514	34	0.178	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.000	HP2-102	34	30.130	1.777	0.004	9785
175.000	(2) 7770.00 w/ Mount Pipe	34	26.451	1.722	0.002	6337
165.000	742 213 w/ Mount Pipe	34	22.957	1.588	0.001	4058
155.000	(2) BXA-70063-6CF-EDIN-2 w/ Mount Pipe	34	19.759	1.428	0.001	3180

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 180	86.824	9	5.125	0.012
L2	180 - 153	81.486	9	5.078	0.008
L3	153 - 151.833	55.259	9	4.031	0.002
L4	151.833 - 151	54.281	9	3.987	0.002
L5	151 - 130	53.588	9	3.964	0.002
L6	135 - 120.667	41.393	9	3.312	0.001
L7	120.667 - 115	32.050	9	2.861	0.001
L8	115 - 114	28.771	9	2.669	0.001
L9	114 - 95	28.215	9	2.640	0.001
L10	101 - 91	21.650	9	2.190	0.001
L11	91 - 90	17.250	9	1.982	0.001
L12	90 - 61.5	16.839	9	1.950	0.001
L13	61.5 - 58	7.463	9	1.212	0.001
L14	58 - 40	6.605	9	1.128	0.000
L15	40 - 33	3.069	9	0.751	0.000
L16	33 - 28	2.072	9	0.609	0.000
L17	28 - 0	1.484	9	0.514	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.000	HP2-102	9	86.824	5.125	0.012	3461
175.000	(2) 7770.00 w/ Mount Pipe	9	76.235	4.965	0.006	2232
165.000	742 213 w/ Mount Pipe	9	66.179	4.578	0.003	1424
155.000	(2) BXA-70063-6CF-EDIN-2 w/ Mount Pipe	9	56.971	4.117	0.002	1116

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	185 - 180 (1)	TP18x18x0.1875	5.000	0.000	0.0	25.200	10.7543	-2.141	271.008	0.008
L2	180 - 153 (2)	TP26.8088x18x0.25	27.000	0.000	0.0	25.200	21.3798	-8.232	538.771	0.015
L3	153 - 151.833 (3)	TP27.1894x26.8088x0.3625	1.167	0.000	0.0	25.200	31.3111	-8.404	789.041	0.011
L4	151.833 - 151 (4)	TP27.4613x27.1894x0.5246	0.833	0.000	0.0	25.182	45.5000	-8.564	1145.780	0.007
L5	151 - 130 (5)	TP34.3125x27.4613x0.3802	21.000	0.000	0.0	25.200	39.5403	-11.187	996.414	0.011
L6	130 - 120.667 (6)	TP36.844x31.9209x0.4447	14.333	0.000	0.0	25.200	52.1180	-14.795	1313.370	0.011
L7	120.667 - 115 (7)	TP38.6875x36.844x0.4776	5.667	0.000	0.0	24.690	58.7656	-16.132	1450.920	0.011
L8	115 - 114 (8)	TP39.0125x38.6875x0.5402	1.000	0.000	0.0	25.200	66.9216	-16.400	1686.430	0.010
L9	114 - 95 (9)	TP45.1875x39.0125x0.4463	19.000	0.000	0.0	25.200	61.5001	-19.551	1549.800	0.013
L10	95 - 91 (10)	TP45.8125x42.3448x0.5294	10.000	0.000	0.0	25.200	77.1854	-23.739	1945.070	0.012
L11	91 - 90 (11)	TP46.1391x45.8125x0.465	1.000	0.000	0.0	25.200	68.3863	-24.015	1723.340	0.014
L12	90 - 61.5 (12)	TP55.4461x46.1391x0.5299	28.500	0.000	0.0	25.200	93.6935	-33.586	2361.080	0.014
L13	61.5 - 58 (13)	TP56.5891x55.4461x0.5263	3.500	0.000	0.0	24.996	95.0159	-34.868	2375.020	0.015
L14	58 - 40 (14)	TP61.6875x56.5891x0.5788	18.000	0.000	0.0	23.898	113.8900	-42.368	2721.750	0.016
L15	40 - 33 (15)	TP63.9583x61.6875x0.5704	7.000	0.000	0.0	25.200	116.4140	-45.418	2933.630	0.015
L16	33 - 28 (16)	TP65.5804x63.9583x0.595	5.000	0.000	0.0	24.390	124.5080	-47.742	3036.740	0.016
L17	28 - 0 (17)	TP73.8125x65.5804x0.5758	28.000	0.000	0.0	22.950	135.7860	-61.294	3116.300	0.020

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	185 - 180 (1)	TP18x18x0.1875	29.314	7.531	25.200	0.299	0.000	0.000	25.200	0.000
L2	180 - 153 (2)	TP26.8088x18x0.25	371.238	32.139	25.200	1.275	0.000	0.000	25.200	0.000
L3	153 - 151.833 (3)	TP27.1894x26.8088x0.3625	396.142	23.277	25.200	0.924	0.000	0.000	25.200	0.000
L4	151.833 - 151 (4)	TP27.4613x27.1894x0.5246	414.059	16.773	25.182	0.666	0.000	0.000	25.182	0.000
L5	151 - 130 (5)	TP34.3125x27.4613x0.3802	777.625	30.000	25.200	1.190	0.000	0.000	25.200	0.000
L6	130 - 120.667	TP36.844x31.9209x0.444	1138.7	29.589	25.200	1.174	0.000	0.000	25.200	0.000

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 $\frac{f_{by}}{F_{by}}$
	(6)	7	00							
L7	120.667 - 115 (7)	TP38.6875x36.844x0.477 6	1291.5 17	28.361	24.690	1.149	0.000	0.000	24.690	0.000
L8	115 - 114 (8)	TP39.0125x38.6875x0.54 02	1319.1 08	25.302	25.200	1.004	0.000	0.000	25.200	0.000
L9	114 - 95 (9)	TP45.1875x39.0125x0.44 63	1693.7 83	31.671	25.200	1.257	0.000	0.000	25.200	0.000
L10	95 - 91 (10)	TP45.8125x42.3448x0.52 94	2003.9 50	28.248	25.200	1.121	0.000	0.000	25.200	0.000
L11	91 - 90 (11)	TP46.1391x45.8125x0.46 5	2036.0 75	32.069	25.200	1.273	0.000	0.000	25.200	0.000
L12	90 - 61.5 (12)	TP55.4461x46.1391x0.52 99	3031.3 92	28.968	25.200	1.150	0.000	0.000	25.200	0.000
L13	61.5 - 58 (13)	TP56.5891x55.4461x0.52 63	3164.7 58	29.205	24.996	1.168	0.000	0.000	24.996	0.000
L14	58 - 40 (14)	TP61.6875x56.5891x0.57 88	3888.7 00	27.468	23.898	1.149	0.000	0.000	23.898	0.000
L15	40 - 33 (15)	TP63.9583x61.6875x0.57 04	4187.4 50	27.884	25.200	1.107	0.000	0.000	25.200	0.000
L16	33 - 28 (16)	TP65.5804x63.9583x0.59 5	4406.4 00	26.764	24.390	1.097	0.000	0.000	24.390	0.000
L17	28 - 0 (17)	TP73.8125x65.5804x0.57 58	5719.7 17	28.230	22.950	1.230	0.000	0.000	22.950	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	185 - 180 (1)	TP18x18x0.1875	6.070	0.564	16.800	0.068	0.008	0.001	16.800	0.000
L2	180 - 153 (2)	TP26.8088x18x0.25	21.260	0.994	16.800	0.120	0.209	0.009	16.800	0.001
L3	153 - 151.833 (3)	TP27.1894x26.8088x0.36 25	21.436	0.685	16.800	0.083	0.215	0.006	16.800	0.000
L4	151.833 - 151 (4)	TP27.4613x27.1894x0.52 46	21.572	0.474	16.788	0.057	0.219	0.004	16.788	0.000
L5	151 - 130 (5)	TP34.3125x27.4613x0.38 02	23.944	0.606	16.800	0.073	0.281	0.005	16.800	0.000
L6	130 - 120.667 (6)	TP36.844x31.9209x0.444 7	26.455	0.508	16.800	0.061	0.363	0.004	16.800	0.000
L7	120.667 - 115 (7)	TP38.6875x36.844x0.477 6	27.496	0.468	16.460	0.058	0.404	0.004	16.460	0.000
L8	115 - 114 (8)	TP39.0125x38.6875x0.54 02	27.685	0.414	16.800	0.050	0.412	0.004	16.800	0.000
L9	114 - 95 (9)	TP45.1875x39.0125x0.44 63	29.999	0.488	16.800	0.059	0.487	0.004	16.800	0.000
L10	95 - 91 (10)	TP45.8125x42.3448x0.52 94	32.030	0.415	16.800	0.050	0.562	0.004	16.800	0.000
L11	91 - 90 (11)	TP46.1391x45.8125x0.46 5	32.232	0.471	16.800	0.057	0.572	0.004	16.800	0.000
L12	90 - 61.5 (12)	TP55.4461x46.1391x0.52 99	37.768	0.403	16.800	0.049	0.770	0.003	16.800	0.000
L13	61.5 - 58 (13)	TP56.5891x55.4461x0.52 63	38.447	0.405	16.664	0.049	0.795	0.003	16.664	0.000
L14	58 - 40 (14)	TP61.6875x56.5891x0.57 88	42.029	0.369	15.932	0.047	0.960	0.003	15.932	0.000
L15	40 - 33 (15)	TP63.9583x61.6875x0.57 04	43.330	0.372	16.800	0.045	1.014	0.003	16.800	0.000
L16	33 - 28 (16)	TP65.5804x63.9583x0.59 5	44.248	0.355	16.260	0.044	1.050	0.003	16.260	0.000
L17	28 - 0 (17)	TP73.8125x65.5804x0.57 58	49.640	0.366	15.300	0.049	1.267	0.003	15.300	0.000

Pole Interaction Design Data

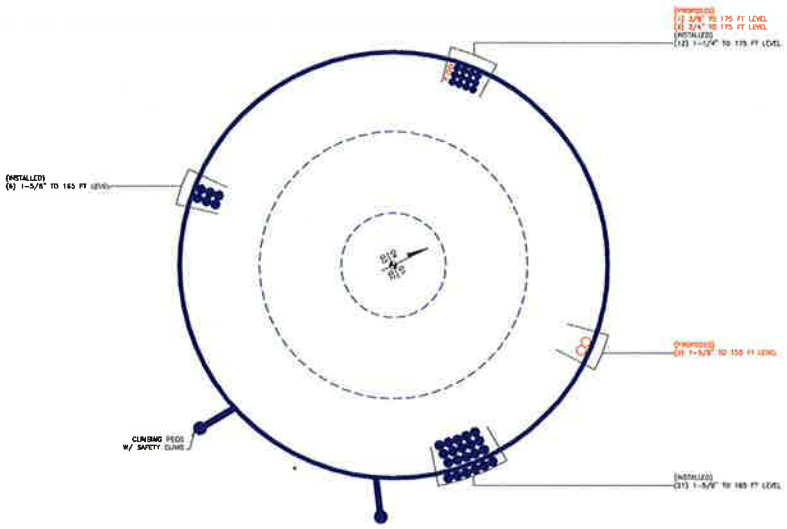
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	185 - 180 (1)	0.008	0.299	0.000	0.068	0.000	0.308 ✔	1.333	H1-3+VT ✔
L2	180 - 153 (2)	0.015	1.275	0.000	0.120	0.001	1.294 ✔	1.333	H1-3+VT ✔
L3	153 - 151.833 (3)	0.011	0.924	0.000	0.083	0.000	0.936 ✔	1.333	H1-3+VT ✔
L4	151.833 - 151 (4)	0.007	0.666	0.000	0.057	0.000	0.674 ✔	1.333	H1-3+VT ✔
L5	151 - 130 (5)	0.011	1.190	0.000	0.073	0.000	1.203 ✔	1.333	H1-3+VT ✔
L6	130 - 120.667 (6)	0.011	1.174	0.000	0.061	0.000	1.186 ✔	1.333	H1-3+VT ✔
L7	120.667 - 115 (7)	0.011	1.149	0.000	0.058	0.000	1.161 ✔	1.333	H1-3+VT ✔
L8	115 - 114 (8)	0.010	1.004	0.000	0.050	0.000	1.014 ✔	1.333	H1-3+VT ✔
L9	114 - 95 (9)	0.013	1.257	0.000	0.059	0.000	1.270 ✔	1.333	H1-3+VT ✔
L10	95 - 91 (10)	0.012	1.121	0.000	0.050	0.000	1.134 ✔	1.333	H1-3+VT ✔
L11	91 - 90 (11)	0.014	1.273	0.000	0.057	0.000	1.287 ✔	1.333	H1-3+VT ✔
L12	90 - 61.5 (12)	0.014	1.150	0.000	0.049	0.000	1.164 ✔	1.333	H1-3+VT ✔
L13	61.5 - 58 (13)	0.015	1.168	0.000	0.049	0.000	1.184 ✔	1.333	H1-3+VT ✔
L14	58 - 40 (14)	0.016	1.149	0.000	0.047	0.000	1.166 ✔	1.333	H1-3+VT ✔
L15	40 - 33 (15)	0.015	1.107	0.000	0.045	0.000	1.122 ✔	1.333	H1-3+VT ✔
L16	33 - 28 (16)	0.016	1.097	0.000	0.044	0.000	1.114 ✔	1.333	H1-3+VT ✔
L17	28 - 0 (17)	0.020	1.230	0.000	0.049	0.000	1.250 ✔	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	185 - 180	Pole	TP18x18x0.1875	1	-2.141	361.254	23.1	Pass
L2	180 - 153	Pole	TP26.8088x18x0.25	2	-8.232	718.182	97.1	Pass
L3	153 - 151.833	Pole	TP27.1894x26.8088x0.3625	3	-8.404	1051.792	70.2	Pass
L4	151.833 - 151	Pole	TP27.4613x27.1894x0.5246	4	-8.564	1527.325	50.6	Pass
L5	151 - 130	Pole	TP34.3125x27.4613x0.3802	5	-11.187	1328.220	90.2	Pass
L6	130 - 120.667	Pole	TP36.844x31.9209x0.4447	6	-14.795	1750.722	89.0	Pass
L7	120.667 - 115	Pole	TP38.6875x36.844x0.4776	7	-16.132	1934.076	87.1	Pass
L8	115 - 114	Pole	TP39.0125x38.6875x0.5402	8	-16.400	2248.011	76.1	Pass
L9	114 - 95	Pole	TP45.1875x39.0125x0.4463	9	-19.551	2065.883	95.3	Pass
L10	95 - 91	Pole	TP45.8125x42.3448x0.5294	10	-23.739	2592.778	85.1	Pass
L11	91 - 90	Pole	TP46.1391x45.8125x0.465	11	-24.015	2297.212	96.6	Pass
L12	90 - 61.5	Pole	TP55.4461x46.1391x0.5299	12	-33.586	3147.320	87.3	Pass
L13	61.5 - 58	Pole	TP56.5891x55.4461x0.5263	13	-34.868	3165.902	88.8	Pass
L14	58 - 40	Pole	TP61.6875x56.5891x0.5788	14	-42.368	3628.093	87.4	Pass
L15	40 - 33	Pole	TP63.9583x61.6875x0.5704	15	-45.418	3910.529	84.2	Pass
L16	33 - 28	Pole	TP65.5804x63.9583x0.595	16	-47.742	4047.974	83.5	Pass
L17	28 - 0	Pole	TP73.8125x65.5804x0.5758	17	-61.294	4154.028	93.8	Pass
							Summary	
						Pole (L2)	97.1	Pass
						RATING =	**97.1**	**Pass**

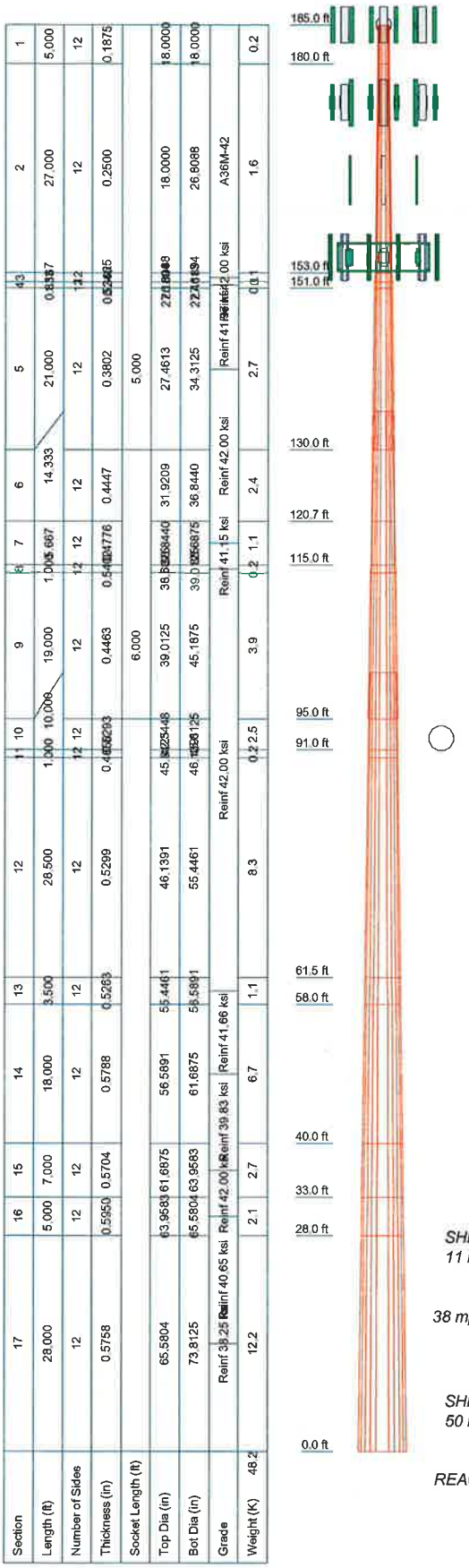
APPENDIX B

BASE LEVEL DRAWING

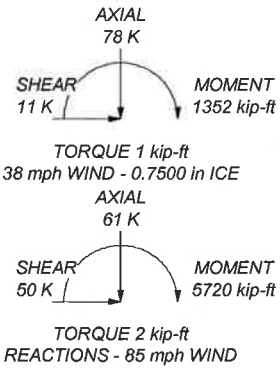

(INSTALLED)
(6) 1-5/8" TO 165 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB

APPENDIX C

ADDITIONAL CALCULATIONS



Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Length (ft)	5.000	27.000			21.000	14.333			19.000		10.000	28.500	3.500	18.000	7.000	5.000	28.000
Number of Sides	12	12			12	12			12		12	12	12	12	12	12	12
Thickness (in)	0.1875	0.2500			0.3802	0.4447			0.4463		0.4553	0.5299	0.5263	0.5788	0.5704	0.5950	0.5758
Socket Length (ft)					5.000				6.000								
Top Dia (in)	18.0000	18.0000			27.4613	31.9209			39.0125		45.3448	46.1391	55.4461	56.5891	61.6875	63.9583	65.5804
Bot Dia (in)	18.0000	26.8088			34.3125	36.8440			45.1875		46.1391	55.4461	56.5891	61.6875	63.9583	65.5804	73.8125
Grade	A36M-42				Reinf 41.66 ksi	Reinf 42.00 ksi					Reinf 42.00 ksi		Reinf 41.66 ksi	Reinf 39.83 ksi	Reinf 42.00 ksi	Reinf 40.65 ksi	Reinf 38.25 ksi
Weight (K)	0.2	1.6			2.7	2.4			3.9		2.5	8.3	1.1	6.7	2.7	2.1	12.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) AIR 21 w/ Mount Pipe	185	(2) DTMABP7819VG12A	175
(3) AIR 21 w/ Mount Pipe	185	DC6-48-60-18-8F	175
(3) AIR 21 w/ Mount Pipe	185	Sector Mount [SM 802-3]	175
AIR 33 w/ Mount Pipe	185	(2) 7770.00 w/ Mount Pipe	175
AIR 33 w/ Mount Pipe	185	742 213 w/ Mount Pipe	165
AIR 33 w/ Mount Pipe	185	742 213 w/ Mount Pipe	165
ETW190VS12UB	185	Pipe Mount [PM 601-3]	165
ETW190VS12UB	185	742 213 w/ Mount Pipe	165
ETW190VS12UB	185	(2) BXA-70063-6CF-EDIN-2 w/ Mount Pipe	155
DC6-48-60-18-8F	185		
Sector Mount [SM 802-3]	185	(2) BXA-70063-6CF-EDIN-2 w/ Mount Pipe	155
HP2-102	185		
(2) 7770.00 w/ Mount Pipe	175	(2) BXA-171063-12CF-EDIN-2 w/ Mount Pipe	155
(2) 7770.00 w/ Mount Pipe	175		
AM-X-CD-16-65-00T-RET w/ Mount Pipe	175	(2) BXA-171063-12CF-EDIN-2 w/ Mount Pipe	155
AM-X-CD-16-65-00T-RET w/ Mount Pipe	175	(2) BXA-171063-12CF-EDIN-2 w/ Mount Pipe	155
AM-X-CD-16-65-00T-RET w/ Mount Pipe	175	RRH2X40-AWS	155
(2) RRUS-11	175	RRH2X40-AWS	155
(2) RRUS-11	175	RRH2X40-AWS	155
(2) RRUS-11	175	RRH2X40-07-U	155
(2) LGP13519	175	RRH2X40-07-U	155
(2) LGP13519	175	RRH2X40-07-U	155
(2) LGP13519	175	DB-T1-6Z-8AB-0Z	155
(2) DTMABP7819VG12A	175	Platform Mount [LP 301-1]	155
(2) DTMABP7819VG12A	175	(2) BXA-70063-6CF-EDIN-2 w/ Mount Pipe	155

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36M-42	42 ksi	60 ksi	Reinf 41.66 ksi	42 ksi	53 ksi
Reinf 42.00 ksi	42 ksi	53 ksi	Reinf 39.83 ksi	40 ksi	50 ksi
Reinf 41.97 ksi	42 ksi	53 ksi	Reinf 40.65 ksi	41 ksi	51 ksi
Reinf 41.15 ksi	41 ksi	52 ksi	Reinf 38.25 ksi	38 ksi	48 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 97.1%

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *185' Monopole / Middletown_1*			
Project: *PJF 37513-1570 / BU 825983*			
Client: CCI	Drawn by: John J Woolley	App'd:	
Code: TIA/EIA-222-F	Date: 09/19/13	Scale: NTS	
Path:		Dwg No. E-1	

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
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v4.2 - Effective 4-3-13

- Date: 9/19/2013
PJF Project: 37513-1570 BP A
Client Ref. # 825983
Site Name: Middletown_1
Description: Micropile
Owner: CCI
Engineer: JJW

Micropile Analysis

Moment =	5720	k-ft	TIA Ref.	F	Location =	Micropile		
Axial =	61.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	50.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Item Qty =	30				Soil =	Soft Clay / Silty Clay (Lean)	for Micropile	

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

Item	Nominal Anchor Dia, in	Description	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compressio n, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio	Required Bond Length, ft
1	2.000	A36	36	58	0.0	68.00	0.00	3.14	57.80	53.94	53.94	0.00	80.17	67.3%	
2	2.000	A36	36	58	15.0	68.00	0.00	3.14	59.19	55.34	55.34	0.00	80.17	69.0%	
3	2.000	A36	36	58	30.0	68.00	0.00	3.14	60.55	56.69	56.69	0.00	80.17	70.7%	
4	2.000	A36	36	58	45.0	68.00	0.00	3.14	61.48	57.63	57.63	0.00	80.17	71.9%	
5	2.000	A36	36	58	60.0	68.00	0.00	3.14	61.73	57.88	57.88	0.00	80.17	72.2%	
6	2.000	A36	36	58	75.0	68.00	0.00	3.14	61.18	57.33	57.33	0.00	80.17	71.5%	
7	2.000	A36	36	58	90.0	68.00	0.00	3.14	59.91	56.06	56.06	0.00	80.17	69.9%	
8	2.000	A36	36	58	105.0	68.00	0.00	3.14	58.17	54.32	54.32	0.00	80.17	67.7%	
9	2.000	A36	36	58	120.0	68.00	0.00	3.14	56.33	52.48	52.48	0.00	80.17	65.5%	
10	2.000	A36	36	58	135.0	68.00	0.00	3.14	54.85	51.00	51.00	0.00	80.17	63.6%	
11	2.000	A36	36	58	150.0	68.00	0.00	3.14	54.12	50.27	50.27	0.00	80.17	62.7%	
12	2.000	A36	36	58	165.0	68.00	0.00	3.14	54.35	50.49	50.49	0.00	80.17	63.0%	
13	2.000	A36	36	58	180.0	68.00	0.00	3.14	55.43	51.58	51.58	0.00	80.17	64.3%	
14	2.000	A36	36	58	195.0	68.00	0.00	3.14	57.05	53.19	53.19	0.00	80.17	66.3%	
15	2.000	A36	36	58	210.0	68.00	0.00	3.14	58.75	54.90	54.90	0.00	80.17	68.5%	
16	2.000	A36	36	58	225.0	68.00	0.00	3.14	60.13	56.28	56.28	0.00	80.17	70.2%	
17	2.000	A36	36	58	240.0	68.00	0.00	3.14	60.89	57.04	57.04	0.00	80.17	71.1%	
18	2.000	A36	36	58	255.0	68.00	0.00	3.14	60.90	57.05	57.05	0.00	80.17	71.2%	
19	2.000	A36	36	58	270.0	68.00	0.00	3.14	60.21	56.36	56.36	0.00	80.17	70.3%	
20	2.000	A36	36	58	285.0	68.00	0.00	3.14	59.05	55.20	55.20	0.00	80.17	68.8%	
21	2.000	A36	36	58	300.0	68.00	0.00	3.14	57.77	53.92	53.92	0.00	80.17	67.3%	
22	2.000	A36	36	58	315.0	68.00	0.00	3.14	56.77	52.92	52.92	0.00	80.17	66.0%	
23	2.000	A36	36	58	330.0	68.00	0.00	3.14	56.38	52.53	52.53	0.00	80.17	65.5%	
24	2.000	A36	36	58	345.0	68.00	0.00	3.14	56.76	52.91	52.91	0.00	80.17	66.0%	
25	0.000	Other			45.0	169.81	4.02	4.02	191.46	186.53	191.46	219.90	219.90	87.1%	55.00
26	0.000	Other			165.0	169.81	4.02	4.02	172.28	167.35	172.28	219.90	219.90	78.3%	55.00
27	0.000	Other			285.0	169.81	4.02	4.02	184.12	179.19	184.12	219.90	219.90	83.7%	55.00
28	0.000	Other			105.0	169.81	4.02	4.02	182.99	178.06	182.99	219.90	219.90	83.2%	55.00
29	0.000	Other			210.0	169.81	4.02	4.02	185.75	180.83	185.75	219.90	219.90	84.5%	55.00
30	0.000	Other			335.0	169.81	4.02	4.02	174.37	169.45	174.37	219.90	219.90	79.3%	55.00
								99.52							

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#:	
Site Name:	
App #:	

Manufacturer:	Other

Reactions		
Moment:	2033.35	ft-kips
Axial:	46.2	kips
Shear:	37.9	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for micropiles

Elevation: 0 feet

Bolt Data				
Qty:	24			
Diam:	2		Bolt Fu:	58
Bolt Material:	Other		Bolt Fy:	36
Strength (Fu):	58	ksi	Bolt Fty:	19.14
Yield (Fy):	36	ksi		
Circle:	68	in		

Plate Data		
Plate Outer Diam:	72.9375	in
Plate Inner Diam:	62	in (Hole @ Ctr)
Thick:	2	in
Grade:	36	ksi
Effective Width:	9.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.75	in
Fillet V. Weld:	0.375	in
Width:	5	in
Height:	18	in
Thick:	1	in
Notch:	1	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	73.8125	in
Thick:	0.4375	in
Pole Inner Diam:	72.9375	in
Grade:	42	ksi
# of Sides:	12	"0" IF Round
Fu	60	ksi

Stress Increase Factor	
ASIF:	1.333

Interior Flange Bolt Results

Maximum Bolt Tension:	57.9 Kips, Ext. T=Interior T
Allowable Tension:	80.2 Kips
Bolt Stress Ratio:	72.2% Pass

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	61.7 Kips, Ext. C= Interior C
Plate Stress:	18.7 ksi
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	52.0% Pass

Stiffener Results

Horizontal Weld :	23.5% Pass
Vertical Weld:	11.9% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	2.2% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	17.3% Pass
Plate Comp. (AISC Bracket):	15.5% Pass

Pole Results

Pole Punching Shear Check:	3.8% Pass

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

PJF job no. **37513-1570 BP A** Project name **0**

Foundation Loads:

Pole weight or tower leg compression =	**46.2**	(kips)
Horizontal load at top of pier =	**37.9**	(kips)
Overturning moment at top of pier=	**2033.3**	(ft-kips)

Design criteria:

Safety factor against overturning =	**1.5**	

Soil Properties:

Soil density =	**120**	(pcf)
Allowable soil bearing =	**3**	(ksf)
Depth to water table =	**16**	(ft)

Dimensions:

Pier shape (round or square)	**R**	("R" or "S")
Pier width =	**7.5**	(ft)
Pier height above grade =	**0.25**	(ft)
depth to bottom of footing =	**10.5**	(ft)
Footing thickness =	**3**	(ft)
Footing width =	**25**	(ft)
Footing length =	**25**	(ft)

Concrete:

Concrete strength =	**4**	(ksi)
Rebar strength =	**60**	(ksi)
ultimate load factor =	**1.3**	

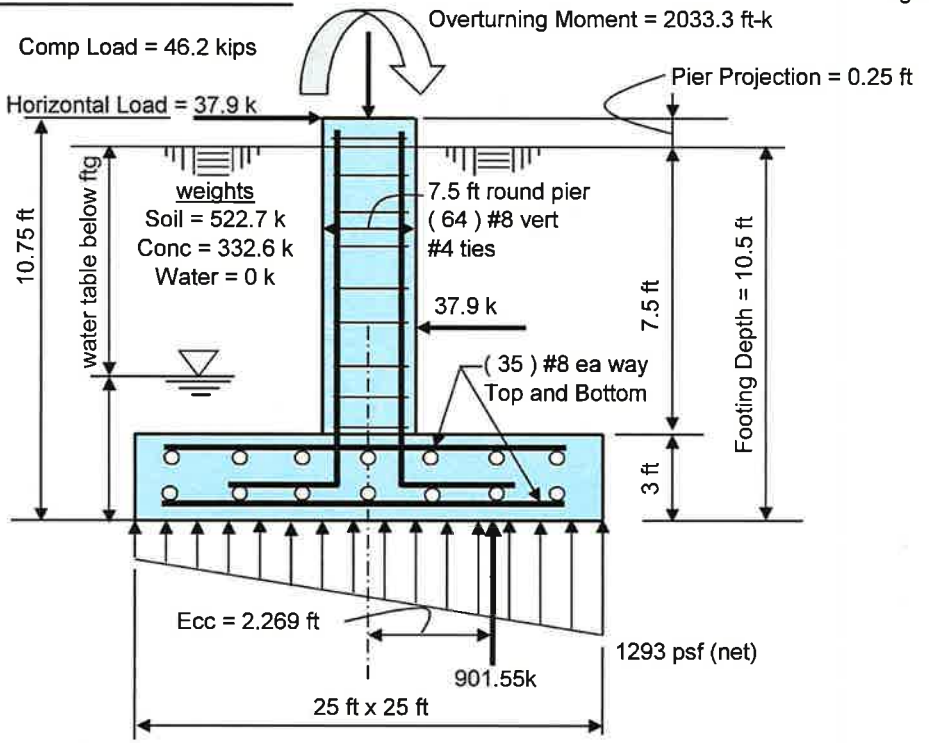
Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#8**	bar
quantity of pad rebar =	**35**	(ea direction)

Reinforcing Steel:

	Pier	
size of vert rebar in pier=	**#8**	bar
vertical rebar quantity =	**64**	
size of pier ties =	**#4**	bar
minimum cover over rebar =	**3**	inches

Total volume of concrete = 82.1 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 1.293 ksf Allowable Net Soil Bearing = 3 ksf **Soil Bearing Stress Ratio = 0.43 Okay**	Ult Bending Shear Capacity = 126 psi Ult Bending Shear Stress = 19 psi **Bending Shear Stress Ratio = 0.15 Okay**
Ftg Overturning Resistance = 11269 ft-kips Overturning Moment = 2046 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 5.508 **Ratio = 0.27 Okay**	Pad Bending Moment Capacity= 3818 ft-k Pad Bending Moment = 864 ft-k **Bending Moment Stress Ratio = 0.23 OK**

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 188916 REV. 6; WO: 649747

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX 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
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: JOHN WOOLLEY AT JWOOLLEY@PJFWEB.COM
PHONE: 614-221-6679

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 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 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#37513-1570 BP A), DATED 9-17-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING

SHEET INDEX

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

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:	37513-1570A
DRAWN BY:	B.M.S.
CHECKED BY:	J.J.W.
APPROVED BY:	
DATE:	9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

T-1

CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
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 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 INSURE 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 CONTINUOUS 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. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS - (NOT REQUIRED)
   G. 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.

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A	ISSUE DATE OF PERMIT: 9-17-2013
DRAWN BY: B.M.S.	
CHECKED BY: J.J.W.	
APPROVED BY:	S-1
DATE: 9-17-2013	

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 E 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 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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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 SILICONE 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.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

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.

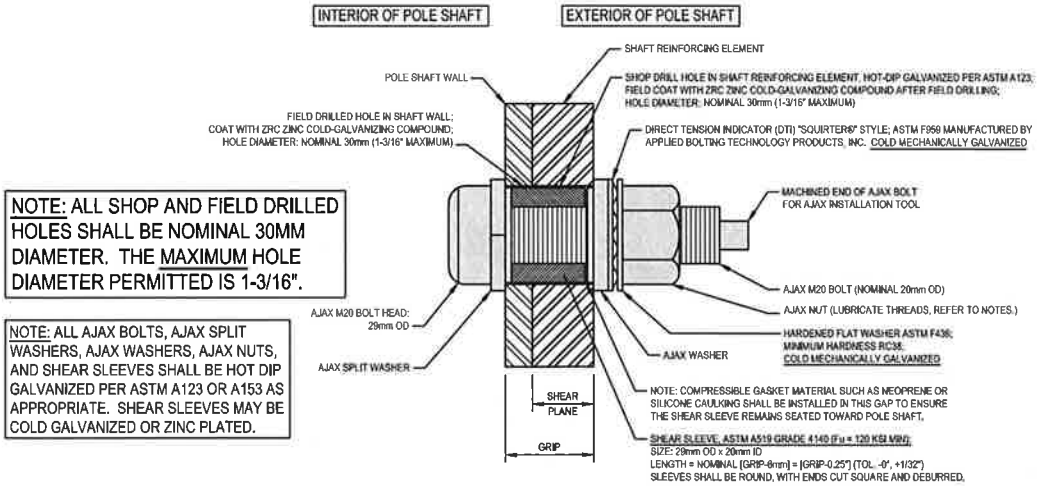
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY 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

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PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A	ISSUE DATE OF PERMIT: 9-17-2013
DRAWN BY: B.M.S.	
CHECKED BY: J.J.W.	
APPROVED BY:	S-3
DATE: 9-17-2013	

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.325000 IN/FT
SHAFT STEEL:	ASTM A36M-42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	2"ø ASTM A36

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	5.000	0.1875		18.000	18.000
2	50.00	0.2500	60.00	18.000	34.313
3	20.00	0.2500		32.181	38.688
4	20.00	0.3125	72.00	38.688	45.188
5	10.00	0.3125		42.613	45.813
6	40.00	0.3750	84.00	45.813	58.875
7	18.00	0.3750		55.839	61.688
8	21.00	0.4375	108.00	61.688	68.500
9	28.00	0.4375		64.705	73.813

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW AEROSOLUTIONS MP3 REINFORCING

ELEVATION	FLAT #	REINFORCING ELEMENT
2'-0" TO 37'-0"	3, 6, 9 & 11	MP306
29'-9" TO 64'-9"	4, 8 & 12	MP306
58'-3" TO 93'-3"	3, 7 & 11	MP306
66'-3" TO 98'-3"	4, 8 & 12	MP304
112'-6" TO 132'-6"	3, 7 & 11	MP303
149'-6" TO 154'-6"	3, 7 & 11	MP303

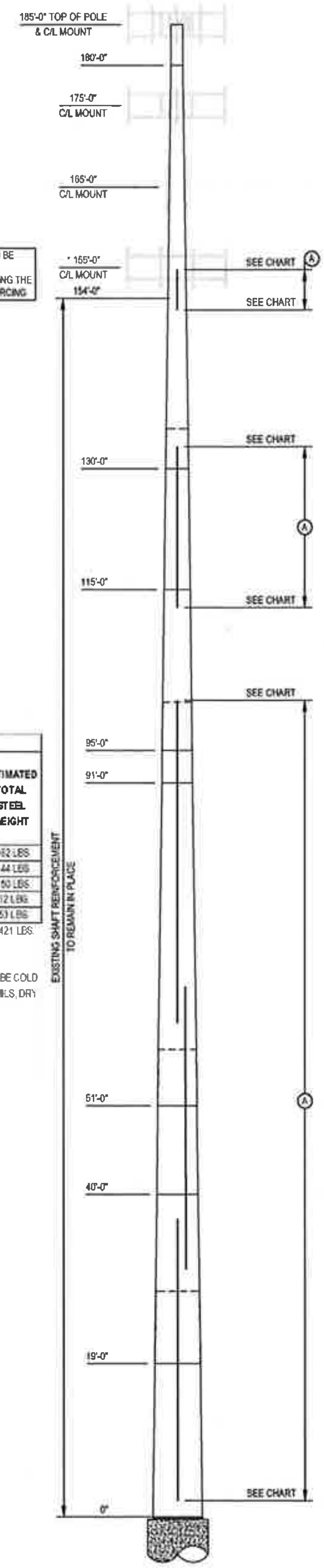
ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A510 GR 4140, MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

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
2'-0"	37'-0"	3,6,9 & 11	1-1/4" x 6-1/2"	35'-0"	4	51	204	16	17	17"	5062 LBS
30'-9"	65'-9"	4,8 & 12	1" x 6"	35'-0"	3	40	120	9	9	16"	2144 LBS
61'-3"	101'-3"	3,7 & 11	1" x 5"	40'-0"	3	44	132	9	9	16"	2450 LBS
112'-9"	132'-9"	3,7 & 11	3/4" x 4"	20'-0"	3	22	66	5	6	16"	612 LBS
149'-9"	154'-9"	3,7 & 11	3/4" x 4"	5'-0"	3	11	33	5	5	16"	153 LBS
							555				10421 LBS

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 25mm 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 ARE ASSUMED 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.



POLE ELEVATION 1/S-4

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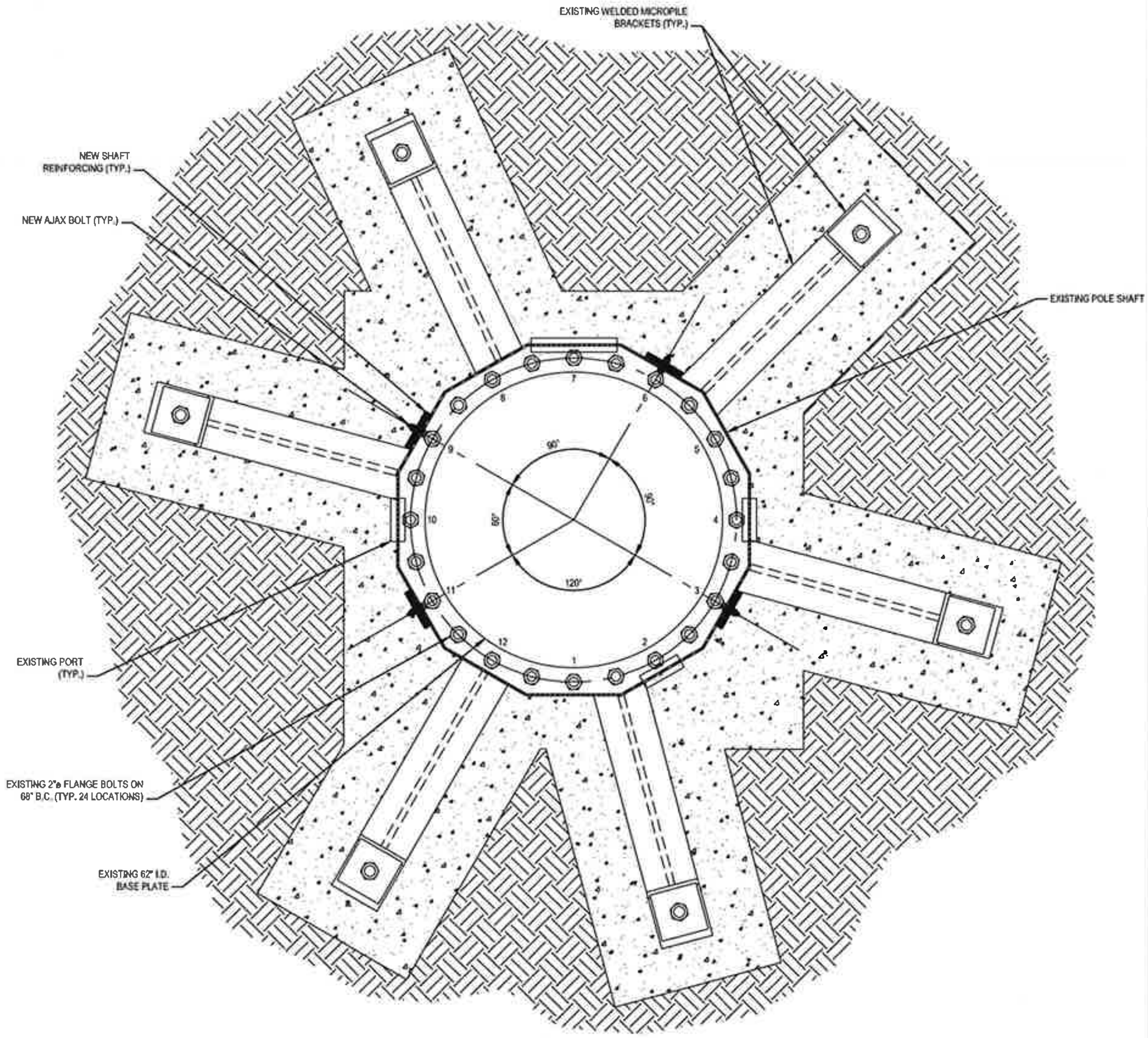

A BASE SECTION 1/S-5

AEROSOLUTIONS REINFORCING NOT SHOWN. LAYOUT DESIGN TO BE FINALIZED FOR AEROSOLUTIONS UPON WINNING BID FOR JOB.

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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 MFS
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 APPROVED SHOP DRAWINGS
NA	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	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 MICROPILE VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
NA	POST INSTALLED MICROPILE 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

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:	37513-1570A
DRAWN BY:	B.M.S.
CHECKED BY:	J.J.W.
APPROVED BY:	
DATE:	9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

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37513-1570 A PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 188916 REV. 6; WO: 649747

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX 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
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: JOHN WOOLLEY AT JWOOLLEY@PJFWEB.COM
PHONE: 614-221-6679

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 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 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#37513-1570 BP A), DATED 9-17-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING

SHEET INDEX

STATE OF CONNECTICUT — JOSEPH PACHICARA JACOBS — No. PEN.22131 — PROFESSIONAL ENGINEER

SEP 19 2013

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CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
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 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 INSURE 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 CONTINUOUS 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. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS - (NOT REQUIRED)

G. 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.

STATE OF CONNECTICUT
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

SEP 1 9 2013

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A	ISSUE DATE OF PERMIT: 9-17-2013
DRAWN BY: B.M.S.	
CHECKED BY: J.J.W.	
APPROVED BY: BKK	S-1
DATE: 9-17-2013	

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 E 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 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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S-2

AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

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 SILICONE 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.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

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.

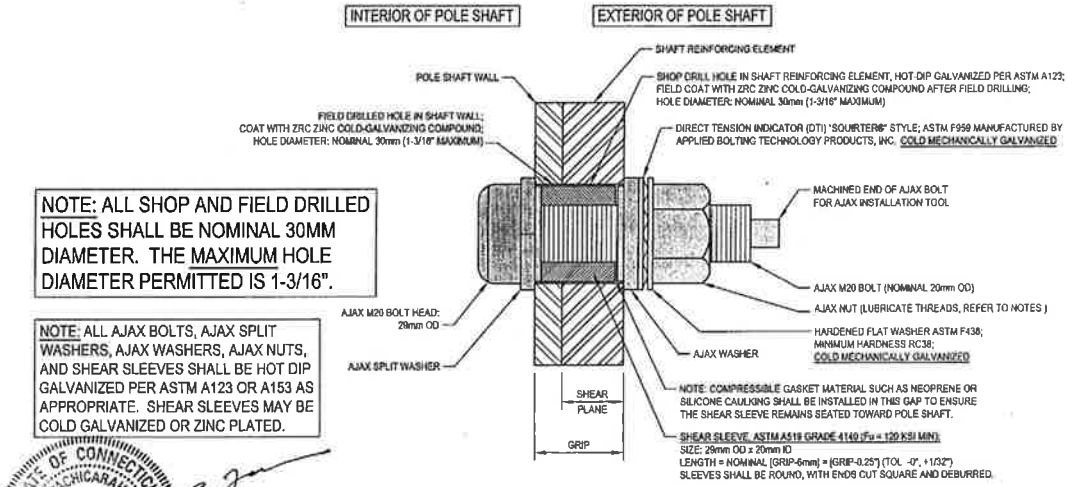
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY 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

STATE OF CONNECTICUT — JOSEPH PAUL PACHICARAH — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

SEP 19 2013

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A	ISSUE DATE OF PERMIT: 9-17-2013
DRAWN BY: B.M.S.	
CHECKED BY: J.J.W.	
APPROVED BY: BKK	S-3
DATE: 9-17-2013	

37513-1570 A PERMIT.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.320000 IN/FT
SHAFT STEEL:	ASTM A36M-42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	2"ø ASTM A36

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	5.000	0.1875	60.00	18.000	18.000
2	50.00	0.2500		18.000	34.313
3	20.00	0.2500		32.181	38.688
4	20.00	0.3125	72.00	36.688	45.188
5	10.00	0.3125		42.613	45.813
6	40.00	0.3750	84.00	45.813	56.876
7	18.00	0.3750		55.839	61.688
8	21.00	0.4375	108.00	61.688	68.500
9	28.00	0.4375		64.705	73.813

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW AEROSOLUTIONS MP3 REINFORCING

ELEVATION	FLAT #	REINFORCING ELEMENT
2'-0" TO 37'-0"	3, 8, 9 & 11	MP308
29'-9" TO 64'-9"	4, 8 & 12	MP306
56'-3" TO 93'-3"	3, 7 & 11	MP308
86'-3" TO 98'-3"	4, 8 & 12	MP304
112'-6" TO 132'-6"	3, 7 & 11	MP303
149'-6" TO 154'-5"	3, 7 & 11	MP303

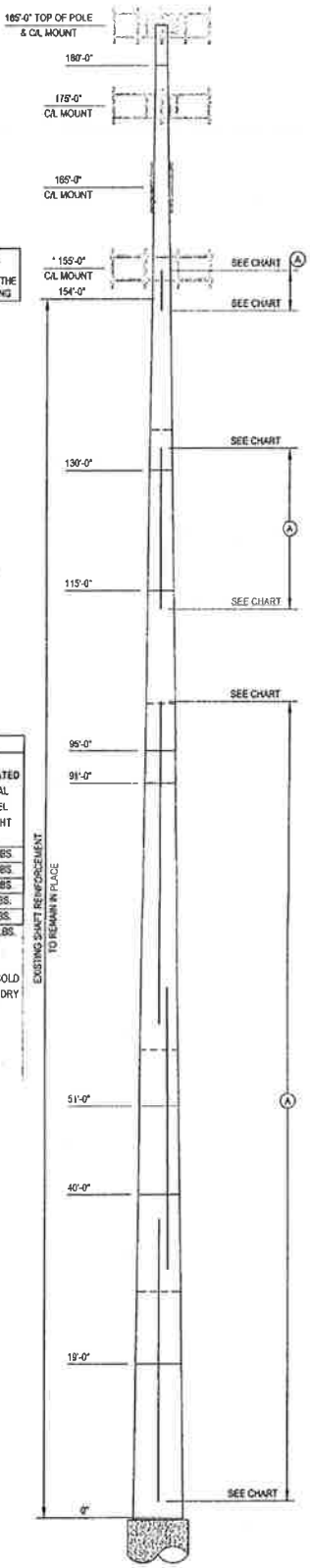
ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 GR 4140, MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

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
2'-0"	37'-0"	3,8,9 & 11	1-1/4" x 6-1/2"	35'-0"	4	51	204	16	17	17"	5052 LBS.
30'-9"	68'-9"	4,8 & 12	1" x 6"	35'-0"	3	40	120	9	9	16"	2144 LBS.
61'-3"	101'-3"	3,7 & 11	1" x 6"	40'-0"	3	44	132	9	9	16"	2450 LBS.
112'-9"	132'-9"	3,7 & 11	3/4" x 4"	20'-0"	3	23	69	5	5	16"	617 LBS.
149'-9"	154'-9"	3,7 & 11	3/4" x 4"	5'-0"	3	11	33	5	5	16"	153 LBS.
							558				10421 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 ARE ASSUMED 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.



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

POLE ELEVATION 1 / S-4

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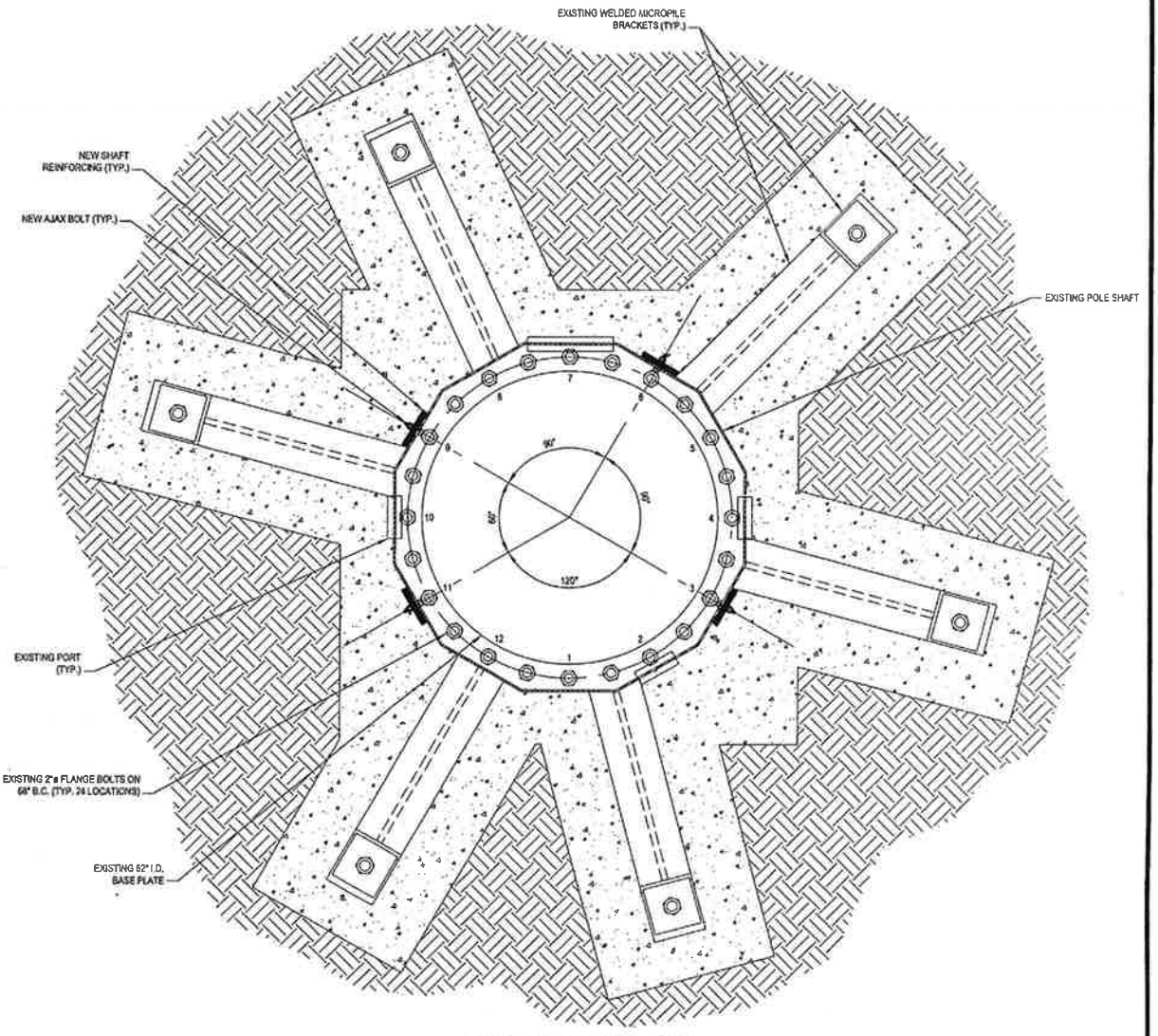
37513-1570 A PERMIT.DWG



A BASE SECTION 1 / S-5

AEROSOLUTIONS REINFORCING NOT SHOWN. LAYOUT DESIGN TO BE FINALIZED FOR AEROSOLUTIONS UPON WINNING BID FOR JOB.

STATE OF CONNECTICUT
JAMES JOSEPH PACIFICARAH
No. PEN 22731
REGISTERED PROFESSIONAL ENGINEER

SEP 19 2013

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37513-1570 A PERMIT.DWG

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 APPROVED SHOP DRAWINGS
NA	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	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 MICROPILE VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
NA	POST INSTALLED MICROPILE 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

STATE OF CONNECTICUT
CHRISTOPHER JOSEPH
No. PEN 22731
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ISSUE DATE OF PERMIT: 9-17-2013

S-6

ATTACHMENT 4

HMB

HMB Acoustics LLC 3 Cherry Tree Lane, Avon, Ct. 06001 860-677-5955

January 17, 2014

Doug Drost
Project Engineer, Wireless
Centek Engineering, Inc.
63-2 North Branford Road
Branford, Ct. 06405

Subject: Middletown NW - CSC Noise Compliance Study

Dear Mr. Drost:

The noise levels for the V1 and V2 wall mounted HVAC units were calculated while they were operating separately. Typically only one of the two air-conditioner units operates at any one time. The noise level was then projected to each property line. The resultant noise level was compared to the State of Ct. Noise Regulation. The Regulation allows a noise level of 55 dBA (daytime) and 45 dBA (nighttime) when measured at a Residential Receptor's property line. I found that the V1 and V2 units meet the conditions for compliance as set forth in the Regulation at all property lines.

Allan Smardin
HMB Acoustics LLC

PROJECT INFORMATION:	Centek Job #: 13132.000
Applicant:	Cellco Partnership d.b.a. Verizon Wireless
Applicant Site ID:	Middletown NW
Site Owner:	T-Mobile
Site Address:	90 Industrial Park Road, Middletowm, CT
Subject Zoning District:	IT - Interstate Trade Zone
Abutting Zoning District(s):	IT - Interstate Trade Zone(All Abutters)

APPLICANT EQUIPMENT:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West
V-1	Wall Mounted HVAC	Bard / W61A1-105EPXXXJ	65	310	244	34
V-2	Wall Mounted HVAC	Bard / W61A1-105EPXXXJ	59	317	245	36

EXISTING COLOCATORS:

☒	AT&T	☒	Metro PCS	☐	Other:
☐	Sprint	☒	T Mobile	☐	Other:
☐	Nextel	☐	None	☐	Other:

EXISTING COLOCATOR EQUIPMENT OWNER: AT&T

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West
A-1	Wall Mounted HVAC	Marvair, ComPac	82	295	264	14
A-2	Wall Mountd HVAC	Marvair, ComPac	79	295	234	43

EXISTING COLOCATOR EQUIPMENT OWNER:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West

EXISTING COLOCATOR EQUIPMENT OWNER:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West

EXISTING COLOCATOR EQUIPMENT OWNER:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West

EXISTING COLOCATOR EQUIPMENT OWNER:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West

CONCLUSION:

Daytime Regulation:	55dBA	**Nighttime Regulation:**	45 dBA
Compliance:	☒ Yes ☐ No	**Compliance:**	☒ Yes ☐ No

BASIS OF FINDINGS:

North property line: V-1 = 40 dBA; V-2 = 45 dBA; A-1 = 48dBA; A-2 = 39 dBA

South property line: V-1 = 33 dBA; V-2 = 32 dBA; A-1 = 37dBA; A-2 = 37 dBA

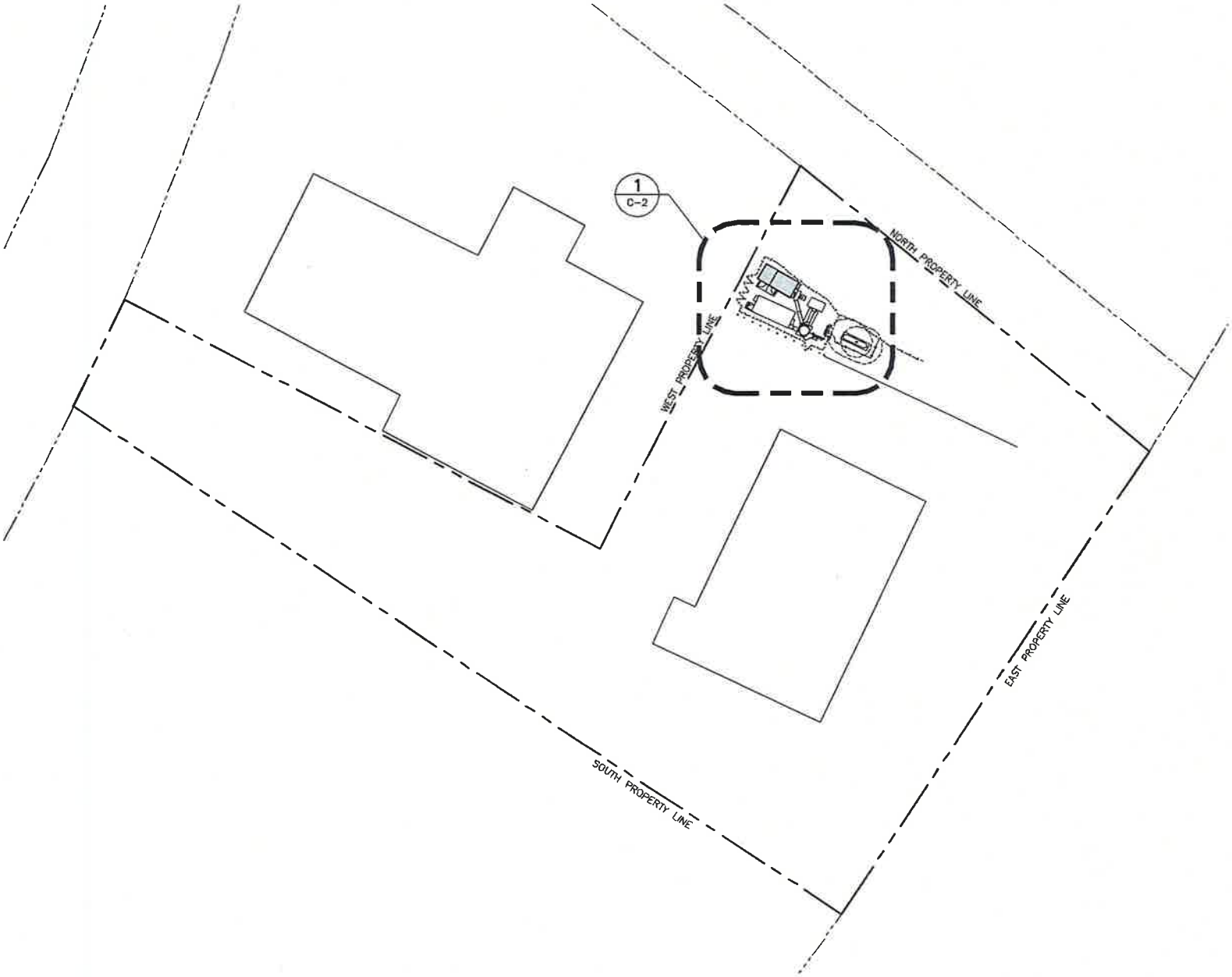
East property line: V-1 = 39 dBA; V-2 = 39 dBA; A-1 = 30dBA; A-2 = 39 dBA

West property line: V-1 = 44 dBA; V-2 = 44 dBA; A-1 = 56dBA; A-2 = 54 dBA

The dBA levels take into account the acoustical shielding effect provided by other structures on the property.

The existing and Metro PCS and T-Moble equipment is inaudible at a distance of 20 feet.

Prepared By: Alan Smardin, HMB ACOUSTICS LLC Date: 01/16/14



1 / C-1 COMPOUND PLAN - PROPOSED
SCALE: 1" = 90'-0"

APPROXIMATE NORTH

GRAPHIC SCALE
0 45 90
(IN FEET)
1 inch = 90 ft.

REV.	DATE	DWD DRAWN BY	CFC CHK'D BY	NOISE DUMETER INFORMATION DESCRIPTION
0	01/16/14			

Cellco Partnership d.b.a. verizon wireless

CENTEK engineering
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(203) 488-0580
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63-2 North Branford Road, Branford, CT 06405

Cellco Partnership d/b/a Verizon Wireless
MIDDLETOWN NW
90 INDUSTRIAL PARK RD
MIDDLETOWN, CT 06457

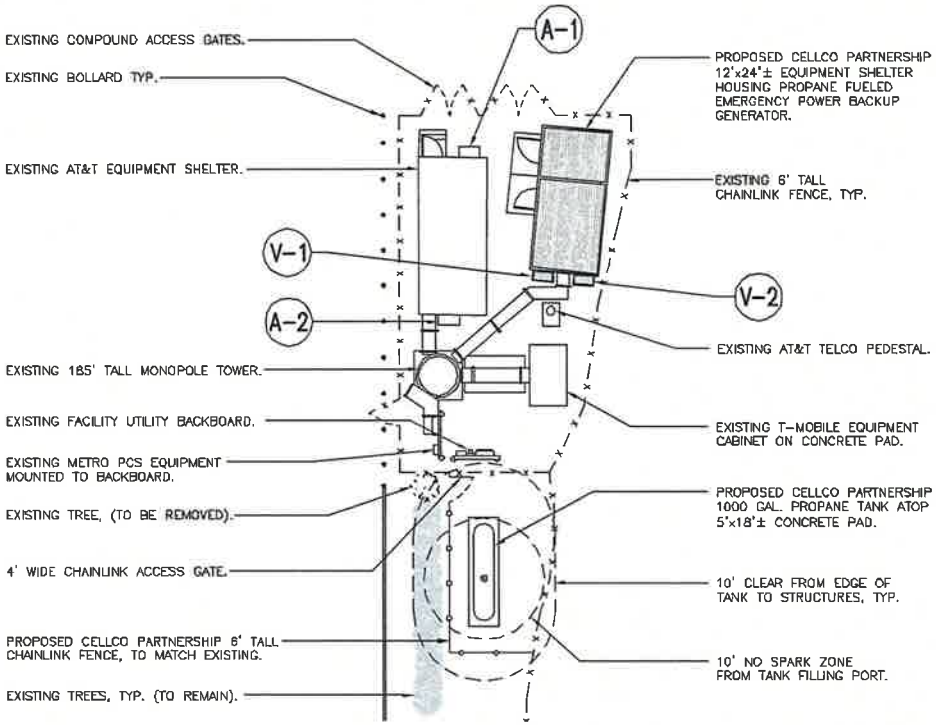
DATE: 01/02/14
SCALE: AS NOTED
JOB NO. 13132.000

SITE PLAN

C-1
DWG. 1 OF 2

NOISE EMMITTER INFORMATION

- (V-1) WALL MOUNTED HVAC UNIT, MAKE: BARD, MODEL: W61A1-A05EPXXXJ
- (V-2) WALL MOUNTED HVAC UNIT, MAKE: BARD, MODEL: W61A1-A05EPXXXJ
- (A-1) WALL MOUNTED HVAC UNIT, MAKE: MARVAIR, COMPAC, MODEL: UNKNOWN
- (A-2) WALL MOUNTED HVAC UNIT, MAKE: MARVAIR, COMPAC, MODEL: UNKNOWN



1 / C-1 COMPOUND PLAN
SCALE: 1" = 30'

APPROXIMATE NORTH

GRAPHIC SCALE
0 15 30
(IN FEET)
1 inch = 30 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/16/14	DMD	CFC	NOISE EMMITER INFORMATION

Cellco Partnership d.b.a. verizon wireless

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Cellco Partnership d/b/a Verizon Wireless
MIDDLETOWN NW
90 INDUSTRIAL PARK RD
MIDDLETOWN, CT 06457

DATE: 01/02/14
SCALE: AS NOTED
JOB NO. 13132.000

COMPOUND PLAN

C-2
DWG. 2 OF 2

ATTACHMENT 5

	General	Power	Density					
Site Name: Middletown NW								
Tower Height: Verizon @ 155'								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*T-Mobile GSM	8	113	185	0.0095	1945	1.0000	0.95%	
*T-Mobile UMTS	2	639	185	0.0134	2100	1.0000	1.34%	
*MetroPCS CDMA	3	727	165	0.0288	2135	1.0000	2.88%	
*MetroPCS LTE	1	1200	165	0.0158	2130	1.0000	1.58%	
*AT&T UMTS	2	565	175	0.0133	880	0.5867	2.26%	
*AT&T UMTS	2	875	175	0.0205	1900	1.0000	2.05%	
*AT&T GSM	1	283	175	0.0033	880	0.5867	0.57%	
*AT&T GSM	4	525	175	0.0247	1900	1.0000	2.47%	
*AT&T LTE	1	1313	175	0.0154	734	0.4893	3.15%	
Verizon	**11**	**500**	**155**	**0.0823**	**1970**	**1.0000**	**8.23%**	
Verizon	**9**	**439**	**155**	**0.0591**	**869**	**0.5790**	**10.21%**	
Verizon	**1**	**1828**	**155**	**0.0274**	**2145**	**1.0000**	**2.74%**	
Verizon	**1**	**898**	**155**	**0.0134**	**698**	**0.4650**	**2.89%**	
* Source: Siting Council								**41.3%**