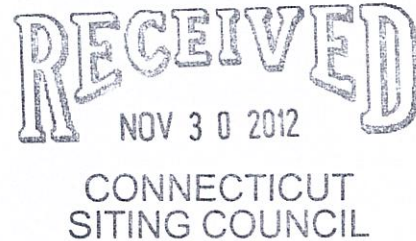




November 29, 2012

ORIGINAL**VIA OVERNIGHT COURIER**

Connecticut Siting Council
 10 Franklin Square
 New Britain, Connecticut 06051
 Attn: Ms. Linda Roberts, Executive Director



Re: New Cingular Wireless PCS, LLC – Exempt Modification
53 Westminster Road, Canterbury

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of New Cingular Wireless PCS, LLC ("AT&T"). AT&T is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.S.C.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Canterbury.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 53 Westminster Road, Canterbury (coordinates 41°-42'-07" N, 71°-58'-50" W). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration, subject to modifications detailed in the attached structural documentation. Also included is a power density report reflecting the modification to AT&T's operations at the site.

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

1. AT&T will relocate two (2) GSM/UMTS antennas on new mounts to the existing platform, add three (3) LTE panel antennas on new mounts to the existing platform, and add one (1) surge arrestor mounted to the platform support arm, all at a centerline height of approximately 161'. Six (6) RRHS (remote radio units) will be mounted at a

centerline height of approximately 159'. AT&T will also place DC power and fiber runs from the equipment to the antennas along the existing coaxial cable run. These changes will not extend the height of the approximately 180' structure.

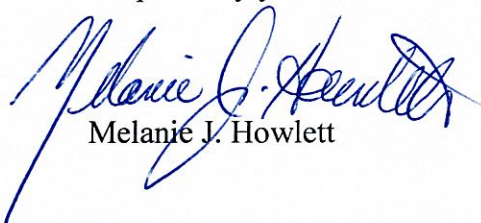
2. AT&T will remove one (1) cabinet and place two (2) stacked cabinets on the existing concrete pad, add one (1) DC Power Plant on a concrete pad extension of 10' -6" X 4' -0" (42 square feet), mount one (1) surge suppressor to the existing Ice Bridge Post, and mount a new GPS antenna to the existing Ice Bridge. These changes will be within the existing compound and will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six (6) decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 1.37%; the combined site operations will result in a total power density of approximately 12.53%.

Please contact me by phone at (203) 610-1071, or by e-mail at mjhowlett@optonline.net with questions concerning this matter. Thank you for your consideration.

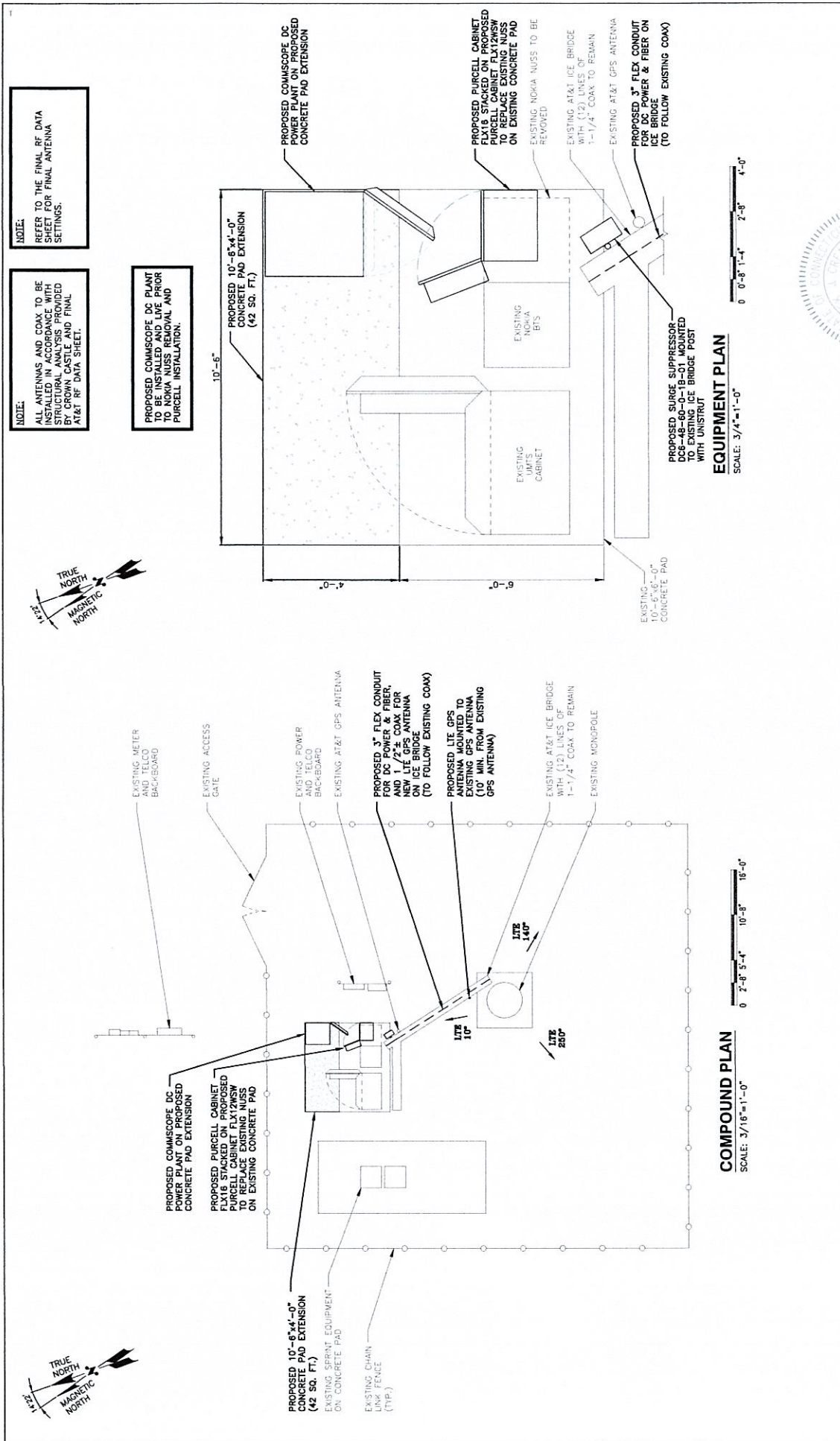
Respectfully yours,



Melanie J. Howlett

Attachments

cc: Honorable Brian H. Sear, First Selectman, Town of Canterbury
John R. Lemire (underlying property owner)



1000 QUACKER STREET
BALDWIN 20 NORTH, SUITE 302
BALDWIN, MA 01460

UnTet Global Services Company
800 MARSHFIELD STREET, UNIT 2A
WINDSOR, CT 06095

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

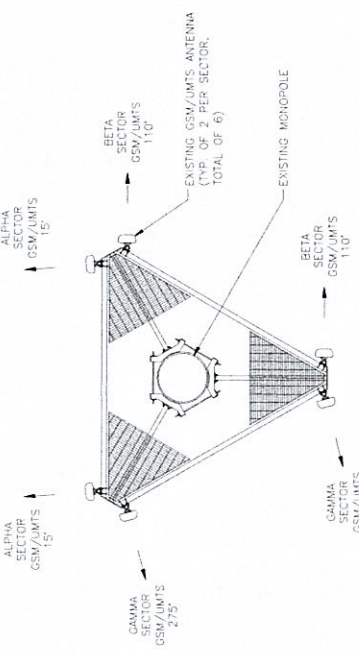
SITE NUMBER: CT5775
SITE NAME: AVE - CANTERBURY EAST
CROWN CASTLE ID: 876375
53 WESTMINSTER ROAD
CANTERBURY, CT 06331
WINDHAM COUNTY

AT&T
COMPOUND PLAN & EQUIPMENT PLAN
(LITE)

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	10/10/12	ISSUED FOR CONSTRUCTION	CA	DP	DP
0	06/09/12	ISSUED FOR REVIEW	RS	DC	DC

SCALE: AS SHOWN

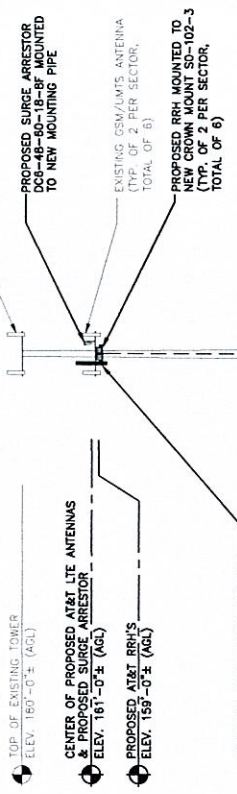
DESIGNED BY:	DC	DRAWN BY:	RS
5775.01		A-1	



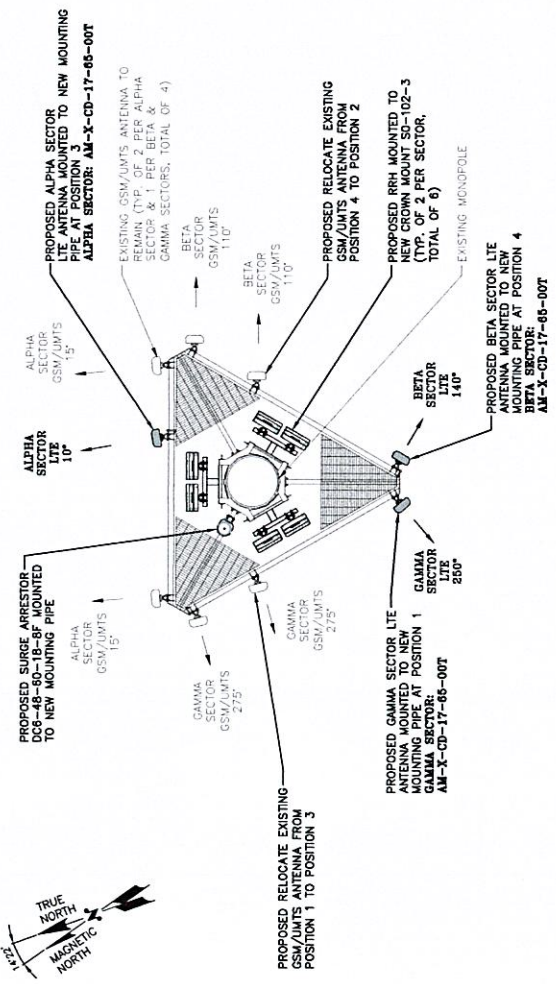
EXISTING GSM/UMTS ANTENNA PLAN
SCALE: N.T.S.

NOTE:
ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED WITH PERMITS AND FINAL AT&T RF DATA SHEET.

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



PROPOSED LITE ANTENNA MOUNTED TO NEW CROWN MOUNT SD-102-3 (TYP. OF 2 PER SECTOR, TOTAL OF 6)
ALPHA SECTOR: AM-X-CD-17-65-00T
BETA SECTOR: AM-X-CD-17-65-00T
GAMMA SECTOR: AM-X-CD-17-65-00T
(TYP. OF 1 PER SECTOR, TOTAL OF 3)



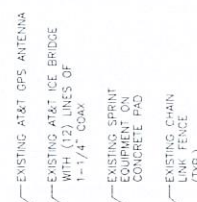
PROPOSED LTE ANTENNA PLAN
SCALE: N.T.S.

PROPOSED DC POWER & FIBER (TO FOLLOW EXISTING COAX)

PROPOSED LITE GPS ANTENNA MOUNTED TO EXISTING GPS ANTENNA FROM EXISTING GPS ANTENNA

PROPOSED 3" FLEX CONDUIT FOR DC POWER & FIBER ON ICE BRIDGE (TO FOLLOW EXISTING COAX)

PROPOSED COMPOSITE DC POWER & FIBER CONDUIT ON CONCRETE PAD EXTENSION



GROUND LEVEL ELEV. 0'-0" ± (AQL)

NORTH ELEVATION
SCALE: 1/16"=1'-0"
0 8'-0" 16'-0" 32'-0" 46'-0"

 1400 S. 2500 E. UNIT 300 N. WINDSOR, CT 06095 TEL: 203.365.5500 FAX: 203.365.5500	 a Uniflex GLOBAL SERVICES company 800 MARSHALL PHELPS ROAD UNIT # 2A WINDSOR, CT 06095	 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067	 SITE NUMBER: CT5775 SITE NAME: AVE - CANTERBURY EAST CROWN CASTLE ID: 876375 53 WESTMINSTER ROAD CANTERBURY, CT 06331 WINDHAM COUNTY	AT&T ANTENNA PLAN & ELEVATION (LTE)	
				NO. DATE 1 10/16/12 ISSUED FOR CONSTRUCTION 0 08/09/12 ISSUED FOR REVIEW	BY: CHK/APPD DATE: 10/16/12 JOB NUMBER: 15775.01 DRAWN BY: RS DESIGNED BY: DC SCALE: AS SHOWN



C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions



CT5775

(AWE - Canterbury East)

53 Westminster Road, Canterbury, CT 06331

November 21, 2012

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located on 53 Westminster Road in Canterbury, CT. The coordinates of the tower are 41° 42' 7.15" N, 71° 58' 50.11" W.

AT&T is proposing the following modifications:

- 1) Install three multi-band (700/850/1900/2100 MHz) antennas for their LTE network (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times \text{EIRP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

$$R = \text{Radial Distance} = \sqrt{H^2 + V^2}$$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical patterns of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm ²)	Limit	%MPE
<i>Cingular UMTS</i>	161	880	1	500	0.0069	0.5867	1.18%
<i>Cingular GSM</i>	161	880	4	296	0.0164	0.5867	2.80%
<i>Cingular GSM</i>	161	1900	2	427	0.0118	1.0000	1.18%
Verizon	170	869	9	314	0.0352	0.5793	6.07%
Verizon	170	1970	7	209	0.0182	1.0000	1.82%
Verizon	170	757	1	723	0.0090	0.5047	1.78%
Sprint	180	1962			0.0149	1.0000	1.49%
AT&T UMTS	161	880	2	565	0.0016	0.5867	0.27%
AT&T UMTS	161	1900	2	875	0.0024	1.0000	0.24%
AT&T LTE	161	734	1	1771	0.0025	0.4893	0.50%
AT&T GSM	161	880	1	283	0.0004	0.5867	0.07%
AT&T GSM	161	1900	4	525	0.0029	1.0000	0.29%
						Total	12.53%

Table 1: Carrier Information^{1 2 3}

¹ The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 7/26/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

² In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario. Blanks in Table 1 indicate omitted information in the CSC database.

³ Antenna height listed for AT&T is in reference to the Paul J. Ford and Company Structural Analysis dated August 17, 2012.

5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **12.53% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet
C Squared Systems, LLC

November 21, 2012

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure⁴

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure⁵

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

⁴ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

⁵ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

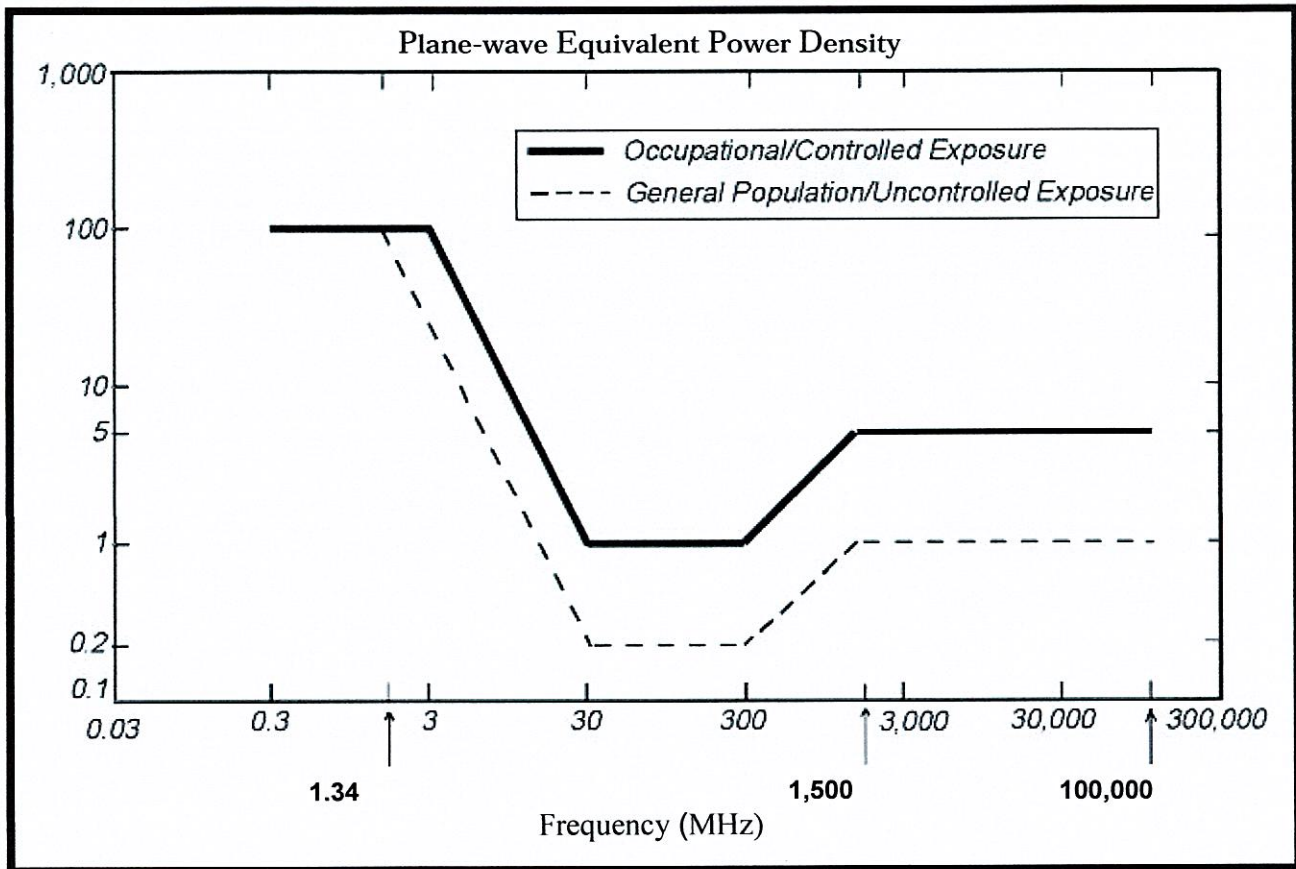
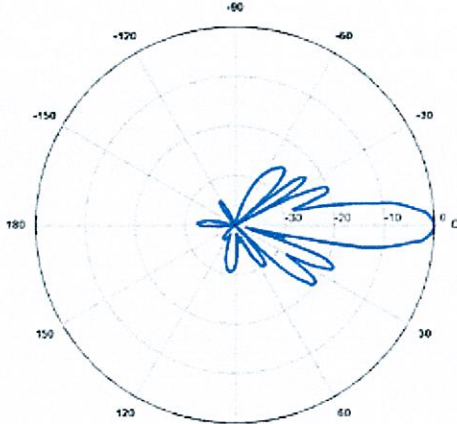
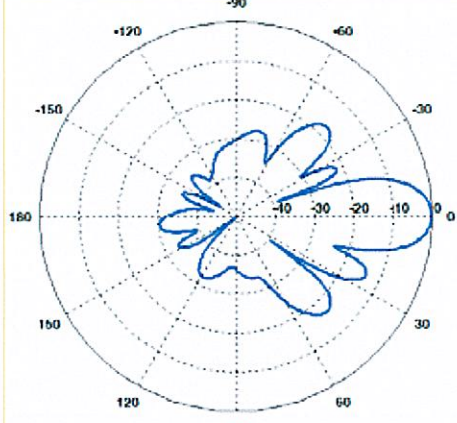
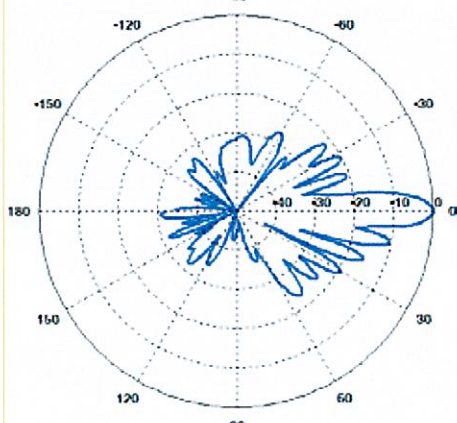


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

700 MHz Manufacturer: KMW Model #: AM-X-CD-17-65-00T-RET Frequency Band: 698-806 MHz Gain: 14.65 dBd Vertical Beamwidth: 10° Horizontal Beamwidth: 66° Polarization: Dual Slant $\pm 45^\circ$ Size L x W x D: 96.0" x 11.8" x 6.0"	
850 MHz Manufacturer: Powerwave Model #: 7770.00 Frequency Band: 824-896 MHz Gain: 11.5 dBd Vertical Beamwidth: 15° Horizontal Beamwidth: 82° Polarization: Dual Linear $\pm 45^\circ$ Size L x W x D: 55" x 11.0" x 5.0"	
1900 MHz Manufacturer: Powerwave Model #: 7770.00 Frequency Band: 1850-1990 MHz Gain: 13.4 dBd Vertical Beamwidth: 7° Horizontal Beamwidth: 86° Polarization: Dual Linear $\pm 45^\circ$ Size L x W x D: 55" x 11.0" x 5.0"	



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: November 02, 2012

George Finley
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 321-3811

Paul J. Ford and Company
250 East Broad Street #1500
Columbus, OH 43215
(614) 221-6679
dkramer@pjfweb.com

Subject: Structural Modification Report

Carrier Designation: AT&T Mobility Co-Locate
Carrier Site Number: CT5775
Carrier Site Name: AWE-CARTERBURY EAST

Crown Castle Designation: Crown Castle BU Number: 876375
Crown Castle Site Name: CANTERBURY / LEMIRE
Crown Castle JDE Job Number: 199390
Crown Castle Work Order Number: 545427
Crown Castle Application Number: 157966 Rev. 2

Engineering Firm Designation: Paul J. Ford and Company Project Number: 37512-2172BP

Site Data: 53 Westminster Rd., CANTERBURY, Windham County, CT
Latitude 41° 42' 7.15", Longitude -71° 58' 50.11"
180 Foot - Monopole Tower

Dear George Finley,

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 498024, in accordance with application 157966, revision 2.

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
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

Sufficient Capacity

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

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

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

Respectfully submitted by:

D. SCOTT KRAMER
D. Scott Kramer, P.E.
Project Engineer

tnxTower Report - version 6.0.3.0

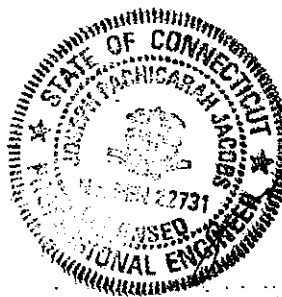


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tnxTower Output

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Additional Calculations

1) INTRODUCTION

This tower is a 180 ft Monopole. The original manufacturer is unknown. FDH, Inc. provided a monopole mapping in May 2009. The tower has been modified per reinforcement drawings prepared by Paul J. Ford and Company in July of 2009. Reinforcement consists of addition of base plate stiffeners.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	161.0	3	kmw communications	AM-X-CD-17-65-00T-RET w/ Mount Pipe	3	3/8	-
		1	raycap	DC6-48-60-18-8F			
158.0	159.0	6	ericsson	TME-RRUS-11	-	-	-
	158.0	1	tower mounts	Side Arm Mount [SO 102-3]			

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
180.0	183.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1 5/8	1
	180.0	1	tower mounts	Platform Mount [LP 601-1]			
170.0	170.0	3	antel	BXA-185063/12CF w/ Mount Pipe	12	1 5/8	2
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 303-1]			
160.0	161.0	6	powerwave technologies	7770.00 w/ Mount Pipe	12	1 1/4	1
	160.0	6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21901			
		1	tower mounts	Platform Mount [LP 303-1]			
78.0	79.0	1	spectracom	8225	1	1/2	1
	78.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Wolti, 1/24/2000	1615348	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 37509-0930, 7/21/2009	2464622	CCISITES
4-TOWER FOUNDATION MAPPING	FDH, 09-04033E N1, 4/15/2009	1615408	CCISITES
4-TOWER MAPPING	FDH, 09-04023T T1, 5/4/2009	2428368	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37509-0930, 7/21/2009	2435769	CCISITES
TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 37512-2172, 08/17/12	3299127	CCISITES
PROPOSED MODIFICATION DRAWINGS	PJF, 37512-2172BP, 11/2/2012	-	PJF

3.1) Analysis Method

tnxTower (version 6.0.3.0), 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) Monopole was reinforced in conformance with the referenced modification drawings.
- 5) Monopole will be reinforced in conformance with the attached proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	180 - 134	Pole	TP26.374x17.62x0.25	1	-6.93	1052.14	91.7	Pass
L2	134 - 120.75	Pole	TP28.3956x25.2555x0.3125	2	-9.22	1448.09	94.9	Pass
L3	120.75 - 107.75	Pole	TP30.8696x28.3956x0.4135	3	-11.36	1796.10	92.3	Pass
L4	107.75 - 88.5	Pole	TP34.533x30.8696x0.443	4	-14.18	2104.37	92.8	Pass
L5	88.5 - 80.75	Pole	TP35.3829x32.8383x0.4998	5	-17.43	2492.36	89.1	Pass
L6	80.75 - 53.75	Pole	TP40.5212x35.3829x0.4819	6	-23.80	2770.45	96.8	Pass
L7	53.75 - 43	Pole	TP42.567x40.5212x0.5201	7	-25.27	3132.51	88.6	Pass
L8	43 - 28.25	Pole	TP44.624x40.5277x0.5088	8	-29.27	3153.78	95.3	Pass
L9	28.25 - 0	Pole	TP50x44.624x0.5012	9	-40.25	3653.18	97.1	Pass
							Summary	
						Pole (L9)	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	90.0	Pass
1	Base Plate	0	91.9	Pass
1	Base Foundation Steel	0	93.7	Pass
1	Base Foundation Soil Interaction	0	95.0	Pass

Structure Rating (max from all components) =	97.1%
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Notes:

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

4.1) Recommendations

See attached proposed modification drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

There is a pole section.

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

The following design criteria apply:

- 1) Tower is located in Windham County, Connecticut.
- 2) Basic wind speed of 85 mph.
- 3) Nominal ice thickness of 1.0000 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56 pcf.
- 6) A wind speed of 38 mph is used in combination with ice.
- 7) Temperature drop of 50 °F.
- 8) Deflections calculated using a wind speed of 50 mph.
- 9) A non-linear (P-delta) analysis was used.
- 10) Pressures are calculated at each section.
- 11) Stress ratio used in pole design is 1.333.
- 12) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

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	180.00-134.00	46.00	3.25	18	17.6200	26.3740	0.2500	1.0000	A572-65 (65 ksi)
L2	134.00-120.75	16.50	0.00	18	25.2555	28.3956	0.3125	1.2500	A572-65 (65 ksi)
L3	120.75-107.75	13.00	0.00	18	28.3956	30.8696	0.4135	1.6540	Reinf 56.18 ksi (56 ksi)
L4	107.75-88.50	19.25	4.25	18	30.8696	34.5330	0.4430	1.7718	Reinf 56.23 ksi (56 ksi)
L5	88.50-80.75	12.00	0.00	18	32.8383	35.3829	0.4998	1.9993	Reinf 56.31 ksi (56 ksi)
L6	80.75-53.75	27.00	0.00	18	35.3829	40.5212	0.4819	1.9276	Reinf 56.56 ksi (57 ksi)
L7	53.75-43.00	10.75	5.25	18	40.5212	42.5670	0.5201	2.0804	Reinf 57.80 ksi (58 ksi)
L8	43.00-28.25	20.00	0.00	18	40.5277	44.6240	0.5088	2.0351	Reinf 57.90 ksi (58 ksi)
L9	28.25-0.00	28.25		18	44.6240	50.0000	0.5012	2.0047	Reinf 58.01 ksi (58 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	17.8918	13.7831	525.3925	6.1664	8.9510	58.6968	1051.4762	6.8929	2.6611	10.644
	26.7809	20.7294	1787.3245	9.2740	13.3980	133.4024	3577.0008	10.3667	4.2018	16.807
L2	26.2732	24.7403	1944.6479	8.8548	12.8298	151.5727	3891.8546	12.3725	3.8950	12.464
	28.8336	27.8549	2775.4193	9.9695	14.4250	192.4040	5554.4906	13.9301	4.4476	14.232
L3	28.8336	36.7259	3633.0377	9.9336	14.4250	251.8578	7270.8559	18.3665	4.2698	10.326
	31.3458	39.9730	4684.3785	10.8119	15.6817	298.7154	9374.9207	19.9903	4.7053	11.379
L4	31.3458	42.7785	5003.4552	10.8015	15.6817	319.0624	10013.494	21.3933	4.6534	10.505

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
	35.0657	47.9291	7037.0626	12.1020	17.5428	401.1376	14083.384	23.9691	5.2982	11.961
L5	34.2600	51.3037	6778.3547	11.4801	16.6818	406.3312	13565.628	25.6567	4.8998	9.803
	35.9287	55.3406	8507.6657	12.3835	17.9745	473.3184	17026.526	27.6756	5.3477	10.699
L6	35.9287	53.3839	8215.2953	12.3898	17.9745	457.0526	16441.400	26.6970	5.3792	11.162
	41.1463	61.2434	12404.209	14.2139	20.5848	602.5918	24824.740	30.6275	6.2836	13.039
L7	41.1463	66.0337	13348.937	14.2004	20.5848	648.4863	26715.440	33.0231	6.2164	11.952
	43.2237	69.4109	15503.622	14.9266	21.6240	716.9625	31027.644	34.7121	6.5764	12.645
L8	42.2448	64.6252	13075.857	14.2067	20.5881	635.1183	26168.920	32.3188	6.2374	12.26
	45.3123	71.2402	17516.134	15.6609	22.6690	772.6922	35055.317	35.6269	6.9584	13.677
L9	45.3123	70.1867	17263.070	15.6636	22.6690	761.5288	34548.856	35.1000	6.9718	13.911
	50.7713	78.7385	24373.294	17.5721	25.4000	959.5785	48778.660	39.3767	7.9179	15.799

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 180.00- 134.00				1	1	1		
L2 134.00- 120.75				1	1	1		
L3 120.75- 107.75				1	1	1		
L4 107.75- 88.50				1	1	1		
L5 88.50- 80.75				1	1	1		
L6 80.75- 53.75				1	1	1		
L7 53.75- 43.00				1	1	1		
L8 43.00- 28.25				1	1	1		
L9 28.25-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
LDF7-50A(1-5/8")	C	No	Inside Pole	180.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF6-50A(1-1/4")	C	No	Inside Pole	160.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
FB-L98B-002-75000(3/8")	C	No	Inside Pole	160.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
WR-VG122ST-BRDA(3/8)	C	No	Inside Pole	160.00 - 0.00	2	4" Ice	0.00	0.06
						No Ice	0.00	0.20
						1/2" Ice	0.00	0.20
						1" Ice	0.00	0.20
						2" Ice	0.00	0.20
LDF4-50A(1/2")	C	No	Inside Pole	78.00 - 0.00	1	4" Ice	0.00	0.20
						No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	170.00 - 0.00	12	4" Ice	0.00	0.15
						No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
** Aero MP3-05	C	No	CaAa (Out Of Face)	56.00 - 0.00	1	4" Ice	0.00	0.82
						No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
						2" Ice	0.88	0.00
Aero MP3-04	C	No	CaAa (Out Of Face)	109.25 - 56.00	1	4" Ice	1.32	0.00
						No Ice	0.27	0.00
						1/2" Ice	0.38	0.00
						1" Ice	0.49	0.00
						2" Ice	0.71	0.00
Aero MP3-03	C	No	CaAa (Out Of Face)	121.75 - 109.25	1	4" Ice	1.16	0.00
						No Ice	0.26	0.00
						1/2" Ice	0.37	0.00
						1" Ice	0.48	0.00
						2" Ice	0.71	0.00
						4" Ice	1.15	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	180.00-134.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.80
L2	134.00-120.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.262	0.31
L3	120.75-107.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.422	0.30
L4	107.75-88.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.179	0.45
L5	88.50-80.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.085	0.18
L6	80.75-53.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.441	0.63
L7	53.75-43.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.739	0.25
L8	43.00-28.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.130	0.34
L9	28.25-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.825	0.66

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A _R	A _F	C _A A _A In Face	C _A A _A Out Face	Weight
n	ft		in	ft ²	ft ²	ft ²	ft ²	K
L1	180.00-134.00	A	1.205	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.80
L2	134.00-120.75	A	1.176	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.530	0.31
L3	120.75-107.75	A	1.161	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.775	0.30
L4	107.75-88.50	A	1.139	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.053	0.45
L5	88.50-80.75	A	1.120	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.047	0.18
L6	80.75-53.75	A	1.089	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	14.167	0.63
L7	53.75-43.00	A	1.047	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.170	0.25
L8	43.00-28.25	A	1.009	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.838	0.34
L9	28.25-0.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.548	0.66

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	180.00-134.00	0.0000	0.0000	0.0000	0.0000
L2	134.00-120.75	-0.0266	0.0154	-0.0490	0.0283
L3	120.75-107.75	-0.3090	0.1784	-0.5251	0.3031
L4	107.75-88.50	-0.3181	0.1836	-0.5379	0.3105
L5	88.50-80.75	-0.3196	0.1845	-0.5439	0.3140
L6	80.75-53.75	-0.3298	0.1904	-0.5581	0.3222
L7	53.75-43.00	-0.4106	0.2370	-0.6970	0.4024
L8	43.00-28.25	-0.4119	0.2378	-0.7020	0.4053
L9	28.25-0.00	-0.4152	0.2397	-0.7056	0.4074

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment t	Placement	C _A A _A Front	C _A A _A Side	Weight
			ft ft ft	°	ft	ft ²	ft ²	K
Lighting Rod 5/8" x 5'	C	From Leg	0.00	0.0000	180.00	No Ice	0.31	0.03
			0.00			1/2"	0.83	0.03
			2.50			Ice	1.32	0.04
						1" Ice	1.96	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
						2" Ice 4" Ice	3.34 3.34	3.34 3.34	0.16 0.16

(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	-30.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	0.03 0.06 0.11 0.22 0.55
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	-30.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	0.03 0.06 0.11 0.22 0.55
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	-30.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	0.03 0.06 0.11 0.22 0.55
*									
Platform Mount [LP 601-1]	C	From Leg	0.00 0.00 0.00	-30.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.47 33.59 38.71 48.95 69.43	28.47 33.59 38.71 48.95 69.43	1.12 1.51 1.91 2.69 4.26
(2) 5' x 2' Pipe Mount	A	From Leg	4.00 0.00 0.00	-30.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.03 0.04 0.05 0.08 0.20
5' x 2' Pipe Mount	B	From Leg	4.00 0.00 0.00	-30.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.03 0.04 0.05 0.08 0.20
(2) 5' x 2' Pipe Mount	C	From Leg	4.00 0.00 0.00	-30.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.03 0.04 0.05 0.08 0.20
8-ft Ladder	B	From Leg	2.00 0.00 -4.00	-30.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.07 9.73 11.19 13.98 18.89	7.07 9.73 11.19 13.98 18.89	0.04 0.07 0.08 0.11 0.15

(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) LGP21401	A	From Leg	4.00 0.00 0.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(2) LGP21901	A	From Leg	4.00 0.00 0.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.01 0.02 0.07
AM-X-CD-17-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.55 12.27 13.00 14.45 17.71	8.94 10.45 11.99 14.31 19.14	0.09 0.17 0.27 0.50 1.12
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	20.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) LGP21401	B	From Leg	4.00 0.00 0.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(2) LGP21901	B	From Leg	4.00 0.00 0.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.01 0.02 0.07
AM-X-CD-17-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	20.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.55 12.27 13.00 14.45 17.71	8.94 10.45 11.99 14.31 19.14	0.09 0.17 0.27 0.50 1.12
DC6-48-60-18-8F	B	From Leg	4.00 0.00 1.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	0.02 0.04 0.06 0.11 0.24
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) LGP21401	C	From Leg	4.00 0.00 0.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(2) LGP21901	C	From Leg	4.00 0.00 0.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.01 0.02 0.07
AM-X-CD-17-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.55 12.27 13.00 14.45 17.71	8.94 10.45 11.99 14.31 19.14	0.09 0.17 0.27 0.50 1.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
4" Ice									
* Platform Mount [LP 303-1]	C	From Leg	0.00 0.00 0.00	10.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
*** 8225	B	From Leg	4.00 0.00 1.00	40.0000	78.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.89 1.08 1.28 1.72 2.69	0.89 1.08 1.28 1.72 2.69	0.00 0.01 0.02 0.05 0.14
* Side Arm Mount [SO 701-1]	B	From Leg	0.00 0.00 0.00	40.0000	78.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
*** (2) RRUS-11	A	From Leg	2.00 0.00 1.00	10.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	0.06 0.08 0.11 0.18 0.37
(2) RRUS-11	B	From Leg	2.00 0.00 1.00	10.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	0.06 0.08 0.11 0.18 0.37
(2) RRUS-11	C	From Leg	2.00 0.00 1.00	10.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	0.06 0.08 0.11 0.18 0.37
* Side Arm Mount [SO 102-3]	C	From Leg	0.00 0.00 0.00	10.0000	158.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
*** (2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	20.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	40.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	30.0000	170.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61 6.65	10.73 11.99 12.97 14.98	0.05 0.11 0.19 0.36

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
						2" Ice	8.83	19.22	0.86
BXA-185063/12CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	20.0000	170.00	4" Ice			
						No Ice	5.03	5.29	0.04
						1/2"	5.58	6.46	0.08
						Ice	6.10	7.35	0.14
						1" Ice	7.17	9.15	0.27
BXA-185063/12CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	40.0000	170.00	2" Ice	9.44	12.95	0.68
						4" Ice			
						No Ice	5.03	5.29	0.04
						1/2"	5.58	6.46	0.08
						Ice	6.10	7.35	0.14
BXA-185063/12CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	30.0000	170.00	1" Ice	7.17	9.15	0.27
						2" Ice	9.44	12.95	0.68
						4" Ice			
						No Ice	5.03	5.29	0.04
						1/2"	5.58	6.46	0.08
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	20.0000	170.00	Ice	6.10	7.35	0.14
						1" Ice	7.17	9.15	0.27
						2" Ice	9.44	12.95	0.68
						4" Ice			
						No Ice	7.98	5.41	0.04
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	40.0000	170.00	1/2"	8.62	6.56	0.10
						Ice	9.23	7.42	0.17
						1" Ice	10.47	9.20	0.33
						2" Ice	13.08	12.95	0.79
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	30.0000	170.00	No Ice	7.98	5.41	0.04
						1/2"	8.62	6.56	0.10
						Ice	9.23	7.42	0.17
						1" Ice	10.47	9.20	0.33
						2" Ice	13.08	12.95	0.79
* Platform Mount [LP 303-1]	C	From Leg	0.00 0.00 0.00	30.0000	170.00	4" Ice			
						No Ice	14.66	14.66	1.25
						1/2"	18.87	18.87	1.48
						Ice	23.08	23.08	1.71
						1" Ice	31.50	31.50	2.18
						2" Ice	48.34	48.34	3.10
						4" Ice			

Tower Pressures - No Ice

$$G_H = 1.690$$

Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
L1 180.00- 134.00	155.71	1.558	29	84.322	A	0.000	84.322	84.322	100.00	0.000	0.000
					B	0.000	84.322		100.00	0.000	0.000
					C	0.000	84.322		100.00	0.000	0.000
L2 134.00- 120.75	127.27	1.471	27	29.961	A	0.000	29.961	29.961	100.00	0.000	0.000
					B	0.000	29.961		100.00	0.000	0.000

Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
L3 120.75- 107.75	114.16	1.426	26	32.102	C	0.000	29.961		100.00	0.000	0.262
					A	0.000	32.102	32.102	100.00	0.000	0.000
					B	0.000	32.102		100.00	0.000	0.000
L4 107.75- 88.50	97.95	1.365	25	52.458	C	0.000	32.102		100.00	0.000	3.422
					A	0.000	52.458	52.458	100.00	0.000	0.000
					B	0.000	52.458		100.00	0.000	0.000
L5 88.50- 80.75	84.59	1.309	24	22.321	C	0.000	52.458		100.00	0.000	5.179
					A	0.000	22.321	22.321	100.00	0.000	0.000
					B	0.000	22.321		100.00	0.000	0.000
L6 80.75- 53.75	66.95	1.224	23	85.392	C	0.000	22.321		100.00	0.000	2.085
					A	0.000	85.392	85.392	100.00	0.000	0.000
					B	0.000	85.392		100.00	0.000	0.000
L7 53.75- 43.00	48.33	1.115	21	37.217	C	0.000	85.392		100.00	0.000	7.441
					A	0.000	37.217	37.217	100.00	0.000	0.000
					B	0.000	37.217		100.00	0.000	0.000
L8 43.00- 28.25	35.54	1.021	19	52.994	C	0.000	37.217		100.00	0.000	3.739
					A	0.000	52.994	52.994	100.00	0.000	0.000
					B	0.000	52.994		100.00	0.000	0.000
L9 28.25-0.00	13.86	1	18	111.380	C	0.000	52.994		100.00	0.000	5.130
					A	0.000	111.380	111.380	100.00	0.000	0.000
					B	0.000	111.380		100.00	0.000	0.000
					C	0.000	111.380		100.00	0.000	9.825

Tower Pressure - With Ice

$$G_H = 1.690$$

Section Elevation	z	K _z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²			
L1 180.00- 134.00	155.71	1.558	6	1.2046	93.557	A	0.000	93.557	93.557	100.00	0.000	0.000
						B	0.000	93.557		100.00	0.000	0.000
						C	0.000	93.557		100.00	0.000	0.000
L2 134.00- 120.75	127.27	1.471	5	1.1758	32.622	A	0.000	32.622	32.622	100.00	0.000	0.000
						B	0.000	32.622		100.00	0.000	0.000
						C	0.000	32.622		100.00	0.000	0.530
L3 120.75- 107.75	114.16	1.426	5	1.1606	34.617	A	0.000	34.617	34.617	100.00	0.000	0.000
						B	0.000	34.617		100.00	0.000	0.000
						C	0.000	34.617		100.00	0.000	6.775
L4 107.75- 88.50	97.95	1.365	5	1.1395	56.114	A	0.000	56.114	56.114	100.00	0.000	0.000
						B	0.000	56.114		100.00	0.000	0.000
						C	0.000	56.114		100.00	0.000	10.053
L5 88.50-80.75	84.59	1.309	5	1.1196	23.793	A	0.000	23.793	23.793	100.00	0.000	0.000
						B	0.000	23.793		100.00	0.000	0.000
						C	0.000	23.793		100.00	0.000	4.047
L6 80.75-53.75	66.95	1.224	4	1.0886	90.291	A	0.000	90.291	90.291	100.00	0.000	0.000
						B	0.000	90.291		100.00	0.000	0.000
						C	0.000	90.291		100.00	0.000	14.167
L7 53.75-43.00	48.33	1.115	4	1.0469	39.092	A	0.000	39.092	39.092	100.00	0.000	0.000
						B	0.000	39.092		100.00	0.000	0.000
						C	0.000	39.092		100.00	0.000	7.170
L8 43.00-28.25	35.54	1.021	4	1.0089	55.567	A	0.000	55.567	55.567	100.00	0.000	0.000
						B	0.000	55.567		100.00	0.000	0.000
						C	0.000	55.567		100.00	0.000	9.838
L9 28.25-0.00	13.86	1	4	1.0000	116.089	A	0.000	116.089	116.089	100.00	0.000	0.000
						B	0.000	116.089		100.00	0.000	0.000
						C	0.000	116.089		100.00	0.000	18.548

Tower Pressure - Service

$$G_H = 1.690$$

Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
L1 180.00- 134.00	155.71	1.558	10	84.322	A	0.000	84.322	84.322	100.00	0.000	0.000
					B	0.000	84.322		100.00	0.000	0.000
					C	0.000	84.322		100.00	0.000	0.000
L2 134.00- 120.75	127.27	1.471	9	29.961	A	0.000	29.961	29.961	100.00	0.000	0.000
					B	0.000	29.961		100.00	0.000	0.000
					C	0.000	29.961		100.00	0.000	0.262
L3 120.75- 107.75	114.16	1.426	9	32.102	A	0.000	32.102	32.102	100.00	0.000	0.000
					B	0.000	32.102		100.00	0.000	0.000
					C	0.000	32.102		100.00	0.000	3.422
L4 107.75- 88.50	97.95	1.365	9	52.458	A	0.000	52.458	52.458	100.00	0.000	0.000
					B	0.000	52.458		100.00	0.000	0.000
					C	0.000	52.458		100.00	0.000	5.179
L5 88.50- 80.75	84.59	1.309	8	22.321	A	0.000	22.321	22.321	100.00	0.000	0.000
					B	0.000	22.321		100.00	0.000	0.000
					C	0.000	22.321		100.00	0.000	2.085
L6 80.75- 53.75	66.95	1.224	8	85.392	A	0.000	85.392	85.392	100.00	0.000	0.000
					B	0.000	85.392		100.00	0.000	0.000
					C	0.000	85.392		100.00	0.000	7.441
L7 53.75- 43.00	48.33	1.115	7	37.217	A	0.000	37.217	37.217	100.00	0.000	0.000
					B	0.000	37.217		100.00	0.000	0.000
					C	0.000	37.217		100.00	0.000	3.739
L8 43.00- 28.25	35.54	1.021	7	52.994	A	0.000	52.994	52.994	100.00	0.000	0.000
					B	0.000	52.994		100.00	0.000	0.000
					C	0.000	52.994		100.00	0.000	5.130
L9 28.25-0.00	13.86	1	6	111.38 0	A	0.000	111.380	111.380	100.00	0.000	0.000
					B	0.000	111.380		100.00	0.000	0.000
					C	0.000	111.380		100.00	0.000	9.825

Load Combinations

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

Comb. No.	Description
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	180 - 134	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-17.36	4.21	-2.76
			Max. Mx	11	-6.93	500.80	-1.52
			Max. My	8	-6.97	2.56	-493.39
			Max. Vy	11	-16.66	500.80	-1.52
			Max. Vx	8	16.49	2.56	-493.39
			Max. Torque	7			-2.13
L2	134 - 120.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.22	4.31	-2.84
			Max. Mx	11	-9.22	785.55	-1.57
			Max. My	8	-9.25	2.63	-775.40
			Max. Vy	11	-17.84	785.55	-1.57
			Max. Vx	8	17.68	2.63	-775.40
			Max. Torque	7			-2.12
L3	120.75 - 107.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22.79	4.38	-2.88
			Max. Mx	11	-11.36	1024.69	-1.60
			Max. My	8	-11.40	2.67	-1012.35
			Max. Vy	11	-18.97	1024.69	-1.60
			Max. Vx	8	18.80	2.67	-1012.35
			Max. Torque	7			-2.15
L4	107.75 - 88.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.14	4.44	-2.93
			Max. Mx	11	-14.18	1318.84	-1.63
			Max. My	8	-14.21	2.71	-1303.98
			Max. Vy	11	-20.27	1318.84	-1.63
			Max. Vx	8	20.11	2.71	-1303.98
			Max. Torque	7			-2.18
L5	88.5 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.07	4.49	-2.96
			Max. Mx	11	-17.43	1569.23	-1.65
			Max. My	8	-17.46	2.73	-1552.35
			Max. Vy	11	-21.41	1569.23	-1.65
			Max. Vx	8	21.24	2.73	-1552.35
			Max. Torque	7			-2.21
L6	80.75 - 53.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.50	4.32	-3.13
			Max. Mx	11	-23.80	2179.06	-1.98
			Max. My	8	-23.82	2.96	-2157.18
			Max. Vy	11	-23.73	2179.06	-1.98
			Max. Vx	8	23.53	2.96	-2157.18
			Max. Torque	7			-2.22
L7	53.75 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.18	4.32	-3.13
			Max. Mx	11	-25.27	2310.67	-2.05
			Max. My	8	-25.29	3.02	-2287.74

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L8	43 - 28.25	Pole	Max. Vy	11	-24.16	2310.67	-2.05
			Max. Vx	8	23.97	3.02	-2287.74
			Max. Torque	7			-2.18
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.88	4.32	-3.13
			Max. Mx	11	-31.89	2809.88	-2.27
			Max. My	8	-31.90	3.25	-2783.14
			Max. Vy	11	-25.68	2809.88	-2.27
L9	28.25 - 0	Pole	Max. Vx	8	25.49	3.25	-2783.14
			Max. Torque	7			-2.25
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-56.38	4.32	-3.13
			Max. Mx	11	-40.25	3561.27	-2.57
			Max. My	8	-40.25	3.56	-3529.26
			Max. Vy	11	-27.56	3561.27	-2.57
			Max. Vx	8	27.37	3.56	-3529.26
			Max. Torque	7			-2.35

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	56.38	6.82	-0.00
	Max. H _x	11	40.27	27.54	-0.01
	Max. H _z	2	40.27	-0.01	27.35
	Max. M _x	2	3525.80	-0.01	27.35
	Max. M _z	5	3555.88	-27.54	0.01
	Max. Torsion	13	2.33	13.76	23.68
	Min. Vert	1	40.27	0.00	-0.00
	Min. H _x	5	40.27	-27.54	0.01
	Min. H _z	8	40.27	0.01	-27.35
	Min. M _x	8	-3529.26	0.01	-27.35
	Min. M _z	11	-3561.27	27.54	-0.01
	Min. Torsion	7	-2.35	-13.76	-23.68

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	40.27	-0.00	0.00	1.72	2.70	0.00
Dead+Wind 0 deg - No Ice	40.27	0.01	-27.35	-3525.80	1.87	-1.77
Dead+Wind 30 deg - No Ice	40.27	13.78	-23.69	-3053.58	-1777.39	-0.74
Dead+Wind 60 deg - No Ice	40.27	23.85	-13.69	-1762.69	-3079.59	0.50
Dead+Wind 90 deg - No Ice	40.27	27.54	-0.01	0.89	-3555.88	1.61
Dead+Wind 120 deg - No Ice	40.27	23.84	13.67	1764.69	-3078.74	2.29
Dead+Wind 150 deg - No Ice	40.27	13.76	23.68	3056.20	-1775.93	2.35
Dead+Wind 180 deg - No Ice	40.27	-0.01	27.35	3529.26	3.56	1.77
Dead+Wind 210 deg - No Ice	40.27	-13.78	23.69	3057.02	1782.81	0.72
Dead+Wind 240 deg - No Ice	40.27	-23.85	13.69	1766.13	3084.98	-0.51
Dead+Wind 270 deg - No Ice	40.27	-27.54	0.01	2.57	3561.27	-1.61
Dead+Wind 300 deg - No Ice	40.27	-23.84	-13.67	-1761.21	3084.14	-2.27
Dead+Wind 330 deg - No Ice	40.27	-13.76	-23.68	-3052.73	1781.35	-2.33
Dead+Ice+Temp	56.38	-0.00	0.00	3.13	4.32	-0.00
Dead+Wind 0 deg+Ice+Temp	56.38	0.00	-6.75	-931.13	4.07	-0.65
Dead+Wind 30 deg+Ice+Temp	56.38	3.41	-5.84	-806.12	-469.65	-0.28
Dead+Wind 60 deg+Ice+Temp	56.38	5.91	-3.38	-464.26	-816.34	0.17

Load Combination	Vertical K	Shear _x K	Shear _y K	Overturing Moment, M _x kip-ft	Overturing Moment, M _y kip-ft	Torque kip-ft
Dead+Wind 90 deg+Ice+Temp	56.38	6.82	-0.00	2.86	-943.11	0.57
Dead+Wind 120 deg+Ice+Temp	56.38	5.91	3.37	470.06	-816.00	0.82
Dead+Wind 150 deg+Ice+Temp	56.38	3.41	5.84	812.18	-469.06	0.85
Dead+Wind 180 deg+Ice+Temp	56.38	-0.00	6.75	937.52	4.75	0.65
Dead+Wind 210 deg+Ice+Temp	56.38	-3.41	5.84	812.52	478.46	0.28
Dead+Wind 240 deg+Ice+Temp	56.38	-5.91	3.38	470.65	825.15	-0.17
Dead+Wind 270 deg+Ice+Temp	56.38	-6.82	0.00	3.54	951.92	-0.57
Dead+Wind 300 deg+Ice+Temp	56.38	-5.91	-3.37	-463.67	824.81	-0.82
Dead+Wind 330 deg+Ice+Temp	56.38	-3.41	-5.84	-805.78	477.87	-0.85
Dead+Wind 0 deg - Service	40.27	0.00	-9.47	-1222.16	2.47	-0.63
Dead+Wind 30 deg - Service	40.27	4.77	-8.20	-1058.33	-614.88	-0.26
Dead+Wind 60 deg - Service	40.27	8.25	-4.74	-610.45	-1066.73	0.18
Dead+Wind 90 deg - Service	40.27	9.53	-0.00	1.47	-1232.01	0.57
Dead+Wind 120 deg - Service	40.27	8.25	4.73	613.47	-1066.44	0.81
Dead+Wind 150 deg - Service	40.27	4.76	8.20	1061.57	-614.38	0.83
Dead+Wind 180 deg - Service	40.27	-0.00	9.47	1225.69	3.05	0.63
Dead+Wind 210 deg - Service	40.27	-4.77	8.20	1061.86	620.40	0.26
Dead+Wind 240 deg - Service	40.27	-8.25	4.74	613.98	1072.25	-0.18
Dead+Wind 270 deg - Service	40.27	-9.53	0.00	2.06	1237.53	-0.57
Dead+Wind 300 deg - Service	40.27	-8.25	-4.73	-609.94	1071.96	-0.81
Dead+Wind 330 deg - Service	40.27	-4.76	-8.20	-1058.04	619.90	-0.83

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-40.27	0.00	0.00	40.27	-0.00	0.000%
2	0.01	-40.27	-27.35	-0.01	40.27	27.35	0.000%
3	13.78	-40.27	-23.69	-13.78	40.27	23.69	0.000%
4	23.85	-40.27	-13.69	-23.85	40.27	13.69	0.000%
5	27.54	-40.27	-0.01	-27.54	40.27	0.01	0.000%
6	23.84	-40.27	13.67	-23.84	40.27	-13.67	0.000%
7	13.76	-40.27	23.68	-13.76	40.27	-23.68	0.000%
8	-0.01	-40.27	27.35	0.01	40.27	-27.35	0.000%
9	-13.78	-40.27	23.69	13.78	40.27	-23.69	0.000%
10	-23.85	-40.27	13.69	23.85	40.27	-13.69	0.000%
11	-27.54	-40.27	0.01	27.54	40.27	-0.01	0.000%
12	-23.84	-40.27	-13.67	23.84	40.27	13.67	0.000%
13	-13.76	-40.27	-23.68	13.76	40.27	23.68	0.000%
14	0.00	-56.38	0.00	0.00	56.38	-0.00	0.000%
15	0.00	-56.38	-6.75	-0.00	56.38	6.75	0.000%
16	3.41	-56.38	-5.84	-3.41	56.38	5.84	0.000%
17	5.91	-56.38	-3.38	-5.91	56.38	3.38	0.000%
18	6.82	-56.38	-0.00	-6.82	56.38	0.00	0.000%
19	5.91	-56.38	3.37	-5.91	56.38	-3.37	0.000%
20	3.41	-56.38	5.84	-3.41	56.38	-5.84	0.000%
21	-0.00	-56.38	6.75	0.00	56.38	-6.75	0.000%
22	-3.41	-56.38	5.84	3.41	56.38	-5.84	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
23	-5.91	-56.38	3.38	5.91	56.38	-3.38	0.000%
24	-6.82	-56.38	0.00	6.82	56.38	-0.00	0.000%
25	-5.91	-56.38	-3.37	5.91	56.38	3.37	0.000%
26	-3.41	-56.38	-5.84	3.41	56.38	5.84	0.000%
27	0.00	-40.27	-9.47	-0.00	40.27	9.47	0.000%
28	4.77	-40.27	-8.20	-4.77	40.27	8.20	0.000%
29	8.25	-40.27	-4.74	-8.25	40.27	4.74	0.000%
30	9.53	-40.27	-0.00	-9.53	40.27	0.00	0.000%
31	8.25	-40.27	4.73	-8.25	40.27	-4.73	0.000%
32	4.76	-40.27	8.20	-4.76	40.27	-8.20	0.000%
33	-0.00	-40.27	9.47	0.00	40.27	-9.47	0.000%
34	-4.77	-40.27	8.20	4.77	40.27	-8.20	0.000%
35	-8.25	-40.27	4.74	8.25	40.27	-4.74	0.000%
36	-9.53	-40.27	0.00	9.53	40.27	-0.00	0.000%
37	-8.25	-40.27	-4.73	8.25	40.27	4.73	0.000%
38	-4.76	-40.27	-8.20	4.76	40.27	8.20	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000366
2	Yes	6	0.00000001	0.00001477
3	Yes	7	0.00000001	0.00001618
4	Yes	7	0.00000001	0.00001628
5	Yes	6	0.00000001	0.00001212
6	Yes	7	0.00000001	0.00001701
7	Yes	7	0.00000001	0.00001579
8	Yes	6	0.00000001	0.00001505
9	Yes	7	0.00000001	0.00001659
10	Yes	7	0.00000001	0.00001649
11	Yes	6	0.00000001	0.00001238
12	Yes	7	0.00000001	0.00001579
13	Yes	7	0.00000001	0.00001702
14	Yes	5	0.00000001	0.00002844
15	Yes	7	0.00000001	0.00002472
16	Yes	7	0.00000001	0.00003712
17	Yes	7	0.00000001	0.00003740
18	Yes	7	0.00000001	0.00002494
19	Yes	7	0.00000001	0.00003892
20	Yes	7	0.00000001	0.00003742
21	Yes	7	0.00000001	0.00002511
22	Yes	7	0.00000001	0.00003930
23	Yes	7	0.00000001	0.00003932
24	Yes	7	0.00000001	0.00002551
25	Yes	7	0.00000001	0.00003787
26	Yes	7	0.00000001	0.00003909
27	Yes	5	0.00000001	0.00007080
28	Yes	6	0.00000001	0.00003916
29	Yes	6	0.00000001	0.00003971
30	Yes	5	0.00000001	0.00005997
31	Yes	6	0.00000001	0.00004305
32	Yes	6	0.00000001	0.00003825
33	Yes	5	0.00000001	0.00007174
34	Yes	6	0.00000001	0.00004207
35	Yes	6	0.00000001	0.00004186
36	Yes	5	0.00000001	0.00006107
37	Yes	6	0.00000001	0.00003874
38	Yes	6	0.00000001	0.00004321

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 134	58.707	36	3.1744	0.0135
L2	137.25 - 120.75	32.352	36	2.4810	0.0051
L3	120.75 - 107.75	24.425	36	2.0695	0.0035
L4	107.75 - 88.5	19.176	36	1.7867	0.0026
L5	92.75 - 80.75	14.043	36	1.4829	0.0019
L6	80.75 - 53.75	10.520	36	1.2968	0.0016
L7	53.75 - 43	4.596	36	0.8053	0.0008
L8	48.25 - 28.25	3.720	36	0.7171	0.0007
L9	28.25 - 0	1.252	36	0.4311	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Lighting Rod 5/8" x 5'	36	58.707	3.1744	0.0135	16660
170.00	(2) LPA-80080/6CF w/ Mount Pipe	36	52.125	3.0466	0.0112	8329
160.00	(2) 7770.00 w/ Mount Pipe	36	45.688	2.9068	0.0091	4163
158.00	(2) RRUS-11	36	44.431	2.8764	0.0086	3785
78.00	8225	36	9.788	1.2515	0.0015	3090

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 134	167.747	11	9.0436	0.0389
L2	137.25 - 120.75	92.747	11	7.1022	0.0147
L3	120.75 - 107.75	70.086	11	5.9321	0.0099
L4	107.75 - 88.5	55.054	11	5.1255	0.0075
L5	92.75 - 80.75	40.336	11	4.2572	0.0055
L6	80.75 - 53.75	30.228	11	3.7244	0.0045
L7	53.75 - 43	13.216	11	2.3148	0.0024
L8	48.25 - 28.25	10.697	11	2.0618	0.0021
L9	28.25 - 0	3.603	11	1.2400	0.0012

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Lighting Rod 5/8" x 5'	11	167.747	9.0436	0.0389	6152
170.00	(2) LPA-80080/6CF w/ Mount Pipe	11	149.039	8.6896	0.0323	3074
160.00	(2) 7770.00 w/ Mount Pipe	11	130.735	8.3008	0.0261	1534
158.00	(2) RRUS-11	11	127.158	8.2158	0.0249	1393
78.00	8225	11	28.128	3.5945	0.0043	1086

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	180 - 134 (1)	TP26.374x17.62x0.25	46.00	0.00	0.0	39.000	20.2386	-6.93	789.31	0.009
L2	134 - 120.75 (2)	TP28.3956x25.2555x0.312 5	16.50	0.00	0.0	39.000	27.8549	-9.22	1086.34	0.008
L3	120.75 - 107.75 (3)	TP30.8696x28.3956x0.413 5	13.00	0.00	0.0	33.708	39.9730	-11.36	1347.41	0.008
L4	107.75 - 88.5 (4)	TP34.533x30.8696x0.443	19.25	0.00	0.0	33.738	46.7919	-14.18	1578.67	0.009
L5	88.5 - 80.75 (5)	TP35.3829x32.8383x0.499 8	12.00	0.00	0.0	33.786	55.3406	-17.43	1869.74	0.009
L6	80.75 - 53.75 (6)	TP40.5212x35.3829x0.481 9	27.00	0.00	0.0	33.936	61.2434	-23.80	2078.36	0.011
L7	53.75 - 43 (7)	TP42.567x40.5212x0.5201	10.75	0.00	0.0	34.680	67.7616	-25.27	2349.97	0.011
L8	43 - 28.25 (8)	TP44.624x40.5277x0.5088	20.00	0.00	0.0	34.740	68.1040	-29.27	2365.93	0.012
L9	28.25 - 0 (9)	TP50x44.624x0.5012	28.25	0.00	0.0	34.806	78.7385	-40.25	2740.57	0.015

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	180 - 134 (1)	TP26.374x17.62x0.25	500.80	47.271	39.000	1.212	0.00	0.000	39.000	0.000
L2	134 - 120.75 (2)	TP28.3956x25.2555x0.31 25	785.55	48.994	39.000	1.256	0.00	0.000	39.000	0.000
L3	120.75 - 107.75 (3)	TP30.8696x28.3956x0.41 35	1024.6 9	41.164	33.708	1.221	0.00	0.000	33.708	0.000
L4	107.75 - 88.5 (4)	TP34.533x30.8696x0.443	1318.8 3	41.407	33.738	1.227	0.00	0.000	33.738	0.000
L5	88.5 - 80.75 (5)	TP35.3829x32.8383x0.49 98	1569.2 2	39.785	33.786	1.178	0.00	0.000	33.786	0.000
L6	80.75 - 53.75 (6)	TP40.5212x35.3829x0.48 19	2179.0 6	43.394	33.936	1.279	0.00	0.000	33.936	0.000
L7	53.75 - 43 (7)	TP42.567x40.5212x0.520 1	2310.6 7	40.592	34.680	1.170	0.00	0.000	34.680	0.000
L8	43 - 28.25 (8)	TP44.624x40.5277x0.508 8	2569.6 3	43.690	34.740	1.258	0.00	0.000	34.740	0.000
L9	28.25 - 0 (9)	TP50x44.624x0.5012	3561.2 7	44.535	34.806	1.280	0.00	0.000	34.806	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	180 - 134 (1)	TP26.374x17.62x0.25	16.66	0.823	26.000	0.063	1.28	0.059	26.000	0.002
L2	134 - 120.75 (2)	TP28.3956x25.2555x0.31 25	17.84	0.641	26.000	0.049	1.28	0.039	26.000	0.001
L3	120.75 - 107.75 (3)	TP30.8696x28.3956x0.41 35	18.97	0.474	22.472	0.042	1.29	0.025	22.472	0.001
L4	107.75 - 88.5 (4)	TP34.533x30.8696x0.443	20.27	0.433	22.492	0.039	1.31	0.020	22.492	0.001
L5	88.5 - 80.75 (5)	TP35.3829x32.8383x0.49 98	21.41	0.387	22.524	0.034	1.32	0.016	22.524	0.001
L6	80.75 - 53.75 (6)	TP40.5212x35.3829x0.48 19	23.73	0.387	22.624	0.034	1.52	0.015	22.624	0.001

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 $\frac{f_{vt}}{F_{vt}}$
L7	53.75 - 43 (7)	TP42.567x40.5212x0.520 1	24.16	0.357	23.120	0.031	1.53	0.013	23.120	0.001
L8	43 - 28.25 (8)	TP44.624x40.5277x0.508 8	25.10	0.369	23.160	0.032	1.54	0.013	23.160	0.001
L9	28.25 - 0 (9)	TP50x44.624x0.5012	27.56	0.350	23.204	0.030	1.61	0.010	23.204	0.000

Pole Interaction Design Data

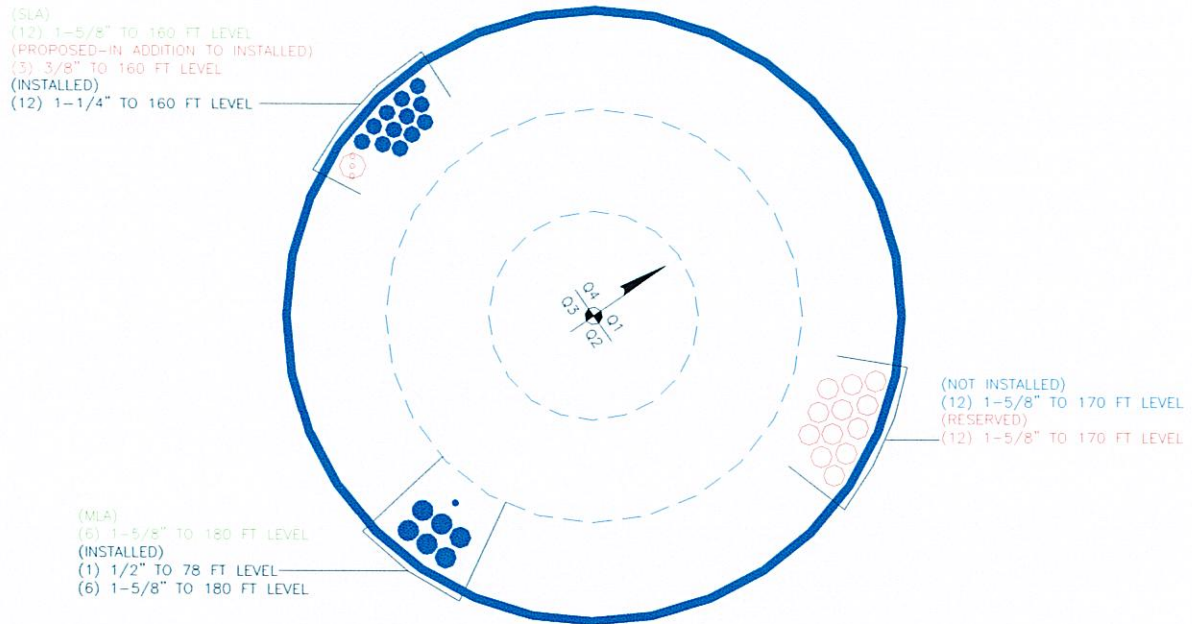
Section No.	Elevation ft	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Ratio f_v F_v	Ratio f_{vt} F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 134 (1)	0.009	1.212	0.000	0.063	0.002	1.222	1.333	H1-3+VT ✓
L2	134 - 120.75 (2)	0.008	1.256	0.000	0.049	0.001	1.265	1.333	H1-3+VT ✓
L3	120.75 - 107.75 (3)	0.008	1.221	0.000	0.042	0.001	1.230	1.333	H1-3+VT ✓
L4	107.75 - 88.5 (4)	0.009	1.227	0.000	0.039	0.001	1.237	1.333	H1-3+VT ✓
L5	88.5 - 80.75 (5)	0.009	1.178	0.000	0.034	0.001	1.187	1.333	H1-3+VT ✓
L6	80.75 - 53.75 (6)	0.011	1.279	0.000	0.034	0.001	1.290	1.333	H1-3+VT ✓
L7	53.75 - 43 (7)	0.011	1.170	0.000	0.031	0.001	1.181	1.333	H1-3+VT ✓
L8	43 - 28.25 (8)	0.012	1.258	0.000	0.032	0.001	1.270	1.333	H1-3+VT ✓
L9	28.25 - 0 (9)	0.015	1.280	0.000	0.030	0.000	1.294	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	180 - 134	Pole	TP26.374x17.62x0.25	1	-6.93	1052.14	91.7	Pass
L2	134 - 120.75	Pole	TP28.3956x25.2555x0.3125	2	-9.22	1448.09	94.9	Pass
L3	120.75 - 107.75	Pole	TP30.8696x28.3956x0.4135	3	-11.36	1796.10	92.3	Pass
L4	107.75 - 88.5	Pole	TP34.533x30.8696x0.443	4	-14.18	2104.37	92.8	Pass
L5	88.5 - 80.75	Pole	TP35.3829x32.8383x0.4998	5	-17.43	2492.36	89.1	Pass
L6	80.75 - 53.75	Pole	TP40.5212x35.3829x0.4819	6	-23.80	2770.45	96.8	Pass
L7	53.75 - 43	Pole	TP42.567x40.5212x0.5201	7	-25.27	3132.51	88.6	Pass
L8	43 - 28.25	Pole	TP44.624x40.5277x0.5088	8	-29.27	3153.78	95.3	Pass
L9	28.25 - 0	Pole	TP50x44.624x0.5012	9	-40.25	3653.18	97.1	Pass
							Summary	
							Pole (L9)	97.1
							RATING =	97.1
								Pass

APPENDIX B

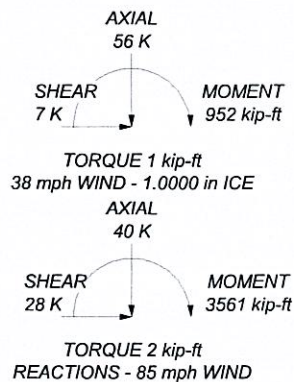
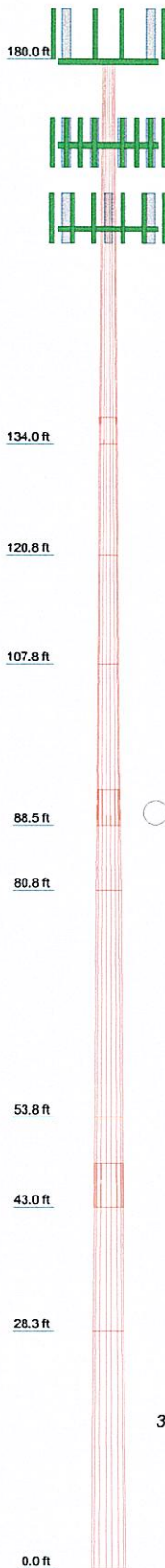
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9
Length (ft)	46.00	16.50	13.00	19.25	12.00	27.00	10.75	20.00	28.25
Number of Sides	18	18	18	18	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.4135	0.4430	0.4998	0.4819	0.5201	0.5088	0.5012
Socket Length (ft)	3.25			4.25			5.25		
Top Dia (in)	17.6200	25.2555	28.3956	30.8696	32.6383	35.3829	40.5212	40.5277	44.6240
Bot Dia (in)	28.3740	28.3956	30.8696	34.5330	35.3829	40.5212	42.5670	44.6240	50.0000
Grade	A572-65		Reinf 56.18 ksi	Reinf 56.23 ksi	Reinf 56.31 ksi	Reinf 56.55 ksi	Reinf 57.80 ksi	Reinf 57.90 ksi	Reinf 58.01 ksi
Weight (K)	2.7	1.5	1.7	3.0	2.2	5.3	2.5	4.8	7.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 5"	180	AM-X-CD-17-65-00T-RET w/ Mount Pipe	160
(2) DB980H90E-M w/ Mount Pipe	180	Platform Mount [LP 303-1]	160
(2) DB980H90E-M w/ Mount Pipe	180	(2) 7770.00 w/ Mount Pipe	160
(2) DB980H90E-M w/ Mount Pipe	180	(2) LGP21401	160
Platform Mount [LP 601-1]	180	(2) LGP21901	160
(2) 5' x 2' Pipe Mount	180	AM-X-CD-17-65-00T-RET w/ Mount Pipe	160
5' x 2' Pipe Mount	180	(2) 7770.00 w/ Mount Pipe	160
(2) 5' x 2' Pipe Mount	180	(2) LGP21401	160
8-ft Ladder	180	(2) LGP21901	160
(2) LPA-80080/6CF w/ Mount Pipe	170	AM-X-CD-17-65-00T-RET w/ Mount Pipe	160
(2) LPA-80080/6CF w/ Mount Pipe	170	DC6-48-60-18-8F	160
(2) LPA-80080/6CF w/ Mount Pipe	170	(2) 7770.00 w/ Mount Pipe	160
BXA-185063/12CF w/ Mount Pipe	170	(2) RRUS-11	158
BXA-185063/12CF w/ Mount Pipe	170	Side Arm Mount [SO 102-3]	158
BXA-70063/6CF w/ Mount Pipe	170	(2) RRUS-11	158
BXA-70063/6CF w/ Mount Pipe	170	(2) RRUS-11	158
BXA-70063/6CF w/ Mount Pipe	170	8225	78
Platform Mount [LP 303-1]	170	Side Arm Mount [SO 701-1]	78
(2) LGP21401	160		
(2) LGP21901	160		

TOWER DESIGN NOTES

1. Tower is located in Windham 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 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 97.1%

 Paul J. Ford and Company 250 East Broad Street #1500 Columbus, OH 43215 Phone: (614) 221-6679 FAX: (614) 448-4105	Job: 180 Ft Monopole - 37512-2172BP_AERO		
	Project: BU#876375		
	Client: Crown Castle	Drawn by: D. Scott Kramer, P.E.	App'd:
	Code: TIA/EIA-222-F	Date: 11/02/12	Scale: NTS
	Path: G:\TOWERS\375. Crown Castle\2012\37512-2172-BU 876375\DWG 545427-BU 876375\37512-2172BP_AERO.dwg	Dwg No. E-1	

Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: 876375

Site Name: Canterbury/Lemire

App #: 157966 Rev. 2

Pole Manufacturer: Other

Anchor Rod Data

Qty: 16
Diam: 2.25 in
Rod Material: A615-J
Strength (Fu): 100 ksi
Yield (Fy): 75 ksi
Bolt Circle: 60 in

Plate Data

Diam: 65 in
Thick: 2 in
Grade: 50 ksi
Single-Rod B-eff: 9.92 in

Stiffener Data (Welding at both sides)

Config: 1 *
Weld Type: Fillet
Groove Depth: 0.5 <-- Disregard
Groove Angle: 45 <-- Disregard
Fillet H. Weld: 0.75 in
Fillet V. Weld: 0.375 in
Width: 6 in
Height: 18 in
Thick: 1 in
Notch: 0.75 in
Grade: 50 ksi
Weld str.: 70 ksi

Pole Data

Diam: 50 in
Thick: 0.375 in
Grade: 65 ksi
of Sides: 18 "0" IF Round
Fu: 80 ksi
Reinf. Fillet Weld: 0 "0" if None

Stress Increase Factor

ASIF: 1.333

Reactions

Moment: 3561 ft-kips
Axial: 40 kips
Shear: 28 kips

If No stiffeners, Criteria: AISC ASD <--Only Applicable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension: 175.6 Kips
Allowable Tension: 195.0 Kips
Anchor Rod Stress Ratio: 90.0% Pass

Stiffened

Service, ASD
Fty*ASIF

Base Plate Results

Base Plate Stress: 45.9 ksi
Allowable Plate Stress: 50.0 ksi
Base Plate Stress Ratio: 91.9% Pass

Flexural Check

Stiffened

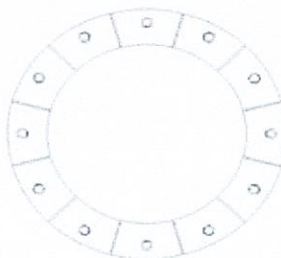
Service, ASD
0.75*Fy*ASIF
Y.L. Length:
N/A, Roark

Stiffener Results

Horizontal Weld : 82.1% Pass
Vertical Weld: 54.7% Pass
Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: 16.8% Pass
Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: 64.8% Pass
Plate Comp. (AISC Bracket): 65.1% Pass

Pole Results

Pole Punching Shear Check: 14.8% 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

Foundation Loads:

Tower leg compression = 40 (kips)
Horizontal load at top of pier = 28 (kips)
Overturning moment at top of pier= 3561 (ft-kips)

Design criteria:

Safety factor against overturning = 1.5

Soil Properties:

Soil density = 125 (pcf)
Allowable soil bearing = 6 (ksf)
Depth to water table = 99 (ft)

Dimensions:

Pier shape (round or square) S ("R" or "S")
Pier width = 6.5 (ft)
Pier height above grade = 1 (ft)
depth to bottom of footing = 5 (ft)
Footing thickness = 3 (ft)
Footing width = 24.5 (ft)
Footing length = 24.5 (ft)

Concrete:

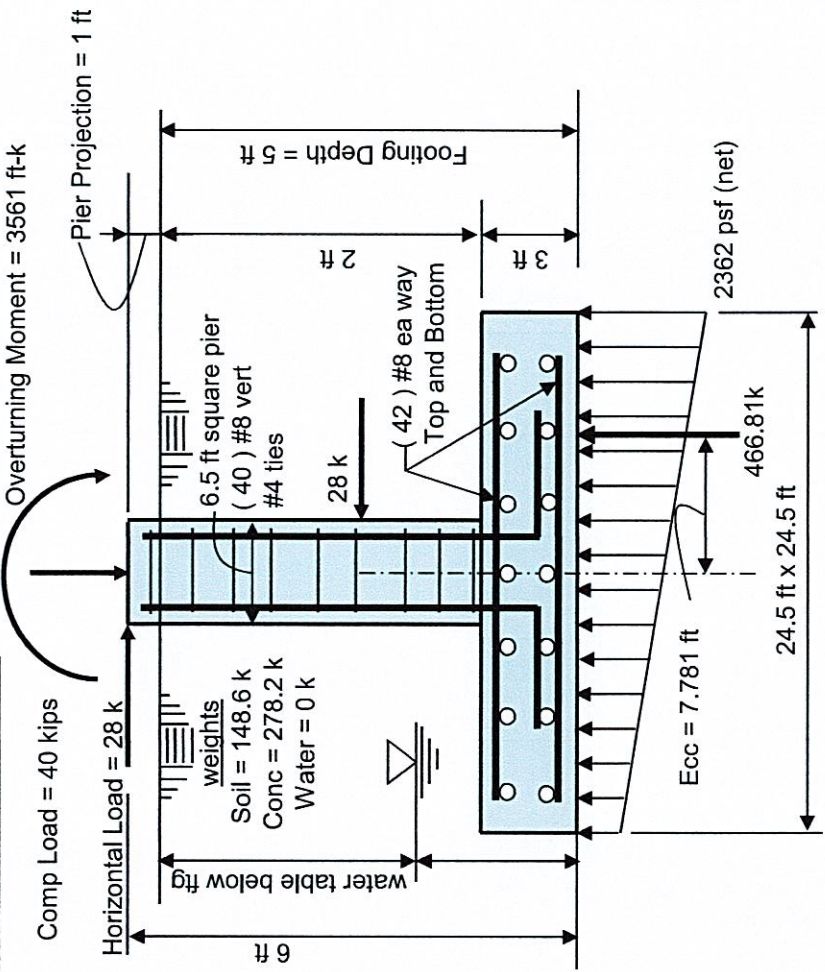
Concrete strength = 4 (ksi)
Rebar strength = 60 (ksi)
ultimate load factor = 1.3

Reinforcing Steel:

minimum cover over rebar = 3 inches
size of pad rebar = #8 bar
quantity of pad rebar = 42 (ea direction)

Reinforcing Steel:

size of vert rebar in pier= #8 bar
vertical rebar quantity = 40
size of pier ties = #4 bar
minimum cover over rebar = 3 inches
Total volume of concrete = 68.7 cu yd



Summary of analysis results			
Maximum Net Soil Bearing = 2.362 ksf		Ult Bending Shear Capacity = 126 psi	
Allowable Net Soil Bearing = 6 ksf		Ult Bending Shear Stress = 41 psi	
Soil Bearing Stress Ratio = 0.39 Okay		Bending Shear Stress Ratio = 0.33 Okay	
Ftg Overturning Resistance = 5718 ft-kips		Pad Bending Moment Capacity= 4555 ft-k	
Overturning Moment = 3632 ft-kips		Pad Bending Moment = 1943 ft-k	
Required Overturning Safety Factor = 1.5		Bending Moment Stress Ratio = 0.43 OK	
Overturning Safety Factor = 1.574			
Ratio = 0.95 Okay			

General Information:

File Name: G:\TOWER\375_Crown_Castle\2012\37512-2172 BU 876375\WO 545427 BU 876375\37512-2172BP.col
 Project: 37512-2172
 Column: Pad and Pier Engineer: CMC
 Code: ACI 318-02 Units: English
 Run Option: Investigation Slenderness: Not considered
 Run Axis: X-axis Column Type: Structural

Material Properties:

f'c = 4 ksi fy = 60 ksi
 Ec = 3605 ksi Es = 29000 ksi
 Ultimate strain = 0.003 in/in
 Beta1 = 0.85

Section:

Rectangular: Width = 78 in Depth = 78 in
 Gross section area, Ag = 6084 in^2
 Ix = 3.08459e+006 in^4 Iy = 3.08459e+006 in^4
 rx = 22.5167 in ry = 22.5167 in
 Xo = 0 in Yo = 0 in

Reinforcement:

Bar Set: ASTM A615

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

Confinement: Tied; #4 ties with #10 bars, #4 with larger bars.
 phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

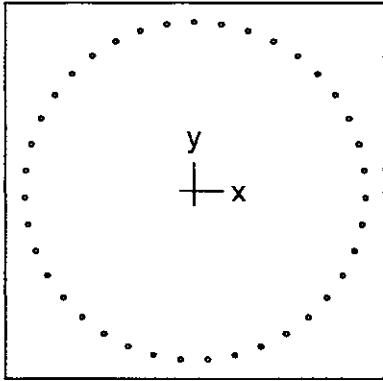
Layout: Circular
 Pattern: All Sides Equal (Cover to transverse reinforcement)
 Total steel area: As = 30.81 in^2 at rho = 0.51% (Note: rho < 1.0%)
 Minimum clear spacing = 4.63 in

39 #8 Cover = 3 in

Factored Loads and Moments with Corresponding Capacities:

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	40.00	4738.50	5056.12	1.067	6.65	73.89	0.03039	0.900

*** End of output ***



78 x 78 in

Code: ACI 318-02

Units: English

Run axis: About X-axis

Run option: Investigation

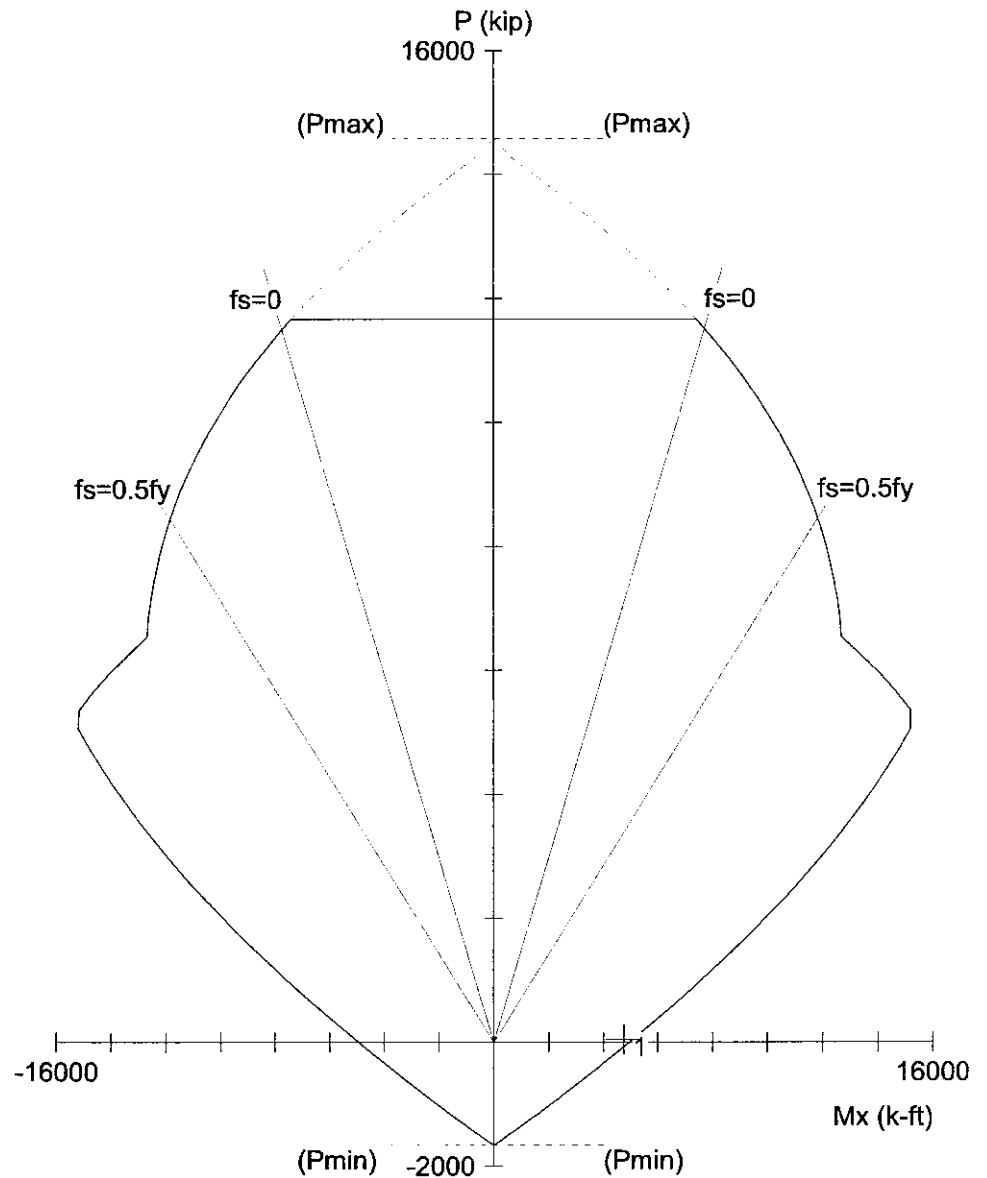
Slenderness: Not considered

Column type: Structural

Bars: ASTM A615

Date: 11/02/12

Time: 13:39:08



spColumn v4.80. Licensed to: Paul J. Ford and Company - Columbus. License ID: 58800-1028985-4-1E6CD-22701

File: G:\TOWER\375_Crown_Castle\2012\37512-2172 BU 876375\WO 545427 BU 876375\37512-2172BP.col

Project: 37512-2172

Column: Pad and Pier

Engineer: CMC

$f_c = 4$ ksi

$f_y = 60$ ksi

$A_g = 6084$ in²

39 #8 bars

$E_c = 3605$ ksi

$E_s = 29000$ ksi

$A_s = 30.81$ in²

$\rho = 0.51\%$

$f_c = 3.4$ ksi

$X_o = 0.00$ in

$I_x = 3.08459e+006$ in⁴

$e_u = 0.003$ in/in

$Y_o = 0.00$ in

$I_y = 3.08459e+006$ in⁴

Beta1 = 0.85

Min clear spacing = 4.63 in

Clear cover = 3.50 in

Confinement: Tied

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

CROWN CASTLE PROJECT: BU #876375; CANTERBURY/LEMIRE, CANTERBURY, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIAEIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 85 MPH AND 38 MPH + 1" RADIAL ICE

A. GENERAL NOTES

- 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.
- 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 TIAEIA-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.
- 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.
- 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 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."
- 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.
- 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.
- 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.
- 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.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
- 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.
- 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. LOW HEAT WELDING PROCEDURES: - (NOT REQUIRED)

C. SPECIAL INSPECTION AND TESTING

- 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.
- 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.
- OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- 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.
 - ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
 - 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.
- 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.
 - GENERAL:
 - 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.
 - FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
 - CONCRETE TESTING PER ACI - (NOT REQUIRED)
- STRUCTURAL STEEL
 - CHECK THE STEEL ON THE JOB WITH THE PLANS.
 - CHECK MILL CERTIFICATIONS.
 - CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
 - INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
 - CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
 - CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
 - CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
 - CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
- WELDING:
 - VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
 - INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
 - APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER
 - 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.
 - INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
 - INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
 - VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
 - INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
 - VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
 - SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
 - INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
 - VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
 - REVIEW THE REPORTS BY TESTING LABS.
 - CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
 - INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
 - CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
- SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:
 - PRIOR TO CONSTRUCTION, THE TESTING AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
 - AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE 5.F.(1.) ABOVE.
 - REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.
- REPORTS:
 - COMPLETE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
- 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.
- 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.
- 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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CROWN CASTLE

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PH: (704) 321-3811 FAX: (704) 416-4950

BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:
37512-2172
DRAWN BY:
S.S.
CHECKED BY:
D.S.K.
APPROVED BY:

ISSUE DATE OF
PERMIT: 11-2-2012

DATE:
11-2-2012

S-1

- D. STRUCTURAL STEEL**
- STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
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).
 - BY THE AMERICAN WELDING SOCIETY (AWS):
(A) "STRUCTURAL WELDING CODE" STEEL D1.1.
(B) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
 - 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.
 - TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE A193 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.
 - 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.
 - 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.
 - STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 - 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.
 - 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).
 - 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.
 - NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
 - 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**
- NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCO), OR APPROVED EQUAL WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
 - GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.
- 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**
- THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRASIONED 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 1-800-451-3276 FOR PRODUCT INFORMATION.
 - 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.
 - 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**
- HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
 - PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
 - DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
 - ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.
- K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
- 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.
 - 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 DETEIORATION 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 DETEIORATION 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.
 - 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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BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:
37512-2172
DRAWN BY:
S.S.
CHECKED BY:
D.S.K.
APPROVED BY:
DATE:
11-2-2012

ISSUE DATE OF
PERMIT: 11-2-2012

S-2

AJAX BOLT NOTE SHEET: REV. 1.2, 01-23-2012

- 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 F559 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](http://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML)

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" 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.

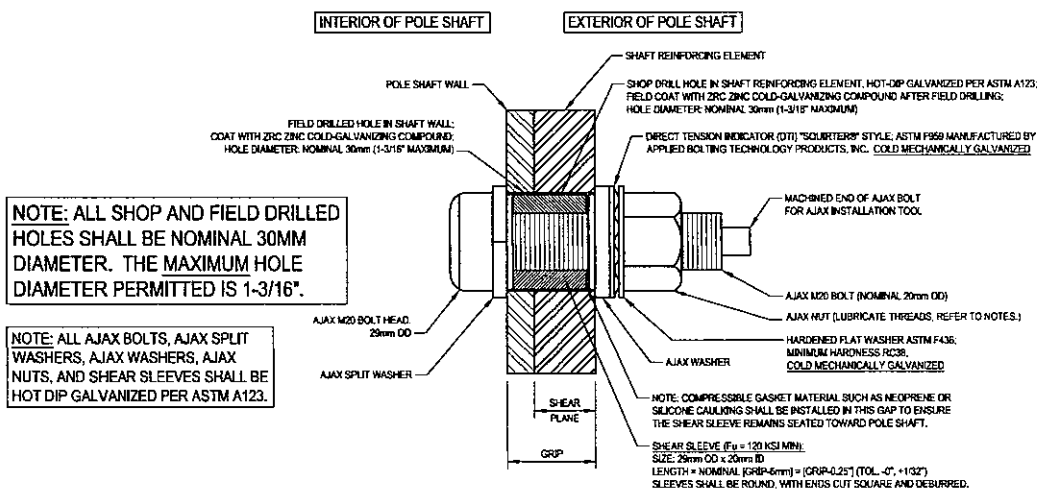
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY 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.



TYPICAL AJAX BOLT DETAIL 1
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BU #876375; CANTERBURY/LEMIRE
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S-3

NOTE: NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY.

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37512-2172), DATED 11-2-2012.

POLE SPECIFICATIONS

POLE SHAPE TYPE:	18-SIDED POLYGON
TAPER:	0.19360 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL. STEEL:	ASTM A633 GR. E (50 KSI)
ANCHOR RODS:	2 1/4" x 9"
	#18J ASTM A615 GRADE 75

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	46.00	0.2500	30.00	17.620	26.374
2	48.75	0.3125	51.00	25.255	34.533
3	49.75	0.3750	63.00	33.099	42.567
4	48.25	0.3750		40.818	50.000

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 SPICE PLATE LOCATION AND AN EXTRA LONG "SPICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPICE PLATE LOCATION.

NOTES:

- 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.
- ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009.
- 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 ON SHEET S-3 FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
- DTIS REQUIRED: * ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. DTIS SHALL BE THE SOURCE-TYPE STYLE, MADE TO ASTM F959 LATEST REVISION, AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 35 OR HIGHER.
- 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. REFER TO SHEET S-3.
- AJAX BOLT HOLE SIZE: ALL SHOP- AND FIELD-DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16". REFER TO SHEET S-3.

* AS OF 5/20/2012, UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC TURN-OF-THE-NUT METHODOLOGY. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-THE-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PUL.

NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. PLEASE SEE ENG-SOW-1033 - TOWER BASE PLATE NDE AND ENG-SUL-10051 - NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE BOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

REINFORCING BAR SPICE DETAILS TO BE COORDINATED BY RESPECTIVE CONTRACTORS.

NEW AEROSOLUTIONS MP3 REINFORCING (OPTION #1)

ELEVATION	FLAT #	REINFORCING ELEMENT
5'-6" TO 30'-6"	18	MP305
0'-6" TO 30'-6"	6 & 12	MP305
25'-0" TO 55'-0"	4, 10 & 16	MP305
52'-3" TO 82'-3"	6, 12 & 18	MP304
79'-3" TO 109'-3"	4, 10 & 16	MP304
105'-6" TO 121'-6"	6, 12 & 18	MP300

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH-STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. $F_u=105$ KSI). CONTACT SUPPLIER FOR MATERIAL, PLATE & BOLTS AND INSTALLATION PROCEDURES.

NEW SABRE FLAT PLATE REINFORCING (OPTION #2)

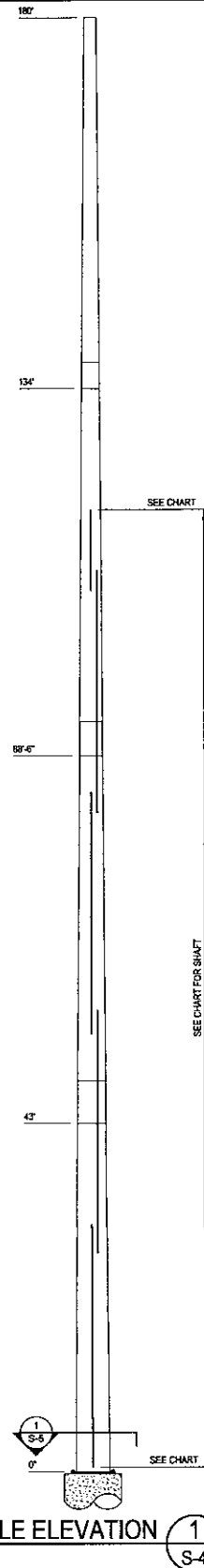
ELEVATION	FLAT #	REINFORCING ELEMENT
5'-6" TO 30'-6"	18	MS-650
0'-6" TO 30'-6"	6 & 12	MS-650
25'-0" TO 55'-0"	4, 10 & 16	MS-650
52'-3" TO 82'-3"	6, 12 & 18	MS-650
79'-3" TO 109'-3"	4, 10 & 16	MS-650
102'-6" TO 122'-6"	6, 12 & 18	MS-650

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH-STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. $F_u=105$ KSI). CONTACT SUPPLIER FOR MATERIAL, PLATE & BOLTS AND INSTALLATION PROCEDURES.

NEW CCI FLAT PLATE (100 KSI) REINFORCING (OPTION #3)

ELEVATION	FLAT #	REINFORCING ELEMENT
5'-6" TO 30'-6"	18	ISP4JR-1004
0'-6" TO 30'-6"	6 & 12	ISP4JR-1004
27'-0" TO 57'-0"	4, 10 & 16	ISP4JR-1004
54'-0" TO 84'-0"	6, 12 & 18	ISP4JR-0754
81'-6" TO 111'-6"	4, 10 & 16	ISP4JR-0754
108'-0" TO 118'-0"	6, 12 & 18	ISP4JR-0754

NOTES FOR CROWN REINFORCING OPTION (100 KSI) MATERIAL:
 1. DO NOT FIELD WELD DIRECTLY TO THE 100 KSI MATERIAL.
 2. THE 100 KSI MATERIAL SHALL CONFORM TO THE FOLLOWING:
 A. MATERIAL SHALL BE ASTM A514, GRADE A, GRADE E, or GRADE F, HAVING A MINIMUM TENSILE STRENGTH (F_u) OF 110 KSI AND A MINIMUM YIELD STRENGTH (F_y) OF 100 KSI.
 B. MATERIAL SHALL BE HEAT TREATED, QUENCHED AND TEMPERED PER ASTM A514.
 C. MATERIAL SHALL HAVE CHARPY V-NOTCH (CVN) IMPACT VALUES OF NOT LESS THAN 15 FT-LB AT -20 DEGREES F, IN ACCORDANCE WITH ASTM A570.
 D. MINIMUM INSIDE BEND RADIUS FOR COLD BENDING, PER ASTM A6 TABLE X4.2, SHALL BE 4X MINIMUM.
 E. ANY AND ALL WELDING TO THE MATERIAL SHALL BE PERFORMED ACCORDING TO AN APPROVED WELDING PROCEDURE SPECIFICATION (WPS) SUITABLE FOR THE GRADE AND INTENDED USE AND SERVICE. THE WPS SHALL BE DEVELOPED BY A QUALIFIED CWI AND IN ACCORDANCE WITH AWS D1.1. PRIOR TO ANY WORK, FABRICATION OR WELDING, THE WPS SHALL BE SUBMITTED TO CROWN CASTLE AND PAUL J. FORD AND COMPANY FOR REVIEW.



POLE ELEVATION 1 S-4



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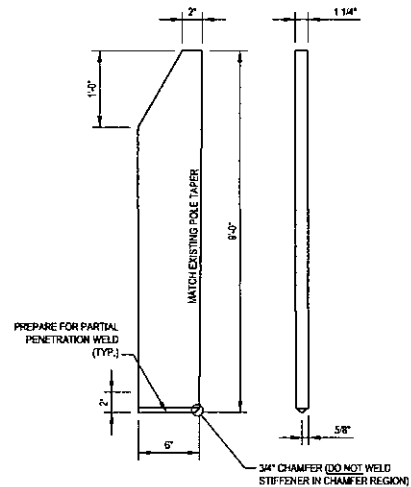
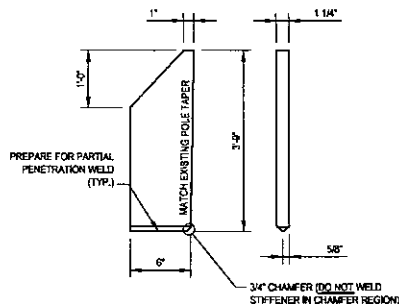
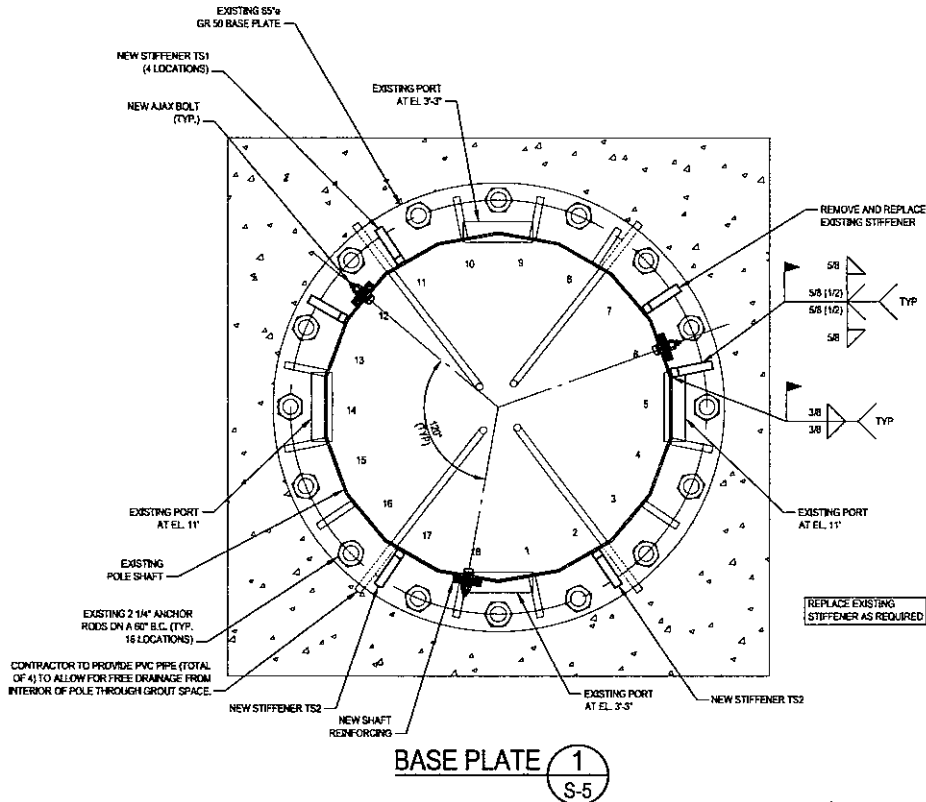
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SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:

- (1) PRIOR TO CONSTRUCTION, CONTRACTOR'S INSPECTION AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE CONTRACTOR'S INSPECTION AGENCY SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS, VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. CONTRACTOR SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER BEFORE PROCEEDING WITH WORK. CONTRACTOR SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
- (2) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD WELDS AND FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE (1) ABOVE.

GENERAL NOTES:

1. AJAX BOLTS ARE TO BE 20 mm Ø WITH CORRESPONDING 28 mm Ø SHEAR SLEEVE WITH MATCHING STEEL GRADE. DRILLED HOLE DIAMETERS IN REINFORCING STEEL AND EXISTING SHAFT SHALL BE 1/315" MAX.
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 ZNC-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 WELD ELECTRODES SHALL BE E80XX.



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BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:
37512-2172
DRAWN BY:
S.S.
CHECKED BY:
D.S.K.
APPROVED BY:
DATE:
11-2-2012

ISSUE DATE OF
PRELIM: 11-2-2012

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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 REMAINS WITH THE EOR AT ALL TIMES.

ALL MIs 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-SOW-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 INFIELDED 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 AND ENG-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 INSPECTIONS 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 MIs

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 INSPECTIONS 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 AESV/SEV 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 INFIELDED 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
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
X	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	INSPECTION OF BOLT PRETENSION PER AISC BOLT SPEC.
X	INSPECTION OF AIA/BOLTS AND DTTS PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT

NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT



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BU #876375; CANTERBURY/LEMIRE
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**CROWN CASTLE PROJECT, BU #876375, CANTERBURY/LEMIRE, CANTERBURY, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 10/2008)**

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE T-ALPHA-222-1133 STANDARD FOR WIND SPEEDS OF 85 MPH AND 10 MPH + 1" RADIAL ICE.

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 REPORTED 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 T-ALPHA-222-1133 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 AND SUPPORT 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 REPAIR 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 PREVENTION AND SAFETY GUIDELINES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 1901-2005 CROWN CASTLE DIRECT METHOD CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY CUTTING AND WELDING. PER ANY DOCUMENTS FOR AN APPROVED PROCESS 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. ALL SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONSULTING 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 CONTRACTORS PERFORMANCE AND SHALL NOT BE CONSIDERED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM 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 OBTAINING, 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 SH-FT 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. IF 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. LOW HEAT WELDING PROCEDURES: (NOT REQUIRED)

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 ENGINEERING FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONSULTING 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 CONTRACTORS PERFORMANCE AND SHALL NOT BE CONSIDERED 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 BE SCHEDULED TO WORK AS TO CAUSE A MINIMUM OF INTERUPTION TO, AND COORDINATE WITH THE WORK 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 EITHER LICENSED INSPECTORS INCLUDING AND CERTIFIED WELDING INSPECTORS (CWI) INSPECTORS SHALL HAVE THE TRAINING, EXPERIENCE, AND EXPERIENCE APPROPRIATE FOR AND COMPENSATE 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 ENTIRE CONTRACTOR'S WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD FINDINGS OR DISCREPANCIES OCCUR.
 - B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION: (NOT REQUIRED)
 - C. CONCRETE TESTING PER ACH-1002 (REQUIRED)
 - D. STRUCTURAL STEEL
 - (1) CHECK THE STEEL ON THE JOB WITH THE PLANS.
 - (2) CHECK ALL CERTIFICATIONS.
 - (3) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
 - (4) ASPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
 - (5) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
 - (6) INSPECT STEEL MEMBERS FOR SIZES, DIMENSIONS AND DIMENSIONAL TOLERANCES.
 - (7) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
 - (8) CHECK BOLT TIGHTENING ACCORDING TO ASPECT 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 IS 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 THAT THE BASE METAL CONFORMS TO THE DRAWINGS 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 SH-FT-TO-LARGE WELD CONNECTIONS
 - (1) PRIOR TO CONSTRUCTION, TESTING AGENCY SHALL INSPECT LOCATION OF EXISTING SH-FT-TO-BASE PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS, VISUAL, MAGNETIC PARTICLE, AND/OR ULTRASONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNERS REQUIRED PROCEDURES AND PROCEEDURES. IMPORTANT: THE TESTING AGENCY SHALL REPORT ALL DEFECTS AND INDICATIONS OF CRACKS, FRACTURES, STRESS, AND/OR DISCONTINUITIES TO THE OWNER AND THE ENGINEER.
 - (2) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE F(1) ABOVE.
 - (3) REFER TO CROWN CASTLE DOCUMENTS ENGINEERING AND ENGINEERING FOR SPECIFICATIONS.
 - G. REPORTS
 - (1) COMPLETE 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 THE PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTORS PERFORMANCE TO DETERMINE 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 OWNERS ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNERS 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 CORRECTION OF STRUCTURAL ISSUES.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S COMPLIANCE OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY VIOLATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.



NOV 02 2012

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**BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT NO. 876375	ISSUE DATE OF PERMIT: 11-2-2012
DRAWN BY S.S.	
CHECKED BY D.S.K.	
APPROVED BY B.K.M.	S-1
DATE 11-2-2012	

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL, MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
 - (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)
2. BY THE AMERICAN WELDING SOCIETY (AWS):
 - (A) "STRUCTURAL WELDING CODE" STEEL D1.1
 - (B) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
3. 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.
4. TO FIT ALL STRUCTURAL BOLTS, INCLUDING THE ANCHOR BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE ASSOCIATION OF THE NUT METHOD. TIGHTEN BOLTS 1/2 TURN PAST THE TIGHT TIGHT CONDITION AS DEFINED BY AWS.
5. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E60XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
6. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDER CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
7. STRUCTURAL STEEL BOLTS SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI/MN) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
8. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION 1 NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
9. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION 1 FOR FURTHER NOTES AND FOR EXCEPTIONS IF ANY.
10. 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.
11. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
12. 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 GRIND SMOOTH AND DEBURRED. 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

1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EPOXY GROUT BY EPOLOD, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
2. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER CASTING PROCEDURES IF NECESSARY. THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
3. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO JOINTS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLO (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

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 ABRASIONED 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 ZINC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.8 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-431-1274 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-HYDRANT ANCHOR DRILLING HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K.

1. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER.
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.
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 DETEIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATINGS 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 DETEIORATION 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.
2. THE OWNER SHALL REFER TO T&E-222-F-1998, 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 T&E-222-F-1998 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".



NOV 02 2012

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BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT NO.
375-2-2-12
DRAWN BY
SS
CHECKED BY
DSK
APPROVED BY
BKE
DATE
11-2-2012

ISSUE DATE OF
PERMIT: 11-2-2012

S-2

AJAX BOLT NOTE SHEET, REV. 1.2, 01-23-2012

- 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 (DTIS) AND HARDENED WASHERS. DTIS SHALL BE THE SQUIRTERS' 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 (DTIS):

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

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTERS' STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOW FALLS, VERMONT, USA 05103
PHONE 1-802-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTERS' DTIS:
[HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLT-NG-DISTRIBUTORS-HTML](http://WWW.APPLIEDBOLTING.COM/APPLIED-BOLT-NG-DISTRIBUTORS-HTML)

DTI USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTIS SHALL NOT BE HOT-DIP GALVANIZED. DTIS SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

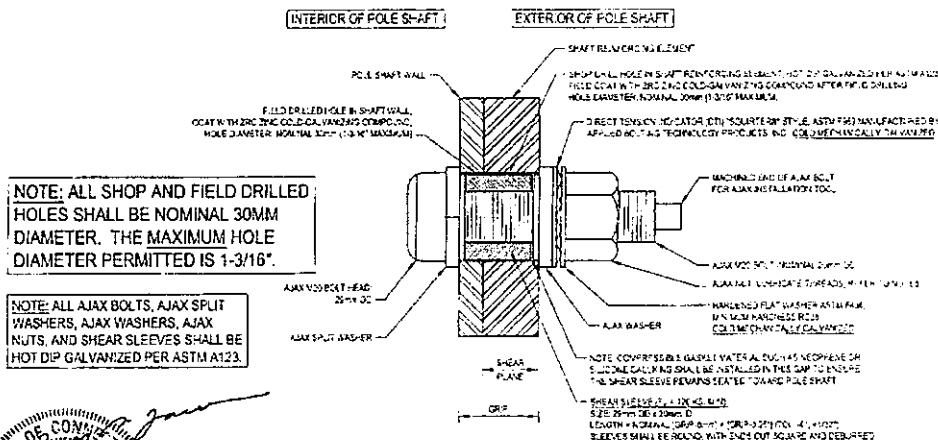
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY 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 DTIS 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.

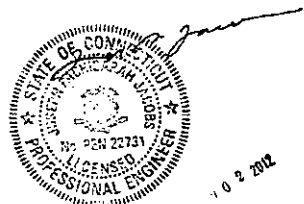
CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

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 DTIS 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 DTIS.



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.



TYPICAL AJAX BOLT DETAIL 1

PAUL J. FORD AND COMPANY STRUCTURAL ENGINEERS 200 East Street, Suite 300, Canterbury, CT 06026 (860) 421-4679 CROWN CASTLE 1630 TORYNWOOD WAY SUITE 300, CHARLOTTE, NC 28217 P.O. BOX 1211, CHARLOTTE, NC 28217	BU #876375; CANTERBURY/LEMIRE CANTERBURY, CT MONOPOLE REINFORCEMENT AND RETROFIT PROJECT		PROJECT NO. 37512-2175 DRAWN BY S.S. CHECKED BY D.S.K. APPROVED BY B.K.K. DATE 11-2-2012	ISSUE DATE OF PERMIT: 11-2-2012 S-3
	1			S-3

PROJECT NO 37552-2177	ISSUE DATE OF PRELIM 11-2-2012
DRAWN BY SS	
CHECKED BY OSK	
APPROVED BY BACIC	S-4
DATE 11-2-2012	

S-5

GENERAL

"THE BASIS TO CONFIRMATION IS DURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF. NOR DOES THE INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE ECR AT ALL TIMES."

ALL WORK SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (ADV) OR ENGINEERING SERVICE VENDOR (ESV), THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-B-1073 LIST OF APPROVED VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MW ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MANUFACTURER 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).

WATER TO BE SUPPLIED FOR THE PROPOSED PROJECTS IS AVAILABLE FROM THE STATE OF TEXAS WATER DEVELOPMENT BOARD. FOR MORE INFORMATION, CONTACT THE BOARD AT (512) 261-2200.

M. H. HARRISON

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

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

THE INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR REFERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE FIELD INSPECTIONS, AND SUBMITTING THE REPORT TO CDOT.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT E.G. AT A MINIMUM

- REVIEW THE REQUIREMENTS OF THE M-CHECKLIST
- WORK WITH THE M-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 MCHS CHECKLIST AND LOGS FOR THIS

RECOMMENDATIONS

RECOMMENDATIONS
THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MESSAGE

- [illegible]

CANCELLATION OR DELAYS IN SCHEDULED VISITS

CANCELLATION OR DELAYS IN RETURN TO THE U.S.
 IF THE U.S. INSPECTOR AGREES TO A DATE ON WHICH THE U.S. WILL BE CONDUCTED AND EITHER PARTY CANCELS OR DELAYS CARRYING OUT THE U.S. INSPECTOR IS RESPONSIBLE FOR ANY COSTS, LOSS OF DEPOSITS AND/OR OTHER FINANCIAL DAMAGES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME, INCLUDING TRAVEL AND LODGING COSTS OF RETURNING TO THE U.S. (E.G., FOREIGN CONTRACTS, RESERVATIONS, ETC.) IF A THIRD PARTY (IN EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY OR CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED

CORRECTION OF FAILING MTS

IF THE MODIFICATION INSTALLATION WOULD FAIL, THE M² (STAINED M²) THE SG SHALL WORK WITH CROWN TO COORDINATE A REINSTATEMENT PLAN IN ONE OF TWO WAYS:

- CORRECT FAILURE STATES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENTAL.
- OR, WITH OWNER'S APPROVAL, THE GC MAY WORK WITH THE EIR TO RE-EVALUATE THE WOOD CATION PERFORMANCE USING THE AS-BUILT COLLECTION.

MONOMER CATION INITIATIONS

GROUND RESERVES THE RIGHT TO CONDUCT A RE-VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED INSPECTION SO ON TO OTHER MODIFICATION PROJECTS

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENR 506-509-10017

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

2. NOT-OF-ONE

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

- PRE-CONSTRUCTION GENERAL SITE CLEANING
- PRE-CONSTRUCTION DURING THE RESPONSIBILITY PERIOD CONSTRUCTION, COMPLETION AND INSPECTION
 - == PHOTOGRAPHY OF ALL CRITICAL DETAILS
 - == FOUNDATION WORK LOGS
 - == WELD PREPARATION
 - == BOLT INSTALLATION AND TORQUE
 - == FINAL WELDED JOINTS
 - == SURFACE COATING REPAIR
 - == POST-CONSTRUCTION PHOTOGRAPHY
 - == FINAL WELD CERTIFICATES

IMPACT OF ELAVATED MODIFICATIONS TAKEN FROM THE ORIGINAL S.A. RE-CONSTRUCTED ENDOCRATE

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MI CHECKLIST

CONS. NOTIFICATION: ASPECTS AND TESTING REQUIRED COMPLETED BY ECR	REPORT TITLE
	PRE-CONSTRUCTION
X	M. CHECKLIST DRAWINGS
X	ECR APPROVED SHOP DRAWINGS
X	WAFRACAT ON INSPECTION
NA	WAFRACAT CERTIFIED WELD INSPECTION
Y	WAFRACAT TEST REPORT (WTR)
NA	WAFRACAT NOE INSPECTION
X	WTR REPORT OF SHORTEST BASE PLATE AS REQUIRED
X	PACKING SLIPS

ADDITIONAL TESTING AND INSPECTIONS:

	CONSTRUCTION
K	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST-INSTALLED ANCHOR BOLT VERIFICATION
K	BASE PLATE DRILL VERIFICATION
K	CONTRACTOR CERTIFIED WELD INSPECTION
NA	EARTHWORK, LIFT AND DENSITY
N	ON-SITE COLD SALVAGING VERIFICATION
NA	SUN-WIRE TENSIONING TEST
K	FOR AS-BUILT DOCUMENTS
K	INSPECTION OF BOLT TENSIONING PER AS-BUILT SPEC.
K	INSPECTION OF ANCHOR BOLTS AND GUTS FOR REEL. PREVENTS ON-SITE COLD

ADD'G NAL TEST'G AND INSPECTIONS

POST-CONSTRUCTION	
K	(A) INSPECTOR RETAINS OR RECORD DRAWINGS
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
K	PHOTOGRAPHS

ACCORDING TO THE TESTING OF THE PROPOSED

NOTE: X DENOTES A DOCUMENT REQUIRED FOR THE PMR REPORT
 NA INDICATES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMR REPORT



May 02 2012



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BU #876375; CANTERBURY/LEMIRE
CANTERBURY, CT
MONOPILE REINFORCEMENT AND RETROFIT PROJECT

PROJECT NO.	375-2-2-72
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CHECKED BY	D.S.
APPROVED BY	
DATE	11-1-72

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