CROWN CASTLE

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

Jerry Feathers
Tel (704) 405-6549
Fax (724) 416-6484
Email: Jerry.feathers.contractor@crowncastle.com



September 22, 2015

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



RE: **T-Mobile-Exempt Modification- EM-T-MOBILE-083-141027**
**T-Mobile Site ID: CT11057C; Crown Site BU: 825983**
**Located at: 90 Industrial Park Rd., Middletown, CT 06457**

Dear Ms. Bachman:

This letter is to confirm that all construction activity has been completed. Pursuant to the Connecticut Siting Council approval of **EM-T-MOBILE-083-141027,** this letter is to satisfy item number two of the approval letter that the CSC will be notified in writing within 45 days after completion of construction and that the was completed per the recommendation of the Structural Analysis. I have also enclosed a PMI document certified by a professional engineer stating the structural modifications were completed in accordance with the CD's and structural analysis. Page 3 of the PMI report shows the engineer's stamp.

Please contact me if you have any questions.

Sincerely,

**Jerry Feathers**
**Property Specialist**
**704-405-6549**

December 30, 2014

Jerry Bruno
Crown Castle
500 West Cummings Park, STE 3600
Woburn, MA 01801
(781) 970-0069
Jerry Bruno.Contractor@crowncastle.com

Sinnott Gering and Schmitt Towers, INC
14301 First National Bank Pkwy, STE 100
Omaha, NE 68154
(402) 507-5170
SGS_PMI@sgstowers.com



***Subject:*** ***Modification Inspection Report***

| | | |
|---|---|---|
| ***Crown Castle Designation:*** | **Crown Castle BU Number:** | 825983 |
| | **Crown Castle Site Name:** | MIDDLETOWN_1 |
| | **Crown Castle JDE Job Number:** | 236900 |
| ***Engineering Firm Designation:*** | **SGS Project Number:** | 146075 |
| ***Site Data:*** | **90 Industrial Park Road**<br>**Middletown, CT 06457**<br>**N 41° 35' 8.3", W 72° 42' 50.49"**<br>**185 Foot Monopole** | |

Dear Mr. Bruno,

Sinnott Gering and Schmitt Towers, Inc. (SGS) is pleased to submit this "Modification Inspection Report" (MI Report) to Crown Castle for the modification/reinforcement to the subject structure. This Modification Inspection (MI) was performed in accordance with Crown Castle ENG-SOW-10007 Modification Inspection SOW, Contract Documents, and Crown Castle Purchase Order number 733664. The purpose of this MI is to confirm that the modification installation configuration and workmanship are in accordance with the contract document(s) listed in Table 2. The MI is not a review of the adequacy or effectiveness of the modification/reinforcement solution.

Table 1 – General Information

| | Company | Contact | Dates on Site |
|---|---|---|---|
| MI Inspector | SGS | Nicholas J. Schmitt, P.E., S.E. | N/A |
| MI Inspector Field Representative (if applicable) | SGS | Caleb Christner | November 26, 2014 |
| ■ Independent | ☐ EOR | ☐ Turnkey | |
| Modification Design EOR | Paul J. Ford | Joseph Jacobs, P.E. | N/A |
| General Contractor | LCC | Keith Stackhouse | Unknown |
| Sub to the General Contractor | N/A | N/A | N/A |
| Field CWI for the General Contractor | N/A | N/A | N/A |
| Field NDE for the General Contractor | N/A | N/A | N/A |

Table 2 – Documents

| Document(s) | Remarks | Source |
|---|---|---|
| Modification Drawings<br>Date: 8/14/2013<br>EOR: Joseph Jacobs, P.E.<br>Job#: 37513-1570 | Creator of Drawings:<br>Paul J. Ford<br>Job #: 37513-1570<br>Date of Drawings: 8/14/2013 | CCI sites<br>Drawing File:<br>3954032 |

Based on our inspection, SGS determines this project:

**X PASSING MI**

The configuration, materials and/or workmanship of the modifications are installed in accordance with the Contract Documents and no deficiencies were found.

## EXECUTIVE SUMMARY

| MODIFICATION | CONFIGURATION | MATERIALS | WORKMANSHIP |
|---|---|---|---|
| Install Micropiles and Micropile Brackets. Flats 1/2, 3/4, 5/6, 8, 9/10 & 12 at Tower Base. | Passing | Passing | Passing |
| **Note: Brackets Had Different Configurations and Dimensions than Designed. See Section 6.3.2 for EOR Approval E-Mail.** | | | |
| Install Plate Shaft Reinforcement. Flats 1, 5 & 9 from 38' 6" to 53' 6". | Passing | Passing | Passing |
| Install Plate Shaft Reinforcement. Flats 1, 5 & 9 from 88' 6" to 123' 6". | Passing | Passing | Passing |
| Install Plate Shaft Reinforcement. Flats 2, 6 & 10 from 119' to 154'. | Passing | Passing | Passing |
| **Note: All Plates were Installed Higher than Designed. See Section 6.3.2 for EOR Approval & Additional Welding Detail.** | | | |

All observations were performed after the construction was complete. SGS was not present during the construction phase. The onsite PMI was performed by Caleb Christner SGS.

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

Respectfully submitted,


Nick Schmitt, P.E., S.E.

# Table of Contents

# PRE-CONSTRUCTION

## 6.1.1 MI CHECKLIST DRAWING

37513-1570 PERMIT DWG

**MODIFICATION INSPECTION NOTES:**

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

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

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-SUL-1017 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 P.O. 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-1337 - MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

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

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

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

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

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

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND DESIGN DRAWINGS.

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

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

**CANCELLATION OR DELAYS IN SCHEDULE 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 MTS**
IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI IF FAILED MTI, 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 WITH ENFORCEMENT 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-1337.

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

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

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

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

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS. PLEASE REFER TO ENG-SOW-1337.

## 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 |
| X | FABRICATOR CERTIFIED WELD INSPECTION |
| X | MATERIAL TEST REPORT (MTR) |
| X | 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 |
| X | POST INSTALLED MICROPILE VERIFICATION |
| X | BASE PLATE GROUT VERIFICATION |
| X | CONTRACTORS CERTIFIED WELD INSPECTION |
| NA | EARTHWORK LIFT AND DENSITY |
| X | ON SITE COLD GALVANIZING VERIFICATION |
| NA | GUY WIRE TENSION REPORT |
| X | GC AS-BUILT DOCUMENTS |
| X | THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSIONING (IF CROWN REQUIRES) |
| X | INSPECTION OF ANA SOLTE AND DTIS PER REQUIREMENTS ON SHEET S-3 |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| | **POST-CONSTRUCTION** |
| X | MI INSPECTOR REDLINE OR RECORD DRAWINGS |
| X | THIRD PARTY ONSITE BOLT INSPECTION REPORT |
| X | POST INSTALLED MICROPILE PULL OUT TESTING |
| X | PHOTOGRAPHS |
| ADDITIONAL TESTING AND INSPECTIONS: | |

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

STATE OF CONNECTICUT
CHRISTOPHER FRANCARA JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 14 2013

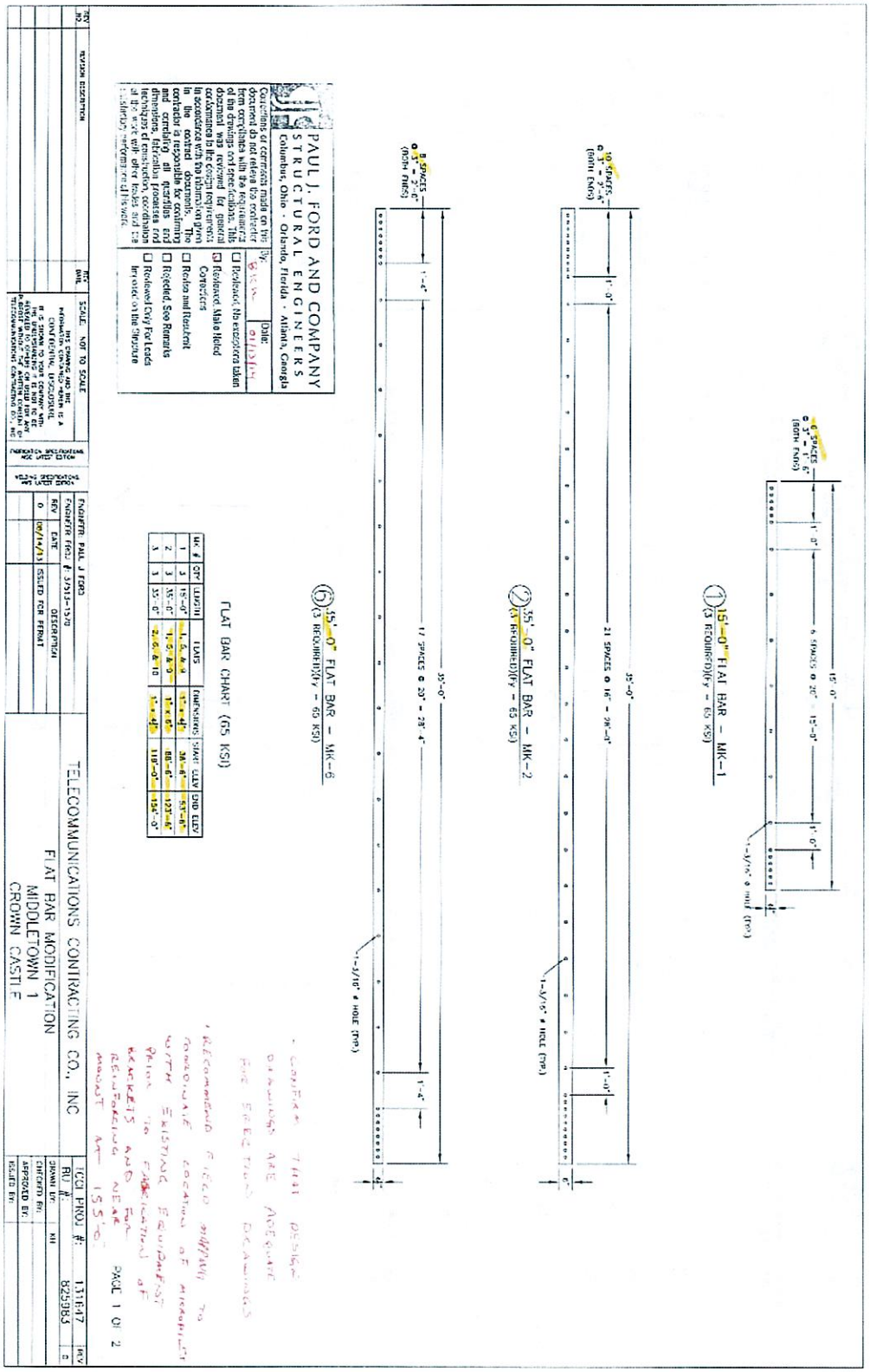
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street - Suite 600 - Columbus, Ohio 43215
(614) 221-6679
www.pjford.com

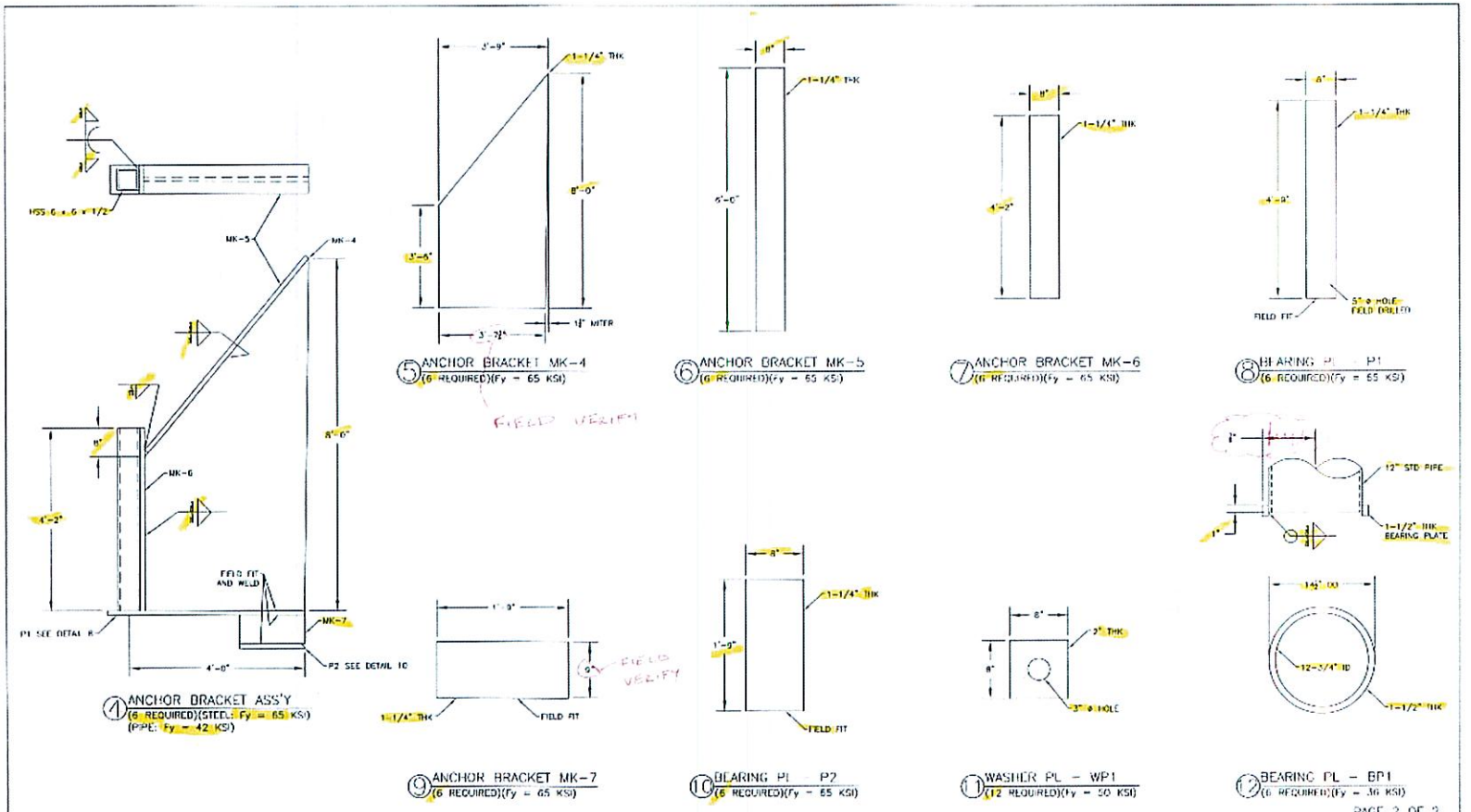
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3440 FAX: (585) 899-3448

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

| | |
|---|---|
| PROJECT No. 37513-1570 | ISSUE DATE OF PERMIT: 8-14-2013 |
| DRAWN BY: BMS | |
| CHECKED BY: BKK | |
| APPROVED BY: | S-8 |
| DATE: 8-14-2013 | |

## 6.1.2 EOR APPROVED SHOP DRAWINGS






⑤ ANCHOR BRACKET MK-4 (6 REQUIRED)(Fy = 65 KSI)

⑥ ANCHOR BRACKET MK-5 (6 REQUIRED)(Fy = 65 KSI)

⑦ ANCHOR BRACKET MK-6 (6 REQUIRED)(Fy = 65 KSI)

⑧ BEARING PL – P1 (6 REQUIRED)(Fy = 65 KSI)

① ANCHOR BRACKET ASS'Y (6 REQUIRED)(STEEL: Fy = 65 KSI) (PIPE: Fy = 42 KSI)

⑨ ANCHOR BRACKET MK-7 (6 REQUIRED)(Fy = 65 KSI)

⑩ BEARING PL – P2 (6 REQUIRED)(Fy = 65 KSI)

⑪ WASHER PL – WP1 (12 REQUIRED)(Fy = 50 KSI)

⑫ BEARING PL – BP1 (6 REQUIRED)(Fy = 36 KSI)

PAGE 2 OF 2

| REV NO. | REVISION DESCRIPTION | REV DATE |
|---|---|---|
| | | |

SCALE: NOT TO SCALE

THIS DRAWING AND THE INFORMATION CONTAINED HEREIN IS A CONFIDENTIAL DISCLOSURE. IT IS GIVEN TO YOUR COMPANY WITH THE UNDERSTANDING IT IS NOT TO BE REVEALED TO OTHERS OR USED FOR ANY PURPOSE WITHOUT THE WRITTEN CONSENT OF TELECOMMUNICATIONS CONTRACTING CO., INC.

NOTIFY SPECIFYING ENGINEER OF ANY DISCREPANCIES

FOR CONSTRUCTION

ENGINEER: PAUL J. FORD

ENGINEER PHONE #: 37513-1570

| REV | DATE | DESCRIPTION |
|---|---|---|
| C | 08/14/13 | ISSUED FOR PERMIT |
| | | |
| | | |

TELECOMMUNICATIONS CONTRACTING CO., INC

FLAT BAR MODIFICATION
MIDDLETOWN 1
CROWN CASTLE

| | | |
|---|---|---|
| TCC PROJ #: | 131647 | REV |
| BU #: | 825983 | D |
| DRAWN BY: | KH | |
| CHECKED BY: | | |
| APPROVED BY: | | |
| ISSUED BY: | | |

## 6.1.3 FABRICATION INSPECTION

**Lockport Steel Fabricators, LLC**
3951 S State Street
Lockport IL 60441
815.726.6281

To: LCC Deployment Service

Subject: Middletown

Date: 5/21/14

Please accept this letter as certification that our work on LSF SO#-15639 - LCC Site ID-Middleton CT-was performed in accordance with industry standards and the contractor documents.

Please contact me if you have any questions.

Thank you,

Mat Yingling
QA Manager
Lockport Steel Fabricators, LLC

James G. Whittaker
CWI
Lockport Steel Fabricators, LLC

James G Whittaker
CWI 06040341
QC1 EXP. 4/1/2015

## 6.1.4 FABRICATOR CERTIFIED WELD INSPECTION

**Lockport Steel Fabricators, LLC**
3851 S State Street
Lockport IL 60441
815.726.6281

To: LCC Deployment Service

Subject: Middletown

Date: 5/21/14

Please accept this letter as certification that our work on LSF SO#-15639 - LCC Site ID-Middleton CT-was performed in accordance with industry standards and the contractor documents.

Please contact me if you have any questions.

Thank you,

Mat Yingling
QA Manager
Lockport Steel Fabricators, LLC

James G. Whittaker
CWI
Lockport Steel Fabricators, LLC

James G Whittaker
CWI 06040341
QC1 EXP. 4/1/2015

LSF
LOCKPORT STEEL FABRICATORS

Form 8.07

## INSPECTION REPORT

| | | |
|---|---|---|
| **Project No.:** 15639 | **Client:** TCCI<br>**P.O. No.** | **Report No.:** 15639 |
| **Prepared By:** MY | **Location:** Middletown, CT | **Date:** 21-May-14 |
| **Description:** | Reinforcement bars,Anchor bracket Ass'y, Anchor bracket plates, | |
| | Bearing plates, washer plates | |

| | | | | | |
|---|---|---|---|---|---|
| Visual | x | NDE | x | PT | | In Progress | x |
| Dimensional | x | OTHER | | MT | x | Final | x |

| | | |
|---|---|---|
| Reference Drawing/Standard | AWS D1.1 | ASME Section IX |

Findings: No relevant indications were noted at time of inspection

NOTE:

| | | |
|---|---|---|
| 1 | QC OK | |
| 2 | QC OK | |
| 3 | QC OK | |
| 4 | QC OK | |
| 5 | QC OK | |
| 1-1 | QC OK | |
| 2-1 | QC OK | |
| 3-1 | QC OK | |
| AB1 | QC OK | Mag particle testing performed MT OK |
| P7 | QC OK | |
| P1 | QC OK | |
| P2 | QC OK | |
| WP1 | QC OK | |

Sketch

Q.A. Manager
Signature

5/21/14
Date

**Lockport Steel Fabricators, LLC**
3051 S State Street
Lockport IL 60441
815.726.6281

Customer: LCC

Project: Middletown

Location: Middletown, CT

LSF SO#: 15639

Date: 5/21/14

To whom it may concern;

We have performed visual observation and monitoring during all phases of the fabrication of the referenced welded components. This includes; pre, post and in process review consisting of a visual examination by an AWS Certified Welding Inspector of all welded components to evaluate their conformance with the applicable welding code requirements. We have reviewed the scope of work to ensure that it meets or exceeds the customer contractual requirements.

During the examination of all welded components it was found that all parts were in compliance with the specified requirements of AWS D1.1 and conformed to the customer project specifications. Please refer to the attached signed inspection sheet for individual piece marks and any relevant notes.

Respectfully submitted,

Lockport Steel Fabricators, LLC.

3051 South State St.

Lockport, Illinois 60441

See Attached: Weld Inspection form and Photos

## ALL WELDS INSPECTED TO AWS D1.1 / ASME SECTION IX

| Project | | | LSF SO# | Date: | |
|---|---|---|---|---|---|
| Middletown/ 131647 | | | 15639 | 5/21/2014 | |
| Dwg # | Piece Mark | Qty. | Code or Specification | Type of Material | |
| 15639-1 | AB1 | | AWS D1.1 | A500 GR b/c | |
| Weld Procedure | | | Base Metal | Filler Metal | |
| | | | A500 GR b/c | 115k | |
| Location | | | Foreman Signature | | |
| High bay | | | | | |
| | | | Welder Signatures | Additional Welders Sign Back | |

***PICTURES MUST BE TAKEN AT EACH HOLD POINT WITH SO# AND PC-MARK VISIBLE IN PHOTO***

| INSPECTION STEPS | INSPECTOR INITIALS | REMARKS |
|---|---|---|
| INSPECT ALL MATERIAL FOR PROPERLY GROUND WELD BEVELS | MY | QC OK |
| HOLD POINT UNTIL INSPECTION IS COMPLETE | MY | QC OK |
| REPAIR IF NEEDED | | |
| INSPECT REPAIRS | | |
| INSPECT FIT UP PER DWG AND PROPER TACK WELD OF JOINTS | MY | QC OK |
| HOLD POINT UNTIL INSPECTION IS COMPLETE | MY | QC OK |
| REPAIR IF NEEDED | | |
| INSPECT REPAIRS | | |
| VISUAL INSPECTION OF ROOT WELDING AND BACK GOUGING BEFORE WELDING BACK SIDE | GW | CWI OK CAWI 14090664 |
| HOLD POINT UNTIL INSPECTION IS COMPLETE | JW/MY | QC OK |
| REPAIR IF NEEDED | | |
| INSPECT REPAIRS | | |
| VISUAL INSPECTION OF FINAL WELDS | JW/MY | QC OK |
| HOLD POINT UNTIL INSPECTION IS COMPLETE | JW/MY | QC OK |
| REPAIR IF NEEDED | | |
| INSPECT REPAIRS | | |
| WELD INPECTION FORM MUST BE SIGNED BY WELDER, FOREMAN, QA AND CWI | | |

ADDITIONAL NOTES:

Q.A. SIGNATURE

5/21/14
DATE

CWI SIGNATURE

LEVEL (CAWI) CWI SCWI

5/21/14
DATE

CERTIFIED FABRICATOR

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Daniel Sona — Identification No.: WS-9
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

| Variables | Record Actual Values Used in Qualifications | QUALIFICATION RANGE |
|---|---|---|
| Process/Type [Table 4.12, Item (1)] | FCAW | FCAW |
| Electrode (single or multiple) [Table 4.12, Item (7)] | Single | Single |
| Current/Polarity | DCEP | |
| Position [Table 4.12, Item (4)] | 3G | 1G, 2G, 3G, 1F, 2F and 3F |
| Weld Progression [Table 4.12, Item (5)] | Uphill | Uphill |
| Backing (YES or NO) [Table 4.12, Item (6)] | YES | With Backing |
| Material/Spec. | A-36 to A-36 | |
| Base Metal | | |
| Thickness: (Plate) | | |
| Groove | 3/8" Plate | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Thickness: (Pipe/tube) | | |
| Groove | N/A | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Diameter (Pipe) | | |
| Groove | N/A | 24" OD and Over |
| Fillet | N/A | 24" OD and Over |
| Filler Metal [Table 4.12] | | |
| Spec. No. | A5.20 | A5.20 and A5.29 |
| Class | E71T-1 | |
| F-No. [Table 4.12, Item (2)] | None Assigned | |
| Gas/Flux Type (Table 4.12) | $Ar/CO_2$, 75/25 | Fillet Dihedrals 30° thru Unlimited |
| Other | --- | |

**VISUAL INSPECTION (4.9.1)**

Acceptable: YES or NO: YES

**Guided Bend Test Results (4.31.5)**

| Type | Result | Type | Result |
|---|---|---|---|
| --- | | --- | |
| --- | | --- | |

**Fillet Test Results (4.31.2.3 and 4.31.4.1)**

Appearance: ---
Fracture Test Root Penetration: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)
Fillet Size: ---
Macroetch: ---

Inspected by: ---
Organization: ---
Test Number: ---
Date: ---

**RADIOGRAPHIC TEST RESULTS (4.31.3.2)**

| Film Identification Number | Results | Remarks | Film Identification Number | Results | Remarks |
|---|---|---|---|---|---|
| WS-9 - 3G | Acceptable | | --- | --- | |
| | | | --- | --- | |

Interpreted by: Don Devich — Level II
Organization: Calumet Testing Services
Test Number: CTS Job No. 23184
Date: May 2, 2014

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M: 2010, *Structural Welding Code - Steel*.

Manufacturer or Contractor: Lockport Steel Fabricators
Authorized By: [signature] Q.A. Manager
Date: May 2, 2014

Form N-4

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Gabriel Magana — Identification No.: WS-N
Welding Procedure Specification No.: PC-105 — Rev: 0 — Date: February 18, 2013

| Variables | Record Actual Values Used in Qualifications | QUALIFICATION RANGE |
|---|---|---|
| Process/Type [Table 4.12, Item (1)] | FCAW | FCAW |
| Electrode (single or multiple)[Table 4.12, Item(7)] | Single | Single |
| Current/Polarity | DCEP | |
| Position [Table 4.12, Item (4)] | 3G | 1G, 2G, 3G, 1F, 2F and 3F |
| Weld Progression [Table 4.12, Item (5)] | Uphill | Uphill |
| Backing (YES or NO) [Table 4.12, Item (6)] | YES | With Backing |
| Material/Spec. | A-36 to A-36 | |
| Base Metal | | |
| Thickness: (Plate) | | |
| Groove | 3/8" Plate | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Thickness: (Pipe/tube) | | |
| Groove | N/A | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Diameter (Pipe) | | |
| Groove | N/A | 24" OD and Over |
| Fillet | N/A | 24" OD and Over |
| Filler Metal [Table 4.12] | | |
| Spec. No. | A5.20 | A5.20 and A5.29 |
| Class | E71T-1 | |
| F-No.[Table 4.12, Item (2)] | None Assigned | |
| Gas/Flux Type (Table 4.12) | Ar/$CO_2$ 75/25 | |
| Other | --- | Fillet Dihedrals 30° thru Unlimited |

**VISUAL INSPECTION (4.9.1)**

Acceptable YES or NO: YES

**Guided Bend Test Results (4.31.5)**

| Type | Result | Type | Result |
|---|---|---|---|
| --- | | --- | |
| --- | | --- | |

**Fillet Test Results (4.31.2.3 and 4.31.4.1)**

| | | | |
|---|---|---|---|
| Appearance | --- | Fillet Size | --- |
| Fracture Test Root Penetration | --- | Macroetch | --- |

(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

**RADIOGRAPHIC TEST RESULTS (4.31.3.2)**

| Film Identification Number | Results | Remarks | Film Identification Number | Results | Remarks |
|---|---|---|---|---|---|
| WS-N - 30 | Acceptable | Film marked as "WS-1" | --- | --- | |
| | | | --- | --- | |

Interpreted by: Don Devich — Level II — Test Number: CTS Job No. 23194
Organization: Calumet Testing Services — Date: May 2, 2014

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M: 2010, *Structural Welding Code - Steel*.

Manufacturer or Contractor: Lockport Steel Fabricators — Authorized By: [signature] — Date: May 9, 2014

Form N-4

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Jose Cruz — Identification No.: WS-T
Welding Procedure Specification No: FC-105 — Rev: 0 — Date: February 18, 2013

| Variables | Record Actual Values Used in Qualifications | QUALIFICATION RANGE |
|---|---|---|
| Process/Type [Table 4.12, Item (1)] | FCAW | FCAW |
| Electrode (single or multiple)[Table 4.12, Item(7)] | Single | Single |
| Current/Polarity | DCEP | |
| Position [Table 4.12, Item (4)] | 3G | 1G, 2G, 3G, 1F, 2F and 3F |
| Weld Progression [Table 4.12, Item (5)] | Uphill | Uphill |
| Backing (YES or NO) [Table 4.12, Item (6)] | YES | With Backing |
| Material/Spec. | A-36 to A-36 | |
| Base Metal | | |
| Thickness: (Plate) | | |
| Groove | 3/8" Plate | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Thickness: (Pipe/tube) | | |
| Groove | N/A | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Diameter (Pipe) | | |
| Groove | N/A | 24" OD and Over |
| Fillet | N/A | 24" OD and Over |
| Filler Metal [Table 4.12] | | |
| Spec. No. | A5.20 | A5.20 and A5.29 |
| Class | E71T-1 | |
| F-No.[Table 4.12, Item (2)] | None Assigned | |
| Gas/Flux Type (Table 4.12) | Ar/$CO_2$ 75/25 | Fillet Dihedrals 30° thru Unlimited |
| Other | --- | |

**VISUAL INSPECTION** (4.9.1)

Acceptable YES or NO: YES

**Guided Bend Test Results** (4.31.5)

| Type | Result | Type | Result |
|---|---|---|---|
| --- | | --- | |
| --- | | --- | |

**Fillet Test Results** (4.31.2.3 and 4.31.4.1)

Appearance: --- — Fillet Size: ---
Fracture Test Root Penetration: --- — Macroetch: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

**RADIOGRAPHIC TEST RESULTS** (4.31.3.2)

| Film Identification Number | Results | Remarks | Film Identification Number | Results | Remarks |
|---|---|---|---|---|---|
| WS-T - 3G | Acceptable | | --- | --- | |
| | | | --- | --- | |

Interpreted by: Don Devich — Level II — Test Number: CTS Job No. 21099
Organization: Calumet Testing Services — Date: April 2, 2013

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2010) *Structural Welding Code - Steel*.

James G Whittaker
CWI 06040341
QC1 EXP. 4/1/2015

Manufacturer or Contractor: **Lockport Steel Fabricators** — Authorized By: — Date: April 2, 2013

Form N-4

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Michael Collins — Identification No.: WS-O
Welding Procedure Specification No.: FC-106 — Rev: 0 — Date: February 18, 2013

| Variables | Record Actual Values Used in Qualifications | QUALIFICATION RANGE |
|---|---|---|
| Process/Type [Table 4.12, Item (1)] | FCAW | FCAW |
| Electrode (single or multiple)(Table 4.12, Item(7)) | Single | Single |
| Current/Polarity | DCEP | |
| Position [Table 4.12, Item (4)] | 3G | 1G, 2G, 3G, 1F, 2F and 3F |
| Weld Progression [Table 4.12, Item (5)] | Uphill | Uphill |
| Backing (YES or NO) [Table 4.12, Item (5)] | YES | With Backing |
| Material/Spec. | A-36 to A-36 | |
| Base Metal | | |
| Thickness: (Plate) | | |
| Groove | 3/8" Plate | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Thickness: (Pipe/tube) | | |
| Groove | N/A | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Diameter (Pipe) | | |
| Groove | N/A | 24" OD and Over |
| Fillet | N/A | 24" OD and Over |
| Filler Metal [Table 4.12] | | |
| Spec. No. | A5.20 | A5.20 and A5.29 |
| Class | E71T-1 | |
| F-No.[Table 4.12, Item (2)] | None Assigned | |
| Gas/Flux Type (Table 4.12) | $ArCO_2$ 75/25 | Fillet Dihedrals 30° thru Unlimited |
| Other | --- | |

**VISUAL INSPECTION (4.9.1)**

Acceptable YES or NO: YES

**Guided Bend Test Results (4.31.5)**

| Type | Result | Type | Result |
|---|---|---|---|
| --- | | --- | |
| --- | | --- | |

**Fillet Test Results (4.31.2.3 and 4.31.4.1)**

Appearance: --- — Fillet Size: ---
Fracture Test Root Penetration: --- — Macroetch: ---
(Describe the location, nature, and size of any crack or lack of fusion of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

**RADIOGRAPHIC TEST RESULTS (4.31.3.2)**

| Film Identification Number | Results | Remarks | Film Identification Number | Results | Remarks |
|---|---|---|---|---|---|
| WS-O - 3G | Acceptable | | --- | --- | |
| | | | --- | --- | |

Interpreted by: Don Devich — Level II — Test Number: CTS Job No. 23184
Organization: Calumet Testing Services — Date: May 2, 2014

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M: 2010, *Structural Welding Code - Steel*.

Manufacturer or Contractor: Lockport Steel Fabricators — Authorized By: J.A. Neumaier — Date: May 6, 2014

Form N-4

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Jose Mosqueda — Identification No.: WS-JM
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

| Variables | Record Actual Values Used In Qualifications | QUALIFICATION RANGE |
|---|---|---|
| Process/Type [Table 4.12, Item (1)] | FCAW | FCAW |
| Electrode (single or multiple)[Table 4.12, Item(7)] | Single | Single |
| Current/Polarity | DCEP | |
| Position [Table 4.12, Item (4)] | 3G | 1G, 2G, 3G, 1F, 2F and 3F |
| Weld Progression [Table 4.12, Item (5)] | Uphill | Uphill |
| Backing (YES or NO) [Table 4.12, Item (6)] | YES | With Backing |
| Material/Spec. | A-36 to A-36 | |
| Base Metal | | |
| Thickness: (Plate) | | |
| Groove | 3/8" Plate | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Thickness: (Pipe/tube) | | |
| Groove | N/A | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Diameter (Pipe) | | |
| Groove | N/A | 24" OD and Over |
| Fillet | N/A | 24" OD and Over |
| Filler Metal [Table 4.12] | | |
| Spec. No. | A5.20 | A5.20 and A5.29 |
| Class | E71T-1 | |
| F-No [Table 4.12, Item (2)] | None Assigned | |
| Gas/Flux Type (Table 4.12) | $Ar/CO_2$ 75/25 | Fillet Dihedrals 30° thru Unlimited |
| Other | --- | |

**VISUAL INSPECTION** (4.9.1)

Acceptable YES or NO: YES

**Guided Bend Test Results** (4.31.5)

| Type | Result | Type | Result |
|---|---|---|---|
| --- | | --- | |
| --- | | --- | |

**Fillet Test Results** (4.31.2.3 and 4.31.4.1)

| | | | |
|---|---|---|---|
| Appearance | --- | Fillet Size | --- |
| Fracture Test Root Penetration | --- | Macroetch | --- |

(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

**RADIOGRAPHIC TEST RESULTS** (4.31.3.2)

| Film Identification Number | Results | Remarks | Film Identification Number | Results | Remarks |
|---|---|---|---|---|---|
| WS-JM - 3G | Acceptable | | --- | --- | |
| | | | --- | --- | |

Interpreted by: Don Devich Level II — Test Number: CTS Job No. 21099
Organization: Calumet Testing Services — Date: April 2, 2013

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2010) *Structural Welding Code - Steel*.

Manufacturer or Contractor: **Lockport Steel Fabricators**

Authorized By: James G Whittaker
CWI 06040341
QC1 EXP. 4/1/2015
Date: April 2, 2013

Form N-4

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Lupe Martinez — Identification No.: WS-E
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

| Variables | Record Actual Values Used in Qualifications | QUALIFICATION RANGE |
|---|---|---|
| Process/Type [Table 4.12, Item (1)] | FCAW | FCAW |
| Electrode (single or multiple)[Table 4.12, Item(7)] | Single | Single |
| Current/Polarity | DCEP | |
| Position [Table 4.12, Item (4)] | 3G | 1G, 2G, 3G, 1F, 2F and 3F |
| Weld Progression [Table 4.12, Item (5)] | Uphill | Uphill |
| Backing (YES or NO) [Table 4.12, Item (6)] | YES | With Backing |
| Material/Spec. | A-36 to A-36 | |
| Base Metal | | |
| Thickness: (Plate) | | |
| Groove | 3/8" Plate | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Thickness: (Pipe/tube) | | |
| Groove | N/A | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Diameter (Pipe) | | |
| Groove | N/A | 24" OD and Over |
| Fillet | N/A | 24" OD and Over |
| Filler Metal [Table 4.12] | | |
| Spec. No | A5.20 | A5.20 and A5.29 |
| Class | E71T-1 | |
| F-No [Table 4.12, Item (2)] | None Assigned | |
| Gas/Flux Type (Table 4.12) | Ar/$CO_2$ 75/25 | Fillet Dihedrals 30° thru Unlimited |
| Other | --- | |

**VISUAL INSPECTION (4.9.1)**

Acceptable YES or NO: YES

**Guided Bend Test Results (4.31.5)**

| Type | Result | Type | Result |
|---|---|---|---|
| --- | | --- | |
| --- | | --- | |

**Fillet Test Results (4.31.2.3 and 4.31.4.1)**

Appearance: --- — Fillet Size: ---
Fracture Test Root Penetration: --- — Macroetch: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

**RADIOGRAPHIC TEST RESULTS (4.31.3.2)**

| Film Identification Number | Results | Remarks | Film Identification Number | Results | Remarks |
|---|---|---|---|---|---|
| WS-E - 3G | Acceptable | | --- | --- | |
| | | | --- | --- | |

Interpreted by: Don Devich — Level II — Test Number: CTS Job No. 21099
Organization: Calumet Testing Services — Date: April 2, 2013

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2010) *Structural Welding Code - Steel*.

James G Whittaker
CWI 08040341
QC1 EXP. 4/1/2015

Manufacturer or Contractor: **Lockport Steel Fabricators** — Authorized By: _____
Date: April 2, 2013

Form N-4

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Martin Juarez — Identification No.: WS-Q
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

| Variables | Record Actual Values Used in Qualifications | QUALIFICATION RANGE |
|---|---|---|
| Process/Type [Table 4.12, Item (1)] | FCAW | FCAW |
| Electrode (single or multiple)[Table 4.12, Item(7)] | Single | Single |
| Current/Polarity | DCEP | |
| Position [Table 4.12, Item (4)] | 3G | 1G, 2G, 3G, 1F, 2F and 3F |
| Weld Progression [Table 4.12, Item (5)] | Uphill | Uphill |
| Backing (YES or NO) [Table 4.12, Item (6)] | YES | With Backing |
| Material/Spec. | A-36 to A-36 | |
| Base Metal | | |
| Thickness: (Plate) | | |
| Groove | 3/8" Plate | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Thickness: (Pipe/tube) | | |
| Groove | N/A | 1/8" thru 0.750" |
| Fillet | N/A | 1/8" thru Unlimited |
| Diameter (Pipe) | | |
| Groove | N/A | 24" OD and Over |
| Fillet | N/A | 24" OD and Over |
| Filler Metal [Table 4.12] | | |
| Spec. No. | A5.20 | A5.20 and A5.29 |
| Class | E71T-1 | |
| F-No.[Table 4.12, Item (2)] | None Assigned | |
| Gas/Flux Type (Table 4.12) | Ar/$CO_2$ 75/25 | Fillet Dihedrals 30° thru Unlimited |
| Other | --- | |

**VISUAL INSPECTION** (4.9.1)

Acceptable YES or NO: YES

**Guided Bend Test Results** (4.31.5)

| Type | Result | Type | Result |
|---|---|---|---|
| --- | | --- | |
| --- | | --- | |

**Fillet Test Results** (4.31.2.3 and 4.31.4.1)

| | | | |
|---|---|---|---|
| Appearance | --- | Fillet Size | --- |
| Fracture Test Root Penetration | --- | Macroetch | --- |

(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

**RADIOGRAPHIC TEST RESULTS** (4.31.3.2)

| Film Identification Number | Results | Remarks | Film Identification Number | Results | Remarks |
|---|---|---|---|---|---|
| WS-Q - 3G | Acceptable | | --- | --- | |
| | | | --- | --- | |

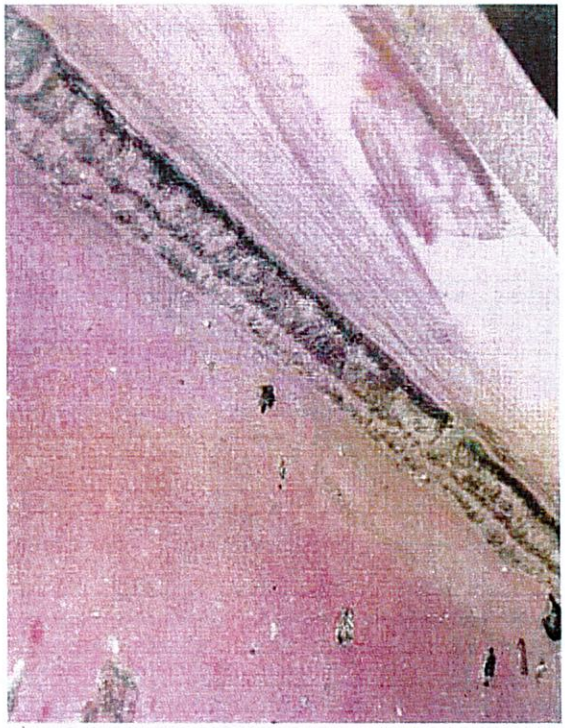
Interpreted by: Don Devich Level II — Test Number: CTS Job No. 21099
Organization: Calumet Testing Services — Date: April 2, 2013

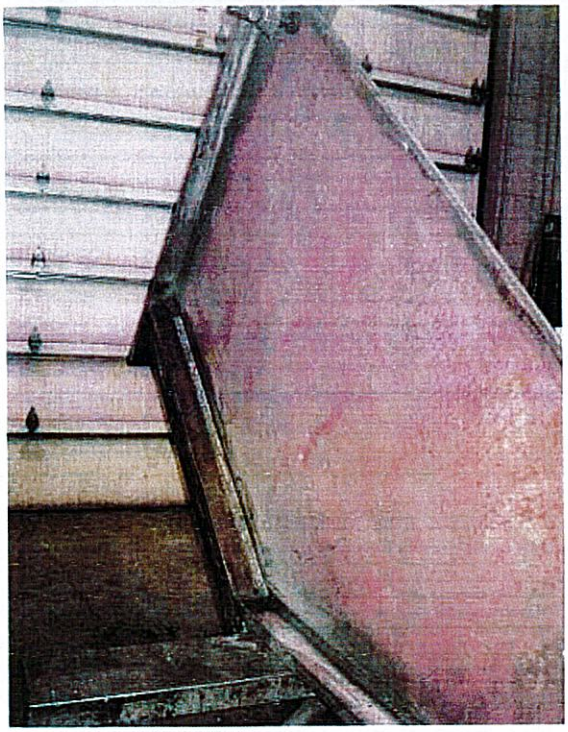
We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2010) *Structural Welding Code - Steel*.

James G Whittaker
CWI 08040341
QC1 EXP. 4/1/2015

Manufacturer or Contractor: **Lockport Steel Fabricators** — Authorized By — Date: April 2, 2013

Form N-4





## 6.1.5 MATERIAL TEST REPORT (MTR)



MARUICHI LEAVITT PIPE & TUBE, LLC

MATERIAL TEST REPORT

ORIGINAL

Page **22** of **130**

# SSAB

## Test Certificate

770 A.V. Sharp Boulevard, Muscatine, IA 52761-3612

Customer:
LIEBOVICH BROTHERS
2116 PRESTON STREET

ROCKFORD
IL 61102

Customer P.O. No.: 5292769 -- 4 | Mill Order No.: 41-002131-04 | Shipping Manifest No.: 138112

Product Description: ASTM A572-50/M345(12)/A709-50/M345(11)

Ship Date: 30 Dec 13 | Cert No.: 0014304
Cert Date: 30 Dec 13 | Page 1 of 1

Size: 2.000 X 96.00 X 240.0 (IN)

| Tested Pieces | | | | Tensiles | | | | | Charge Impact Tests | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Heat Id | Piece Id | Tested Thickness | Tst Loc | YS (KSI) | UTS (KSI) | %RA | Elong % 2in | Elong % 8in | Tst Dir | Hardness | Abs. Energy(FT-LBS) 1 | 2 | 3 | Avg | % Shear 1 | 2 | 3 | Avg | Tst Temp | Tst Dir | Tst Siz | 80%FT-LBS Imp | 80%FT-LBS Stat |
| A3K116 | C06 | 2.000 (DISCRT) | L | 59 | 82 | | | 31 | T | | | | | | | | | | | | | | |
| A3K116 | C08 | 2.005 (DISCRT) | L | 60 | 81 | | | 26 | T | | | | | | | | | | | | | | |
| B5L516 | A12 | 2.009 (DISCRT) | L | 59 | 87 | | | 30 | T | | | | | | | | | | | | | | |
| B5L516 | A13 | 2.010 (DISCRT) | L | 58 | 86 | | | 29 | T | | | | | | | | | | | | | | |

| Heat Id | Chemical Analysis C | Mn | P | S | Si | Tot Al | Cu | Ni | Cr | Mo | Cb | V | Ti | ORIGIN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A3K116 | .12 | 1.24 | .012 | .002 | .19 | .029 | .25 | .18 | .16 | .04 | .003 | .096 | .008 | USA |
| B5L516 | .16 | 1.26 | .013 | .001 | .18 | .033 | .25 | .17 | .16 | .05 | .00 | .090 | .018 | USA |

MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY HAS INTENTIONALLY ADDED
DURING THE MANUFACTURE OF THIS PRODUCT.
NDE BY RADIOGRAPHY INSPECTION EXPECTANCY 1 1 COMPLIANT
100% MELTED AND MANUFACTURED IN THE USA
PRODUCTS SHIPPED
571614 [illegible] PCES 1 WGT: 2823# 571616 [illegible]

Cust Part # :

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF THE APPROPRIATE SPECIFICATION

B. H. Wilks
[illegible]

NUCOR
PLATE MILL
P.O.Box 279
Winton, NC 27986
(252) 358-3700

# Mill Test Report

Page 1

NUCOR It's our Nature

Issuing Date : 03/24/2014 B/L No. : 383462 Load No. : 386923 Our Order No. : 118781/17 Cust. Order No. : 12085

Vehicle No: 8517

Specification : 1.2500" x 96.000" x 466.800"
ASTM A572 Grade 65-13a .05 Max Si

Sold To : RANGER STEEL SERVICES LP
1215 NORTH LOOP W STE 850
HOUSTON,TX 77008

Ship To : RANGER STEEL (TRUCK)
1650 S 813T W AVE
TULSA,OK 74127

Marking :

| Heat No | C | Mn | P | S | Si | Cu | Ni | Cr | Mo | Al(tot) | V | Nb | Ti | N | Ca | B | Sn | CEQ | PCM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4501901 | 0.16 | 1.37 | 0.019 | 0.002 | 0.03 | 0.15 | 0.06 | 0.08 | 0.01 | 0.025 | 0.058 | 0.042 | 0.002 | 0.0127 | 0.0019 | 0.0005 | 0.007 | 0.43 | 0.25 |

| | | Tensile Test | | | | | | Charpy Impacts | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plate Serial No. | Pieces | Tons | Dir. | (psi) Yield | (psi) Tensile | Elongation % in 2" | Elongation % in 8" | Dir. | (ft-lbs) 1 | (%) shear | (ft-lbs) 2 | (%) shear | (ft-lbs) 3 | (%) shear | (ft-lbs) Ave. | (%) shear | Size | Temp (°F) | Min Ave. |
| 4501901-01 | 2 | 16.33 | T | 65,300 | 86,600 | 52.7 | | H-L | 20.3 | | 35.4 | | 55.8 | | 37.2 | | 10mm | -20 | 15 |
| | | | T | 69,400 | 86,800 | 40.7 | | | | | | | | | | | | | |

PO 25602

Q.C. [illegible]

Ranger Steel

Plate Frequency per A673, each plate "as-rolled" :

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast slabrex plate as-rolled, unless otherwise noted in Specification.
Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+(Cr+Mo+V)/5+(Cu+Ni)/15
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B
Melted and manufactured in the USA. ISO 9001:2008 certified (6008163) by SRI Quality System Registrar (#0085-EN, PED 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. DIN 55949 3.1.B/EN 10204 3.1B(2004), DIN EN 10204 3.1(2005) compliant. For ABS grades only, Quality Assurance certificate 05-AM/PQA-546

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Depreta

T. A. Depreta, Metallurgist

03/24/2014 3:52:34 PM

NUCOR
PLATE MILL
P.O.Box 279
Wilton, NC 27896
(252) 366-3700

# Mill Test Report

Page 1

NUCOR
It's in our Nature.

Issuing Date : 02/05/2014 Bill No. : 379617 Load No. : 383852 Our Order No. : 117776/15 Cust. Order No. : 12288

Vehicle No: LW 62063

Specification : 1.0000" x 96.000" x 460.000"
ASTM A572 Grade 65-13a .05 Max SI

Sold To : RANGER STEEL SERVICES LP
1225 NORTH LOOP W STE 660
HOUSTON,TX 77008

Ship To : RANGER STEEL (RAIL)
SAND SPRINGS RAIL RD
1650 S 81ST ST
SAND SPRINGS,OK 74063

Marking :

| Heat No | C | Mn | P | S | Si | Cu | Ni | Cr | Mo | Al(tot) | V | Nb | Ti | N | Ca | B | Sn | CEQ | PCM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4500888 | 0.16 | 1.38 | 0.025 | 0.004 | 0.03 | 0.14 | 0.05 | 0.08 | 0.01 | 0.037 | 0.061 | 0.045 | 0.002 | 0.0127 | 0.0017 | 0.0000 | 0.006 | 0.43 | 0.25 |
| 4500869 | 0.16 | 1.44 | 0.029 | 0.006 | 0.03 | 0.16 | 0.05 | 0.10 | 0.01 | 0.035 | 0.056 | 0.046 | 0.002 | 0.0145 | 0.0024 | 0.0000 | 0.006 | 0.44 | 0.25 |

| | | | | Tensile Test | | | | Charpy Impacts | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plate Serial No | Pieces | Tons | Dir. | (ksi) Yield | (ksi) Tensile | Elongation % in 2" | Elongation % in 8" | Dir. | (ft-lbs) 1 | (%) shear | (ft-lbs) 2 | (%) shear | (ft-lbs) 3 | (%) shear | (ft-lbs) Ave. | (%) shear | Size | Temp(°F) | Min Ave. |
| 4500888-02 | 6 | 39.20 | T | 68,800 | 85,300 | 27.1 | | H-L | 134.5 | | 71.3 | | 134.6 | | 113.5 | | 10mm | -20 | 15 |
| | | | T | 68,600 | 85,300 | 20.9 | | | | | | | | | | | | | |
| 4500888-03 | 6 | 39.20 | T | 68,800 | 85,300 | 27.1 | | H-L | 71.8 | | 85.3 | | 124.9 | | 94.0 | | 10mm | -20 | 15 |
| | | | T | 68,600 | 85,300 | 20.9 | | | | | | | | | | | | | |
| 4500889-02 | 1 | 6.53 | T | 67,200 | 88,100 | 43.8 | | H-L | 134.8 | | 132.7 | | 147.4 | | 138.3 | | 10mm | -20 | 15 |
| | | | T | 66,900 | 84,800 | 22.5 | | | | | | | | | | | | | |

RANGER ST
P.O.

Plate Frequency per A673, each plate "as-rolled" ;

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate as-rolled, unless otherwise noted in Specification.

Yield by 0.5EUL method unless otherwise specified. Ceq = C+Mn/6+(Cr+Mo+V)/5+(Cu+Ni)/15

Pcm = C+(Si)/30+(Mn)/20+(Cu)/20+(Ni)/60+(Cr)/20+(Mo)/15+(V)/10+5B

Melted and manufactured in the USA. ISO 9001:2008 certified (9100033) by SRI Quality System Registrar (RQ095-08). PED 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. DIN 50049 3.1, BSEN 10204 3.1B(2004), DIN EN 10204 3.1(2005) compliant. For ABS grades only, Quality Assurance certificate 08-HMPQA-588

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Dipretis

T. A. Dipretis, Metallurgist

02/05/2014 4:33:01 PM

## 6.1.6 FABRICATOR NDE INSPECTION

**From:** John Woolley <jwoolley@pjfweb.com>
**Sent:** Friday, December 19, 2014 2:52 PM
**To:** Keith_ Stackhouse
**Cc:** James (Vendor) Donahue; Jason (Vendor) D'Amico; Jerry (Contractor) Bruno; SGS MI; lccmods; pjfmod pjfmod
**Subject:** Re: Middletown 1 - 825983 - project #37513-1570 fab CWI

Keith,

As long as the parts are built as specified and the CWI passed, I have no issue with this.

Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

>>> Keith_ Stackhouse <keith_stackhouse@lcc.com> 12/19/2014 2:41 PM >>>

Hello John,

As per our conversation,

The fabricator did not collect any photos of the fabrication process nor perform NDE of the shop weld. Our CWI performed NDE(MT) of the fabricated anchor brackets while performing his CWI inspection.

Could review the CWI/NDE report and approve of the fabricated parts in lieu of not having photo documentation of the fabrication process?

Thanks,

**Keith A. Stackhouse**
Structural Construction Manager

1

## 6.1.7 NDE REPORT OF MONOPOLE BASE PLATE

**See Section 6.2.4 Contractor's Certified Weld Inspection.**

## 6.1.8 PACKING SLIPS

LCC

**Purchase Order**

PO Number
412547

LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

**Ship To:** 90 Industrial Park Rd
Middletown, CT 06457

**Vendor:** Lockport Steel Fabricators, LLC
3051 S. State Street
P.O. Box 248
Lockport, IL 60441

**Bill To:** LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

| PAYMENT TERMS | FOB | DATE OF ORDER | FREIGHT TERMS |
|---|---|---|---|
| Net 30 | | 04/04/2014 | Prepaid |
| DATE EXPECTED | | REFERENCE | |
| 04/04/2014 | | 131647 | |

| ITEM | DESCRIPTION | QUANTITY | U.O.M. | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| A-D-Subcontractor-Equipment | FB - 1-1/4" x 8-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65<br>Ready 3-4 weeks | 4 | Each | | |
| A-D-Subcontractor-Equipment | FB - 1" x 6-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 | 3 | Each | | |
| A-D-Subcontractor-Equipment | FB - 1" x 6-1/2" x 40'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 | 3 | Each | | |
| A-D-Subcontractor-Equipment | FB - 3/4" x 4" x 20'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 | 3 | Each | | |
| A-D-Subcontractor-Equipment | FB - 3/4" x 4" x 5'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 | 3 | Each | | |
| A-D-Subcontractor-Equipment | FB - 1" x 4-1/2" x 15'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 | 3 | Each | | |
| A-D-Subcontractor-Equipment | FB - 1" x 6" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 | 3 | Each | | |
| A-D-Subcontractor-Equipment | FB - 1" x 4-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 | 3 | Each | | |
| A-D-Subcontractor-Equipment | HSS - 6 x 6 x 1/2" x 4'-2" cut to size, fabbed, and HDG per provided sketches A500-42 - AB/HSS1 | 6 | Each | | |
| A-D-Subcontractor-Equipment | PL - 1-1/4" x 43-3/4" x 8'-0" cut to size fabbed, and HDG per provided sketches A572-65 - AB1 | 6 | Each | | |
| A-D-Subcontractor-Equipment | PL - 1-1/4" x 8" x 4'-2" cut to size, fabbed, and HDG per provided sketches A572-65 - AB1-Vert | 6 | Each | | |
| A-D-Subcontractor-Equipment | PL - 1-1/4" x 8" x 6'-3" cut to size, fabbed, and HDG per provided sketches A572-65 - AB1-Cap | 6 | Each | | |

# Purchase Order

PO Number
412547

LCC Deployment Services, Inc
7900 Westpark Drive, Suite A300
Mclean, VA 22102

**Ship To:** 90 Industrial Park Rd
Middletown, CT 06457

**Vendor:** Lockport Steel Fabricators, LLC
3051 S. State Street
P.O. Box 248
Lockport, IL 60441

**Bill To:** LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

| | | | | |
|---|---|---|---|---|
| A-D-Subcontractor-Equipment | PL - 1-1/4" x 8" x 4'-9" cut to size, fabbed, and HDG per provided sketches A572-65 - P1 | 6 | Each | [redacted] |
| A-D-Subcontractor-Equipment | PL - 1-1/4" x 9" x 1'-9" cut to size, fabbed, and HDG per provided sketches A572-65 | 6 | Each | |
| A-D-Subcontractor-Equipment | PL - 1-1/4" x 8" x 1'-9" cut to size, fabbed, and HDG per provided sketches A572-65 - P2 | 6 | Each | |
| A-D-Subcontractor-Equipment | PL - 2" x 8" x 8" cut to size, fabbed, and HDG per provided sketches A572-50 - WP1 | 12 | Each | |

## SUPPLIER INSTRUCTIONS

1. Invoice must reference Purchase Order Number listed above or supplier will experience payment delays.
2. Invoice should be emailed to "AP_TEAM@lcc.com"
3. Process order with the above shipping method, terms, prices, and specifications.
4. Please notify LCC's contact person immediately if you are unable to ship as specified. Upon acceptance of this purchase order seller agrees to adhere to LCC terms and conditions located at http://www.lcc.com/index.php/en/purchasing-terms-conditions as amended from time to time, which are incorporated herein by this reference, with the same force and effect as if they were given in full text.

## LCC APPROVAL

Procurement Dept. 04/04/2014
LCC Authorized Agent Date

**EAST COAST STEEL INC.**
317 SALINA ROAD
SEWELL, NJ 08080
856-582-6776
FAX 856-582-0288

MIDDLETOWN
131647

# PACKING SLIP

| Date | Invoice # |
|---|---|
| 4/7/2014 | 153247 |

| Bill To | Ship To |
|---|---|
| LCC DEPLOYMENT SERVICES, INC.<br>7900 WESTPARK DRIVE, SUITE A300<br>MCLEAN, VA 22102 | 2242 OLD MARLTON PIKE<br>MARLTON, NJ. 08053<br>856-810-1658<br>*SEND MTRS WITH ALL ORDERS* |

| P.O. NUMBER | TERMS | DUE DATE | REP | Ship VIA | FOB |
|---|---|---|---|---|---|
| 412550 | N30 | 5/7/2014 | CD | PICKUP | ECS |

| Qty | Description |
|---|---|
| 6 | 1-1/2" HR PLATE 14-1/4" OD X 12-3/4" ID<br>NJ Sales Tax |

P/U on 4-9-10 By Tom M
PO # 412550 for Site
MIDDLETOWN - 131647
6 PCS

TERMS & CONDITIONS:
Random lengths are estimates only, averages to be paid by customer.
Shipping weights calculated based on material theoretical weights.
ECS must be notified within ten days of any discrepancies.
VISIT US AT WWW.EASTCOASTSTEEL.NET

Re-Steel Supply Co., Inc.
2000 Eddystone Industrial Park
Eddystone, PA 19022-
Phone: (610)876-5216 FAX: (610)876-9279

| JOB NUMBER | RELEASE NUMBER | REQ DELIVERY DATE | PAGE |
|---|---|---|---|
| S4549 | 1 | 8/14/2014 | 1 of 1 |

JOB NAME: MARLTON NJ
CC: A23Y
CUSTOMER: LCC DEPLOYMENT SERVICES
BY: MDD

| MATERIAL TYPE | REINFORCING | DRAWING ID | DESCRIPTION |
|---|---|---|---|
| Rebar, Grade 60, Black | EDDY | | PO# 413317 MIDDLETOWN 1 |

| Itm | Qty | Size | Length | Mark | Shape | Lbs | A | B | C | D | E | F/R | G | H | J | K | O | BC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***CPU*** | | | | | | | | | | | | | | | | | | |
| CONTACT RICH TASCHER 609-685-1655 | | | | | | | | | | | | | | | | | | |
| $575.00 | | | | | | | | | | | | | | | | | | |
| RM | | | | | | | | | | | | | | | | | | |
| 1 | 30 | 9 | 4-06 | | | 459 | | | | | | | | | | | | 0 |
| | 30. | | | | | 459. | | | | | | | | | | | | |
| 2 | 45 | 5 | 11-00 | 500 | T1 | 551 | 0-06 | 2-06 | 2-06 | 2-06 | 2-06 | | 0-06 | | | | | L06 |
| | 48. | | | | | 551. | | | | | | | | | | | | |

CPU

Total Weight: 1,010 Lbs

Longest Length: 11-00

**WEIGHT SUMMARY**

| | TOTAL | | | STRAIGHT | | | LIGHT BENDING | | | HEAVY BENDING | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | ITEMS | PIECES | LBS | ITEMS | PIECES | LBS | ITEMS | PIECES | LBS | ITEMS | PIECES | LBS |
| **Rebar, Grade 60, Black** | | | | | | | | | | | | |
| 5 | 1 | 48 | 551 | 0 | 0 | 0 | 1 | 48 | 551 | 0 | 0 | 0 |
| 9 | 1 | 30 | 459 | 1 | 30 | 459 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 78 | 1010 | 1 | 30 | 459 | 1 | 48 | 551 | 0 | 0 | 0 |

Total Weight: 1,010 Lbs

Longest Length: 11-00

PO# 413317 FOR
MIDDLETOWN-1 131447
P/U 8-14-14

0210366

# CONSTRUCTION

## 6.2.1 CONSTRUCTION INSPECTIONS

**LCC Deployment Services Inc.**
**2242 Old Marlton Pike, Marlton, NJ 08053**
**856-810-1658 (Ph)  856-810-1659 (Fax)**

To: Crown Castle

Subject: Construction inspection

Site: **Middletown 1 - 825983**

December 10, 2014

Please be advised that all work was completed per drawings dated **09/17/2013 & 08/14/2013** by **Paul J. Ford and Company**, in accordance with industry standards and contract documents including modification drawings and specifications, state and local regulations, OSHA, and engineering standards. On-site cold galvanizing was applied in accordance with Crown ENG-BUL-10149.

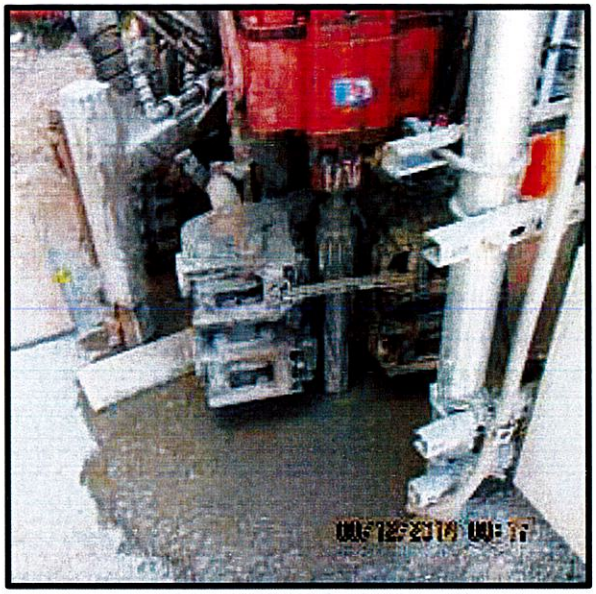
Please let me know if you have any questions.

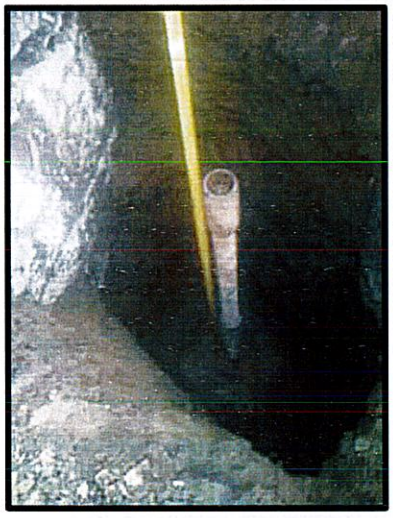
Thank you,

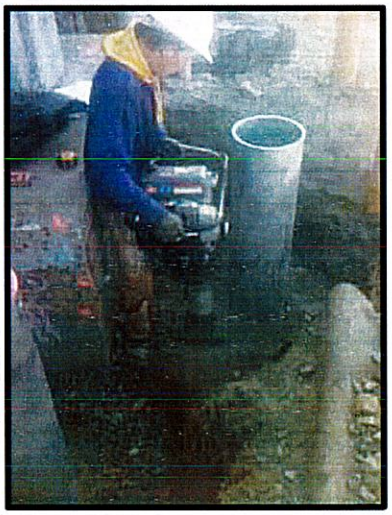
Keith A. Stackhouse

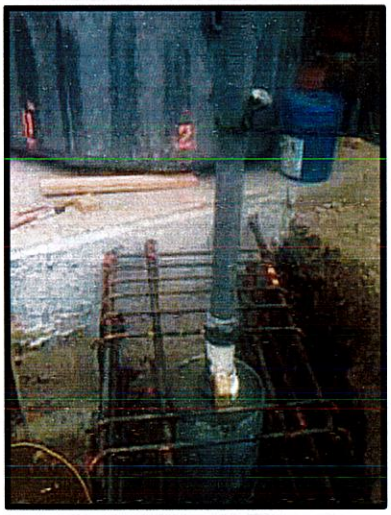
Keith A. Stackhouse
Structural Construction Manager
LCC Deployment Services

## 6.2.2 POST INSTALLED MICROPILE VERIFICATION









## 6.2.3 BASE PLATE GROUT VERIFICATION

## 6.2.4 CONTRACTOR'S CERTIFIED WELD INSPECTION

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810

Phone: (256) 425-8975
daniel.irons11@att.net

December 09, 2014

Mr. Keith Stackhouse
LCC Deployment Services, Inc.
2500 Sylon Boulevard
Hainesport, New Jersey 08036

**Subject:** ATG Project No. 074-14, Final Examination Report, Monopole Reinforcement and Retrofit Project, Middletown_1, BU# 825983, 90 Industrial Park Road, Middletown, Connecticut 06457

Dear Mr. Stackhouse:

We are pleased to submit two copies of our Final Examination Report for the above referenced project. These services were provided in accordance with our Master Subcontract Agreement dated June 20, 2014. We proceeded with our services based on both your purchase order and email authorization.

**SCOPE OF SERVICES**

We have reviewed or observed the pre, during, and post welding operations, and accomplished a 100% ultrasonic (UT), 100% magnetic particle, (MT), and 100% visual (VT) examination of the base plate-to-pole shaft circumferential weld, a 100% VT and 50% MT examination of the six new anchor bracket assembly welds, a 100% VT and 50% MT of the six anchor bracket base plate welds, a 100% VT and 50% MT of six fabricated anchor bracket tube-to-plate welds, and a 100% VT and 100% MT of the anchor bracket-to-tower shaft welded connections, to evaluate their conformance with the applicable code requirements, project plans, and specifications.

The following services have not been provided by our firm: surveying for line and grade, cost estimates, review of design and contract documents, tests of material other than structural steel, and professional services not discussed herein.

**WELDING, VISUAL MAGNETIC PARTICLE, AND ULTRASONIC OBSERVATIONS**

AWS/Certified Welding Inspector and NDE II/III Technician personnel from our office reviewed or observed the pre, during, and post welding operations. We also accomplished a 100% ultrasonic (UT), 100% magnetic particle, (MT), and 100% visual (VT) examination of the base plate-to-pole shaft circumferential weld, a 100% VT and 50% MT examination of the six new anchor bracket assembly welds, a 100% VT and 50% MT of the six anchor bracket base plate welds, a 100% VT and 50% MT of six fabricated anchor bracket tube-to-plate welds, and a 100% VT and 100% MT of the anchor bracket-to-tower shaft welded connections, at the site between September 28, 2014 and December 06, 2014. The plans used were those prepared by Paul J. Ford, Inc., dated August 14, 2013.

**WELDING, VISUAL, MAGNETIC PARTICLE, AND ULTRASONIC OBSERVATION RESULTS**

The pre, during, and post welding operations, the UT, MT, and VT examinations of the base plate-to-pole shaft circumferential weld, the VT and MT examination of the six new anchor bracket assembly welds, the VT and MT of the six new anchor bracket base plate welds, the VT and MT of six fabricated anchor bracket tube-to-plate welds, and the VT and MT of the anchor bracket-to-tower shaft welded connections, were in conformance with the applicable requirements delineated in ANSI/AWS D 1.1:2010-*Stuctural Steel Code*, and the project plans and specifications, as we understand them. Refer to the appended Visual Observation Report, Welder Certifications, Ultrasonic Calibration Report, Ultrasonic Testing of Welds Report, Magnetic Particle Observation Report, Welding Procedure Specifications, CWI/NDE Certifications, and supporting photographs for particulars.

Discrepancies noted between the plans and specifications or code requirements, and the as-built construction observed in the conduct of the welding and structural steel observations were brought to the attention of the contractor. According to our records, all of the noted discrepancies have been corrected in the field in accordance with the project plans and specifications.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this agreement, or any report, opinion, document, or other instrument of service.

We are pleased to be of service to you on this project. If you have any questions concerning this report, do not hesitate to contact either of the undersigned.

Very truly yours,

APPLIED TESTING GROUP, LLC.

L. John Harper, CWI/NDE Level II
Senior Staff Technologist

Daniel Irons

Daniel Irons, NDE Level III
Principal

Appended: Visual Observation Reports (1)
Magnetic Particle Observation Report (1)
Ultrasonic Calibration Reports (1)
Ultrasonic Testing of Welds Reports (1)
Welding Procedures (2)
Welder Certification (1)
CWI/NDE Certifications (2)
Photographs (42)

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# MAGNETIC-PARTICLE EXMAINATION REPORT

**Client:** LCC Deployment Services, Inc. **Project:** Middletown_1 **ATG No:** 074-14
**Location:** 90 Industrial Park Road, Middletown, CT **Area:** Various Welds (see below) **BU/Site#:** 825983

## WELD LOCATION AND IDENTIFICATION SKETCH

| Component/Weld Identification | Area Examined | | Interpretation | | Repairs | | Remarks |
|---|---|---|---|---|---|---|---|
| | Entire | Specific | Accept | Reject | Accept | Reject | |
| Six new anchor bracket assembly welds - 50% | | X | X | | N/A | N/A | ACCEPTABLE |
| One base plate circumferential weld - 100% (all available) | X | | X | | N/A | N/A | ACCEPTABLE |
| Six new bearing plate welds – 50% | | X | X | | N/A | N/A | ACCEPTABLE |
| Six fabricated anchor bracket tube-to-plate welds – 100% | X | | X | | N/A | N/A | ACCEPTABLE |
| Six new anchor bracket-to-tower welds – 100% | X | | X | | N/A | N/A | ACCEPTABLE |
| | | | | | | | |

***PRE-EXAMINATION:***
**Surface Preparation:** Wire Brush

***EQUIPMENT:***
**Instrument Make:** Parker Research Corp. **Model:** DA-400 **Serial No:** 13018
**Powder Manufacturer:** Parker Research Corp. **Description:** RP6 Red Powder **Batch No:** 12209

***METHOD OF INSPECTION:***

☒Dry ☐Wet ☒Visible ☐Fluorescent

**How Media Applied:** Manual Dusting, Magnetic Powder Blower

☐Residual ☒Continuous ☐True-Continuous
☐AC ☒DC ☐Half-Wave
☐Prods ☒Yoke ☐Cable Wrap ☐Other: _____

**Direction for Field:** ☒ Longitudinal ☐ Circular ☐ Other: _____

**Strength of Field:** Verified with pie gauge, varying intensity

***POST EXAMINATION:***
**Demagnetizing Technique** (if required): N/A
**Cleaning (if required):** Wipe **Coating Method :** Manual, CRC Zinc

**We, the undersigned, certify that the statements in this record are correct, and that the test welds were prepared and tested in accordance with the requirements of ANSI/AWS D1.1 2010.**

Inspector / Level: L. John Harper, CWI/NDE Level II Date: 11/13/2014

Reviewed by: Daniel Irons, NDE Level III Date: 11/13/2014

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# ULTRASONIC CALIBRATION REPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| **Client:** LCC Deployment Services, Inc. | | | **Project:** Middletown_1 | | | **BU#:** 825983 |
| **Location/Area:** 90 Industrial Park Road, Middletown, CT | | | **Component(s):** Tower-to-Base Plate Weld | | | |
| **Time In:** 11:45 a.m. | **Time Out:** 3:45 p.m. | | **Job No.:** ATG-074-14 | | **PJF Reference #:** 37513-1570 | |
| **ITEM:** | ☒ **Weld(s)** | ☐ **Structural** | ☐ **Casting(s)** | ☐ **Pipe(s)** | ☒ **Plate(s)** | |
| | ☐ **Machinery** | ☐ **Machined Part** | ☒ **Other:** Tower-to-Base Plate Weld | | | |
| **Material:** | **Size** | **No. of Pieces** | **Base Metal** | **Process/Filler Metal** | **Weld Condition:** | |
| Carbon Steel | 0.438" | 1 | A572 Gr. 65 | E 8018 | ☒ **As Welded** ☐ **Ground** | |
| **Acceptance Standard:** ANSI/AWS D1.1: 2010 Edition | | | **Procedure:** AWS-UT-1, Rev. 1 | | | |
| **Type of Inspection Method** | ☒ **Soundness** | ☐ **Thickness** | **UT Equipment Name/Model/Serial No.:** KrautKramer Branson / USK-7 / SER# 27276-3260 | | | |
| | ☒ **Angle Beam** | ☐ **Bond** | **Straight Beam:** **Transducer:** GE Gamma RPH **Size:** .500" Diameter **Frequency:** 2.25 MHz **Serial No.** 0221J3D | | **Angle Beam:** **Transducer:** GE Gamma **Size:** .375" Diameter **Frequency:** 2.25 MHz **Serial No.** 00P1CV | |
| | ☐ **Other:** | | **Transducer Type:** ☒ **Single** ☐ **Dual** ☐ **Delay** | | **Wedge Angle(s):** ☒ 60 Degree S/N W-300 ☒ 70 Degree S/N W-223 | |
| **Reference Block:** ☒ **DSC** ☐ **IIW** ☐ **Other:** | **Reference Block No.:** 97-8116 | **Material:** Carbon Steel | **Calibration Block Type:** DSC **Diameter:** N/A | **Calibration Block No.:** 97-8116 | **Material:** C/S - 1.0" | |
| **Screen Size:** ☐ 2.5" ☒ 5" ☐ 10" ☐ Other: | **Reference Gain:** 42.0 dB - 60 Degree 46.0 dB - 70Degree | **Scanning Gain:** ☐ +6db ☒ **Other:** 14dB | **Initial Calibration Time:** 11:45 a.m. | **Calibration Rechecks:** 1) 3:45 pm 2) 3) 4) | **Couplant:** Ultragel II, Batch # 25-001/10125E | |
| **EXAMINATION SUMMARY:** Acceptable. See "notes" on UTR-001 for details. | | | | | | |
| **Examined By:** Daniel Irons, Level III | | | **Date:** November 01, 2014 | | | |
| **Reviewed By:** L.J. Harper, CWI/Level II | | | **Date:** November 01, 2014 | | | |

**Cal. Sheet No.** : UTC - 001
**Indication Report No(s).** : UTR - 001

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# REPORT OF ULTRASONIC TESTING OF WELDS

| | | | |
|---|---|---|---|
| **Client:** : LCC Deployment Services, Inc. | **Project:** Middletown_1 | **Job No.:** ATG-075-14 | **BU#:** 825983 |
| **Location:** 90 Industrial Park Road, Middletown, CT | **Area:** Tower-to-Base Plate Weld | **Report No:** UTR-001 | |

**WELD IDENTIFICATION:** Full Penetration Tower-to-Base Plate Circumferential Weld
**MATERIAL THICKNESS:** 0.478"
**WELD JOINT AWS:** T/C
**WELDING PROCESS:** SMAW
**QUALITY REQUIREMENTS** ANSI/ AWS D1.1: 2010
**REMARKS:** All dimensions are expressed in inches
**NOTES:** 100% of available surface areas examined

| FLAT NO./ LOCATION | INDICATION NUMBER | TRANSDUCER ANGLE | FROM FACE / SURFACE | LEG* | DECIBELS | | | | DISCONTINUITY | | | | | ACCEPTABLE | REJECTABLE | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | INDICATION LEVEL | REFERENCE LEVEL | ATTENUATION FACTOR | INDICATION RATING | LENGTH | ANGULAR DISTANCE (SOUND PATH) | DEPTH FROM SURFACE "A" | DISTANCE | | | | |
| | | | | | A | B | C | D | | | | FROM X | FROM Y | | | |
| **100% of available surface area scanned** | - | 60/ 70 | A | - | - | 42 46 | - | - | - | - | - | - | - | X | | ACCEPTABLE |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

**NOTE:**

An ultrasonic examination of 100% of the available existing full penetration tower-to-base plate circumferential welded connection was conducted. The subject weld proved to be acceptable in accordance with the applicable acceptance criteria as set forth in ANSI/AWS D1.1: 2010- *Structural Welding Code – Steel*, and the project plans and specifications, as we understand them.

| | |
|---|---|
| **Examined By:** Daniel Irons, Level III D. Irons | **Date:** November 01, 2014 |
| **Reviewed By:** L.J. Harper, CWI/Level II | **Date:** November 01, 2014 |

**NOTE:** We, the above signed, have evaluated the above referenced welded connections, and to the best of our knowledge, state that the information in this report is accurate. This examination report reflects the actual NDE procedure that was conducted by Applied Testing Group, LLC. Submission of this report is for informational purposes only and does not reflect any guarantee of the part, inspection procedures, or standards, and is subject to the limitations of each test method.

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# VISUAL OBSERVATION REPORT

| | | | |
|---|---|---|---|
| **Client:** LCC Deployment Services, Inc. | | **Project:** Middletown_1 | **Site#:** 825983 |
| **Project Location:** 90 Industrial Park Road, Middletown, CT | | **ATG Technician:** L. Harper | **Date:** 12-03-14 |
| **Time In:** 11:30 a.m. | **Time Out:** 5:30 p.m. | **Job No:** ATG-074-14 | **PJF Ref. #:** 37513-1570 |

## FIELD OBSERVATIONS

| | | | |
|---|---|---|---|
| ☒ | **New Anchor Bracket Connections:** | Location | Acceptable |
| | Installation of six new anchor bracket assembly-to-pole shaft and base plate | Plate Size | Acceptable |
| | welded connections at the base elevation. | Welds Correct Size | Acceptable |
| | | Welds Correct Length | Acceptable |
| | ☒ Acceptable ☐ Unacceptable ☒ See note: 1 | | |
| ☒ | **Fabricated Anchor Bracket Connections:** | Location | Acceptable |
| | Installation of six anchor tube-to-steel plate welds at the base elevation. | Plate Size | Acceptable |
| | | Welds Correct Size | Acceptable |
| | | Welds Correct Length | Acceptable |
| | ☒ Acceptable ☐ Unacceptable ☒ See note: 2 | | |
| ☒ | **Base Plate-to-Pole Shaft Circumferential Welded Connection:** | Beams Correct Size | Acceptable |
| | Installation of existing base plate-to-pole shaft circumferential weld at the base | Locations / Orientation | Acceptable |
| | elevation. | Welds Correct Size | Acceptable |
| | | Welds Correct Length | Acceptable |
| | ☒ Acceptable ☐ Unacceptable ☒ See note: 3 | | |
| ☐ | **Bridge Stiffener Welded Connections:** | Location | |
| | | Plate Size | |
| | | Welds Correct Size | |
| | | Welds Correct Length | |
| | ☐ Acceptable ☐ Unacceptable ☐ See note: | | |
| ☒ | **Steel Plate-to-Pole Shaft Welded Connections:** | Location | Acceptable |
| | Installation of six new anchor bracket-to-pole shaft top welded connections at the | Plate Size | Acceptable |
| | base elevation (changed from original design). | Welds Correct Size | Acceptable |
| | | Welds Correct Length | Acceptable |
| | ☒ Acceptable ☐ Unacceptable ☒ See note: 4 | | |
| ☐ | **New Reinforcing Plate-to-Pole Shaft Welded Connections:** | Location | |
| | | Plate Size | |
| | | Welds Correct Size | |
| | | Welds Correct Length | |
| | ☐ Acceptable ☐ Unacceptable ☐ See note: | | |
| ☒ | **Other:** | | |
| | The pre, during, and post welding operations were observed to be acceptable in accordance with the applicable | | |
| | requirements delineated in ANSI/AWS D1.1:2010. | | |
| | | | |
| | ☒ Acceptable ☐ Unacceptable | | |

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

| Project: Middletown_1 | Site #: 825983 | Job No: ATG-074-14 | Date: 12-03-14 |
|---|---|---|---|
| REMARKS AND/OR DISCREPANCIES: | | | |

**Notes:**

On December 03, 2013, Applied Testing Group LLC, performed a visual examination of the installation of six new anchor bracket assembly-to-pole shaft, six anchor tube-to-steel plate, one existing pole shaft-to-base plate circumferential, and six new bearing plate-to-pole shaft welded connections, located at 90 Industrial Park Road, Middletown, CT. The pre, during, and post welding operations were noted to be acceptable in accordance with the applicable requirements delineated in ANSI/AWS D1.1:2010.

The following were examined:

1) Installation of six new anchor bracket assembly-to-pole shaft welded connections at the base elevation.
2) Installation of six anchor tube-to-steel plate welds at the base elevation.
3) Installation of one existing base plate-to-pole shaft circumferential weld at the base elevation.
4) Installation of six new bearing plate-to-pole shaft welded connections at the base elevation.

The welds were acceptable in accordance with ANSI/AWS D1.1:2010 and the project plans/specifications. Cold galvanizing paint has been acceptably applied to all exterior locations.

**PLANS USED:**

| Title(s): Paul J. Ford | Date: 08-14-13 | As-Built Date: | N/A |
|---|---|---|---|
| Drawing No(s): T1, S1 to S8 | | | |
| Visit Requested by: Keith Stackhouse | Title: Project Coordinator | LCC Deployment Services, Inc | |

| | |
|---|---|
| **Examined By:** L. John Harper, AWS/CWI-NDE Level II | **Date:** December 03, 2014 |
| **Reviewed By:** Daniel Irons, NDE Level III | **Date:** December 03, 2014 |

AWS QC 1 CWI
LLOYD J. HARPER
04050761

**NOTE:** We, the above signed, have evaluated the above referenced welded connections, and to the best of our knowledge, state that the information in this report is accurate. This examination report reflects the actual NDE procedure that was conducted by Applied Testing Group, LLC. Submission of this report is for informational purposes and does not reflect any guarantee of the part, inspection procedures, or standards, and is subject to the limitations of each test method.

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810

Phone: (256) 425-8975
daniel.irons11@att.net

December 22, 2014

Mr. Keith Stackhouse
LCC Deployment Services, Inc.
2500 Sylon Boulevard
Hainesport, New Jersey 08036

**Subject:** ATG Project No. 074-14, Final Examination Report, Monopole Reinforcement and Retrofit Project, Middletown_1, BU# 825983, 90 Industrial Park Road, Middletown, Connecticut 06457

Dear Mr. Stackhouse:

We are pleased to submit two copies of our Final Examination Report for the above referenced project. These services were provided in accordance with our Master Subcontract Agreement dated June 20, 2014. We proceeded with our services based on both your purchase order and email authorization.

**SCOPE OF SERVICES**

We have reviewed or observed the pre, during, and post welding operations and accomplished a 100% magnetic particle, (MT) and 100% visual (VT) examination of the six new flat bar welded connections at approximately the 38' and 88' elevations, to evaluate their conformance with the applicable code requirements, project plans, and specifications.

The following services have not been provided by our firm: surveying for line and grade, cost estimates, review of design and contract documents, tests of material other than structural steel, and professional services not discussed herein.

**WELDING, VISUAL, AND MAGNETIC PARTICLE OBSERVATIONS**

AWS/Certified Welding Inspector and NDE II/III Technician personnel from our office reviewed or observed the pre, during, and post welding operations. We also accomplished a 100% magnetic particle, (MT), and 100% visual (VT) examination of the six new flat bar welded connections at approximately the 38' and 83' elevations, at the site between December 15, 2014 and December 22, 2014. The plans used were those prepared by Paul J. Ford, Inc., dated August 14, 2013.

**WELDING, VISUAL, AND MAGNETIC PARTICLE OBSERVATION RESULTS**

The pre, during, and post welding operations, and the MT and VT examination of the six new flat bar welded connections, were in conformance with the applicable requirements delineated in ANSI/AWS D 1.1:2010-*Stuctural Steel Code*, and the project plans and specifications, as we understand them. Refer to the appended Visual Observation Report, Welder Certifications, Magnetic Particle Observation Report, Welding Procedure Specifications, CWI/NDE Certifications, and supporting photographs for particulars.

Discrepancies noted between the plans and specifications or code requirements, and the as-built construction observed in the conduct of the welding and structural steel observations were brought to the attention of the contractor. According to our records, all of the noted discrepancies have been corrected in the field in accordance with the project plans and specifications.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this agreement, or any report, opinion, document, or other instrument of service.

We are pleased to be of service to you on this project. If you have any questions concerning this report, do not hesitate to contact either of the undersigned.

Very truly yours,

APPLIED TESTING GROUP, LLC.

L. John Harper, CWI/NDE Level II
Senior Staff Technologist

Daniel Irons

Daniel Irons, NDE Level III
Principal

Appended: Visual Observation Report (1)
Magnetic Particle Observation Report (1)
Welding Procedures (2)
Welder Certification (1)
CWI/NDE Certifications (2)
Photographs (13)

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# MAGNETIC-PARTICLE EXMAINATION REPORT

**Client:** LCC Deployment Services, Inc. **Project:** Middletown_1 **ATG No:** 074-14
**Location:** 90 Industrial Park Road, Middletown, CT **Area:** Various Welds (see below) **BU/Site#:** 825983

## WELD LOCATION AND IDENTIFICATION SKETCH

| Component/Weld Identification | Area Examined | | Interpretation | | Repairs | | Remarks |
|---|---|---|---|---|---|---|---|
| | Entire | Specific | Accept | Reject | Accept | Reject | |
| Six new flat plate reinforcing welds at approximately the 38' and 88' elevations. | | X | X | | N/A | N/A | ACCEPTABLE |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

***PRE-EXAMINATION:***
**Surface Preparation:** Wire Brush

***EQUIPMENT:***
**Instrument Make:** Parker Research Corp. **Model:** DA-400 **Serial No:** 13018
**Powder Manufacturer:** Parker Research Corp. **Description:** RP6 Red Powder **Batch No:** 17209

***METHOD OF INSPECTION:***

☒Dry ☐Wet ☒Visible ☐Fluorescent

**How Media Applied:** Manual Dusting, Magnetic Powder Blower

☐Residual ☒Continuous ☐True-Continuous
☐AC ☒DC ☐Half-Wave
☐Prods ☒Yoke ☐Cable Wrap ☐Other: _____

**Direction for Field:** ☒ Longitudinal ☐ Circular ☐ Other: _____

**Strength of Field:** Verified with pie gauge, varying intensity

***POST EXAMINATION:***
**Demagnetizing Technique** (if required): N/A
**Cleaning (if required):** Wipe **Coating Method :** Manual, CRC Zinc.

**We, the undersigned, certify that the statements in this record are correct, and that the test welds were prepared and tested in accordance with the requirements of ANSI/AWS D1.1 2010.**

Inspector / Level: L. John Harper, CWI/NDE Level II Date: 12/22/2014

Reviewed by: Daniel Irons, NDE Level III Date: 12/22/2014

AWS QC 1 CWI

**NOTICE:** THIS EXAMINATION REPORT REFLECTS THE ACTUAL NDE PROCEDURE THAT WAS CONDUCTED BY APPLIED TESTING GROUP, LLC PERSONNEL. SUBMISSION OF THIS REPORT IS FOR INFORMATIONAL PURPOSES AND DOES NOT REFLECT ANY GUARANTEE OF THE PART, INSPECTION PROCEDURES, OR STANDARDS AND IS SUBJECT TO THE LIMITATIONS OF EACH TEST METHOD.

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# VISUAL OBSERVATION REPORT

| | | | |
|---|---|---|---|
| **Client:** : LCC Deployment Services, Inc. | | **Project:** Middletown_1 | **Site#:** 825983 |
| **Project Location:** 90 Industrial Park Road, Middletown, CT | | **ATG Technician:** L. Harper | **Date:** 12-22-14 |
| **Time In:** 9:30 a.m. | **Time Out:** 1:30 p.m. | **Job No:** ATG-074-14 | **PJF Ref. #:** 37513-1570 |

**FIELD OBSERVATIONS**

| | | | |
|---|---|---|---|
| ☐ | **New Anchor Bracket Connections:** | Location | |
| | | Plate Size | |
| | | Welds Correct Size | |
| | | Welds Correct Length | |
| | ☐ Acceptable ☐ Unacceptable ☐ See note: | | |
| ☐ | **Fabricated Anchor Bracket Connections:** | Location | |
| | | Plate Size | |
| | | Welds Correct Size | |
| | | Welds Correct Length | |
| | ☐ Acceptable ☐ Unacceptable ☐ See note: | | |
| ☐ | **Base Plate-to-Pole Shaft Circumferential Welded Connection:** | Beams Correct Size | |
| | | Locations / Orientation | |
| | | Welds Correct Size | |
| | | Welds Correct Length | |
| | ☐ Acceptable ☐ Unacceptable ☐ See note: | | |
| ☐ | **Bridge Stiffener Welded Connections:** | Location | |
| | | Plate Size | |
| | | Welds Correct Size | |
| | | Welds Correct Length | |
| | ☐ Acceptable ☐ Unacceptable ☐ See note: | | |
| ☒ | **New Reinforcing Plate-to-Pole Shaft Welded Connections:** | Location | Acceptable |
| | Installation of six new reinforcing plate-to-pole shaft welded connections at | Plate Size | Acceptable |
| | approximately the 38' and 88' elevations. | Welds Correct Size | Acceptable |
| | | Welds Correct Length | Acceptable |
| | ☒ Acceptable ☐ Unacceptable ☒ See note: 1 | | |
| ☐ | **Steel Plate-to-Pole Shaft Welded Connections:** | Location | |
| | | Plate Size | |
| | | Welds Correct Size | |
| | | Welds Correct Length | |
| | ☐ Acceptable ☐ Unacceptable ☐ See note: | | |
| ☒ | **Other:** | | |
| | The pre, during, and post welding operations were observed to be acceptable in accordance with the applicable | | |
| | requirements delineated in ANSI/AWS D1.1:2010. | | |
| | ☒ Acceptable ☐ Unacceptable | | |

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

| Project: Middletown_1 | Site #: 825983 | Job No: ATG-074-14 | Date: 12-22-14 |
|---|---|---|---|
| **REMARKS AND/OR DISCREPANCIES:** | | | |

**Notes:**

On December 22, 2013, Applied Testing Group LLC, performed a visual examination of six new reinforcing plate-to-pole shaft welded connections, located at 90 Industrial Park Road, Middletown, CT. The pre, during, and post welding operations were noted to be acceptable in accordance with the applicable requirements delineated in ANSI/AWS D1.1:2010.

The following were examined:

1) Installation of six new six new reinforcing plate-to-pole shaft welded connections at approximately the 38' and 88' elevations.

The welds were acceptable in accordance with ANSI/AWS D1.1:2010 and the project plans/specifications. Cold galvanizing paint has been acceptably applied to all exterior locations.

**PLANS USED:**

| Title(s): Paul J. Ford | Date: 08-14-13 | As-Built Date: | N/A |
|---|---|---|---|
| Drawing No(s): T1, S1 to S8 | | | |
| Visit Requested by: Keith Stackhouse | Title: Project Coordinator – : LCC Deployment Services, Inc. | | |

| **Examined By:** L. John Harper, AWS/CWI-NDE Level II | **Date:** December 22, 2014 |
|---|---|
| **Reviewed By:** Daniel Irons, NDE Level III | **Date:** December 22, 2014 |

AWS QC 1 CWI
LLOYD J. HARPER

**NOTE:** We, the above signed, have examined the above referenced welded connections, and to the best of our knowledge, state that the information in this record is accurate. This examination report reflects the actual NDE procedure that was conducted by Applied Testing Group, LLC. Submission of this report is for informational purposes, and does not reflect any guarantee of the part, inspection procedures, or standards, and is subject to the limitations of each test method.

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Process SMAW
Name Turner, Tarry Identification No. 3241
Welding Procedure Specification No. 031 Rev 0 Date 11/16/2013

| Variable | Record Actual Values Used in Qualification | Qualification Range |
|---|---|---|
| Process/Type | SMAW | |
| Electrode (single or multiple) | Single | |
| Current/Polarity | DCEP | |
| Position | 3-G | |
| Weld Progression | Vertical-Up | |
| Backing (YES or NO) | Yes ASTM A-148-73 | |
| Material/Spec | ASTM A 148-73 to ASTM A 148-73 | |
| Base Metal | | |
| Thickness: (Plate) | 1" | 1/8" To Unlimited |
| Groove | | |
| Fillet | | |
| Thickness: (Pipe/Tube) | N/A | |
| Groove | N/A | |
| Fillet | | |
| Diameter: (Pipe) | N/A | |
| Groove | N/A | |
| Fillet | | |
| Filler Metal | | |
| Spec. No. | ANSI/AWS A5-1 | |
| Class | E7018 | |
| F-No | F-4 | |
| Gas/Flux Type | N/A | |
| Other | | |

AWS QC 1 MARVIN L. TYLER 94070891 CWI

Marvin L. Tyler

**VISUAL INSPECTION**
Acceptable YES or NO YES

**Guided Bend Test Results**

| Type | Result | Type | Result |
|---|---|---|---|
| Side Bend (2) | Satisfactory | | |

**FILLET TEST RESULTS**

Appearance N/A
Fracture Test Root Penetration N/A
Fillet Size N/A
Macroetch N/A
(Describe the location, nature, and size of any crack or tearing of the specimen)

Inspected by Marvin L. Tyler (AWS-CWI) #94070891
Organization TYLER ASSOCIATES, INC.
Test Number 014
Date 11/16/2013

**RADIOGRAPHIC TEST RESULTS**

| Film Identification Number | Result | Remarks | Film Identification Number | Result | Remarks |
|---|---|---|---|---|---|

RADIOGRAPHIC TEST N/A

Interpreted by
Organization
Test Number
Date

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4, Part C of ANSI/AWS D1.1 Structural Welding Code-Steel 2010 Ed

Manufacturer or contractor: Tyler Welding Lab, 110 Fairchild Downs Place, Cary, NC 27518 (919) 367-8872 tyweld@juno.com
Authorized by: Marvin Tyler (Welding Engineer & AWS QC-1 CWI) Certified Welding Inspector
Date 11/16/2013

## WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Process SMAW
Name Turner, Terry Identification No. 3245
Welding Procedure Specification No. 031 Rev 0 Date 11/16/2013

| Variable | Record Actual Values Used in Qualification | Qualification Range |
|---|---|---|
| Process/Type | SMAW | |
| Electrode (single or multiple) | Single | |
| Current/Polarity | DCEP | |
| Position | 4-G | |
| Weld Progression | N/A | |
| Backing (YES or NO) | Yes ASTM A-148-73 | |
| Material/Spec. | ASTM A-148-73 to ASTM A-148-73 | |
| Base Metal | | |
| Thickness: (Plate) | 1" | 1/8" To Unlimited |
| Groove | | |
| Fillet | N/A | |
| Thickness: (Pipe/tube) | N/A | |
| Groove | | |
| Fillet | N/A | |
| Diameter: (Pipe) | N/A | |
| Groove | | |
| Fillet | N/A | |
| Filler Metal | | |
| Spec. No. | ANSI/AWS A5-1 | |
| Class | E7018 | |
| F-No. | F-4 | |
| Gas/Flux Type | N/A | |
| Other | | |

AWS QC 1 MARVIN L TYLER #94070891 CWI

Marvin L. Tyler

**VISUAL INSPECTION**
Acceptable YES or NO YES

**Guided Bend Test Results**

| Type | Result | Type | Result |
|---|---|---|---|
| Side Bend (2) | Satisfactory | | |

**FILLET TEST RESULTS**

Appearance N/A Fillet Size N/A
Fracture Test Root Penetration N/A Macroetch N/A
(Describe the location, nature, and size of any crack or tearing of the specimen)

Inspected by Marvin L. Tyler (AWS-CWI) #94070891 Test Number 019
Organization TYLER ASSOCIATES, INC. Date 11/16/2013

**RADIOGRAPHIC TEST RESULTS**

| Film Identification Number | Result | Remarks | Film Identification Number | Result | Remarks |
|---|---|---|---|---|---|
| RADIOGRAPHIC TEST N/A | | | | | |

Interpreted by Test Number
Organization Date

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4, Part C of ANSI/AWS D1.1 Structural Welding Code-Steel 2010 Ed.

Manufacturer or contractor: Tyler Welding Lab 110 Fairchild Downs Place, Cary, NC 27518 (919) 367-8872 tyweld@ntlo.com
Authorized by: Marvin Tyler (Welding Engineer & AWS QC-1 CWI) Certified Welding Inspector
Date 11/16/2013

# AWS
## Welder and Welding Operator Qualification Test Record

Welder or operator's name Ervin Moore Identification no. 231-72-5884
Welding process SMAW Manual X Semiautomatic Machine
Position F4 Overhead
(flat, horizontal, overhead or vertical--if vertical, state whether upward or downward)
In accordance with procedure specification AWS D1.1 Pre qualified Telcom-SM1
Material specification ASTM A36
Diameter and wall thickness (if pipe) - otherwise, joint thickness 1/2"in. Plate
Thickness range this qualifies 1/8- Unlimited.

FILLER METAL

Specification no. AWS 5.1 Classification E7018 F no. F4
Describe filler metal (if not covered by AWS specification)
Is backing strip used? N/A
Filler metal diameter and trade name 1/8"Lincoln Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut None Piping porosity None

Guided Bent Test Results

| Type | Result | Type | Result |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

Test conducted by laboratory test no
per Test date

Fillet Test Results

Appearance Acceptable Fillet size 5/16" inch
Fracture test root penetration Acceptable Marcoeth Acceptable
(describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by D. Preston CWI Laboratory test no. 5884 - oh
per AWS D1.1 2000 4.25 Test date 5/9/07

RADIOGRAPHIC TEST RESULTS

| Film identification | Results | Remarks | Film identification | Results | Remarks |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Test witnessed by Test no.
per

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D1.1 ( 2000 ) Structural Welding Code.
year

Dale Preston AWS CWI

AWS QC 1 DALE W. PRESTON 05041051 CWI

Manufacturer or Contractor Telecommunications Contracting Co.
Authorized by T. Roberts.
Date 5/9/07

# AWS
## Welder and Welding Operator Qualification Test Record

Welder or operator's name Ervin Moore Identification no. 231-72-5884
Welding process SMAW Manual X Semiautomatic Machine
Position F3 Vertical Up
(flat, horizontal, overhead or vertical--if vertical, state whether upward or downward)
In accordance with procedure specification AWS D1.1 Pre qualified Telcom-SM1
Material specification ASTM A36
Diameter and wall thickness (if pipe) - otherwise, joint thickness 1/2"in. Plate
Thickness range this qualifies 1/8- Unlimited.

FILLER METAL

Specification no. AWS 5.1 Classification E7018 F no. F4
Describe filler metal (if not covered by AWS specification)
Is backing strip used? N/A
Filler metal diameter and trade name 1/8"Lincoln Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut None Piping porosity None

Guided Bent Test Results

| Type | Result | Type | Result |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

Test conducted by laboratory test no
per Test date

Fillet Test Results

Appearance Acceptable Fillet size 5/16" inch
Fracture test root penetration Acceptable Marcoeth Acceptable
(describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by D. Preston CWI Laboratory test no. 5884
per AWS D1.1 2000 4.25 Test date 5/9/07

RADIOGRAPHIC TEST RESULTS

| Film identification | Results | Remarks | Film identification | Results | Remarks |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Test witnessed by Test no.
per

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D1.1 ( 2000 ) Structural Welding Code.
year

Dale Preston AWS CWI

AWS QC 1 DALE W. PRESTON 05041051 CWI

Manufacturer or Contractor Telecommunications Contracting Co.
Authorized by T. Roberts.
Date 5/9/07

# RAMBALL TESTLAB, INC.

1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144


## LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN: Tom Roberts

1/7/2013

P.O. Number: Verbal T. Roberts
Lab Number: 333149


Item: 1" Thick Weld Test Plate
Material: A514 to A572 Gr.65
Heat Number: 88778 to 88776
Welder: Erv Moore
Filler Metal: E8018
Weld Process: SMAW
Weld Position: 4G
PQR: 25.PQR.TccI.D.1-A5.5

### VISUAL INSPECTION

Test Specification: AWS D1.1
Disposition: Acceptable

### RADIOGRAPHIC INSPECTION

Acceptance Specification: AWS D1.1

| QUANTITY TESTED | QUANTITY ACCEPTED | QUANTITY REJECTED |
|---|---|---|
| 1 | 1 | 0 |

Tested By: Donahue, B. Level II

Joel Muzik
Quality Manager

# RAMBALL TESTLAB, INC.

1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-9880 FAX: (856) 786-3144


## LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN: Tom Roberts

1/7/2013

P.O. Number: Verbal T. Roberts
Lab Number: 333151
Page 1 of 1

Item: 1" Thick Weld Test Plate
Material: A514 to A572 Gr.65
Heat Number: 88778 to 88776
Welder: Erv Moore
Filler Metal: E8018
Weld Process: SMAW
Weld Position: 3G
PQR: 25.PQR.TccI.D.1-A5.5

### VISUAL INSPECTION

Test Specification: AWS D1.1

Disposition: Acceptable

### RADIOGRAPHIC INSPECTION

Acceptance Specification: AWS D1.1

| QUANTITY TESTED | QUANTITY ACCEPTED | QUANTITY REJECTED |
|---|---|---|
| 1 | 1 | 0 |

Tested By: Donahue, B. Level II

Joel Muzik
Quality Manager

**RAMBALL TESTLAB, INC.**
1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8080 FAX: (856) 786-3144

# LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

11/2/2012

P.O. Number: Verbal Tom Roberts
Lab Number: 332318
Page 1 of 1

Item: 1" Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 3G Vertical
Process: SMAW
Welder: Erv Moore
PQR Number: 25.PQR.TccI.D.1-A5.5
Note: Visual Inspection Required. State Visual acceptance per AWS D1.1

## VISUAL INSPECTION

Test Specification: AWS D1.1

Disposition: Acceptable

## RADIOGRAPHIC INSPECTION

Test Specification: AWS D1.1

| QUANTITY TESTED | QUANTITY ACCEPTED | QUANTITY REJECTED |
|---|---|---|
| 1 | 1 | 0 |

Disposition: Acceptable

Tested By:Donahue, B. Level II

Joel Muzik
Quality Manager

**RAMBALL TESTLAB, INC.**
1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

# LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

11/2/2012
P.O. Number: Verbal Tom
Lab Number: 332319
Page 1 of 1

Item: 1" Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 3G Vertical
Process: SMAW
Welder: Brv Moore
PQR Number: 25.PQR.TccI.D.1-A5.5

## WELD PROCEDURE QUALIFICATION TEST

### IAW AWS D1.1

### TRANSVERSE TENSILE TEST

Required Stress, ksi: 110-130 minimum/maximum

| | SPECIMEN #1 | SPECIMEN #2 |
|---|---|---|
| WIDTH (inches): | 0.754 | 0.755 |
| THICKNESS (inches): | 0.930 | 0.975 |
| AREA (sq. inches): | 0.701 | 0.736 |
| ULTIMATE LOAD (lbs): | 79,816 | 82,757 |
| ULTIMATE STRESS (ksi): | 114 | 112 |
| LOCATION OF FRACTURE: | Weld | Weld |
| CHARACTER OF FAILURE: | Ductile | Ductile |
| DISPOSITION: | Acceptable | Acceptable |

### GUIDED BEND TEST

Bend Diameter: 2-1/2" Bend Angle: 180 Degrees

| | SPECIMEN #1 | SPECIMEN #2 | SPECIMEN #3 | SPECIMEN #4 |
|---|---|---|---|---|
| TYPE: | Side | Side | Side | Side |
| DEFECTS: | Absent | Absent | Absent | Absent |
| DISPOSITION: | Acceptable | Acceptable | Acceptable | Acceptable |

Joel Muzik
Quality Manager

# AWS
## Welder and Welding Operator Qualification Test Record

Welder or operator's name Ervin Moore Identification no. 231-72-5884
Welding process SMAW Manual X Semiautomatic Machine
Position F4 Overhead
(flat, horizontal, overhead or vertical--if vertical, state whether upward or downward)
In accordance with procedure specification AWS D1.1 Pre qualified Telcom-SM1
Material specification ASTM A36
Diameter and wall thickness (if pipe) - otherwise, joint thickness 1/2"in. Plate
Thickness range this qualifies 1/8- Unlimited.

FILLER METAL

Specification no. AWS 5.1 Classification E7018 F no. F4
Describe filler metal (if not covered by AWS specification)
Is backing strip used? N/A
Filler metal diameter and trade name 1/8"Lincoln Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut None Piping porosity None

Guided Bent Test Results

| Type | Result | Type | Result |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

Test conducted by laboratory test no
per Test date

Fillet Test Results

Appearance Acceptable Fillet size 5/16" inch
Fracture test root penetration Acceptable Marcoeth Acceptable
(describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by D. Preston CWI Laboratory test no. 5884 - oh
per AWS D1.1 2000 4.25 Test date 5/9/07

RADIOGRAPHIC TEST RESULTS

| Film identification | Results | Remarks | Film identification | Results | Remarks |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Test witnessed by Test no.
per

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D1.1 ( 2000 ) Structural Welding Code.
year

Dale Preston AWS CWI

AWS QC 1 DALE W. PRESTON 05041051 CWI

Manufacturer or Contractor Telecommunications Contracting Co.
Authorized by T. Roberts.
Date 5/9/07

# RAMBALL TESTLAB, INC.

1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144


## LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

11/2/2012

P.O. Number: Verbal Tom Roberts
Lab Number: 332320
Page 1 of 1

Item: 1" Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 4G
Process: SMAW
Welder: Erv Moore
PQR Number: 25.PQR.TccI.D.1-A5.5
Note: Visual Inspection Required. State Visual acceptance per AWS D1.1

### VISUAL INSPECTION

Test Specification: AWS D1.1

Disposition: Acceptable

### RADIOGRAPHIC INSPECTION

Test Specification: AWS D1.1

| QUANTITY TESTED | QUANTITY ACCEPTED | QUANTITY REJECTED |
|---|---|---|
| 1 | 1 | 0 |

Disposition: Acceptable

Tested By: Donahue, B Level II

Joel Muzik
Quality Manager

**RAMBALL TESTLAB, INC.**
1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8080 FAX: (856) 786-3144

# LABORATORY REPORT

11/2/2012

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

P.O. Number: Verbal Tom
Lab Number: 332321
Page 1 of 1

Item: ." Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 4G Overhead
Process: SMAW
Welder: Erv Moore
PQR Number: 25.PQR.TccI.D.1-A5.5

## WELD PROCEDURE QUALIFICATION TEST

## IAW AWS D1.1

## TRANSVERSE TENSILE TEST

Required Stress, ksi: 110-130 minimum/maximum

| | SPECIMEN #1 | SPECIMEN #2 |
|---|---|---|
| WIDTH (inches): | 0.752 | 0.749 |
| THICKNESS (inches): | 0.920 | 0.850 |
| AREA (sq. inches): | 0.692 | 0.637 |
| ULTIMATE LOAD (lbs): | 77,723 | 70,678 |
| ULTIMATE STRESS (ksi): | 112 | 111 |
| LOCATION OF FRACTURE: | Weld | Weld |
| CHARACTER OF FAILURE: | Ductile | Ductile |
| DISPOSITION: | Acceptable | Acceptable |

## GUIDED BEND TEST

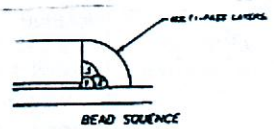
Bend Diameter: 2-1/2" Bend Angle: 180 Degrees

| | SPECIMEN #1 | SPECIMEN #2 | SPECIMEN #3 | SPECIMEN #4 |
|---|---|---|---|---|
| TYPE: | Side | Side | Side | Side |
| DEFECTS: | Absent | Absent | Absent | Absent |
| DISPOSITION: | Acceptable | Acceptable | Acceptable | Acceptable |

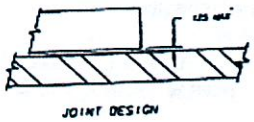
Joel Muzik
Quality Manager

Sketch A


Sketch B




Sketch C




**MEMO**

1. Paint will be abated by others prior to welding.
2. All welds will be welded vertically.
3. Welds to be cleaned free of slag.
4. All welds after cleaning will be brushed with (2) coats of ZRC Galvilite primer.
5. Finish coat to match existing.

# Telecommunications Contracting Co., Inc.

## Welding Procedure Specification



WPS No. 6 TCCI - D1.1 - All Fillets Revision 0 Date _____ By _____

Authorized By Tom Roberts Date 11/10/09 Prequalified ☒

Welding Process(es) SMAW _____ Type: Manual ☒ Machine ☐ Semi-Auto ☐ Auto ☐

Supporting PQR(s) N/A PreQualified

**JOINT**

Type Lapped/Inside Corner 1/8" to 5/8" Fillet Welds

Backing Yes ☒ No ☒ Single Weld ☒ Double Weld ☐

Backing Material A572

Root Opening 0 Root Face Dimension 0

Groove Angle 0 Radius (J-U) 0

Back Gouge Yes ☒ No ☒

Method N/A

Prequalifed Joint Parameters:

See Page 2

**BASE METALS**

Material Spec. A572 to Per Table 3.1

Type or Grade Any Group II to Any Group II or III

Thickness: Groove (in.) N/A - _____

Fillet (in.) Various - _____

Diameter (Pipe, in.) N/A - _____

**FILLER METALS**

AWS Specification AWS A5.1 _____

AWS Classification E7018

**SHIELDING**

Flux N/A

Electrode-Flux (Class) N/A

Gas - Composition - Flow Rate - Gas Cup Size -

**PREHEAT**

Preheat Temp., Min. Per AWS Table 3.2 Category B

| Thickness | Temperature |
|---|---|
| Up to 3/4" | < 32 F - 70 F |
| Over 3/4" to 1-1/2" | 50 F |
| Over 1-1/2" to 2-1/2" | 150 F |
| Over 2-1/2" | 225 F |

Interpass Temp., Min. _____ Max. _____

**POSITION**

Position of Groove N/A Fillet Vertical Up

Vertical Progression: ☒ Up ☐ Down

**ELECTRICAL CHARACTERISTICS**

Transfer Mode (GMAW):

Short-Circuiting ☐ Globular ☐ Spray ☐

Current: AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Other _____

Tungsten Electrode (GTAW):

Size N/A Type -

**TECHNIQUE**

Stringer or Weave Bead Stringer

Multi-pass or Single Pass (per side) Multi-pass

Number of Electrodes 1

Electrode Spacing: Longitudinal N/A

Lateral N/A

Angle N/A

Contact Tube to Work Distance N/A

Peening None

Interpass Cleaning Wire Brush, Chip, or Grind

**POSTWELD HEAT TREATMENT** PWHT Required ☐

Temp. N/A Time N/A

**WELDING PROCEDURE**

| Layer/Pass | Process | Filler Metal Class | Diameter | Cur. Type | Amps or WFS | Volts | Travel Speed | Other Notes |
|---|---|---|---|---|---|---|---|---|
| 1-n | SMAW | E7018 | 1/8" | DCEP | 75 - 130 | 18-26 | 6 - 10 ipm | |

# Telecommunications Contracting Co., Inc.

## Welding Procedure Specification

WPS No. 010 TCCI - D1.1 - BU4a  Revision 0  Date 11/12/09  By Michael whelan

Authorized By Tom Roberts  Date 11/13/09  Prequalified ☒

Welding Process(es) SMAW  Type: Manual ☒ Machine ☐ Semi-Auto ☐ Auto ☐

Supporting PQR(s) N/A PreQualified

**JOINT**

Type B-U4a Single Bevel Groove

Backing Yes ☒ No ☐  Single Weld ☒ Double Weld ☐

Backing Material A572

Root Opening 1/4"  Root Face Dimension 0

Groove Angle 45  Radius (J-U) N/A

Back Gouge Yes ☒ No ☐

Method

Prequalifed Joint Parameters:

See Page 2

**BASE METALS**

Material Spec. A572 to A572

Type or Grade 50 to 50

Thickness: Groove (in ) 1" -

Fillet ( in ) -

Diameter (Pipe, in ) N/A -

**FILLER METALS**

AWS Specification AWS A5.5

AWS Classification E8018-C3

**SHIELDING**

Flux N/A

Electrode-Flux (Class) N/A

Gas -

Composition -

Flow Rate -

Gas Cup Size -

**PREHEAT**

Preheat Temp., Min. 150 F Per AWS Table 3.2 Category C

Thickness Up to 3/4" Temperature

Over 3/4" to 1-1/2" 150 F

Over 1-1/2" to 2-1/2"

Over 2-1/2"

Interpass Temp., Min. 150 F  Max. 300 F

**POSITION**

Position of Groove Horizontal  Fillet Horizontal

Vertical Progression: ☒ Up ☐ Down

**ELECTRICAL CHARACTERISTICS**

Transfer Mode (GMAW):

Short-Circuiting ☐ Globular ☐ Spray ☐

Current: AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Other

Tungsten Electrode (GTAW):

Size N/A  Type N/A

**TECHNIQUE**

Stringer or Weave Bead Stringer

Multi-pass or Single Pass (per side) Multi-pass

Number of Electrodes 1

Electrode Spacing: Longitudinal N/A

Lateral N/A

Angle N/A

Contact Tube to Work Distance N/A

Peening None

Interpass Cleaning Wire Brush, Chip, or Grind

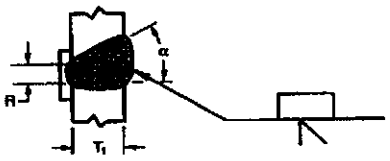
**POSTWELD HEAT TREATMENT** PWHT Required ☐

Temp. N/A  Time N/A

**WELDING PROCEDURE**

| Layer/Pass | Process | Filler Metal Class | Diameter | Cur. Type | Amps or WFS | Volts | Travel Speed | Other Notes |
|---|---|---|---|---|---|---|---|---|
| 1 - 2 | SMAW | E8018 | 1/8" | DCEP | 110 - 140 | | 6 -10 ipm | |
| 3 - n | SMAW | E8018 | 5/32" | DCEP | 150 - 187 | | 8 -11 ipm | |

Single-bevel-groove weld (4)
Butt joint (B)

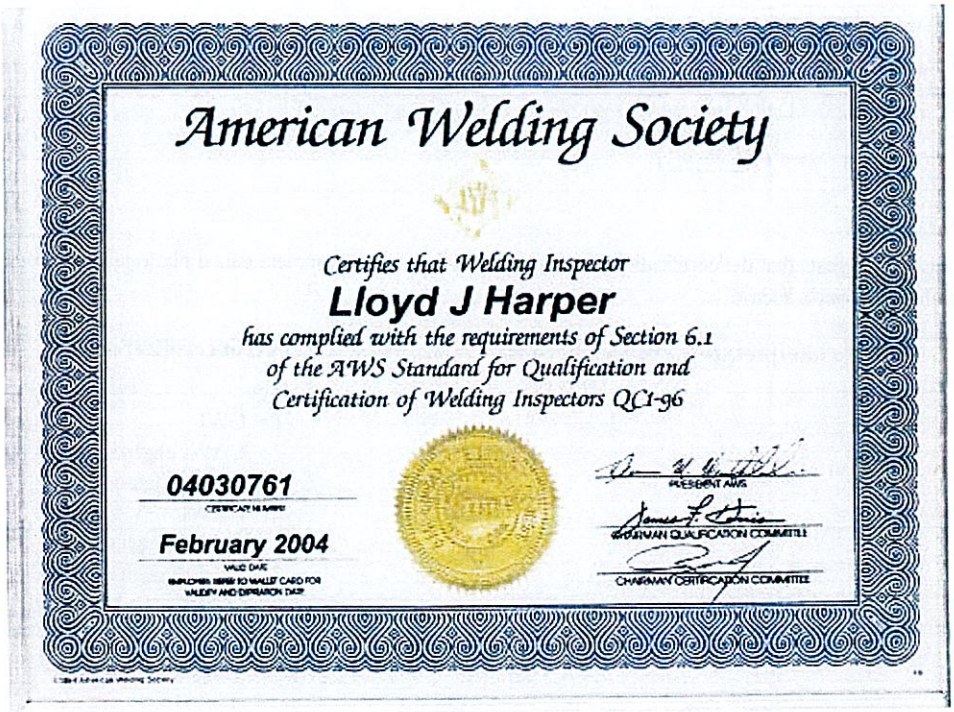



| Tolerances | |
|---|---|
| As Detailed (see 3.13.1) | As Fit-Up (see 3.13.1) |
| R = +1/16, –0 | +1/4, –1/16 |
| α = +10°, –0° | +10°, –5° |

| Welding Process | Joint Designation | Base Metal Thickness (U = unlimited) $T_1$ | Base Metal Thickness (U = unlimited) $T_2$ | Groove Preparation: Root Opening | Groove Preparation: Groove Angle | Permitted Welding Positions | Gas Shielding for FCAW |
|---|---|---|---|---|---|---|---|
| SMAW | B-U4a | U | — | R = 1/4 | α = 45° | All | — |
| | | | | R = 3/8 | α = 30° | All | — |

MEMO

1. Paint will be abated by others prior to welding.
2. All welds will be welded vertically.
3. Welds to be cleaned free of slag.
4. All welds after cleaning will be brushed with (2) coats of ZRC Galvilite primer.
5. Finish coat to match existing.



American Welding Society

Certifies that Welding Inspector

**Lloyd J Harper**

has complied with the requirements of Section 6.1
of the AWS Standard for Qualification and
Certification of Welding Inspectors QC1-96

04030761

February 2004

PRESIDENT AWS

CHAIRMAN QUALIFICATION COMMITTEE

CHAIRMAN CERTIFICATION COMMITTEE

# Certification QuikCheck

**AWS's Free Online Certification Verification Service**

Please enter a Certification number below, along with the last name of the inspector. This number can be found on a wallet card or wall certificate produced by the inspector. The search will return the certification number, a name, and an expiration date for that individual.

*Certification was found .....*

| Cert. No. | Name | Expiration | Cert. Description |
|---|---|---|---|
| 04030761 | Lloyd J Harper | March 1, 2016 | Certified Welding Inspector |

Certification number 04030761

Last name harper

Go

Alternatively, you may search using the individual's information to view all certifications *(all fields are required)*:

Last Name

First Name or First Initial

Birth Month / Day –select birth month– / –select birth day–

Search

AWS strongly suggests that the certification identity be verified with a government issued photo identification card, such as a driver's license.

**How to interpret the Certification number to determine the level of certification:**

*Key*
1 = CWI
2 = CAWI eligible for upgrade*
3 = cwi by upgrade*
4 = CAWI
5 = CWI through CWSIP
7 = CWI through Reciprocity
8 = SCWI
E = CWE
G = CWENG

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# VISUAL ACUITY RECORD

**NAME** : Llyod J. Harper **Social Security Number:** 9716

**NEAR VISION :** Required ☒ Not Required: ☐

| | LEFT | | RIGHT | |
|---|---|---|---|---|
| | Jaeger # | Distance | Jaeger # | Distance |
| UNCORRECTED | | | | |
| CORRECTED | J-2 | 12" | J-2 | 12" |

**FAR VISION:** Required: ☐ Not Required: ☒

| | LEFT | RIGHT |
|---|---|---|
| UNCORRECTED | | |
| CORRECTED | 20/20 | 20/20 |

COLOR CONTRAST DIFFERENTIATION: **REQUIRED** ☒ **NOT REQUIRED** ☐

PSEUDO ISOCHROMATIC PLATES: **PASS** ☒ **FAIL** ☐

BRIGHTNESS DISCRIMINATION: **PASS** ☒ **FAIL** ☐

Restrictions: None

Corrective Lenses Required: Yes ☒ No: ☐

Examiner: Thomas J Munson Date: November 4, 2013

**Expiration date of visual acuity examination:** **Date:** **NOVEMBER 4, 2014**

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** Magnetic Particle

**Certification Level** : II **Date of Certification:** 06/28/14

**Certification Expiration Date:** 06/28/2017

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **General:** | 85.0 | T. Munson | |
| **Specific:** | 95.0 | T. Munson | |
| **Practical** | 95.0 | T. Munson | |
| **Composite:** | 91.6 | | |

**Limitations:** None

**Recommended for certification by:** Thomas J Munson **Date:** 06/28/14

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by** : **Date:** 06/28/14

NDE Manager

Applied Testing Group, LLC
11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** Liquid Penetrant

**Certification Level** : II **Date of Certification:** 06/21/2014

**Certification Expiration Date:** 06/21/2017

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **General:** | 90.0 | T. Munson | |
| **Specific:** | 95.0 | T. Munson | |
| **Practical** | 95.0 | T. Munson | |
| **Composite:** | 96.3 | | |

**Recommended for certification by:** Thomas J Munson **Date:** 06/20/2014

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by** : David Clower **Date:** 06/21/2014

NDE Manager

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** Visual

**Certification Level** : II **Date of Certification:** 01/12/14

**Certification Expiration Date:** 02/26/2017

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **General:** | 95.0 | T. Munson | |
| **Specific:** | 100.0 | T. Munson | |
| **Practical** | 100.0 | T. Munson | AWS-CWI |
| **Composite:** | 98.3 | | |

**Recommended for certification by:** Thomas B Munson **Date:** 01/10/14

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by** : David Thomas **Date:** 01/12/14

NDE Manager

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# Personnel Testing
# Education, Training and Experience Record

Name: Lloyd J. Harper Signature:* L. D. Harper

Date of Birth: 06/10/1956 Date of Employment: 11/24/03

Training and Experience Through: July 1, 2014

- The information provided is accurate and true to the best of my knowledge.

## EDUCATION

| School | Location | Date Graduated | Degree/Major |
|---|---|---|---|
| Varina High School | Varina, VA | 1984 | Diploma/General Studies |

## CLASSROOM TRAINING

| Subject | Training Hours | Dates Completed | Source/ Company |
|---|---|---|---|
| Liquid Penetrant Level I & II | 40 | 2003 | Schnabel |
| Magnetic Particle Level I & II | 40 | 2002 | Schnabel |
| Radiation Safety/Level I | 49 | 2002 | E. I. Dupont |
| Visual Testing – AWS | 40 | 1993 | AWS |
| Fundamental of Weld Engineering | 40 | 1994 | Ohio State U. |
| Liquid Penetrant Level I | 12 | 1996 | ASNT |

Applied Testing Group, LLC
11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

# Personnel Testing
# Education, Training and Experience Record

## WORK EXPERIENCE

| Test Method | Level | Company | Total Months Exp. |
|---|---|---|---|
| **Visual Testing** | II | Applied Testing Group, LLC | 41 |
| | II | Mistras Services, Inc. | 36 |
| | II | Schnabel Engineering | 44 |
| | CWI | American Welding Society | 181 |
| | | | |
| | | | |
| **Magnetic Particle** | II | Applied Testing Group, LLC | 42 |
| | II | Mistras Services, Inc. | 24 |
| | II | Schnabel Engineering | 22 |
| | | | |
| | | | |
| | | | |
| | | | |
| **Liquid Penetrant** | II | Applied Testing Group, LLC | 34 |
| | II | Mistras Services, Inc. | 24 |
| | II | Schnabel Engineering | 40 |
| | II | | |
| | | | |
| **Radiographic** | II | Mistras Services, Inc. | 9 |
| | II | Schnabel Engineering | 14 |
| | | | |
| | | | |
| | | | |
| | | | |

Applied Testing Group, LLC

11017 MT. CHARRON RD. NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

# VISUAL ACUITY RECORD

**NAME** : Daniel Irons **Social Security Number:** 6010

**NEAR VISION:** Required ☒ Not Required: ☐

| | LEFT | | RIGHT | |
|---|---|---|---|---|
| | Jaeger # | Distance | Jaeger # | Distance |
| **UNCORRECTED** | | | | |
| **CORRECTED** | J-2 | 12" | J-2 | 12" |

**FAR VISION:** Required: ☒ Not Required: ☐

| | LEFT | RIGHT |
|---|---|---|
| **UNCORRECTED** | | |
| **CORRECTED** | 20/20 | 20/20 |

COLOR CONTRAST DIFFERENTIATION: **REQUIRED** ☒ **NOT REQUIRED** ☐

PSEUDO ISOCHROMATIC PLATES: **PASS** ☒ **FAIL** ☐

BRIGHTNESS DISCRIMINATION: **PASS** ☒ **FAIL** ☐

Restrictions: Far Vision

Corrective Lenses Required: Yes ☒ No: ☐

Examiner: Thomas J Munroe Date: September 14, 2013

**Expiration date of visual acuity examination:** **Date:** **SEPTEMBER 14, 2014**

Applied Testing Group, LLC

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-6975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** UT

**Certification Level** : III **Date of Certification:** 03/14/2011

**Certification Expiration Date:** 03/13/2016

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **Basic:** | 90.0 | T. Munson, P.E. | |
| **Method:** | 92.0 | T. Munson, P.E. | |
| **Specific:** | 96.0 | T. Munson, P.E. | |
| **Practical** | 92.0 | T. Munson, P.E. | |
| **Composite:** | 92.5 | | |

**Limitations:** Contact, Immersion, Air Coupled

**Recommended for certification by:** Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by** : Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH. (256) 425-8975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** BT

**Certification Level :** III **Date of Certification:** 03/17/2011

**Certification Expiration Date:** 03/16/2016

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **Basic:** | 90.0 | T. Munson, P.E. | |
| **Method:** | 96.0 | T. Munson, P.E. | |
| **Specific:** | 96.0 | T. Munson, P.E. | |
| **Practical** | 92.0 | T. Munson, P.E. | |
| **Composite:** | 93.5 | | |

**Limitations:** Bubble Leak

**Recommended for certification by:** Thomas B Munson, P.E. **Date:** 03/17/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by :** Thomas B Munson, P.E. **Date:** 03/17/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

1017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425 8975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** MT

**Certification Level** : III **Date of Certification:** 03/14/2011

**Certification Expiration Date:** 03/13/2011

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **Basic:** | 90.0 | T. Munson, P.E. | |
| **Method:** | 88.0 | T. Munson, P.E. | |
| **Specific:** | 96.0 | T. Munson, P.E. | |
| **Practical** | 90.0 | T. Munson, P.E. | |
| **Composite:** | 91.0 | | |

**Limitations:** Visible Dry, Fluorescent Wet

**Recommended for certification by:** Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by** : Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

# Nondestructive Testing
## Qualification and Certification Record

This is to certify that:

**Name:** Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** RT

**Certification Level** : III **Date of Certification:** 03/15/2011

**Certification Expiration Date:** 03/14/2016

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **Basic:** | 90.0 | T. Munson, P.E. | |
| **Method:** | 90.0 | T. Munson, P.E. | |
| **Specific:** | 94.0 | T. Munson, P.E. | |
| **Practical** | 96.0 | T. Munson, P.E. | |
| **Composite:** | 92.5 | | |

**Limitations:** Conventional Film, Digital, Computed, Neutron

**Recommended for certification by:** Thomas B Munson, P.E. **Date:** 03/15/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by** : Thomas B Munson, P.E. **Date:** 03/15/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

11012 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 426-8975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** PT

**Certification Level :** III **Date of Certification:** 03/15/2011

**Certification Expiration Date:** 03/14/2016

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **Basic:** | 90.0 | T. Munson, P.E. | |
| **Method:** | 88.0 | T. Munson, P.E. | |
| **Specific:** | 92.0 | T. Munson, P.E. | |
| **Practical** | 92.0 | T. Munson, P.E. | |
| **Composite:** | 90.5 | | |

**Limitations:** Visible Solvent Dye, Visible & Fluorescent Water Washable, Visible & Fluorescent Solvent Dye

**Recommended for certification by:** Thomas B Munson, P.E. **Date:** 03/15/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by :** Thomas B Munson, P.E. **Date:** 03/15/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** Eddy Current

**Certification Level :** III **Date of Certification:** 03/16/2011

**Certification Expiration Date:** 03/15/2016

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **Basic:** | 90.0 | T. Munson, P.E. | |
| **Method:** | 84.0 | T. Munson, P.E. | |
| **Specific:** | 88.0 | T. Munson, P.E. | |
| **Practical** | 92.0 | T. Munson, P.E. | |
| **Composite:** | 88.5 | | |

**Limitations:** Tubing Ferrous and Nonferrous, Surface

**Recommended for certification by:** Thomas E Munson, P.E. **Date:** 03/16/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

**Certified by :** Thomas E Munson, P.E. **Date:** 03/16/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

# Nondestructive Testing
# Qualification and Certification Record

This is to certify that:

**Name:** Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

**NDT Method:** Visual

**Certification Level** : III **Date of Certification:** 03/16/2011

**Certification Expiration Date:** 03/15/2016

**Test Scores:**

| Test | Grade | Administered By | Remarks |
|---|---|---|---|
| **Basic:** | 90.0 | T. Munson, P.E. | |
| **Method:** | 94.0 | T. Munson, P.E. | |
| **Specific:** | 96.0 | T. Munson, P.E. | |
| **Practical** | 100.0 | T. Munson, P.E. | |
| **Composite:** | 95.0 | | |

**Limitations:** Manual and Remote

**Recommended for certification by:** Thomas S Munson, P.E.
Corporate Professional ASNT NDT Level III
ASNT File Number 9295
**Date:** 03/16/2011

**Certified by** : Thomas S Munson, P.E.
Corporate Professional ASNT NDT Level III
ASNT File Number 9295
**Date:** 03/16/2011

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

# Nondestructive Testing
# Education, Training and Experience Form

Name: Daniel Irons Signature:

Date of Birth: 11/26/57 Date of Employment: 03/14/2011

Training and Experience Through: January 1, 2014

## EDUCATION

| School | Location | Date Graduated | Degree/Major |
|---|---|---|---|
| MenchvilleHigh School | Newport News, VA | 1976 | Advanced Studies |
| General Nuclear Services, Inc. | Newport News, VA | 1979 | Nondestructive Testing Technology |
| Newport News Shipbuilding & Drydock, Inc. | Newport News, VA | 1981 | Advanced Automated Ultrasonic |
| Newport News Shipbuilding & Drydock, Inc. | Newport News, VA | 1981 | Eddy Current |
| Northeast Utilities, Inc. | Milford, CT | 1982 | IGSCC Detection |
| Ebasco Services, Inc. | New York, NY | 1983 | Automated Ultrasonics, Eddy Current, IGSCC Detection & Sizing |
| Electric Power Research Institute (ERPI) | Charlotte, NC | 1985 | IGSCC Detection & Sizing |
| Electric Power Research Institute (ERPI) | Charlotte, NC | 1985 | IGSCC Overlay |
| American Welding Society (AWS) | Houston, TX | 2002 | NDT of Welds |
| Fundamentals of Professional Practice | Silver Spring, MD | 2003 | American Soils & Foundation Engineers (ASFE) |
| Computed Radiography – Starr System | Pensacola, FL | 2007 | Virtual Media Integration (VMI) |
| Infrared Testing & Technologies | Richmond, VA | 2010 | Munson NDT |
| Computed Radiography Image Interpretation | Richmond, VA | 2010 | General Electric |

## Nondestructive TestingTraining Form

| Subject | Training Hours | Dates Completed | Source/ Company |
|---|---|---|---|
| Ultrasonic Testing, Level I & II | 650 | 1979 | General Nuclear Services, Inc. |
| Radiographic Testing, Level I & II | 725 | 1979 | General Nuclear Services, Inc. |
| Eddy Current Testing, Level I & II | 180 | 1979 | General Nuclear Services, Inc. |
| Liquid Penetrant Testing, Level I & II | 95 | 1979 | General Nuclear Services, Inc. |
| Magnetic Particle Testing, Level I & II | 110 | 1979 | General Nuclear Services, Inc. |
| Visual Testing, Level I & II | 425 | 1979 | General Nuclear Services, Inc. |
| Leak Testing, Level I & II – Bubble | 40 | 1979 | General Nuclear Services, Inc. |
| Leak Testing, Level I & II – Pressure Change | 40 | 1979 | General Nuclear Services, Inc. |
| Leak Testing, Level I & II – Halogen Diode, | 40 | 1979 | General Nuclear Services, Inc. |
| Leak Testing, Mass Spectrometer – Level I & II | 80 | 1979 | General Nuclear Services, Inc. |
| Advanced Automated Ultrasonic Testing – (UDARPS) | 80 | 1981 | Newport News Shipbuilding & Drydock, Inc. |
| Eddy Current-Shipboard and BOP Applications | 80 | 1981 | Newport News Shipbuilding & Drydock, Inc. |
| IGSCC Detection | 8 | 1982 | Northeast Utilities, Inc. |
| Automated Ultrasonic, Eddy Current, IGSCC Detection & Sizing, Leak Testing (BT and PC) | 160 | 1983 | Ebasco Services, Inc. |
| IGSCC Detection & Sizing | 40 | 1985 | Electric Power Research Institute (ERPI) |
| IGSCC Overlay Detection & Sizing | 8 | 1985 | Electric Power Research Institute (ERPI) |
| NDT of Welds | 24 | 2002 | American Welding Society (AWS) |
| Computer Radiography | 24 | 2007 | Virtual Media Integration (VMI) |
| InfraredTesting &Technologies | 80 | 2010 | Munson NDT |
| Computed Radiography Interpretation | 24 | 2010 | General Electric |

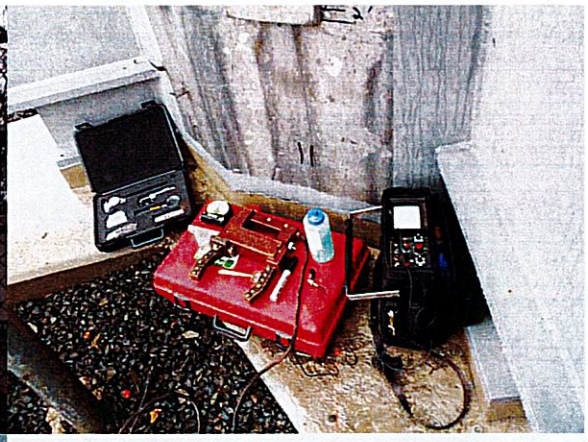
## Nondestructive TestingExperience Form Continued...

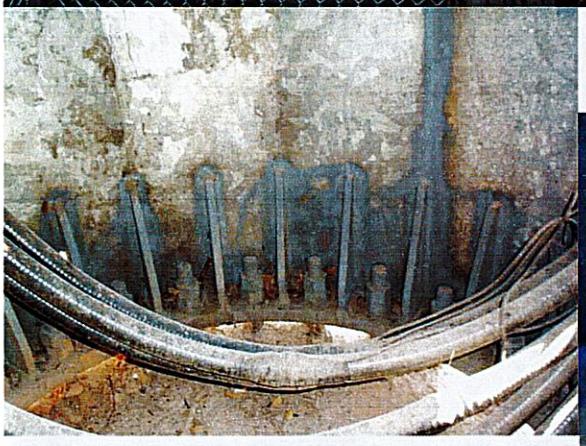
| Test Method | Level | Company | Total Months Experience |
|---|---|---|---|
| Ultrasonic | II | General Services Nuclear Corporation, Inc. | 37 |
| | II | Newport News Shipbuilding & Drydock, Inc. | 20 |
| | II | Ebasco Services, Inc. | 27 |
| | III | Nuclear Energy Services, Inc. | 14 |
| | III | General Electric, Nuclear Plant Services | 22 |
| | III | ATEC Associates, Inc. | 49 |
| | III | Deadline Support Services, Inc. | 99 |
| | II | Mechanical Integrity Quality Assurance, Inc. | 15 |
| | III | Schnabel Engineering, Inc. | 93 |
| | III | Mistras Services, Inc. | 29 |
| | III | Applied Testing Group, Inc. | 48 |
| Radiographic | II | General Services Nuclear Corporation, Inc. | 37 |
| | II | Newport News Shipbuilding & Drydock, Inc. | 20 |
| | II | Ebasco Services, Inc. | 27 |
| | III | Nuclear Energy Services, Inc. | 14 |
| | III | General Electric, Nuclear Plant Services | 22 |
| | III | ATEC Associates, Inc. | 49 |
| | III | Deadline Support Services, Inc. | 99 |
| | II | Mechanical Integrity Quality Assurance, Inc. | 2 |
| | III | Schnabel Engineering, Inc. | 95 |
| | III | Mistras Services, Inc. | 29 |
| | III | Applied Testing Group, Inc. | 3 |
| Liquid Penetrant | II | General Services Nuclear Corporation, Inc. | 37 |
| | II | Newport News Shipbuilding & Drydock, Inc. | 20 |
| | II | Ebasco Services, Inc. | 27 |
| | III | Nuclear Energy Services, Inc. | 14 |
| | III | General Electric, Nuclear Plant Services | 22 |
| | III | ATEC Associates, Inc. | 49 |
| | III | Deadline Support Services, Inc. | 99 |
| | II | Mechanical Integrity Quality Assurance, Inc. | 15 |
| | III | Schnabel Engineering, Inc. | 74 |

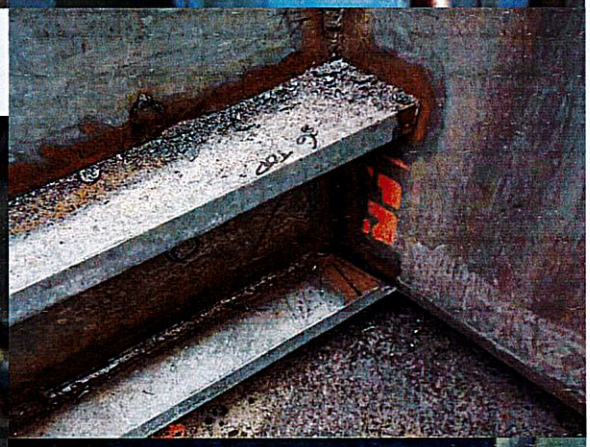
## Nondestructive Testing
## Experience Form Continued...

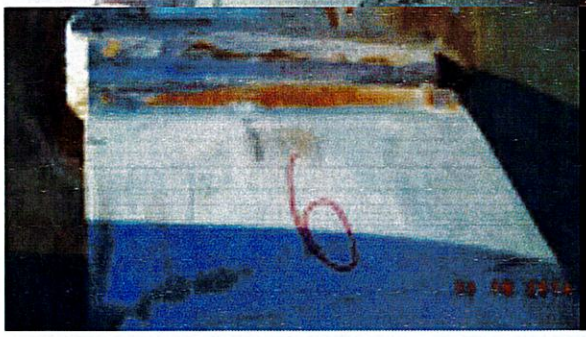
| | | | |
|---|---|---|---|
| **Liquid Penetrant-Continued** | III | Applied Testing Group, Inc. | 11 |
| **Magnetic Particle** | II | General Services Nuclear Corporation, Inc. | 37 |
| | II | Newport News Shipbuilding & Drydock, Inc. | 20 |
| | II | Ebasco Services, Inc. | 27 |
| | III | Nuclear Energy Services, Inc. | 14 |
| | III | General Electric, Nuclear Plant Services | 22 |
| | III | ATEC Associates, Inc. | 49 |
| | III | Deadline Support Services, Inc. | 99 |
| | II | Mechanical Integrity Quality Assurance, Inc. | 15 |
| | III | Schnabel Engineering, Inc. | 62 |
| | III | Mistras Services, Inc. | 29 |
| | III | Applied Testing Group, Inc. | 39 |
| **Eddy Current** | II | General Services Nuclear Corporation, Inc. | 37 |
| | II | Newport News Shipbuilding & Drydock, Inc. | 20 |
| | II | Ebasco Services, Inc. | 27 |
| | III | ATEC Associates, Inc. | 49 |
| | III | Deadline Support Services, Inc. | 99 |
| | II | Mechanical Integrity Quality Assurance, Inc. | 15 |
| | III | Schnabel Engineering, Inc. | 48 |
| | III | Mistras Services, Inc. | 15 |
| | III | Applied Testing Group, Inc. | 26 |
| **Visual Testing** | II | General Services Nuclear Corporation, Inc. | 37 |
| | II | Newport News Shipbuilding & Drydock, Inc. | 20 |
| | II | Ebasco Services, Inc. | 27 |
| | III | Nuclear Energy Services, Inc. | 14 |
| | III | General Electric, Nuclear Plant Services | 22 |
| | III | ATEC Associates, Inc. | 49 |
| | III | Deadline Support Services, Inc. | 99 |
| | II | Mechanical Integrity Quality Assurance, Inc. | 15 |
| | III | Schnabel Engineering, Inc. | 95 |
| | III | Mistras Services, Inc. | 29 |
| | III | Applied Testing Group, Inc. | 48 |


NOTICE
NOTICE
www.crowncastle.com
877-486-9377
800-788-7011
825983





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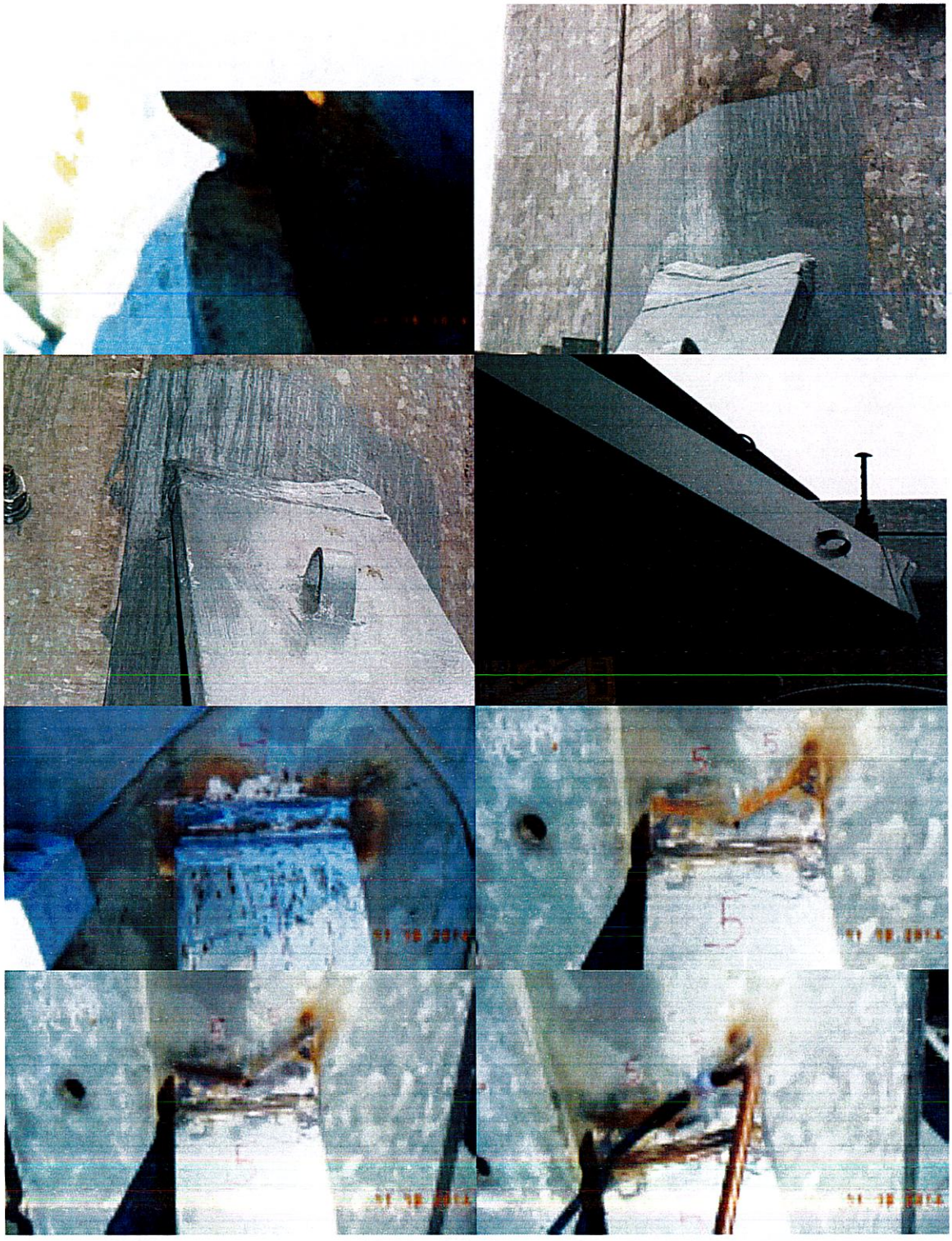

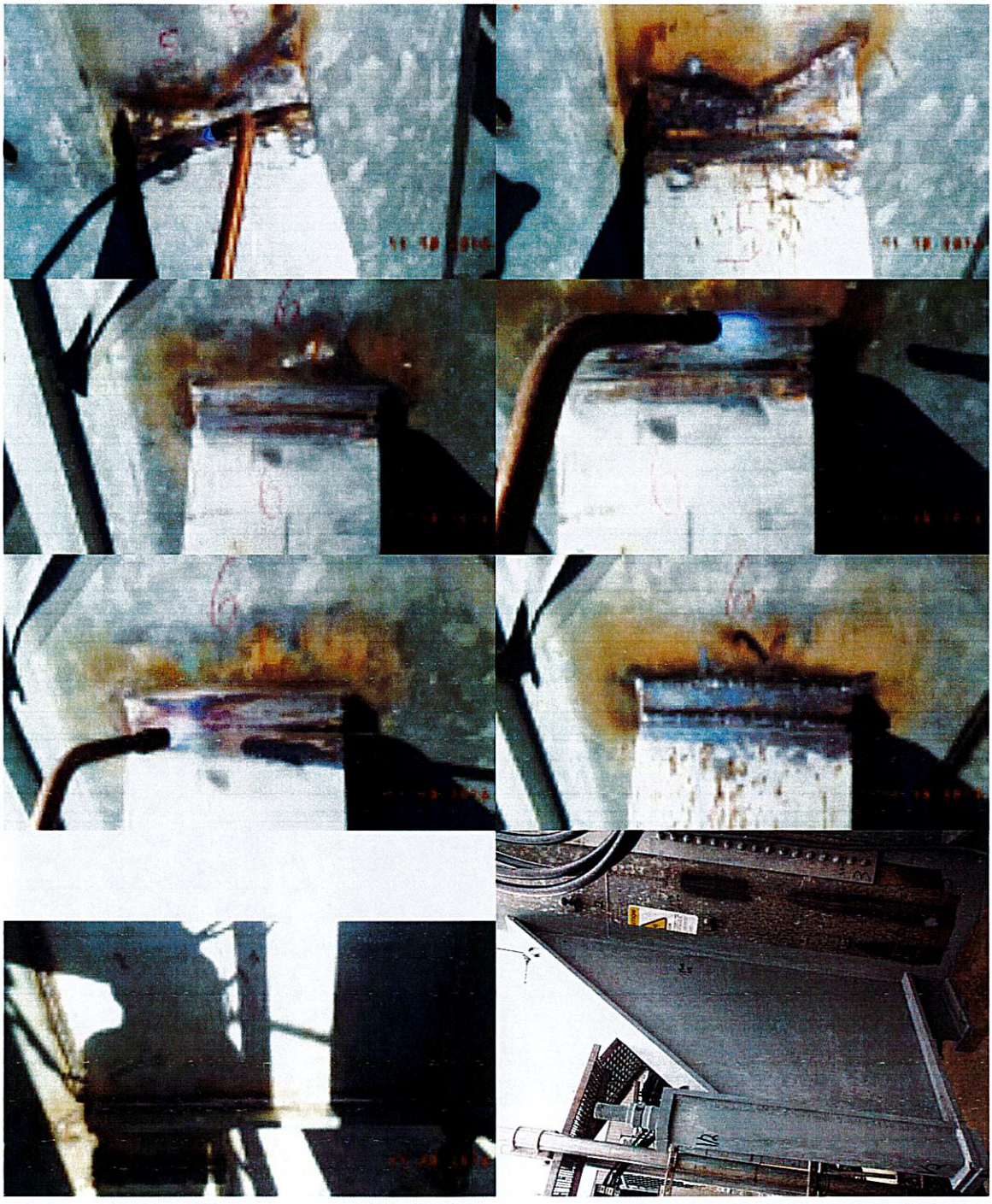


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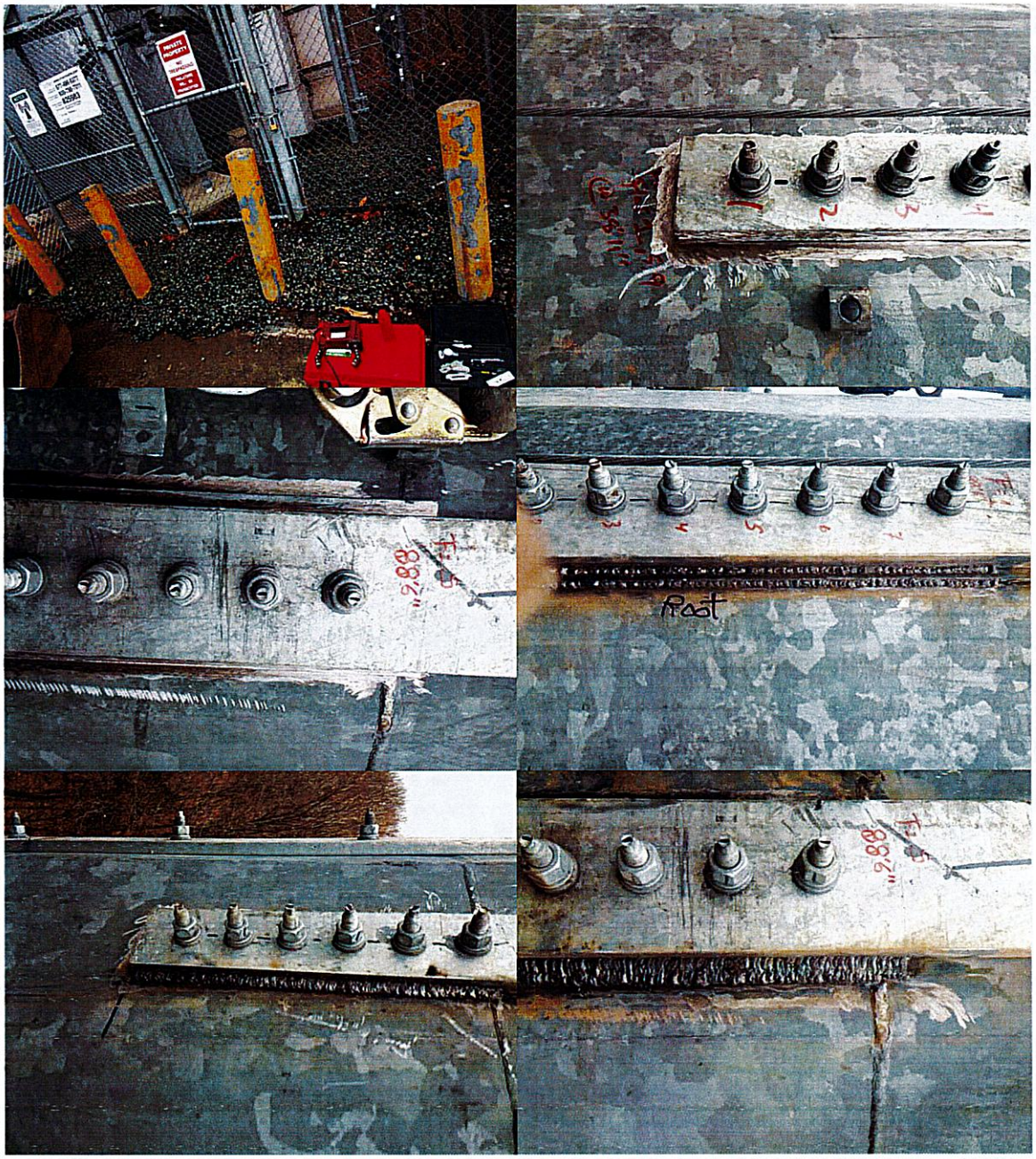
CIRC
WELD
11/13/14
CAUTION
11/13/14
MT OK
11/13/14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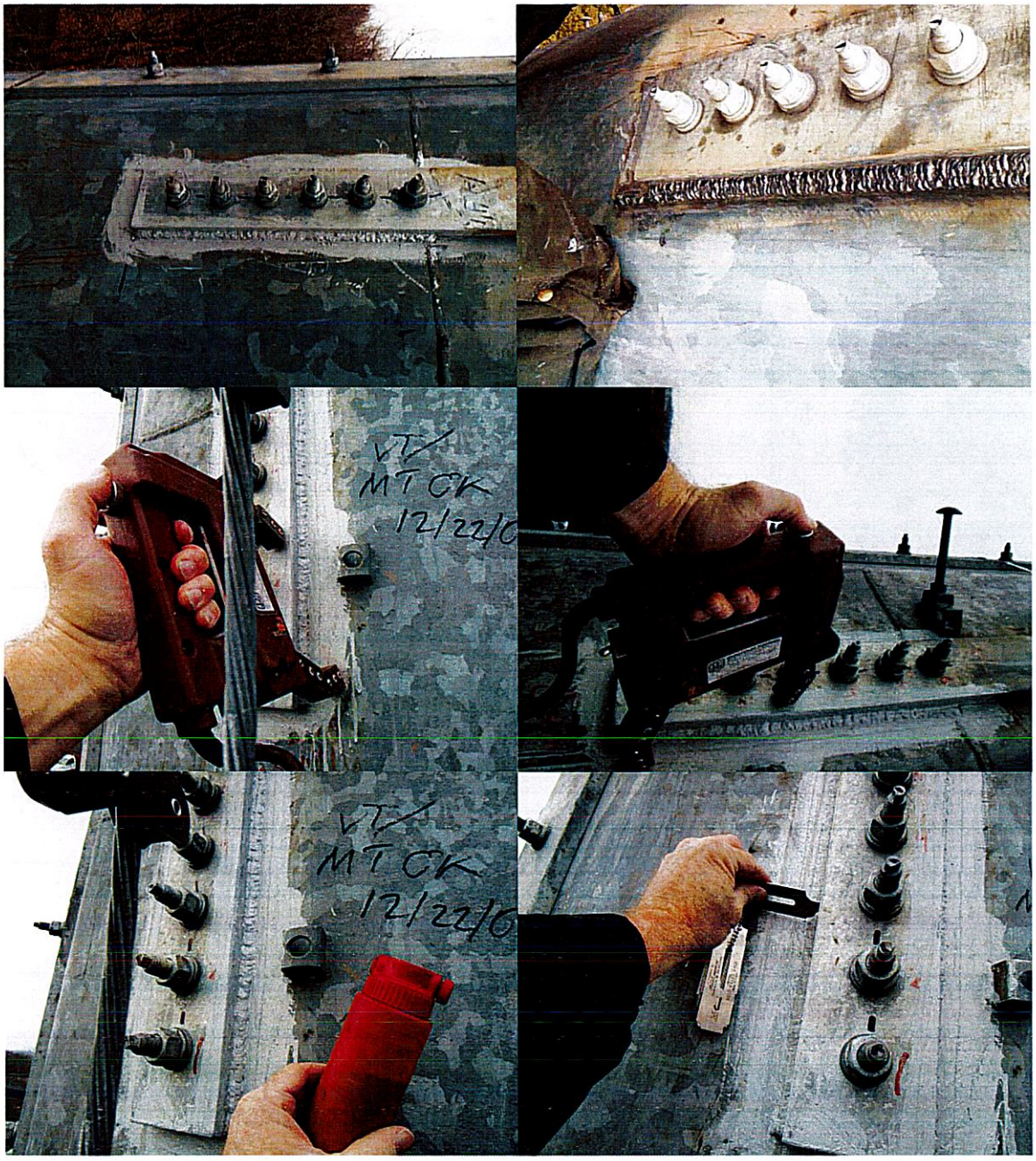
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MTCK
12/22/16

## 6.2.5 ON SITE COLD GALVANIZING VERIFICATION

## 6.2.6 GC AS-BUILT DOCUMENTS

# MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

**BU #825983; MIDDLETOWN_1**

APP: 185826 REV. 13; WO: 628395

SITE ADDRESS

**90 INDUSTRIAL PARK ROAD**
**MIDDLETOWN, CT 06457**
**MIDDLESEX COUNTY**

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

**PROJECT NOTES**

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
4. (A.) DTIS REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

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

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED [NON-TC] BOLTS AND/OR BOLTS WITHOUT DTIS INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.
5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 *"TOWER BASE PLATE NDE"* AND ENG-BUL-10051 *"NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE"*. NOTIFY THE EOR 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. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

**PROJECT CONTACTS:**

**MONOPOLE OWNER:**
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

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

**DESIGN STANDARD**

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570), DATED 8-14-2013.

**THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:**

| |
|---|
| SHAFT REINFORCING |
| FIELD WELDED MICROPILE BRACKETS |
| HIGH STRENGTH GROUT |
| FOUNDATION AUGMENTATION: MICROPILES |

**SHEET INDEX**

| SHEET NUMBER | DESCRIPTION |
|---|---|
| T-1 | TITLE SHEET |
| S-1 | GENERAL NOTES |
| S-2 | GENERAL NOTES |
| S-3 | AJAX BOLT DETAIL |
| S-4 | MONOPOLE PROFILE |
| S-5 | BASE PLATE DETAILS |
| S-6 | MICROPILE DETAILS |
| S-7 | MISC DETAILS |
| S-8 | MI CHECKLIST |

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

AUG 1 4 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street - Suite 600 - Columbus, Ohio 43215
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CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534

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

PROJECT NO: 37513-1570
DRAWN BY: B.M.S
CHECKED BY: B.K.K
APPROVED BY:
DATE: 8-14-2013

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CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA 222 F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-100151) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT."
5. IF THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION, THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10008 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.

A. GENERAL:
   (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION:
   (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
   (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
   (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
   (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
   (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

D. STRUCTURAL STEEL:
   (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
   (2.) CHECK MILL CERTIFICATIONS.
   (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
   (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
   (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
   (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
   (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
   (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.

E. WELDING:
   (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
   (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
   (3.) APPROVE FIELD WELDING SEQUENCE.
      (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
   (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
      (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
      (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
      (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
      (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
      (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
      (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
      (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
      (H.) REVIEW THE REPORTS BY TESTING LABS.
      (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
      (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
      (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.

F. SPECIAL INSPECTION OF EXISTING SHAFT TO FLANGE WELD CONNECTIONS:
   (1.) PRIOR TO CONSTRUCTION, 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.
   (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 5.F.(1.) ABOVE.
   (3.) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.

G. REPORTS:
   IT TO COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.

6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT
JOSEPH PACHECARAN JACOBS
No. PEN 22731
PROFESSIONAL ENGINEER
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**D. STRUCTURAL STEEL**

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

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

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

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

**E. BASE PLATE GROUT**

1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT CUT 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.
2. 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**

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-631-1275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

**J. HOT DIP GALVANIZING**

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

**K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

LCC

**AS-BUILT**
**No changes**
**Date 12-17-14**
**Signed K.A. Stackhouse**

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

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| PROJECT No: 375131570 | ISSUE DATE OF PERMIT: 8-14-2013 |
| DRAWN BY: B.M.S. | |
| CHECKED BY: B.K.K. | |
| APPROVED BY: | S-2 |
| DATE: 8-14-2013 | |

37513-1570 PERMIT.DWG

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

NOTES:

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

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

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

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

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

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

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

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1939
WEBSITE: WWW.APPLIEDBOLTING.COM

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

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

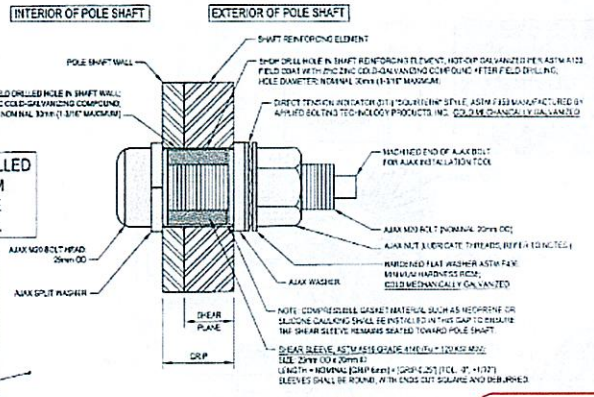
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY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

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

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

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

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




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

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

TYPICAL AJAX BOLT DETAIL 1/S-3

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

AUG 1 4 2013

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

PAUL J. FORD AND COMPANY
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PH: (585) 899-5445 FAX: (585) 899-5448

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

| | |
|---|---|
| PROJECT No: 37513-1570 | ISSUE DATE OF PERMIT: 5-14-2013 |
| DRAWN BY: B.M.S | |
| CHECKED BY: B.K.K | |
| APPROVED BY: | S-3 |
| DATE: 5-14-2013 | |

37513-1570 PERMIT.DWG

| POLE SPECIFICATIONS | |
|---|---|
| POLE SHAPE, TYPE: | 12 SIDED POLYGON |
| TAPER: | 0.320000 INCH |
| SHAFT STEEL: | ASTM A572 GR 65 |
| BASE PL STEEL: | ASTM A36 |
| ANCHOR RODS: | 2"ø ASTM A36 |

| SHAFT SECTION DATA | | | | | |
|---|---|---|---|---|---|
| SHAFT SECTION | SECTION LENGTH (FT) | PLATE THICKNESS (IN) | LAP SPLICE (IN) | DIAMETER ACROSS FLATS (IN) @ TOP | DIAMETER ACROSS FLATS (IN) @ BOTTOM |
| 1 | 5.000 | 0.1875 | 53.03 | 18.000 | 18.650 |
| 2 | 50.00 | 0.2559 | | 18.650 | 34.313 |
| 3 | 20.00 | 0.2559 | | 32.181 | 36.668 |
| 4 | 20.00 | 0.3125 | 72.33 | 36.668 | 45.168 |
| 5 | 10.00 | 0.3125 | | 42.615 | 45.813 |
| 6 | 40.00 | 0.3750 | 84.33 | 45.813 | 58.875 |
| 7 | 16.00 | 0.3750 | | 55.639 | 61.688 |
| 8 | 21.00 | 0.4375 | 106.00 | 61.688 | 68.500 |
| 9 | 26.00 | 0.4375 | | 64.706 | 73.813 |

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

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

MODIFICATIONS:

(A) INSTALL NEW MICROPILES AND MICROPILE BRACKETS AT BASE PLATE. SEE SHEET S-5.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

## NEW AEROSOLUTIONS MP3 REINFORCING

| ELEVATION | PLAT # | REINFORCING ELEMENT |
|---|---|---|
| 36'-4" TO 52'-4" | 1, 5 & 9 | MP304 |
| 88'-4" TO 123'-4" | 1, 5 & 9 | MP305 |
| 119'-8" TO 157'-8" | 2, 6 & 10 | MP304 |

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A572 GR 65, MIN Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL, PLATE & BOLTS AND INSTALLATION PROCEDURES.

LCC

**AS-BUILT**
**No changes**
**Date 12-17-14**
**Signed K.A. Stackhouse**

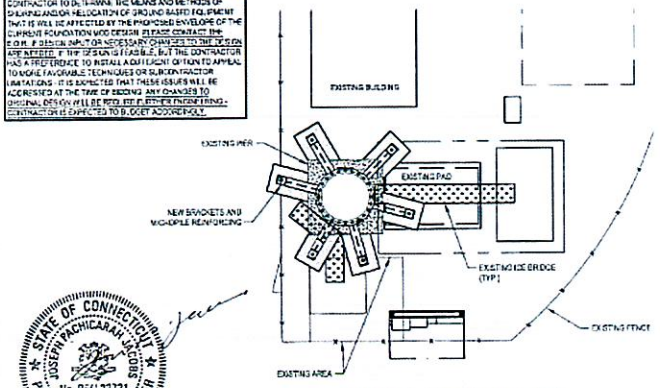
## NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

| BOTTOM ELEVATION | TOP ELEVATION | FLAT (4) DEGREE SEPARATION | ELEMENT | ELEMENT LENGTH | ELEMENT QUANTITY | APPROXIMATE AJAX BOLTS PER ELEMENT | APPROXIMATE TOTAL AJAX BOLT QUANTITY | TERMINATION BOLTS (BOTTOM) | TERMINATION BOLTS (TOP) | MAXIMUM INTERMEDIATE BOLT SPACING | ESTIMATED TOTAL STEEL WEIGHT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36'-4" | 52'-4" | 1, 5 & 9 | 1"x 4-1/2" | 16'-0" | 3 | 20 | 60 | 6 | 6 | 10" | 625 LBS |
| 88'-4" | 123'-4" | 1, 5 & 9 | 1"x 6" | 35'-0" | 3 | 37 | 111 | 10 | 10 | 20" | 2144 LBS |
| 119'-8" | 154'-8" | 2, 6 & 10 | 1"x 6-1/2" | 35'-0" | 3 | 39 | 117 | 8 | 8 | 10" | 1606 LBS |
| | | | | | | | 288 | | | | 4441 LBS |

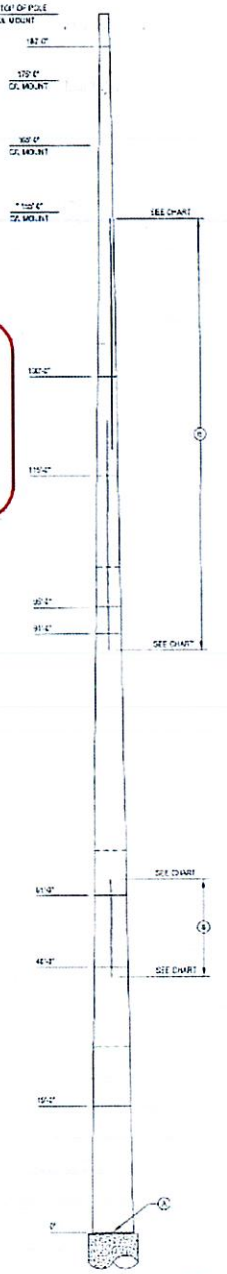
NOTES:

1) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 30mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEAR STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE WET 3.5 MILS, DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-851-5976 FOR PRODUCT INFORMATION.
3) ALL REINFORCING SHALL BE ASTM A572 GR 65.
4) FILLETS ARE ASSUMED 5/16" OR GREATER. TERMINATION WELDS SHALL BE 5/8" FILLET WELDS.
5) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 35mm UNLESS NOTED OTHERWISE.
6) ALL SHIMS SHALL BE ASTM A36.

SITE COORDINATION REQUIRED: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE MEANS AND METHODS OF DISMANTLING AND/OR RELOCATION OF GROUND BASED EQUIPMENT THAT WILL BE AFFECTED BY THE PROPOSED ENVELOPE OF THE CURRENT FOUNDATION MOD DESIGN. PLEASE CONTACT THE E.O.R. IF DESIGN INPUT OR NECESSARY CHANGES TO THE DESIGN ARE NEEDED. IF THE DESIGN IS FEASIBLE, BUT THE CONTRACTOR HAS A PREFERENCE TO INSTALL A DIFFERENT OPTION TO MAKE A MORE FAVORABLE TECHNIQUES OR SUBCONTRACTOR LIMITATIONS - IT IS EXPECTED THAT THESE ISSUES WILL BE ADDRESSED AT THE TIME OF BIDDING. ANY CHANGES TO ORIGINAL DESIGN WILL BE PER E.O.R. SITE SPECIFIC ENGINEERING - CONTRACTOR IS EXPECTED TO BUDGET ACCORDINGLY.




PARTIAL SITE PLAN 2 / S-4




POLE ELEVATION 1 / S-4

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

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

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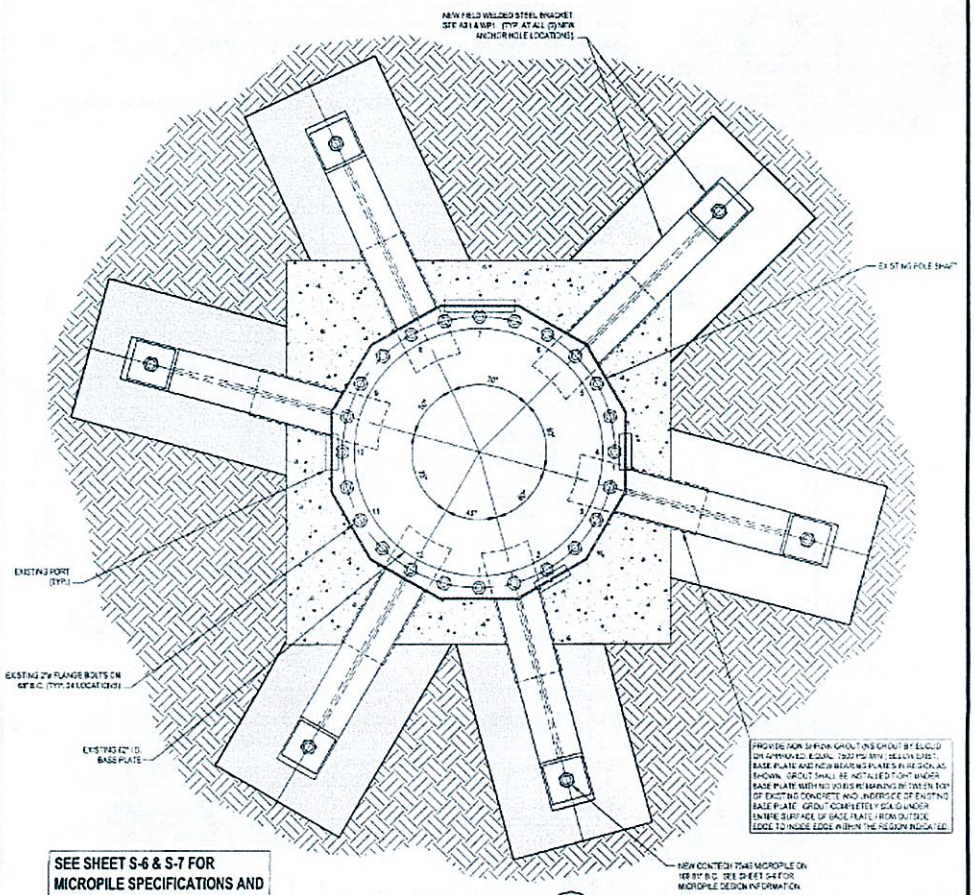
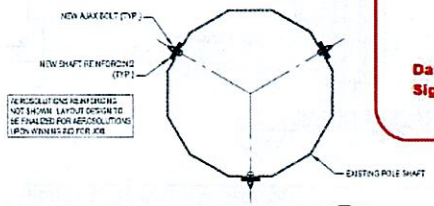



SEE SHEET S-6 & S-7 FOR MICROPILE SPECIFICATIONS AND ANCHOR BRACKET DETAILS

A BASE SECTION 1 / S-5

LCC

**AS-BUILT**
**No changes**
**Date 12-17-14**
**Signed K.A. Stackhouse**




RE-RESOLUTIONS REINFORCING NOT SHOWN. LAYOUT DESIGN TO BE FINALIZED FOR AS-RESOLUTIONS UPON WINNING BID FOR JOB

B BASE SECTION 2 / S-5

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## MICROPILE TESTING REQUIREMENTS

A MINIMUM OF 3 IN-PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS) ARE TO BE TESTED TO 274 kN IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCLOSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DES GN GUIDE. ALIGNMENT LOAD, AL, SHALL BE 23 KIPS, DESIGN LOAD, DL, IS 225 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH ABOVE GRADE.

MICROPILE NOTES:

1. ALL HOLLOW BAR STEEL, AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CON-TECH SYSTEMS OR OWNER-OR APPROVED EQUIVALENT.
2. ALL HOLLOW BAR NUTS AND BEARING PLATES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CON-TECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THE DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FDH, DATED 6-2-2013.
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS.

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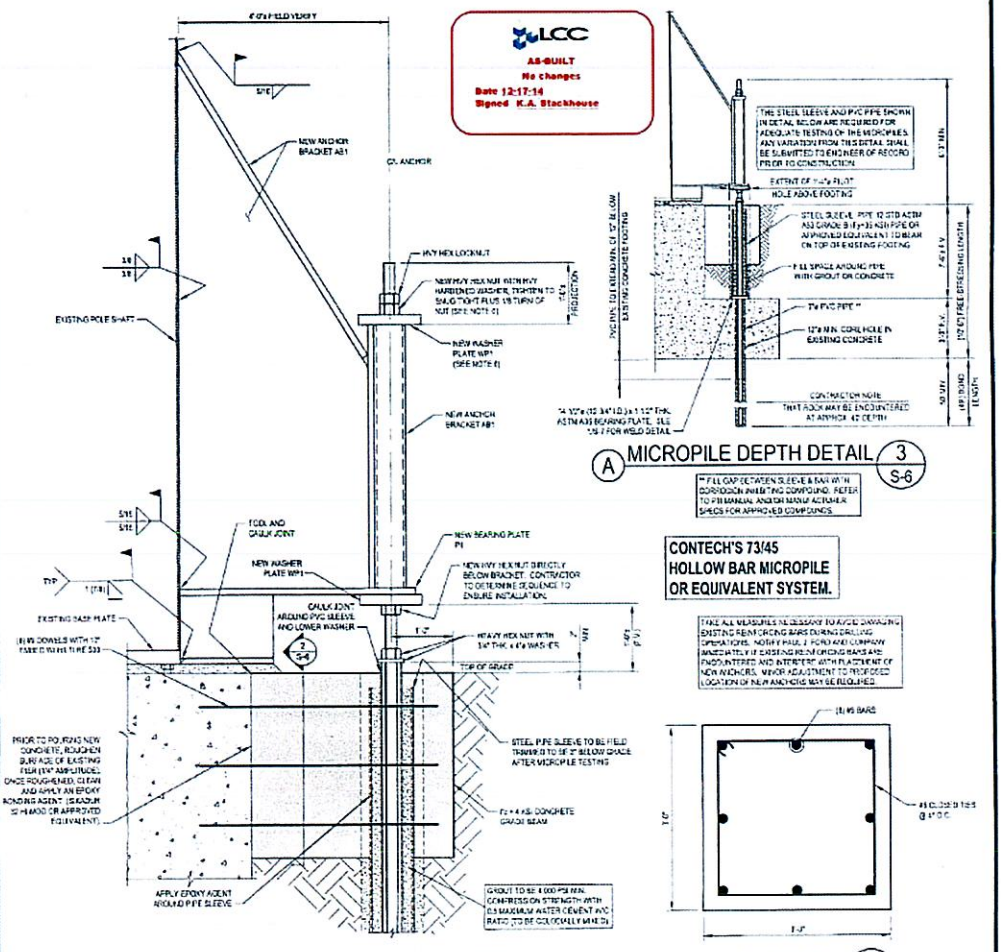
No changes
Date 12-17-14
Signed K.A. Stackhouse




A MICROPILE DEPTH DETAIL 3 S-6

** FILL GAP BETWEEN SLEEVE & BAR WITH CORROSION INHIBITING COMPOUND. REFER TO PII MANUAL AND/OR MANUFACTURER SPECS FOR APPROVED COMPOUNDS.

**CONTECH'S 73/45 HOLLOW BAR MICROPILE OR EQUIVALENT SYSTEM.**

TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY PAUL J. FORD AND COMPANY IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.




SECTION 2 S-6

A NEW MICROPILE & BRACKET DETAIL 1 S-6

STATE OF CONNECTICUT — JOSEPH ANTHONY FORD — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

### PILE DESIGN PARAMETER SCHEDULE

| PARAMETER / OPTIONS | MIN. HOLE & STEEL AREA | PILE CAPACITY (TYP.) | ULTIMATE SKIN FRICTION (PSI) | FREE STRESSING LENGTH | FIXED ZONE DEVELOPMENT LENGTH (BOND) | ROCK SOCKET/ BULGE LENGTH | TOTAL LENGTH |
|---|---|---|---|---|---|---|---|
| MICROPILE | 7.0"ø & 4.02 in² MIN. | 216 kip | VARIES, SEE GEOTECH | 5' | 50' | N/A | 57.0' |

* THE DESIGN ANTICIPATES A FINAL GROUT DIAMETER OF 12" BASED ON A MINIMUM DRAW AUGER IN SILTY CLAY AND SAND. THE DESIGN REQUIRES UNFACTORED PILE CAPACITY IN TENSION AND COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR (MICROPILE INSTALLER) IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND AUGER/PILOT DIAMETERS ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CLIENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

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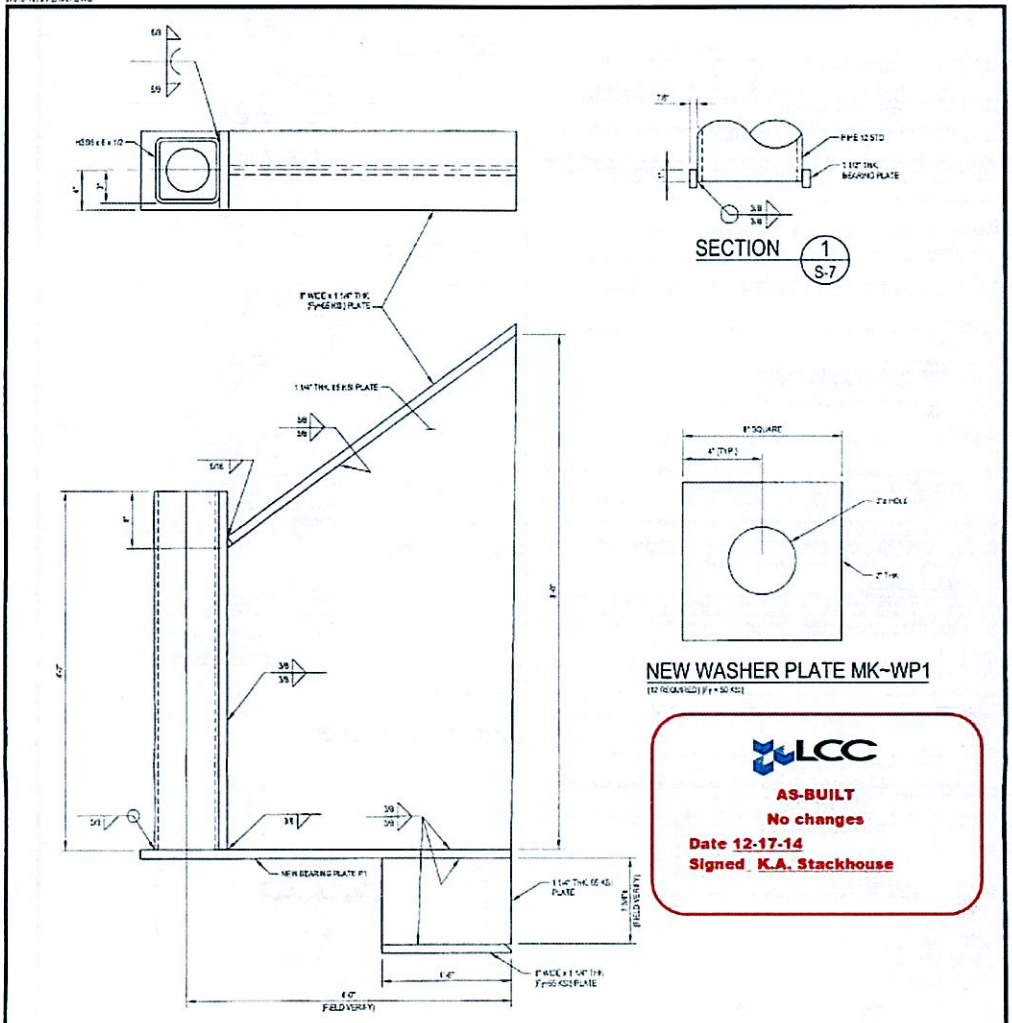

SECTION 1 / S-7

NEW WASHER PLATE MK~WP1

NEW MICROPILE BRACKET MK~AB1

BEARING PLATE MK~P1

LCC

AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT
JOSHUA FAGAN-ZACHARIAH JACKSON
No. PEN.22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

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**MODIFICATION INSPECTION NOTES:**

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

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

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-SUL-1017 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 P.O. 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-1302T - MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

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

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

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

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

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

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-1302T.

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

- THIS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, IF FEASIBLE, 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 RETENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

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

**CORRECTION OF FAILING MTL**
IF THE MODIFICATION INSTALLATION WOULD FAIL THE INITIAL MTL, 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 PER ENFORCEMENT USING THE AS-BUILT CONDITION.

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

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-1302T.

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

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

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

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

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS. PLEASE REFER TO ENG-SOW-1302T.

## 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 |
| X | FABRICATOR CERTIFIED WELD INSPECTION |
| X | MATERIAL TEST REPORT (MTR) |
| X | 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 |
| X | POST-INSTALLED MICROSITE 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 | THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS |
| X | INSPECTION OF ANVIL BOLTS AND DTIS PER REQUIREMENTS ON SHEET S-3 |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| | **POST-CONSTRUCTION** |
| X | MI INSPECTOR REDLINE OR RECORD DRAWINGS |
| X | THIRD PARTY ONSITE BOLT INSPECTION REPORT |
| X | POST-INSTALLED MICROPILE PULL OUT TESTING |
| X | PHOTOGRAPHS |
| ADDITIONAL TESTING AND INSPECTIONS: | |

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

LCC
**AS-BUILT**
**No changes**
**Date 12-17-14**
**Signed K.A. Stackhouse**

STATE OF CONNECTICUT
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 14 2013

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

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 340-3400 FAX: (585) 586-3388

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

PROJECT No: 37513-1570
DRAWN BY: BMS
CHECKED BY: BKK
APPROVED BY:
DATE: 8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

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# POST-CONSTRUCTION

## 6.3.1 MI INSPECTOR REDLINE OR RECORD DRAWING(S)

37513-1570-PERMIT.DWG

# MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

SGS REDLINES
Discrepancies Noted
See Section 6.3.2

BU NUMBER; SITE NAME
**BU #825983; MIDDLETOWN_1**
APP: 185826 REV. 13; WO: 628395

SITE ADDRESS
**90 INDUSTRIAL PARK ROAD**
**MIDDLETOWN, CT 06457**
**MIDDLESEX COUNTY**

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

**PROJECT NOTES**

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

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

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

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

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

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

5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 *'TOWER BASE PLATE NDE'* AND ENG-BUL-10051 *'NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE'*. NOTIFY THE EOR 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. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

**PROJECT CONTACTS:**

**MONOPOLE OWNER:**
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

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

| DESIGN STANDARD |
|---|
| THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.<br>REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570), DATED 8-14-2013. |
| **THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:** |
| SHAFT REINFORCING |
| FIELD WELDED MICROPILE BRACKETS |
| HIGH STRENGTH GROUT |
| FOUNDATION AUGMENTATION: MICROPILES |

**SHEET INDEX**

| SHEET NUMBER | DESCRIPTION |
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| S-1 | GENERAL NOTES |
| S-2 | GENERAL NOTES |
| S-3 | AJAX BOLT DETAIL |
| S-4 | MONOPOLE PROFILE |
| S-5 | BASE PLATE DETAILS |
| S-6 | MICROPILE DETAILS |
| S-7 | MISC DETAILS |
| S-8 | MI CHECKLIST |

STATE OF CONNECTICUT
JOSEPH PACHICARAN JACOBS
No. PEN 22731
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AUG 14 2013

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

PROJECT NO: 37513-1570
DRAWN BY: B.M.S
CHECKED BY: B.K.K
APPROVED BY:
DATE: 8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

T-1

37513-1570 PERMITTING

CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

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

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10008 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.

A. GENERAL
   (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION
   (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
   (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
   (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
   (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
   (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

D. STRUCTURAL STEEL
   (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
   (2.) CHECK MILL CERTIFICATIONS.
   (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
   (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
   (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
   (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
   (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
   (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.

E. WELDING
   (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1
   (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
   (3.) APPROVE FIELD WELDING SEQUENCE.
      (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
   (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
      (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
      (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
      (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
      (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
      (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
      (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
      (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
      (H.) REVIEW THE REPORTS BY TESTING LABS.
      (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
      (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
      (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.

F. SPECIAL INSPECTION OF EXISTING SHAFT TO FLANGE WELD CONNECTIONS
   (1.) PRIOR TO CONSTRUCTION, 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 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 OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, PROTRUDES, DISTRESS, AND/OR CORROSION TO THE OWNER AND 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 5.F.(1.) ABOVE.
   (3.) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.

G. REPORTS
   (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.

6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

SGS REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

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

AUG 1 4 2013

PAUL J. FORD AND COMPANY
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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570
DRAWN BY: B.M.S.
CHECKED BY: B.K.K.
APPROVED BY:
DATE: 8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

S-1

37513-1570 PERMIT.DWG

**D. STRUCTURAL STEEL**

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
   A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
      (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
      (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION
      (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED);
   B. BY THE AMERICAN WELDING SOCIETY (AWS):
      (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
      (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M30 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
   (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
   (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

**E. BASE PLATE GROUT**

1. NON-SHRINK GROUT FOR THE POLE BASE SHALL BE NON-S-RINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCLID, 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.
2. 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**

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-630-631-1275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

**J. HOT DIP GALVANIZING**

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

**K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**

1. **AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.**
2. **THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. **THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1, "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS."

SGS
REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
**AS-BUILT**
**No changes**
**Date 12-17-14**
**Signed K.A. Stackhouse**

STATE OF CONNECTICUT
JOSEPH PACHCARAH RODS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

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

| | |
|---|---|
| PROJECT No: 37513-1570 | ISSUE DATE OF PERMIT: 8-14-2013 |
| DRAWN BY: B.M.S. | |
| CHECKED BY: B.K.K. | |
| APPROVED BY: | S-2 |
| DATE: 8-14-2013 | |

37513-1570 PERMIT.DWG

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

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

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

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

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

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

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

SGS
REDLINES
Discrepancies Noted
See Section 6.3.2

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

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

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

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

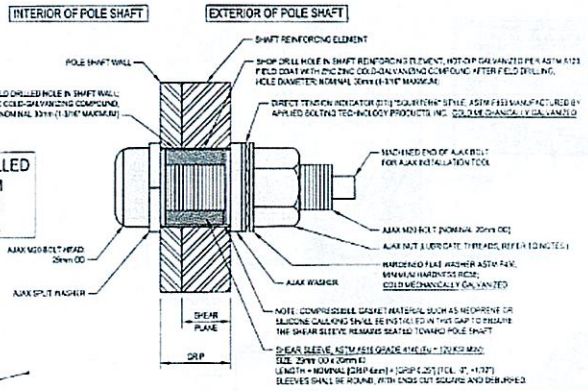
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY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

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

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

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

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




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

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

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

AUG 1 4 2013

TYPICAL AJAX BOLT DETAIL 1 S-3

LCC
AS-BUILT
No changes
Date 12-17-14
Signed R.A. Stackhouse

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

| | |
|---|---|
| PROJECT No: 37513-1570 | ISSUE DATE OF PERMIT: 8-14-2013 |
| DRAWN BY: B.M.S. | |
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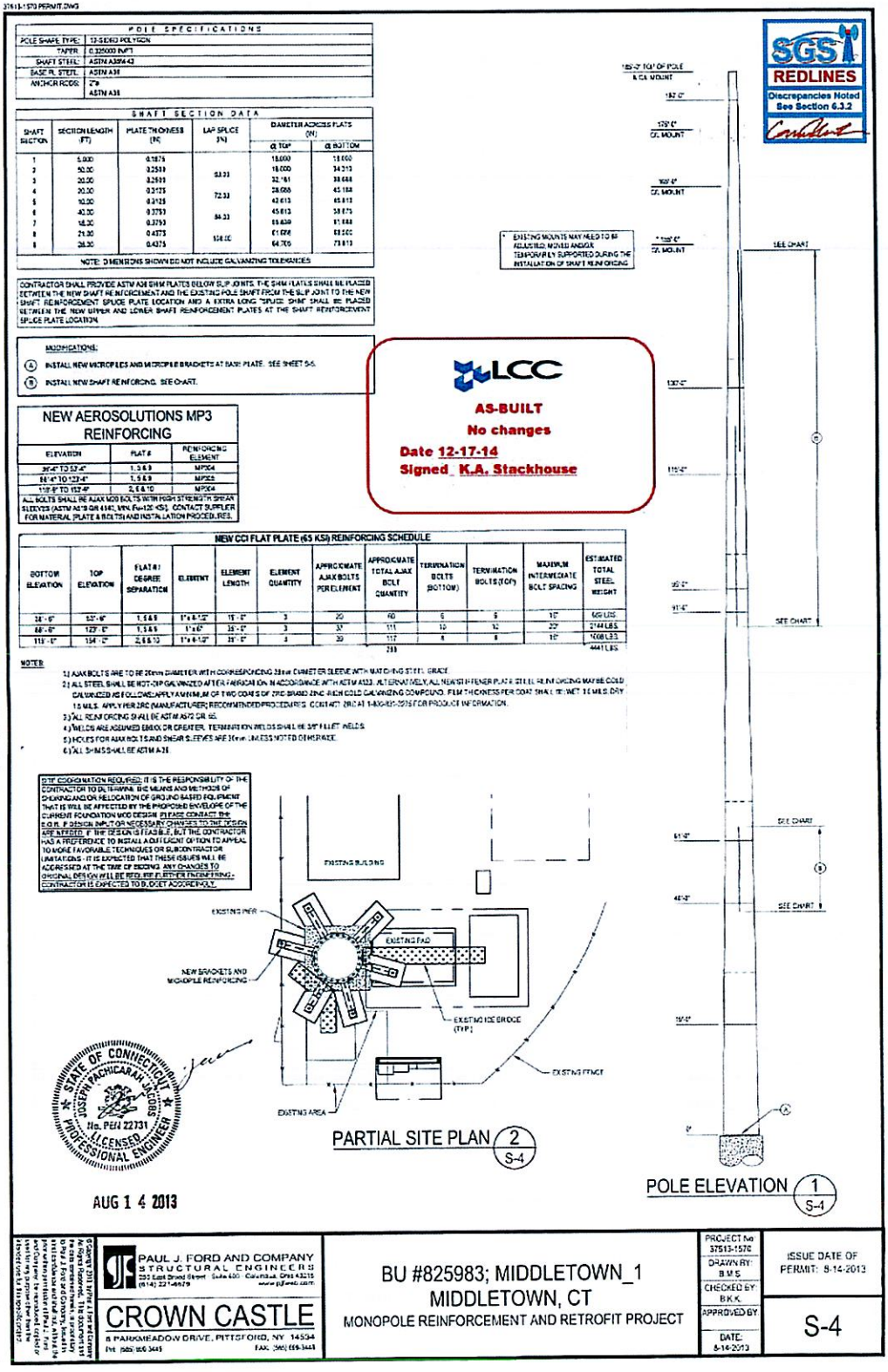
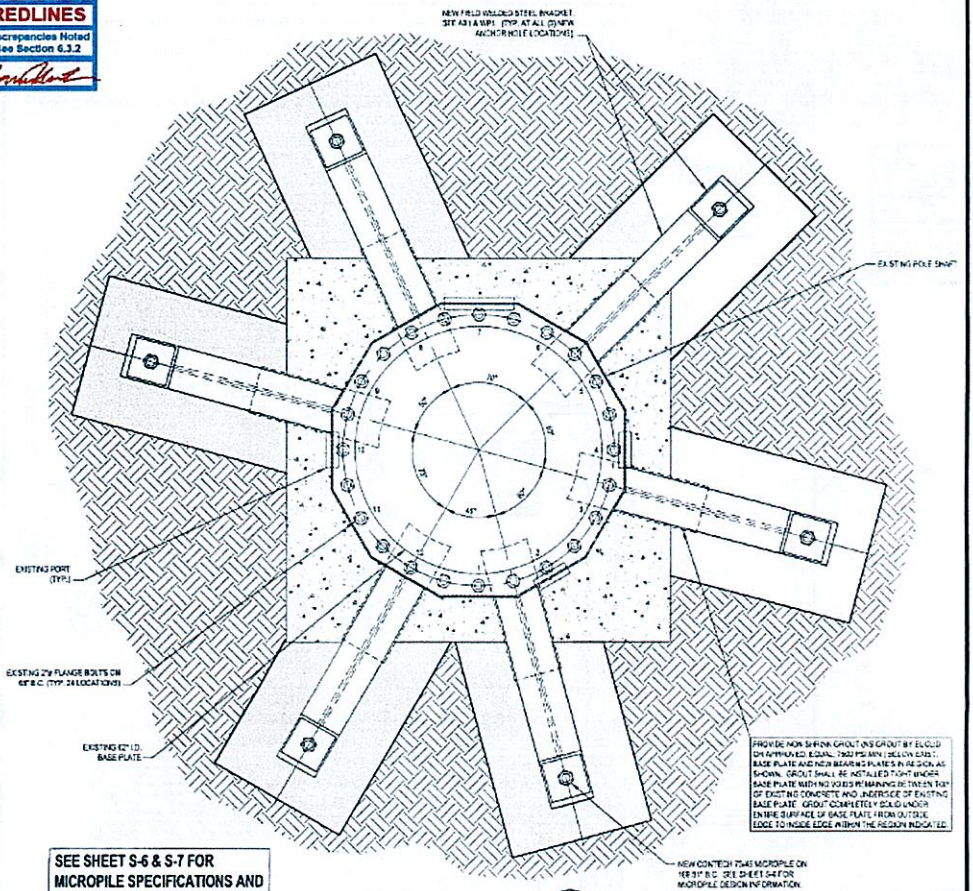
| APPROVED BY: | S-3 |
| DATE: 8-14-2013 | |


POLE SPECIFICATIONS
POLE SHAPE, TYPE: 12-SIDED POLYGON
TAPER: 0.225000 IN/FT
SHAFT STEEL: ASTM A595 Gr.B
BASE PL STEEL: ASTM A36
ANCHOR RODS: 2"ø ASTM A36
SHAFT SECTION DATA
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES
CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.
MODIFICATIONS:
(A) INSTALL NEW MICROPILES AND MICROPILE BRACKETS AT BASE PLATE. SEE SHEET S-5.
(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.
NEW AEROSOLUTIONS MP3 REINFORCING
ELEVATION
FLAT #
REINFORCING ELEMENT
ALL BOLTS SHALL BE AJAX M39 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A572 GR 65), MIN. Fu=120 KSI. CONTACT SUPPLIER FOR MATERIAL, PLATE & BOLTS AND INSTALLATION PROCEDURES.
* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING
LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE
BOTTOM ELEVATION
TOP ELEVATION
FLAT #/ DEGREE SEPARATION
ELEVATION
ELEMENT LENGTH
ELEMENT QUANTITY
APPROXIMATE TOTAL AJAX BOLTS PER ELEMENT
APPROXIMATE TOTAL AJAX BOLT QUANTITY
TERMINATION BOLTS (BOTTOM)
TERMINATION BOLTS (TOP)
MAXIMUM INTERMEDIATE BOLT SPACING
EST. MATED TOTAL STEEL WEIGHT
NOTES
1.) AJAX BOLTS ARE TO BE 39mm DIAMETER WITH CORRESPONDING 39mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW WITH FENDER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZINC RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE NOT LESS THAN 3.5 MILS DRY. APPLY PER ZRC MANUFACTURER RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-621-5976 FOR PRODUCT INFORMATION.
3.) ALL REINFORCING SHALL BE ASTM A572 GR 65.
4.) WELDS ARE ASSUMED 5/16in OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 3.5in UNLESS NOTED OTHERWISE.
6.) ALL SHIMS SHALL BE ASTM A36.
SITE COORDINATION REQUIRED: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE VALUES AND METHODS OF SHIMMING OR RELOCATION OF GROUND BASED EQUIPMENT THAT IS WILL BE AFFECTED BY THE PROPOSED ENVELOPE OF THE CURRENT FOUNDATION MOD DESIGN. PLEASE CONTACT THE E.O.R. IF ANY IMPACT OR NECESSARY CHANGES TO THE DESIGN ARE NEEDED. IF THE DESIGN IS FEASIBLE, BUT THE CONTRACTOR HAS A PREFERENCE TO INSTALL A DIFFERENT OPTION TO APPEAL TO MORE FAVORABLE TECHNIQUES OR SUBCONTRACTOR LIMITATIONS - IT IS EXPECTED THAT THESE ISSUES WILL BE ADDRESSED AT THE TIME OF BIDDING. ANY CHANGES TO ORIGINAL DESIGN WILL BE REQUIRE FURTHER ENGINEERING - CONTRACTOR IS EXPECTED TO BUDGET ACCORDINGLY.
EXISTING BUILDING
EXISTING PIER
EXISTING PAD
NEW BRACKETS AND MONOPOLE REINFORCING
EXISTING ICE BRIDGE (TYP.)
EXISTING FENCE
EXISTING AREA
PARTIAL SITE PLAN 2 S-4
STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER
AUG 1 4 2013
SEE CHART
POLE ELEVATION 1 S-4
SGS
REDLINES
Discrepancies Noted
See Section 6.3.2
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
CROWN CASTLE
BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
PROJECT No 37513-1570
DRAWN BY: BMS
CHECKED BY: BKK
APPROVED BY:
DATE: 8-14-2013
ISSUE DATE OF PERMIT: 8-14-2013
S-4

37513-1570 PERMIT.DWG

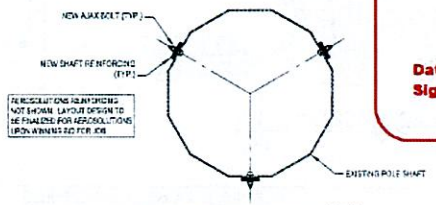
SGS
REDLINES
Discrepancies Noted
See Section 6.3.2




**SEE SHEET S-6 & S-7 FOR MICROPILE SPECIFICATIONS AND ANCHOR BRACKET DETAILS**

A BASE SECTION 1 / S-5

LCC
**AS-BUILT**
**No changes**
**Date 12-17-14**
**Signed K.A. Stackhouse**




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

B BASE SECTION 2 / S-5

STATE OF CONNECTICUT
JOSEPH CHICARAMO RECORDS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 Civic Center Drive, Suite 500, Columbus, Ohio 43215
(614) 221-6679
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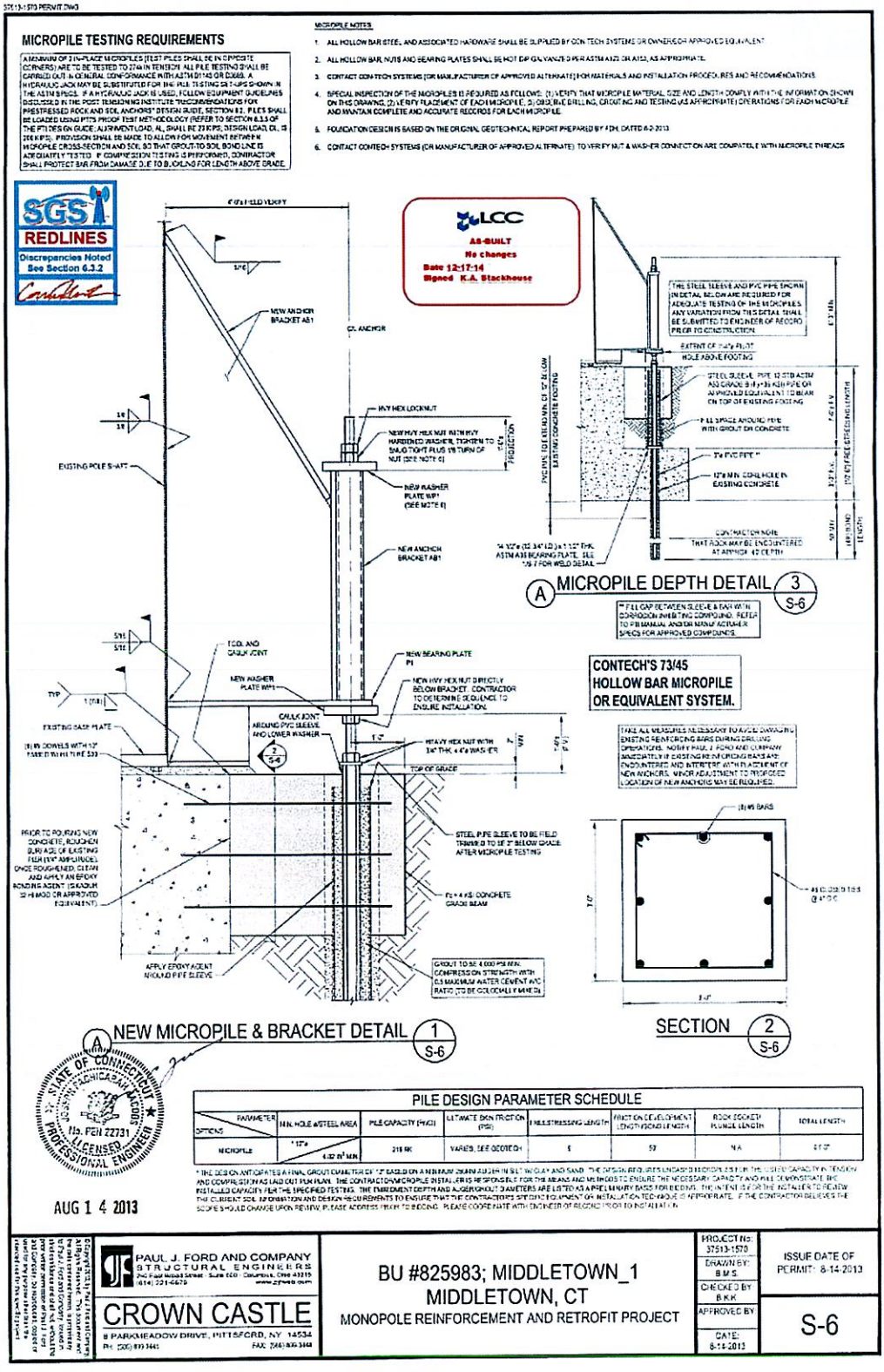
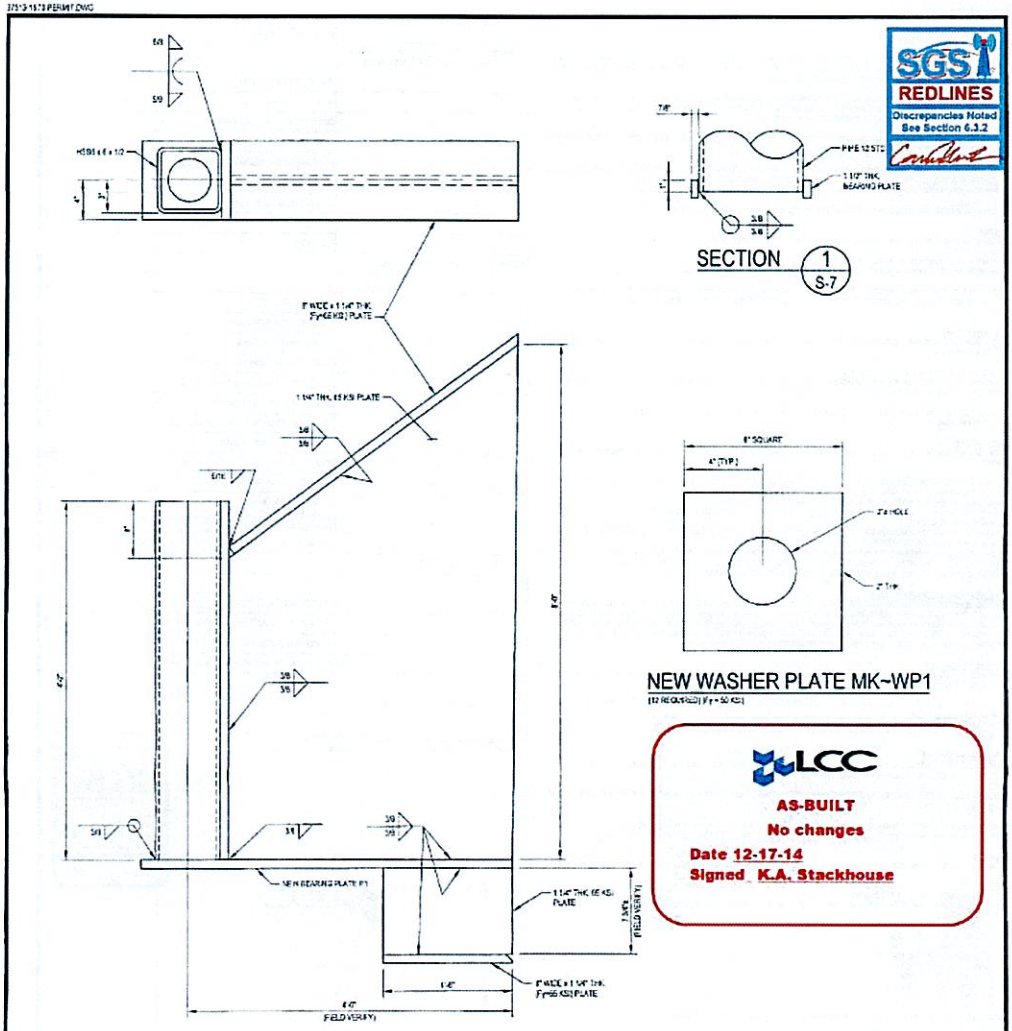
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3448 FAX: (585) 586-3810

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

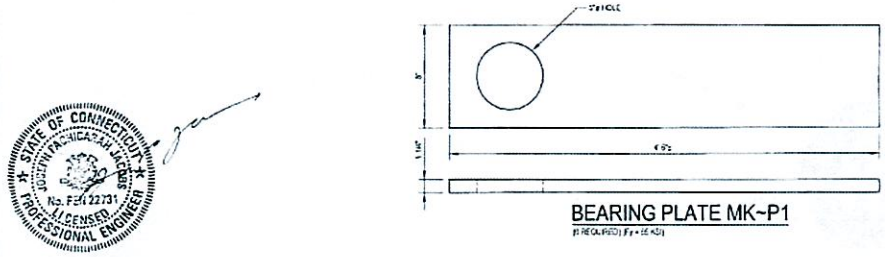
| | |
|---|---|
| PROJECT NO: 37513-1570 | ISSUE DATE OF PERMIT: 8-14-2013 |
| DRAWN BY: B.M.S. | |
| CHECKED BY: B.K.K. | |
| APPROVED BY: | S-5 |
| DATE: 8-14-2013 | |


MICROPILE TESTING REQUIREMENTS
A MINIMUM OF 3 IN-PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS) ARE TO BE TESTED TO 27kip IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS' DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 6.3.5 OF THE PTI DES GN GUIDE: ALIGNMENT LOAD, AL, SHALL BE 20 KIPS, DESIGN LOAD, DL, IS 200 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO SOIL BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH ABOVE GRADE.
MICROPILE NOTES
1. ALL HOLLOW BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CONTECH SYSTEMS OR OWNER-OR APPROVED EQUIVALENT
2. ALL HOLLOW BAR, NUTS AND BEARING PLATES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE MATERIAL SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FDH, DATED 6-7-2013
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS
SGS
REDLINES
Discrepancies Noted
See Section 6.3.2
LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse
NEW ANCHOR BRACKET AB1
EXISTING POLE SHAFT
NEW WASHER PLATE WP1 (SEE NOTE 6)
NEW ANCHOR BRACKET AB1
NEW BEARING PLATE P1
NEW WASHER PLATE WP1
EXISTING BASE PLATE
TOP OF GRADE
STEEL PIPE SLEEVE TO BE FIELD TRIMMED TO BE 3" BELOW GRADE AFTER MICROPILE TESTING
APPLY EPOXY AGENT AROUND PIPE SLEEVE
GROUT TO BE 4,000 PSI MIN. COMPRESSION STRENGTH WITH 0.5 MAXIMUM WATER CEMENT AND RATIO, (TO BE COLOCALLY MIXED)
A MICROPILE DEPTH DETAIL 3 S-6
CONTECH'S 73/45 HOLLOW BAR MICROPILE OR EQUIVALENT SYSTEM.
A NEW MICROPILE & BRACKET DETAIL 1 S-6
SECTION 2 S-6
PILE DESIGN PARAMETER SCHEDULE
OPTIONS
PARAMETER
MIN. HOLE ø/STEEL AREA
PILE CAPACITY (PNOM)
ULTIMATE SKIN FRICTION (PSI)
MIN. STRESSING LENGTH*
FRICTION DEVELOPMENT LENGTH BEYOND LENGTH
ROCK SOCKET BOND LENGTH
TOTAL LENGTH
MICROPILE
AUG 14 2013
STATE OF CONNECTICUT
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
PROJECT No: 37513-1570
DRAWN BY: BMS
CHECKED BY: BKK
APPROVED BY:
DATE: 8-14-2013
ISSUE DATE OF PERMIT: 8-14-2013
S-6




SGS REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse




STATE OF CONNECTICUT
JOSHUA JACOBS
No. PEN.22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534

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

PROJECT NO: 37513-1570
DRAWN BY: B.M.S.
CHECKED BY: B.K.K.
APPROVED BY:
DATE: 8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

S-7

37513-1570 PERMIT DWG

**MODIFICATION INSPECTION NOTES:**

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

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

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-SUL-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-10337 - MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

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

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

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

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

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

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG SOW-10337.

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

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

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

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

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

**MI VERIFICATION INSPECTIONS**
CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION/SOW 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-10337.

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

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

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL IN-FIELD 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-10337.

## 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 |
| X | FABRICATOR CERTIFIED WELD INSPECTION |
| X | MATERIAL TEST REPORT (MTR) |
| X | 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 |
| X | POST INSTALLED MICROPILE 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 | THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS |
| X | INSPECTION OF AJAX BOLTS AND SITE PER REQUIREMENTS ON SHEET S-3 |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| | **POST-CONSTRUCTION** |
| X | MI INSPECTOR REDLINE OR RECORD DRAWING(S) |
| X | THIRD PARTY ONSITE BOLT INSPECTION REPORT |
| X | POST-INSTALLED MICROPILE PULL OUT TESTING |
| X | PHOTOGRAPHS |
| ADDITIONAL TESTING AND INSPECTIONS: | |

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

SGS
REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT — KRISHNAKUMAR SHESHADRI — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

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

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 850-3400 FAX: (585) 899-3400

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

PROJECT No: 37513-1570
DRAWN BY: BMS
CHECKED BY: BKK
APPROVED BY:
DATE: 8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

S-8

## 6.3.2 ENGINEER OF RECORD EMAIL

**Stephen Teti**

**From:** Brian Kermode
**Sent:** Monday, August 11, 2014 8:41 AM
**To:** Rich Taschek
**Cc:** Joseph Gentes; Keith_ Stackhouse; Stephen Teti; jorge_forsythe@lcc.com; pjfmod
**Subject:** Re: 825983 Middletown

Good morning Rich,

The changes to the cage are acceptable.

Thanks,
Brian

Brian K Kermode, PE, SE
Project Engineer
Main: 614.221.6679 x2169
Direct: 614.448.4169
E-Mail: bkermode@pjfweb.com
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

>>> Rich Taschek <rich_taschek@lcc.com> 8/11/2014 8:37 AM >>>
Hi Brain,

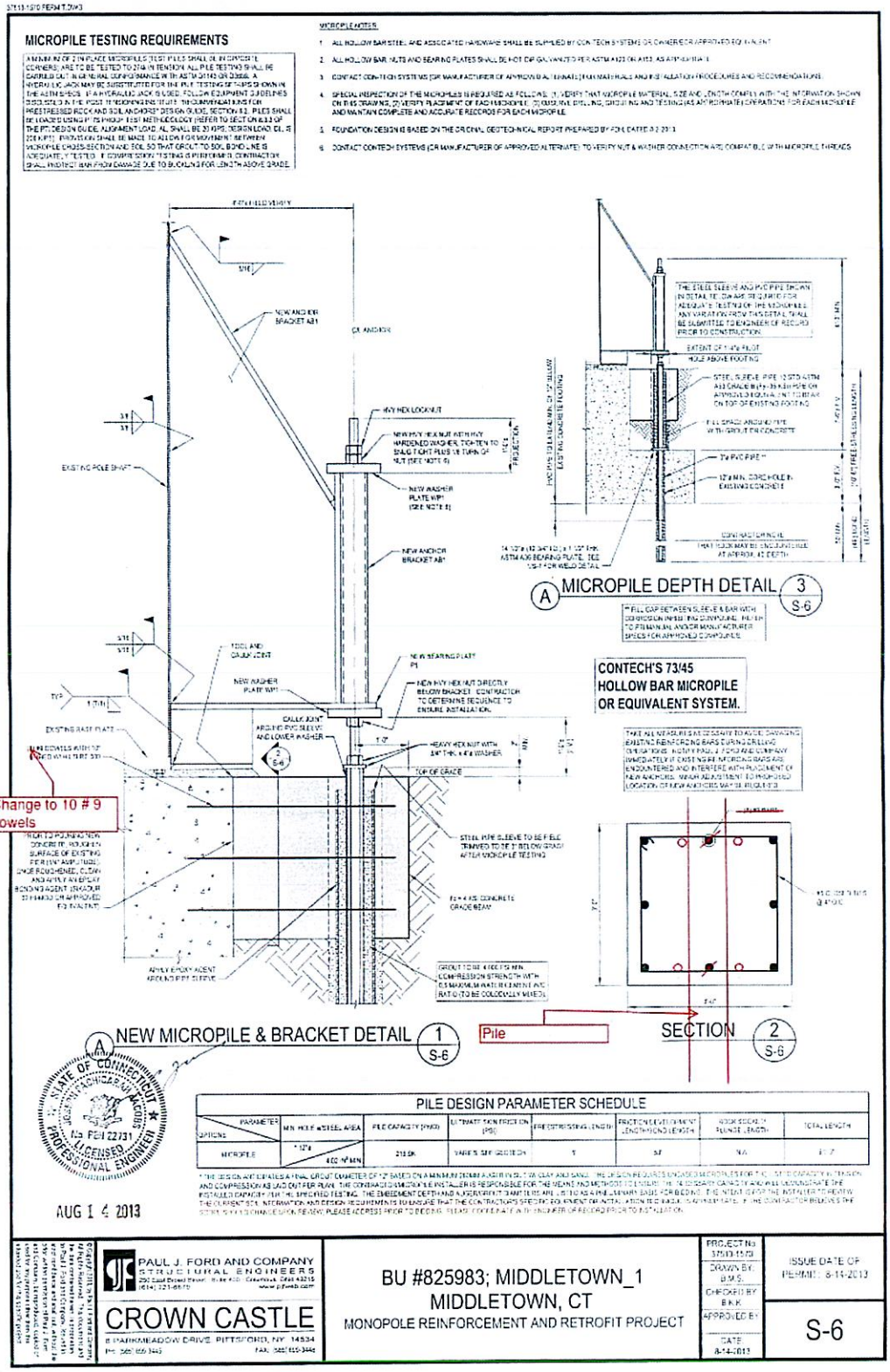
Please see attached PDF for changes made to the rebar cage. Let us know if this is acceptable.

Thanks,
Rich





1


MICROPILE TESTING REQUIREMENTS
MICROPILE NOTES:
1. ALL HOLLOW BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CONTECH SYSTEMS OR OWNER OR APPROVED EQUIVALENT.
2. ALL HOLLOW BAR NUTS AND BEARING PLATES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: 1) VERIFY THAT MICROPILE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THE RS DRAWINGS, 2) VERIFY PLACEMENT OF EACH MICROPILE, 3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FOR EATED 0 2 2013
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS
A MICROPILE DEPTH DETAIL 3 S-6
CONTECH'S 73/45 HOLLOW BAR MICROPILE OR EQUIVALENT SYSTEM.
Change to 10 # 9 dowels
A NEW MICROPILE & BRACKET DETAIL 1 S-6
Pile
SECTION 2 S-6
PILE DESIGN PARAMETER SCHEDULE
PARAMETER
OPTIONS
MIN. HOLE & STEEL AREA
PILE CAPACITY (KIP)
ULTIMATE SKIN FRICTION (PSI)
PRESTRESSING LENGTH
FRICTION DEVELOPMENT LENGTH (LD) LENGTH
ADDITIONAL PLUNGE LENGTH
TOTAL LENGTH
MICROPILE
AUG 1 4 2013
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
PROJECT No:
DRAWN BY:
CHECKED BY:
APPROVED BY:
DATE:
8-14-2013
ISSUE DATE OF PERMIT: 8-15-2013
S-6

**From:** John Woolley <jwoolley@pjfweb.com>
**Sent:** Wednesday, December 10, 2014 10:53 AM
**To:** Keith_ Stackhouse
**Cc:** Jason D'Amico; Jerry (Contractor) Bruno; SGS_PMI@sgstowers.com; lccmods
**Subject:** RE: Middletown_1 825983 130608 Punch List

Keith,

All of these items are acceptable.

Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

>>> Keith_ Stackhouse <keith_stackhouse@lcc.com> 12/10/2014 9:33 AM >>>

Hello John,

Have you had a chance to review this punch list, there are 2 separate punch list for each mod.

**Keith A. Stackhouse**
Structural Construction Manager

LCC

LCC Construction Services
2500 Sylon Blvd.
Hainesport, NJ 08036

# PUNCH ITEM 1

| HEIGHT | FLAT/ARC | PLATE # | PLATE HT START/STOP | DRAWING PG # |
|---|---|---|---|---|
| Base | 3/4 , 5/6 ,8,12 | N/A | N/A | S-7 |

**DISCREPANCY:**

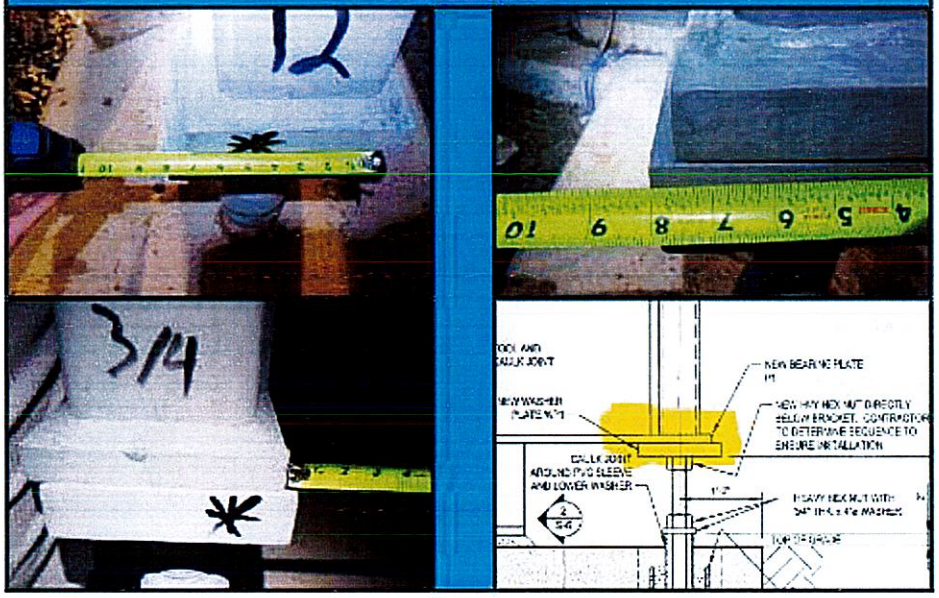
Washer plates are not centered under the anchor brackets in the above mentioned locations.

*APPROVED-EOR-KDS*

**ACTIONS NEEDED BY GC:**

Provide EOR approval for the existing conditions or install per the modification drawings.

**PHOTOGRAPHS**



# PUNCH ITEM 2

| HEIGHT | FLAT/ARC | PLATE # | PLATE HT START/STOP | DRAWING PG # |
|---|---|---|---|---|
| Base | 9/10, 3/4 , 1/2 | N/A | N/A | S-7 |

**DISCREPANCY:**

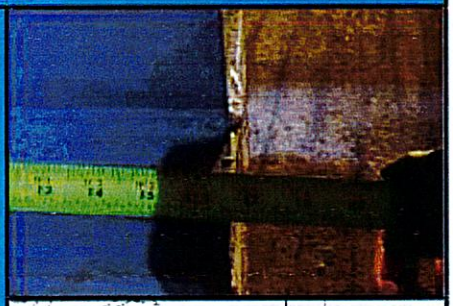
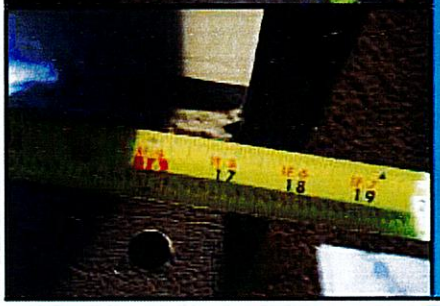
The bottom bearing plate was found to be short in length in the above mentioned locations.

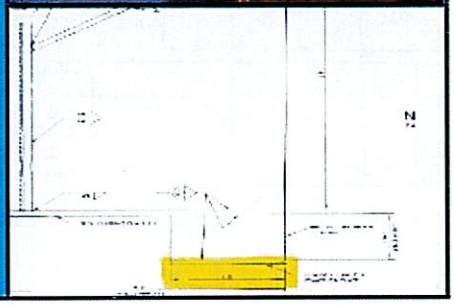
APPROVED-EOR-KDS

**ACTIONS NEEDED BY GC:**

Provide EOR approval for the existing conditions or install per the modification drawings.

**PHOTOGRAPHS**



# PUNCH ITEM 4

| HEIGHT | FLAT/ARC | PLATE # | PLATE HT START/STOP | DRAWING PG # |
|---|---|---|---|---|
| Base | All | NA | NA | S-7 |

**DISCREPANCY:**

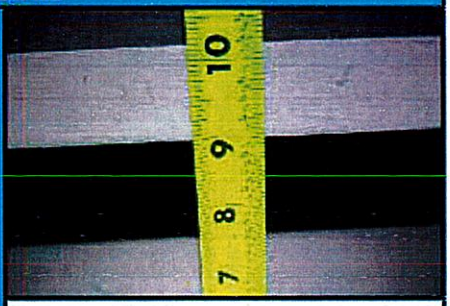
The vertical plate under the new anchor bracket was found to be 9", drawings specify it at 7 ¾"

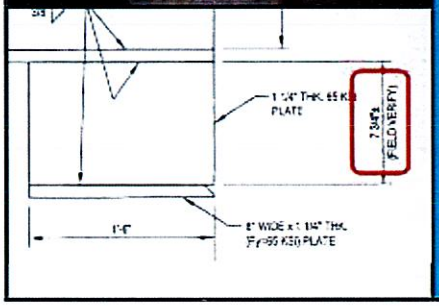
*APPROVED-EOR-KDS*

**ACTIONS NEEDED BY GC:**

Provide EOR approval for the existing conditions or install per the modification drawings.

**PHOTOGRAPHS**



# PUNCH ITEM 5

| HEIGHT | FLAT/ARC | PLATE # | PLATE HT START/STOP | DRAWING PG # |
|---|---|---|---|---|
| Base | All new mod | NA | NA | S-7 |

**DISCREPANCY:**

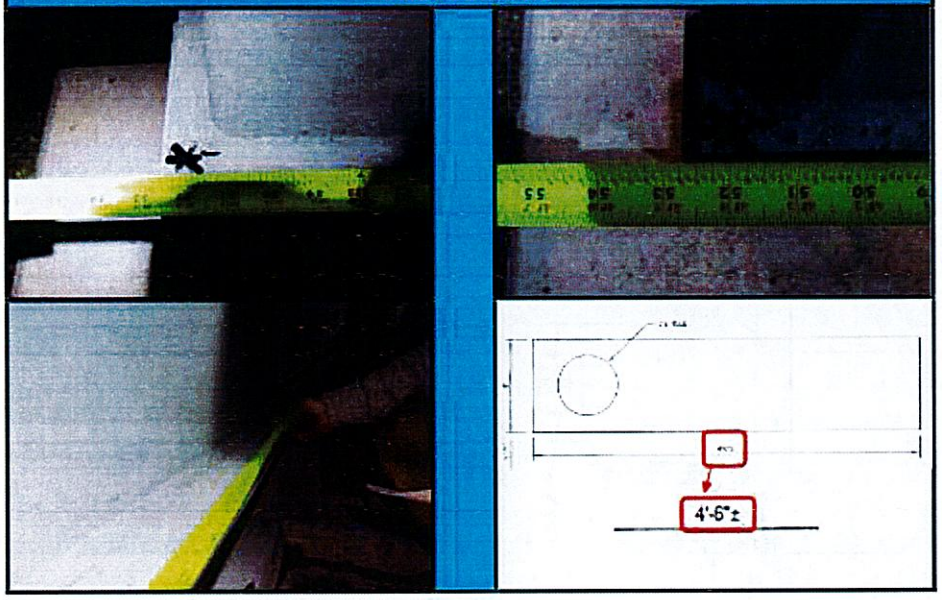
The bottom MK-P1 plate was found to be short at 4'-4 ½", the drawings specify 4'-6".

*APPROVED-EOR-KDS*

**ACTIONS NEEDED BY GC:**

Provide EOR approval for the existing conditions or install per the modification drawings.

**PHOTOGRAPHS**



# PUNCH ITEM 6

| HEIGHT | FLAT/ARC | PLATE # | PLATE HT START/STOP | DRAWING PG # |
|---|---|---|---|---|
| Base | See below | NA | NA | S-6 |

**DISCREPANCY:**

The drawings specified an anchor height/top of grade to washer plate distance of 12". The following measurements were observed:

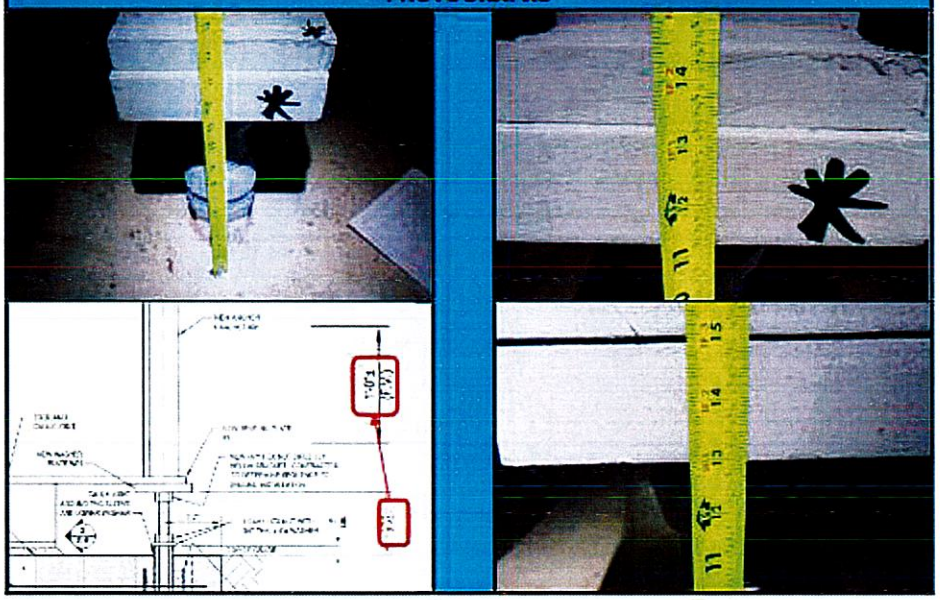
1. Flat 1/2, 11" distance observed.
2. Flat 5/6, 13" distance observed.

**ACTIONS NEEDED BY GC:**

Provide EOR approval for the existing conditions or install per the modification drawings.

*APPROVED-EOR-KDS*

**PHOTOGRAPHS**



# PUNCH ITEM 7

| HEIGHT | FLAT/ARC | PLATE # | PLATE HT START/STOP | DRAWING PG # |
|---|---|---|---|---|
| Base | All | NA | NA | S-7 |

**DISCREPANCY:**

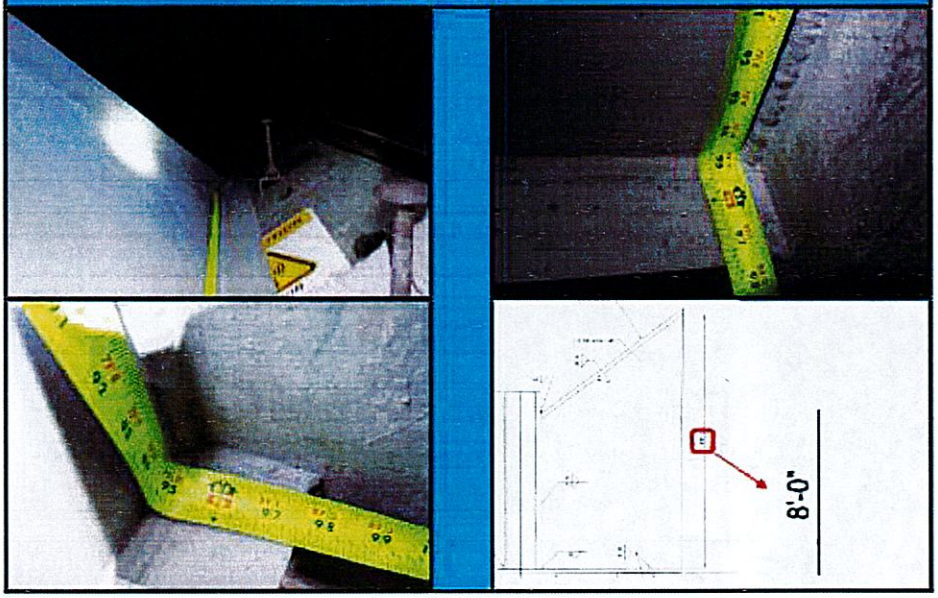
The inner plate of the anchor modification was found to be short. A height of 7'-11" was observed, the drawings specify 8'

APPROVED-EOR-KDS

**ACTIONS NEEDED BY GC:**

Provide EOR approval for the existing conditions or install per the modification drawings.

**PHOTOGRAPHS**



# PUNCH ITEM 8

| HEIGHT | FLAT/ARC | PLATE # | PLATE HT START/STOP | DRAWING PG # |
|---|---|---|---|---|
| Base | 1/2 | N/A | N/A | S-6 |

**DISCREPANCY:**

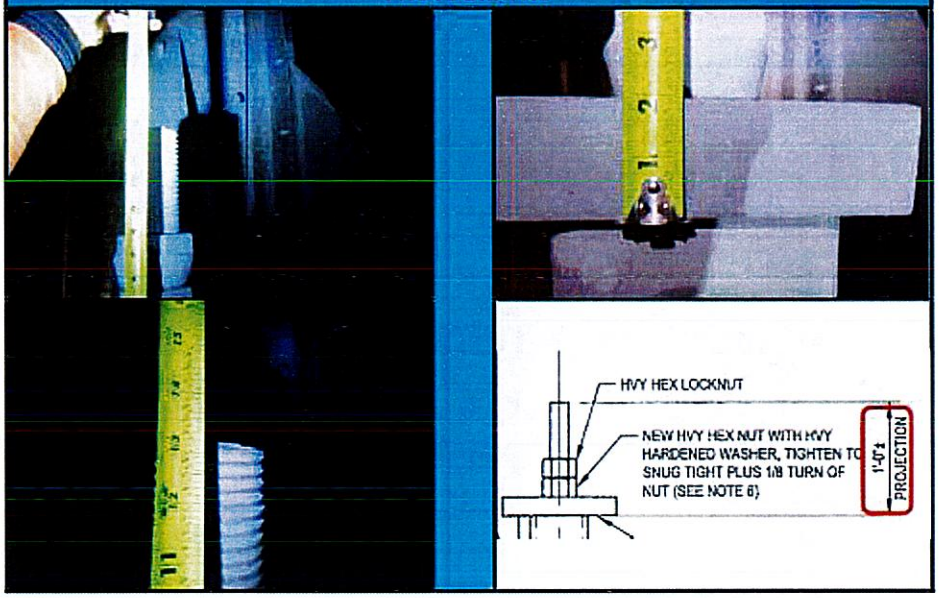
The drawings specify an anchor rod projection of 12", a projection of 13" was observed in the above mentioned location.

*APPROVED-EOR-KDS*

**ACTIONS NEEDED BY GC:**

Provide EOR approval for the existing conditions or install per the modification drawings.

**PHOTOGRAPHS**



**From:** John Woolley [mailto:jwoolley@pjfweb.com]
**Sent:** Wednesday, December 10, 2014 1:48 PM
**To:** Keith_ Stackhouse
**Cc:** Jason D'Amico; Jerry (Contractor) Bruno; SGS_PMI@sgstowers.com; lccmods
**Subject:** RE: Middletown_1 825983 146075 Punch List

Keith,

See the attached rough sketch. That should give you the idea of what's required.

Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

>>> Keith_ Stackhouse <keith_stackhouse@lcc.com> 12/10/2014 1:41 PM >>>

Hello John,

As per our conversation,

I believe the welded fix is going to be the best solution, could you shoot over a hand sketch of the weld detail?

Thanks,

**Keith A. Stackhouse**
Structural Construction Manager

LCC

LCC Construction Services
2500 Sylon Blvd.
Hainesport, NJ 08036

(Cell) 609-367-6107
**keith_stackhouse@lcc.com**

1

**From:** John Woolley [mailto:jwoolley@pjfweb.com]
**Sent:** Tuesday, December 09, 2014 12:47 PM
**To:** Keith_ Stackhouse
**Cc:** Jason D'Amico; Jerry (Contractor) Bruno; SGS_PMI@sgstowers.com; lccmods
**Subject:** Re: Middletown_1 825983 146075 Punch List

Keith,

I see only two items in the document you sent, but the answers are as follows to those two:

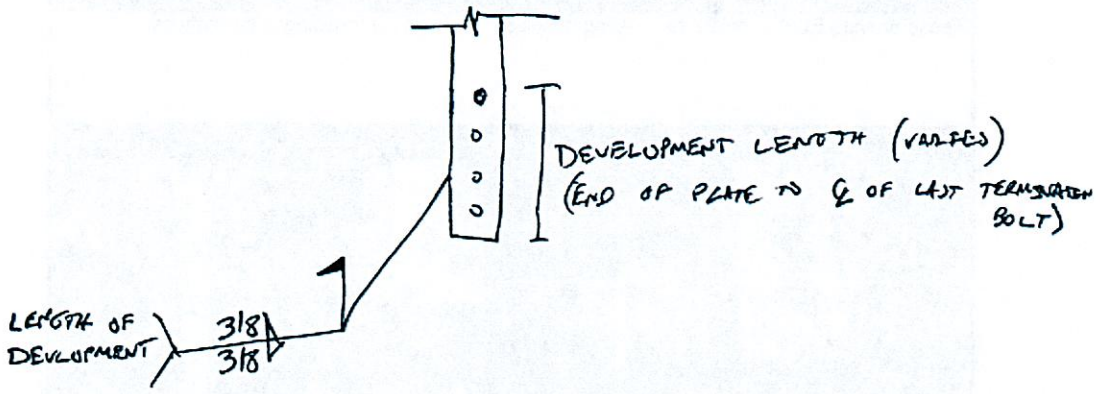
1) Unfortunately, plates 1 and 2 are now starting too high. The lap on plate 3 is still effective, so that one is approved. The welded splice in the pole should be above the development bolts on plate 2. If you can confirm that this is still the case, I can approve plate 2. Plate 1 will need to have the 6" gap bridged on an adjacent flat or have the bottom termination welded up with a 3/8" weld on both sides.

2) New bolts will need to be installed to meet the minimum spacing requirements.

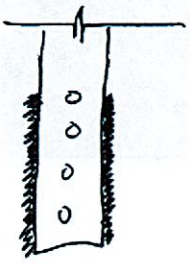
Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

WELDED TERMINATION FIX SKETCH




FINAL WOULD LOOK LIKE THIS



# PUNCH ITEM 1

| HEIGHT | FLAT/ARC | PLATE # | PLATE HT START/STOP | DRAWING PG # |
|---|---|---|---|---|
| 35' – 155' | See below | 1,2,3 | See below | S4 |

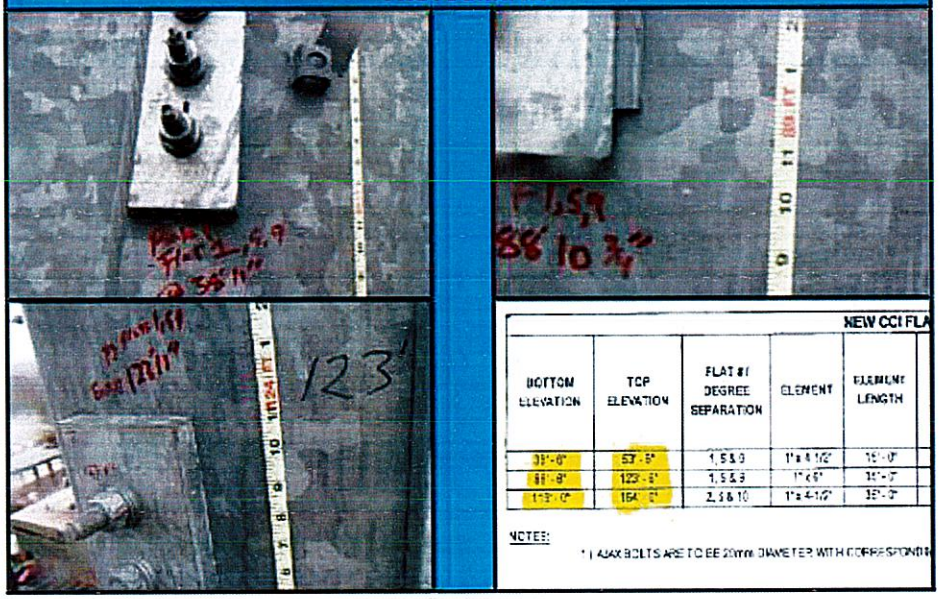
**DISCREPANCY:**

The newly installed plate heights were found to be different from the specified heights in the drawings.
Plate 1 on flats 1, 5, and 9 was found to be from 38'-11" – 53'-11" instead of 38'-6" – 53'-6"
Plate 2 on flats 1, 5, and 9 was found to be from 88'-10 ¾" – 123'-11" instead of 88'-6" – 123'-6"
Plate 3 on flats 2, 6, and 10 was found to be from 119'-6" – 154'-6" instead of 119' – 154'

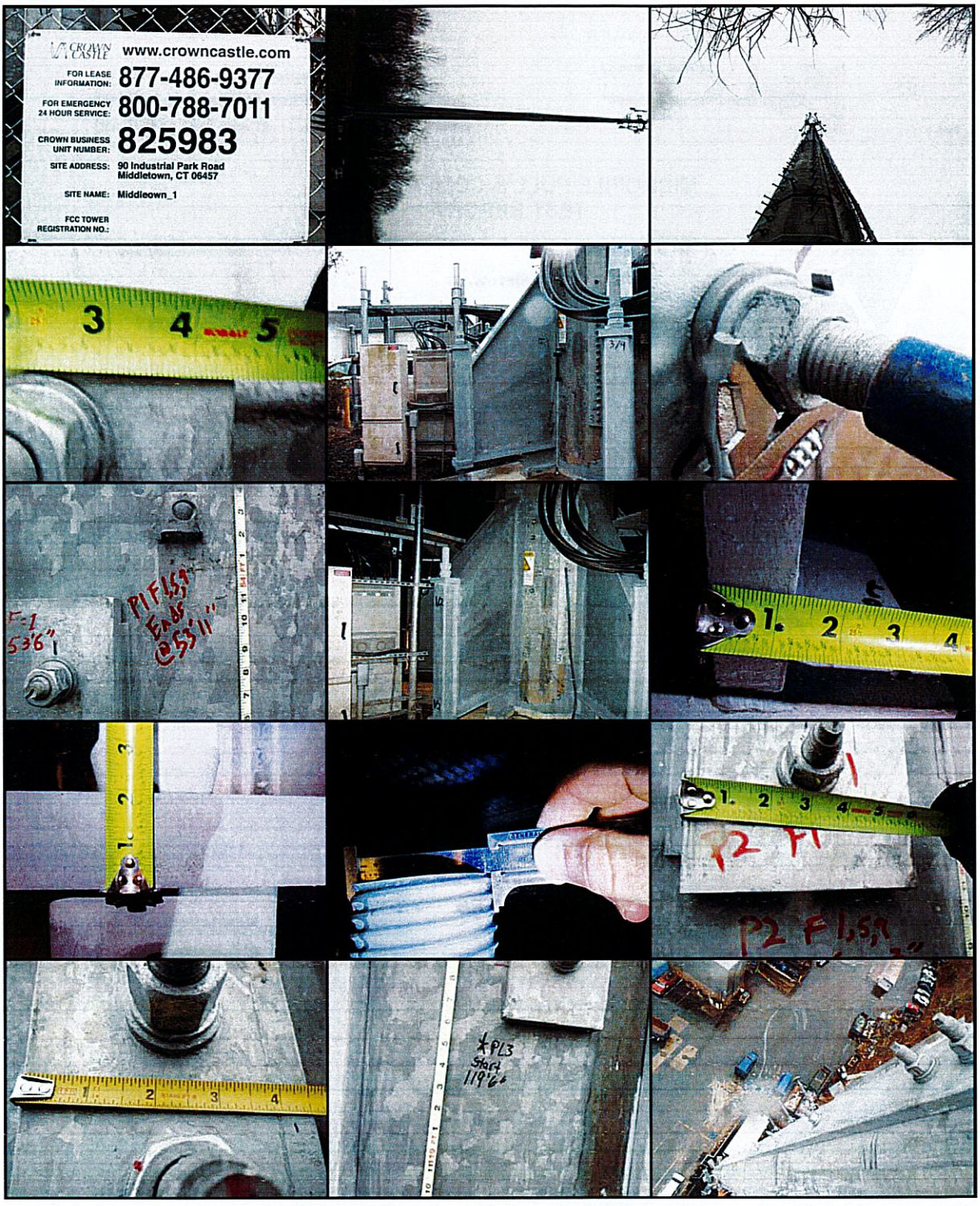
**ACTIONS NEEDED BY GC:**

Please provide EOR approval for existing condition, or install per drawing specifications.

**PHOTOGRAPHS**



## 6.3.3 PHOTOGRAPHS

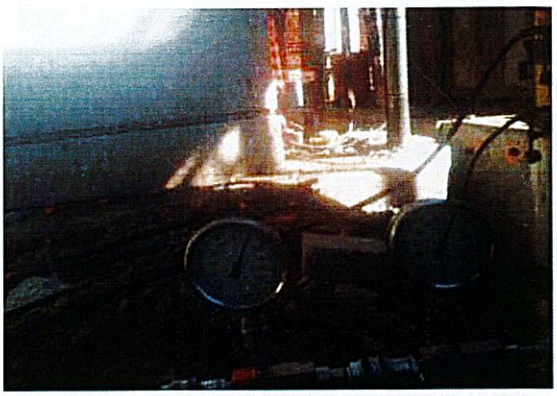


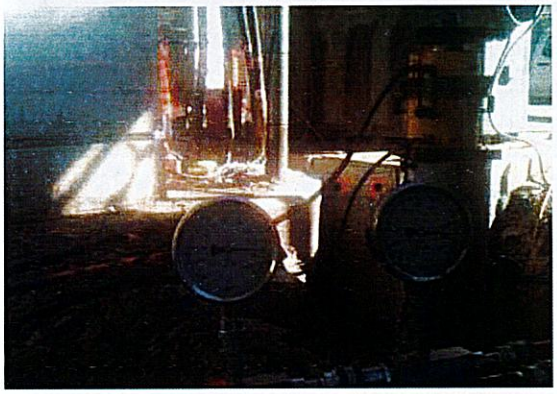
## 6.3.4 POST INSTALLED ANCHOR ROD PULL-OUT TESTING

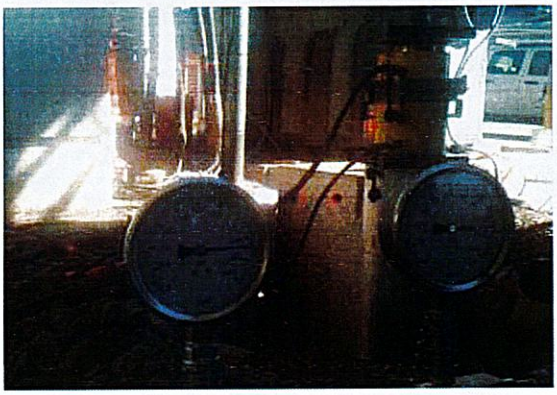
**LCC Deployment Services Inc.**
**2242 Old Marlton Pike, Marlton, NJ 08053**
**856-810-1658 (Ph) 856-810-1659 (Fax)**

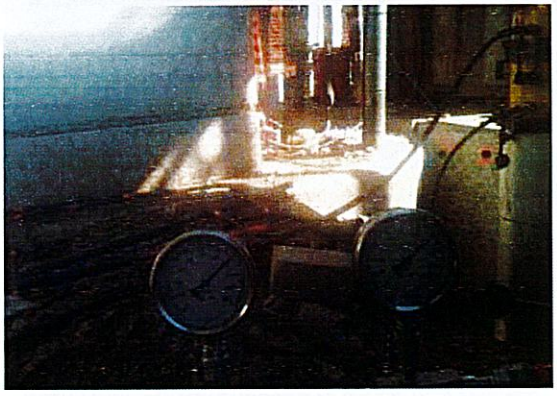
### MICROPILE PULL & COMPRESSION TEST REPORT

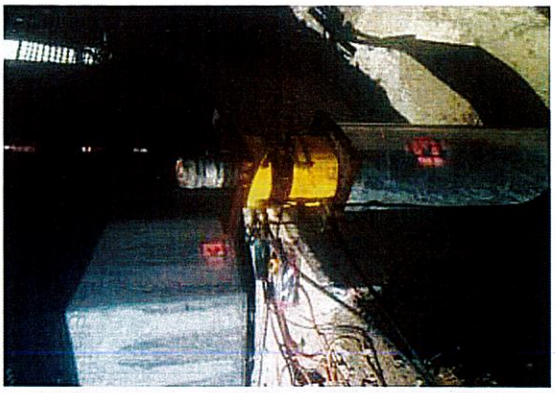
| | |
|---|---|
| **SITE NAME:** | Middletown 1 |
| **ADDRESS:** | 90 Industrial Park Road Middletown, CT 06457 |
| **CROWN BU #:** | 825983 |
| **DATE OF TEST** | 9/22/2014 |
| **TECHNICIAN** | Joseph Gentes |
| **ANCHOR SIZE:** | Con- Tech Titan 73/45 Hollow Bar |
| **QUANTITY OF TEST MICROPILES INSTALLED:** | (6) Production (1) Test |
| **QUANTITY TESTED:** | (2) Productions opposite and (1) Test pile |
| **GROUT USED:** | PORTLAND CEMENT |
| **WEATHER CONDITIONS:** | 70 Degrees SUNNY |
| **TEST UNIT:** | ENERPAC RRH1508 |
| **TEST RESULT # 1:** | PASS |
| **TEST RESULT # 2:** | PASS |
| **TEST RESULT # 3:** | PASS |
| **COMMENTS:** | Production piles were pulled to 190, 222 & 276 kips and held for 3 minutes each. No movement or bleed-off on the jack was detected.<br><br>The test pile was pulled to 190, 222, 270 & 288 kips and |



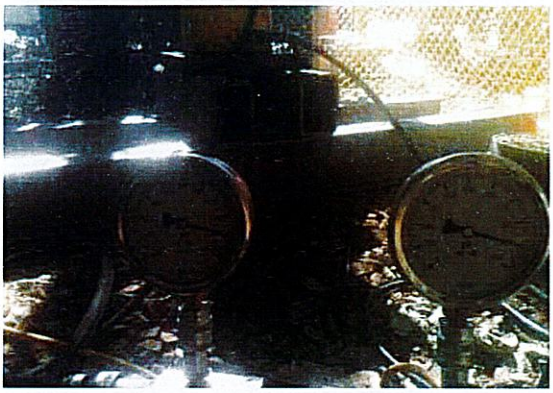


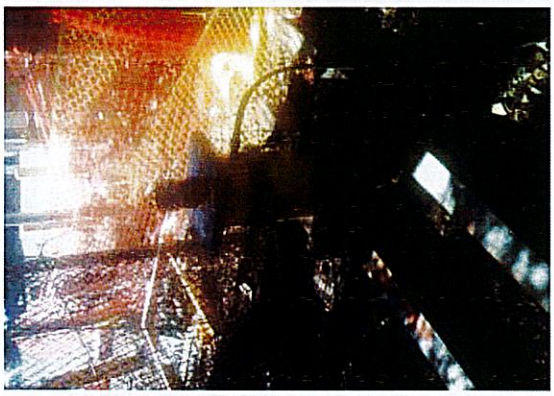
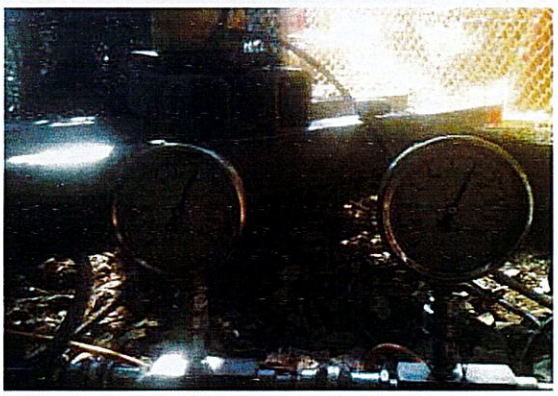
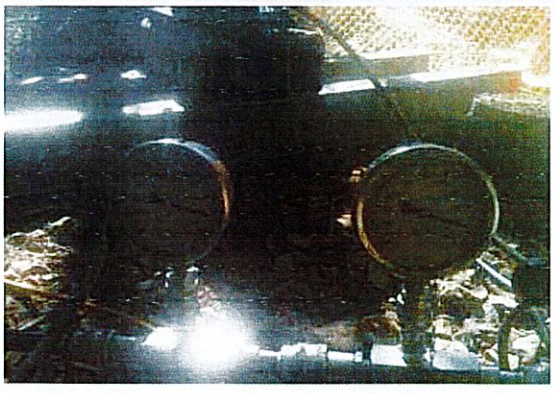


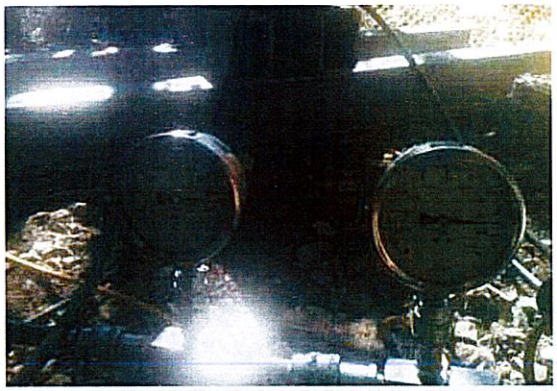


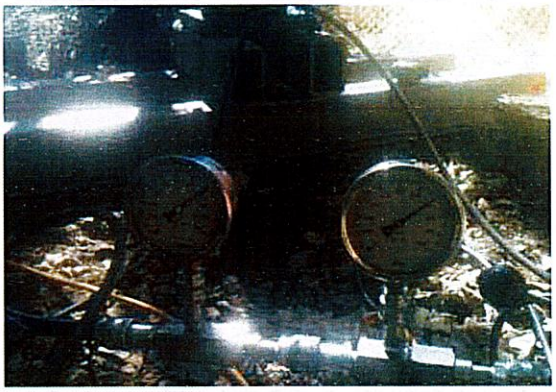








Please Reply To:
Sam Simons
35 Griffin Road South
Bloomfield, CT 06002
203-482-5156
Sam.Simons@T-Mobile.com

August 5, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council Ten
Franklin Square
New Britain, CT 06501

**EM-TMOBILE-083-141027**
T-Mobile Site ID CT11057C
190 Industrial Park Road, Middletown CT
Notice of Construction Completion

Dear Attorney Bachman:

The Connecticut Siting Council ("Council") acknowledged the above referenced T- Mobile Northeast LLC ("T-Mobile") notice of exempt modification on November 17, 2014. The Council imposed the following condition in its acknowledgment:

- Reinforce tower in accordance with Section 4.1 of the structural analysis report prepared by FDH Engineering, stamped Justin Kline on September 10, 2014;
- Within 45 day's following completion of the equipment installation, T-Mobile shall provide documentation that its installation complied with the recommendations of the Structural Analysis Report;
- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by T-Mobile shall be removed within 60 days of the date the antenna ceased to function;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The attached PE Closeout Letter, dated July 29, 2015, provides evidence of compliance with the conditions outlined by the Council.

In addition, T-Mobile hereby notifies the Council that construction of the acknowledged modifications were complete as of January 15, 2015.

Please don't hesitate to contact me with any questions.

Sincerely,

Sam Simons

Samuel Simons, T-Mobile

CC: Mark Richard, T-Mobile

PJF PAUL J. FORD & COMPANY

Date: **July 30, 2015**

Sam Simons
Engineering Development - Connecticut
T-Mobile
35 Griffin Road South
Bloomfield, CT 06002

Paul J Ford and Company
250 E. Broad St., Suite 600
Columbus, OH 43215
614-221-6679

**Subject:** **Structural Opinion Letter**

| | | |
|---|---|---|
| ***Carrier Designation:*** | ***T-Mobile* Co-Locate** | |
| | **Carrier Site Number:** | EM-T-MOBILE-083-141027 |
| | **Carrier Site Name:** | CT11057C |
| ***Engineering Firm Designation:*** | **Paul J Ford and Company Project Number:** | 79915-0003.001.7101 |
| ***Site Data:*** | **90 Industrial Park Road, Middletown, CT** | |
| | **Latitude *41° 35' 8.3"*, Longitude *-72° 42' 50.49"*** | |
| | **185 Foot – Monopole Tower** | |

Dear Sam Simons,

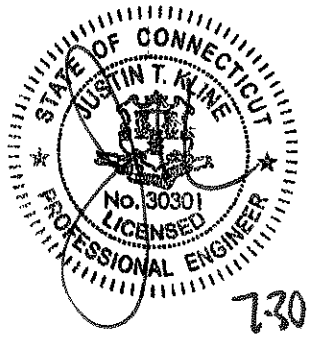
*Paul J. Ford and Company* is pleased to submit this **"Structural Opinion Letter"** for the structural integrity of the aforementioned monopole tower. The purpose of the opinion letter is to determine the suitability of the monopole tower with the proposed, and existing loading as specified in Tables 1 & 2 on the next two pages. The opinion is consistent with the guidelines as stated in 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 0.75 inch ice thickness and 50 mph under service loads.

Based on a comparison of the previous analysis loads (including wind speeds) from the Paul J. Ford and Company job number 37513-1570.004.7805, dated October 23, 2014, we have determined the monopole tower and foundation ***ARE*** sufficient for the verified proposed loading installation.

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

Respectfully submitted by:

Corey McCartney, EI
Structural Designer




7-30-15

**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 |
|---|---|---|---|---|---|---|---|
| **185.0** | **185.0** | **3** | **ericsson** | **Double TMA 17/21-M** | **-** | **-** | **1** |
| | | **3** | **ericsson** | **DTMA 1900 Premium CWA** | | | |
| | | **3** | **commscope** | **ATBT-BOTTOM-24V** | | | |
| | | **3** | **commscope** | **LNX-6515DS-VTM w/ Mount Pipe** | | | |
| | | **3** | **ems wireless** | **RR90-17-02DP w/ Mount Pipe** | | | |
| | | **3** | **rfs celwave** | **APX16DWV-16DWVS-C w/ Mount Pipe** | | | |

Notes:
**1) Verified antenna/coax installation heights and quantities**

**Table 2 - Existing and Reserved Antenna and Cable Information**

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---|---|---|---|---|---|---|---|
| 185.0 | 185.0 | 9 | ericsson | AIR 21 w/ Mount Pipe | 3 | 1-5/8 | 3 |
| | | 3 | ericsson | AIR 33 w/ Mount Pipe | | | |
| | | 1 | raycap | DC6-48-60-18-8F | | | |
| | | 1 | tower mounts | Sector Mount [SM 802-3] | 12 | 1-5/8 | 1 |
| 175.0 | 175.0 | 6 | cci antennas | OPA-65R-LCUU-H6 w/ Mount Pipe | 2<br>4 | 3/8<br>3/4 | 2 |
| | | 3 | ericsson | RRUS 11-700 | | | |
| | | 2 | raycap | DC6-48-60-18-8F | | | |
| | | 3 | ericsson | RRUS A2 MODULE | | | |
| | | 3 | ericsson | RRUS-11 1900MHz | | | |
| | | 3 | powerwave technologies | 7770.00 w/ Mount Pipe | 12 | 1-1/4 | 1 |
| | | 1 | tower mounts | Sector Mount [SM 802-3] | | | |
| 165.0 | 165.0 | 3 | rfs celwave | APXV18-206517S-C w/ Mount Pipe | 6 | 1-5/8 | 1 |
| | | 1 | tower mounts | Pipe Mount [PM 601-3] | | | |
| 155.0 | 155.0 | 3 | alcatel lucent | RRH2X40-07-U | 2 | 1-5/8 | 2 |
| | | 3 | alcatel lucent | RRH2X40-AWS | | | |
| | | 6 | antel | BXA-171063-12CF-EDIN-2 w/ Mount Pipe | | | |
| | | 6 | antel | BXA-70063-6CF-EDIN-2 w/ Mount Pipe | | | |
| | | 1 | rfs celwave | DB-T1-6Z-8AB-0Z | | | |
| | | 1 | tower mounts | Platform Mount [LP 301-1] | | | |

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