ROBINSON & COLE LLP

KENNETH C. BALDWIN

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ORIGINAL

February 23, 2009

Michael Perrone
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Cellco Partnership d/b/a Verizon Wireless**
Exempt Modification Approval

Dear Mr. Perrone:

Enclosed you will find a Post-Construction Observation Report confirming that the Verizon Wireless antenna installation was completed in accordance with the requirements of the Structural Analysis submitted as a part of the exempt modification filing referenced below. The attached report relates specifically to the following Siting Council filing.

1. EM-VER-029-080718
   Colebrook SW – Pinney Street, Colebrook, CT

If you have any questions regarding any of these materials, please do not hesitate to contact me or Rachel Mayo.

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Sandy M. Carter
Brian Ragozzine
Mark Gauger

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

February 11, 2009

John Eigenbrode
Crown Castle International
9105 Monroe Rd.
Charlotte, NC 28270
(704) 321-3816

Subject: Post-Construction Observation Report of Reinforced 148-Ft Monopole

Carrier Designation	Verizon Wireless Co-Locate	
	Carrier Site Number:	N/A
	Carrier Site Name:	Colebrook SW
Crown Castle Designation	Crown Castle BU Number:	876377
	Crown Castle Site Name:	Horton 2 / Fredsall Property
	Crown Castle JDE Job Number:	98242
	Crown Castle Application Number:	55996 Rev#2
Engineering Firm Designation	Paul J. Ford and Company	41708-0177_Record
Site Data	116 Pinney St., Colebrook, Litchfield County, CT Latitude 41° 57' 58.57", Longitude -73° 7' 19.65"	

Dear John Eigenbrode,

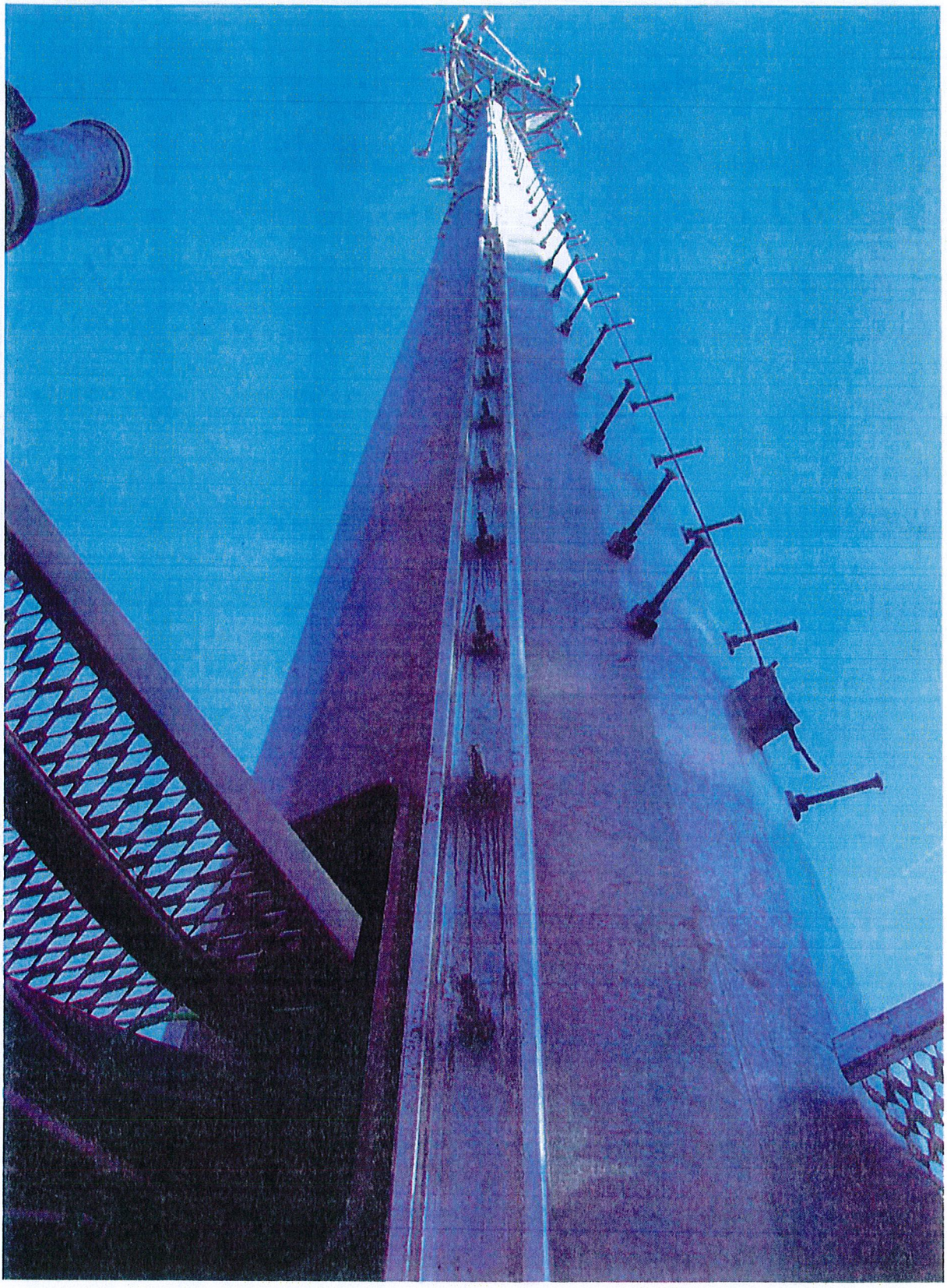
Paul J. Ford and Company is pleased to submit this "Post-Construction Observation Report" for the modifications recently performed on the aforementioned monopole. The purpose of the report is to verify that the pole modifications were installed in accordance with the drawings produced by Paul J. Ford and Company. You will find a copy of the record drawings attached to the post-construction structural analysis report.

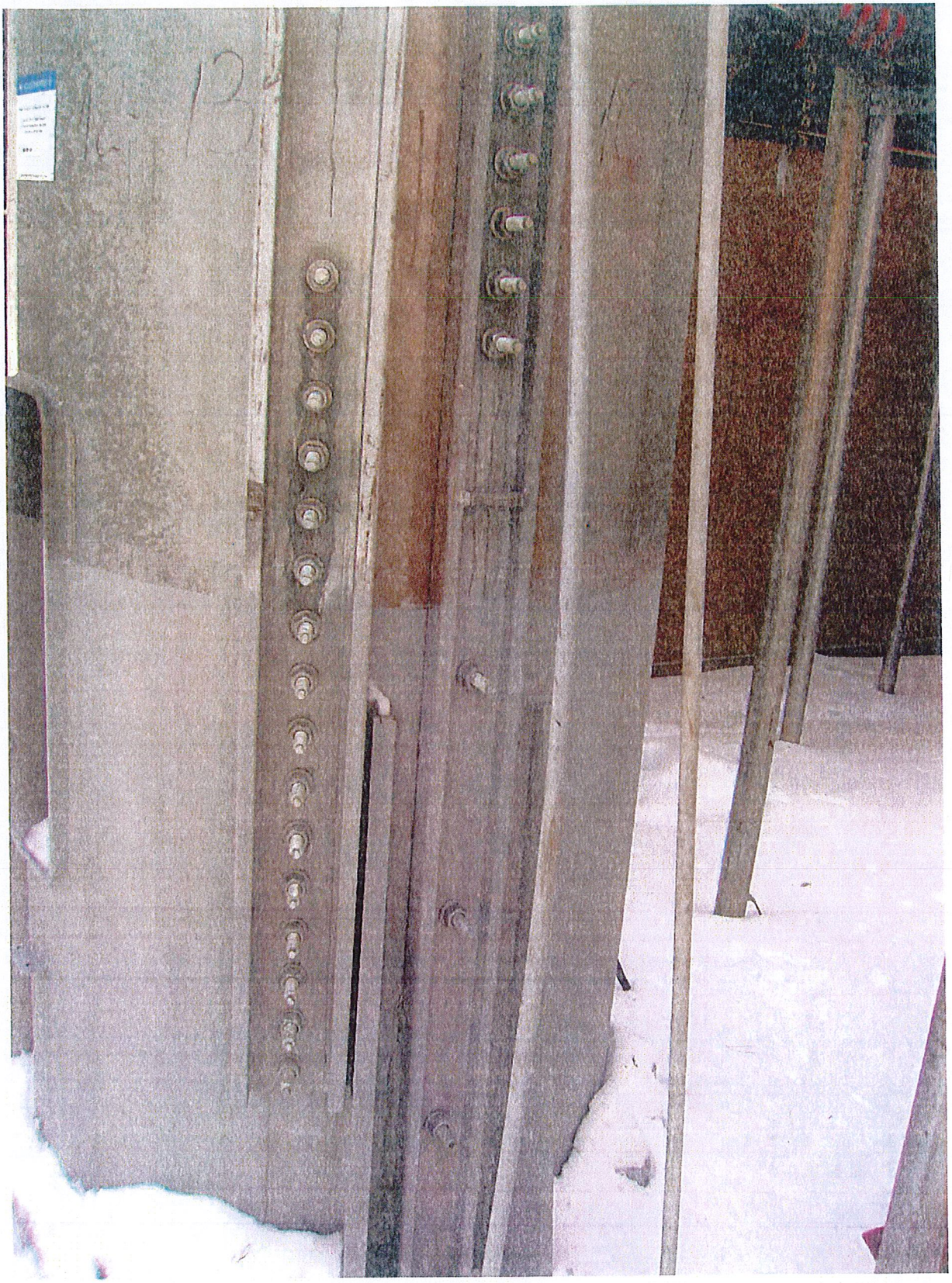
The modifications required: Aero shaft and foundation reinforcement. Based on the construction photos, construction observation letter and the redline drawings provided by AeroSolutions LLC, we feel that the modifications were completed in accordance with the design intent indicated on our drawings. All information shown on the Record drawings is based on documentation provided by AeroSolutions LLC.

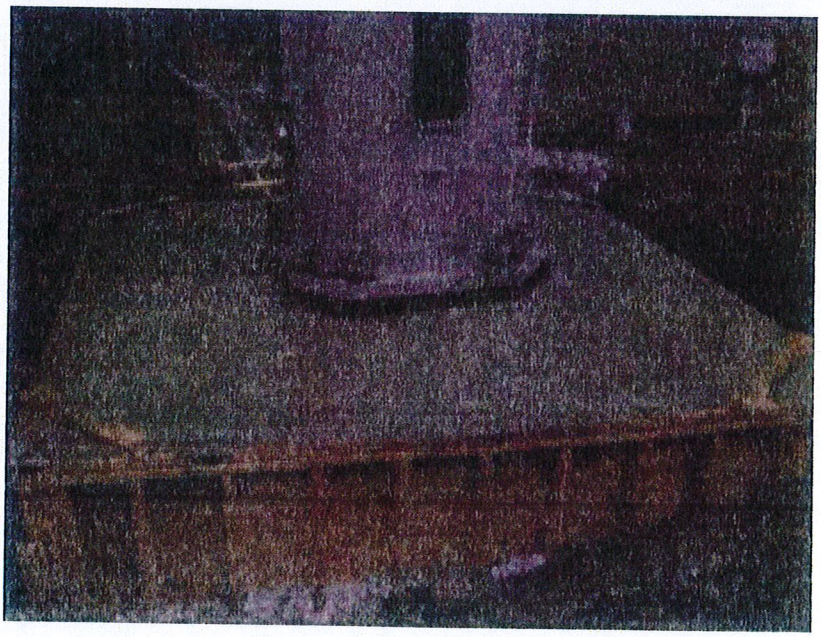
We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Crown Castle International. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted,

Maria C. Lopez
Project Engineer
mclopez@pjfweb.com







Aero*Solutions* LLC

Optimizing your Tower Infrastructure

02/11/2009

Hasan Reza
Paul J. Ford and Company
250 East Broad Street, Suite 1500
Columbus, Ohio 42315
(614) 221-6679

Re: Foundation installation at 876377, Horton 2

Hasan,

Per our discussion, the contractor responsible for this site lost their SD card holding the digital photographs of the foundation installation at Horton 2, BU 876377. The contractor was able to provide the rebar assembly drawing that was prepared in advance of the foundation modification. We have also provided you with a few pictures of the rebar being assembled and the dowel bars installed.

Our project manager, Jeremy Klapac, has confirmed that the rebar specified in the PJF construction drawing dated 11/28/2008 was installed per the drawing.

Please proceed with the closeout and attach this letter with the closeout documentation.

Thank you,

Tom Warchol
Aero Solutions, LLC
720-381-2854

Aero*Solutions* LLC

Optimizing Your Tower Infrastructure

103 Rotary Drive
West Hazleton, PA 18202

Phone: 570-455-7736
Fax: 570-455-9881

January 10, 2009

Customer: Crown
Site #: 876377
Site Name: Horton 2
116 Pinney Street
Colebrook, CT 06021

Scope: Work on this project consisted of the welding of transition stiffeners and the bottom of the reinforcement channel all in accordance with the approved PJF drawings dated 11/24/08. The shaft to base plate weld was examined using both UT & MT disciplines.

Stiffener Welding: All galvanizing was removed in the areas to be welded. All welding was performed in accordance with AWS D1.1 2008 Structural Welding Code and Aero Solutions Field Welding Procedure (Stiffener/Anchor Rod Brackets to Monopole Tower Wall/Base Plate). Upon completion all welds were visually inspected and checked for the correct fillet size which was 5/16 " for the vertical and 1/2" for the horizontal weld on the stiffeners. The foot pad weld was a partial penetration beveled weld with a 1/8" above flush reinforcement. The channel required a 3/8" fillet weld on both sides from the bottom of the channel to the first hole. Pictures were taken throughout the entire process and final pictures upon completion. The base area was painted with ZRC to a thickness of 3 mls.

UT & MT Testing:
The monopole weld between the base plate and the shaft was examined for general weld quality characteristics. In addition the weld between the base plate and the shaft was tested for the presence of crack-like indications along all flats on the shaft using magnetic particle testing techniques (MPT) followed by ultrasonic testing (UT). A Parker 400DA contour probe was used for the MT testing and a Krautkramer USK7S ultrasonic unit along with a Dapco 2.25 MHZ 70 degree transducer for the UT testing.

Observation and Results:
MPT & UT Results of Shaft-Base Plate Weld

No crack-like indications detected

Visual Observations of Shaft- Base Plate Weld

Visual appearance of weld quality was judged to be good

Ron Skasko
Aero Solutions
Quality Coordinator
ASNT Level II UT & MT, CWI

ATLANTIC TESTING LABORATORIES

CONCRETE COMPRESSION TEST REPORT UT3216CL-01B-12-08

CLIENT: Tower Network Technologies
PROJECT: Site # 876377

CONTRACTOR: Tower Network Technologies

PLACEMENT DATE: December 15, 2008 (Monday)
CYLINDERS FABRICATED BY: Client
SUPPLIER: Not Available
PLANT LOCATION: Not Available

LABORATORY DATA (ASTM C 39, C 511, and C 1231)

Cylinder Number	Client Provided Information	Unit Weight (pcf)	Date of Test	Age (days)	Cylinder Diameter (in)	Cylinder Area (in)	Fracture Type (1-6)	Total Load (lbs)	Unit Load (psi)
UT3216C-001	Truck # 1	143	12-22	7	6.00	28.27	5	73,000	2580
UT3216C-002		144	01-12	28	6.00	28.27	5	135,500	4750
UT3216C-003	Truck # 2	143	12-22	7	6.00	28.27	5	80,000	2830
UT3216C-004		143	01-12	28	6.00	28.27	5	133,000	4660

REMARKS

Cylinders were delivered by the client on December 22, 2008.
Unit weights are approximate and are calculated based on cylinder weights and volumes determined in the laboratory.

Reviewed by: _____ Date: 1/13/09

THE FOLLOWING NOTES AND DETAILS WERE PROVIDED ON THE CONSTRUCTION DRAWINGS FOR THIS SITE:

AEROSOLUTIONS PROJECT: BU876377, HORTON2 / FREDSALL PROPERTY, COLEBROOK, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIA/EIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 80 MPH AND 65 MPH + 1/2" RADIAL ICE

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY (ENGINEER-OF-RECORD) BY CROWN CASTLE USA ("CCUSA", OWNER). THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY (ENGINEER-OF-RECORD) 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 USA AND (ENGINEER-OF-RECORD) 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 CCUSA CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CCUSA GUIDELINES FROM CCUSA. PER THE 12-01-2005 CCUSA DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CCUSA POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".**
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CCUSA 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. "LOW HEAT" WELDING PROCEDURES:

1. ANY AND ALL FIELD WELDING REQUIRED ON THIS PROJECT SHALL BE PERFORMED BY AWS CERTIFIED WELDERS USING "LOW HEAT" WELDING TECHNIQUES.
2. FOR THE PURPOSES OF THIS PROJECT, "LOW HEAT" WELDING IS DEFINED AS A CAREFUL AND CONTROLLED WELDING PROCESS, PERFORMED BY EXPERIENCED AWS CERTIFIED WELDERS, SUCH THAT THE CORRECT AMOUNT OF WELD METAL IS DEPOSITED AND IS PROPERLY FUSED IN SUCH A WAY THAT EXCESSIVE AMOUNTS OF HEAT BUILDUP AT THE WELDED JOINT, DUE TO EXCESSIVE MOLTEN WELD METAL POOLING, IS AVOIDED.
3. THE "LOW HEAT" WELDING PROCESS SHALL BE SET UP SO THAT ANY FIELD WELDING ACTIVITY ON THE POLE STRUCTURE DOES NOT SCORCH OR OTHERWISE DAMAGE THE EXISTING GALVANIZED SURFACE ON THE INSIDE OF THE POLE SHAFT IN AND AROUND THE REGION OF THE WELD.
4. THE "LOW HEAT" WELDING PROCESS, USED IN CONJUNCTION WITH THE CCUSA COAX PROTECTION AND FIRE SAFETY GUIDELINES, SHALL BE SET UP SO THAT ANY FIELD WELDING ACTIVITY ON THE POLE STRUCTURE DOES NOT SCORCH AND/OR OTHERWISE DAMAGE THE EXISTING COAX CABLES THAT RUN ON THE INSIDE AND/OR OUTSIDE OF THE POLE SHAFT IN AND AROUND THE REGION OF THE WELD.
5. **"LOW HEAT" WELD DEMONSTRATION REQUIRED:** PRIOR TO BEGINNING THE FIELD WELDING FOR THE REINFORCEMENT WORK, THE CONTRACTOR'S AWS CERTIFIED WELDER SHALL DEMONSTRATE THE "LOW HEAT" WELDING PROCESS THAT WILL BE USED ON THIS PROJECT SO THAT CCUSA REPRESENTATIVES CAN OBSERVE AND VERIFY THAT THE PROPOSED PROCESS DOES NOT DAMAGE THE EXISTING GALVANIZED SURFACE ON THE BACK SIDE OF THE SAMPLE PLATE THAT IS BEING WELDED. THE CONTRACTOR SHALL USE TEMPERATURE MONITORING DEVICES SUCH AS THERMOCOUPLE, HEAT CRAYON, AND/OR INFRARED SENSOR TO MEASURE AND DEMONSTRATE THE TEMPERATURE OF THE STEEL ON THE BACK SURFACE IN THE REGION OF THE WELD. THE "LOW HEAT" WELD DEMONSTRATION SHALL BE CARRIED OUT ON-SITE AND USING A GALVANIZED STEEL PLATE SAMPLE WITH A THICKNESS EQUAL TO THE MINIMUM SHAFT THICKNESS THAT WILL BE REINFORCED. ONLY AFTER THE "LOW HEAT" TECHNIQUES HAVE BEEN SUCCESSFULLY DEMONSTRATED AND ARE APPROVED BY CCUSA REPRESENTATIVES, CAN THE CONTRACTOR PROCEED WITH THE FIELD WELDING ON THE STRUCTURE.
6. **CAUTION: THE CONTRACTOR SHALL CAREFULLY FOLLOW ALL CCUSA CUTTING, WELDING, FIRE SAFETY, AND ALL OTHER SAFETY GUIDELINES WHICH ALSO INCLUDE "LOW HEAT" WELDING TECHNIQUES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR MAINTAINING THE SAFETY AND STABILITY OF THE STRUCTURE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE HELD FULLY LIABLE FOR ANY DAMAGE (INCLUDING HEAT AND FIRE DAMAGE CAUSED BY FIELD WELDING) TO THE STRUCTURE AND ANY OF ITS COMPONENTS WHICH OCCURS DURING CONSTRUCTION.**

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.
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

C. CONCRETE TESTING PER ACI

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.

5. 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.

5. 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.

5. 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.

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. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1.
4. 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.
5. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
6. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION H NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
7. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION I FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
8. 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.
9. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
10. 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 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

1. THE CONTRACTOR SHALL PROTECT THE EXISTING MONOPOLE STRUCTURE, AS WELL AS ANY OTHER NEARBY EXISTING FOUNDATIONS FOR OTHER STRUCTURES OR EQUIPMENT, FROM LOSS OF SOIL AROUND AND/OR BENEATH FOOTINGS DURING ANY REQUIRED EXCAVATION. THE CONTRACTOR SHALL BRACE THE SIDES OF THE OPEN EXCAVATION AS REQUIRED.
2. THE EFFECT OF ADDITIONAL EXCAVATION (WHERE REQUIRED) FOR THE NEW MAT FOOTING (WHERE REQUIRED) OR OTHER FOUNDATION AUGMENTATION AND REINFORCING (WHERE REQUIRED) MAY HAVE IMPACT ON EXISTING EQUIPMENT AND/OR OTHER EXISTING STRUCTURES NEAR THE EXCAVATION. (ENGINEER-OF-RECORD) HAS NOT BEEN PROVIDED WITH ANY SPECIFIC INFORMATION OR DETAILS REGARDING EXISTING EQUIPMENT OR OTHER EXISTING STRUCTURES ON THE SITE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE IMPACT OR EFFECT THAT ANY REQUIRED EXCAVATION WORK HAS ON ANY EXISTING NEARBY EQUIPMENT AND/OR STRUCTURES. CONTRACTOR SHALL COORDINATE THIS SITE-SPECIFIC INFORMATION WITH THE OWNER AND TESTING AGENCY PRIOR TO CONSTRUCTION AND FOUNDATION WORK. THE CONTRACTOR SHALL ADEQUATELY BRACE, SHORE, AND/OR RELOCATE (AFTER OBTAINING THE PRIOR WRITTEN PERMISSION OF THE OWNER), AS NECESSARY, THE INTERFERING EXISTING NEARBY EQUIPMENT AND/OR STRUCTURES.

G. CAST-IN-PLACE CONCRETE

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
   (A.) CONCRETE EXPOSED TO WEATHER SHALL BE AIR ENTRAINED (6% +/- 1.5%).
   (B.) WATER CEMENT RATIO = 0.52 (MAXIMUM).
2. ALL REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.
3. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH "THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" ACI 318, LATEST EDITION. CONTRACTOR SHALL FOLLOW ALL APPLICABLE ACI PROCEDURES FOR COLD WEATHER CONCRETE PLACEMENT
4. ALL REINFORCING DETAILS SHALL CONFORM TO "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" ACI 315, LATEST EDITION, UNLESS DETAILED OTHERWISE ON THE STRUCTURAL DRAWINGS.
5. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL OPENINGS, SLEEVES, ANCHOR RODS, INSERTS, ETC., AS REQUIRED BEFORE CONCRETE IS PLACED.
6. WHERE BAR LENGTHS ARE GIVEN ON THE DRAWINGS, THE LENGTH OF ANY HOOK, IF REQUIRED, IS NOT INCLUDED.
7. CONTRACTOR SHALL PROVIDE SPACERS, CHAIRS, BOLSTERS, ETC., NECESSARY TO SUPPORT REINFORCING STEEL. CHAIRS WHICH BEAR ON EXPOSED CONCRETE SURFACES SHALL HAVE ENDS WHICH ARE PLASTIC TIPPED OR STAINLESS STEEL.
8. ALL STRUCTURAL MEMBERS SHALL BE POURED MONOLITHICALLY, EXCEPT FOR REQUIRED CONSTRUCTION JOINTS. CONTRACTOR SHALL SUBMIT PROPOSED CONSTRUCTION JOINT LOCATIONS AND DETAILS TO THE ENGINEER FOR REVIEW.
9. CONTRACTOR SHALL PROVIDE 3/4-INCH CHAMFER ON ALL EXPOSED CORNERS UNLESS OTHERWISE INDICATED ON THE DRAWINGS. MINIMUM CLEARANCES FOR REINFORCING STEEL SHALL BE MAINTAINED AS SPECIFIED BY ACI.
10. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:
    3" .... CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.
    2" .... CONCRETE EXPOSED TO EARTH OR WEATHER, #6 THROUGH #18 BARS.
    1-1/2" .... CONCRETE EXPOSED TO EARTH OR WEATHER, #5 BAR AND SMALLER.
11. FOOTING BARS SHALL BE BENT 1'-6" AROUND CORNERS, OR PROVIDE CORNER BARS WITH A 2'-0" LAP ON EACH LEG.
12. TESTING LABORATORY SHALL SUBMIT ONE COPY OF ALL CONCRETE TEST REPORTS DIRECTLY TO THE ENGINEER.
13. CONTRACTOR SHALL KEEP A COPY OF "FIELD REFERENCE MANUAL" (ACI PUBLICATION SP-15, LATEST EDITION) AT THE PROJECT FIELD OFFICE.
14. FLY ASH SHALL BE PERMITTED. FLY ASH CONTENT SHALL BE A MAXIMUM OF 25% OF CEMENT WEIGHT

H. TOUCH UP OF GALVANIZING

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

I. 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.

J. 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. **(ENGINEER-OF-RECORD) 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".

NOTE: RECORD DRAWING WAS PREPARED BASED ON THE INFORMATION AND 'AS-BUILT' DOCUMENTATION RECEIVED FROM AEROSOLUTIONS' QUALITY CONTROL INSPECTOR. AEROSOLUTIONS HAS CERTIFIED THAT ALL INSTRUCTIONS AND SPECIFICATIONS WERE COMPLETED AS LISTED ABOVE.

RECORD DRAWING

This strengthening project utilizes the ***AeroForce™*** Upgrade System

STATE OF CONNECTICUT
JOSEPH PACHECO ... JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER
FEB 1 1 2009

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
BU 876377; HORTON 2 / FREDSALL PROPERTY; COLEBROOK, CT

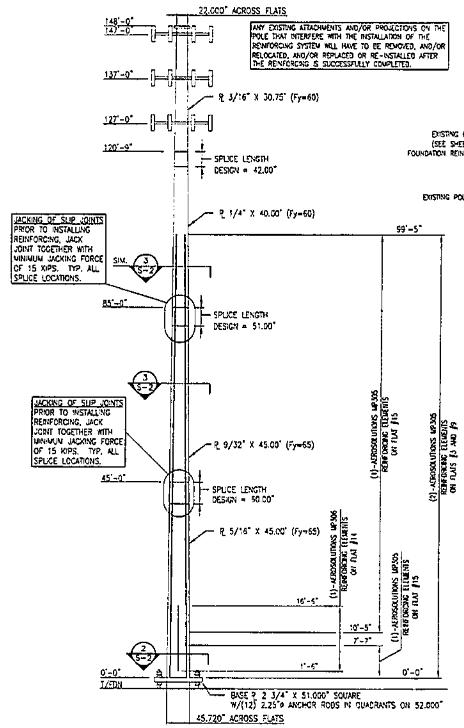
AeroSolutions LLC
Tower Upgrades and Maintenance
1909 13TH STREET, SUITE 250, BOULDER, COLORADO 80302
Tel: 702.304.6862 Fax: 702.304.6863 www.AeroSolutionsLLC.com

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street Suite 1500 Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

Job No.	41708-0177
Date:	02-11-2009
Scale:	N.T.S.
Designed By:	M.C.L.
Drawn By:	D.T.G.
Checked By:	[illegible]
Sheet No.	S-1

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

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37508-0010_RP), DATED 02-11-2009.



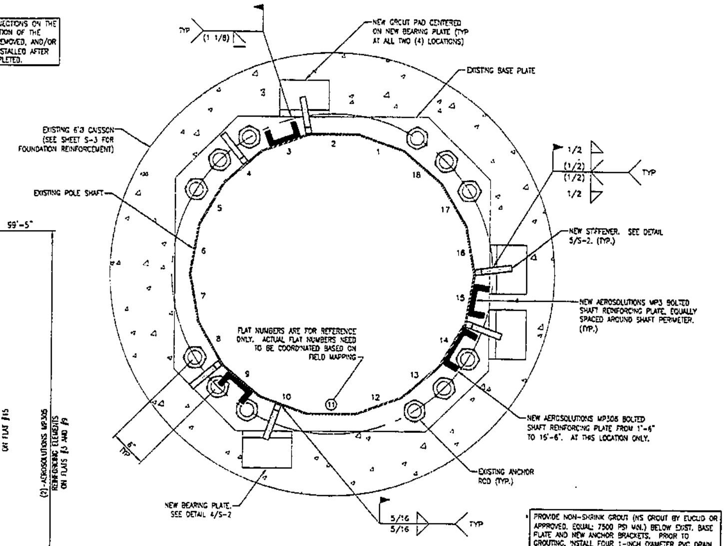
MONOPOLE ELEVATION (1/S-2)
SCALE: NTS

LOAD CASES		
CASE 1	80 MPH WITH NO ICE	DESIGN WIND
CASE 2	69 MPH WITH 1/2" RADIAL ICE	REDUCED WIND WITH ICE
CASE 3	50 MPH WITH NO ICE	OPERATIONAL WIND

POLE SPECIFICATIONS	
Pole Shape Type:	18-SIDED POLYGON
Taper:	0.168843 IN/FT
Shaft Steel:	ASTM A607 GRADE 60, 65
Base PL Steel:	ASTM A572 GRADE 55 (55 KSI)
Anchor Rods:	2 1/4"Ø #18J ASTM A615 GRADE 75

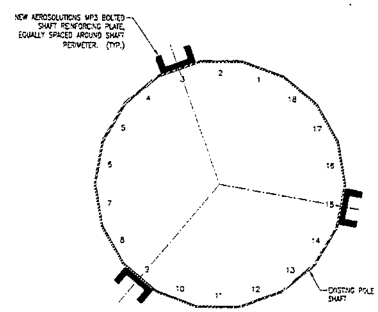
Shaft Section	Section Length (feet)	Plate Thickness (in.)	Lap Splice (in.)	Diameter Across Flats (inches) @ Top	Diameter Across Flats (inches) @ Bottom
1	30.75	0.1875	42.00	22.000	27.227
2	40.00	0.2500	51.00	26.257	33.056
3	45.00	0.2813	60.00	31.834	39.483
4	45.00	0.3125		38.071	45.720

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

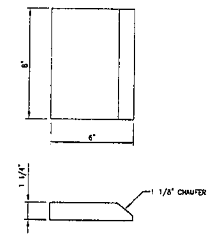


BASE PLATE PLAN (2/S-2)

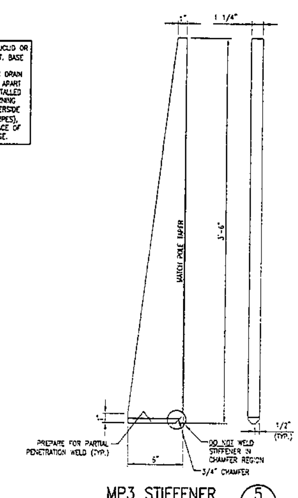
PROVIDE NON-SHRINK GROUT (NS GROUT BY EUCLID OR APPROVED. EQUAL: 7500 PSI MIN.) BELOW EXIST. BASE PLATE AND NEW ANCHOR BRACKETS. PRIOR TO GROUTING, INSTALL FOUR 1-INCH DIAMETER PVC DRAIN PIPES AT APPROXIMATELY NINETY (90) DEGREES APART THROUGH GROUT SPACE. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.



SHAFT PLAN (3/S-2)

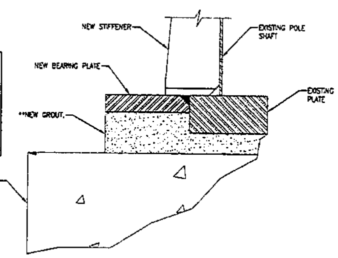


NEW BEARING PLATE (4/S-2)
(Fy = 65) (TYP. AT 4 LOCATIONS)



MP3 STIFFENER (5/S-2)
(Fy = 65) (TYP. AT 4 LOCATIONS)

** PROVIDE NON-SHRINK GROUT (NS GROUT BY EUCLID OR APPROVED. EQUAL: 7500 PSI MIN.) BELOW EXIST. BASE PLATE AND NEW ANCHOR BRACKETS. PRIOR TO GROUTING, INSTALL FOUR 1-INCH DIAMETER PVC DRAIN PIPES AT APPROXIMATELY NINETY (90) DEGREES APART THROUGH GROUT SPACE. 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 UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.



NEW BEARING PLATE DETAIL (6/S-2)
(TYP. AT 4 LOCATIONS)

STATE OF CONNECTICUT — LICENSED PROFESSIONAL ENGINEER — No. 22731

FEB 1 1 2009

RECORD DRAWING

This strengthening project utilizes the *AeroForce*™ Upgrade System

The AeroForce™ System, is proprietary to, and a trademark of AeroSolutions, LLC. Patents pending. Reproduction and/or distribution of these drawings is strictly not allowed without the express written permission of Aero Solutions, LLC. These drawings are authorized to be used only for this site-specific project.

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
BU 876377; HORTON 2 / FREDSALL PROPERTY; COLEBROOK, CT

AeroSolutions LLC
1955 13TH STREET, SUITE 250, BOULDER, COLORADO 80302

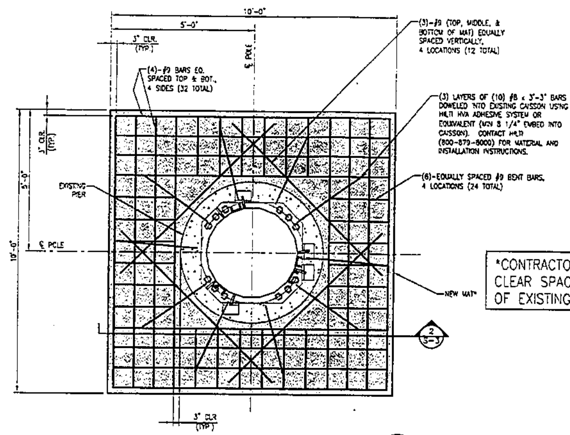
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

Job No. 41708-0177
Date 02-11-2009
Scale N.T.S.

Sheet No. S-2

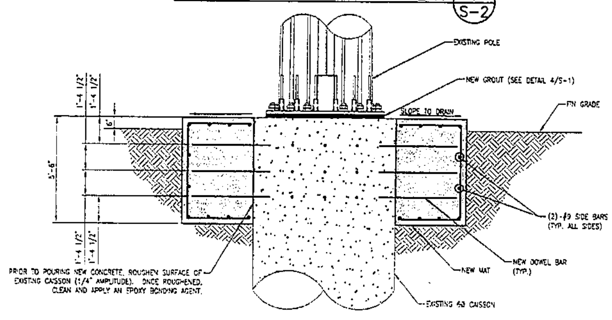
NOTE: NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND AEROSOLUTIONS FIELD PERSONNEL IMMEDIATELY.

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37508-0010_RP), DATED 02-11-2009.



*CONTRACTOR SHALL VERIFY THE ACCESSIBILITY AND CLEAR SPACE AVAILABLE FOR THE UPGRADE. RELOCATION OF EXISTING STEPS MAY BE REQUIRED.

FOUNDATION REINFORCING PLAN 1/S-2



PARTIAL ELEVATION 2/S-2

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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
BU 876377; HORTON 2 / FREDSALL PROPERTY; COLEBROOK, CT

AeroSolutions LLC

PAUL J. FORD AND COMPANY STRUCTURAL ENGINEERS

Date: 02-11-2009

Scale: N.T.S.

S-3

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

February 11, 2009

John Eigenbrode
Crown Castle International
9105 Monroe Rd.
Charlotte, NC 28270
(704) 321-3816

Modified Structure is Adequate
Modified Monopole is Adequate
Modified Foundation is Adequate

Subject: Post-Construction Structural Analysis Report of Existing 148-Ft Monopole with new modifications

Carrier Designation	**Verizon Wireless Co-Locate**	
	Carrier Site Number:	**N/A**
	Carrier Site Name:	**Colebrook SW**
Crown Castle Designation	**Crown Castle BU Number:**	**876377**
	Crown Castle Site Name:	**Horton 2 / Fredsall Property**
	Crown Castle JDE Job Number:	**98242**
	Crown Castle Application Number:	**55996 Rev#2**
Engineering Firm Designation	**Paul J. Ford and Company**	**41708-0177_Record**
Site Data	**116 Pinney St., Colebrook, Litchfield County, CT** **Latitude 41° 57' 58.57", Longitude -73° 7' 19.65"**	

Dear John Eigenbrode,

Paul J. Ford and Company is pleased to submit this "Post-Construction Structural Analysis Report" to determine the structural adequacy of the above reinforced monopole. This analysis has been performed in accordance with the Crown Castle Structural "Statement of Work", the terms of the Purchase Order, and the TIA/EIA-222-F Standard for the following Basic Wind Speeds: 80 mph without ice, 69 mph with 0.5" radial ice, and 50 mph (Operational) without ice.

The monopole was analyzed with the addition of the proposed antenna loading shown in the table below combined with the existing and reserved loading on the structure:

Elevation - ft	Count	Antenna Description
127	6	Antel LPA-80080/6CF w/mount pipe
	6	Antel LPA-185080/12CFx2 w/ Mount Pipe
126	1	14' LP Platform

The modifications to the monopole shaft and foundation are now complete. Based on our analysis, we have determined that with completed modifications the monopole and foundation will have sufficient capacity to support the existing, reserved, and proposed loading. Additional modifications are not required at this time.

Respectfully submitted,

Maria C. Lopez
Project Engineer
mclopez@pjfweb.com

STATE OF CONNECTICUT
JOSEPH ANTHONY JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER
FEB 11 2009

TABLE OF CONTENTS

INTRODUCTION

At the request of Crown Castle International, Paul J. Ford and Company has analyzed the reinforced monopole at the Horton 2 / Fredsall Property site located in Colebrook, Litchfield County, CT. This structural analysis has been performed in accordance with the TIA/EIA-222-F-1996 Standard, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures" to determine if the monopole structure has adequate capacity to support the existing, reserved, and proposed antenna loading.

ANALYSIS CRITERIA

The reinforced monopole has been analyzed for the antenna and coax loading listed in Tables 1A, 1B, 2A, and 2B below. The monopole has been analyzed in accordance with the TIA/EIA-222-F-1996 Standard for the following fastest-mile Basic Wind Speeds: 80 mph without ice, 69 with 0.5" radial ice, and 50 mph without ice as recommended for Litchfield County, CT.

Table 1A - Proposed Antenna Information

Elevation - ft	Count	Antenna Description	Status
127	6	Antel LPA-80080/6CF w/mount pipe	Proposed
	6	Antel LPA-185080/12CFx2 w/ Mount Pipe	Proposed
126	1	14' LP Platform	Proposed

Table 1B - Proposed Cable Information

Elevation - ft	Count	Cable Description	Location	Status
126 - 0	12	LDF7-50A (1-5/8 FOAM)	Internal	Proposed

Table 2A - Existing and Reserved Antenna Information

Elevation - ft	Count	Antenna Description	Status
148*	9	FV65-14-00NA2 w/Mount Pipe	MLA
	1	Generic 12' LP Platform	
140	9	DUO1417-8686 w/Mount Pipe	Existing
	3	CSS DBC-750	Existing
	6	ADC DD1900 Full Band Masthead	Existing
	3	DUO1417-8686 w/Mount Pipe	Existing
	3	12' T-Arm Mounts	Reserved
127	3	7221 w/Mount Pipe	Existing
126	3	3' side arms	To be removed
117	12	Antel LPA-185063/12CF w/ Mount Pipe	
	6	TMA	
	1	Generic 12' LP Platform	
102	1	KS24019-L112A	
100	1	MTS 24" Stand-Off Bracket (1)	Existing
			Existing

* MLA antenna loading controls design. Existing antenna loading consists of (6) DB980H90E-M.

Table 2B - Existing and Reserved Cable Information

Elevation - ft	Count	Cable Description	Location	Status
147 – 0*	9	1-5/8	Internal	MLA
140 - 0	9	1-5/8	Internal	Existing
	3	1-5/8	Internal	Reserved
126 - 0	6	1-5/8	Internal	To be removed
117 - 0	12	1-5/8	Internal	
100 - 0	1	1/2	Internal	Existing
8 - 0	1	1/2	Internal	Existing

* MLA coax loading controls design. Existing coax loading consists of (6) 1-5/8".

Information for the existing monopole and foundation is based on the available drawings, documents, and/or information listed in Table 3 below.

Table 3 - Reference Documents Provided

Document	Source	Reference	Remarks
Proposed Antenna Loading	Crown Castle	BU#876377	
Existing Antenna Loading	Crown Castle	BU#876377	
Original Tower Drawings	Crown Castle	1883532	Summit/PJF, 11163/29200-1364, 09/11/00
Foundation Drawings	Crown Castle	1629428	Summit/PJF, 11163/29200-1364, 09/11/00
Geotechnical Report	Crown Castle	1532992	SEA Consultants, 99674.03-A, 09/05/00
Structural Analysis	Crown Castle		PJF, 37508-0010_BP-R1, 07/24/08

ANALYSIS PROCEDURE

ANALYSIS METHODS

RISA Tower (Version 5.3.1.0), a commercially available software program, was used to create a three-dimensional model of the monopole and calculate member stresses for various dead, live, wind, and ice load cases. The analysis was performed in accordance with the TIA/EIA-222-F Standard. Selected output from the analysis is included in Appendix A.

ASSUMPTIONS

1. Monopole was fabricated and installed in accordance with the manufacturer's specifications.
2. Monopole has been properly maintained in accordance with manufacturer's specifications.
3. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1A, 1B, 2A, and 2B and the referenced drawings.

If any of the above assumptions are not valid or have been made in error, then the results of this analysis may be affected. In that case, please notify Paul J. Ford and Company immediately so that we can review any new and/or modified information and determine its affect on the analysis results regarding the structural adequacy of the monopole and foundation.

ANALYSIS RESULTS

The specified modifications to the existing monopole structure and foundation are now complete; our structural analysis indicates that the reinforced monopole and foundation will have sufficient capacity to adequately support the existing, reserved, and proposed loading.

Table 4 - Component Stresses vs. Capacity (for Reinforced Condition)

Notes	Component	Elevation ft	% Capacity	Pass / Fail
Risa Tower Analysis Summary:				
	L1	148 - 117.25	61.6	Pass
	L2	117.25 - 96	88.8	Pass
Reinforced	L3	96 - 80.75	62.5	Pass
Reinforced	L4	80.75 - 40	83.7	Pass
Reinforced	L5	40 - 8.5	95.2	Pass
Reinforced	L6	8.5 - 0	94.6	Pass
Additional Components:				
	Base Plate	0 - 0	59.6	Pass
	Anchor Rods	0 - 0	97.8	Pass
Reinforced	Foundation (Soil) - PJF Pole	0 - 0	97	Pass
			Structural Rating (maximum capacity of all components) =	97.8

APPENDIX A

Output From Computer Programs

Tower Input Data

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

4. Tower is located in Litchfield County, Connecticut.
5. Basic wind speed of 80 mph.
6. Nominal ice thickness of 0.5000 in.
7. Ice density of 56 pcf.
8. A wind speed of 69 mph is used in combination with ice.
9. Deflections calculated using a wind speed of 50 mph.
10. A non-linear (P-delta) analysis was used.
11. Pressures are calculated at each section.
12. Stress ratio used in pole design is 1.333.
13. Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	148.00-117.25	30.75	3.50	18	22.0000	27.2270	0.1875	0.7500	A607-60 (60 ksi)
L2	117.25-96.00	24.75	0.00	18	26.2571	30.4640	0.2500	1.0000	A607-60 (60 ksi)
L3	96.00-80.75	15.25	4.25	18	30.4640	33.0560	0.4271	1.7084	(58 ksi)
L4	80.75-40.00	45.00	5.00	18	31.4795	39.4830	0.4269	1.7077	(58 ksi)
L5	40.00-8.50	36.50	0.00	18	37.7399	44.2750	0.4253	1.7010	(58 ksi)
L6	8.50-0.00	8.50		18	44.2750	45.7200	0.4340	1.7361	(58 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	27.6470	16.0919	1486.4203	9.5990	13.8313	107.4677	2974.7964	8.0475	4.4620	23.797
L2	27.2662	20.6366	1763.4291	9.2325	13.3386	132.2051	3529.1786	10.3203	4.1812	16.725
	30.9340	23.9748	2765.0886	10.7260	15.4757	178.6728	5533.8156	11.9897	4.9217	19.687
L3	30.9340	40.7178	4641.2232	10.6631	15.4757	299.9037	9288.5535	20.3628	4.6100	10.794
	33.5659	44.2315	5949.4169	11.5833	16.7924	354.2912	11906.6622	22.1200	5.0662	11.862
L4	32.7326	42.0776	5126.0514	11.0236	15.9916	320.5473	10258.8478	21.0428	4.7890	11.218
	40.0921	52.9228	10199.0052	13.8649	20.0574	508.4918	20411.4305	26.4664	6.1976	14.517
L5	39.2311	50.3652	8859.8413	13.2467	19.1719	462.1275	17731.3405	25.1874	5.8938	13.86
	44.9580	59.1859	14377.7213	15.5667	22.4917	639.2456	28774.3611	29.5986	7.0440	16.564

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L6	44.9580	60.3962	14665.8587	15.5635	22.4917	652.0565	29351.0152	30.2039	7.0285	16.193
	46.4253	62.3869	16164.3431	16.0765	23.2258	695.9662	32349.9557	31.1994	7.2828	16.779

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 148.00-117.25				1	1	1		
L2 117.25-96.00				1	1	1		
L3 96.00-80.75				1	1	1		
L4 80.75-40.00				1	1	1		
L5 40.00-8.50				1	1	1		
L6 8.50-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM) (MLA) **	C	No	Inside Pole	147.00 - 0.00	9	No Ice 1/2" Ice	0.00 0.00	0.82 0.82
LDF7-50A (1-5/8 FOAM) (E)	C	No	Inside Pole	140.00 - 0.00	9	No Ice 1/2" Ice	0.00 0.00	0.82 0.82
LDF7-50A (1-5/8 FOAM) (R) ** **	C	No	Inside Pole	140.00 - 0.00	3	No Ice 1/2" Ice	0.00 0.00	0.82 0.82
LDF7-50A (1-5/8 FOAM) (P) **	C	No	Inside Pole	126.00 - 0.00	12	No Ice 1/2" Ice	0.00 0.00	0.82 0.82
LDF4-50A (1/2" foam) (E) **	C	No	Inside Pole	100.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00	0.15 0.15
LDF4-50A (1/2" foam) (E) **	C	No	Inside Pole	8.33 - 0.00	1	No Ice 1/2" Ice	0.00 0.00	0.15 0.15
Aero MP3-05	C	No	CaAa (Out Of Face)	100.00 - 0.00	1	No Ice 1/2" Ice	0.35 0.40	19.22 20.97

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.00-117.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	117.25-96.00	A	0.000	0.000	0.000	0.000	0.53
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L3	96.00-80.75	A	0.000	0.000	0.000	1.391	0.65
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L4	80.75-40.00	A	0.000	0.000	0.000	5.304	0.71
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L5	40.00-8.50	A	0.000	0.000	0.000	14.173	1.89
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L6	8.50-0.00	A	0.000	0.000	0.000	10.956	1.46
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
						2.956	0.40

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.00-117.25	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	117.25-96.00	A	0.500	0.000	0.000	0.000	0.000	0.53
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L3	96.00-80.75	A	0.500	0.000	0.000	0.000	1.600	0.66
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L4	80.75-40.00	A	0.500	0.000	0.000	0.000	6.101	0.73
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L5	40.00-8.50	A	0.500	0.000	0.000	0.000	16.303	1.96
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L6	8.50-0.00	A	0.500	0.000	0.000	0.000	12.603	1.52
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
							3.401	0.41

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.00-117.25	0.0000	0.0000	0.0000	0.0000
L2	117.25-96.00	-0.0870	0.0502	-0.0964	0.0557
L3	96.00-80.75	-0.3993	0.2306	-0.4395	0.2537
L4	80.75-40.00	-0.4047	0.2337	-0.4474	0.2583
L5	40.00-8.50	-0.4105	0.2370	-0.4559	0.2632
L6	8.50-0.00	-0.4135	0.2387	-0.4604	0.2658

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**									
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	A	From Face	2.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	B	From Face	2.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	C	From Face	2.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
*									
*									
**									
14' LP Platform (E)	C	None		0.0000	148.00	No Ice 1/2" Ice	25.24 28.60	25.24 28.60	1.80 2.00
**									
(3) DUO1417-8686 w/Mount Pipe (E)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
(3) DUO1417-8686 w/Mount Pipe (E)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
(3) DUO1417-8686 w/Mount Pipe (E)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
CSS DBC-750 (E)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.51 0.60	0.10 0.16	0.01 0.01
CSS DBC-750 (E)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.51 0.60	0.10 0.16	0.01 0.01
CSS DBC-750 (E)	C	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.51 0.60	0.10 0.16	0.01 0.01
(2) ADC DD1900 Full Band Masthead (E)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.29 1.44	0.32 0.42	0.02 0.02
(2) ADC DD1900 Full Band Masthead (E)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.29 1.44	0.32 0.42	0.02 0.02
(2) ADC DD1900 Full Band Masthead (E)	C	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.29 1.44	0.32 0.42	0.02 0.02
DUO1417-8686 w/Mount Pipe (R)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
DUO1417-8686 w/Mount Pipe (R)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
DUO1417-8686 w/Mount Pipe (R)	C	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
14' T-Arm Mounts (3) (E)	A	From Face	2.00 0.00	0.0000	140.00	No Ice 1/2"	12.00 15.00	12.00 15.00	0.85 1.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**			0.00			Ice			
**									
(2) Antel LPA-80080/6CF w/mount pipe (P)	A	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	4.47 4.95	10.93 11.93	0.06 0.12
(2) Antel LPA-80080/6CF w/mount pipe (P)	B	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	4.47 4.95	10.93 11.93	0.06 0.12
(2) Antel LPA-80080/6CF w/mount pipe (P)	C	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	4.47 4.95	10.93 11.93	0.06 0.12
(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	A	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	3.67 4.15	6.11 7.17	0.03 0.08
(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	B	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	3.67 4.15	6.11 7.17	0.03 0.08
(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	C	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	3.67 4.15	6.11 7.17	0.03 0.08
14' LP Platform (P)	C	None		0.0000	126.00	No Ice 1/2" Ice	25.24 28.60	25.24 28.60	1.80 2.00
**									
**									
KS24019-L112A (E)	C	From Face	1.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice	0.10 0.18	0.10 0.18	0.01 0.01
MTS 24" Stand-Off Bracket (1) (E)	C	None		0.0000	100.00	No Ice 1/2" Ice	0.63 1.00	0.94 1.45	0.02 0.03

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.00-117.25	132.21	1.487	24	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.25-96.00	106.40	1.397	23	50.749	A	0.000	50.749	50.749	100.00	0.000	0.000
					B	0.000	50.749		100.00	0.000	0.000
					C	0.000	50.749		100.00	0.000	1.391
L3 96.00-80.75	88.27	1.325	22	40.362	A	0.000	40.362	40.362	100.00	0.000	0.000
					B	0.000	40.362		100.00	0.000	0.000
					C	0.000	40.362		100.00	0.000	5.304
L4 80.75-40.00	60.18	1.187	19	121.772	A	0.000	121.772	121.772	100.00	0.000	0.000
					B	0.000	121.772		100.00	0.000	0.000

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L5 40.00-8.50	23.89	1	16	108.820	C	0.000	121.772		100.00	0.000	14.173
					A	0.000	108.820	108.820	100.00	0.000	0.000
					B	0.000	108.820		100.00	0.000	0.000
L6 8.50-0.00	4.23	1	16	31.873	C	0.000	108.820		100.00	0.000	10.956
					A	0.000	31.873	31.873	100.00	0.000	0.000
					B	0.000	31.873		100.00	0.000	0.000
					C	0.000	31.873		100.00	0.000	2.956

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.00-117.25	132.21	1.487	18	0.5000	65.635	A	0.000	65.635	65.635	100.00	0.000	0.000
						B	0.000	65.635		100.00	0.000	0.000
						C	0.000	65.635		100.00	0.000	0.000
L2 117.25-96.00	106.40	1.397	17	0.5000	52.519	A	0.000	52.519	52.519	100.00	0.000	0.000
						B	0.000	52.519		100.00	0.000	0.000
						C	0.000	52.519		100.00	0.000	1.600
L3 96.00-80.75	88.27	1.325	16	0.5000	41.633	A	0.000	41.633	41.633	100.00	0.000	0.000
						B	0.000	41.633		100.00	0.000	0.000
						C	0.000	41.633		100.00	0.000	6.101
L4 80.75-40.00	60.18	1.187	15	0.5000	125.168	A	0.000	125.168	125.168	100.00	0.000	0.000
						B	0.000	125.168		100.00	0.000	0.000
						C	0.000	125.168		100.00	0.000	16.303
L5 40.00-8.50	23.89	1	12	0.5000	111.445	A	0.000	111.445	111.445	100.00	0.000	0.000
						B	0.000	111.445		100.00	0.000	0.000
						C	0.000	111.445		100.00	0.000	12.603
L6 8.50-0.00	4.23	1	12	0.5000	32.582	A	0.000	32.582	32.582	100.00	0.000	0.000
						B	0.000	32.582		100.00	0.000	0.000
						C	0.000	32.582		100.00	0.000	3.401

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.00-117.25	132.21	1.487	10	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.25-96.00	106.40	1.397	9	50.749	A	0.000	50.749	50.749	100.00	0.000	0.000
					B	0.000	50.749		100.00	0.000	0.000
					C	0.000	50.749		100.00	0.000	1.391
L3 96.00-80.75	88.27	1.325	8	40.362	A	0.000	40.362	40.362	100.00	0.000	0.000
					B	0.000	40.362		100.00	0.000	0.000
					C	0.000	40.362		100.00	0.000	5.304
L4 80.75-40.00	60.18	1.187	8	121.772	A	0.000	121.772	121.772	100.00	0.000	0.000
					B	0.000	121.772		100.00	0.000	0.000
					C	0.000	121.772		100.00	0.000	14.173
L5 40.00-8.50	23.89	1	6	108.820	A	0.000	108.820	108.820	100.00	0.000	0.000
					B	0.000	108.820		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L6 8.50-0.00	4.23	1	6	31.873	C	0.000	108.820	31.873	100.00	0.000	10.956
					A	0.000	31.873		100.00	0.000	0.000
					B	0.000	31.873		100.00	0.000	0.000
					C	0.000	31.873		100.00	0.000	2.956

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 117.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-11.01	2.10	3.10
			Max. Mx	11	-6.70	248.82	0.19
			Max. My	2	-6.75	0.37	243.76
			Max. Vy	11	-14.51	248.82	0.19
			Max. Vx	2	-14.24	0.37	243.76

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L2	117.25 - 96	Pole	Max. Torque	5			3.91
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.28	2.27	3.10
			Max. Mx	11	-9.71	627.82	-1.68
			Max. My	2	-9.75	-1.48	615.88
			Max. Vy	11	-16.13	627.82	-1.68
			Max. Vx	2	-15.86	-1.48	615.88
L3	96 - 80.75	Pole	Max. Torque	5			3.91
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-16.60	2.56	2.97
			Max. Mx	11	-11.86	810.32	-2.65
			Max. My	2	-11.89	-2.09	794.99
			Max. Vy	11	-17.02	810.32	-2.65
			Max. Vx	2	-16.74	-2.09	794.99
L4	80.75 - 40	Pole	Max. Torque	5			3.88
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.42	3.72	2.40
			Max. Mx	11	-21.13	1553.17	-6.29
			Max. My	2	-21.15	-4.22	1525.31
			Max. Vy	11	-19.97	1553.17	-6.29
			Max. Vx	2	-19.69	-4.22	1525.31
L5	40 - 8.5	Pole	Max. Torque	5			3.86
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-36.81	4.84	1.75
			Max. Mx	11	-31.06	2322.89	-9.71
			Max. My	2	-31.06	-5.99	2283.56
			Max. Vy	11	-22.07	2322.89	-9.71
			Max. Vx	2	-21.81	-5.99	2283.56
L6	8.5 - 0	Pole	Max. Torque	5			3.79
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.23	5.13	1.58
			Max. Mx	11	-33.38	2512.48	-10.51
			Max. My	2	-33.38	-6.36	2470.50
			Max. Vy	11	-22.51	2512.48	-10.51
			Max. Vx	8	22.25	15.59	-2469.52
			Max. Torque	5			3.74

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	39.23	0.04	-18.27
	Max. H_x	11	33.39	22.50	-0.08
	Max. H_z	2	33.39	-0.08	22.24
	Max. M_x	2	2470.50	-0.08	22.24
	Max. M_z	5	2503.31	-22.50	0.08
	Max. Torsion	5	3.73	-22.50	0.08
	Min. Vert	1	33.39	0.00	0.00
	Min. H_x	5	33.39	-22.50	0.08
	Min. H_z	8	33.39	0.08	-22.24
	Min. M_x	8	-2469.52	0.08	-22.24
	Min. M_z	11	-2512.48	22.50	-0.08
	Min. Torsion	11	-3.72	22.50	-0.08

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	33.39	-0.00	-0.00	-0.50	4.56	-0.00
Dead+Wind 0 deg - No Ice	33.39	0.08	-22.24	-2470.50	-6.36	0.43
Dead+Wind 30 deg - No Ice	33.39	11.31	-19.30	-2145.02	-1258.90	-1.49
Dead+Wind 60 deg - No Ice	33.39	19.52	-11.18	-1244.92	-2172.81	-3.01
Dead+Wind 90 deg - No Ice	33.39	22.50	-0.08	-11.44	-2503.31	-3.73
Dead+Wind 120 deg - No Ice	33.39	19.45	11.05	1225.00	-2161.88	-3.44
Dead+Wind 150 deg - No Ice	33.39	11.18	19.22	2133.13	-1239.90	-2.24
Dead+Wind 180 deg - No Ice	33.39	-0.08	22.24	2469.52	15.59	-0.43
Dead+Wind 210 deg - No Ice	33.39	-11.31	19.30	2144.02	1268.09	1.49
Dead+Wind 240 deg - No Ice	33.39	-19.52	11.18	1243.96	2181.97	3.01
Dead+Wind 270 deg - No Ice	33.39	-22.50	0.08	10.51	2512.48	3.72
Dead+Wind 300 deg - No Ice	33.39	-19.45	-11.05	-1225.92	2171.08	3.44
Dead+Wind 330 deg - No Ice	33.39	-11.18	-19.22	-2134.08	1249.13	2.23
Dead+Ice	39.23	-0.00	-0.00	-1.58	5.13	-0.00
Dead+Wind 0 deg+Ice	39.23	0.04	-18.27	-2083.49	-0.84	0.34
Dead+Wind 30 deg+Ice	39.23	9.24	-15.84	-1807.56	-1051.43	-1.37
Dead+Wind 60 deg+Ice	39.23	15.96	-9.17	-1047.72	-1818.87	-2.71
Dead+Wind 90 deg+Ice	39.23	18.41	-0.04	-7.59	-2097.57	-3.33
Dead+Wind 120 deg+Ice	39.23	15.92	9.10	1034.17	-1812.85	-3.05
Dead+Wind 150 deg+Ice	39.23	9.17	15.80	1798.41	-1040.98	-1.96
Dead+Wind 180 deg+Ice	39.23	-0.04	18.27	2080.31	11.22	-0.34
Dead+Wind 210 deg+Ice	39.23	-9.24	15.84	1804.39	1061.78	1.37
Dead+Wind 240 deg+Ice	39.23	-15.96	9.17	1044.57	1829.20	2.71
Dead+Wind 270 deg+Ice	39.23	-18.41	0.04	4.47	2107.90	3.32
Dead+Wind 300 deg+Ice	39.23	-15.92	-9.10	-1037.27	1823.22	3.05
Dead+Wind 330 deg+Ice	39.23	-9.17	-15.80	-1801.54	1051.37	1.95
Dead+Wind 0 deg - Service	33.39	0.03	-8.69	-966.75	0.33	0.17
Dead+Wind 30 deg - Service	33.39	4.42	-7.54	-839.45	-489.66	-0.59
Dead+Wind 60 deg - Service	33.39	7.63	-4.37	-487.35	-847.20	-1.19
Dead+Wind 90 deg - Service	33.39	8.79	-0.03	-4.81	-976.49	-1.47
Dead+Wind 120 deg - Service	33.39	7.60	4.32	478.89	-842.90	-1.36
Dead+Wind 150 deg - Service	33.39	4.37	7.51	834.13	-482.21	-0.88
Dead+Wind 180 deg - Service	33.39	-0.03	8.69	965.72	8.92	-0.17
Dead+Wind 210 deg - Service	33.39	-4.42	7.54	838.42	498.90	0.59
Dead+Wind 240 deg - Service	33.39	-7.63	4.37	486.32	856.44	1.19
Dead+Wind 270 deg - Service	33.39	-8.79	0.03	3.79	985.73	1.47
Dead+Wind 300 deg - Service	33.39	-7.60	-4.32	-479.91	852.15	1.36
Dead+Wind 330 deg - Service	33.39	-4.37	-7.51	-835.15	491.47	0.88

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-33.39	0.00	0.00	33.39	0.00	0.000%
2	0.08	-33.39	-22.24	-0.08	33.39	22.24	0.000%
3	11.31	-33.39	-19.30	-11.31	33.39	19.30	0.000%
4	19.52	-33.39	-11.18	-19.52	33.39	11.18	0.000%
5	22.50	-33.39	-0.08	-22.50	33.39	0.08	0.000%
6	19.45	-33.39	11.05	-19.45	33.39	-11.05	0.000%
7	11.18	-33.39	19.22	-11.18	33.39	-19.22	0.000%
8	-0.08	-33.39	22.24	0.08	33.39	-22.24	0.000%
9	-11.31	-33.39	19.30	11.31	33.39	-19.30	0.000%
10	-19.52	-33.39	11.18	19.52	33.39	-11.18	0.000%
11	-22.50	-33.39	0.08	22.50	33.39	-0.08	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
12	-19.45	-33.39	-11.05	19.45	33.39	11.05	0.000%
13	-11.18	-33.39	-19.22	11.18	33.39	19.22	0.000%
14	0.00	-39.23	0.00	0.00	39.23	0.00	0.000%
15	0.04	-39.23	-18.27	-0.04	39.23	18.27	0.000%
16	9.24	-39.23	-15.84	-9.24	39.23	15.84	0.000%
17	15.96	-39.23	-9.17	-15.96	39.23	9.17	0.000%
18	18.41	-39.23	-0.04	-18.41	39.23	0.04	0.000%
19	15.92	-39.23	9.10	-15.92	39.23	-9.10	0.000%
20	9.17	-39.23	15.80	-9.17	39.23	-15.80	0.000%
21	-0.04	-39.23	18.27	0.04	39.23	-18.27	0.000%
22	-9.24	-39.23	15.84	9.24	39.23	-15.84	0.000%
23	-15.96	-39.23	9.17	15.96	39.23	-9.17	0.000%
24	-18.41	-39.23	0.04	18.41	39.23	-0.04	0.000%
25	-15.92	-39.23	-9.10	15.92	39.23	9.10	0.000%
26	-9.17	-39.23	-15.80	9.17	39.23	15.80	0.000%
27	0.03	-33.39	-8.69	-0.03	33.39	8.69	0.000%
28	4.42	-33.39	-7.54	-4.42	33.39	7.54	0.000%
29	7.63	-33.39	-4.37	-7.63	33.39	4.37	0.000%
30	8.79	-33.39	-0.03	-8.79	33.39	0.03	0.000%
31	7.60	-33.39	4.32	-7.60	33.39	-4.32	0.000%
32	4.37	-33.39	7.51	-4.37	33.39	-7.51	0.000%
33	-0.03	-33.39	8.69	0.03	33.39	-8.69	0.000%
34	-4.42	-33.39	7.54	4.42	33.39	-7.54	0.000%
35	-7.63	-33.39	4.37	7.63	33.39	-4.37	0.000%
36	-8.79	-33.39	0.03	8.79	33.39	-0.03	0.000%
37	-7.60	-33.39	-4.32	7.60	33.39	4.32	0.000%
38	-4.37	-33.39	-7.51	4.37	33.39	7.51	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00007039
3	Yes	6	0.00000001	0.00009796
4	Yes	6	0.00000001	0.00010878
5	Yes	5	0.00000001	0.00037838
6	Yes	6	0.00000001	0.00009208
7	Yes	6	0.00000001	0.00010512
8	Yes	4	0.00000001	0.00047396
9	Yes	6	0.00000001	0.00010457
10	Yes	6	0.00000001	0.00009520
11	Yes	5	0.00000001	0.00031893
12	Yes	6	0.00000001	0.00010940
13	Yes	6	0.00000001	0.00009495
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00009064
16	Yes	6	0.00000001	0.00020274
17	Yes	6	0.00000001	0.00022715
18	Yes	5	0.00000001	0.00064099
19	Yes	6	0.00000001	0.00019017
20	Yes	6	0.00000001	0.00021773
21	Yes	4	0.00000001	0.00095207
22	Yes	6	0.00000001	0.00021768
23	Yes	6	0.00000001	0.00019704
24	Yes	5	0.00000001	0.00058880
25	Yes	6	0.00000001	0.00022969
26	Yes	6	0.00000001	0.00019826
27	Yes	4	0.00000001	0.00030723
28	Yes	5	0.00000001	0.00024314
29	Yes	5	0.00000001	0.00029705

30	Yes	5	0.00000001	0.00008781
31	Yes	5	0.00000001	0.00021959
32	Yes	5	0.00000001	0.00027527
33	Yes	4	0.00000001	0.00022032
34	Yes	5	0.00000001	0.00027556
35	Yes	5	0.00000001	0.00023510
36	Yes	5	0.00000001	0.00008314
37	Yes	5	0.00000001	0.00030611
38	Yes	5	0.00000001	0.00023607

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	40.446	36	2.4184	0.0210
L2	120.75 - 96	27.126	36	2.1571	0.0118
L3	96 - 80.75	17.098	36	1.6517	0.0061
L4	85 - 40	13.490	36	1.4781	0.0049
L5	45 - 8.5	3.841	36	0.7872	0.0019
L6	8.5 - 0	0.132	36	0.1489	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	(3) FV65-14-00NA2 w/Mount Pipe	36	40.446	2.4184	0.0210	17700
140.00	(3) DUO1417-8686 w/Mount Pipe	36	36.412	2.3677	0.0182	11062
127.00	(2) Antel LPA-80080/6CF w/mount pipe	36	30.037	2.2474	0.0138	4213
126.00	14' LP Platform	36	29.563	2.2347	0.0134	4022
102.00	KS24019-L112A	36	19.287	1.7705	0.0071	2690
100.00	MTS 24" Stand-Off Bracket (1)	36	18.539	1.7290	0.0067	2642

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	102.771	11	6.1356	0.0536
L2	120.75 - 96	69.003	11	5.4835	0.0300
L3	96 - 80.75	43.523	11	4.2036	0.0154
L4	85 - 40	34.348	11	3.7628	0.0123
L5	45 - 8.5	9.786	11	2.0055	0.0049
L6	8.5 - 0	0.337	11	0.3795	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
148.00	(3) FV65-14-00NA2 w/Mount Pipe	11	102.771	6.1356	0.0536	7186
140.00	(3) DUO1417-8686 w/Mount Pipe	11	92.550	6.0110	0.0463	4490
127.00	(2) Antel LPA-80080/6CF w/mount pipe	11	76.389	5.7110	0.0350	1708
126.00	14' LP Platform	11	75.187	5.6792	0.0342	1630
102.00	KS24019-L112A	11	49.091	4.5041	0.0180	1072
100.00	MTS 24" Stand-Off Bracket (1)	11	47.188	4.3991	0.0170	1052

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
L1	148 - 117.25 (1)	TP27.227x22x0.1875	30.75	0.00	0.0	36.000	15.7378	-6.70	566.56	0.012
L2	117.25 - 96 (2)	TP30.464x26.2571x0.25	24.75	0.00	0.0	36.000	23.9748	-9.71	863.09	0.011
L3	96 - 80.75 (3)	TP33.056x30.464x0.4271	15.25	0.00	0.0	34.800	43.2523	-11.86	1505.18	0.008
L4	80.75 - 40 (4)	TP39.483x31.4795x0.4269	45.00	0.00	0.0	34.800	51.7178	-21.13	1799.78	0.012
L5	40 - 8.5 (5)	TP44.275x37.7399x0.4253	36.50	0.00	0.0	34.800	59.1859	-31.06	2059.67	0.015
L6	8.5 - 0 (6)	TP45.72x44.275x0.434	8.50	0.00	0.0	34.800	62.3869	-33.38	2171.06	0.015

Pole Bending Design Data

Section No.	Elevation	Size	Actual M_x	Actual f_{bx}	Allow. F_{bx}	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y	Actual f_{by}	Allow. F_{by}	Ratio $\frac{f_{by}}{F_{by}}$
	ft		kip-ft	ksi	ksi		kip-ft	ksi	ksi	
L1	148 - 117.25 (1)	TP27.227x22x0.1875	248.82	29.052	36.000	0.807	0.00	0.000	36.000	0.000
L2	117.25 - 96 (2)	TP30.464x26.2571x0.25	627.82	42.165	36.000	1.171	0.00	0.000	36.000	0.000
L3	96 - 80.75 (3)	TP33.056x30.464x0.4271	810.32	28.711	34.800	0.825	0.00	0.000	34.800	0.000
L4	80.75 - 40 (4)	TP39.483x31.4795x0.426 9	1553.19	38.392	34.800	1.103	0.00	0.000	34.800	0.000
L5	40 - 8.5 (5)	TP44.275x37.7399x0.425 3	2322.91	43.606	34.800	1.253	0.00	0.000	34.800	0.000
L6	8.5 - 0 (6)	TP45.72x44.275x0.434	2512.51	43.321	34.800	1.245	0.00	0.000	34.800	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V	Actual f_v	Allow. F_v	Ratio $\frac{f_v}{F_v}$	Actual T	Actual f_{vt}	Allow. F_{vt}	Ratio $\frac{f_{vt}}{F_{vt}}$
	ft		K	ksi	ksi		kip-ft	ksi	ksi	
L1	148 - 117.25 (1)	TP27.227x22x0.1875	14.51	0.922	24.000	0.077	3.91	0.223	24.000	0.009
L2	117.25 - 96 (2)	TP30.464x26.2571x0.25	16.13	0.673	24.000	0.056	3.88	0.127	24.000	0.005
L3	96 - 80.75 (3)	TP33.056x30.464x0.4271	17.02	0.393	23.200	0.034	3.86	0.066	23.200	0.003

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L4	80.75 - 40 (4)	TP39.483x31.4795x0.4269	19.97	0.386	23.200	0.033	3.80	0.046	23.200	0.002
L5	40 - 8.5 (5)	TP44.275x37.7399x0.4253	22.07	0.373	23.200	0.032	3.74	0.034	23.200	0.001
L6	8.5 - 0 (6)	TP45.72x44.275x0.434	22.51	0.361	23.200	0.031	3.72	0.031	23.200	0.001

Pole Interaction Design Data

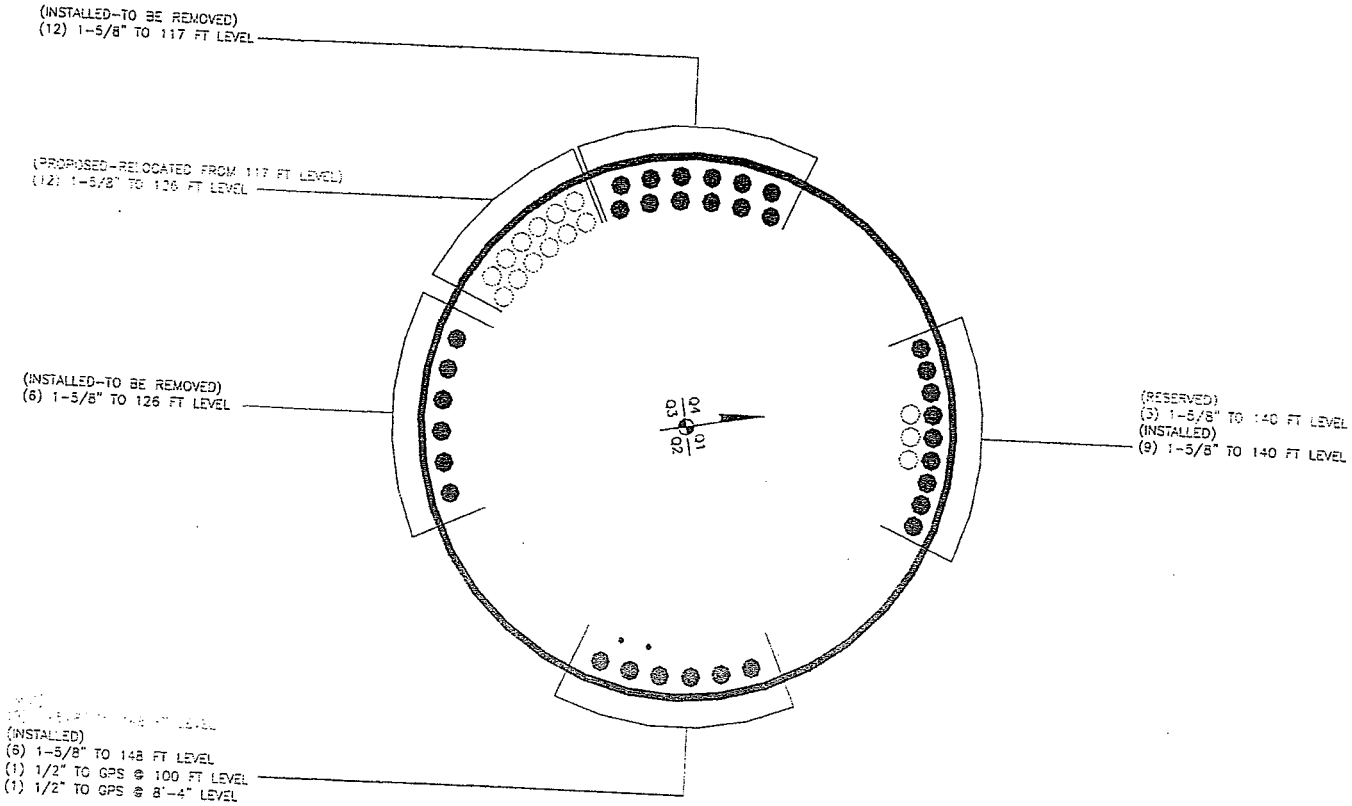
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 117.25 (1)	0.012	0.807	0.000	0.077	0.009	0.821 ✓	1.333	H1-3+VT ✓
L2	117.25 - 96 (2)	0.011	1.171	0.000	0.056	0.005	1.184 ✓	1.333	H1-3+VT ✓
L3	96 - 80.75 (3)	0.008	0.825	0.000	0.034	0.003	0.833 ✓	1.333	H1-3+VT ✓
L4	80.75 - 40 (4)	0.012	1.103	0.000	0.033	0.002	1.115 ✓	1.333	H1-3+VT ✓
L5	40 - 8.5 (5)	0.015	1.253	0.000	0.032	0.001	1.268 ✓	1.333	H1-3+VT ✓
L6	8.5 - 0 (6)	0.015	1.245	0.000	0.031	0.001	1.261 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	148 - 117.25	Pole	TP27.227x22x0.1875	1	-6.70	755.23	61.6	Pass
L2	117.25 - 96	Pole	TP30.464x26.2571x0.25	2	-9.71	1150.50	88.8	Pass
L3	96 - 80.75	Pole	TP33.056x30.464x0.4271	3	-11.86	2006.40	62.5	Pass
L4	80.75 - 40	Pole	TP39.483x31.4795x0.4269	4	-21.13	2399.11	83.7	Pass
L5	40 - 8.5	Pole	TP44.275x37.7399x0.4253	5	-31.06	2745.54	95.2	Pass
L6	8.5 - 0	Pole	TP45.72x44.275x0.434	6	-33.38	2894.02	94.6	Pass
							Summary	
						Pole (L5)	95.2	Pass
						RATING =	95.2	Pass

APPENDIX B

Cable Routing Drawing

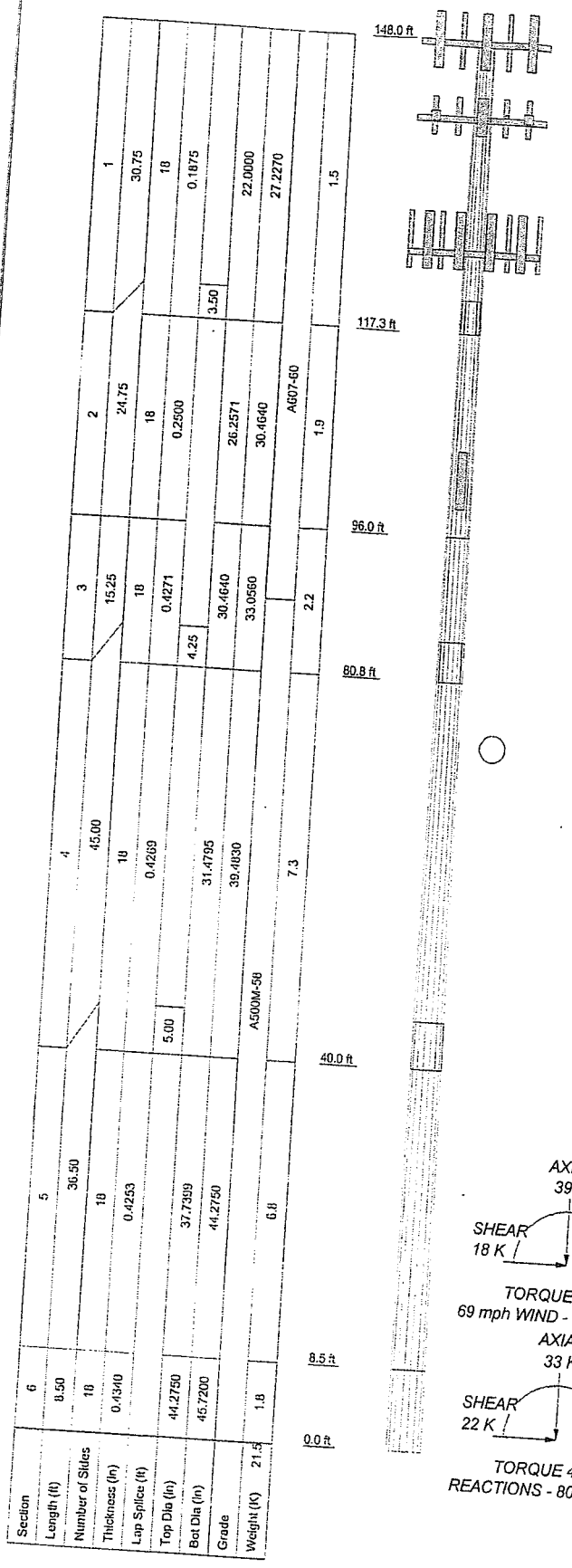


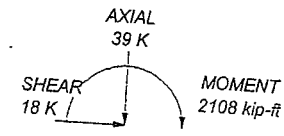
APPENDIX C

Table C1 - List of Attached Documents

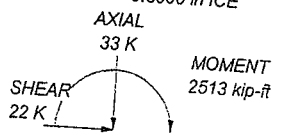
Attachment
ERI Monopole Profile
Base Plate Calculations
Foundation Calculations
Modification Record Drawings

Program Version 5.3.1.0 - 10/3/2008 File:T:/417_Aero_Solutions_LLC/2008/41708-0177 876377 Horton 2/41708-0177_Record/41708-0177 record.eri





TORQUE 3 kip-ft
69 mph WIND - 0.5000 in ICE



TORQUE 4 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	148	DUO1417-8686 w/Mount Pipe (R)	140
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	148	DUO1417-8686 w/Mount Pipe (R)	140
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	148	DUO1417-8686 w/Mount Pipe (R)	140
14' LP Platform (E)	148	14' T-Arm Mounts (3) (E)	140
(3) DUO1417-8686 w/Mount Pipe (E)	140	(2) Antel LPA-80080/6CF w/mount pipe (P)	127
(3) DUO1417-8686 w/Mount Pipe (E)	140	(2) Antel LPA-80080/6CF w/mount pipe (P)	127
(3) DUO1417-8686 w/Mount Pipe (E)	140	(2) Antel LPA-80080/6CF w/mount pipe (P)	127
CSS DBC-750 (E)	140	(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	127
CSS DBC-750 (E)	140	(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	127
CSS DBC-750 (E)	140	(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	127
(2) ADC DD1900 Full Band Masthead (E)	140	14' LP Platform (P)	126
(2) ADC DD1900 Full Band Masthead (E)	140	KS24019-L112A (E)	102
(2) ADC DD1900 Full Band Masthead (E)	140	MTS 24" Stand-Off Bracket (1) (E)	100

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A500M-58	58 ksi	70 ksi

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 95.2%

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, Ohio 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job:	Ex. 148' Pole; Horton 2 / Fredsall Property, Colebrook, CT
Project:	PJF #41708-0177 / BU #876377
Client:	Crown Castle International
Drawn by:	Maria C. Lopez
App'd:	
Code:	TIA/EIA-222-F
Date:	02/11/09
Scale:	NTS
Path:	
Dwg No.	E-1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

Date: 2/11/2009
PJF Project: A41708-0177
Client Ref. # BU876377
Site Name: Horton 2
Description: 148' pole
Owner: CCI
Engineer: mcl

Version: 1.05 Date: 1-19-2009
No Stiffeners; CCI Methodology

Monopole Base Plate Analysis for Round/Square Unstiffened Base Plates

Reference Standard and Methodology:

Reference Standard:	TIA-222-F	Design Methodology:	CCI, 11/14/08
ASD Stress Increase:	1.3333	Base Plate Type:	Square/Unstiffened

Base Reactions from Analysis (ASD, TIA-222-F):

Moment:	2513.0 ft-kips	Elevation:	0.0 ft
Axial Load:	33.0 kips		

Shaft Parameters:

Shaft Shape; Number of Sides:	18	Shaft Steel Specification:	ASTM A572 GR 65
Diameter Across Flats:	45.72 inch	Shaft Yield Strength, Fy:	65 ksi
Shaft Thickness:	0.31250 inch	Base Connection Type:	Butt Weld

Base Plate Parameters:

Plate Type:	Square	Bolt Circle, BC:	52.00 inch
Plate Diameter or Width:	51.00 inch	Plate Steel Specification:	ASTM A572 GR 50
Plate Thickness:	2.750 inch	Plate Yield Strength, Fy:	50 ksi

Anchor Rod Parameters:

Number of Anchor Rods:	12	Anchor Rod Diameter:	2.250 inch
Anchor Rod Spacing:	Divided per 4 Corners	Anchor Rod Specification:	A615 #18J (Gr. 75)

Anchor Rod Analysis Results:

		Calculation reference, and/or controlling condition:
Moment of Inertia	4056.0 in²	0.125 Number of Anchors x Bolt Circle²
Anchor Rod Compression:	2.8 kips	Axial Load / Number of Anchors
Anchor Rod Tension from Moment:	193.3 kips	Moment x Max. Anchor Rod Distance / Moment of Inertia
Net Anchor Rod Compression:	196.1 kips	Anchor Tension + Anchor Compression
Net Anchor Rod Tension:	190.6 kips	Anchor Tension - Anchor Compression
Allowable Anchor Tension:	194.9 kips	0.6 x Anchor Fy x Anchor Net Area x Stress Increase
Actual/Allowable Load Ratio:	97.8% ✓	RESULTS: Within Allowable Limits: PASS

Base Plate Bending Analysis Results:

		Calculation reference, and/or controlling condition:
Bend Plane:	23.961 inch	Limiting 2-to-1 Projection Bend Plane Controls
Moment Arm, MA:	2.015 inch	CCI Face-of-Bolt Method Used
Plate Bending Moment:	900.088 in-kips	∑ Net Anchor Compression x MA
Plate Section Modulus:	30.200 in³	Bend Plane x Thickness² / 6
Plate Bending Stress:	29.804 ksi	Bending Moment / Section Modulus
Allowable Bending Stress:	50.000 ksi	0.75 x Plate Fy x Stress Increase
Actual/Allowable Stress Ratio:	59.6% ✓	RESULTS: Within Allowable Limits: PASS

Analysis Summary:

Anchor Rods: 97.8% PASS Base Plate: 59.6% PASS

Verification of Caisson Design

Depth = **18.00** feet Height above grade = **0.5** feet

Center of Rotation = **12.71** feet from grade

Shear = **22** kips Overturning moment at top of caisson = **2513** foot-kips
Overturning moment at center of rotation of caisson = **2803.6** foot-kips

Layer	Unit Wt (pcf)	Thickness (feet)	K_p	Cohesion (psf)	Caisson Dia. (feet)	Soil Type (C4, C8 or S)	Thickness Above COR (feet)	Thickness Below COR (feet)	Overburden (psf)	Ult. Lateral Force (C4) (kips)	Ult. Lateral Force (C8) (kips)	Ult. Lateral Force (S) (kips)	Distance (C) (feet)	Distance (S) (feet)	Shear (kips)	Moment (ft-k)
1	100	0.5	1.00	0	10	S	0.5		0.0 (Top) 50.0 (Bot)	0.0	0.0	-0.4	12.46	12.38	-0.4	4.6
								0								
2	100	2.5	4.20	0	10	S	2.5		50.0 (Top) 300.0 (Bot)	0.0	0.0	-55.2	10.96	10.66	-55.2	588.3
								0								
3	140	2	4.20	0	10	S	2		300.0 (Top) 580.0 (Bot)	0.0	0.0	-111.0	8.71	8.60	-111.0	954.9
								0								
4	140	6	4.20	0	6	S	6		580.0 (Top) 1420.0 (Bot)	0.0	0.0	-454.0	4.71	4.29	-454.0	1947.8
								0								
5	77.6	3	4.20	0	6	S	1.71		1420.0 (Top) 1552.7 (Bot)	0.0	0.0	-192.3	0.85	0.84	-192.3	162.0
								1.29	1552.7 (Top) 1652.8 (Bot)	0.0	0.0	156.5	0.65	0.65	156.5	102.0
6	97.6	4	4.60	0	6	S	0									
								4	1652.8 (Top) 2043.2 (Bot)	0.0	0.0	611.9	3.29	3.36	611.9	2056.3

Ultimate Foundation Capacities

Ult. resisting moment = **5816.0** ft-kips

Ult. resisting shear = **-44.52** kips **(Must be negative. Otherwise it won't be resisting the shear at the caisson top.)**

Safety Factors

S.F. against overturning = **2.07**

S.F. against lateral loads = **2.02**

Note: The closer the S.F.'s against shear and moment, the better the answer

THE FOLLOWING NOTES AND DETAILS WERE PROVIDED ON THE CONSTRUCTION DRAWINGS FOR THIS SITE:

AEROSOLUTIONS PROJECT: BU876377, HORTON2 / FREDSALL PROPERTY, COLEBROOK, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIA/EIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 80 MPH AND 65 MPH + 1/2" RADIAL ICE

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY (ENGINEER-OF-RECORD) BY CROWN CASTLE USA ("CCUSA", OWNER). THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY (ENGINEER-OF-RECORD) 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 USA AND (ENGINEER-OF-RECORD) 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 CCUSA CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CCUSA GUIDELINES FROM CCUSA. PER THE 12-01-2005 CCUSA DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CCUSA POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".**
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CCUSA 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. "LOW HEAT" WELDING PROCEDURES:

1. ANY AND ALL FIELD WELDING REQUIRED ON THIS PROJECT SHALL BE PERFORMED BY AWS CERTIFIED WELDERS USING "LOW HEAT" WELDING TECHNIQUES.
2. FOR THE PURPOSES OF THIS PROJECT, "LOW HEAT" WELDING IS DEFINED AS A CAREFUL AND CONTROLLED WELDING PROCESS, PERFORMED BY EXPERIENCED AWS CERTIFIED WELDERS, SUCH THAT THE CORRECT AMOUNT OF WELD METAL IS DEPOSITED AND IS PROPERLY FUSED IN SUCH A WAY THAT EXCESSIVE AMOUNTS OF HEAT BUILDUP AT THE WELDED JOINT, DUE TO EXCESSIVE MOLTEN WELD METAL POOLING, IS AVOIDED.
3. THE "LOW HEAT" WELDING PROCESS SHALL BE SET UP SO THAT ANY FIELD WELDING ACTIVITY ON THE POLE STRUCTURE DOES NOT SCORCH OR OTHERWISE DAMAGE THE EXISTING GALVANIZED SURFACE ON THE INSIDE OF THE POLE SHAFT IN AND AROUND THE REGION OF THE WELD.
4. THE "LOW HEAT" WELDING PROCESS, USED IN CONJUNCTION WITH THE CCUSA COAX PROTECTION AND FIRE SAFETY GUIDELINES, SHALL BE SET UP SO THAT ANY FIELD WELDING ACTIVITY ON THE POLE STRUCTURE DOES NOT SCORCH AND/OR OTHERWISE DAMAGE THE EXISTING COAX CABLES THAT RUN ON THE INSIDE AND/OR OUTSIDE OF THE POLE SHAFT IN AND AROUND THE REGION OF THE WELD.
5. "LOW HEAT" WELD DEMONSTRATION REQUIRED: PRIOR TO BEGINNING THE FIELD WELDING FOR THE REINFORCEMENT WORK, THE CONTRACTOR'S AWS CERTIFIED WELDER SHALL DEMONSTRATE THE "LOW HEAT" WELDING PROCESS THAT WILL BE USED ON THIS PROJECT SO THAT CCUSA REPRESENTATIVES CAN OBSERVE AND VERIFY THAT THE PROPOSED PROCESS DOES NOT DAMAGE THE EXISTING GALVANIZED SURFACE ON THE BACK SIDE OF THE SAMPLE PLATE THAT IS BEING WELDED. THE CONTRACTOR SHALL USE TEMPERATURE MONITORING DEVICES SUCH AS THERMOCOUPLE, HEAT CRAYON, AND/OR INFRARED SENSOR TO MEASURE AND DEMONSTRATE THE TEMPERATURE OF THE STEEL ON THE BACK SURFACE IN THE REGION OF THE WELD. THE "LOW HEAT" WELD DEMONSTRATION SHALL BE CARRIED OUT ON-SITE AND USING A GALVANIZED STEEL PLATE SAMPLE WITH A THICKNESS EQUAL TO THE MINIMUM SHAFT THICKNESS THAT WILL BE REINFORCED. ONLY AFTER THE "LOW HEAT" TECHNIQUES HAVE BEEN SUCCESSFULLY DEMONSTRATED AND ARE APPROVED BY CCUSA REPRESENTATIVES, CAN THE CONTRACTOR PROCEED WITH THE FIELD WELDING ON THE STRUCTURE.
6. **CAUTION: THE CONTRACTOR SHALL CAREFULLY FOLLOW ALL CCUSA CUTTING, WELDING, FIRE SAFETY, AND ALL OTHER SAFETY GUIDELINES WHICH ALSO INCLUDE "LOW HEAT" WELDING TECHNIQUES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR MAINTAINING THE SAFETY AND STABILITY OF THE STRUCTURE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE HELD FULLY LIABLE FOR ANY DAMAGE (INCLUDING HEAT AND FIRE DAMAGE CAUSED BY FIELD WELDING) TO THE STRUCTURE AND ANY OF ITS COMPONENTS WHICH OCCURS DURING CONSTRUCTION.**

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.
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

C. CONCRETE TESTING PER ACI

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.

5. 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.

5. 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.

5. 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.

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. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1.
4. 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.
5. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 55 (FY = 55 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
6. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION H NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
7. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION I FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
8. 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.
9. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
10. 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 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

1. THE CONTRACTOR SHALL PROTECT THE EXISTING MONOPOLE STRUCTURE, AS WELL AS ANY OTHER NEARBY EXISTING FOUNDATIONS FOR OTHER STRUCTURES OR EQUIPMENT, FROM LOSS OF SOIL AROUND AND/OR BENEATH FOOTINGS DURING ANY REQUIRED EXCAVATION. THE CONTRACTOR SHALL BRACE THE SIDES OF THE OPEN EXCAVATION AS REQUIRED.
2. THE EFFECT OF ADDITIONAL EXCAVATION (WHERE REQUIRED) FOR THE NEW MAT FOOTING (WHERE REQUIRED) OR OTHER FOUNDATION AUGMENTATION AND REINFORCING (WHERE REQUIRED) MAY HAVE IMPACT ON EXISTING EQUIPMENT AND/OR OTHER EXISTING STRUCTURES NEAR THE EXCAVATION. (ENGINEER-OF-RECORD) HAS NOT BEEN PROVIDED WITH ANY SPECIFIC INFORMATION OR DETAILS REGARDING EXISTING EQUIPMENT OR OTHER EXISTING STRUCTURES ON THE SITE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE IMPACT OR EFFECT THAT ANY REQUIRED EXCAVATION WORK HAS ON ANY EXISTING NEARBY EQUIPMENT AND/OR STRUCTURES. CONTRACTOR SHALL COORDINATE THIS SITE-SPECIFIC INFORMATION WITH THE OWNER AND TESTING AGENCY PRIOR TO CONSTRUCTION AND FOUNDATION WORK. THE CONTRACTOR SHALL ADEQUATELY BRACE, SHORE, AND/OR RELOCATE (AFTER OBTAINING THE PRIOR WRITTEN PERMISSION OF THE OWNER), AS NECESSARY, THE INTERFERING EXISTING NEARBY EQUIPMENT AND/OR STRUCTURES.

G. CAST-IN-PLACE CONCRETE

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
   (A.) CONCRETE EXPOSED TO WEATHER SHALL BE AIR ENTRAINED (6% +/- 1.5%).
   (B.) WATER CEMENT RATIO = 0.52 (MAXIMUM).
2. ALL REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.
3. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH "THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" ACI 318, LATEST EDITION. CONTRACTOR SHALL FOLLOW ALL APPLICABLE ACI PROCEDURES FOR COLD WEATHER CONCRETE PLACEMENT.
4. ALL REINFORCING DETAILS SHALL CONFORM TO "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" ACI 315, LATEST EDITION, UNLESS DETAILED OTHERWISE ON THE STRUCTURAL DRAWINGS.
5. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL OPENINGS, SLEEVES, ANCHOR RODS, INSERTS, ETC., AS REQUIRED BEFORE CONCRETE IS PLACED.
6. WHERE BAR LENGTHS ARE GIVEN ON THE DRAWINGS, THE LENGTH OF ANY HOOK, IF REQUIRED, IS NOT INCLUDED.
7. CONTRACTOR SHALL PROVIDE SPACERS, CHAIRS, BOLSTERS, ETC., NECESSARY TO SUPPORT REINFORCING STEEL. CHAIRS WHICH BEAR ON EXPOSED CONCRETE SURFACES SHALL HAVE ENDS WHICH ARE PLASTIC TIPPED OR STAINLESS STEEL.
8. ALL STRUCTURAL MEMBERS SHALL BE POURED MONOLITHICALLY, EXCEPT FOR REQUIRED CONSTRUCTION JOINTS. CONTRACTOR SHALL SUBMIT PROPOSED CONSTRUCTION JOINT LOCATIONS AND DETAILS TO THE ENGINEER FOR REVIEW.
9. CONTRACTOR SHALL PROVIDE 3/4-INCH CHAMFER ON ALL EXPOSED CORNERS UNLESS OTHERWISE INDICATED ON THE DRAWINGS. MINIMUM CLEARANCES FOR REINFORCING STEEL SHALL BE MAINTAINED AS SPECIFIED BY ACI.
10. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:
    3" .... CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.
    2" .... CONCRETE EXPOSED TO EARTH OR WEATHER, #6 THROUGH #18 BARS.
    1-1/2" .... CONCRETE EXPOSED TO EARTH OR WEATHER, #5 BAR AND SMALLER.
11. FOOTING BARS SHALL BE BENT 1'-6" AROUND CORNERS, OR PROVIDE CORNER BARS WITH A 2'-0" LAP ON EACH LEG.
12. TESTING LABORATORY SHALL SUBMIT ONE COPY OF ALL CONCRETE TEST REPORTS DIRECTLY TO THE ENGINEER.
13. CONTRACTOR SHALL KEEP A COPY OF "FIELD REFERENCE MANUAL" (ACI PUBLICATION SP-15, LATEST EDITION) AT THE PROJECT FIELD OFFICE.
14. FLY ASH SHALL BE PERMITTED. FLY ASH CONTENT SHALL BE A MAXIMUM OF 25% OF CEMENT WEIGHT

H. TOUCH UP OF GALVANIZING

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

I. 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.

J. 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. **(ENGINEER-OF-RECORD) 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".

NOTE: RECORD DRAWING WAS PREPARED BASED ON THE INFORMATION AND 'AS-BUILT' DOCUMENTATION RECEIVED FROM AEROSOLUTIONS' QUALITY CONTROL INSPECTOR. AEROSOLUTIONS HAS CERTIFIED THAT ALL INSTRUCTIONS AND SPECIFICATIONS WERE COMPLETED AS LISTED ABOVE.

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

RECORD DRAWING

This strengthening project utilizes the *AeroForce™* Upgrade System

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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
BU 876377; HORTON 2 / FREDSALL PROPERTY; COLEBROOK, CT

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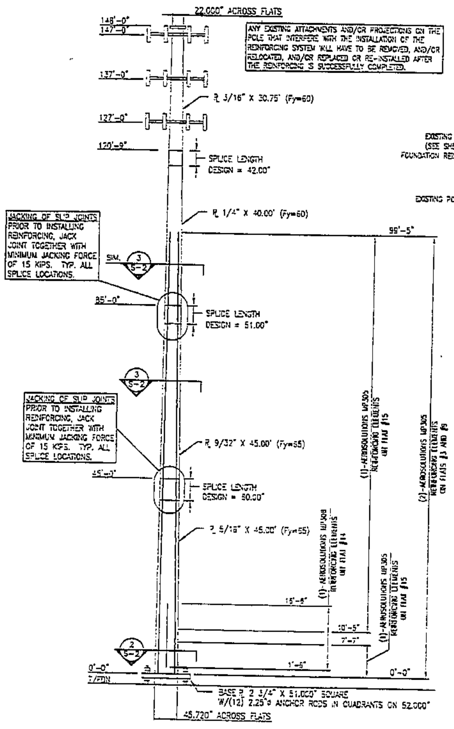
(614) 221-6679 www.pjfweb.com

Job No.	41708-0177
Date	02-11-2009
Scale	N.T.S.
Designed By	M.C.L.
Drawn By	D.T.C.
Checked By	
Sheet No.	S-1

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

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37508-0010_RP), DATED 02-11-2009.



MONOPOLE ELEVATION (1/S-2)
SCALE: NTS

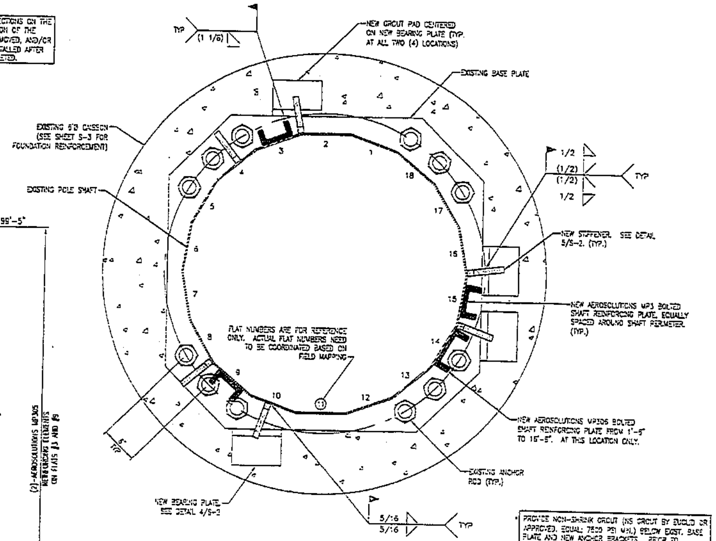
LOAD CASES		
CASE 1	80 MPH WITH NO ICE	DESIGN WIND
CASE 2	59 MPH WITH 1/2" RADIAL ICE	REDUCED WIND WITH ICE
CASE 3	50 MPH WITH NO ICE	OPERATIONAL WIND

POLE SPECIFICATIONS	
Pole Shape Type:	18-SIDED POLYGON
Taper:	0.168843 IN/FT
Shaft Steel:	ASTM A607 GRADE 60, 65
Base PL Steel:	ASTM A572 GRADE 55 (55 KSI)
Anchor Rods:	2 1/4"ɸ #18J ASTM A615 GRADE 75

SHAFT SECTION DATA

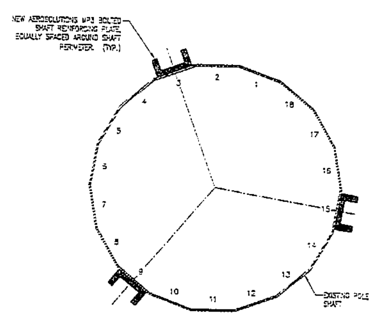
Shaft Section	Section Length (feet)	Plate Thickness (in.)	Lap Splice (in.)	Diameter Across Flats (inches) @ Top	Diameter Across Flats (inches) @ Bottom
1	30.75	0.1875	42.00	22.000	27.227
2	40.00	0.2500	51.00	26.257	33.056
3	45.00	0.2813	60.00	31.834	39.483
4	45.00	0.3125		38.071	45.720

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

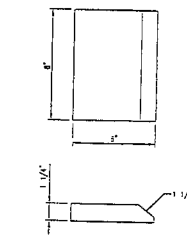


BASE PLATE PLAN (2/S-2)

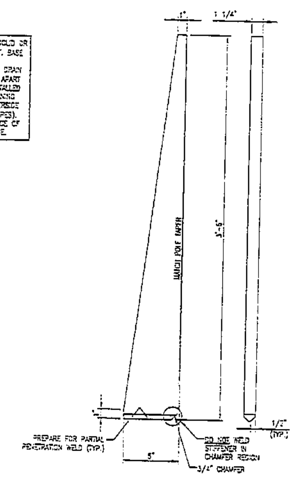
* PROVIDE NON-SHRINK GROUT (NS GROUT BY EUCLID OR APPROVED. EQUAL: 7500 PSI MIN.) BELOW EXIST. BASE PLATE AND NEW ANCHOR BRACKETS. PRIOR TO GROUTING, INSTALL FOUR 1-INCH DIAMETER PVC DRAIN PIPES AT APPROXIMATELY NINETY (90) DEGREES APART THROUGH GROUT SPACE. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.



SHAFT PLAN (3/S-2)

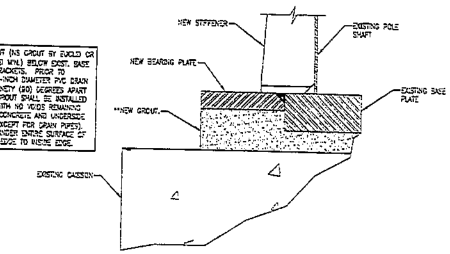


NEW BEARING PLATE (4/S-2)
(Fy = 65) (TYP. AT 4 LOCATIONS)



MP3 STIFFENER (5/S-2)
(Fy = 65) (TYP. AT 4 LOCATIONS)

** PROVIDE NON-SHRINK GROUT (NS GROUT BY EUCLID OR APPROVED. EQUAL: 7500 PSI MIN.) BELOW EXIST. BASE PLATE AND NEW ANCHOR BRACKETS. PRIOR TO GROUTING, INSTALL FOUR 1-INCH DIAMETER PVC DRAIN PIPES AT APPROXIMATELY NINETY (90) DEGREES APART THROUGH GROUT SPACE. 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 UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.



NEW BEARING PLATE DETAIL (6/S-2)
(TYP. AT 4 LOCATIONS)

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

RECORD DRAWING

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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
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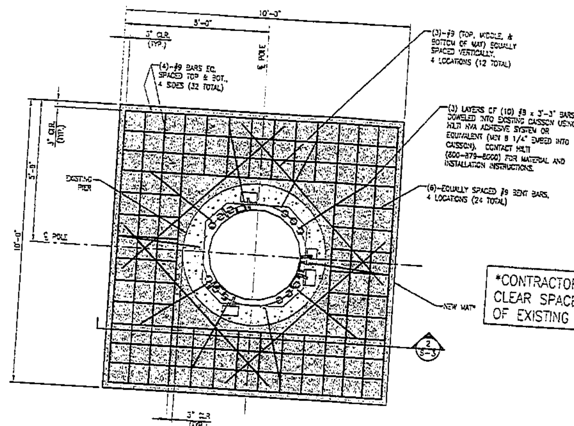
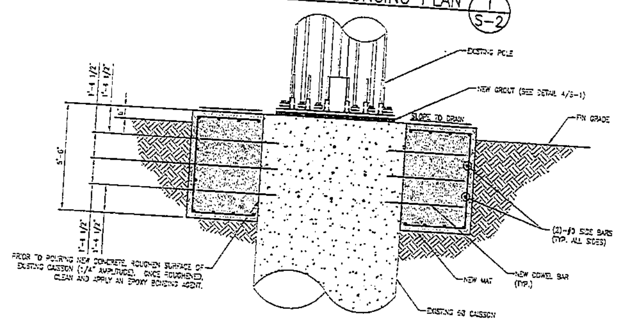


*CONTRACTOR SHALL VERIFY THE ACCESSIBILITY AND CLEAR SPACE AVAILABLE FOR THE UPGRADE. RELOCATION OF EXISTING STEPS MAY BE REQUIRED.

FOUNDATION REINFORCING PLAN (1/S-2)



PARTIAL ELEVATION (2/S-2)

RECORD DRAWING

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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
BU 876377; HORTON 2 / FREDSALL PROPERTY; COLEBROOK, CT

AeroSolutions LLC

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

Date: 02-11-2009

S-3

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

September 2, 2008

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-029-080718** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 161 Pinney Street, Colebrook, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies, with the following conditions:

- That any remaining antenna mounts at the 117-foot level of the tower are removed within one year of the date of this acknowledgement unless they can be utilized by another carrier within that time period; and
- The tower is reinforced as recommended in the structural analysis report dated July 8, 2008 and sealed by Kevin Bauman, P.E. prior to the antenna swap, and the post-construction tower and foundation ratings are not more than 100 percent; and
- A signed letter from a Professional Engineer duly licensed in the State of Connecticut is submitted to the Council to certify that the reinforcements have been properly completed and that the post-construction tower and foundation ratings of not more than 100 percent have been achieved..

The proposed modifications are to be implemented as specified here and in your notice dated July 18, 2008, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP/cm

c: The Honorable Thomas D. McKeon, First Selectman, Town of Colebrook
Karl Nilsen, Zoning Enforcement Officer, Town of Colebrook
Crown Castle

ROBINSON & COLE LLP

EM-VER-029-080718

KENNETH C. BALDWIN

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

ORIGINAL

July 18, 2008

Via Hand Delivery

S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
161 Pinney Street, Colebrook, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains a wireless telecommunications facility, with antennas at the 117-foot level on an existing 148-foot tower at 161 Pinney Street in Colebrook, Connecticut. The tower is owned by Crown Castle. The Council approved Cellco's shared use of this facility on October 31, 2006. At that time, Alltel Communications ("Alltel") maintained twelve antennas at the 127-foot level on the tower.

On May 30, 2008, Cellco acquired Alltel's CT-1 RSA cellular license for Litchfield County Connecticut. Cellco now intends to remove its twelve PCS antennas from the 117-foot level and Alltel's twelve antennas from the 127-foot level on the existing tower and install six (6) LPA-80080/6CF cellular antennas and six (6) LPA-185080/12CF PCS antennas at the 127-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Thomas D. McKeon, First Selectman of the Town of Colebrook. Pursuant to a Council directive, a copy of this letter is being sent to Ellen C. Fredsall, the owner of the property on which the tower is located.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in the increase in the overall height of the existing structure. Cellco's replacement antennas will be located at the 127-foot level of the 148-foot tower.

2. The proposed modifications will not require the extension of the site boundaries. Alltel's ground mounted equipment will be removed from of the existing site compound.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for the facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower, with modifications, can support the proposed modifications. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Thomas D. McKeon, Colebrook First Selectman
Ellen C. Fredsall
Sandy M. Carter

Vertically Polarized, Log Periodic 80° / 14 dBd

LPA-80080/6CF ___

When ordering replace "___" with connector type.

Mechanical specifications

Length	1800 mm	70.9 in
Width	140 mm	5.5 in
Depth	335 mm	13.2 in
Depth with z-bracket	375 mm	14.8 in
[4] Weight	9.5 kg	21.0 lbs
Wind Area		
Fore/Aft	0.25 m^2	2.7 ft^2
Side	0.60 m^2	6.5 ft^2
Rated Wind Velocity (Safety factor 2.0)	>295 km/hr	>183 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	415 N	93.3 lbs
Side	870 N	195.6 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

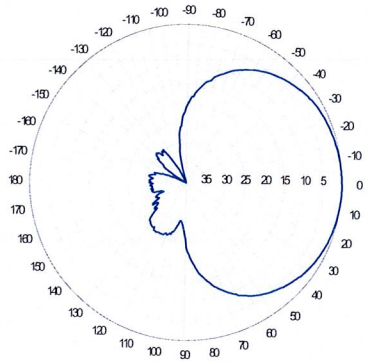
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket & Downtilt Bracket Kit #21699999

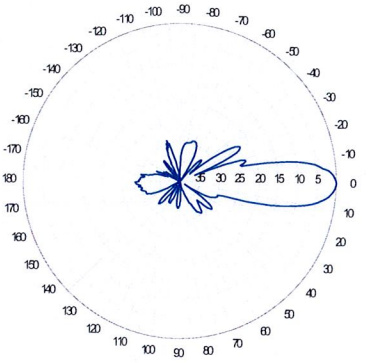
Electrical specifications

	Frequency Range	806-960 MHz
	Impedance	50Ω
[3]	Connector(s)	NE or E-DIN 1 port / center
[1]	VSWR	≤ 1.4:1
	Polarization	Vertical
[1]	Gain	14 dBd
[2]	Power Rating	500 W
[1]	Half Power Angle	
	H-Plane	80°
	E-Plane	10°
[1]	Electrical Downtilt	0°
[1]	Null Fill	10%
	Lightning Protection	Direct Ground

Radiation pattern[1]



Horizontal

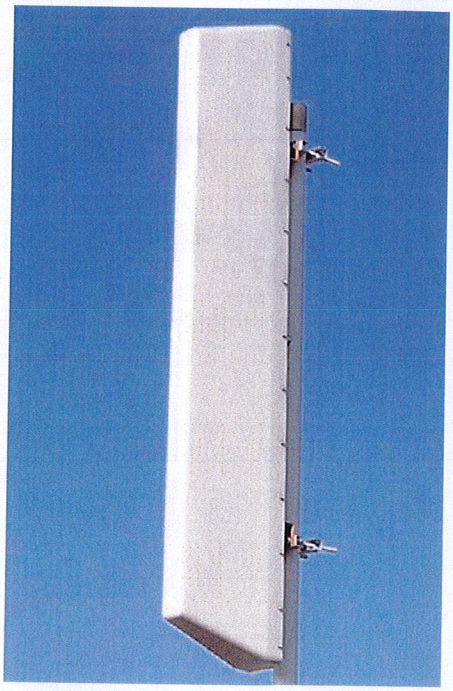


Vertical

Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.

1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

CF Denotes a Center-Fed Connector.

806-960 MHz

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Revision Date: 7/5/07

Vertically Polarized, Log Periodic 80° / 17.5 dBi

LPA-185080/12CF ___

When ordering replace "___" with connector type.

Mechanical specifications

Length	1806 mm	71.1 in
Width	104 mm	4.1 in
Depth	150 mm	5.9 in
Depth with t-bracket	178 mm	7.0 in
[4] Weight	4.8 kg	10.5 lbs
Wind Area		
Fore/Aft	0.19 m^2	2.0 ft^2
Side	0.27 m^2	2.9 ft^2
Rated Wind Velocity (Safety factor 2.0)	>270 km/hr	>168 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	325 N	73.1 lbs
Side	440 N	98.9 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

Mounting bracket kit #26799997
Downtilt bracket kit #26799999

The downtil bracket kit includes the mounting bracket kit.

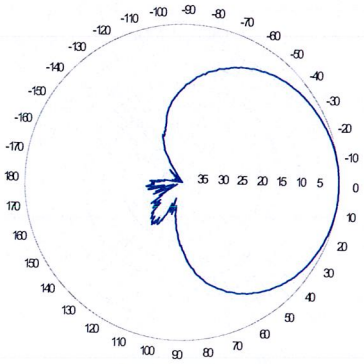
Electrical specifications

Frequency Range	1850-1990 MHz
Impedance	50Ω
[3] Connector(s)	NE or E-DIN 1 port / center
[1] VSWR	≤ 1.4:1
Polarization	Vertical
[1] Gain	17.5 dBi
[2] Power Rating	250 W
[1] Half Power Angle	
H-Plane	80°
E-Plane	5°
[1] Electrical Downtilt	0°
[1] Null Fill	10%
Lightning Protection	Direct Ground

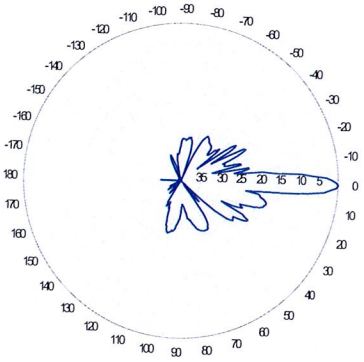
[1] Typical values.
[2] Power rating limited by connector only.
[3] NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
[4] The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation pattern[1]



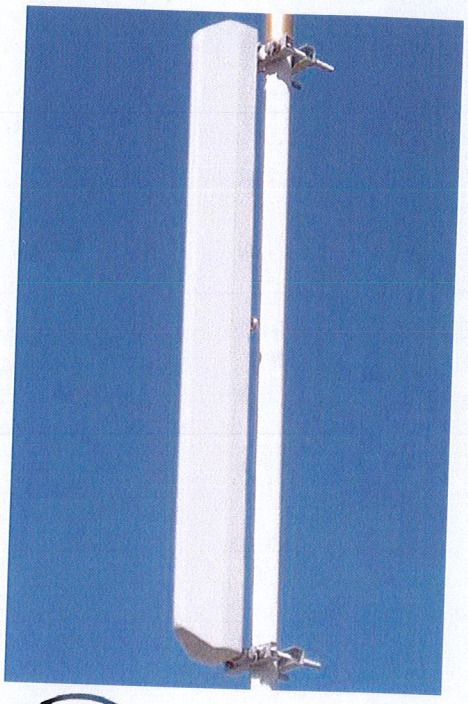
Horizontal



Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



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- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.

CF Denotes a Center-Fed Connector.

1850-1990 MHz

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Revision Date: 7/12/07

	General	Power	Density					
Site Name: Colebrook SW								
Tower Height: Verizon @ 127Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Alltel	4	250	127	0.0223	1945	1.0000	2.23%	
*Alltel	1	192.75	127	0.0043	878	0.5853	0.73%	
*Sprint	11	250	147	0.0458	1962.5	1.0000	4.58%	
*Cingular - GSM	2	296	137	0.0113	880	0.5867	1.93%	
*Cingular - GSM	2	427	137	0.0164	1930	1.0000	1.64%	
Verizon	**9**	**485**	**127**	**0.0973**	**1970**	**1.0000**	**9.73%**	
Verizon	**9**	**200**	**127**	**0.0401**	**875**	**0.5830**	**6.88%**	
								27.72%
* Source: Siting Council								

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

July 8, 2008
Ben Goodhart
Crown Castle International
1200 MacArthur Blvd., Suite 1200
Mahwah, NJ 07430
(704) 321-3845

Modifications Required
Monopole is Overstressed
Foundation is Adequate

Subject: Structural Analysis Report of Existing 148-Ft Monopole

Carrier Designation	**Verizon Wireless Co-Locate**	
	Carrier Site Number:	**N/A**
	Carrier Site Name:	**Colebrook SW**
Crown Castle Designation	**Crown Castle BU Number:**	**876377**
	Crown Castle Site Name:	**Horton 2 / Fredsall Property**
	Crown Castle JDE Job Number:	**98242**
	Crown Castle Application Number:	**55996 Revision # 2**
	Crown Castle PO Number:	**293960**
	Crown Castle WO Number:	**218952**
Engineering Firm Designation	**Paul J. Ford and Company**	**37508-0010_R1**
Site Data	**116 Pinney St., Colebrook, Litchfield County, CT** **Latitude 41° 57' 58.57", Longitude -73° 7' 19.65"**	

Dear Ben Goodhart,

Paul J. Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural adequacy of the above monopole. This analysis has been performed in accordance with the Crown Castle Structural "Statement of Work", the terms of the Purchase Order, and the TIA/EIA-222-F Standard for the following Basic Wind Speeds: 80 mph without ice, 69 mph with 0.5" radial ice, and 50 mph (Operational) without ice.

The monopole was analyzed with the addition of the proposed antenna loading shown in the table below combined with the existing and reserved loading on the structure:

Elevation - ft	Count	Antenna Description
127	6	Antel LPA-80080/6CF w/mount pipe
	6	Antel LPA-185080/12CFx2 w/ Mount Pipe
126	1	Generic 12' LP Platform

Based on our analysis, we have determined that (a.) the existing monopole structure is overstressed, and (b.) the foundation has sufficient capacity to support the existing, reserved, and proposed loading. Modifications to the monopole structure are required prior to adding the proposed loads.

Respectfully submitted,

Maria C. ~~Lopez~~
Project Engineer
mclopez@pjfweb.com

STATE OF CONNECTICUT
KEVIN P. BAUMAN
NO. 17891
LICENSED
PROFESSIONAL ENGINEER

1-10-08

TABLE OF CONTENTS

INTRODUCTION

At the request of Crown Castle International, Paul J. Ford and Company has analyzed the monopole at the Horton 2 / Fredsall Property site located in Colebrook, Litchfield County, CT. This structural analysis has been performed in accordance with the TIA/EIA-222-F-1996 Standard, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures" to determine if the monopole structure has adequate capacity to support the existing, reserved, and proposed antenna loading.

ANALYSIS CRITERIA

The existing monopole has been analyzed for the antenna and coax loading listed in Tables 1A, 1B, 2A, and 2B below. The monopole has been analyzed in accordance with the TIA/EIA-222-F-1996 Standard for the following fastest-mile Basic Wind Speeds: 80 mph without ice, 69 with 0.5" radial ice, and 50 mph without ice as recommended for Litchfield County, CT.

Table 1A - Proposed Antenna Information

Elevation - ft	Count	Antenna Description	Status
127	6	Antel LPA-80080/6CF w/mount pipe	Proposed
	6	Antel LPA-185080/12CFx2 w/ Mount Pipe	Proposed
126	1	Generic 12' LP Platform	Proposed

Table 1B - Proposed Cable Information

Elevation - ft	Count	Cable Description	Location	Status
126 - 0	12	LDF7-50A (1-5/8 FOAM)	Internal	Proposed

Table 2A - Existing and Reserved Antenna Information

Elevation - ft	Count	Antenna Description	Status
148*	9	FV65-14-00NA2 w/Mount Pipe	MLA
	1	Generic 12' LP Platform	Existing
140	9	DUO1417-8686 w/Mount Pipe	Existing
	3	CSS DBC-750	Existing
	6	ADC DD1900 Full Band Masthead	Existing
	3	DUO1417-8686 w/Mount Pipe	Reserved
	3	12' T-Arm Mounts (MC-K12)	Existing
127	3	7221 w/Mount Pipe	To be removed
126	3	3' side arms	
117	12	Antel LPA-185063/12CF w/ Mount Pipe	
	6	TMA	
	1	Generic 12' LP Platform	
102	1	KS24019-L112A	Existing
100	1	MTS 24" Stand-Off Bracket (1)	Existing

* MLA antenna loading controls design. Existing antenna loading consists of (6) DB980H90E-M.

Table 2B - Existing and Reserved Cable Information

Elevation - ft	Count	Cable Description	Location	Status
147 – 0*	9	1-5/8	Internal	MLA
140 - 0	9	1-5/8	Internal	Existing
	3	1-5/8	Internal	Reserved
126 - 0	6	1-5/8	Internal	To be removed
117 - 0	12	1-5/8	Internal	
100 - 0	1	1/2	Internal	Existing
8 - 0	1	1/2	Internal	Existing

* MLA coax loading controls design. Existing coax loading consists of (6) 1-5/8".

Information for the existing monopole and foundation is based on the available drawings, documents, and/or information listed in Table 3 below.

Table 3 - Reference Documents Provided

Document	Source	Reference	Remarks
Proposed Antenna Loading	Crown Castle		App. 55996 Rev# 2, 11/20/07
Existing Antenna Loading	Crown Castle	CAD Drawings	BU#876377
Original Tower Drawings	Crown Castle	1883532	Summit/PJF, 11163/29200-1364, 09/11/00
Foundation Drawings	Crown Castle	1629428	Summit/PJF, 11163/29200-1364, 09/11/00
Geotechnical Report	Crown Castle	1532992	SEA Consultants, 99674.03-A, 09/05/00

ANALYSIS PROCEDURE

ANALYSIS METHODS

RISA Tower (Version 5.2.0.1), a commercially available software program, was used to create a three-dimensional model of the monopole and calculate member stresses for various dead, live, wind, and ice load cases. The analysis was performed in accordance with the TIA/EIA-222-F Standard. Selected output from the analysis is included in Appendix A.

ASSUMPTIONS

1. Monopole was fabricated and installed in accordance with the manufacturer's specifications.
2. Monopole has been properly maintained in accordance with manufacturer's specifications.
3. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1A, 1B, 2A, and 2B and the referenced drawings.

If any of the above assumptions are not valid or have been made in error, then the results of this analysis may be affected. In that case, please notify Paul J. Ford and Company immediately so that we can review any new and/or modified information and determine its affect on the analysis results regarding the structural adequacy of the monopole and foundation.

ANALYSIS RESULTS

Our structural analysis indicates that the existing monopole structure is overstressed. Our analysis indicates that the existing foundation has sufficient capacity to adequately support the existing, reserved, and proposed loading.

Table 4 - Component Stresses vs. Capacity

Notes	Component	Elevation ft	% Capacity	Pass / Fail
Risa Tower Analysis Summary:				
	L1	148 - 117.25	62.3	Pass
	L2	117.25 - 80.75	102.7	Pass
	L3	80.75 - 40	111.4	Fail
	L4	40 - 0	114.1	Fail
Additional Components:				
	Base Plate	0 - 0	63.5	Pass
	Anchor Rods	0 - 0	97.5	Pass
	Foundation (Soil) - PJF Pole	0 - 0	107*	Pass
	Foundation (Structural) - PJF Pole	0 - 0	96.2	Pass
		Structural Rating (maximum capacity of all components) =		**114.1**

* Overstress acceptable per Crown Engineering Forum decision (Maximum of 10% overstress acceptable for foundation)

As summarized in Table 4 above, our analysis indicates that (a.) the existing monopole structure is overstressed, and (b.) the foundation has sufficient capacity to support the existing, reserved, and proposed loading. Modifications to the monopole structure are required prior to adding the proposed loads.

MODIFICATIONS

1. Provide monopole shaft reinforcement.

APPENDIX A

Output From Computer Programs

Tower Input Data

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

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	148.00-117.25	30.75	3.50	18	22.0000	27.2270	0.1875	0.7500	A607-60 (60 ksi)
L2	117.25-80.75	40.00	4.25	18	26.2571	33.0560	0.2500	1.0000	A607-60 (60 ksi)
L3	80.75-40.00	45.00	5.00	18	31.8336	39.4830	0.2813	1.1252	A607-65 (65 ksi)
L4	40.00-0.00	45.00		18	38.0705	45.7200	0.3125	1.2500	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	27.6470	16.0919	1486.4203	9.5990	13.8313	107.4677	2974.7964	8.0475	4.4620	23.797
L2	27.2662	20.6366	1763.4291	9.2325	13.3386	132.2051	3529.1786	10.3203	4.1812	16.725
	33.5659	26.0316	3539.5188	11.6461	16.7924	210.7804	7083.6950	13.0183	5.3779	21.511
L3	33.0583	28.1714	3543.2979	11.2011	16.1715	219.1079	7091.2582	14.0884	5.1076	18.157
	40.0921	35.0011	6795.6156	13.9166	20.0574	338.8090	13600.173 1	17.5039	6.4539	22.943
L4	39.5208	37.4512	6745.5946	13.4041	19.3398	348.7934	13500.065 2	18.7292	6.1504	19.681
	46.4253	45.0386	11732.138 2	16.1197	23.2258	505.1347	23479.713 8	22.5236	7.4967	23.99

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 148.00-117.25				1	1	1		
L2 117.25-80.75				1	1	1		
L3 80.75-40.00				1	1	1		
L4 40.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM) (MLA) **	C	No	Inside Pole	147.00 - 0.00	9	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM) (E)	C	No	Inside Pole	140.00 - 0.00	9	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM) (R) ** **	C	No	Inside Pole	140.00 - 0.00	3	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM) (P) **	C	No	Inside Pole	126.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF4-50A (1/2" foam) (E) **	C	No	Inside Pole	100.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
LDF4-50A (1/2" foam) (E)	C	No	Inside Pole	8.33 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.00-117.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.53
L2	117.25-80.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.99

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L3	80.75-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.11
L4	40.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.09

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.00-117.25	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.53
L2	117.25-80.75	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.99
L3	80.75-40.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.11
L4	40.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.09

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.00-117.25	0.0000	0.0000	0.0000	0.0000
L2	117.25-80.75	0.0000	0.0000	0.0000	0.0000
L3	80.75-40.00	0.0000	0.0000	0.0000	0.0000
L4	40.00-0.00	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(3) FV65-14-00NA2 w/Mount Pipe (MLA) **	A	From Face	2.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
(3) FV65-14-00NA2 w/Mount Pipe (MLA) **	B	From Face	2.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
(3) FV65-14-00NA2 w/Mount Pipe (MLA) **	C	From Face	2.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
*									
*									
**									
Generic 12' LP Platform (E)	C	None		0.0000	148.00	No Ice 1/2" Ice	25.24 28.60	25.24 28.60	1.80 2.00
**									
(3) DUO1417-8686 w/Mount Pipe (E)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
(3) DUO1417-8686 w/Mount Pipe (E)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
(3) DUO1417-8686 w/Mount Pipe (E)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
CSS DBC-750 (E)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.51 0.60	0.10 0.16	0.01 0.01
CSS DBC-750 (E)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.51 0.60	0.10 0.16	0.01 0.01
CSS DBC-750 (E)	C	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	0.51 0.60	0.10 0.16	0.01 0.01
(2) ADC DD1900 Full Band Masthead (E)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.29 1.44	0.32 0.42	0.02 0.02
(2) ADC DD1900 Full Band Masthead (E)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.29 1.44	0.32 0.42	0.02 0.02
(2) ADC DD1900 Full Band Masthead (E)	C	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.29 1.44	0.32 0.42	0.02 0.02
DUO1417-8686 w/Mount Pipe (R)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
DUO1417-8686 w/Mount Pipe (R)	B	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
DUO1417-8686 w/Mount Pipe (R)	C	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	7.25 7.96	5.86 6.96	0.05 0.10
12' T-Arm Mounts (3) (E)	A	From Face	2.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	12.00 15.00	12.00 15.00	0.85 1.10
**									
**									
(2) Antel LPA-80080/6CF w/mount pipe (P)	A	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	4.47 4.95	10.93 11.93	0.06 0.12
(2) Antel LPA-80080/6CF w/mount pipe (P)	B	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	4.47 4.95	10.93 11.93	0.06 0.12
(2) Antel LPA-80080/6CF w/mount pipe (P)	C	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	4.47 4.95	10.93 11.93	0.06 0.12
(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	A	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	3.67 4.15	6.11 7.17	0.03 0.08
(2) Antel LPA-	B	From Face	4.00	0.0000	127.00	No Ice	3.67	6.11	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
185080/12CFx2 w/ Mount Pipe (P)			0.00 0.00			1/2" Ice	4.15	7.17	0.08
(2) Antel LPA - 185080/12CFx2 w/ Mount Pipe (P)	C	From Face	4.00 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	3.67 4.15	6.11 7.17	0.03 0.08
Generic 12' LP Platform (P) ** **	C	None		0.0000	126.00	No Ice 1/2" Ice	25.24 28.60	25.24 28.60	1.80 2.00
KS24019-L112A (E)	C	From Face	1.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice	0.10 0.18	0.10 0.18	0.01 0.01
MTS 24" Stand-Off Bracket (1) (E)	C	None		0.0000	100.00	No Ice 1/2" Ice	0.63 1.00	0.94 1.45	0.02 0.03

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.00-117.25	132.21	1.487	24	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.25-80.75	98.61	1.367	22	91.110	A	0.000	91.110	91.110	100.00	0.000	0.000
					B	0.000	91.110		100.00	0.000	0.000
					C	0.000	91.110		100.00	0.000	0.000
L3 80.75-40.00	60.22	1.187	19	122.316	A	0.000	122.316	122.316	100.00	0.000	0.000
					B	0.000	122.316		100.00	0.000	0.000
					C	0.000	122.316		100.00	0.000	0.000
L4 40.00-0.00	19.46	1	16	141.067	A	0.000	141.067	141.067	100.00	0.000	0.000
					B	0.000	141.067		100.00	0.000	0.000
					C	0.000	141.067		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.00-117.25	132.21	1.487	18	0.5000	65.635	A	0.000	65.635	65.635	100.00	0.000	0.000
						B	0.000	65.635		100.00	0.000	0.000
L2 117.25-	98.61	1.367	17	0.5000	94.152	C	0.000	65.635		100.00	0.000	0.000
						A	0.000	94.152	94.152	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
80.75						B	0.000	94.152		100.00	0.000	0.000
						C	0.000	94.152		100.00	0.000	0.000
L3 80.75-40.00	60.22	1.187	15	0.5000	125.712	A	0.000	125.712	125.712	100.00	0.000	0.000
						B	0.000	125.712		100.00	0.000	0.000
						C	0.000	125.712		100.00	0.000	0.000
L4 40.00-0.00	19.46	1	12	0.5000	144.401	A	0.000	144.401	144.401	100.00	0.000	0.000
						B	0.000	144.401		100.00	0.000	0.000
						C	0.000	144.401		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.00-117.25	132.21	1.487	10	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.25-80.75	98.61	1.367	9	91.110	A	0.000	91.110	91.110	100.00	0.000	0.000
					B	0.000	91.110		100.00	0.000	0.000
					C	0.000	91.110		100.00	0.000	0.000
L3 80.75-40.00	60.22	1.187	8	122.316	A	0.000	122.316	122.316	100.00	0.000	0.000
					B	0.000	122.316		100.00	0.000	0.000
					C	0.000	122.316		100.00	0.000	0.000
L4 40.00-0.00	19.46	1	6	141.067	A	0.000	141.067	141.067	100.00	0.000	0.000
					B	0.000	141.067		100.00	0.000	0.000
					C	0.000	141.067		100.00	0.000	0.000

Load Combinations

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

Comb. No.	Description
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 117.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-11.01	2.10	3.12
			Max. Mx	11	-6.23	252.13	0.08
			Max. My	2	-6.29	0.36	247.06
			Max. Vy	11	-14.72	252.13	0.08
			Max. Vx	2	-14.45	0.36	247.06
			Max. Torque	5			3.87
L2	117.25 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-15.64	2.20	3.26
			Max. Mx	11	-10.47	820.55	-2.53
			Max. My	2	-10.52	-2.49	805.66
			Max. Vy	11	-17.06	820.55	-2.53
			Max. Vx	2	-16.78	-2.49	805.66
			Max. Torque	5			3.86
L3	80.75 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22.23	2.27	3.36
			Max. Mx	11	-16.82	1551.32	-5.60
			Max. My	2	-16.85	-5.66	1525.41
			Max. Vy	11	-19.38	1551.32	-5.60
			Max. Vx	2	-19.11	-5.66	1525.41
			Max. Torque	5			3.83
L4	40 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.54	2.27	3.36
			Max. Mx	11	-25.84	2471.77	-9.07
			Max. My	2	-25.84	-9.12	2433.80
			Max. Vy	11	-21.45	2471.77	-9.07
			Max. Vx	2	-21.19	-9.12	2433.80
			Max. Torque	5			3.81

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	31.54	0.04	-17.34
	Max. H_x	11	25.86	21.42	-0.08
	Max. H_z	2	25.86	-0.08	21.16
	Max. M_x	2	2433.80	-0.08	21.16

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_z	5	2467.94	-21.42	0.08
	Max. Torsion	5	3.80	-21.42	0.08
	Min. Vert	1	25.86	0.00	0.00
	Min. H_x	5	25.86	-21.42	0.08
	Min. H_z	8	25.86	0.08	-21.16
	Min. M_x	8	-2429.70	0.08	-21.16
	Min. M_z	11	-2471.77	21.42	-0.08
	Min. Torsion	11	-3.80	21.42	-0.08

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	25.86	-0.00	-0.00	-2.07	1.94	0.00
Dead+Wind 0 deg - No Ice	25.86	0.08	-21.16	-2433.80	-9.12	0.70
Dead+Wind 30 deg - No Ice	25.86	10.78	-18.36	-2113.43	-1242.66	-1.29
Dead+Wind 60 deg - No Ice	25.86	18.59	-10.64	-1227.37	-2142.58	-2.94
Dead+Wind 90 deg - No Ice	25.86	21.42	-0.08	-13.09	-2467.94	-3.80
Dead+Wind 120 deg - No Ice	25.86	18.51	10.51	1204.20	-2131.60	-3.64
Dead+Wind 150 deg - No Ice	25.86	10.64	18.29	2098.39	-1223.51	-2.51
Dead+Wind 180 deg - No Ice	25.86	-0.08	21.16	2429.70	13.04	-0.70
Dead+Wind 210 deg - No Ice	25.86	-10.78	18.36	2109.32	1246.53	1.30
Dead+Wind 240 deg - No Ice	25.86	-18.59	10.64	1223.29	2146.41	2.94
Dead+Wind 270 deg - No Ice	25.86	-21.42	0.08	9.07	2471.77	3.80
Dead+Wind 300 deg - No Ice	25.86	-18.51	-10.51	-1208.21	2135.48	3.64
Dead+Wind 330 deg - No Ice	25.86	-10.64	-18.29	-2102.44	1227.44	2.50
Dead+Ice	31.54	-0.00	-0.00	-3.36	2.27	0.00
Dead+Wind 0 deg+Ice	31.54	0.04	-17.34	-2061.32	-3.83	0.58
Dead+Wind 30 deg+Ice	31.54	8.77	-15.03	-1788.62	-1042.59	-1.19
Dead+Wind 60 deg+Ice	31.54	15.16	-8.70	-1037.56	-1801.33	-2.64
Dead+Wind 90 deg+Ice	31.54	17.48	-0.04	-9.42	-2076.81	-3.38
Dead+Wind 120 deg+Ice	31.54	15.12	8.63	1020.37	-1795.24	-3.22
Dead+Wind 150 deg+Ice	31.54	8.70	14.99	1775.90	-1032.00	-2.19
Dead+Wind 180 deg+Ice	31.54	-0.04	17.34	2054.65	8.41	-0.58
Dead+Wind 210 deg+Ice	31.54	-8.77	15.03	1781.94	1047.13	1.19
Dead+Wind 240 deg+Ice	31.54	-15.16	8.70	1030.91	1805.83	2.64
Dead+Wind 270 deg+Ice	31.54	-17.48	0.04	2.81	2081.32	3.38
Dead+Wind 300 deg+Ice	31.54	-15.12	-8.63	-1026.97	1799.79	3.22
Dead+Wind 330 deg+Ice	31.54	-8.70	-14.99	-1782.53	1036.59	2.19
Dead+Wind 0 deg - Service	25.86	0.03	-8.27	-954.61	-2.37	0.28
Dead+Wind 30 deg - Service	25.86	4.21	-7.17	-829.17	-485.57	-0.52
Dead+Wind 60 deg - Service	25.86	7.26	-4.16	-482.11	-838.13	-1.17
Dead+Wind 90 deg - Service	25.86	8.37	-0.03	-6.44	-965.58	-1.52
Dead+Wind 120 deg - Service	25.86	7.23	4.11	470.40	-833.79	-1.45
Dead+Wind 150 deg - Service	25.86	4.16	7.14	820.64	-478.05	-1.00
Dead+Wind 180 deg - Service	25.86	-0.03	8.27	950.41	6.31	-0.28
Dead+Wind 210 deg - Service	25.86	-4.21	7.17	824.97	489.51	0.52
Dead+Wind 240 deg - Service	25.86	-7.26	4.16	477.92	842.05	1.17
Dead+Wind 270 deg - Service	25.86	-8.37	0.03	2.25	969.51	1.52
Dead+Wind 300 deg - Service	25.86	-7.23	-4.11	-474.59	837.72	1.45
Dead+Wind 330 deg - Service	25.86	-4.16	-7.14	-824.83	481.99	1.00

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-25.86	0.00	0.00	25.86	0.00	0.000%
2	0.08	-25.86	-21.16	-0.08	25.86	21.16	0.000%
3	10.78	-25.86	-18.36	-10.78	25.86	18.36	0.000%
4	18.59	-25.86	-10.64	-18.59	25.86	10.64	0.000%
5	21.42	-25.86	-0.08	-21.42	25.86	0.08	0.000%
6	18.51	-25.86	10.51	-18.51	25.86	-10.51	0.000%
7	10.64	-25.86	18.29	-10.64	25.86	-18.29	0.000%
8	-0.08	-25.86	21.16	0.08	25.86	-21.16	0.000%
9	-10.78	-25.86	18.36	10.78	25.86	-18.36	0.000%
10	-18.59	-25.86	10.64	18.59	25.86	-10.64	0.000%
11	-21.42	-25.86	0.08	21.42	25.86	-0.08	0.000%
12	-18.51	-25.86	-10.51	18.51	25.86	10.51	0.000%
13	-10.64	-25.86	-18.29	10.64	25.86	18.29	0.000%
14	0.00	-31.54	0.00	0.00	31.54	0.00	0.000%
15	0.04	-31.54	-17.34	-0.04	31.54	17.34	0.000%
16	8.77	-31.54	-15.03	-8.77	31.54	15.03	0.000%
17	15.16	-31.54	-8.70	-15.16	31.54	8.70	0.000%
18	17.48	-31.54	-0.04	-17.48	31.54	0.04	0.000%
19	15.12	-31.54	8.63	-15.12	31.54	-8.63	0.000%
20	8.70	-31.54	14.99	-8.70	31.54	-14.99	0.000%
21	-0.04	-31.54	17.34	0.04	31.54	-17.34	0.000%
22	-8.77	-31.54	15.03	8.77	31.54	-15.03	0.000%
23	-15.16	-31.54	8.70	15.16	31.54	-8.70	0.000%
24	-17.48	-31.54	0.04	17.48	31.54	-0.04	0.000%
25	-15.12	-31.54	-8.63	15.12	31.54	8.63	0.000%
26	-8.70	-31.54	-14.99	8.70	31.54	14.99	0.000%
27	0.03	-25.86	-8.27	-0.03	25.86	8.27	0.000%
28	4.21	-25.86	-7.17	-4.21	25.86	7.17	0.000%
29	7.26	-25.86	-4.16	-7.26	25.86	4.16	0.000%
30	8.37	-25.86	-0.03	-8.37	25.86	0.03	0.000%
31	7.23	-25.86	4.11	-7.23	25.86	-4.11	0.000%
32	4.16	-25.86	7.14	-4.16	25.86	-7.14	0.000%
33	-0.03	-25.86	8.27	0.03	25.86	-8.27	0.000%
34	-4.21	-25.86	7.17	4.21	25.86	-7.17	0.000%
35	-7.26	-25.86	4.16	7.26	25.86	-4.16	0.000%
36	-8.37	-25.86	0.03	8.37	25.86	-0.03	0.000%
37	-7.23	-25.86	-4.11	7.23	25.86	4.11	0.000%
38	-4.16	-25.86	-7.14	4.16	25.86	7.14	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00016935
3	Yes	6	0.00000001	0.00024941
4	Yes	6	0.00000001	0.00027555
5	Yes	5	0.00000001	0.00073274
6	Yes	6	0.00000001	0.00023422
7	Yes	6	0.00000001	0.00026980
8	Yes	5	0.00000001	0.00003626
9	Yes	6	0.00000001	0.00026394
10	Yes	6	0.00000001	0.00024053
11	Yes	5	0.00000001	0.00059139
12	Yes	6	0.00000001	0.00027893
13	Yes	6	0.00000001	0.00024089
14	Yes	4	0.00000001	0.00000001

15	Yes	5	0.00000001	0.00024343
16	Yes	6	0.00000001	0.00063741
17	Yes	6	0.00000001	0.00070172
18	Yes	6	0.00000001	0.00010362
19	Yes	6	0.00000001	0.00059651
20	Yes	6	0.00000001	0.00067773
21	Yes	5	0.00000001	0.00010628
22	Yes	6	0.00000001	0.00067171
23	Yes	6	0.00000001	0.00061611
24	Yes	6	0.00000001	0.00009266
25	Yes	6	0.00000001	0.00070948
26	Yes	6	0.00000001	0.00061959
27	Yes	4	0.00000001	0.00070908
28	Yes	5	0.00000001	0.00066287
29	Yes	5	0.00000001	0.00078106
30	Yes	5	0.00000001	0.00020201
31	Yes	5	0.00000001	0.00059117
32	Yes	5	0.00000001	0.00072725
33	Yes	4	0.00000001	0.00051221
34	Yes	5	0.00000001	0.00072340
35	Yes	5	0.00000001	0.00063301
36	Yes	5	0.00000001	0.00018750
37	Yes	5	0.00000001	0.00080094
38	Yes	5	0.00000001	0.00063573

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	54.951	36	3.1563	0.0237
L2	120.75 - 80.75	37.431	36	2.8908	0.0147
L3	85 - 40	18.485	36	2.0806	0.0070
L4	45 - 0	5.135	36	1.0509	0.0026

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	(3) FV65-14-00NA2 w/Mount Pipe	36	54.951	3.1563	0.0237	16728
140.00	(3) DUO1417-8686 w/Mount Pipe	36	49.677	3.0965	0.0209	10455
127.00	(2) Antel LPA -80080/6CF w/mount pipe	36	41.298	2.9728	0.0166	3981
126.00	Generic 12' LP Platform	36	40.670	2.9609	0.0162	3800
102.00	KS24019-L112A	36	26.772	2.5287	0.0101	2645
100.00	MTS 24" Stand-Off Bracket (1)	36	25.726	2.4810	0.0097	2606

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	139.423	11	8.0016	0.0601
L2	120.75 - 80.75	95.097	11	7.3409	0.0371

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	85 - 40	47.033	11	5.2925	0.0176
L4	45 - 0	13.081	11	2.6769	0.0066

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	(3) FV65-14-00NA2 w/Mount Pipe	11	139.423	8.0016	0.0601	6888
140.00	(3) DUO1417-8686 w/Mount Pipe	11	126.085	7.8575	0.0529	4304
127.00	(2) Antel LPA-80080/6CF w/mount pipe	11	104.885	7.5506	0.0419	1636
126.00	Generic 12' LP Platform	11	103.297	7.5204	0.0411	1561
102.00	KS24019-L112A	11	68.076	6.4049	0.0254	1070
100.00	MTS 24" Stand-Off Bracket (1)	11	65.421	6.2834	0.0244	1053

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	30.75	0.00	0.0	36.000	15.7378	-6.23	566.56	0.011
L2	117.25 - 80.75 (2)	TP33.056x26.2571x0.25	40.00	0.00	0.0	36.000	25.4583	-10.47	916.50	0.011
L3	80.75 - 40 (3)	H1-3+VT (1.37 CR) - 2 TP39.483x31.8336x0.2813	45.00	0.00	0.0	39.000	34.2422	-16.82	1335.45	0.013
L4	40 - 0 (4)	H1-3+VT (1.49 CR) - 3 TP45.72x38.0705x0.3125 H1-3+VT (1.52 CR) - 4	45.00	0.00	0.0	39.000	45.0386	-25.84	1756.50	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	252.13	29.439	36.000	0.818	0.00	0.000	36.000	0.000
L2	117.25 - 80.75 (2)	TP33.056x26.2571x0.25	820.56	48.851	36.000	1.357	0.00	0.000	36.000	0.000
L3	80.75 - 40 (3)	TP39.483x31.8336x0.2813	1551.33	57.417	39.000	1.472	0.00	0.000	39.000	0.000
L4	40 - 0 (4)	TP45.72x38.0705x0.3125	2471.79	58.720	39.000	1.506	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	14.72	0.935	24.000	0.078	3.86	0.220	24.000	0.009
L2	117.25 - 80.75 (2)	TP33.056x26.2571x0.25	17.06	0.670	24.000	0.056	3.83	0.111	24.000	0.005
L3	80.75 - 40 (3)	TP39.483x31.8336x0.2813	19.38	0.566	26.000	0.044	3.81	0.069	26.000	0.003
L4	40 - 0 (4)	TP45.72x38.0705x0.3125	21.45	0.476	26.000	0.037	3.80	0.044	26.000	0.002

Pole Interaction Design Data

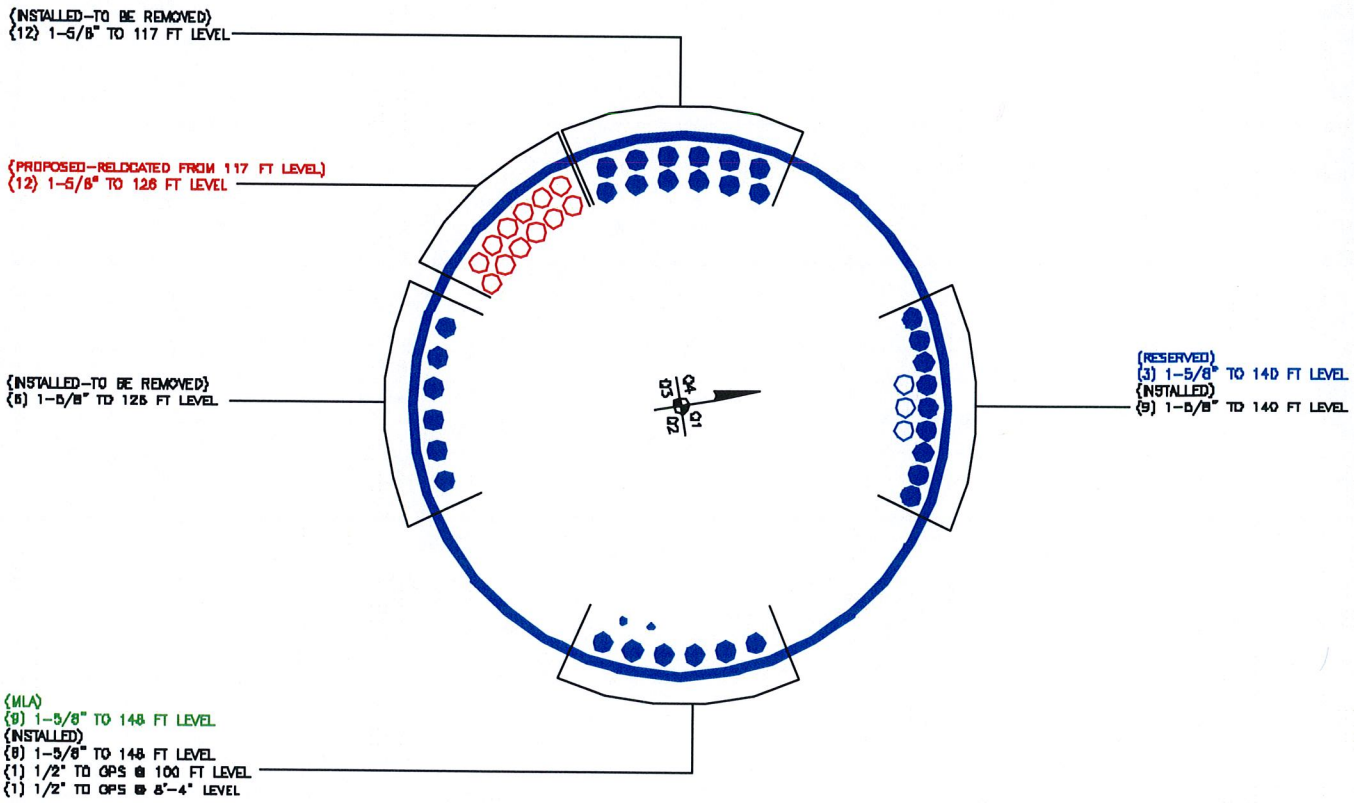
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 117.25 (1)	0.011	0.818	0.000	0.078	0.009	0.831 ✓	1.333	H1-3+VT ✓
L2	117.25 - 80.75 (2)	0.011	1.357	0.000	0.056	0.005	1.369 ✗	1.333	H1-3+VT ✗
L3	80.75 - 40 (3)	0.013	1.472	0.000	0.044	0.003	1.485 ✗	1.333	H1-3+VT ✗
L4	40 - 0 (4)	0.015	1.506	0.000	0.037	0.002	1.521 ✗	1.333	H1-3+VT ✗

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	148 - 117.25	Pole	TP27.227x22x0.1875	1	-6.23	755.23	62.3	Pass
L2	117.25 - 80.75	Pole	TP33.056x26.2571x0.25	2	-10.47	1221.70	102.7	Fail ✗
L3	80.75 - 40	Pole	TP39.483x31.8336x0.2813	3	-16.82	1780.15	111.4	Fail ✗
L4	40 - 0	Pole	TP45.72x38.0705x0.3125	4	-25.84	2341.41	114.1	Fail ✗
							Summary	
						Pole (L4)	114.1	Fail ✗
						RATING =	**114.1**	**Fail** ✗

APPENDIX B

Cable Routing Drawing

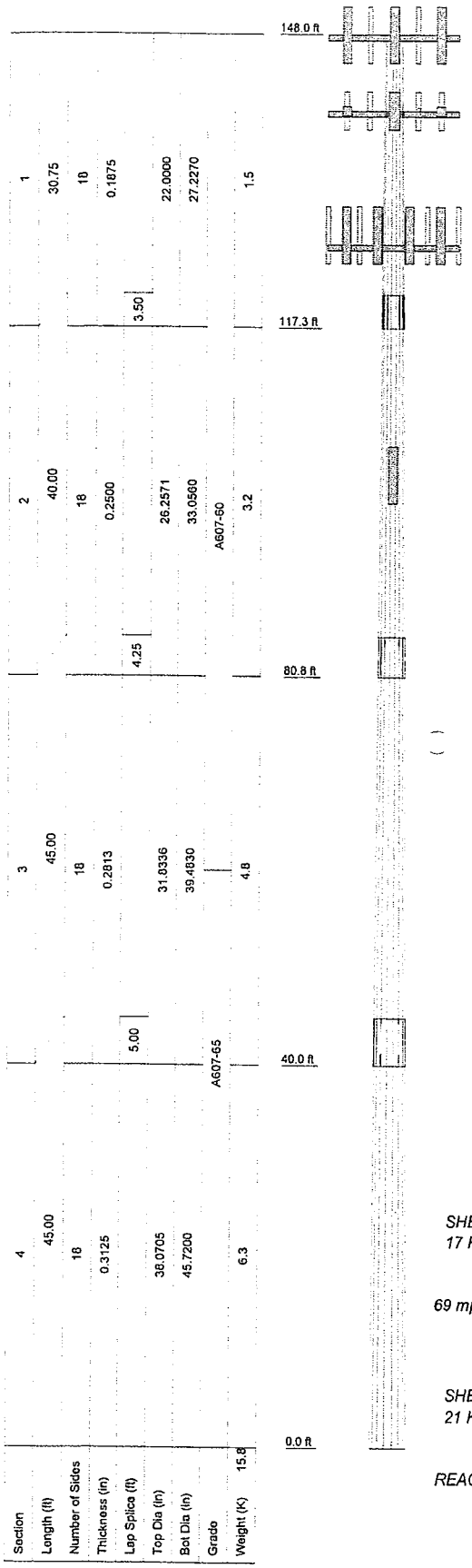


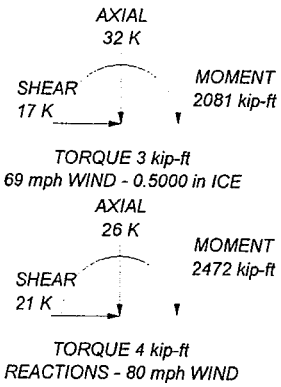
APPENDIX C

Table C1 - List of Attached Documents

Attachment
ERI Monopole Profile
Base Plate Calculations
Foundation Calculations

Program Version 5.2.0.1 - 6/16/2008 File:T:/375_Crown_Castle/2008/37508-0010_BU 876377/37508-0010_R1_876377 WO 218952/37508-0010_R1.eri





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	148	DUO1417-8686 w/Mount Pipe (R)	140
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	148	DUO1417-8686 w/Mount Pipe (R)	140
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	148	DUO1417-8686 w/Mount Pipe (R)	140
Generic 12' LP Platform (E)	148	12' T-Arm Mounts (3) (E)	140
(3) DUO1417-8686 w/Mount Pipe (E)	140	(2) Antel LPA-80080/6CF w/mount pipe (P)	127
(3) DUO1417-8686 w/Mount Pipe (E)	140	(2) Antel LPA-80080/6CF w/mount pipe (P)	127
(3) DUO1417-8686 w/Mount Pipe (E)	140	(2) Antel LPA-80080/6CF w/mount pipe (P)	127
CSS DBC-750 (E)	140	(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	127
CSS DBC-750 (E)	140	(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	127
CSS DBC-750 (E)	140	(2) Antel LPA-185080/12CFx2 w/ Mount Pipe (P)	127
(2) ADC DD1900 Full Band Masthead (E)	140	Generic 12' LP Platform (P)	126
(2) ADC DD1900 Full Band Masthead (E)	140	KS24019-L112A (E)	102
(2) ADC DD1900 Full Band Masthead (E)	140	MTS 24" Stand-Off Bracket (1) (E)	100

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 114.1%

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, Ohio 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job:	*Ex. 148' Pole; Horton 2 / Fredsall Property, Colebrook, C*
Project:	*PJF #37508-0010_R1 / BU #876377*
Client: Crown Castle International	Drawn by: Maria C. Lopez App'd:
Code: TIA/EIA-222-F	Date: 07/08/08 Scale: NTS
Path: T:\375_Crown_Castle\2008\37508-0010_BU 876377\37508-0010_R1_876377 WO 216957\37508-0010_R1.eri	Dwg No. E-1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 500 • Columbus, Ohio 43215
Ph: (614) 221-6679 • Fax1: (614) 221-2540 • Fax2: (614) 221-0166

MONOPOLE BASE PLATE ANALYSIS

TITLE:	148-Ft Pole
SITE:	Horton 2
OWNER:	CCI
COMM. NO:	37508-0010_R1
DATE:	08-Jul-08

Number of Sides	18	Stress Increase	1.33
Shaft Dia, DF	45.720 in.	Base Plate Shape	SQUARE
PT-to-PT, DP	46.425 in.		
Min Bolt Circle	49.72 in.	Actual Bolt Circle	52.00 in.

Base Reactions

Moment	2472.0 ft-kips
Axial Load	26.0 kips
Base Elevation	0.0 ft

Bolt Details

Number of Bolts	12
Bolt Diameter	2 1/4 inches
Bolt Type	A615 #18J
Mom. Of Inertia	4056.00 inches4
Bolt Tension, T	190.15 kips
Allowable Tension	195.00 kips
Bolt Compression, C	192.32 kips
Actual / Allowable Ratio	97.5% ☑

Base Plate Details

Plate Moment, MPL	1162.58 inch-kips
Bend Plane, W	26.40 inches
Plate Thickness, t	2.75 inches
Plate Width	51.00 inches
Plate Steel Spec.	ASTM A572 GRADE 55
Plate Steel Grade	55.00 ksi
Actual Stress	34.93 ksi
Allowable Stress	55.00 ksi
Actual / Allowable Ratio	63.5% ☑

Base Plate Analysis Summary

Plate Thickness	2.75 in.	Bolt Circle	52.00 in.
Plate Length	51.00 in.	Bolt Diameter	2.25 in.
Number of Bolts	12	Bolt Type	A615 #18J

PJF_Pole (tm) - Monopole Design Program
Windows Version 3.04.0000 Tue Jul 8, 2008 - 10:53:57 am
(c) 1993 to 2000 PAUL J. FORD AND COMPANY, Columbus, Ohio

Job No.....: 37508-0010 Design No: BU#876377 Engineer : MCL
Description : 148-ft pole - horton 2 / fredsall property, colebrook, ct
Design..... :
Owner..... : Crown Castle
Status..... : Final Design Client: Crown Castle 2008
Revision: Rev. Date :

S U M M A R Y O F C U R R E N T C A I S S O N D E S I G N

Diameter (ft) .....:	6.00	Compression (kips):	26.00	Friction S.F .....:	2.00
Min. Depth (ft) ...:	19.00	Horizontal (kips) :	21.00	Lateral S.F .....:	2.00
Depth Used (ft) ...:	18.50	Uplift (kips) ....:	0.00	Concrete S.F .....:	1.30
Rebar Area (in^2) .:	24.96	Moment (Ft-kips) .:	2472.0	Concrete F'c (psi) :	3000.0
Rebar Used .....:	(16)#11	Full Cohesion (ft):	18.00	Steel Cover (in) ..:	4.00
Water at (ft) .....:	11.00	Rock at (ft) .....:	14.00		

SOIL PROFILE :

Soil Layer	Layer Thickness (ft)	Unit Weight (pcf)	Ult. Skin Friction (psf)	Allowable Friction Bearing (psf)	Angle- Phi (deg)	Passive Coeff.- KP	Cohesion (c) (psf)
1	3.00	100.00	0.00	0.00	0.00	1.000	0.00
2	8.00	140.00	0.00	4000.00	38.00	4.204	0.00
3	3.00	77.60	0.00	4000.00	38.00	4.204	0.00
4	4.00	97.60	0.00	6000.00	40.00	4.599	0.00
5	6.00	97.60	0.00	6000.00	40.00	4.599	0.00

LATERAL / MOMENT CAPACITY (CHECK) :

	Min Design	Actual Design
Caisson Diameter (ft) .....:	6.00	6.00
Height Above Grade (ft) .....:	0.50	0.50
Depth Below Grade (ft) .....:	19.00	18.50
Concrete Volume (CY) .....:	20.42	19.90
Applied Moment From Loads (Working), Mwork(Ft-kip):	2773.35	2766.00
Resisting Moment From Soil (Ult), Mult(Ft-kip) ...:	5597.70	5173.83
Moment S.F. (Mult / Mwork) .....:	2.02	1.87
Applied Horizontal Load (Working), Hwork (Kips) ..:	21.00	21.00
Horizontal Soil Resistance (Ultimate), Hult (Kips):	46.89	48.28
Horizontal S.F. (Hult / Hwork) .....:	2.23	2.30
Center of Rotation (from grade) (ft) .....:	13.85	13.50
Inflection Point (Max Design Moment Location (ft) :	4.60	4.60
Maximum Factored Design Moment for Reinf. (Ft-kip):	3424.93	3424.93
Area Steel Required From Loads (in^2) .....:	24.00	24.00
ACI Minimum Steel (0.5%) (in^2) .....:	20.36	20.36
Area Reinf. Steel Provided (in^2) .....:	24.96	24.96

UPLIFT CAPACITY CHECK :

Actual Uplift on Caisson (Kips) .....:	0.00	0.00
Allowable Uplift Capacity (Kips) .....:	54.87	53.88

COMPRESSION CAPACITY CHECK :

Actual Compression on Caisson (Kips) .....:	26.00	26.00
Total Compression (Includes Concrete Wt.) (Kips) .:	54.98	54.27
Allowable Compression Capacity (Kips) .....:	169.65	169.65

CAISSON DESIGN:
USE: 6.00 ft Diameter X 19.00 ft Long (Concrete Volume = 19.90 CY)
Reinf: (16)#11 Vert, w/Closed Ties: (12)#5 @6.0", remaining ties @18.0" (ASTM A615)
