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

November 9, 2015

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

RE: **AT&T-Exempt Modification - Crown Site BU: 829046**
AT&T Site ID: CT2099
Located at: 56 Norfield Road (Town Hall), Weston, CT 06883

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of AT&T. AT&T is making modifications to certain existing sites in its Connecticut system in order to replace three antennas. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mrs. Gayle Weinstein, First Selectman for the Town of Weston. The Town of Weston is also the Property Owner.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at **56 Norfield Road (Town Hall), Weston, CT 06883**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to AT&T's operations at the site (Exhibit-3).

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

1. The proposed modifications will not result in an increase in the height of the existing tower. AT&T's additional antennas will be located at the same elevation on the existing tower.

2. There will be no proposed modifications to the ground and no extension of boundaries.

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

4. A Structural Modification Report confirming that the tower and foundation can support AT&T's proposed modifications is included as Exhibit-2.

5. The operation of the additional antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for AT&T's modified facility is included as Exhibit-3.

For the foregoing reasons, AT&T respectfully submits the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeff Barbadora.

Sincerely,

Jeff Barbadora
Real Estate Specialist

Enclosures

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Mrs. Gayle Weinstein, First Selectman
56 Norfield Rd
Weston, CT 06883

cc: Town of Weston
ATTN: Tom Landry
56 Norfield Rd
Weston, CT 06883

PROJECT INFORMATION

SCOPE OF WORK:

- AT&T ANTENNAS: REMOVE (1) EXISTING ANTENNA PER SECTOR (3) TOTAL, AND REPLACE WITH (1) NEW LTE ANTENNAS PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW LTE ANTENNAS; (6) EXISTING UMTS/GSM ANTENNAS & TMAs TO BE RE-USED (1 PER SECTOR)
- AT&T RRUs: (1) NEW RRUs PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW RRUs; (1) EXISTING RRU PER SECTOR TO BE REUSED, FOR A TOTAL OF (3) EXISTING RRUs.
- (1) NEW A2 MODULE PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) A2 MODULES.

SITE ADDRESS:	56 NORFIELD ROAD WESTON, CT 06883
LATITUDE:	41.2021861 41° 12' 7.87"N
LONGITUDE:	-72.3794989 73° 22' 46.19"W
USID:	24056
TOWER OWNER:	TBD
TYPE OF SITE:	MONOPOLE/INDOOR EQUIPMENT
MONOPOLE HEIGHT:	190'-0"±
RAD CENTER:	160'-0"±
CURRENT USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

at&t MOBILITY

FA CODE: 10035306
SITE NUMBER: CT2099
SITE NAME: WESTON DT

PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:

COMPANY: VERTICAL DEVELOPMENT, LLC
ADDRESS: 20 COMMERCIAL STREET, BRANFORD, CT 06405
CONTACT: DAVID BASS
PHONE: 203-826-5857
EMAIL: dbass@verticaldevelopmentllc.com

ZONING:

COMPANY: VERTICAL DEVELOPMENT, LLC
ADDRESS: 20 COMMERCIAL STREET, BRANFORD, CT 06405
CONTACT: DAVID BASS
PHONE: 203-826-5857
EMAIL: dbass@verticaldevelopmentllc.com

ENGINEERING:

COMPANY: COM-EX CONSULTANTS, LLC
ADDRESS: 4 SECOND AVENUE, SUITE 204, DENVILLE, NJ 07834
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862-209-4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:

COMPANY: AT&T MOBILITY - NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD, SUITE 550 13 & 14, FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508-596-7146
EMAIL: cs6970@att.com

CONSTRUCTION MANAGEMENT:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484-683-1750
EMAIL: gdorman@empiretelecomm.com

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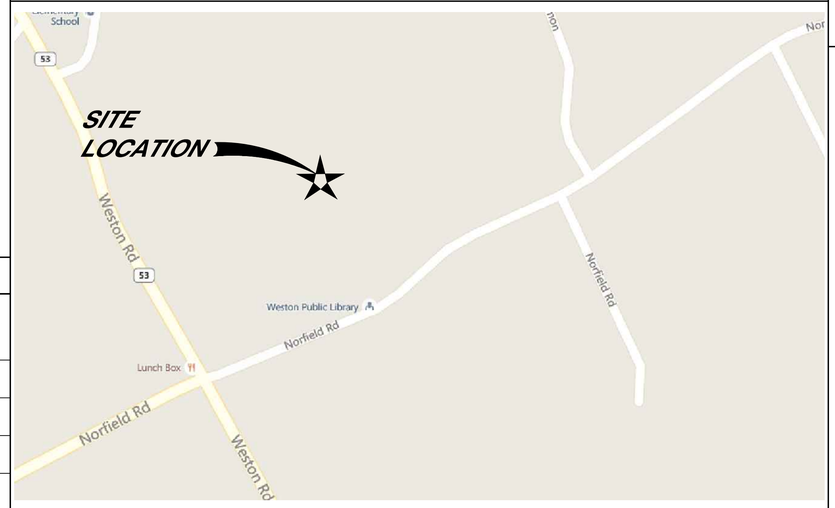
VICINITY MAP

1. HEAD WEST ON COCHITUATE RD TOWARD BURR ST (0.3 MI). 2. TURN LEFT ONTO SHOPPERS WORLD DR (230 FT). 3. MAKE A U-TURN AT RING RD (138 FT). 4. TAKE THE 1ST RIGHT ONTO COCHITUATE RD (0.3 MI). 5. TAKE THE RAMP TO I-90 E/MASSPIKE W/SPRINGFIELD/BOSTON (0.6 MI). 6. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR INTERSTATE 90 AND MERGE ONTO I-90 W/MASSACHUSETTS TURNPIKE (0.5 MI). 7. FOLLOW I-90 W/MASSACHUSETTS TURNPIKE AND I-84 TO US-6 W/GRAND ARMY OF THE REPUBLIC HWY IN FARMINGTON. TAKE EXIT 38 FROM I-84 (89.9 MI). 8. MERGE ONTO I-90 W/MASSACHUSETTS TURNPIKE (37.8 MI). 9. TAKE EXIT 9 TO MERGE ONTO I-84 TOWARD US-20/HARTFORD/NEW YORK CITY (51.9 MI). 10. TAKE EXIT 38 FOR US-6 W TOWARD BRISTOL (0.3 MI) . 11. FOLLOW US-6 W/GRAND ARMY OF THE REPUBLIC HWY TO YOUR DESTINATION IN PLYMOUTH (16.1 MI). 12. CONTINUE STRAIGHT ONTO US-6 W/GRAND ARMY OF THE REPUBLIC HWY (14.6 MI). 13. TURN RIGHT ONTO NORTH ST (1.4 MI). 14. TURN LEFT (0.1 MI). 15. FOLLOW ACCESS ROAD TO SITE



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY, AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP - CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AMD MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

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NO.	DATE	REVISIONS	BY	CHK	APP'D
0	11/02/15	ISSUED AS FINAL	KCD	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: KCD

SEAL: STATE OF CONNECTICUT, NICHOLAS D. BARILE, 28643, PROFESSIONAL ENGINEER, CT

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15010-EMP	T-1	0

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').
14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   - CONTRACTOR – EMPIRE TELECOM
   - SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   - OWNER – AT&T MOBILITY
   - OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR
9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
   - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
   - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
   - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS
20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
   - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
   - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
   - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
   - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
   - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
   - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
   - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
   - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS
21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

COM-EX Consultants
4 SECOND AVENUE
SUITE 204
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PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT2099
SITE NAME: WESTON DT
56 NORFIELD ROAD
WESTON, CT 06883
FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	11/02/15	ISSUED AS FINAL	KCD	NDB	NDB

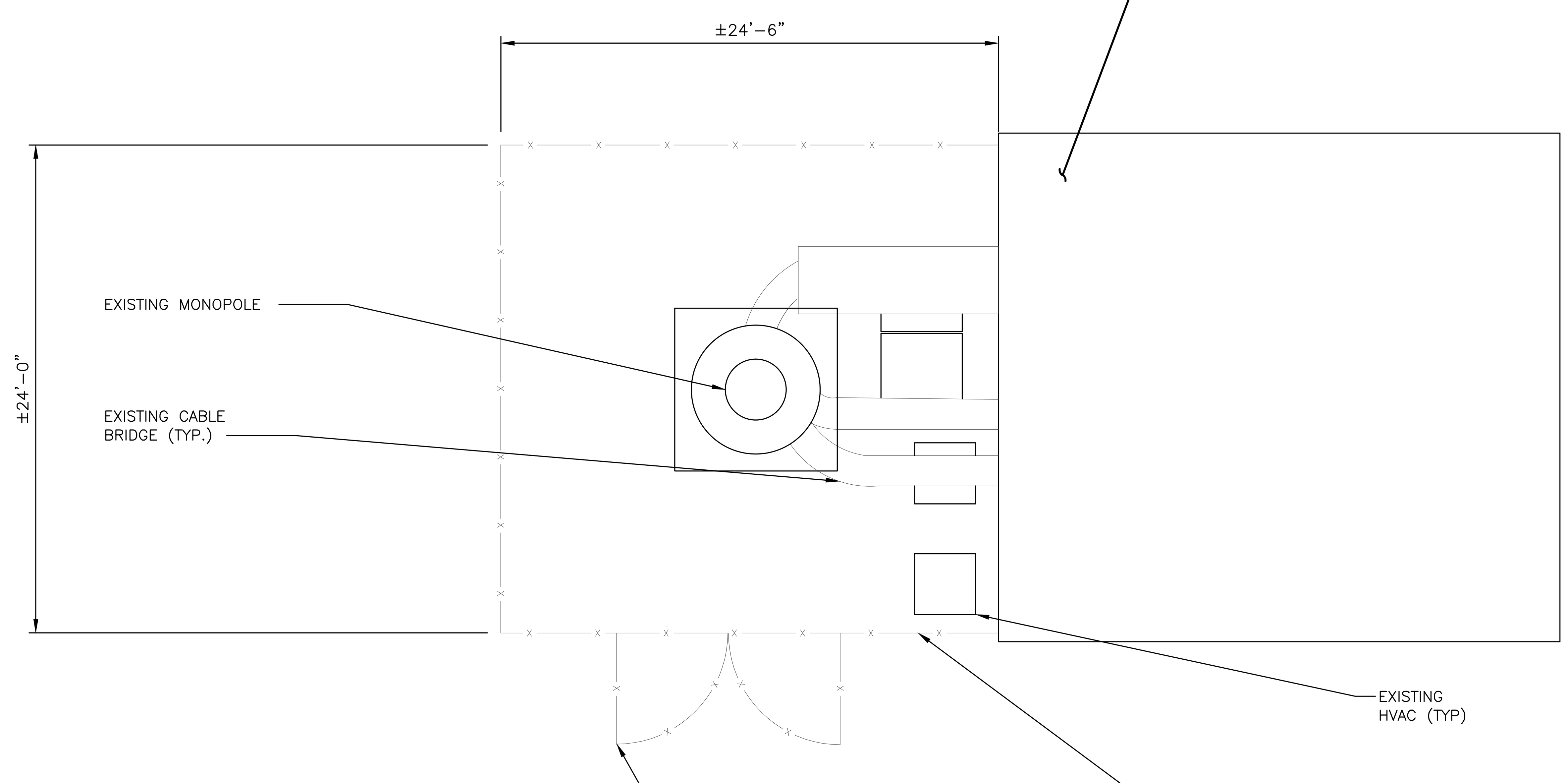
SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: KCD

SEAL: STATE OF CONNECTICUT, NICHOLAS D. BARILE, No. 28643, LICENSED PROFESSIONAL ENGINEER
NICHOLAS D. BARILE
PROFESSIONAL ENGINEER
CT LIC. NO. 28643

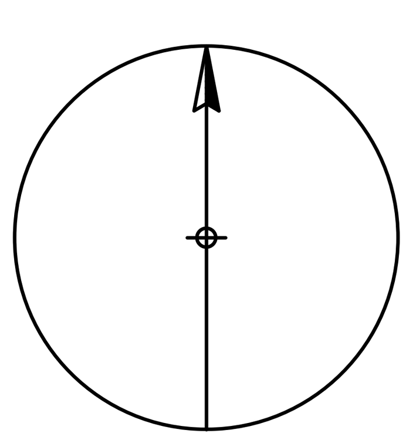
AT&T

DRAWING TITLE: GROUNDING NOTES & GENERAL NOTES

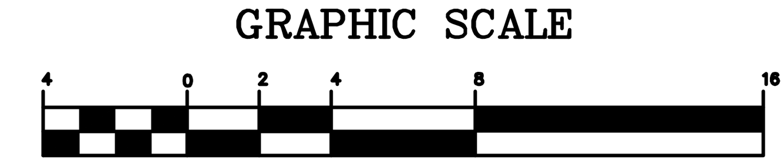
JOB NUMBER	DRAWING NUMBER	REV
15010-EMP	GN-1	0



COMPOUND LAYOUT
SCALE: 3/16" = 1'-0"



GRAPHIC SCALE



(IN FEET)
3/16 inch = 1 Foot

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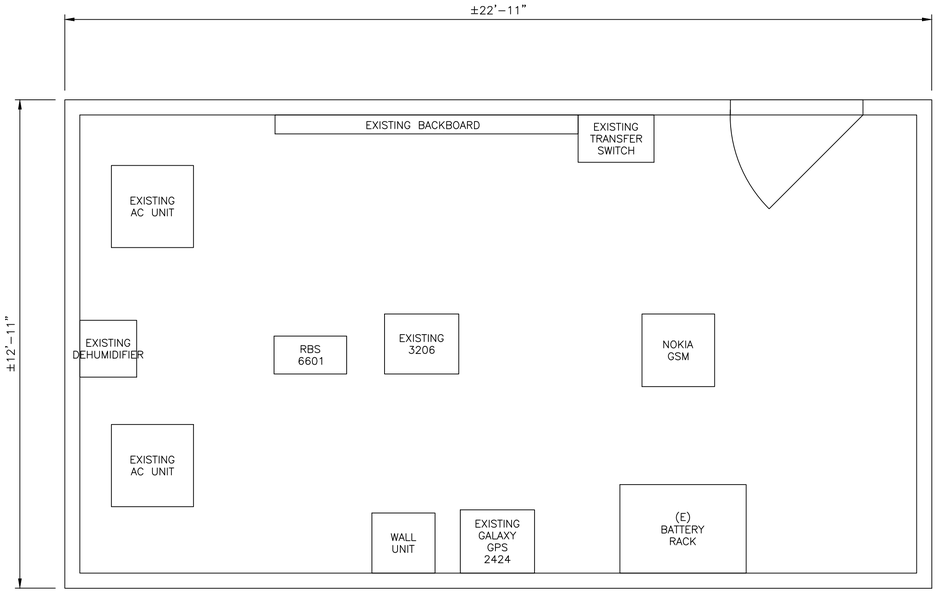
SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: KCD

SEAL:
STATE OF CONNECTICUT NICHOLAS D. BARILE No. 28643 LICENSED PROFESSIONAL ENGINEER
NICHOLAS D. BARILE
PROFESSIONAL ENGINEER
CT LIC. NO. 28643

AT&T

DRAWING TITLE:
COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15010-EMP	A-1	0



NORTH

EXISTING EQUIPMENT LAYOUT

SCALE: 1" = 2'-0"

2 0 1 2 4 8

(IN FEET)
1/2 Inch = 1 Foot

NO GROUND EQUIPMENT MODIFICATIONS ARE BEING MADE AS PART OF THIS SCOPE. EXISTING GROUND EQUIPMENT CONFIGURATION TO REMAIN.

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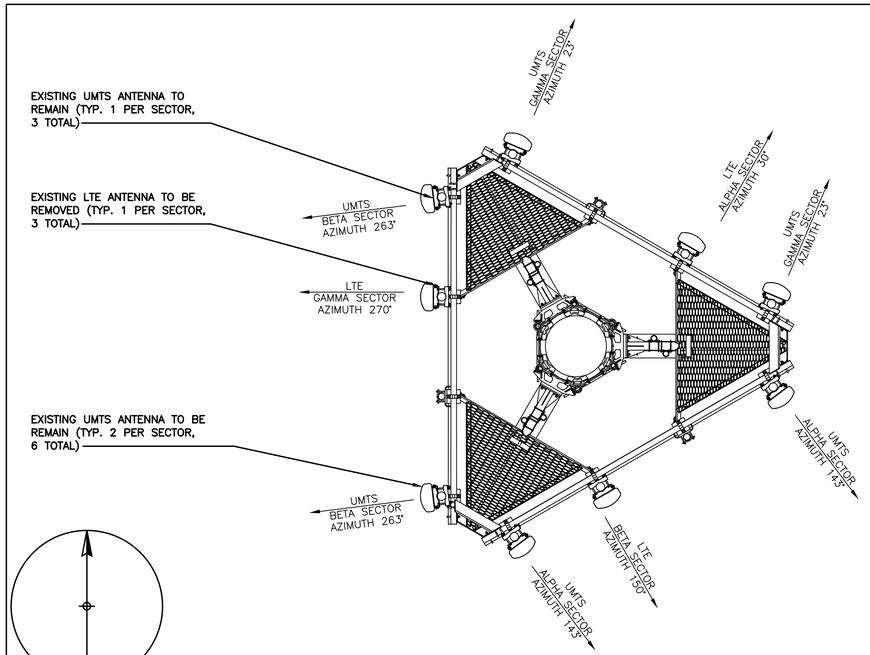
SEAL:
STATE OF CONNECTICUT
DOUGLAS D. BAKER
LICENSED
PROFESSIONAL ENGINEER
CT PROFESSIONAL ENGINEER 23643

AT&T

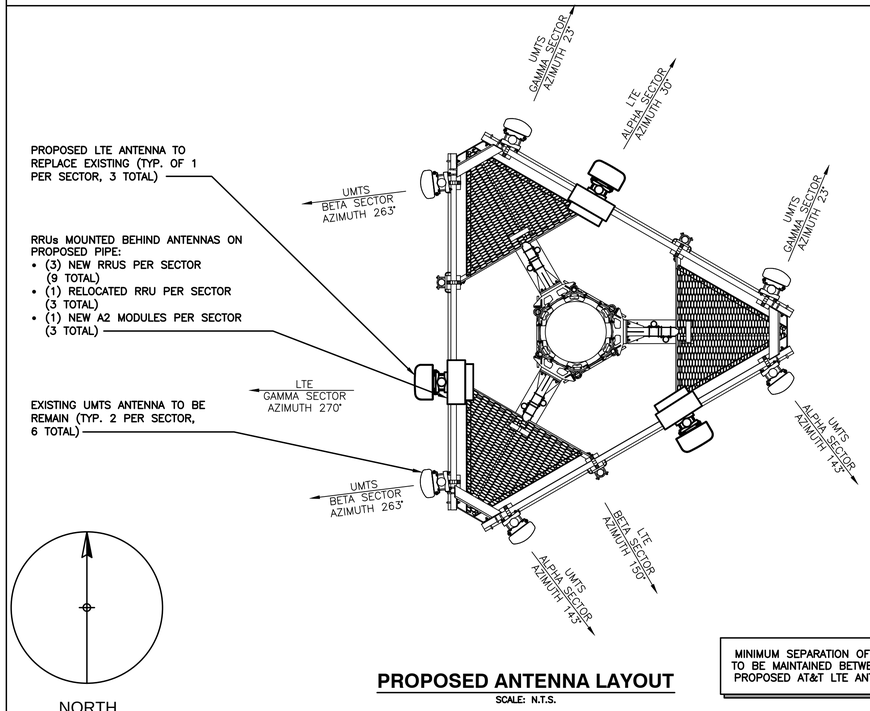
DRAWING TITLE:
EQUIPMENT LAYOUTS

JOB NUMBER	DRAWING NUMBER	REV
15010-EMP	A-2	0



EXISTING ANTENNA LAYOUT

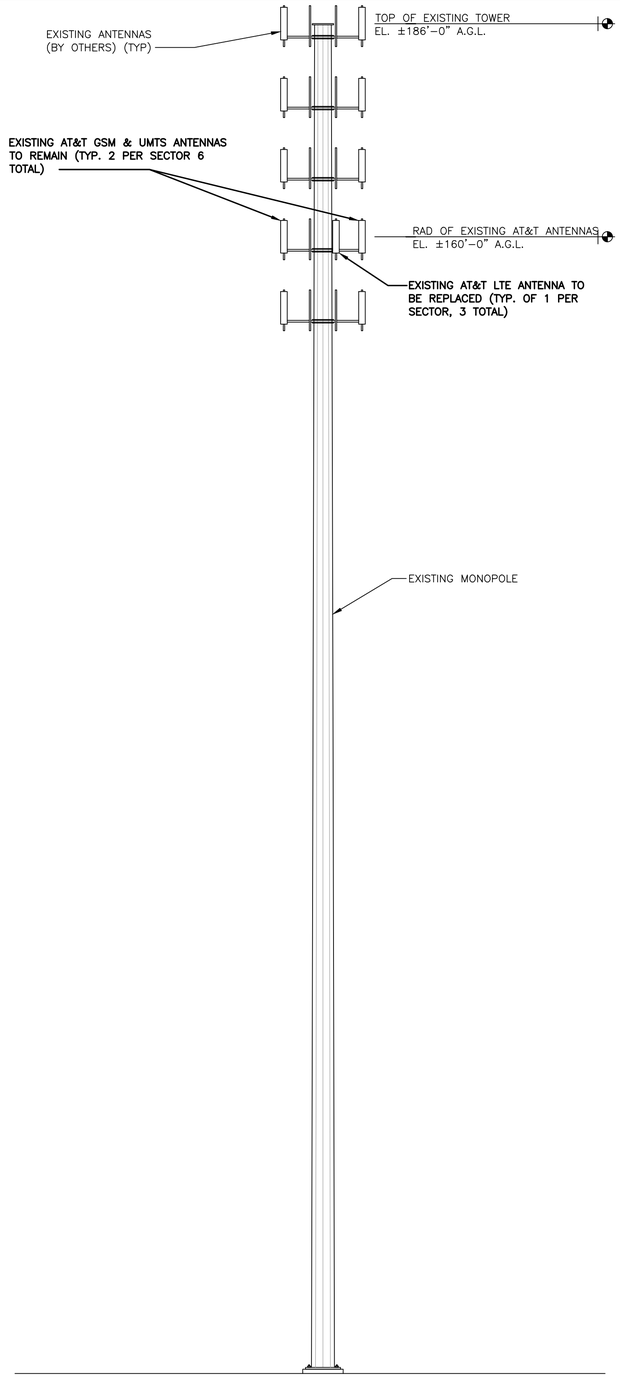
SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT

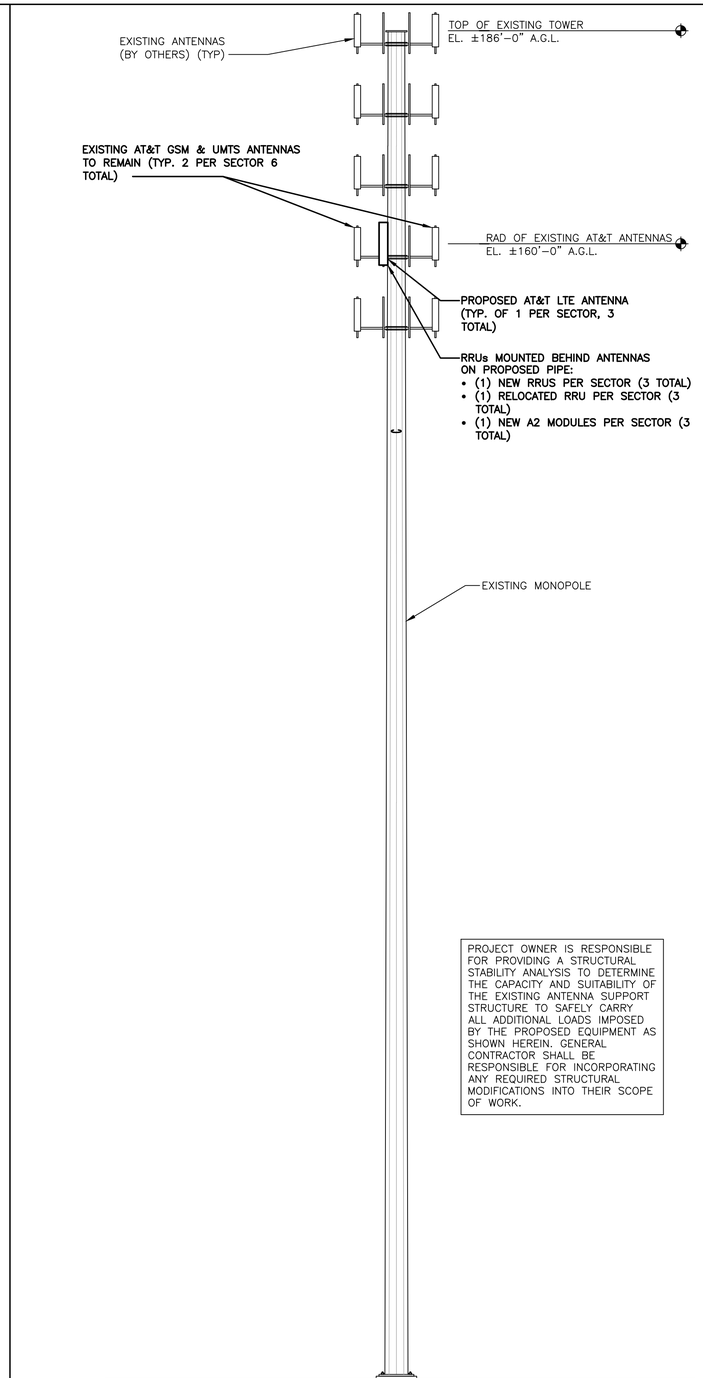
SCALE: N.T.S.

MINIMUM SEPARATION OF 6'-0" TO BE MAINTAINED BETWEEN ALL PROPOSED AT&T LTE ANTENNAS



EXISTING TOWER ELEVATION

SCALE: NTS



PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

PROPOSED TOWER ELEVATION

SCALE: NTS

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FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT2099
SITE NAME: WESTON DT

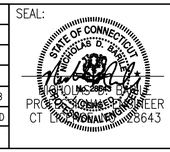
56 NORFIELD ROAD
WESTON, CT 06883
FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	11/02/15	ISSUED AS FINAL	KCD	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: KCD

SEAL:



SHEILA M. SHEA, ESQ.
PROFESSIONAL ENGINEER
CT LICENSE NO. 23643

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
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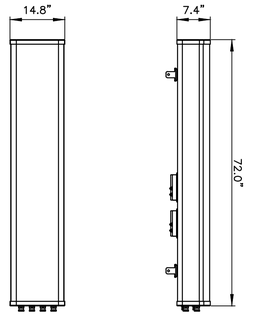


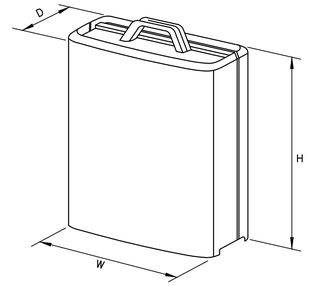
FRONT VIEW SIDE VIEW

BOTTOM VIEW

MANUFACTURER	CCI
MODEL	OPA–65R–LCUU–H6
WEIGHT	73.0 LBS

LTE OCTO-PORT ANTENNA DETAIL

SCALE: N.T.S.

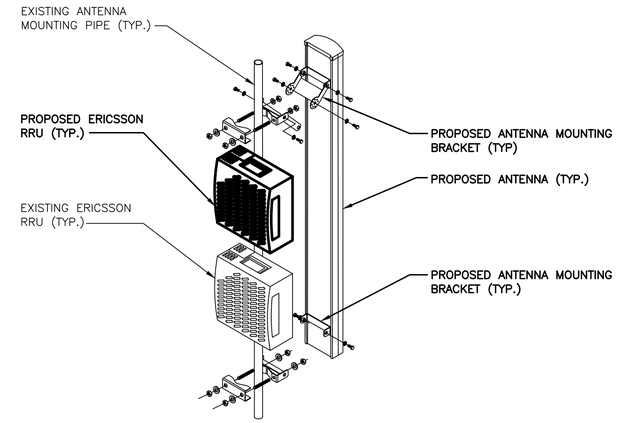


MODEL	L x W x H	WEIGHT
*RRUS–11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS–12	20.4" x 18.5" x 7.5"	58 LBS
A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

*ALL EXISTING RRUS–11 TO BE RELOCATED & REUSED

RRUS DETAIL

SCALE: N.T.S.



ANTENNA AND RRU MOUNTING DETAIL

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770.00	55"X11"X5"
	A2	–	–	–
	A3	POWERWAVE	P65–16–XLH–RR	72"X11"X5"
	A4	POWERWAVE	7770.00	55"X11"X5"
BETA	B1	POWERWAVE	7770.00	55"X11"X5"
	B2	–	–	–
	B3	POWERWAVE	P65–16–XLH–RR	72"X11"X5"
	B4	POWERWAVE	7770.00	55"X11"X5"
GAMMA	G1	POWERWAVE	7770.00	55"X11"X5"
	G2	–	–	–
	G3	POWERWAVE	P65–16–XLH–RR	72"X11"X5"
	G4	POWERWAVE	7770.00	55"X11"X5"

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770.00	55"X11"X5"
	A2	**CCI**	**OPA–65R–LCUU–H6**	**72"X14.8"X7.4"**
	A3	–	–	–
	A4	POWERWAVE	7770.00	55"X11"X5"
BETA	B1	POWERWAVE	7770.00	55"X11"X5"
	B2	**CCI**	**OPA–65R–LCUU–H6**	**72"X14.8"X7.4"**
	B3	–	–	–
	B4	POWERWAVE	7770.00	55"X11"X5"
GAMMA	G1	POWERWAVE	7770.00	55"X11"X5"
	G2	**CCI**	**OPA–65R–LCUU–H6**	**72"x14.8"x7.4"**
	G3	–	–	–
	G4	POWERWAVE	7770.00	55"X11"X5"

PROPOSED RRH SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	**ERICSSON**	**RRUS–12**	**20.4"x18.5"x7.5"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS–11 (RELOCATED)	19.7"x16.9"x7.2"		
BETA	**ERICSSON**	**RRUS–12**	**20.4"x18.5"x7.5"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS–11 (RELOCATED)	19.7"x16.9"x7.2"		
GAMMA	**ERICSSON**	**RRUS–12**	**20.4"x18.5"x7.5"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS–11 (RELOCATED)	19.7"x16.9"x7.2"		

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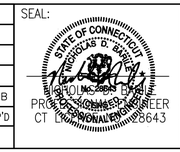
FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	11/02/15	ISSUED AS FINAL	KCD	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: KCD

SEAL:

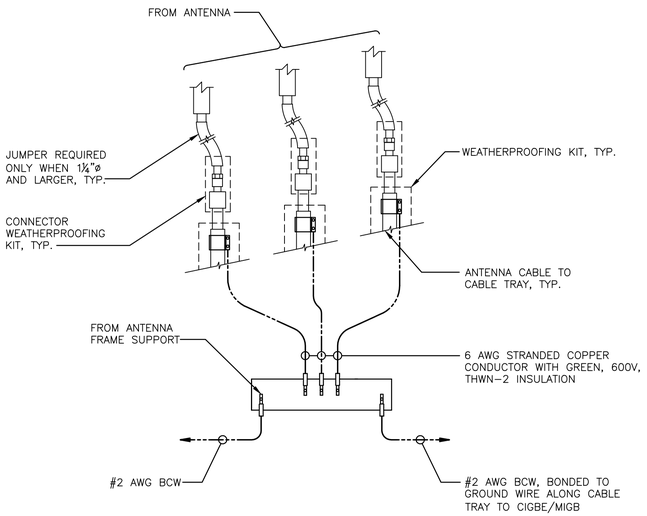


PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

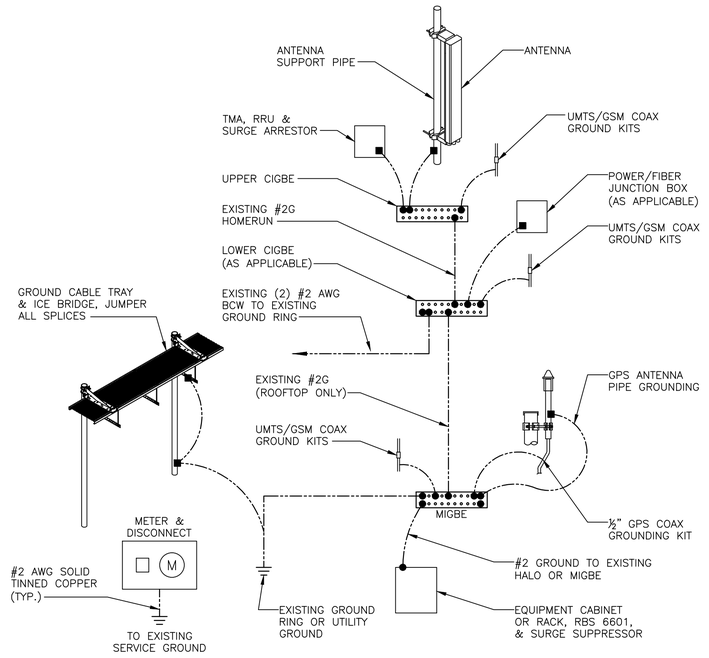
DRAWING TITLE:
DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15010–EMP	A–4	0



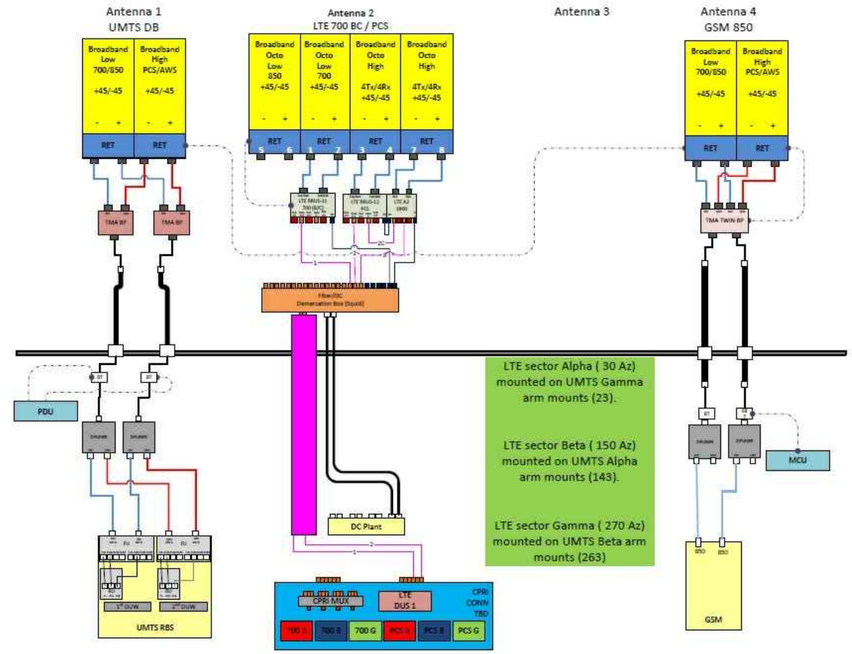
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



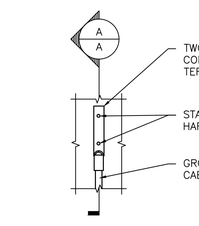
GROUNDING RISER DIAGRAM

SCALE: N.T.S.

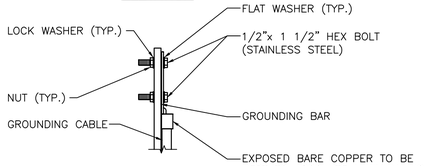


TYPICAL PLUMBING DIAGRAM (PER SECTOR)

SCALE: N.T.S.



ELEVATION



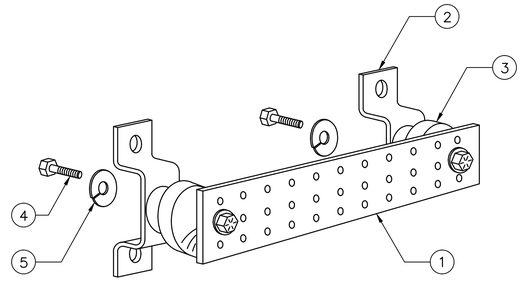
SECTION "A–A"

NOTE:

1. "DOUBLING UP" OR "STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"–11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION "P" – SURGE PRODUCERS
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- –48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

SCALE: N.T.S.

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SCALE: AS SHOWN | DESIGNED BY: CJT | DRAWN BY: KCD

SEAL:

AT&T

DRAWING TITLE:

GROUNDING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15010–EMP	G–1	0

PAUL J. FORD & COMPANY

Date: **September 1, 2015**

Darcy Tarr
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

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

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2099
	Carrier Site Name:	Weston DT
Crown Castle Designation:	**Crown Castle BU Number:**	829046
	Crown Castle Site Name:	Weston/ Rt-57/ Norfield R
	Crown Castle JDE Job Number:	344619
	Crown Castle Work Order Number:	1110484
	Crown Castle Application Number:	301042 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37515-0537.003.7805
Site Data:	**56 Norfield Rd. (Town Hall), Weston, Fairfield County, CT** **Latitude *41° 12' 8.4"*, Longitude *-73° 22' 46.6"*** **190 Foot - Monopole Tower**	

Dear Darcy Tarr,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 829046, in accordance with application 301042, revision 0.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

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

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

Respectfully submitted by:

Joshua Johnson
Structural Designer

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

9.1.15

tnxTower Report - version 6.1.4.1

PAUL J. FORD & COMPANY

Date: **September 1, 2015**

Darcy Tarr
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3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
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614.221.6679
jjohnson@pjfweb.com

Subject: Structural Analysis Report

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Respectfully submitted by:

Joshua Johnson
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 190 ft Monopole tower designed by PIROD MANUFACTURES INC. in January of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
162.0	163.0	3	cci antennas	OPA-65R-LCUU-H6 w/Mount Pipe	-	-	-
		3	ericsson	RRUS12/RRUS A2			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
190.0	193.0	1	rfs celwave	PD201-7	3 1	1-1/4 7/8	1
	190.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 403-1]			
188.0	188.0	3	alcatel lucent	TME 1900MHz RRH	-	-	1
		3	alcatel lucent	TME 800MHZ RRH			
		1	tower mounts	Side Arm Mount [SO 102-3]			
182.0	182.0	1	tower mounts	Platform Mount [LP 403-1]	-	-	1
173.0	173.0	1	tower mounts	Platform Mount [LP 405-1]	7	1-5/8	1
	170.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	-	-	2
		3	ericsson	RRUS 11 B12			
162.0	163.0	3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe	1	3/4	3
		6	powerwave technologies	7770.00 w/ Mount Pipe	2 12	7/8 1-5/8	1
		12	powerwave technologies	7020.00			
	162.0	1	tower mounts	Platform Mount [LP 403-1]			
	160.0	1	raycap	DC6-48-60-18-8F			
		3	ericsson	RRUS-11			
		6	powerwave technologies	LGP21401			
		3	powerwave technologies	TT19-08BP111-001			
		3	ericsson	RRUS-11	-	-	3
151.0	151.0	3	alcatel lucent	RRH2X40-AWS	-	-	2
		1	tower mounts	Pipe Mount [PM 601-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	150.0	2	andrew	LNX-6514DS-T4M w/ Mount Pipe	13	1-5/8	1
		6	antel	BXA-171063-12CF-EDIN-X w/ Mount Pipe			
		2	antel	LPA-80080/6CF w/ Mount Pipe			
		4	decibel	DB846F65ZAXY w/ Mount Pipe			
		1	powerwave technologies	P65-16-XL-R w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 403-1]			
125.0	130.0	1	rfs celwave	PD128-1	1 1	1/2 7/8	1
		1	rfs celwave	PD201-1			
	125.0	1	tower mounts	Side Arm Mount [SO 701-3]			
110.0	115.0	2	rfs celwave	PD128-1	2	7/8	1
	110.0	1	tower mounts	Side Arm Mount [SO 701-3]			
95.0	100.0	2	rfs celwave	PD128-1	2	1/2	1
	95.0	1	tower mounts	Side Arm Mount [SO 701-3]			
80.0	85.0	1	decibel	DB222	2	1/2	1
		1	rfs celwave	PD128-1			
	80.0	1	tower mounts	Side Arm Mount [SO 701-3]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Arcnet, A99.506-247B, 10/15/1999	3529916	CCISITES
4-POST-MODIFICATION INSPECTION	Sabre, 61801, 11/19/2012	3774763	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, A-116331, 1/5/2000	3529917	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP, 1/25/2012	3667108	CCISITES
FABRICATION DRAWINGS	Sabre, 61801-MR, 8/2/2012	-	SABRE
4-POST-MODIFICATION INSPECTION	TEP, 48073, 11/10/14	5392198	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole has been reinforced in conformance with the referenced modification drawings.
5) The rock anchors have been analyzed assuming reinforced concrete-type action in the interaction between the rock anchors and the rock.
6) The existing anchor brackets have been welded through their chamfer region. This analysis assumes no damage to the weld from the pole shaft to the base plate has occurred and that the weld is complete and effective.
7) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN/PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 100% or less, then the existing flange plates are at a usage capacity of 100% or less and no additional analysis of the flange plate is required.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	190 - 180	Pole	30'' x 0.375''	1	-4.916	1166.570	6.7	Pass
L2	180 - 160	Pole	36'' x 0.375''	2	-13.024	1325.678	27.4	Pass
L3	160 - 140	Pole	42'' x 0.375''	3	-19.086	1484.549	58.0	Pass
L4	140 - 120	Pole	P48x3/8	4	-23.751	1643.282	82.8	Pass
L5	120 - 113.33	Pole	54'' x 0.375''	5	-25.408	1801.923	77.8	Pass
L6	113.33 - 103	Pole	RPS 54'' x 0.49054''	6	-28.868	2350.759	73.2	Pass
L7	103 - 100	Pole	RPS 54'' x 0.49054''	7	-29.817	2350.759	77.2	Pass
L8	100 - 90	Pole	RPS 60'' x 0.47803''	8	-33.420	2493.470	77.2	Pass
L9	90 - 85.5	Pole	RPS 60'' x 0.55603''	9	-35.169	2896.062	71.3	Pass
L10	85.5 - 84	Pole	RPS 60'' x 0.63464''	10	-35.824	3001.849	64.3	Pass
L11	84 - 80	Pole	RPS 60'' x 0.52996''	11	-37.322	2761.003	81.0	Pass
L12	80 - 60	Pole	RPS 60'' x 0.57817''	12	-45.691	3211.717	90.2	Pass
L13	60 - 58.5	Pole	RPS 60'' x 0.70417''	13	-46.420	3764.312	71.6	Pass
L14	58.5 - 47.25	Pole	P60x5/8	14	-51.382	3682.439	90.8	Pass
L15	47.25 - 40	Pole	RPS 60'' x 0.76962''	15	-55.232	4113.078	80.2	Pass
L16	40 - 32.25	Pole	RPS 60'' x 0.76962''	16	-59.360	4113.078	86.5	Pass
L17	32.25 - 29.75	Pole	RPS 60'' x 0.96202''	17	-60.988	5123.199	71.5	Pass
L18	29.75 - 20	Pole	RPS 60'' x 0.81453''	18	-66.474	4346.166	91.7	Pass
L19	20 - 4.25	Pole	RPS 60'' x 0.94201''	19	-76.597	5311.885	85.9	Pass
L20	4.25 - 0	Pole	RPS 60'' x 1.07924''	20	-79.690	6049.207	78.3	Pass
							Summary	
						Pole (L18)	91.7	Pass
						RATING =	**91.7**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	85.5	Pass
1	Base Plate	0	69.5	Pass
1	Base Foundation	0	74.5	Pass
1	Flange Connection	20	74.9	Pass
1	Flange Connection	40	76.3	Pass
1	Flange Connection	60	73.5	Pass
1	Flange Connection	80	71.3	Pass
1	Flange Connection	100	60.7	Pass
1, 2	Flange Connection	120	72.9	Pass
1, 2	Flange Connection	140	50.8	Pass
1, 2	Flange Connection	160	23.3	Pass
1, 2	Flange Connection	180	5.4	Pass

Structure Rating (max from all components) =	91.7%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) See assumption #7.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.750 in.
4) Ice density of 56.000 pcf.
5) A wind speed of 28 mph is used in combination with ice.
6) Temperature drop of 50.000 °F.
7) Deflections calculated using a wind speed of 50 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	190.000-180.000	10.000	30" x 0.375"	A53-B-42 (42 ksi)	
L2	180.000-160.000	20.000	36" x 0.375"	A53-B-42 (42 ksi)	
L3	160.000-140.000	20.000	42" x 0.375"	A53-B-42 (42 ksi)	
L4	140.000-120.000	20.000	P48x3/8	A53-B-42 (42 ksi)	
L5	120.000-113.330	6.670	54" x 0.375"	A53-B-42 (42 ksi)	
L6	113.330-103.000	10.330	RPS 54" x 0.49054"	Reinf 38.43 ksi (38 ksi)	
L7	103.000-100.000	3.000	RPS 54" x 0.49054"	Reinf 38.43 ksi (38 ksi)	
L8	100.000-90.000	10.000	RPS 60" x 0.47803"	Reinf 39.13 ksi (39 ksi)	
L9	90.000-85.500	4.500	RPS 60" x 0.55603"	Reinf 36.97 ksi	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
				(37 ksi)	
L10	85.500-84.000	1.500	RPS 60" x 0.63464"	Reinf 31.71 ksi	
				(32 ksi)	
L11	84.000-80.000	4.000	RPS 60" x 0.52996"	Reinf 37.68 ksi	
				(38 ksi)	
L12	80.000-60.000	20.000	RPS 60" x 0.57817"	Reinf 39.86 ksi	
				(40 ksi)	
L13	60.000-58.500	1.500	RPS 60" x 0.70417"	Reinf 35.88 ksi	
				(36 ksi)	
L14	58.500-47.250	11.250	P60x5/8	A53-B-42	
				(42 ksi)	
L15	47.250-40.000	7.250	RPS 60" x 0.76962"	Reinf 35.91 ksi	
				(36 ksi)	
L16	40.000-32.250	7.750	RPS 60" x 0.76962"	Reinf 35.91 ksi	
				(36 ksi)	
L17	32.250-29.750	2.500	RPS 60" x 0.96202"	Reinf 35.90 ksi	
				(36 ksi)	
L18	29.750-20.000	9.750	RPS 60" x 0.81453"	Reinf 35.88 ksi	
				(36 ksi)	
L19	20.000-4.250	15.750	RPS 60" x 0.94201"	Reinf 38.00 ksi	
				(38 ksi)	
L20	4.250-0.000	4.250	RPS 60" x 1.07924"	Reinf 37.86 ksi	
				(38 ksi)	

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
AL5-50(7/8")	C	No	Inside Pole	190.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
TYPE I(1-1/4")	C	No	Inside Pole	190.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
*****								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	173.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	173.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
****								
LDF5-50A(7/8")	C	No	CaAa (Out Of Face)	162.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
LDF5-50A(7/8")	C	No	CaAa (Out Of Face)	162.000 - 0.000	1	No Ice	0.109	0.000
						1/2" Ice	0.209	0.001
						1" Ice	0.309	0.003
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	162.000 - 0.000	2	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	162.000 - 0.000	10	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
****								
LDF7-50A(1-5/8")	C	No	Inside Pole	150.000 - 0.000	13	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
****								
LDF5-50A(7/8")	C	No	Inside Pole	125.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF4P-50A(1/2)	C	No	Inside Pole	125.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
*****								
LDF5-50A(7/8")	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
****								
LDF5-50A(7/8")	C	No	Inside Pole	95.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
****								
LDF5-50A(7/8")	C	No	Inside Pole	80.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
****								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	15.000 - 0.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	112.500 - 57.500	1	No Ice	0.167	0.000
						1/2" Ice	0.278	0.000
						1" Ice	0.389	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	35.000 - 25.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	45.000 - 35.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	51.000 - 45.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	25.000 - 15.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	45.000 - 35.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	65.000 - 55.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	87.250 - 75.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	190.000-180.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.021
L2	180.000-160.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.584	0.139
L3	160.000-140.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	14.060	0.474
L4	140.000-120.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	14.060	0.583

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
L5	120.000-113.330	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.689	0.197
L6	113.330-103.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.845	0.310
L7	103.000-100.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	2.609	0.091
L8	100.000-90.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.697	0.305
L9	90.000-85.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.278	0.139
L10	85.500-84.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.617	0.046
L11	84.000-80.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.312	0.123
L12	80.000-60.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	19.477	0.630
L13	60.000-58.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.617	0.047
L14	58.500-47.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	9.586	0.354
L15	47.250-40.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	7.649	0.228
L16	40.000-32.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.104	0.244
L17	32.250-29.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	2.278	0.079
L18	29.750-20.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.885	0.307
L19	20.000-4.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	14.353	0.496
L20	4.250-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.873	0.134

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	190.000-180.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.021
L2	180.000-160.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	6.434	0.442
L3	160.000-140.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	26.060	1.525
L4	140.000-120.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	26.060	1.634
L5	120.000-113.330	A	0.750	0.000	0.000	0.000	0.000	0.000

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
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.691	0.547
L6	113.330-103.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	16.627	0.852
L7	103.000-100.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.909	0.248
L8	100.000-90.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	16.363	0.830
L9	90.000-85.500	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.020	0.375
L10	85.500-84.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	3.017	0.125
L11	84.000-80.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.045	0.333
L12	80.000-60.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	36.477	1.680
L13	60.000-58.500	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	3.017	0.126
L14	58.500-47.250	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	17.711	0.945
L15	47.250-40.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	14.041	0.609
L16	40.000-32.250	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	14.880	0.651
L17	32.250-29.750	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.195	0.210
L18	29.750-20.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	16.361	0.819
L19	20.000-4.250	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	26.429	1.323
L20	4.250-0.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	7.132	0.357

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	190.000-180.000	0.000	0.000	0.000	0.000
L2	180.000-160.000	-0.220	0.127	-0.364	0.210
L3	160.000-140.000	-0.760	0.439	-1.202	0.694
L4	140.000-120.000	-0.777	0.448	-1.247	0.720
L5	120.000-113.330	-0.790	0.456	-1.285	0.742
L6	113.330-103.000	-0.935	0.540	-1.509	0.871
L7	103.000-100.000	-0.947	0.547	-1.528	0.882
L8	100.000-90.000	-0.962	0.556	-1.572	0.908
L9	90.000-85.500	-1.038	0.599	-1.676	0.968
L10	85.500-84.000	-1.152	0.665	-1.831	1.057
L11	84.000-80.000	-1.152	0.665	-1.831	1.057
L12	80.000-60.000	-1.059	0.611	-1.705	0.984
L13	60.000-58.500	-1.152	0.665	-1.831	1.057
L14	58.500-47.250	-0.946	0.546	-1.526	0.881

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L15	47.250-40.000	-1.132	0.653	-1.781	1.028
L16	40.000-32.250	-1.123	0.649	-1.770	1.022
L17	32.250-29.750	-1.001	0.578	-1.602	0.925
L18	29.750-20.000	-1.001	0.578	-1.602	0.925
L19	20.000-4.250	-1.001	0.578	-1.602	0.925
L20	4.250-0.000	-1.001	0.578	-1.602	0.925

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
PD201-7	C	From Leg	4.000 0.000 3.000	0.000	190.000	No Ice 1/2" Ice 1" Ice	1.015 1.810 2.620	1.015 1.810 2.620	0.004 0.013 0.026
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	50.000	190.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	45.000	190.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	60.000	190.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227
(2) 2.375" OD x 6' Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	190.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
(2) 2.375" OD x 6' Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	190.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
(2) 2.375" OD x 6' Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	190.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
Platform Mount [LP 403-1]	C	None		0.000	190.000	No Ice 1/2" Ice 1" Ice	18.850 24.300 29.750	18.850 24.300 29.750	1.500 1.797 2.093
****									
800MHZ RRH	A	From Leg	4.000 0.000 0.000	50.000	188.000	No Ice 1/2" Ice 1" Ice	2.490 2.706 2.931	2.068 2.271 2.481	0.053 0.074 0.098
800MHZ RRH	B	From Leg	4.000 0.000 0.000	45.000	188.000	No Ice 1/2" Ice 1" Ice	2.490 2.706 2.931	2.068 2.271 2.481	0.053 0.074 0.098
800MHZ RRH	C	From Leg	4.000 0.000 0.000	60.000	188.000	No Ice 1/2" Ice 1" Ice	2.490 2.706 2.931	2.068 2.271 2.481	0.053 0.074 0.098
1900MHz RRH	A	From Leg	4.000 0.000 0.000	50.000	188.000	No Ice 1/2" Ice 1" Ice	2.907 3.145 3.391	3.801 4.065 4.337	0.044 0.075 0.110
1900MHz RRH	B	From Leg	4.000 0.000	45.000	188.000	No Ice 1/2"	2.907 3.145	3.801 4.065	0.044 0.075

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*
			0.000			Ice	3.391	4.337	0.110
						1" Ice			
1900MHz RRH	C	From Leg	4.000	60.000	188.000	No Ice	2.907	3.801	0.044
			0.000			1/2"	3.145	4.065	0.075
			0.000			Ice	3.391	4.337	0.110
						1" Ice			
Side Arm Mount [SO 102-3]	C	None		0.000	188.000	No Ice	3.000	3.000	0.081
						1/2"	3.480	3.480	0.111
						Ice	3.960	3.960	0.141
						1" Ice			
****									
Platform Mount [LP 403-1]	C	None		0.000	182.000	No Ice	18.850	18.850	1.500
						1/2"	24.300	24.300	1.797
						Ice	29.750	29.750	2.093
						1" Ice			
(4) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	182.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			0.000			Ice	2.294	2.294	0.048
						1" Ice			
(4) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	182.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			0.000			Ice	2.294	2.294	0.048
						1" Ice			
(4) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	182.000	No Ice	1.425	1.425	0.022
			0.000			1/2"	1.925	1.925	0.033
			0.000			Ice	2.294	2.294	0.048
						1" Ice			
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000	0.000	173.000	No Ice	6.825	5.642	0.112
			0.000			1/2"	7.347	6.480	0.169
			-3.000			Ice	7.863	7.257	0.233
						1" Ice			
KRY 112 144/1	A	From Leg	4.000	0.000	173.000	No Ice	0.408	0.204	0.011
			0.000			1/2"	0.497	0.273	0.014
			-3.000			Ice	0.594	0.351	0.019
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000	0.000	173.000	No Ice	6.825	5.642	0.112
			0.000			1/2"	7.347	6.480	0.169
			-3.000			Ice	7.863	7.257	0.233
						1" Ice			
KRY 112 144/1	B	From Leg	4.000	0.000	173.000	No Ice	0.408	0.204	0.011
			0.000			1/2"	0.497	0.273	0.014
			-3.000			Ice	0.594	0.351	0.019
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000	0.000	173.000	No Ice	6.825	5.642	0.112
			0.000			1/2"	7.347	6.480	0.169
			-3.000			Ice	7.863	7.257	0.233
						1" Ice			
KRY 112 144/1	C	From Leg	4.000	0.000	173.000	No Ice	0.408	0.204	0.011
			0.000			1/2"	0.497	0.273	0.014
			-3.000			Ice	0.594	0.351	0.019
						1" Ice			
Platform Mount [LP 405-1]	C	None		0.000	173.000	No Ice	20.800	20.800	1.800
						1/2"	28.100	28.100	2.066
						Ice	35.400	35.400	2.332
						1" Ice			
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	A	From Leg	4.000	0.000	173.000	No Ice	11.782	11.038	0.159
			0.000			1/2"	12.502	12.564	0.254
			-3.000			Ice	13.232	14.116	0.360
						1" Ice			
RRUS 11 B12	A	From Leg	4.000	0.000	173.000	No Ice	3.306	1.361	0.051
			0.000			1/2"	3.550	1.540	0.072
			-3.000			Ice	3.802	1.728	0.095
						1" Ice			
Ericsson Air 21 B4A B12P-	B	From Leg	4.000	0.000	173.000	No Ice	11.782	11.038	0.159

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
B5P 8FT w/ Mount Pipe			0.000			1/2" Ice	12.502	12.564	0.254
			-3.000			1" Ice	13.232	14.116	0.360
RRUS 11 B12	B	From Leg	4.000	0.000	173.000	No Ice	3.306	1.361	0.051
			0.000			1/2" Ice	3.550	1.540	0.072
			-3.000			1" Ice	3.802	1.728	0.095
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	C	From Leg	4.000	0.000	173.000	No Ice	11.782	11.038	0.159
			0.000			1/2" Ice	12.502	12.564	0.254
			-3.000			1" Ice	13.232	14.116	0.360
RRUS 11 B12	C	From Leg	4.000	0.000	173.000	No Ice	3.306	1.361	0.051
			0.000			1/2" Ice	3.550	1.540	0.072
			-3.000			1" Ice	3.802	1.728	0.095
***									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	162.000	No Ice	6.221	4.820	0.086
			0.000			1/2" Ice	6.714	5.508	0.143
			1.000			1" Ice	7.218	6.213	0.208
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	162.000	No Ice	6.221	4.820	0.086
			0.000			1/2" Ice	6.714	5.508	0.143
			1.000			1" Ice	7.218	6.213	0.208
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	162.000	No Ice	6.221	4.820	0.086
			0.000			1/2" Ice	6.714	5.508	0.143
			1.000			1" Ice	7.218	6.213	0.208
(2) LGP21401	A	From Leg	4.000	0.000	162.000	No Ice	1.288	0.364	0.014
			0.000			1/2" Ice	1.445	0.479	0.021
			-2.000			1" Ice	1.611	0.602	0.030
(2) LGP21401	B	From Leg	4.000	0.000	162.000	No Ice	1.288	0.364	0.014
			0.000			1/2" Ice	1.445	0.479	0.021
			-2.000			1" Ice	1.611	0.602	0.030
(2) LGP21401	C	From Leg	4.000	0.000	162.000	No Ice	1.288	0.364	0.014
			0.000			1/2" Ice	1.445	0.479	0.021
			-2.000			1" Ice	1.611	0.602	0.030
(2) 7020.00	A	From Leg	4.000	0.000	162.000	No Ice	0.119	0.204	0.002
			0.000			1/2" Ice	0.171	0.279	0.005
			1.000			1" Ice	0.232	0.363	0.009
(2) 7020.00	B	From Leg	4.000	0.000	162.000	No Ice	0.119	0.204	0.002
			0.000			1/2" Ice	0.171	0.279	0.005
			1.000			1" Ice	0.232	0.363	0.009
(2) 7020.00	C	From Leg	4.000	0.000	162.000	No Ice	0.119	0.204	0.002
			0.000			1/2" Ice	0.171	0.279	0.005
			1.000			1" Ice	0.232	0.363	0.009
TT19-08BP111-001	A	From Leg	4.000	0.000	162.000	No Ice	0.645	0.520	0.016
			0.000			1/2" Ice	0.757	0.623	0.022
			-2.000			1" Ice	0.877	0.735	0.029
TT19-08BP111-001	B	From Leg	4.000	0.000	162.000	No Ice	0.645	0.520	0.016
			0.000			1/2" Ice	0.757	0.623	0.022
			-2.000			1" Ice	0.877	0.735	0.029
TT19-08BP111-001	C	From Leg	4.000	0.000	162.000	No Ice	0.645	0.520	0.016
			0.000			1/2" Ice	0.757	0.623	0.022
			-2.000			1" Ice	0.877	0.735	0.029
RRUS-11	A	From Leg	4.000	0.000	162.000	No Ice	3.249	1.373	0.048

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
			0.000			1/2" Ice	3.491	1.551	0.068
			-2.000			1" Ice	3.741	1.738	0.092
RRUS-11	B	From Leg	4.000	0.000	162.000	No Ice	3.249	1.373	0.048
			0.000			1/2" Ice	3.491	1.551	0.068
			-2.000			1" Ice	3.741	1.738	0.092
RRUS-11	C	From Leg	4.000	0.000	162.000	No Ice	3.249	1.373	0.048
			0.000			1/2" Ice	3.491	1.551	0.068
			-2.000			1" Ice	3.741	1.738	0.092
DC6-48-60-18-8F	C	From Leg	4.000	0.000	162.000	No Ice	1.467	1.467	0.019
			0.000			1/2" Ice	1.667	1.667	0.037
			-2.000			1" Ice	1.878	1.878	0.057
OPA-65R-LCUU-H6 w/Mount Pipe	A	From Leg	4.000	0.000	162.000	No Ice	10.598	8.113	0.092
			0.000			1/2" Ice	11.268	9.304	0.174
			1.000			1" Ice	11.906	10.209	0.263
OPA-65R-LCUU-H6 w/Mount Pipe	B	From Leg	4.000	0.000	162.000	No Ice	10.598	8.113	0.092
			0.000			1/2" Ice	11.268	9.304	0.174
			1.000			1" Ice	11.906	10.209	0.263
OPA-65R-LCUU-H6 w/Mount Pipe	C	From Leg	4.000	0.000	162.000	No Ice	10.598	8.113	0.092
			0.000			1/2" Ice	11.268	9.304	0.174
			1.000			1" Ice	11.906	10.209	0.263
RRUS12/RRUS A2	A	From Leg	4.000	0.000	162.000	No Ice	3.667	2.141	0.072
			0.000			1/2" Ice	3.924	2.347	0.099
			1.000			1" Ice	4.189	2.563	0.130
RRUS12/RRUS A2	B	From Leg	4.000	0.000	162.000	No Ice	3.667	2.141	0.072
			0.000			1/2" Ice	3.924	2.347	0.099
			1.000			1" Ice	4.189	2.563	0.130
RRUS12/RRUS A2	C	From Leg	4.000	0.000	162.000	No Ice	3.667	2.141	0.072
			0.000			1/2" Ice	3.924	2.347	0.099
			1.000			1" Ice	4.189	2.563	0.130
Platform Mount [LP 403-1]	C	None		0.000	162.000	No Ice	18.850	18.850	1.500
						1/2" Ice	24.300	24.300	1.797
						1" Ice	29.750	29.750	2.093
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	162.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			1.000			1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	162.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			1.000			1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	162.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			1.000			1" Ice	2.294	2.294	0.048
***									
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	7.271	7.821	0.047
			0.000			1/2" Ice	7.877	9.010	0.114
			0.000			1" Ice	8.484	9.912	0.189
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	7.271	7.821	0.047
			0.000			1/2" Ice	7.877	9.010	0.114
			0.000			1" Ice	8.484	9.912	0.189
LNX-6514DS-T4M w/	A	From Leg	4.000	0.000	150.000	No Ice	8.449	6.885	0.056

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
Mount Pipe			0.000 0.000			1/2" Ice 1" Ice	9.044 9.631	7.951 8.809	0.124 0.199
LNX-6514DS-T4M w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	8.449 9.044 9.631	6.885 7.951 8.809	0.056 0.124 0.199
(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.029 5.583 6.103	5.289 6.459 7.348	0.041 0.087 0.140
(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.029 5.583 6.103	5.289 6.459 7.348	0.041 0.087 0.140
(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.029 5.583 6.103	5.289 6.459 7.348	0.041 0.087 0.140
P65-16-XL-R w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	8.544 9.128 9.716	6.569 7.480 8.335	0.082 0.149 0.225
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.564 5.105 5.612	10.728 11.990 12.968	0.046 0.113 0.187
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.367 0.451 0.543	0.085 0.136 0.196	0.003 0.005 0.009
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.367 0.451 0.543	0.085 0.136 0.196	0.003 0.005 0.009
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.367 0.451 0.543	0.085 0.136 0.196	0.003 0.005 0.009
DB-T1-6Z-8AB-0Z	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.600 5.915 6.240	2.333 2.558 2.791	0.044 0.080 0.120
Platform Mount [LP 403-1]	C	None		0.000	150.000	No Ice 1/2" Ice 1" Ice	18.850 24.300 29.750	18.850 24.300 29.750	1.500 1.797 2.093
****									
Pipe Mount [PM 601-3]	C	None		0.000	151.000	No Ice 1/2" Ice 1" Ice	4.390 5.480 6.570	4.390 5.480 6.570	0.195 0.237 0.280
RRH2X40-AWS	A	From Leg	0.500 0.000 0.000	0.000	151.000	No Ice 1/2" Ice 1" Ice	2.522 2.753 2.993	1.589 1.795 2.010	0.044 0.061 0.082
RRH2X40-AWS	B	From Leg	0.500 0.000 0.000	0.000	151.000	No Ice 1/2" Ice 1" Ice	2.522 2.753 2.993	1.589 1.795 2.010	0.044 0.061 0.082
RRH2X40-AWS	C	From Leg	0.500 0.000 0.000	0.000	151.000	No Ice 1/2" Ice 1" Ice	2.522 2.753 2.993	1.589 1.795 2.010	0.044 0.061 0.082
*****									

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
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD201-1	A	From Leg	4.000 0.000 5.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	0.628 1.539 2.467	0.628 1.539 2.467	0.004 0.011 0.023
Side Arm Mount [SO 701-3]	C	None		0.000	125.000	No Ice 1/2" Ice 1" Ice	2.830 3.920 5.010	2.830 3.920 5.010	0.195 0.237 0.279
***									
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-3]	C	None		0.000	110.000	No Ice 1/2" Ice 1" Ice	2.830 3.920 5.010	2.830 3.920 5.010	0.195 0.237 0.279
***									
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	95.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	95.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-3]	C	None		0.000	95.000	No Ice 1/2" Ice 1" Ice	2.830 3.920 5.010	2.830 3.920 5.010	0.195 0.237 0.279
***									
DB222	A	From Leg	4.000 0.000 5.000	0.000	80.000	No Ice 1/2" Ice 1" Ice	1.600 2.880 4.160	1.600 2.880 4.160	0.016 0.021 0.026
PD128-1	C	From Leg	4.000 0.000 5.000	0.000	80.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-3]	C	None		0.000	80.000	No Ice 1/2" Ice 1" Ice	2.830 3.920 5.010	2.830 3.920 5.010	0.195 0.237 0.279
****									

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 190.000-180.000	185.000	1.636	0.030	25.000	A B	0.000 0.000	25.000 25.000	25.000	100.00 100.00	0.000 0.000	0.000 0.000

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	25.000		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.597	0.030	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	3.584
L3 160.000-140.000	150.000	1.541	0.029	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	14.060
L4 140.000-120.000	130.000	1.48	0.027	80.000	A	0.000	80.000	80.000	100.00	0.000	0.000
					B	0.000	80.000		100.00	0.000	0.000
					C	0.000	80.000		100.00	0.000	14.060
L5 120.000-113.330	116.665	1.434	0.027	30.015	A	0.000	30.015	30.015	100.00	0.000	0.000
					B	0.000	30.015		100.00	0.000	0.000
					C	0.000	30.015		100.00	0.000	4.689
L6 113.330-103.000	108.165	1.404	0.026	46.485	A	0.000	46.485	46.485	100.00	0.000	0.000
					B	0.000	46.485		100.00	0.000	0.000
					C	0.000	46.485		100.00	0.000	8.845
L7 103.000-100.000	101.500	1.379	0.025	13.500	A	0.000	13.500	13.500	100.00	0.000	0.000
					B	0.000	13.500		100.00	0.000	0.000
					C	0.000	13.500		100.00	0.000	2.609
L8 100.000-90.000	95.000	1.353	0.025	50.000	A	0.000	50.000	50.000	100.00	0.000	0.000
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	8.697
L9 90.000-85.500	87.750	1.322	0.024	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	4.278
L10 85.500-84.000	84.750	1.309	0.024	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.617
L11 84.000-80.000	82.000	1.297	0.024	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	4.312
L12 80.000-60.000	70.000	1.24	0.023	100.000	A	0.000	100.000	100.000	100.00	0.000	0.000
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	19.477
L13 60.000-58.500	59.250	1.182	0.022	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.617
L14 58.500-47.250	52.875	1.144	0.021	56.250	A	0.000	56.250	56.250	100.00	0.000	0.000
					B	0.000	56.250		100.00	0.000	0.000
					C	0.000	56.250		100.00	0.000	9.586
L15 47.250-40.000	43.625	1.083	0.020	36.250	A	0.000	36.250	36.250	100.00	0.000	0.000
					B	0.000	36.250		100.00	0.000	0.000
					C	0.000	36.250		100.00	0.000	7.649
L16 40.000-32.250	36.125	1.026	0.019	38.750	A	0.000	38.750	38.750	100.00	0.000	0.000
					B	0.000	38.750		100.00	0.000	0.000
					C	0.000	38.750		100.00	0.000	8.104
L17 32.250-29.750	31.000	1	0.018	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	2.278
L18 29.750-20.000	24.875	1	0.018	48.750	A	0.000	48.750	48.750	100.00	0.000	0.000
					B	0.000	48.750		100.00	0.000	0.000
					C	0.000	48.750		100.00	0.000	8.885
L19 20.000-4.250	12.125	1	0.018	78.750	A	0.000	78.750	78.750	100.00	0.000	0.000
					B	0.000	78.750		100.00	0.000	0.000
					C	0.000	78.750		100.00	0.000	14.353
L20 4.250-0.000	2.125	1	0.018	21.250	A	0.000	21.250	21.250	100.00	0.000	0.000
					B	0.000	21.250		100.00	0.000	0.000
					C	0.000	21.250		100.00	0.000	3.873

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 190.000-180.000	185.000	1.636	0.003	0.750	26.250	A	0.000	26.250	26.250	100.00	0.000	0.000
						B	0.000	26.250		100.00	0.000	0.000
						C	0.000	26.250		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.597	0.003	0.750	62.500	A	0.000	62.500	62.500	100.00	0.000	0.000
						B	0.000	62.500		100.00	0.000	0.000
						C	0.000	62.500		100.00	0.000	6.434
L3 160.000-140.000	150.000	1.541	0.003	0.750	72.500	A	0.000	72.500	72.500	100.00	0.000	0.000
						B	0.000	72.500		100.00	0.000	0.000
						C	0.000	72.500		100.00	0.000	26.060
L4 140.000-120.000	130.000	1.48	0.003	0.750	82.500	A	0.000	82.500	82.500	100.00	0.000	0.000
						B	0.000	82.500		100.00	0.000	0.000
						C	0.000	82.500		100.00	0.000	26.060
L5 120.000-113.330	116.665	1.434	0.003	0.750	30.849	A	0.000	30.849	30.849	100.00	0.000	0.000
						B	0.000	30.849		100.00	0.000	0.000
						C	0.000	30.849		100.00	0.000	8.691
L6 113.330-103.000	108.165	1.404	0.003	0.750	47.776	A	0.000	47.776	47.776	100.00	0.000	0.000
						B	0.000	47.776		100.00	0.000	0.000
						C	0.000	47.776		100.00	0.000	16.627
L7 103.000-100.000	101.500	1.379	0.003	0.750	13.875	A	0.000	13.875	13.875	100.00	0.000	0.000
						B	0.000	13.875		100.00	0.000	0.000
						C	0.000	13.875		100.00	0.000	4.909
L8 100.000-90.000	95.000	1.353	0.003	0.750	51.250	A	0.000	51.250	51.250	100.00	0.000	0.000
						B	0.000	51.250		100.00	0.000	0.000
						C	0.000	51.250		100.00	0.000	16.363
L9 90.000-85.500	87.750	1.322	0.003	0.750	23.063	A	0.000	23.063	23.063	100.00	0.000	0.000
						B	0.000	23.063		100.00	0.000	0.000
						C	0.000	23.063		100.00	0.000	8.020
L10 85.500-84.000	84.750	1.309	0.003	0.750	7.688	A	0.000	7.688	7.688	100.00	0.000	0.000
						B	0.000	7.688		100.00	0.000	0.000
						C	0.000	7.688		100.00	0.000	3.017
L11 84.000-80.000	82.000	1.297	0.003	0.750	20.500	A	0.000	20.500	20.500	100.00	0.000	0.000
						B	0.000	20.500		100.00	0.000	0.000
						C	0.000	20.500		100.00	0.000	8.045
L12 80.000-60.000	70.000	1.24	0.003	0.750	102.500	A	0.000	102.500	102.500	100.00	0.000	0.000
						B	0.000	102.500		100.00	0.000	0.000
						C	0.000	102.500		100.00	0.000	36.477
L13 60.000-58.500	59.250	1.182	0.002	0.750	7.688	A	0.000	7.688	7.688	100.00	0.000	0.000
						B	0.000	7.688		100.00	0.000	0.000
						C	0.000	7.688		100.00	0.000	3.017
L14 58.500-47.250	52.875	1.144	0.002	0.750	57.656	A	0.000	57.656	57.656	100.00	0.000	0.000
						B	0.000	57.656		100.00	0.000	0.000
						C	0.000	57.656		100.00	0.000	17.711
L15 47.250-40.000	43.625	1.083	0.002	0.750	37.156	A	0.000	37.156	37.156	100.00	0.000	0.000
						B	0.000	37.156		100.00	0.000	0.000
						C	0.000	37.156		100.00	0.000	14.041
L16 40.000-32.250	36.125	1.026	0.002	0.750	39.719	A	0.000	39.719	39.719	100.00	0.000	0.000
						B	0.000	39.719		100.00	0.000	0.000
						C	0.000	39.719		100.00	0.000	14.880
L17 32.250-29.750	31.000	1	0.002	0.750	12.813	A	0.000	12.813	12.813	100.00	0.000	0.000
						B	0.000	12.813		100.00	0.000	0.000
						C	0.000	12.813		100.00	0.000	4.195
L18 29.750-20.000	24.875	1	0.002	0.750	49.969	A	0.000	49.969	49.969	100.00	0.000	0.000
						B	0.000	49.969		100.00	0.000	0.000
						C	0.000	49.969		100.00	0.000	16.361
L19 20.000-4.250	12.125	1	0.002	0.750	80.719	A	0.000	80.719	80.719	100.00	0.000	0.000
						B	0.000	80.719		100.00	0.000	0.000
						C	0.000	80.719		100.00	0.000	26.429
L20 4.250-0.000	2.125	1	0.002	0.750	21.781	A	0.000	21.781	21.781	100.00	0.000	0.000
						B	0.000	21.781		100.00	0.000	0.000
						C	0.000	21.781		100.00	0.000	7.132

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 190.000-180.000	185.000	1.636	0.010	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.597	0.010	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	3.584
L3 160.000-140.000	150.000	1.541	0.010	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	14.060
L4 140.000-120.000	130.000	1.48	0.009	80.000	A	0.000	80.000	80.000	100.00	0.000	0.000
					B	0.000	80.000		100.00	0.000	0.000
					C	0.000	80.000		100.00	0.000	14.060
L5 120.000-113.330	116.665	1.434	0.009	30.015	A	0.000	30.015	30.015	100.00	0.000	0.000
					B	0.000	30.015		100.00	0.000	0.000
					C	0.000	30.015		100.00	0.000	4.689
L6 113.330-103.000	108.165	1.404	0.009	46.485	A	0.000	46.485	46.485	100.00	0.000	0.000
					B	0.000	46.485		100.00	0.000	0.000
					C	0.000	46.485		100.00	0.000	8.845
L7 103.000-100.000	101.500	1.379	0.009	13.500	A	0.000	13.500	13.500	100.00	0.000	0.000
					B	0.000	13.500		100.00	0.000	0.000
					C	0.000	13.500		100.00	0.000	2.609
L8 100.000-90.000	95.000	1.353	0.009	50.000	A	0.000	50.000	50.000	100.00	0.000	0.000
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	8.697
L9 90.000-85.500	87.750	1.322	0.008	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	4.278
L10 85.500-84.000	84.750	1.309	0.008	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.617
L11 84.000-80.000	82.000	1.297	0.008	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	4.312
L12 80.000-60.000	70.000	1.24	0.008	100.000	A	0.000	100.000	100.000	100.00	0.000	0.000
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	19.477
L13 60.000-58.500	59.250	1.182	0.008	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.617
L14 58.500-47.250	52.875	1.144	0.007	56.250	A	0.000	56.250	56.250	100.00	0.000	0.000
					B	0.000	56.250		100.00	0.000	0.000
					C	0.000	56.250		100.00	0.000	9.586
L15 47.250-40.000	43.625	1.083	0.007	36.250	A	0.000	36.250	36.250	100.00	0.000	0.000
					B	0.000	36.250		100.00	0.000	0.000
					C	0.000	36.250		100.00	0.000	7.649
L16 40.000-32.250	36.125	1.026	0.007	38.750	A	0.000	38.750	38.750	100.00	0.000	0.000
					B	0.000	38.750		100.00	0.000	0.000
					C	0.000	38.750		100.00	0.000	8.104
L17 32.250-29.750	31.000	1	0.006	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	2.278
L18 29.750-20.000	24.875	1	0.006	48.750	A	0.000	48.750	48.750	100.00	0.000	0.000
					B	0.000	48.750		100.00	0.000	0.000
					C	0.000	48.750		100.00	0.000	8.885
L19 20.000-4.250	12.125	1	0.006	78.750	A	0.000	78.750	78.750	100.00	0.000	0.000
					B	0.000	78.750		100.00	0.000	0.000
					C	0.000	78.750		100.00	0.000	14.353
L20 4.250-0.000	2.125	1	0.006	21.250	A	0.000	21.250	21.250	100.00	0.000	0.000
					B	0.000	21.250		100.00	0.000	0.000
					C	0.000	21.250		100.00	0.000	3.873

Load Combinations

Comb. No.	Description
1	Dead Only

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	190 - 180	Pole	Max Tension	11	0.000	-0.000	0.001
			Max. Compression	14	-7.373	0.099	-0.057
			Max. Mx	11	-4.920	43.882	0.120
			Max. My	8	-4.918	-0.118	-44.000
			Max. Vy	11	-6.521	43.882	0.120
			Max. Vx	8	6.533	-0.118	-44.000
			Max. Torque	7			-0.361
L2	180 - 160	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.046	0.882	-0.510
			Max. Mx	11	-13.033	254.326	0.272
			Max. My	8	-13.028	-0.176	-254.631
			Max. Vy	11	-18.332	254.326	0.272
			Max. Vx	8	18.346	-0.176	-254.631
			Max. Torque	13			0.778
L3	160 - 140	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.349	2.661	-2.113
			Max. Mx	11	-19.117	714.572	3.104
			Max. My	8	-19.102	-3.057	-717.112
			Max. Vy	11	-27.592	714.572	3.104
			Max. Vx	8	27.789	-3.057	-717.112
			Max. Torque	13			2.171
L4	140 - 120	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-37.001	5.137	-3.244
			Max. Mx	11	-23.780	1297.429	9.090
			Max. My	8	-23.766	-8.698	-1303.628

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-30.701	1297.429	9.090
			Max. Vx	8	30.899	-8.698	-1303.628
			Max. Torque	13			2.329
L5	120 - 113.33	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.317	6.062	-3.777
			Max. Mx	11	-25.436	1505.741	11.049
			Max. My	8	-25.423	-10.558	-1513.187
			Max. Vy	11	-31.716	1505.741	11.049
			Max. Vx	8	31.913	-10.558	-1513.187
			Max. Torque	13			2.192
L6	113.33 - 103	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-43.909	7.496	-4.196
			Max. Mx	11	-28.894	1844.303	14.222
			Max. My	8	-28.881	-13.442	-1853.523
			Max. Vy	11	-33.588	1844.303	14.222
			Max. Vx	8	33.785	-13.442	-1853.523
			Max. Torque	13			2.234
L7	103 - 100	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-45.149	7.912	-4.436
			Max. Mx	11	-29.842	1945.816	15.104
			Max. My	8	-29.830	-14.280	-1955.599
			Max. Vy	11	-34.047	1945.816	15.104
			Max. Vx	8	34.244	-14.280	-1955.599
			Max. Torque	2			2.025
L8	100 - 90	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-49.901	9.449	-4.899
			Max. Mx	11	-33.444	2296.448	18.172
			Max. My	8	-33.433	-17.040	-2307.926
			Max. Vy	11	-35.920	2296.448	18.172
			Max. Vx	8	36.117	-17.040	-2307.926
			Max. Torque	2			2.154
L9	90 - 85.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-52.117	10.140	-5.296
			Max. Mx	11	-35.192	2459.843	19.486
			Max. My	8	-35.181	-18.283	-2472.161
			Max. Vy	11	-36.655	2459.843	19.486
			Max. Vx	8	36.853	-18.283	-2472.161
			Max. Torque	2			2.217
L10	85.5 - 84	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-52.929	10.368	-5.428
			Max. Mx	11	-35.847	2515.049	19.924
			Max. My	8	-35.836	-18.698	-2527.647
			Max. Vy	11	-36.907	2515.049	19.924
			Max. Vx	8	37.106	-18.698	-2527.647
			Max. Torque	2			2.240
L11	84 - 80	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-54.833	10.985	-5.783
			Max. Mx	11	-37.344	2664.079	21.093
			Max. My	8	-37.333	-19.803	-2677.424
			Max. Vy	11	-37.562	2664.079	21.093
			Max. Vx	8	37.759	-19.803	-2677.424
			Max. Torque	2			2.303
L12	80 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-65.286	14.208	-7.490
			Max. Mx	11	-45.709	3451.117	26.987
			Max. My	8	-45.701	-25.265	-3468.064
			Max. Vy	11	-40.771	3451.117	26.987
			Max. Vx	8	40.968	-25.265	-3468.064
			Max. Torque	2			2.866
L13	60 - 58.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-66.165	14.427	-7.616
			Max. Mx	11	-46.437	3512.463	27.424
			Max. My	8	-46.429	-25.679	-3529.691
			Max. Vy	5	40.986	-3505.959	-30.843
			Max. Vx	8	41.185	-25.679	-3529.691
			Max. Torque	2			2.888
L14	58.5 - 47.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-72.199	16.086	-8.574
			Max. Mx	11	-51.396	3981.835	30.698

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	8	-51.389	-28.780	-4001.160
			Max. Vy	11	-42.409	3981.835	30.698
			Max. Vx	8	42.606	-28.780	-4001.160
			Max. Torque	2			3.008
L15	47.25 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-76.745	17.154	-9.191
			Max. Mx	11	-55.244	4292.759	32.803
			Max. My	8	-55.238	-30.774	-4313.433
			Max. Vy	11	-43.322	4292.759	32.803
			Max. Vx	8	43.519	-30.774	-4313.433
			Max. Torque	2			3.100
L16	40 - 32.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-81.604	18.294	-9.850
			Max. Mx	11	-59.370	4632.116	35.048
			Max. My	8	-59.365	-32.901	-4654.229
			Max. Vy	5	44.212	-4623.846	-39.551
			Max. Vx	8	44.409	-32.901	-4654.229
			Max. Torque	2			3.193
L17	32.25 - 29.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-83.471	18.663	-10.063
			Max. Mx	11	-60.997	4743.033	35.770
			Max. My	8	-60.993	-33.586	-4765.610
			Max. Vy	5	44.485	-4734.596	-40.376
			Max. Vx	2	-44.682	42.566	4761.243
			Max. Torque	2			3.218
L18	29.75 - 20	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-89.858	20.098	-10.892
			Max. Mx	11	-66.480	5181.838	38.582
			Max. My	8	-66.477	-36.251	-5206.218
			Max. Vy	5	45.482	-5172.750	-43.588
			Max. Vx	2	-45.678	45.924	5201.469
			Max. Torque	2			3.316
L19	20 - 4.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-101.425	22.415	-12.230
			Max. Mx	11	-76.598	5910.743	43.092
			Max. My	8	-76.597	-40.529	-5938.016
			Max. Vy	5	47.019	-5900.610	-48.742
			Max. Vx	2	-47.214	51.310	5932.654
			Max. Torque	2			3.474
L20	4.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-104.908	23.041	-12.592
			Max. Mx	11	-79.690	6111.494	44.301
			Max. My	8	-79.690	-41.677	-6139.542
			Max. Vy	5	47.419	-6101.081	-50.124
			Max. Vx	2	-47.614	52.754	6134.016
			Max. Torque	2			3.517

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	104.908	-0.001	0.001
	Max. H_x	11	79.699	47.400	0.304
	Max. H_z	2	79.699	0.304	47.599
	Max. M_x	2	6134.016	0.304	47.599
	Max. M_z	5	6101.081	-47.404	-0.304
	Max. Torsion	2	3.517	0.304	47.599
	Min. Vert	11	79.699	47.400	0.304
	Min. H_x	5	79.699	-47.404	-0.304
	Min. H_z	8	79.699	-0.304	-47.597
	Min. M_x	8	-6139.542	-0.304	-47.597
	Min. M_z	11	-6111.494	47.400	0.304
	Min. Torsion	8	-3.513	-0.304	-47.597

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	79.699	-0.000	0.000	2.839	5.410	0.000
Dead+Wind 0 deg - No Ice	79.699	-0.304	-47.599	-6134.016	52.754	-3.517
Dead+Wind 30 deg - No Ice	79.699	23.440	-41.071	-5288.416	-3007.127	-2.920
Dead+Wind 60 deg - No Ice	79.699	40.904	-23.536	-3024.783	-5259.780	-1.539
Dead+Wind 90 deg - No Ice	79.699	47.404	0.304	50.124	-6101.081	0.254
Dead+Wind 120 deg - No Ice	79.699	41.208	24.064	3112.350	-5306.936	1.977
Dead+Wind 150 deg - No Ice	79.699	23.967	41.375	5341.389	-3088.875	3.170
Dead+Wind 180 deg - No Ice	79.699	0.304	47.597	6139.542	-41.677	3.513
Dead+Wind 210 deg - No Ice	79.699	-23.440	41.071	5294.234	3018.202	2.916
Dead+Wind 240 deg - No Ice	79.699	-40.904	23.536	3030.602	5270.856	1.540
Dead+Wind 270 deg - No Ice	79.699	-47.400	-0.304	-44.301	6111.494	-0.250
Dead+Wind 300 deg - No Ice	79.699	-41.208	-24.064	-3106.534	5318.015	-1.974
Dead+Wind 330 deg - No Ice	79.699	-23.967	-41.375	-5335.575	3099.952	-3.170
Dead+Ice+Temp	104.908	0.001	-0.001	12.592	23.041	-0.000
Dead+Wind 0 deg+Ice+Temp	104.908	-0.034	-6.484	-833.758	28.708	-0.641
Dead+Wind 30 deg+Ice+Temp	104.908	3.203	-5.599	-717.722	-393.666	-0.624
Dead+Wind 60 deg+Ice+Temp	104.908	5.581	-3.213	-405.935	-704.266	-0.439
Dead+Wind 90 deg+Ice+Temp	104.908	6.463	0.034	18.061	-819.868	-0.137
Dead+Wind 120 deg+Ice+Temp	104.908	5.614	3.271	440.655	-709.495	0.202
Dead+Wind 150 deg+Ice+Temp	104.908	3.261	5.632	748.638	-402.736	0.487
Dead+Wind 180 deg+Ice+Temp	104.908	0.034	6.484	859.449	18.250	0.641
Dead+Wind 210 deg+Ice+Temp	104.908	-3.203	5.599	743.409	440.637	0.624
Dead+Wind 240 deg+Ice+Temp	104.908	-5.581	3.213	431.611	751.248	0.439
Dead+Wind 270 deg+Ice+Temp	104.908	-6.463	-0.034	7.602	866.853	0.137
Dead+Wind 300 deg+Ice+Temp	104.908	-5.614	-3.271	-415.005	756.477	-0.202
Dead+Wind 330 deg+Ice+Temp	104.908	-3.261	-5.632	-722.975	449.696	-0.487
Dead+Wind 0 deg - Service	79.699	-0.105	-16.468	-2121.045	21.886	-1.219
Dead+Wind 30 deg - Service	79.699	8.110	-14.210	-1828.522	-1037.198	-1.012
Dead+Wind 60 deg - Service	79.699	14.153	-8.144	-1045.032	-1816.882	-0.533
Dead+Wind 90 deg - Service	79.699	16.401	0.105	19.252	-2108.014	0.088
Dead+Wind 120 deg - Service	79.699	14.258	8.326	1079.159	-1833.223	0.685
Dead+Wind 150 deg - Service	79.699	8.293	14.316	1850.684	-1065.504	1.099
Dead+Wind 180 deg - Service	79.699	0.105	16.468	2126.866	-10.797	1.218
Dead+Wind 210 deg - Service	79.699	-8.110	14.210	1834.344	1048.288	1.011
Dead+Wind 240 deg - Service	79.699	-14.153	8.144	1050.854	1827.973	0.533
Dead+Wind 270 deg - Service	79.699	-16.401	-0.105	-13.431	2119.104	-0.087
Dead+Wind 300 deg - Service	79.699	-14.258	-8.326	-1073.338	1844.314	-0.685
Dead+Wind 330 deg - Service	79.699	-8.293	-14.316	-1844.863	1076.594	-1.099

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	0.000	-79.699	0.000	0.000	79.699	-0.000	0.000%
2	-0.304	-79.699	-47.600	0.304	79.699	47.599	0.001%
3	23.440	-79.699	-41.071	-23.440	79.699	41.071	0.000%
4	40.904	-79.699	-23.536	-40.904	79.699	23.536	0.000%
5	47.408	-79.699	0.304	-47.404	79.699	-0.304	0.003%
6	41.208	-79.699	24.064	-41.208	79.699	-24.064	0.000%
7	23.967	-79.699	41.375	-23.967	79.699	-41.375	0.000%
8	0.304	-79.699	47.600	-0.304	79.699	-47.597	0.003%
9	-23.440	-79.699	41.071	23.440	79.699	-41.071	0.000%
10	-40.904	-79.699	23.536	40.904	79.699	-23.536	0.000%
11	-47.408	-79.699	-0.304	47.400	79.699	0.304	0.008%
12	-41.208	-79.699	-24.064	41.208	79.699	24.064	0.000%
13	-23.967	-79.699	-41.375	23.967	79.699	41.375	0.000%
14	0.000	-104.908	0.000	-0.001	104.908	0.001	0.001%
15	-0.034	-104.908	-6.484	0.034	104.908	6.484	0.000%
16	3.203	-104.908	-5.599	-3.203	104.908	5.599	0.000%
17	5.581	-104.908	-3.213	-5.581	104.908	3.213	0.000%
18	6.463	-104.908	0.034	-6.463	104.908	-0.034	0.000%
19	5.614	-104.908	3.271	-5.614	104.908	-3.271	0.000%
20	3.261	-104.908	5.632	-3.261	104.908	-5.632	0.000%
21	0.034	-104.908	6.484	-0.034	104.908	-6.484	0.000%
22	-3.203	-104.908	5.599	3.203	104.908	-5.599	0.000%
23	-5.581	-104.908	3.213	5.581	104.908	-3.213	0.000%
24	-6.463	-104.908	-0.034	6.463	104.908	0.034	0.000%
25	-5.614	-104.908	-3.271	5.614	104.908	3.271	0.000%
26	-3.261	-104.908	-5.632	3.261	104.908	5.632	0.000%
27	-0.105	-79.699	-16.471	0.105	79.699	16.468	0.003%
28	8.111	-79.699	-14.211	-8.110	79.699	14.210	0.001%
29	14.154	-79.699	-8.144	-14.153	79.699	8.144	0.001%
30	16.404	-79.699	0.105	-16.401	79.699	-0.105	0.003%
31	14.259	-79.699	8.327	-14.258	79.699	-8.326	0.001%
32	8.293	-79.699	14.317	-8.293	79.699	-14.316	0.001%
33	0.105	-79.699	16.471	-0.105	79.699	-16.468	0.003%
34	-8.111	-79.699	14.211	8.110	79.699	-14.210	0.001%
35	-14.154	-79.699	8.144	14.153	79.699	-8.144	0.001%
36	-16.404	-79.699	-0.105	16.401	79.699	0.105	0.003%
37	-14.259	-79.699	-8.327	14.258	79.699	8.326	0.001%
38	-8.293	-79.699	-14.317	8.293	79.699	14.316	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00000001	0.00009689
3	Yes	18	0.00000001	0.00007955
4	Yes	18	0.00000001	0.00008274
5	Yes	14	0.00004849	0.00008060
6	Yes	18	0.00000001	0.00008745
7	Yes	18	0.00000001	0.00008298
8	Yes	14	0.00004848	0.00012526
9	Yes	18	0.00000001	0.00008474
10	Yes	18	0.00000001	0.00008118
11	Yes	13	0.00011202	0.00008395
12	Yes	18	0.00000001	0.00008387
13	Yes	18	0.00000001	0.00008873
14	Yes	8	0.00000001	0.00004547
15	Yes	15	0.00000001	0.00014642
16	Yes	15	0.00000001	0.00014612
17	Yes	15	0.00000001	0.00014521
18	Yes	15	0.00000001	0.00014382
19	Yes	15	0.00000001	0.00014972
20	Yes	16	0.00000001	0.00006872
21	Yes	16	0.00000001	0.00006826
22	Yes	16	0.00000001	0.00007017
23	Yes	16	0.00000001	0.00007029
24	Yes	16	0.00000001	0.00006884

25	Yes	16	0.00000001	0.00006987
26	Yes	16	0.00000001	0.00006906
27	Yes	13	0.00011383	0.00006124
28	Yes	14	0.00000001	0.00010925
29	Yes	14	0.00000001	0.00012187
30	Yes	13	0.00011384	0.00003028
31	Yes	14	0.00000001	0.00013243
32	Yes	14	0.00000001	0.00011447
33	Yes	13	0.00011384	0.00005331
34	Yes	14	0.00000001	0.00013046
35	Yes	14	0.00000001	0.00011561
36	Yes	13	0.00011384	0.00002761
37	Yes	14	0.00000001	0.00011776
38	Yes	14	0.00000001	0.00013793

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load	Tilt	Twist
	ft	in	Comb.	°	°
L1	190 - 180	24.217	38	1.031	0.002
L2	180 - 160	22.061	38	1.026	0.002
L3	160 - 140	17.821	38	0.988	0.001
L4	140 - 120	13.833	38	0.902	0.001
L5	120 - 113.33	10.291	38	0.777	0.001
L6	113.33 - 103	9.234	38	0.736	0.001
L7	103 - 100	7.702	38	0.678	0.001
L8	100 - 90	7.283	38	0.659	0.001
L9	90 - 85.5	5.958	38	0.605	0.001
L10	85.5 - 84	5.398	38	0.582	0.001
L11	84 - 80	5.216	38	0.575	0.001
L12	80 - 60	4.744	38	0.551	0.001
L13	60 - 58.5	2.691	38	0.424	0.000
L14	58.5 - 47.25	2.559	38	0.415	0.000
L15	47.25 - 40	1.676	38	0.333	0.000
L16	40 - 32.25	1.206	38	0.286	0.000
L17	32.25 - 29.75	0.786	38	0.231	0.000
L18	29.75 - 20	0.669	38	0.216	0.000
L19	20 - 4.25	0.302	38	0.143	0.000
L20	4.25 - 0	0.013	38	0.029	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	°	°	ft
190.000	PD201-7	38	24.217	1.031	0.002	150726
188.000	800MHZ RRH	38	23.785	1.031	0.002	150726
182.000	Platform Mount [LP 403-1]	38	22.491	1.028	0.002	93277
173.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	38	20.560	1.018	0.002	37496
162.000	(2) 7770.00 w/ Mount Pipe	38	18.237	0.994	0.001	20910
151.000	Pipe Mount [PM 601-3]	38	15.983	0.955	0.001	14042
150.000	(2) DB846F65ZAXY w/ Mount Pipe	38	15.783	0.951	0.001	13624
125.000	PD128-1	38	11.125	0.809	0.001	8428
110.000	PD128-1	38	8.726	0.718	0.001	10143
95.000	PD128-1	38	6.606	0.631	0.001	10591
80.000	DB222	38	4.744	0.551	0.001	9965

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load	Tilt	Twist
	ft	in	Comb.	°	°
L1	190 - 180	69.912	13	2.978	0.005

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	180 - 160	63.689	13	2.964	0.005
L3	160 - 140	51.452	13	2.854	0.004
L4	140 - 120	39.940	13	2.605	0.003
L5	120 - 113.33	29.717	13	2.244	0.002
L6	113.33 - 103	26.665	13	2.126	0.002
L7	103 - 100	22.243	13	1.957	0.002
L8	100 - 90	21.031	13	1.902	0.002
L9	90 - 85.5	17.206	13	1.748	0.002
L10	85.5 - 84	15.590	13	1.681	0.002
L11	84 - 80	15.065	13	1.660	0.002
L12	80 - 60	13.703	13	1.592	0.001
L13	60 - 58.5	7.772	13	1.224	0.001
L14	58.5 - 47.25	7.392	13	1.198	0.001
L15	47.25 - 40	4.842	13	0.962	0.001
L16	40 - 32.25	3.484	13	0.825	0.001
L17	32.25 - 29.75	2.272	13	0.667	0.001
L18	29.75 - 20	1.934	13	0.623	0.000
L19	20 - 4.25	0.872	13	0.414	0.000
L20	4.25 - 0	0.038	13	0.085	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	PD201-7	13	69.912	2.978	0.005	52519
188.000	800MHZ RRH	13	68.666	2.977	0.005	52519
182.000	Platform Mount [LP 403-1]	13	64.931	2.968	0.005	32501
173.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	13	59.358	2.940	0.005	13062
162.000	(2) 7770.00 w/ Mount Pipe	13	52.652	2.871	0.004	7284
151.000	Pipe Mount [PM 601-3]	13	46.147	2.759	0.004	4890
150.000	(2) DB846F65ZAXY w/ Mount Pipe	13	45.569	2.747	0.004	4744
125.000	PD128-1	13	32.126	2.337	0.003	2930
110.000	PD128-1	13	25.199	2.072	0.002	3522
95.000	PD128-1	13	19.078	1.821	0.002	3676
80.000	DB222	13	13.703	1.592	0.001	3457

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	190 - 180 (1)	30" x 0.375"	10.000	0.000	0.0	25.075	34.901	-4.916	875.146	0.006
L2	180 - 160 (2)	36" x 0.375"	20.000	0.000	0.0	23.696	41.970	-13.024	994.507	0.013
L3	160 - 140 (3)	42" x 0.375"	20.000	0.000	0.0	22.711	49.038	-19.086	1113.690	0.017
L4	140 - 120 (4)	P48x3/8	20.000	0.000	0.0	21.972	56.107	-23.751	1232.770	0.019
L5	120 - 113.33 (5)	54" x 0.375"	6.670	0.000	0.0	21.397	63.175	-25.408	1351.780	0.019
L6	113.33 - 103 (6)	RPS 54" x 0.49054"	10.330	0.000	0.0	21.386	82.462	-28.868	1763.510	0.016
L7	103 - 100 (7)	RPS 54" x 0.49054"	3.000	0.000	0.0	21.386	82.462	-29.817	1763.510	0.017
L8	100 - 90 (8)	RPS 60" x 0.47803"	10.000	0.000	0.0	20.926	89.389	-33.420	1870.570	0.018
L9	90 - 85.5 (9)	RPS 60" x 0.55603"	4.500	0.000	0.0	20.923	103.838	-35.169	2172.590	0.016
L10	85.5 - 84 (10)	RPS 60" x 0.63464"	1.500	0.000	0.0	19.026	118.361	-35.824	2251.950	0.016
L11	84 - 80 (11)	RPS 60" x 0.52996"	4.000	0.000	0.0	20.919	99.013	-37.322	2071.270	0.018
L12	80 - 60 (12)	RPS 60" x 0.57817"	20.000	0.000	0.0	22.323	107.932	-45.691	2409.390	0.019
L13	60 - 58.5 (13)	RPS 60" x 0.70417"	1.500	0.000	0.0	21.528	131.175	-46.420	2823.940	0.016
L14	58.5 - 47.25 (14)	P60x5/8	11.250	0.000	0.0	23.696	116.583	-51.382	2762.520	0.019

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 $\frac{P}{P_a}$
L15	47.25 - 40 (15)	RPS 60" x 0.76962"	7.250	0.000	0.0	21.546	143.209	-55.232	3085.580	0.018
L16	40 - 32.25 (16)	RPS 60" x 0.76962"	7.750	0.000	0.0	21.546	143.209	-59.360	3085.580	0.019
L17	32.25 - 29.75 (17)	RPS 60" x 0.96202"	2.500	0.000	0.0	21.540	178.429	-60.988	3843.360	0.016
L18	29.75 - 20 (18)	RPS 60" x 0.81453"	9.750	0.000	0.0	21.528	151.451	-66.474	3260.440	0.020
L19	20 - 4.25 (19)	RPS 60" x 0.94201"	15.750	0.000	0.0	22.800	174.777	-76.597	3984.910	0.019
L20	4.25 - 0 (20)	RPS 60" x 1.07924"	4.250	0.000	0.0	22.716	199.773	-79.690	4538.040	0.018

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	190 - 180 (1)	30" x 0.375"	44.071	2.072	25.075	0.083	0.000	0.000	25.075	0.000
L2	180 - 160 (2)	36" x 0.375"	254.767	8.264	23.696	0.349	0.000	0.000	23.696	0.000
L3	160 - 140 (3)	42" x 0.375"	719.315	17.066	22.711	0.751	0.000	0.000	22.711	0.000
L4	140 - 120 (4)	P48x3/8	1309.967	23.715	21.972	1.079	0.000	0.000	21.972	0.000
L5	120 - 113.33 (5)	54" x 0.375"	1520.892	21.698	21.397	1.014	0.000	0.000	21.397	0.000
L6	113.33 - 103 (6)	RPS 54" x 0.49054"	1863.392	20.454	21.386	0.956	0.000	0.000	21.386	0.000
L7	103 - 100 (7)	RPS 54" x 0.49054"	1966.083	21.582	21.386	1.009	0.000	0.000	21.386	0.000
L8	100 - 90 (8)	RPS 60" x 0.47803"	2320.758	21.104	20.926	1.008	0.000	0.000	20.926	0.000
L9	90 - 85.5 (9)	RPS 60" x 0.55603"	2485.908	19.511	20.923	0.932	0.000	0.000	20.923	0.000
L10	85.5 - 84 (10)	RPS 60" x 0.63464"	2541.700	17.547	20.929	0.838	0.000	0.000	20.929	0.000
L11	84 - 80 (11)	RPS 60" x 0.52996"	2692.292	22.141	20.919	1.058	0.000	0.000	20.919	0.000
L12	80 - 60 (12)	RPS 60" x 0.57817"	3487.167	26.350	22.323	1.180	0.000	0.000	22.323	0.000
L13	60 - 58.5 (13)	RPS 60" x 0.70417"	3549.100	22.159	23.681	0.936	0.000	0.000	23.681	0.000
L14	58.5 - 47.25 (14)	P60x5/8	4022.850	28.186	23.696	1.189	0.000	0.000	23.696	0.000
L15	47.25 - 40 (15)	RPS 60" x 0.76962"	4336.600	24.855	23.701	1.049	0.000	0.000	23.701	0.000
L16	40 - 32.25 (16)	RPS 60" x 0.76962"	4678.958	26.817	23.701	1.131	0.000	0.000	23.701	0.000
L17	32.25 - 29.75 (17)	RPS 60" x 0.96202"	4790.850	22.180	23.694	0.936	0.000	0.000	23.694	0.000
L18	29.75 - 20 (18)	RPS 60" x 0.81453"	5233.417	28.405	23.681	1.199	0.000	0.000	23.681	0.000
L19	20 - 4.25 (19)	RPS 60" x 0.94201"	5968.367	28.190	25.080	1.124	0.000	0.000	25.080	0.000
L20	4.25 - 0 (20)	RPS 60" x 1.07924"	6170.741	25.616	24.988	1.025	0.000	0.000	24.988	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	190 - 180 (1)	30" x 0.375"	6.543	0.375	16.800	0.022	0.335	0.008	15.644	0.001
L2	180 - 160 (2)	36" x 0.375"	18.359	0.875	16.800	0.052	0.778	0.013	11.901	0.001
L3	160 - 140 (3)	42" x 0.375"	28.012	1.142	16.800	0.068	2.170	0.026	9.619	0.003
L4	140 - 120 (4)	P48x3/8	31.122	1.109	16.800	0.066	2.115	0.019	8.021	0.002
L5	120 - 113.33	54" x 0.375"	32.137	1.017	16.800	0.061	2.191	0.016	7.343	0.002

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 $\frac{f_{vt}}{F_{vt}}$
	(5)									
L6	113.33 - 103 (6)	RPS 54" x 0.49054"	34.009	0.825	15.372	0.054	1.978	0.011	10.272	0.001
L7	103 - 100 (7)	RPS 54" x 0.49054"	34.468	0.836	15.372	0.054	2.020	0.011	10.272	0.001
L8	100 - 90 (8)	RPS 60" x 0.47803"	36.340	0.813	15.652	0.052	1.810	0.008	9.190	0.001
L9	90 - 85.5 (9)	RPS 60" x 0.55603"	37.077	0.714	14.788	0.048	1.882	0.007	11.101	0.001
L10	85.5 - 84 (10)	RPS 60" x 0.63464"	37.330	0.631	12.684	0.050	1.910	0.007	12.684	0.001
L11	84 - 80 (11)	RPS 60" x 0.52996"	37.982	0.767	15.072	0.051	1.982	0.008	10.454	0.001
L12	80 - 60 (12)	RPS 60" x 0.57817"	41.189	0.763	15.944	0.048	2.419	0.009	11.656	0.001
L13	60 - 58.5 (13)	RPS 60" x 0.70417"	41.408	0.631	14.352	0.044	2.443	0.008	14.352	0.001
L14	58.5 - 47.25 (14)	P60x5/8	42.827	0.735	16.800	0.044	2.582	0.009	12.848	0.001
L15	47.25 - 40 (15)	RPS 60" x 0.76962"	43.740	0.611	14.364	0.043	2.689	0.008	14.364	0.001
L16	40 - 32.25 (16)	RPS 60" x 0.76962"	44.629	0.623	14.364	0.043	2.796	0.008	14.364	0.001
L17	32.25 - 29.75 (17)	RPS 60" x 0.96202"	44.903	0.503	14.360	0.035	2.825	0.007	14.360	0.000
L18	29.75 - 20 (18)	RPS 60" x 0.81453"	45.897	0.606	14.352	0.042	2.938	0.008	14.352	0.001
L19	20 - 4.25 (19)	RPS 60" x 0.94201"	47.431	0.543	15.200	0.036	3.121	0.007	15.200	0.000
L20	4.25 - 0 (20)	RPS 60" x 1.07924"	47.831	0.479	15.144	0.032	3.170	0.007	15.144	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	190 - 180 (1)	0.006	0.083	0.000	0.022	0.001	0.089 ✔	1.333	H1-3+VT ✔
L2	180 - 160 (2)	0.013	0.349	0.000	0.052	0.001	0.365 ✔	1.333	H1-3+VT ✔
L3	160 - 140 (3)	0.017	0.751	0.000	0.068	0.003	0.774 ✔	1.333	H1-3+VT ✔
L4	140 - 120 (4)	0.019	1.079	0.000	0.066	0.002	1.103 ✔	1.333	H1-3+VT ✔
L5	120 - 113.33 (5)	0.019	1.014	0.000	0.061	0.002	1.037 ✔	1.333	H1-3+VT ✔
L6	113.33 - 103 (6)	0.016	0.956	0.000	0.054	0.001	0.976 ✔	1.333	H1-3+VT ✔
L7	103 - 100 (7)	0.017	1.009	0.000	0.054	0.001	1.029 ✔	1.333	H1-3+VT ✔
L8	100 - 90 (8)	0.018	1.008	0.000	0.052	0.001	1.029 ✔	1.333	H1-3+VT ✔
L9	90 - 85.5 (9)	0.016	0.932	0.000	0.048	0.001	0.951 ✔	1.333	H1-3+VT ✔
L10	85.5 - 84 (10)	0.016	0.838	0.000	0.050	0.001	0.857 ✔	1.333	H1-3+VT ✔
L11	84 - 80 (11)	0.018	1.058	0.000	0.051	0.001	1.079 ✔	1.333	H1-3+VT ✔
L12	80 - 60 (12)	0.019	1.180	0.000	0.048	0.001	1.202 ✔	1.333	H1-3+VT ✔
L13	60 - 58.5 (13)	0.016	0.936	0.000	0.044	0.001	0.954 ✔	1.333	H1-3+VT ✔
L14	58.5 - 47.25 (14)	0.019	1.189	0.000	0.044	0.001	1.210 ✔	1.333	H1-3+VT ✔
L15	47.25 - 40 (15)	0.018	1.049	0.000	0.043	0.001	1.068 ✔	1.333	H1-3+VT ✔
L16	40 - 32.25 (16)	0.019	1.131	0.000	0.043	0.001	1.153 ✔	1.333	H1-3+VT ✔
L17	32.25 - 29.75	0.016	0.936	0.000	0.035	0.000	0.953	1.333	H1-3+VT ✔

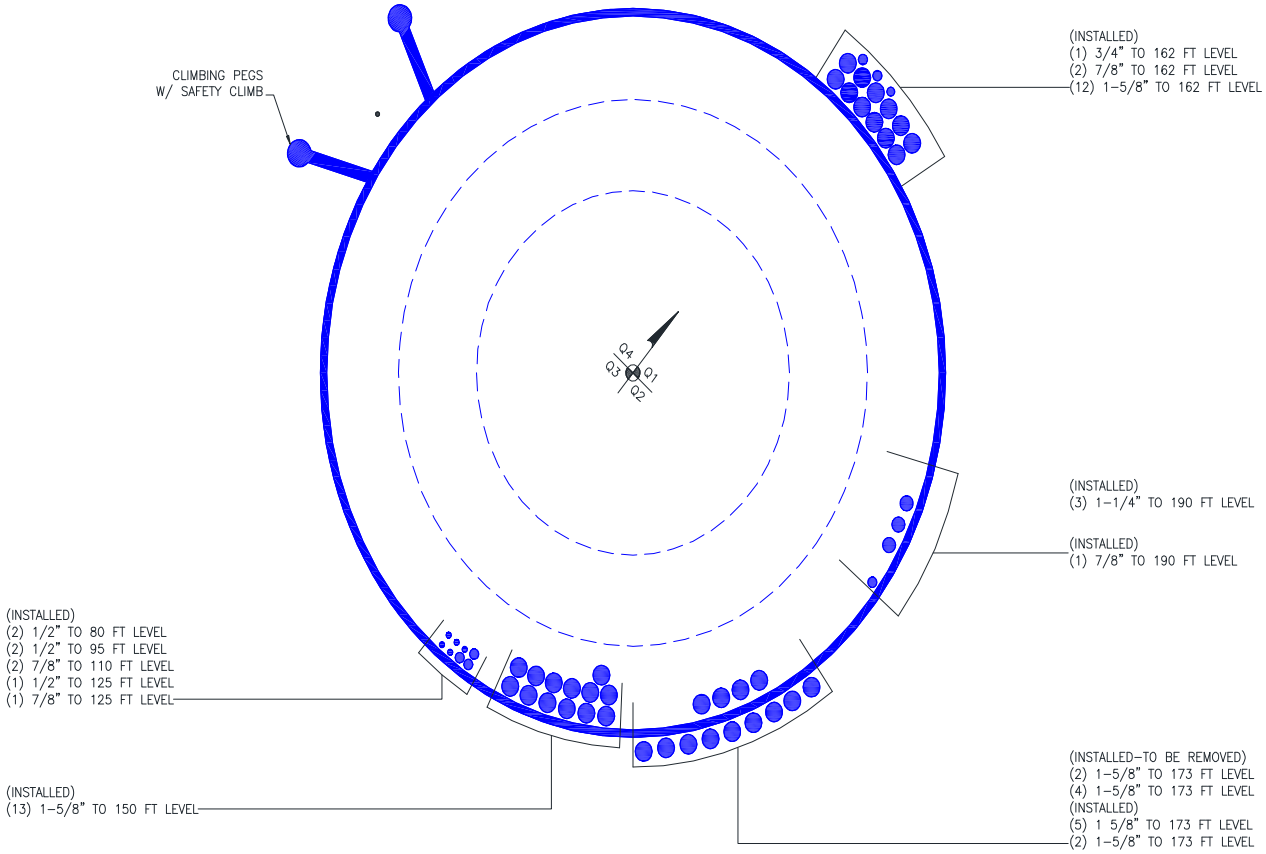
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	(17)						✔		
L18	29.75 - 20	0.020	1.199	0.000	0.042	0.001	1.222	1.333	H1-3+VT ✔
	(18)						✔		
L19	20 - 4.25 (19)	0.019	1.124	0.000	0.036	0.000	1.145	1.333	H1-3+VT ✔
							✔		
L20	4.25 - 0 (20)	0.018	1.025	0.000	0.032	0.000	1.044	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	190 - 180	Pole	30" x 0.375"	1	-4.916	1166.570	6.7	Pass
L2	180 - 160	Pole	36" x 0.375"	2	-13.024	1325.678	27.4	Pass
L3	160 - 140	Pole	42" x 0.375"	3	-19.086	1484.549	58.0	Pass
L4	140 - 120	Pole	P48x3/8	4	-23.751	1643.282	82.8	Pass
L5	120 - 113.33	Pole	54" x 0.375"	5	-25.408	1801.923	77.8	Pass
L6	113.33 - 103	Pole	RPS 54" x 0.49054"	6	-28.868	2350.759	73.2	Pass
L7	103 - 100	Pole	RPS 54" x 0.49054"	7	-29.817	2350.759	77.2	Pass
L8	100 - 90	Pole	RPS 60" x 0.47803"	8	-33.420	2493.470	77.2	Pass
L9	90 - 85.5	Pole	RPS 60" x 0.55603"	9	-35.169	2896.062	71.3	Pass
L10	85.5 - 84	Pole	RPS 60" x 0.63464"	10	-35.824	3001.849	64.3	Pass
L11	84 - 80	Pole	RPS 60" x 0.52996"	11	-37.322	2761.003	81.0	Pass
L12	80 - 60	Pole	RPS 60" x 0.57817"	12	-45.691	3211.717	90.2	Pass
L13	60 - 58.5	Pole	RPS 60" x 0.70417"	13	-46.420	3764.312	71.6	Pass
L14	58.5 - 47.25	Pole	P60x5/8	14	-51.382	3682.439	90.8	Pass
L15	47.25 - 40	Pole	RPS 60" x 0.76962"	15	-55.232	4113.078	80.2	Pass
L16	40 - 32.25	Pole	RPS 60" x 0.76962"	16	-59.360	4113.078	86.5	Pass
L17	32.25 - 29.75	Pole	RPS 60" x 0.96202"	17	-60.988	5123.199	71.5	Pass
L18	29.75 - 20	Pole	RPS 60" x 0.81453"	18	-66.474	4346.166	91.7	Pass
L19	20 - 4.25	Pole	RPS 60" x 0.94201"	19	-76.597	5311.885	85.9	Pass
L20	4.25 - 0	Pole	RPS 60" x 1.07924"	20	-79.690	6049.207	78.3	Pass
							Summary	
						Pole (L18)	91.7	Pass
						RATING =	**91.7**	**Pass**

APPENDIX B

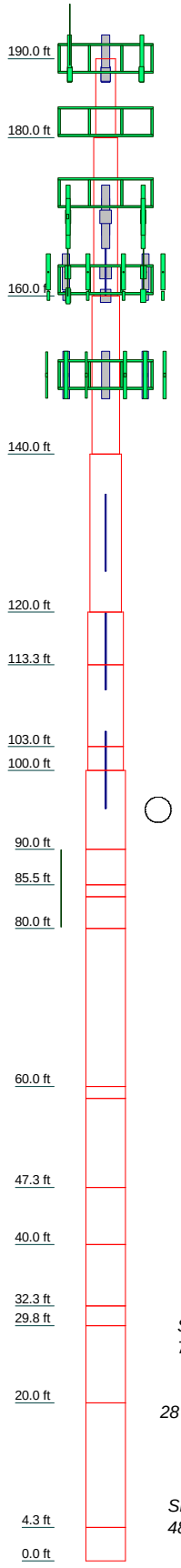
BASE LEVEL DRAWING

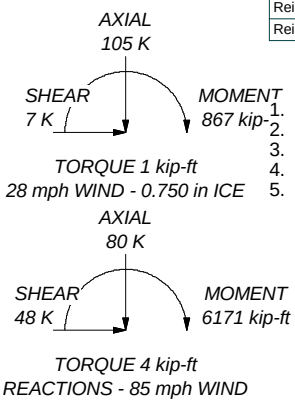


APPENDIX C

ADDITIONAL CALCULATIONS

Section	Size	Length (ft)	Grade	Weight (K)
1	30" x 0.375"	10.000	A53-B-42	1.2
2	36" x 0.375"	20.000		2.9
3	42" x 0.375"	20.000		3.3
4	P48x3/8	20.000		3.8
5	41" x 0.375"	6.670		1.4
6	39.4" x 0.496"	10.330	Reinf 38.43 ksi	2.9
7		3.000		0.8
8		10.000	Reinf 39.13 ksi	3.0
9		4.500		1.6
10				0.6
11		4.000		1.3
12	60" x 0.578"	20.000	Reinf 39.86 ksi	7.3
13	60" x 0.703"	1.500	Reinf 35.88 ksi	0.7
14	P60x3/8	11.250	A53-B-42	4.5
15	60" x 0.766"	7.250	Reinf 35.91 ksi	3.5
16		7.750		3.8
17		2.500		1.5
18		9.750		5.0
19	60" x 0.942"	15.750	Reinf 38.00 ksi	9.4
20	60" x 1.075"	4.250	Reinf 37.86 ksi	2.9
	RPS 60" x 1.075"			61.5





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD201-7	190	TT19-08BP111-001	162
APXVSPP18-C-A20 w/ Mount Pipe	190	RRUS-11	162
APXVSPP18-C-A20 w/ Mount Pipe	190	RRUS-11	162
APXVSPP18-C-A20 w/ Mount Pipe	190	RRUS-11	162
(2) 2.375" OD x 6' Mount Pipe	190	DC6-48-60-18-8F	162
(2) 2.375" OD x 6' Mount Pipe	190	OPA-65R-LCUU-H6 w/Mount Pipe	162
(2) 2.375" OD x 6' Mount Pipe	190	OPA-65R-LCUU-H6 w/Mount Pipe	162
Platform Mount [LP 403-1]	190	OPA-65R-LCUU-H6 w/Mount Pipe	162
800MHZ RRH	188	RRUS12/RRUS A2	162
800MHZ RRH	188	RRUS12/RRUS A2	162
800MHZ RRH	188	RRUS12/RRUS A2	162
1900MHz RRH	188	Platform Mount [LP 403-1]	162
1900MHz RRH	188	6' x 2" Mount Pipe	162
1900MHz RRH	188	6' x 2" Mount Pipe	162
Side Arm Mount [SO 102-3]	188	6' x 2" Mount Pipe	162
Platform Mount [LP 403-1]	182	Pipe Mount [PM 601-3]	151
(4) 6' x 2" Mount Pipe	182	RRH2X40-AWS	151
(4) 6' x 2" Mount Pipe	182	RRH2X40-AWS	151
(4) 6' x 2" Mount Pipe	182	RRH2X40-AWS	151
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	173	(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	150
KRY 112 144/1	173	(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	173	(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	150
KRY 112 144/1	173	P65-16-XL-R w/ Mount Pipe	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	173	(2) LPA-80080/6CF w/ Mount Pipe	150
KRY 112 144/1	173	(2) FD9R6004/2C-3L	150
Platform Mount [LP 405-1]	173	(2) FD9R6004/2C-3L	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	173	(2) FD9R6004/2C-3L	150
RRUS 11 B12	173	DB-T1-6Z-8AB-0Z	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	173	Platform Mount [LP 403-1]	150
RRUS 11 B12	173	(2) DB846F65ZAXY w/ Mount Pipe	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	173	(2) DB846F65ZAXY w/ Mount Pipe	150
RRUS 11 B12	173	LNX-6514DS-T4M w/ Mount Pipe	150
(2) 7770.00 w/ Mount Pipe	162	LNX-6514DS-T4M w/ Mount Pipe	150
(2) 7770.00 w/ Mount Pipe	162	PD128-1	125
(2) 7770.00 w/ Mount Pipe	162	PD201-1	125
(2) LGP21401	162	Side Arm Mount [SO 701-3]	125
(2) LGP21401	162	PD128-1	110
(2) LGP21401	162	PD128-1	110
(2) 7020.00	162	Side Arm Mount [SO 701-3]	110
(2) 7020.00	162	PD128-1	95
(2) 7020.00	162	PD128-1	95
TT19-08BP111-001	162	Side Arm Mount [SO 701-3]	95
TT19-08BP111-001	162	DB222	80
		PD128-1	80
		Side Arm Mount [SO 701-3]	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	Reinf 39.86 ksi	40 ksi	50 ksi
Reinf 38.43 ksi	38 ksi	49 ksi	Reinf 35.88 ksi	36 ksi	45 ksi
Reinf 39.13 ksi	39 ksi	49 ksi	Reinf 35.91 ksi	36 ksi	45 ksi
Reinf 36.97 ksi	37 ksi	47 ksi	Reinf 35.90 ksi	36 ksi	45 ksi
Reinf 31.71 ksi	32 ksi	40 ksi	Reinf 38.00 ksi	38 ksi	48 ksi
Reinf 37.68 ksi	38 ksi	48 ksi	Reinf 37.86 ksi	38 ksi	48 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 91.7%

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, Ohio
Phone: 614.221.6679
FAX:

Job: 190' Monopole / Weston Rt-57 Norfield R			
Project: PJF 37515-0537 / BU 829046			
Client: CCI	Drawn by: jjohnson		App'd:
Code: TIA/EIA-222-F	Date: 09/01/15		Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2015\37515-0537_829046_WESTON- RT-57- NORFIELD\37515-0537-003.7805_SA_111048\37515-0537-003.7805.eri			Dwg No. E-1

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

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	44.07	ft-kips
Axial:	4.92	kips
Shear:	6.54	kips
Elevation:	180	feet

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

Bolt Data			
Qty:	24		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle (in.):	33		

Plate Data		
Diam:	36	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.93	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.333333

Flange Bolt Results — Rigid (Service, ASD; Fty*ASIF)

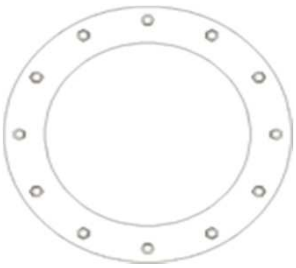
Bolt Tension Capacity, **B**:	46.08 kips	
Max Bolt directly applied T:	2.47 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.398 in	
Min PL "treq" for actual **T w/ Pry**:	0.246 in	
Min PL "t1" for actual **T w/o Pry**:	0.324 in	
T allowable with Prying:	42.99 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	2.47 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	5.4% **Pass**	

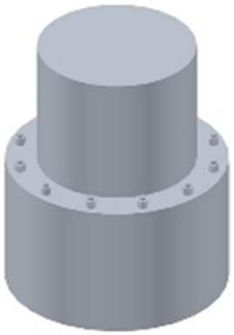
Exterior Flange Plate Results — Flexural Check — Rigid (Service ASD; 0.75*Fy*ASIF; Comp. Y.L. Length: 13.75)

Compression Side Plate Stress:	Rohn/Pirod,	OK
Allowable Plate Stress:	36.0 ksi	
Compression Plate Stress Ratio:	Rohn/Pirod,	OK
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	3.9% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





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

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

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

Site Data	
BU#:	*829046*
Site Name:	*Weston*
App #:	

Manufacturer:	Pirod

Reactions		
Moment:	44.07	ft-kips
Axial:	4.92	kips
Shear:	6.54	kips
Exterior Flange Run, T+Q:	2.47	kips

Elevation: 180 feet

Bolt Data			
Qty:	24		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle:	33	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	2.5	Kips, Ext. Flange T+Q
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	5.4%	**Pass**

Plate Data		
Plate Outer Diam:	35.25	in
Plate Inner Diam:	30	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.61	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	2.9	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

Stiffener Results N/A for Rohn / Pirod

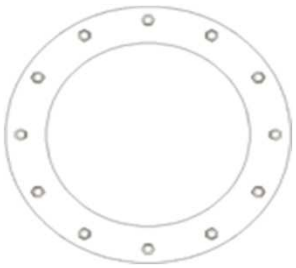
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

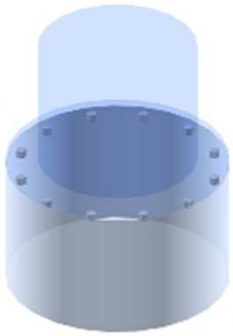
Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	36	in
Thick:	0.375	in
Pole Inner Diam:	35.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333333	





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

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

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

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	254.99	ft-kips
Axial:	13.02	kips
Shear:	18.36	kips
Elevation:	160	feet

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

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle (in.):	39		

Plate Data		
Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333333	

Flange Bolt Results | Rigid

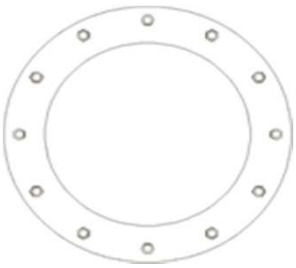
Bolt Tension Capacity, **B**:	46.08	kips	Service, ASD
Max Bolt directly applied T:	10.74	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.379	in	
Min PL "treq" for actual **T w/ Pry**:	0.505	in	
Min PL "t1" for actual **T w/o Pry**:	0.666	in	
T allowable with Prying:	43.34	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	10.74	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	23.3%	**Pass**	

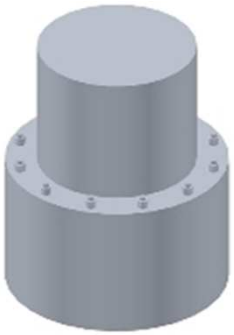
Exterior Flange Plate Results Flexural Check | Rigid

Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		15.00
Tension Side Stress Ratio, (treq/t)^2:	16.3% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





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

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

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

Site Data	
BU#:	*829046*
Site Name:	*Weston*
App #:	

Manufacturer:	Pirod

Reactions		
Moment:	254.99	ft-kips
Axial:	13.02	kips
Shear:	18.36	kips
Exterior Flange Run, T+Q:	10.74	kips

Elevation: 160 feet

Bolt Data			
Qty:	28		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle:	39	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	10.7	Kips, Ext. T=Interior T
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	23.3%	**Pass**

Plate Data		
Plate Outer Diam:	41.25	in
Plate Inner Diam:	36	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.63	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	11.7	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

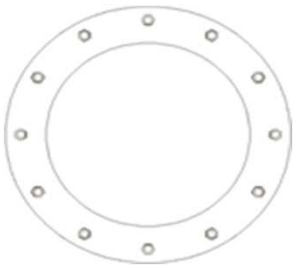
Stiffener Results N/A for Rohn / Pirod

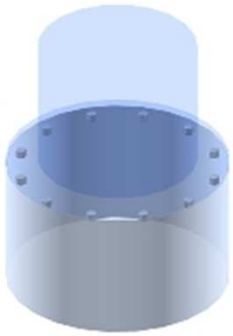
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	42	in
Thick:	0.375	in
Pole Inner Diam:	41.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





Stress Increase Factor		
ASIF:	1.333333	

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

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

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

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	719.54	ft-kips
Axial:	19.09	kips
Shear:	28.01	kips
Elevation:	140	feet

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

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle (in.):	45		

Plate Data		
Diam:	48	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	46.08	kips	Service, ASD
Max Bolt directly applied T:	23.39	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.365	in	
Min PL "treq" for actual **T w/ Pry**:	0.737	in	
Min PL "t1" for actual **T w/o Pry**:	0.972	in	
T allowable with Prying:	43.60	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	23.39	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	50.8%	**Pass**	

Exterior Flange Plate Results — Flexural Check

			Rigid
Compression Side Plate Stress:	Rohn/Pirod,	OK	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod,	OK	Comp. Y.L. Length:
No Prying			16.16
Tension Side Stress Ratio, (treq/t)^2:	34.7%	**Pass**	

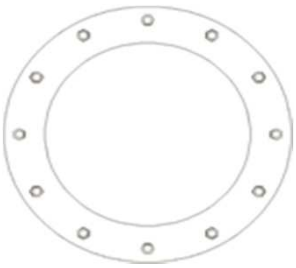
n/a

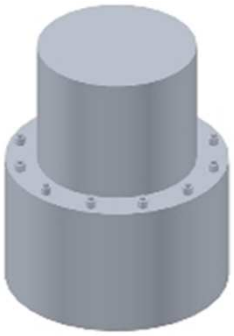
Stiffener Results — N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





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

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

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

Site Data	
BU#:	*829046*
Site Name:	*Weston*
App #:	

Manufacturer:	Pirod

Reactions		
Moment:	719.54	ft-kips
Axial:	19.09	kips
Shear:	28.01	kips
Exterior Flange Run, T+Q:	23.39	kips

Elevation: 140 feet

Bolt Data			
Qty:	32		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle:	45	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	23.4	Kips, Ext. Flange T+Q
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	50.8%	**Pass**

Plate Data		
Plate Outer Diam:	47.25	in
Plate Inner Diam:	42	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.64	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	24.6	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

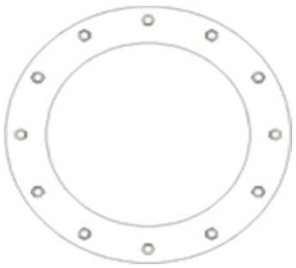
Stiffener Results N/A for Rohn / Pirod

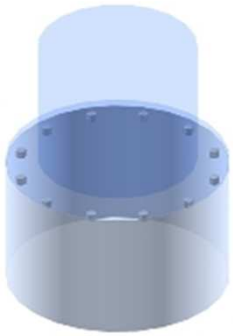
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	48	in
Thick:	0.375	in
Pole Inner Diam:	47.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





Stress Increase Factor		
ASIF:	1.333333	

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

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

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

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	1310.2	ft-kips
Axial:	23.75	kips
Shear:	31.12	kips
Elevation:	120	feet

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

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle (in.):	51		

Plate Data		
Diam:	54	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.333333

Flange Bolt Results — Rigid (Service, ASD; Fty*ASIF)

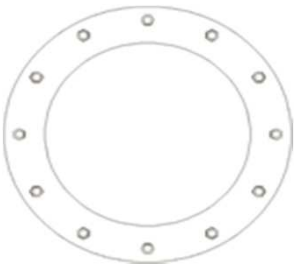
Bolt Tension Capacity, **B**:	46.08 kips	
Max Bolt directly applied T:	33.59 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.354 in	
Min PL "treq" for actual **T w/ Pry**:	0.875 in	
Min PL "t1" for actual **T w/o Pry**:	1.156 in	
T allowable with Prying:	43.81 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	33.59 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	72.9% **Pass**	

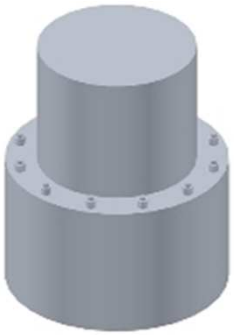
Exterior Flange Plate Results — Flexural Check — Rigid (Service ASD; 0.75*Fy*ASIF; Comp. Y.L. Length: 17.23)

Compression Side Plate Stress:	Rohn/Pirod, OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Pirod, OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	49.0% **Pass**

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





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

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

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

Site Data	
BU#:	*829046*
Site Name:	*Weston*
App #:	

Manufacturer:	Pirod

Reactions		
Moment:	1310.2	ft-kips
Axial:	23.75	kips
Shear:	31.12	kips
Exterior Flange Run, T+Q:	33.59	kips

Elevation: 120 feet

Bolt Data			
Qty:	36		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle:	51	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	33.6	Kips, Ext. T=Interior T
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	72.9%	**Pass**

Plate Data		
Plate Outer Diam:	53.25	in
Plate Inner Diam:	48	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.65	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	34.9	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

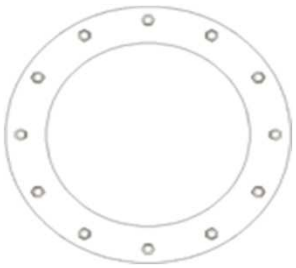
Stiffener Results N/A for Rohn / Pirod

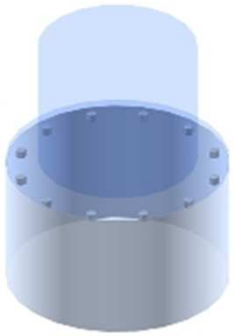
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	54	in
Thick:	0.375	in
Pole Inner Diam:	53.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





Stress Increase Factor		
ASIF:	1.333333	

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

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

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

Site Data

BU#: *829046*
Site Name:
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	1512.9	ft-kips
Axial:	29.8	kips
Shear:	34.5	kips
Elevation:	100	feet

Reactions adjusted to account for load in flat plate shaft reinforcing.

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

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty: 44.00
N/A:	55	<-- Disregard	
Circle (in.):	57		

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

			Stiffened
Bolt Tension Capacity, **B**:	46.07	kips	Service, ASD
Max Bolt directly applied T:	25.92	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened	in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened	in	
T allowable	46.07	kips	<-- B, Stiffened
Prying Force, Q:	0.00	kips	Stiffened
Total Bolt Tension=T+Q:	25.92	kips	
Non-Prying Bolt Stress Ratio, T/B:	56.3%	**Pass**	

Exterior Flange Plate Results Shear Check Only

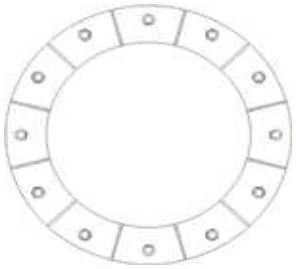
			Stiffened
Compression Side Plate Stress:	3.6	ksi	Service, ASD
Allowable Plate Stress:	19.2	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	18.9%	**Pass**	Comp. Y.L. Length:
Stiffened			N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A		

Stiffener Results

Horizontal Weld :	56.6%	**Pass**
Vertical Weld:	38.4%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	26.4%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	41.7%	**Pass**
Plate Comp. (AISC Bracket):	60.7%	**Pass**

Pole Results

Pole Punching Shear Check:	19.4%	**Pass**



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

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

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

Site Data

BU#: *829046*
Site Name:
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	1512.9	ft-kips
Axial:	29.8	kips
Shear:	34.5	kips
Elevation:	100	feet

Reactions adjusted to account for load in flat plate shaft reinforcing.

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

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty: 44.00
N/A:	55	<-- Disregard	
Circle (in.):	57		

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

			Stiffened
Bolt Tension Capacity, **B**:	46.07	kips	Service, ASD
Max Bolt directly applied T:	25.92	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened	in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened	in	
T allowable	46.07	kips	<-- B, Stiffened
Prying Force, Q:	0.00	kips	Stiffened
Total Bolt Tension=T+Q:	25.92	kips	
Non-Prying Bolt Stress Ratio, T/B:	56.3%	**Pass**	

Exterior Flange Plate Results Shear Check Only

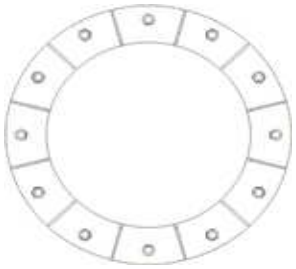
			Stiffened
Compression Side Plate Stress:	3.6	ksi	Service, ASD
Allowable Plate Stress:	19.2	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	18.9%	**Pass**	Comp. Y.L. Length:
Stiffened			N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A		

Stiffener Results

Horizontal Weld :	56.6%	**Pass**
Vertical Weld:	38.4%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	26.4%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	41.7%	**Pass**
Plate Comp. (AISC Bracket):	60.7%	**Pass**

Pole Results

Pole Punching Shear Check:	19.4%	**Pass**



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

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

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v4.1 - Effective 7-3-12

Date: 8/31/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description: Flange at 80'
Owner:
Engineer: JRJ

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	2242	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	37.3	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	38.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	67							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	28.80	27.80	27.80	0.00	71.99	38.6%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%

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v4.1 - Effective 7-3-12

Date: 8/31/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description: Flange at 80'
Owner:
Engineer: JRJ

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	2242	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	37.3	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	38.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	67							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

58	1.250	A325	81	105	281.3	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
63	1.250	A325	81	105	337.5	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	25.59	24.60	24.60	0.00	71.99	34.2%
65	0.000	Sabre 4.5 x 1	65	80	0.0	61.00	4.50	4.50	121.26	117.61	121.26	170.16	170.16	71.3%
66	0.000	Sabre 4.5 x 1	65	80	120.0	61.00	4.50	4.50	121.26	117.61	121.26	170.16	170.16	71.3%
67	0.000	Sabre 4.5 x 1	65	80	240.0	61.00	4.50	4.50	121.26	117.61	121.26	170.16	170.16	71.3%
								92.04						

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

Site Data	80' Flange
BU#:	829046
Site Name:	
App #:	

Manufacturer:	Other

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	50	in	

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.82	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1786.2	ft-kips
Axial:	30.4	kips
Shear:	32.4	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for flange jumps

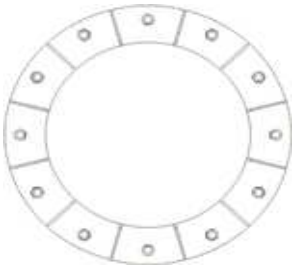
Elevation: 80 feet

PLATE CHECK ONLY

Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	54.5	Kips, Ext. C= Interior C
Plate Stress:	22.2	ksi
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	61.7%	**Pass**

Stiffener Results		
Horizontal Weld :	43.7%	**Pass**
Vertical Weld:	38.2%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	26.4%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	31.1%	**Pass**
Plate Comp. (AISC Bracket):	63.0%	**Pass**

Pole Results		
Pole Punching Shear Check:	20.5%	**Pass**



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

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

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v4.1 - Effective 7-3-12

Date: 8/31/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description: Flange at 60'
Owner:
Engineer: JRJ

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	3028	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	45.7	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	41.2	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	67							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	33.31	32.22	32.22	0.00	71.99	44.8%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%

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v4.1 - Effective 7-3-12

Date: 8/31/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description: Flange at 60'
Owner:
Engineer: JRJ

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	3028	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	45.7	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	41.2	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	67							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

58	1.250	A325	81	105	281.3	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
63	1.250	A325	81	105	337.5	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	29.60	28.51	28.51	0.00	71.99	39.6%
65	0.000	Sabre 6.5 x 1.25	65	80	0.0	61.25	8.13	8.13	254.30	247.08	254.30	345.86	345.86	73.5%
66	0.000	Sabre 6.5 x 1.25	65	80	120.0	61.25	8.13	8.13	254.30	247.08	254.30	345.86	345.86	73.5%
67	0.000	Sabre 6.5 x 1.25	65	80	240.0	61.25	8.13	8.13	254.30	247.08	254.30	345.86	345.86	73.5%
								102.91						

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

Site Data	60' Flange
BU#:	829046
Site Name:	
App #:	

Reactions		
Moment:	2068.1	ft-kips
Axial:	34.8	kips
Shear:	31.4	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for flange jumps

Manufacturer:	Other

Elevation: 60 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	50	in	

PLATE CHECK ONLY

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Interior Flange Plate Results — Flexural Check

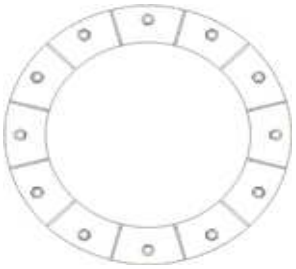
Controlling Bolt Axial Force:	63.1	Kips, Ext. C= Interior C
Plate Stress:	25.7	ksi
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	71.4%	**Pass**

Stiffener Results

Horizontal Weld :	44.6%	**Pass**
Vertical Weld:	39.0%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	27.1%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	31.8%	**Pass**
Plate Comp. (AISC Bracket):	64.3%	**Pass**

Pole Results

Pole Punching Shear Check:	15.7%	**Pass**



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

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

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v4.1 - Effective 7-3-12

Date: 8/31/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description: Flange at 40'
Owner:
Engineer: JRJ

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	3548	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	55.2	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	43.7	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	70							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	34.05	32.87	32.87	0.00	71.99	45.7%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%

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v4.1 - Effective 7-3-12

Date: 8/31/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description: Flange at 40'
Owner:
Engineer: JRJ

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	3548	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	55.2	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	43.7	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	70							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

58	1.250	A325	81	105	281.3	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
63	1.250	A325	81	105	337.5	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	30.26	29.08	29.08	0.00	71.99	40.4%
65	0.000	Sabre 6 x 1	65	80	0.0	61.00	6.00	6.00	191.17	185.39	191.17	250.40	250.40	76.3%
66	0.000	Sabre 6 x 1	65	80	60.0	61.00	6.00	6.00	191.17	185.39	191.17	250.40	250.40	76.3%
67	0.000	Sabre 6 x 1	65	80	120.0	61.00	6.00	6.00	191.17	185.39	191.17	250.40	250.40	76.3%
68	0.000	Sabre 6 x 1	65	80	180.0	61.00	6.00	6.00	191.17	185.39	191.17	250.40	250.40	76.3%
69	0.000	Sabre 6 x 1	65	80	240.0	61.00	6.00	6.00	191.17	185.39	191.17	250.40	250.40	76.3%
70	0.000	Sabre 6 x 1	65	80	300.0	61.00	6.00	6.00	191.17	185.39	191.17	250.40	250.40	76.3%
								114.54						

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

Site Data	40' Flange
BU#:	829046
Site Name:	
App #:	

Manufacturer:	Other

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	50	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	2111.9	ft-kips
Axial:	37.8	kips
Shear:	30	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for flange jumps

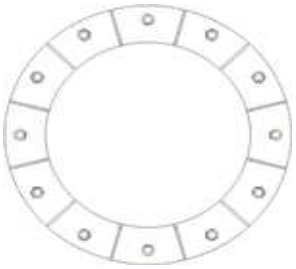
Elevation: 40 feet

PLATE CHECK ONLY

Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	64.5	Kips, Ext. C= Interior C
Plate Stress:	26.3	ksi
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	73.0%	**Pass**

Stiffener Results		
Horizontal Weld :	45.6%	**Pass**
Vertical Weld:	39.8%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	27.9%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	32.6%	**Pass**
Plate Comp. (AISC Bracket):	65.7%	**Pass**

Pole Results		
Pole Punching Shear Check:	16.1%	**Pass**



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

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

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v4.1 - Effective 7-3-12

Date: 8/31/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description: Flange at 20'
Owner:
Engineer: JRJ

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	4054	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	66.5	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	45.9	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	70							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	33.95	32.67	32.67	0.00	71.99	45.4%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%

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v4.1 - Effective 7-3-12

Date: 8/31/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description: Flange at 20'
Owner:
Engineer: JRJ

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	4054	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	66.5	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	45.9	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	70							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

58	1.250	A325	81	105	281.3	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
63	1.250	A325	81	105	337.5	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	30.18	28.90	28.90	0.00	71.99	40.1%
65	0.000	Sabre 6.5 x 1.25	65	80	0.0	61.25	8.13	8.13	259.14	250.65	259.14	345.86	345.86	74.9%
66	0.000	Sabre 6.5 x 1.25	65	80	60.0	61.25	8.13	8.13	259.14	250.65	259.14	345.86	345.86	74.9%
67	0.000	Sabre 6.5 x 1.25	65	80	120.0	61.25	8.13	8.13	259.14	250.65	259.14	345.86	345.86	74.9%
68	0.000	Sabre 6.5 x 1.25	65	80	180.0	61.25	8.13	8.13	259.14	250.65	259.14	345.86	345.86	74.9%
69	0.000	Sabre 6.5 x 1.25	65	80	240.0	61.25	8.13	8.13	259.14	250.65	259.14	345.86	345.86	74.9%
70	0.000	Sabre 6.5 x 1.25	65	80	300.0	61.25	8.13	8.13	259.14	250.65	259.14	345.86	345.86	74.9%
								127.29						

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

Site Data	20' Flange
BU#:	829046
Site Name:	
App #:	

Manufacturer:	Other

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	50	in	

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	2102.7	ft-kips
Axial:	66.5	kips
Shear:	45.9	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for flange jumps

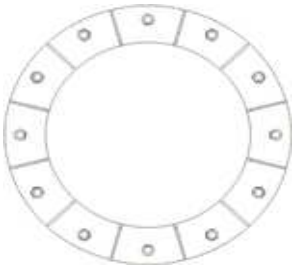
Elevation: 20 feet

PLATE CHECK ONLY

Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	65.2	Kips, Ext. C= Interior C
Plate Stress:	26.5	ksi
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	73.7%	**Pass**

Stiffener Results		
Horizontal Weld :	41.3%	**Pass**
Vertical Weld:	36.1%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	24.6%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	29.1%	**Pass**
Plate Comp. (AISC Bracket):	59.5%	**Pass**

Pole Results		
Pole Punching Shear Check:	11.6%	**Pass**



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

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

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v4.1 - Effective 7-3-12

Date: 9/1/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description:
Owner:
Engineer: JRJ

Asymmetric Anchor Rod Analysis

Moment =	6171	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	80.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	48.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	60							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A687	105	125	0.0	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
2	1.250	A687	105	125	6.9	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
3	1.250	A687	105	125	13.8	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
4	1.250	A687	105	125	20.8	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
5	1.250	A687	105	125	27.7	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
6	1.250	A687	105	125	34.6	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
7	1.250	A687	105	125	41.5	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
8	1.250	A687	105	125	48.5	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
9	1.250	A687	105	125	55.4	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
10	1.250	A687	105	125	62.3	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
11	1.250	A687	105	125	69.2	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
12	1.250	A687	105	125	76.2	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
13	1.250	A687	105	125	83.1	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
14	1.250	A687	105	125	90.0	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
15	1.250	A687	105	125	96.9	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
16	1.250	A687	105	125	103.8	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
17	1.250	A687	105	125	110.8	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
18	1.250	A687	105	125	117.7	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
19	1.250	A687	105	125	124.6	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
20	1.250	A687	105	125	131.5	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
21	1.250	A687	105	125	138.5	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
22	1.250	A687	105	125	145.4	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
23	1.250	A687	105	125	152.3	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
24	1.250	A687	105	125	159.2	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
25	1.250	A687	105	125	166.2	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
26	1.250	A687	105	125	173.1	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
27	1.250	A687	105	125	180.0	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
28	1.250	A687	105	125	186.9	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
29	1.250	A687	105	125	193.8	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
30	1.250	A687	105	125	200.8	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
31	1.250	A687	105	125	207.7	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
32	1.250	A687	105	125	214.6	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
33	1.250	A687	105	125	221.5	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
34	1.250	A687	105	125	228.5	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
35	1.250	A687	105	125	235.4	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
36	1.250	A687	105	125	242.3	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
37	1.250	A687	105	125	249.2	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
38	1.250	A687	105	125	256.2	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
39	1.250	A687	105	125	263.1	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
40	1.250	A687	105	125	270.0	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
41	1.250	A687	105	125	276.9	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
42	1.250	A687	105	125	283.8	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
43	1.250	A687	105	125	290.8	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
44	1.250	A687	105	125	297.7	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
45	1.250	A687	105	125	304.6	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
46	1.250	A687	105	125	311.5	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
47	1.250	A687	105	125	318.5	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
48	1.250	A687	105	125	325.4	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
49	1.250	A687	105	125	332.3	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
50	1.250	A687	105	125	339.2	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
51	1.250	A687	105	125	346.2	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
52	1.250	A687	105	125	353.1	67.00	0.00	1.23	52.82	50.77	50.77	0.00	67.50	75.2%
53	2.250	F1554 Gr 105	105	125	3.5	76.00	0.00	3.98	193.70	187.04	187.04	0.00	218.68	85.5%
54	2.250	F1554 Gr 105	105	125	48.5	76.00	0.00	3.98	193.70	187.04	187.04	0.00	218.68	85.5%
55	2.250	F1554 Gr 105	105	125	93.5	76.00	0.00	3.98	193.70	187.04	187.04	0.00	218.68	85.5%
56	2.250	F1554 Gr 105	105	125	138.5	76.00	0.00	3.98	193.70	187.04	187.04	0.00	218.68	85.5%
57	2.250	F1554 Gr 105	105	125	183.5	76.00	0.00	3.98	193.70	187.04	187.04	0.00	218.68	85.5%

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v4.1 - Effective 7-3-12

Date: 9/1/2015
PJF Project: 37515-0537.003.7805
Client Ref. # 829046
Site Name:
Description:
Owner:
Engineer: JRJ

Asymmetric Anchor Rod Analysis

Moment =	6171	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	80.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	48.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	60							

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

58	2.250	F1554 Gr 105	105	125	228.5	76.00	0.00	3.98	193.70	187.04	187.04	0.00	218.68	85.5%
59	2.250	F1554 Gr 105	105	125	273.5	76.00	0.00	3.98	193.70	187.04	187.04	0.00	218.68	85.5%
60	2.250	F1554 Gr 105	105	125	318.5	76.00	0.00	3.98	193.70	187.04	187.04	0.00	218.68	85.5%
								95.62						

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

TIA Rev F

Site Data

BU#:	*829046*
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Moment:	3759.7	ft-kips
Axial:	53.4	kips
Shear:	32	kips

Reactions adjusted to account for additional anchors

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

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

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	50.8 Kips	Service, ASD
Allowable Tension:	81.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	62.7% **Pass**	

Plate Data		
Diam:	70	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

Base Plate Results — Shear Check Only

		Stiffened
Base Plate Stress:	4.7 ksi	Service, ASD
Allowable Plate Stress:	19.2 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	24.5% **Pass**	Y.L. Length: N/A, Roark

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	4.5	in
Height:	8	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Stiffener Results

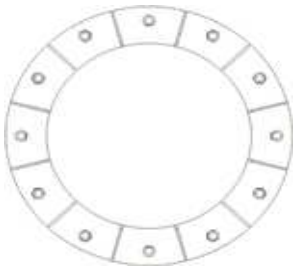
Horizontal Weld :	64.0% **Pass**
Vertical Weld:	41.2% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	28.9% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	47.7% **Pass**
Plate Comp. (AISC Bracket):	69.5% **Pass**

Pole Results

Pole Punching Shear Check:	10.0% **Pass**

Pole Data		
Diam:	60	in
Thick:	0.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



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

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

Moment Capacity of Rock Anchored Foundation - Wind into Side

PJF job no. 37515-0537.003

Note: For purposes of this check, max allowable rock anchor cap limited to proved rock anchor cap / lock-off load of 172 kips

Determination of effective rock compression area (for moment loads)

Controlling foundation % Capacity = **74.5%** **OK**

Elevation = **0** feet Total pole plus soil & fdn weight = **370.4** kips

Side dimension = **216.00** in 1/2 x diagonal dimension = **108.00** in

Neutral axis location = **68.08** in (Measured from max. compression fiber)

Therefore c= **68.08** inches and a = β_1 x c = **57.87** inches β_1 = **0.85**

Area of fdn-rock contact, Afr = **12499.0** square inches Net area of Afr = **12325.2** square inches

Centroid of Afr located **187.07** inches from maximum tension fiber of cross-section

Check fdn-rock contact area compression capacity versus actual rock compressive stress

Rock f'c = **277** psi Gross area of rock, Ac = **######** sq. in. $\Sigma T - \Sigma C$ = **0.0**

Total rock anchor load, T_L, on annulus area, ΣT = **918.8** kips

Usable rock and rock anchor compression capacity, SC = **1289.2** kips

Rock contribution to Mn = **4205.6** ft-kips

Pole / foundation / soil wt contribution to Mn = **1232.3** ft-kips

Cross-section Moment Cap.		
M_{cap} =	13159.3	ft-kips

M_{actual} = **6531** ft-kips (At bottom of pad)

Mact / Mcap = **49.6%**

Rock anchor steel capacity = **200** kips (SF = 2)

Rock anchor % Cap = **42.7%** **OK**

Max rock strain = **0.0015** (SF=2)

Rock % Cap = **44.1%** **OK**

Additional bar reinforcement information

No. of bars, Nb = 8 Number of bar group locations = 5 No. of bars per group location = 1

Separation angle between bar groups = 45 degrees Area of bar = 2.6 sq. in.

Bar edge distance = -0.187 inches (measured to center of bar group) Modulus of elasticity of bar, E_b = 29000 ksi

Bar strain calculations

Assumed rock strain = 0.0013328

Location	No. of bar groups, N_{BG}	Dist. to neutral axis	ε (Tension)	Tension per bar, T_B	$T_L = N_{BG} \times T_B$	Mn Contribution
1	0	148.11	0.0029	216.2	0.0	0.0
2	2	116.42	0.0022	169.5	338.9	3288.4
3	0	39.92	0.0007	56.5	0.0	0.0
4	2	-36.58	0.0000	0.0	0.0	0.0
5	0	-68.26	0.0000	0.0	0.0	0.0
6	0	- - -	- - -	- - -	- - -	- - -
7	0	- - -	- - -	- - -	- - -	- - -
8	0	- - -	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -	- - -

Determination of bar contribution to ultimate moment capacity

Location	No. of bar groups, N_{BG}	ε (C)	Comp. per bar, C_B	$C_L = N_{BG} \times C_B$	Mn Contribution	Area Occupied by Bar
1	0	0.0000	0.0	0.0	0.0	- - -
2	2	0.0000	0.0	0.0	0.0	- - -
3	0	0.0000	0.0	0.0	0.0	- - -
4	2	-0.0007	-54.0	0.0	0.0	28.27
5	0	-0.0013	-100.8	0.0	0.0	28.27
6	0	- - -	- - -	- - -	- - -	- - -
7	0	- - -	- - -	- - -	- - -	- - -
8	0	- - -	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -	- - -

$M_n = \Sigma$ (Load in bar groups x bar group distance to N.A.) = **3288.4** ft-kips

$M_u = \phi M_n = 0.75 \times M_n =$ **2466.3** ft-kips

Bar yield strength = **332.000** kips

Additional bar reinforcement information

No. of bar, Nf = 20 Number of bar group locations = 11 No. of bar per group location = 1

Separation angle between bar groups = 18 degrees Area of bar = 2.6 sq. in.

bar edge distance = 27.4 inches (measured to center of bar group) Modulus of elasticity of bar, Ef = 29000 ksi

Bar strain calculations

(Type of bar = B ("B" for bar, "T" for tape or "L" for laminate)

Assumed rock strain = 0.0013328

Location	No. of bar groups, NFG	Dist. to neutral axis	ε (Tension)	Tension per bar, TF	$T_L = N_{FG} \times T_F$	Mn Contribution
1	0	120.52	0.0024	177.9	0.0	0.0
2	2	116.58	0.0023	172.1	344.2	3343.6
3	0	105.13	0.0021	155.2	0.0	0.0
4	0	87.30	0.0017	128.9	0.0	0.0
5	2	64.83	0.0013	95.7	191.4	1034.0
6	0	39.92	0.0008	58.9	0.0	0.0
7	2	15.02	0.0003	22.2	44.3	55.5
8	0	-7.45	0.0000	0.0	0.0	0.0
9	0	-25.28	0.0000	0.0	0.0	0.0
10	2	-36.73	0.0000	0.0	0.0	0.0
11	0	-40.68	0.0000	0.0	0.0	0.0
12	0	- - -	- - -	- - -	- - -	- - -
13	0	- - -	- - -	- - -	- - -	- - -

Determination of bar contribution to ultimate moment capacity

Location	No. of bar groups, NFG	ε (Comp)	Comp. per bar, CF	$C_L = N_{FG} \times C_F$	Mn Contribution	Area Occupied by bar
1	0	0.0000	0.0	0.0	0.0	- - -
2	2	0.0000	0.0	0.0	0.0	- - -
3	0	0.0000	0.0	0.0	0.0	- - -
4	0	0.0000	0.0	0.0	0.0	- - -
5	2	0.0000	0.0	0.0	0.0	- - -
6	0	0.0000	0.0	0.0	0.0	- - -
7	2	0.0000	0.0	0.0	0.0	- - -
8	0	-0.0001	-11.0	0.0	0.0	28.27
9	0	-0.0005	-37.3	0.0	0.0	28.27
10	2	-0.0007	-54.2	0.0	0.0	28.27
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12	0	- - -	- - -	- - -	- - -	- - -
13	0	- - -	- - -	- - -	- - -	- - -

Mn = S (Load in bar groups x bar group distance to N.A.) = **4433.1** ft-kips

$M_u = \phi M_n = 0.9 \times M_n =$ **3989.8** ft-kips

bar yield strength = **332.000** kips

Rock Anchored Foundation Structural and Overturning Checks

Beam Shear, Tension Side - Wind into Side

b =	216.00	in	(Equal to width of mat)
d=	31	in	
f'c=	5000	psi	
Vu=	443.9	kips	(1.3 times max proven anchor capacity, adjusted for overall foundation % Capacity)
ϕ=	0.85		
ϕVc=	804.9	kips	
% Cap=	55.1%	OK	

Beam Shear, Compression Side - Wind into Side

b =	216.0	in	(Equal to width of mat)
d=	43	in	
f'c=	5000	psi	
Vu=	831.8	kips	(1.3 times SC, adjusted for overall foundation % Capacity)
ϕ=	0.85		
ϕVc=	1116.5	kips	
% Cap=	74.5%	OK	

Punching Shear, Tension Side - Wind into Side

b =	94	in	(Critical section at distance of 0.5d away from center of anchor in all applicable directions)
d=	31	in	
f'c=	5000	psi	
Vu=	223.6	kips	(Assumed to be 1.3 times max proven anchor capacity)
ϕ=	0.85		
ϕVc=	700.6	kips	
% Cap=	15.8%	OK	(Adjusted for actual rock bolt load)

Centroid of loads on tension and compression sides of foundation less than distance of d away from face of pier. Therefore, load assumed to be transferred through deep beam type action (bending is negligible)

Overturning / Stability - Worst case assumed to be wind into the side

Rock anchor proof load, PL =	259	kips	(Assumed to be ultimate anchor capacity)
# of anchors in Line 1, N1 =	4		
Line 1 distance to rotation pt, d1 =	13.75	feet	
# of anchors in Line 2, N2 =	4		(Combined anchors on either side of foundation centerline)
Line 2 distance to rotation pt, d2 =	9	feet	
Foundation / pole / soil wt, W =	370.4	kips	
Distance to rotation pt, dw =	9	feet	
Foundation actual OTM, Mo =	6531	ft-k	(At bottom of foundation)
Overturning resistance, Mr =	23682	ft-k	(N1 x d1 x PL + N2 x d2 x [d2/d1 x PL] + W x dw)
% Cap = Mo / 0.5Mr =	55.2%	OK	(Min SF=2)

Note - Overturning % Cap conservative due to:

1) Line of anchors closest to point of overturning not included in calculation
2) Ultimate / maximum anchor capacity likely greater than proof load applied to anchor during installation

Moment Capacity of Rock Anchored Foundation - Wind into Side

PJF job no. 37515-0537.003

Note: For purposes of this check, max allowable rock anchor cap limited to proved rock anchor cap / lock-off load of 172 kips

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Elevation = **0** feet Total pole plus soil & fdn weight = **370.4** kips

Side dimension = **216.00** in 1/2 x diagonal dimension = **108.00** in

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M_{cap} =	13159.3	ft-kips

M_{actual} = **6531** ft-kips (At bottom of pad)

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7	0	- - -	- - -	- - -	- - -	- - -
8	0	- - -	- - -	- - -	- - -	- - -
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8	0	- - -	- - -	- - -	- - -	- - -
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4	0	0.0000	0.0	0.0	0.0	- - -
5	2	0.0000	0.0	0.0	0.0	- - -
6	0	0.0000	0.0	0.0	0.0	- - -
7	2	0.0000	0.0	0.0	0.0	- - -
8	0	-0.0001	-11.0	0.0	0.0	28.27
9	0	-0.0005	-37.3	0.0	0.0	28.27
10	2	-0.0007	-54.2	0.0	0.0	28.27
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12	0	- - -	- - -	- - -	- - -	- - -
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$M_u = \phi M_n = 0.9 \times M_n =$ **3989.8** ft-kips

bar yield strength = **332.000** kips

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d=	31	in	
f'c=	5000	psi	
Vu=	443.9	kips	(1.3 times max proven anchor capacity, adjusted for overall foundation % Capacity)
ϕ=	0.85		
ϕVc=	804.9	kips	
% Cap=	55.1%	OK	

Beam Shear, Compression Side - Wind into Side

b =	216.0	in	(Equal to width of mat)
d=	43	in	
f'c=	5000	psi	
Vu=	831.8	kips	(1.3 times SC, adjusted for overall foundation % Capacity)
ϕ=	0.85		
ϕVc=	1116.5	kips	
% Cap=	74.5%	OK	

Punching Shear, Tension Side - Wind into Side

b =	94	in	(Critical section at distance of 0.5d away from center of anchor in all applicable directions)
d=	31	in	
f'c=	5000	psi	
Vu=	223.6	kips	(Assumed to be 1.3 times max proven anchor capacity)
ϕ=	0.85		
ϕVc=	700.6	kips	
% Cap=	15.8%	OK	(Adjusted for actual rock bolt load)

Centroid of loads on tension and compression sides of foundation less than distance of d away from face of pier. Therefore, load assumed to be transferred through deep beam type action (bending is negligible)

Overturning / Stability - Worst case assumed to be wind into the side

Rock anchor proof load, PL =	259	kips	(Assumed to be ultimate anchor capacity)
# of anchors in Line 1, N1 =	4		
Line 1 distance to rotation pt, d1 =	13.75	feet	
# of anchors in Line 2, N2 =	4		(Combined anchors on either side of foundation centerline)
Line 2 distance to rotation pt, d2 =	9	feet	
Foundation / pole / soil wt, W =	370.4	kips	
Distance to rotation pt, dw =	9	feet	
Foundation actual OTM, Mo =	6531	ft-k	(At bottom of foundation)
Overturning resistance, Mr =	23682	ft-k	(N1 x d1 x PL + N2 x d2 x [d2/d1 x PL] + W x dw)
% Cap = Mo / 0.5Mr =	55.2%	OK	(Min SF=2)

Note - Overturning % Cap conservative due to:

1) Line of anchors closest to point of overturning not included in calculation
2) Ultimate / maximum anchor capacity likely greater than proof load applied to anchor during installation

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RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

AT&T Existing Facility

Site ID: CT2099

Weston DT
56 Norfield Road
Weston, CT 06883

November 6, 2015

EBI Project Number: 6215005562

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.44 %

EBI Consulting
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November 6, 2015

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT2099 – Weston DT**

EBI Consulting was directed to analyze the proposed AT&T facility located at **56 Norfield Road, Weston, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the PCS, AWS and WCS bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **56 Norfield Road, Weston, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 4 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 4 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 4 GSM channels (850 MHz Band) was considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **Powerwave 7770** for 1900 MHz (PCS) and 850 MHz channels and the **CCI OPA-65R-LCUU-H6** for 700 MHz and 1900 MHz (PCS. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Powerwave 7770** has a maximum gain of **11.4 dBd** at 850 MHz and **13.4 dBd** at 1900MHz at its main lobe. The **CCI OPA-65R-LCUU-H6** has a maximum gain of **11.7 dBd** at 700 MHz and **14.9 dBd** at 1900MHz at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **160 feet** above ground level (AGL).

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

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AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.3 dBd	Gain:	11.4 / 13.3 dBd	Gain:	11.4 / 13.3 dBd
Height (AGL):	160 feet	Height (AGL):	160 feet	Height (AGL):	160 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	8	Channel Count	8	# PCS Channels:	8
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	4,281.78	ERP (W):	4,281.78	ERP (W):	4,281.78
Antenna A1 MPE%	**0.84**	Antenna B1 MPE%	**0.84**	Antenna C1 MPE%	**0.84**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	11.7 / 14.9 dBd	Gain:	11.7 / 14.9 dBd	Gain:	11.7 / 14.9 dBd
Height (AGL):	160 feet	Height (AGL):	160 feet	Height (AGL):	160 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	240	Total TX Power:	240	Total TX Power:	240
ERP (W):	5,483.28	ERP (W):	5,483.28	ERP (W):	5,483.28
Antenna A2 MPE%	**1.14**	Antenna B2 MPE%	**1.14**	Antenna C2 MPE%	**1.14**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 dBd	Gain:	11.4 dBd	Gain:	11.4 dBd
Height (AGL):	160 feet	Height (AGL):	160 feet	Height (AGL):	160 feet
Frequency Bands	850 MHz	Frequency Bands	850 MHz	Frequency Bands	850 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	1,656.46	ERP (W):	1,656.46	ERP (W):	1,656.46
Antenna A3 MPE%	**0.44**	Antenna B3 MPE%	**0.44**	Antenna C3 MPE%	**0.44**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**2.42**
Town of Weston FD	0.40 %
Town of Weston	0.59 %
EMS	0.30 %
Sprint	0.34 %
Verizon Wireless	2.44 %
T-Mobile	1.95 %
Site Total MPE %:	**8.44 %**

AT&T Sector 1 Total:	2.42 %
AT&T Sector 2 Total:	2.42 %
AT&T Sector 3 Total:	2.42 %
Site Total:	8.44 %

AT&T _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	**4**	**414.12**	**160**	**2.51**	**850**	**567**	**0.44 %**
AT&T 1900 MHz (PCS) UMTS	**4**	**656.33**	**160**	**3.98**	**1900**	**1000**	**0.40 %**
AT&T 700 MHz LTE	**2**	**887.47**	**160**	**2.69**	**850**	**467**	**0.58 %**
AT&T 1900 MHz (PCS) LTE	**2**	**1854.18**	**160**	**5.62**	**2300**	**1000**	**0.56 %**
AT&T 850 MHz GSM	**4**	**414.12**	**160**	**2.51**	**700**	**567**	**0.44 %**
						Total:	**2.42 %**

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector 1:	2.42 %
Sector 2:	2.42 %
Sector 3 :	2.42 %
AT&T Maximum Total (per sector):	2.42 %
Site Total:	8.44 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.44%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

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