Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

December 29, 2016

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 841288**
AT&T Site ID: CT2160
2 Kaechele Place, Bridgeport, CT 06606
Latitude: 41° 13′ 24.04″/ Longitude: -73° 13′ 0.38″

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 154-foot level of the existing 150-foot monopole tower at 2 Kaechele Place in Bridgeport, CT. The tower and property is owned by Crown Castle. AT&T now intends to replace three (3) antennas with three (3) new antennas. AT&T also intends to add three (3) RRU32s, six (6) triplexers, three (3) Bias-Ts, one (1) raycap, two (2) DC, and one (1) fiber cable.

This facility was approved by the Connecticut Siting Council in Docket No. 45 on September 14, 1984. This approval included the conditions that:

1. The towers shall be no taller than necessary to provide the proposed service, and in no event shall exceed
    a. 167’ at the Bridgeport site,
    b. 167’ at the Norwalk,
    c. 189.5’ at the Shelton site,
    d. 167’ at the Stamford site,
    e. 117’ at the Westport site;

2. A fence not lower than eight feet shall surround each town and its associated equipment;

3. The applicant or its successor shall notify the Council if and when directional antennas or any other equipment is added to any of these facilities;

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Joseph Ganin, Mayor, City of Bridgeport, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that 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: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

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: The Honorable Joseph Ganin, Mayor
City of Bridgeport
999 Broad Street
Bridgeport, CT 06604

DOCKET NO. 45

AN APPLICATION SUBMITTED BY THE SOUTHERN NEW ENGLAND TELEPHONE COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN FAIRFIELD COUNTY.	:	CONNECTICUT SITING COUNCIL
	:	September 14, 1984

DECISION AND ORDER

Pursuant to the foregoing opinion, the Council hereby directs that a certificate of environmental compatibility and public need as required by section 16-50k of the General Statutes of Connecticut, revisions of 1958, revised to 1983, as amended, be issued to the Southern New England Telephone Company for the construction, operation, and maintenance of a telecommunications tower and associated equipment to provide cellular service at each of the following sites:

Kaechele Place, Bridgeport, Connecticut;
Connecticut Avenue, Norwalk, Connecticut;
Nells Rock Road, Shelton, Connecticut;
Newfield Avenue, Stamford, Connecticut; and
Bayberry Lane, (former Nike site), Westport, Connecticut.

The facilities shall be constructed, operated, and maintained as specified in the Council's record on this matter, and subject to the following conditions:

1. The towers shall be no taller than necessary to provide the proposed service, and in no event shall exceed

   a) 167' at the Bridgeport site,
   b) 167' at the Norwalk site,
   c) 189.5' at the Shelton site,
   d) 167' at the Stamford site,
   e) 117' at the Westport site;

2. A fence not lower than eight feet shall surround each tower and its associated equipment;

3. The applicant or its successor shall notify the Council if and when directional antennas or any other equipment is added to any of these facilities;

4. The applicant or its successor shall permit, in accordance with representations made by it during the proceeding, public or private entities to share space on the facilities, for due consideration received, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing;
5. Unless necessary to comply with condition number six, below, no lights shall be installed on any of these towers;
6. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations;
7. The applicant shall submit a development and management plan (D&M) for the Bridgeport, Stamford, and Westport sites pursuant to sections 16-50j-85 through 16-50j-87 of the regulations of state agencies, except that irrelevant items in section 16-50j-86 need only be identified as such. The D&M plans shall include appropriate evergreen screening of the sites, erosion control measures, reseeding plans, and tree removal plans. The applicant shall consult with the Stamford Environmental Protection Board in the preparation of a drainage and erosion control plan for the Stamford tower. The applicant shall comply with the reporting requirements of section 16-50j-87 for all sites;
8. Construction activities shall take place during daylight working hours;
9. This decision and order shall be void and the towers and associated equipment approved herein shall be dismantled and

removed, or reapplication for any new use shall be made to the Connecticut Siting Council before any such new use is made, if the towers do not provide or permanently cease to provide cellular service following completion of construction;

10. This decision and order shall be void if all construction authorized is not completed within three years of the issuance of this decision.

Pursuant to section 16-50p of the General Statutes, we hereby direct that a copy of the opinion and decision and order be served on each person listed below. A notice of the issuance shall be published in the Bridgeport Post, the Norwalk Hour, the Stamford Advocate, and the Shelton Suburban News, and the Westport News.

The parties to this proceeding are

The Southern New England Telephone Company Room 314 227 Church Street New Haven, Connecticut 06506	(Applicant)
Attention: Mr. Peter J. Tyrrell Senior Attorney	(its attorney)
Rolnick Observatory 52 Sawyer Road Fairfield, Connecticut	represented by: Frederick H. Bump Director
Mr. Adam Norton 40 Highland Road Westport, Connecticut 06880	
Representative John Wayne Fox 13 Apple Tree Drive Stamford, Connecticut 06906	(service waived)
Mr. George C. Lenfest 4 Highland Road Westport, Connecticut	

Mr. William Seiden
First Selectman
Town of Westport
110 Myrtle Avenue
P.O. Box 549
Westport, Connecticut 06881

Mr. Arthur L. Schimel
174 Bayberry Lane
Westport, Connecticut

Mr. Seymour Bendremer
11 Apache Trail
Westport, Connecticut

Ms. Gladys Floch
32 Woody Lane
Westport, Connecticut

Ms. Helen S. Cohen (service waived)
15 Highland Road
Westport, Connecticut

Mr. Jack Braverman
226 Bayberry Lane
Westport, Connecticut

Mr. Kevin Gavin (service waived)
191 Bayberry Lane
Westport, Connecticut

Mr. A.B. Beiser
12 Highland Road
Westport, Connecticut

Mr. Edward V. Polusky (service waived)
4 Hooper Road
Westport, Connecticut

Ms. Lois Schine represented by:

Mary D. Mix, Esquire
830 Post Road - East
Suite 100
Westport, Connecticut 06880

Mr. Allen Witt
3 Apache Trail
Westport, Connecticut

Ms. Gayle Shiller (service waived)
5 Apache Trail
Westport, Connecticut

Mrs. Ronnie Hammer
3 Hooper Road
Westport, Connecticut

Mr. Paul Rosenblatt (service waived)
7 Apache Trail
Westport, Connecticut

Mr. Henry J. Wolfson (service waived)
179 Bayberry Lane
Westport, Connecticut

Mr. Melvin H. Barr (service waived)
Planning Director
Town of Westport
110 Myrtle Avenue
P.O. Box 549
Westport, Connecticut 06881

Mr. Mark Infeld (service waived)
6 Apache Trail
Westport, Connecticut

Ms. Barbara Saipe (service waived)
Representative Town
Meeting Member
District #8
Town Hall
P.O. Box 549
Westport, Connecticut 06881

Ms. Peggy Goldenberg (service waived)
201 Bayberry Lane
Westport, Connecticut

Ms. Martha Hauhuth (service waived)
Board of Selectman
Town Hall
P.O. Box 549
Westport, Connecticut 06881

Ms. Meg Coffee
32 Otter Trail
Westport, Connecticut (service waived)

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 14th day of September, 1984.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Yes
Commissioner John Downey Designee: Commissioner Peter G. Boucher	Absent
Commissioner Stanley Pac	Absent
Owen L. Clark	Yes
Fred J. Doocy	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Yes
Janet Sitty	Yes
Colin C. Tait	Absent

STATE OF CONNECTICUT)
: ss. New Britain, September 14, 1984
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

Christopher S. Wood

Christopher S. Wood, Executive Director
Connecticut Siting Council

205 KAECHELE PL

Location	205 KAECHELE PL	**Mblu**	81/ 2602/ 9/ /
Acct#	R--0148640	**Owner**	SOUTHERN NEW ENGLAND TEL
Assessment	$104,120	**Appraisal**	$148,730
PID	29859	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$51,340	$97,390	$148,730
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$35,950	$68,170	$104,120

Owner of Record

Owner	SOUTHERN NEW ENGLAND TEL	**Sale Price**	$0
Co-Owner	% SBC COMMUNICATIONS INC	**Certificate**	
Address	ONE SBC CENTER 36-M-01 ST LOUIS, MO 63101	**Book & Page**	0/ 0
		Sale Date	

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
SOUTHERN NEW ENGLAND TEL	$0		0/ 0	

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	

Building Photo

Grade:	
Stories:	
Occupancy:	
Exterior Wall 1:	
Exterior Wall 2:	
Roof Structure:	
Roof Cover:	
Interior Wall 1:	
Interior Wall 2:	
Interior Flr 1:	
Interior Flr 2	
Heat Fuel:	
Heat Type:	
AC Type:	
Total Bedrooms	
Total Full Baths	
Total Half Baths	
Total Xtra Fixtrs:	
Total Rooms	
Bath Style:	
Kitchen Style:	
Fireplaces	
Fin Bsmt Area	
Fin Bsmt Quality	
Bsmt Garages	
.	

(http://images.vgsi.com/photos/BridgeportCTPhotos//\00\03\05/86.JPG)

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	499
Description	Utility Vac Ln
Zone	RA
Neighborhood	2080
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.15
Frontage	0
Depth	0
Assessed Value	$68,170
Appraised Value	$97,390

Outbuildings

Outbuildings	Legend

Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
SHD3	Shed w/ Lt	CM	Comm	384 SF	$6,910	1
SHD3	Shed w/ Lt	CM	Comm	384 SF	$6,910	1
SHD3	Shed w/ Lt	CM	Comm	576 SF	$10,370	1
FN1	Fence, Chain	8	8 ft	350 LF	$3,150	1
TWR	Tower			120 LF	$24,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$51,340	$106,880	$158,220
2013	$51,340	$106,880	$158,220
2012	$51,340	$106,880	$158,220

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$35,950	$74,820	$110,770
2013	$35,950	$74,820	$110,770
2012	$35,950	$74,820	$110,770

City of Bridgeport

My Map

Legend

- Parcels

283.9 0 141.95 283.9 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Connecticut Metropolitan Council of Governments

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

METROCOG
Connecticut Metropolitan Council of Governments

PROJECT INFORMATION

SCOPE OF WORK:
- AT&T ANTENNAS: (1) NEW ANTENNAS PER SECTOR TO REPLACE EXISTING ANTENNA, FOR A TOTAL OF (3) NEW ANTENNAS
- AT&T RRUs: (1) EXISTING RRUS PER SECTOR TO REMAIN, (2) NEW RRUS PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (6) NEW RRUs, (1) EXISTING RRUs PER SECTOR TO BE REMOVED, FOR A TOTAL OF (3) EXISTING RRUs.
- AT&T TRIPLEXERS: (2) NEW TRIPLEXERS PER SECTOR FOR A TOTAL OF (6)
- AT&T DC TRUNKS: (2) NEW DC TRUNKS, (1) FIBER TRUNK
- (1) NEW DC/FIBER SQUID

SITE ADDRESS: 2 KAECHELE PLACE
BRIDGEPORT, CT 06606

LATITUDE: 41.223325 41° 13' 23.97"N
LONGITUDE: −73.216777 73° 13' 0.397"W

USID: 60393

TOWER OWNER: CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

TYPE OF SITE: MONOPOLE/INDOOR EQUIPMENT

MONOPOLE HEIGHT: 154'−0"±
RAD CENTER: 154'−0"±

CURRENT USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

at&t MOBILITY

FA CODE: 10034977
SITE NUMBER: CT2106
SITE NAME: BRIDGEPORT NORTH
PROJECT: LTE 3C / MULIT CARRIER

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

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

DRAWING INDEX

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A−2	EQUIPMENT LAYOUTS	0
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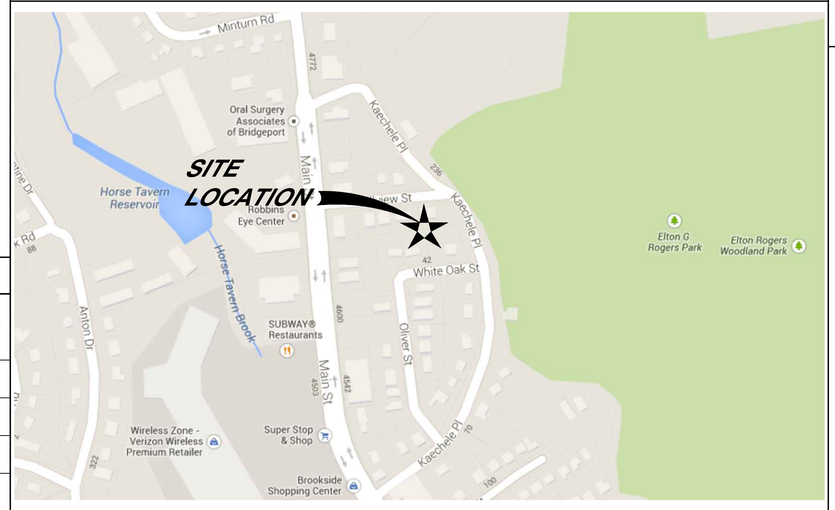
VICINITY MAP

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 W/MASSACHUSETTS TURNPIKE/WORCESTER/SPRINGFIELD AND MERGE ONTO I−90 W/MASSACHUSETTS TURNPIKE (38.3 MI). 7. TAKE EXIT 9 TO MERGE ONTO I−84 TOWARD US−20/HARTFORD/NEW YORK CITY (41.7 MI). 8. KEEP LEFT TO CONTINUE ON CT−15 S, FOLLOW SIGNS FOR I−91 S/CHARTER OAK BRIDGE/N Y. CITY (1.1 MI). 9. CONTINUE ONTO CT−15 S/US−5 S (0.8 MI). 10. TAKE EXIT 86 TO MERGE ONTO I−91 S TOWARD NEW HAVEN/NEW YORK CITY (17.1 MI). 11. TAKE EXIT 17 FOR CT−15 S/W CROSS PKWY (0.4 MI). 12. MERGE ONTO CT−15 S (33.7 MI). 13. TAKE EXIT 48 FOR CT−111/MAIN ST (0.1 MI). 14. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR BRIDGEPORT (220 FT). 15. TURN LEFT ONTO MAIN ST (0.6 MI). 16. TURN LEFT ONTO HILLVIEW ST − DESTINATION WILL BE ON THE RIGHT (384 FT).



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.

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

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

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

COM−EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT2106
SITE NAME: BRIDGEPORT NORTH
2 KAECHELE PLACE
BRIDGEPORT, CT 06606
FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/7/16	ISSUED FOR FILING	NJM	NDB	NDB

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

SEAL: STATE OF CONNECTICUT · NICHOLAS D. BARILE · No. 20643 · PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
16044−EMP	T−1	A

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.

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FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT2106
SITE NAME: BRIDGEPORT NORTH

2 KAECHELE PLACE
BRIDGEPORT, CT 06606
FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/7/16	ISSUED FOR FILING	NJM	NDB	NDB

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

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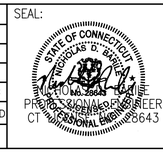
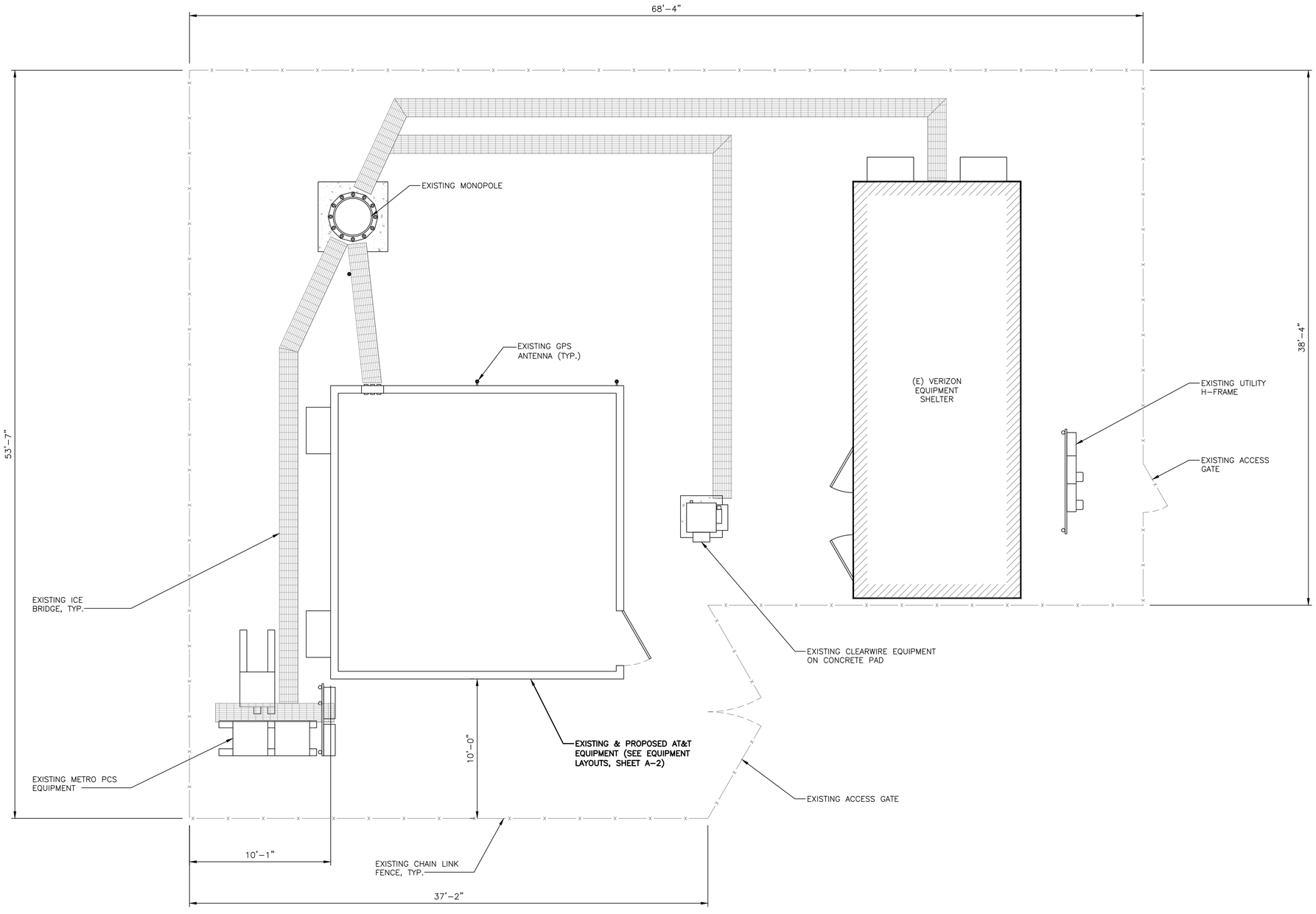


PRESTON, THOMAS G. – PROFESSIONAL ENGINEER
CT PROFESSIONAL ENGINEER LICENSE NO. 28643

AT&T

DRAWING TITLE:
GROUNDING NOTES & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
16044-EMP	GN-1	A



NORTH

COMPOUND LAYOUT

SCALE: 1" = 4'-0"

4 0 2 4 8 16

(IN FEET)

1/4 inch = 1 Foot

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

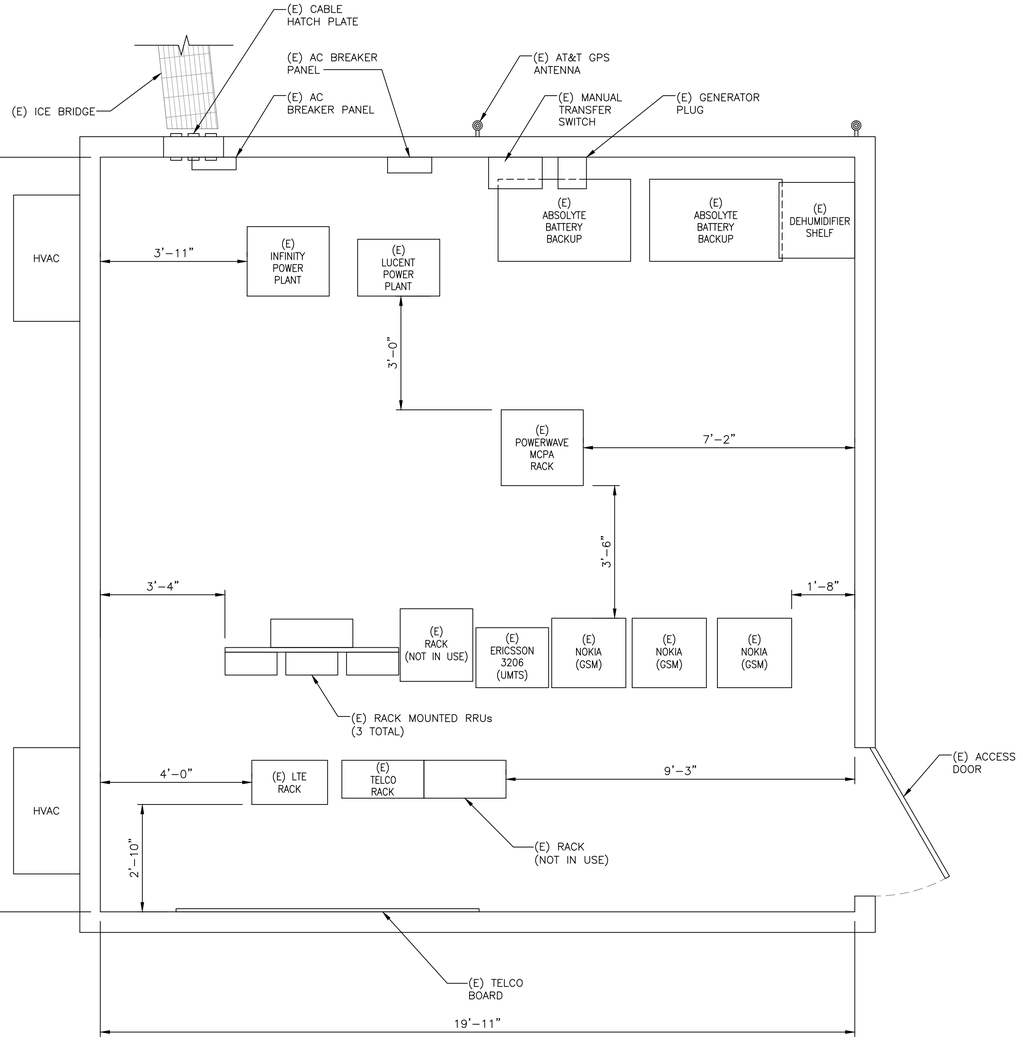
SEAL:

STATE OF CONNECTICUT
NICHOLAS D. BARBER
LICENSED
No. 20643
PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
CT 20643

AT&T

DRAWING TITLE: COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
16044-EMP	A-1	A



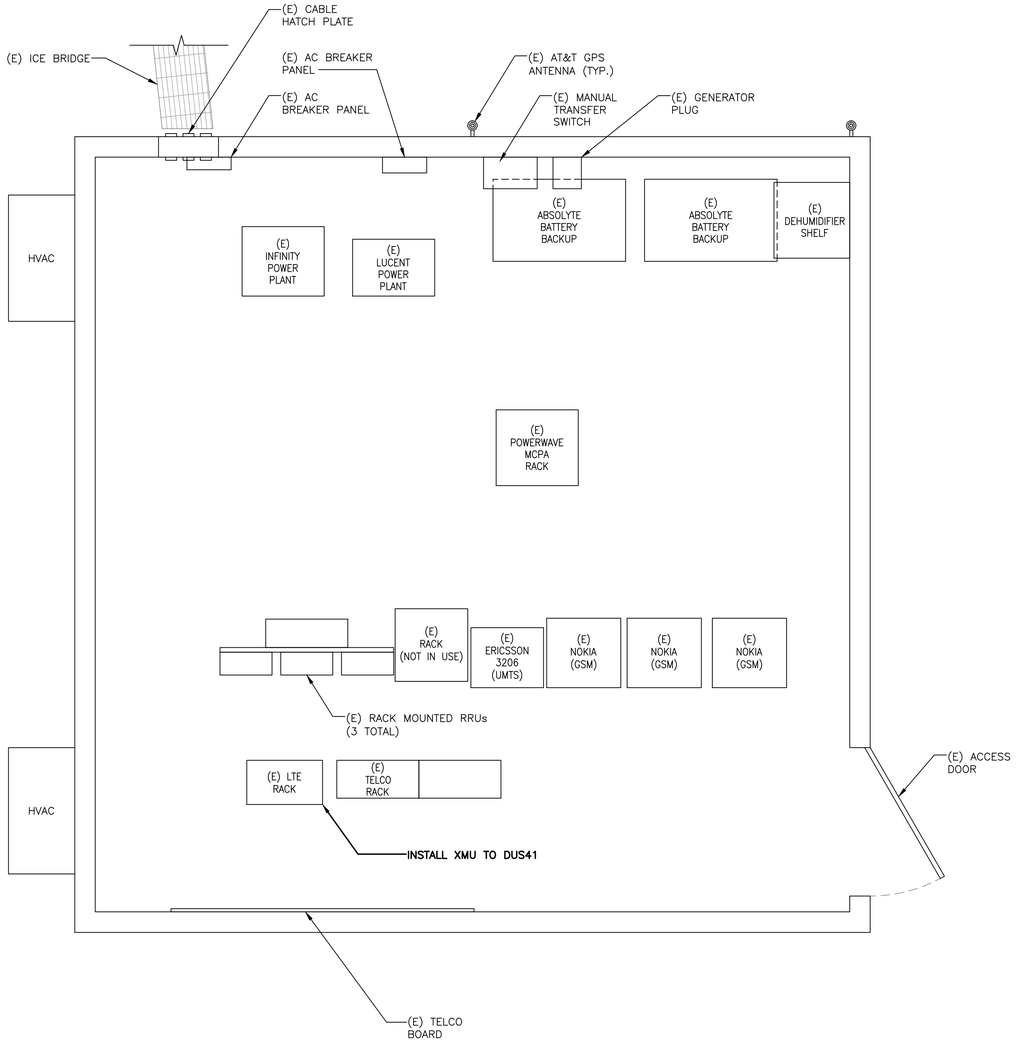
EXISTING EQUIPMENT LAYOUT

SCALE: 1" = 2'-0"

2 0 1 2 4 8

(IN FEET)
1/2 Inch = 1 Foot

NORTH



PROPOSED EQUIPMENT LAYOUT

SCALE: 1" = 2'-0"

2 0 1 2 4 8

(IN FEET)
1/2 Inch = 1 Foot

NORTH

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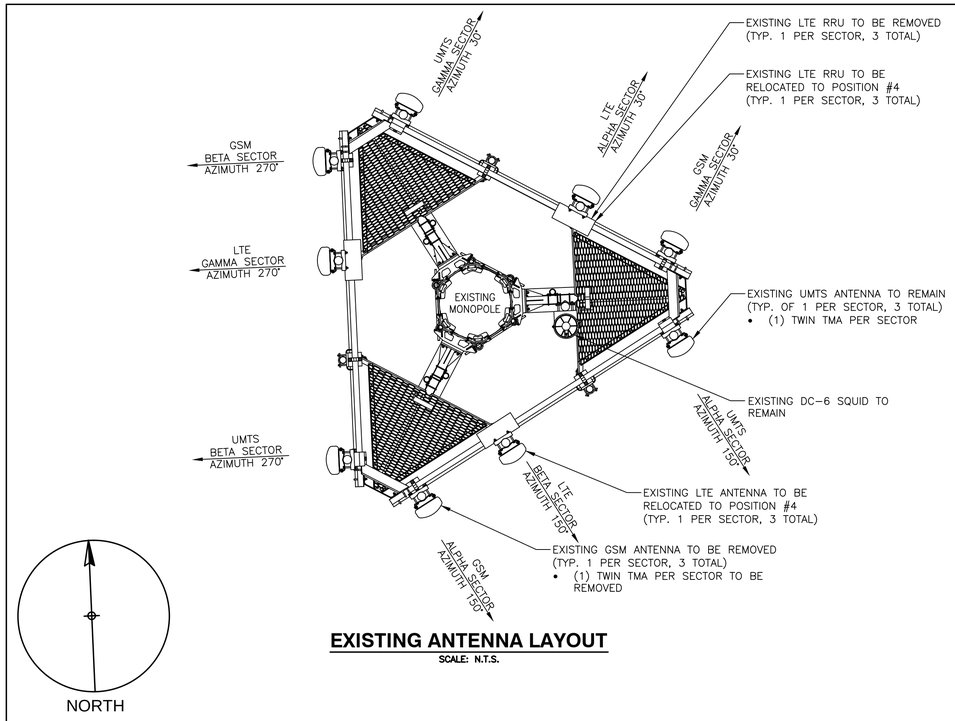
SEAL:

STATE OF CONNECTICUT
NICHOLAS D. BARBIERI
LICENSE NO. 24643
PROFESSIONAL ENGINEER
PROJECT ENGINEER
CT PROFESSIONAL ENGINEER #24643

AT&T

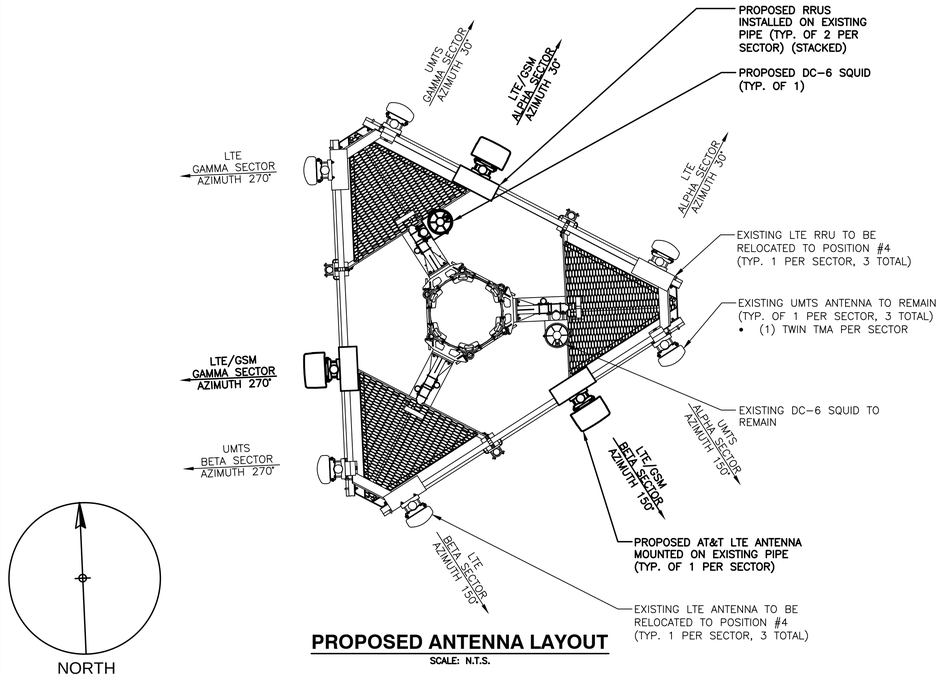
DRAWING TITLE:
EQUIPMENT LAYOUTS

JOB NUMBER	DRAWING NUMBER	REV
16044-EMP	A-2	A



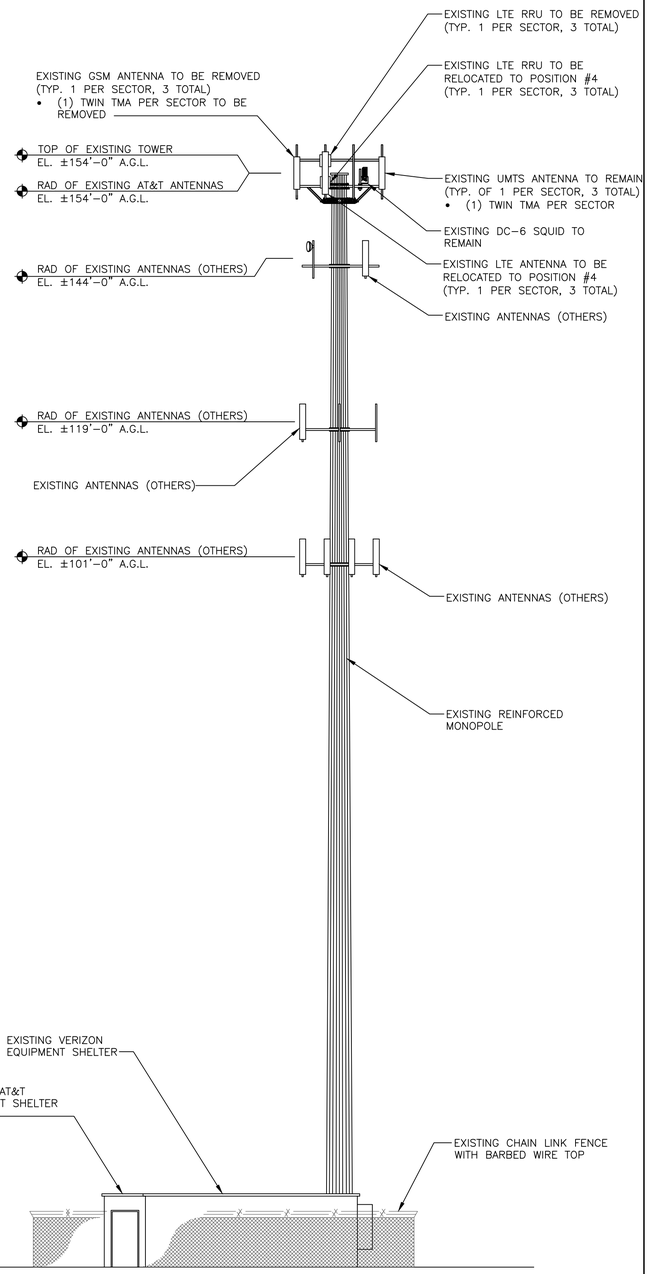
EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



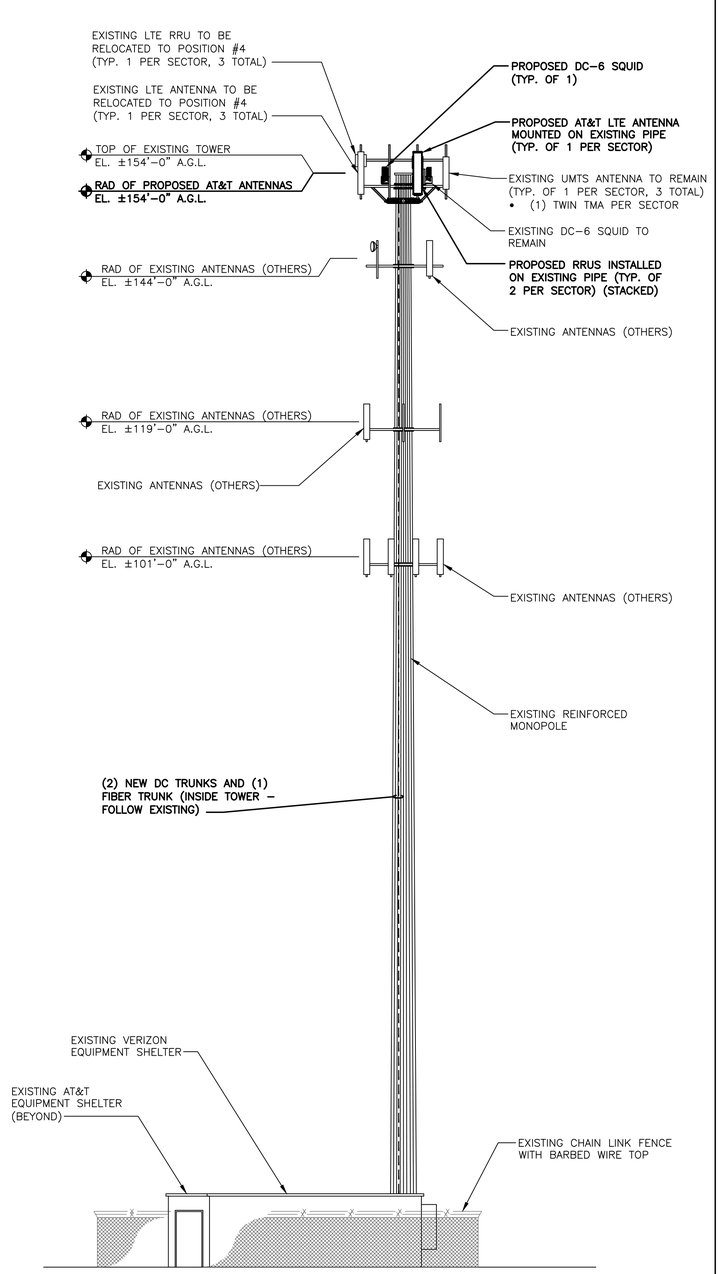
PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.



EXISTING TOWER ELEVATION

SCALE: NTS



PROPOSED 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.

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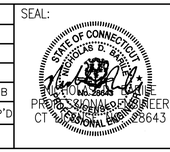

AT&T

DRAWING TITLE: ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
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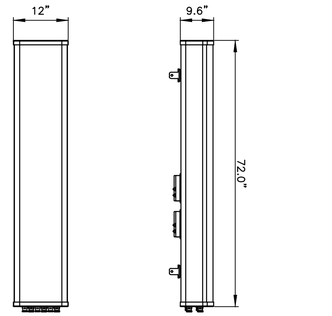


FRONT VIEW

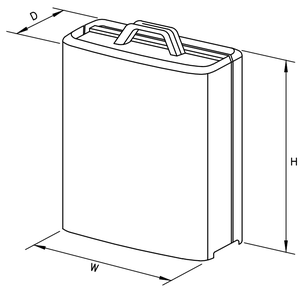
SIDE VIEW

BOTTOM VIEW

MANUFACTURER	QUINTEL
MODEL	QS66512-2
WEIGHT	111.0 LBS

LTE ANTENNA DETAIL

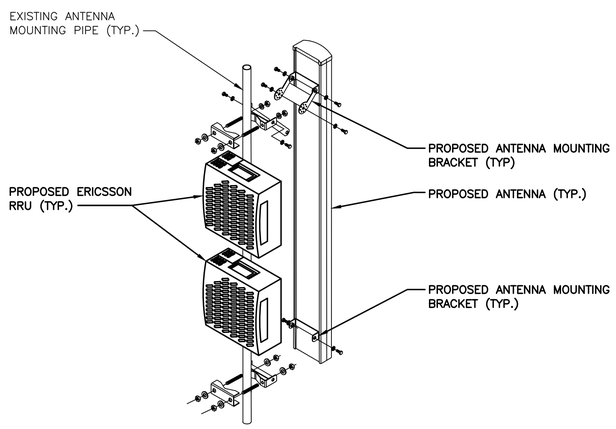
SCALE: N.T.S.



MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-32 B2	29.9" x 13.3" x 9.5"	77 LBS
RRUS-32	29.9" x 13.3" x 9.5"	77 LBS

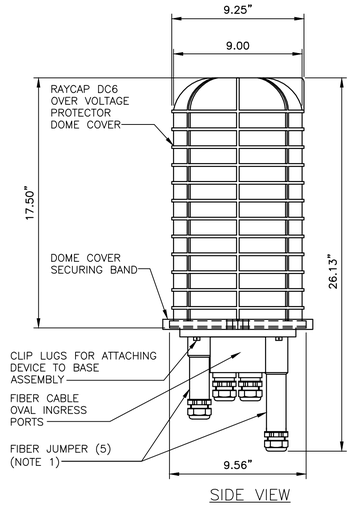
RRUS DETAIL

SCALE: N.T.S.

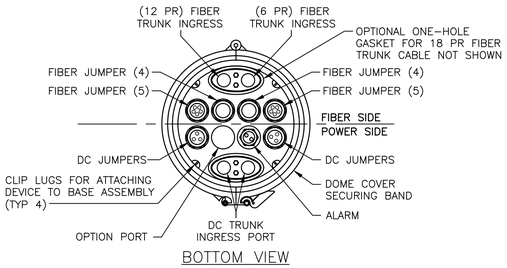


ANTENNA & RRU MOUNTING DETAIL

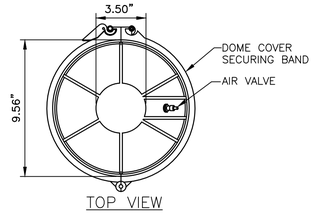
SCALE: N.T.S.



SIDE VIEW



BOTTOM VIEW



TOP VIEW

NOTES:

1. REMOVE CABLE SEALING GLAND AND INSTALL M32x1.5 METRIC-TO-1" NPT ADAPTER (COOPER CROUSE-HINES P/N CAP 740 994 OR EQUIVALENT MFR) WHEN CONNECTING CONDUIT TO OVP.

DC-6 SURGE SUPPRESSOR DETAIL

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	–	–	–
	A3	POWERWAVE	P65-16-XLH-RR	72"X12"X6"
	A4	POWERWAVE	7770	55"x11"x5"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	–	–	–
	B3	POWERWAVE	P65-16-XLH-RR	72"X12"X6"
	B4	POWERWAVE	7770	55"x11"x5"
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	–	–	–
	G3	POWERWAVE	P65-16-XLH-RR	72"X12"X6"
	G4	POWERWAVE	7770	55"x11"x5"

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	**QUINTEL**	**QS66512-2**	**72"X12"x9.6"**
	A3	–	–	–
	A4	POWERWAVE	P65-16-XLH-RR	72"X12"X6"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	**QUINTEL**	**QS66512-2**	**72"X12"x9.6"**
	B3	–	–	–
	B4	POWERWAVE	P65-16-XLH-RR	72"X12"X6"
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	**QUINTEL**	**QS66512-2**	**72"X12"x9.6"**
	G3	–	–	–
	G4	POWERWAVE	P65-16-XLH-RR	72"X12"X6"

FINAL RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	**ERICSSON**	**RRUS-32 B2**	**29.9"x13.3"x9.5"**		
	ERICSSON	**RRUS-32**	**29.9"x13.3"x9.5"**		
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
BETA	**ERICSSON**	**RRUS-32 B2**	**29.9"x13.3"x9.5"**		
	ERICSSON	**RRUS-32**	**29.9"x13.3"x9.5"**		
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
GAMMA	**ERICSSON**	**RRUS-32 B2**	**29.9"x13.3"x9.5"**		
	ERICSSON	**RRUS-32**	**29.9"x13.3"x9.5"**		
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		

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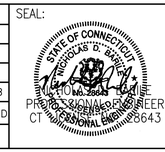
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: CJT

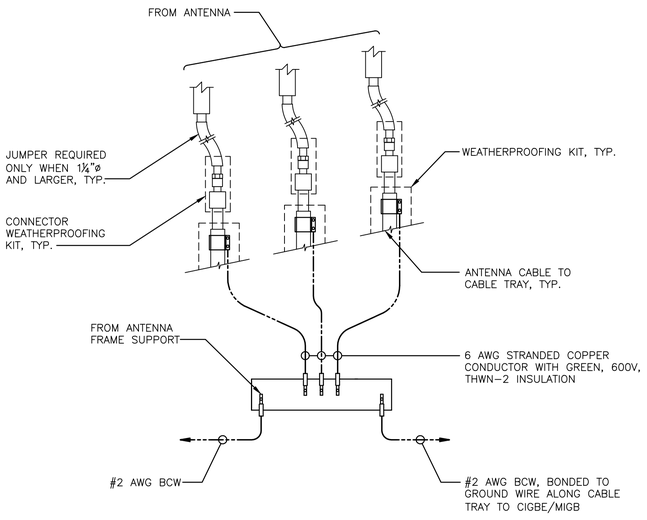
SEAL:



AT&T

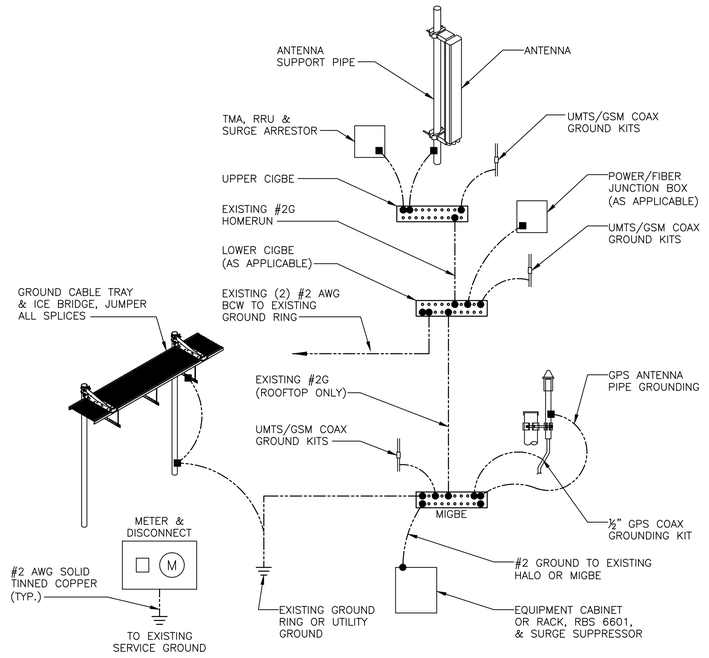
DRAWING TITLE: DETAILS

JOB NUMBER	DRAWING NUMBER	REV
16044-EMP	A-4	A



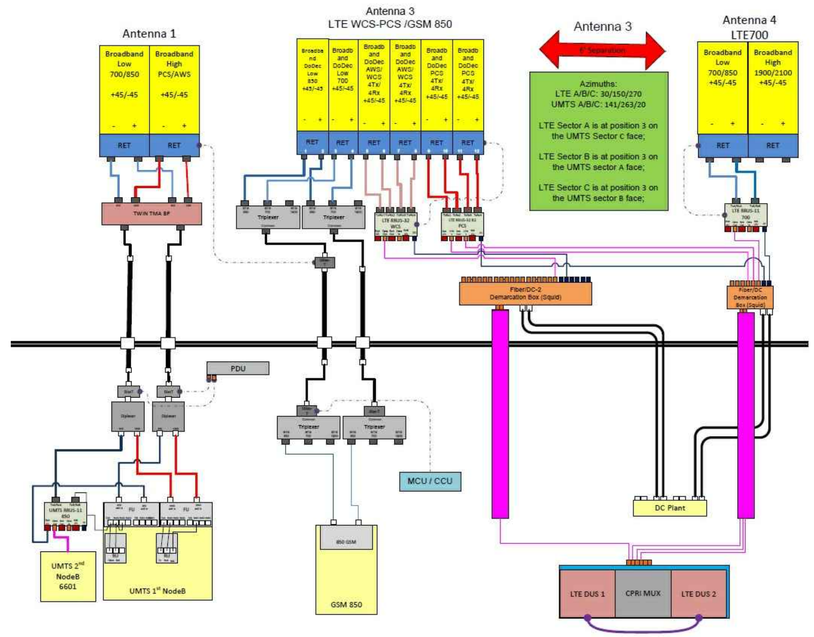
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



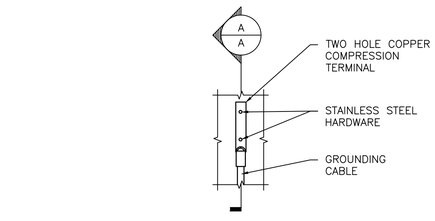
GROUNDING RISER DIAGRAM

SCALE: N.T.S.

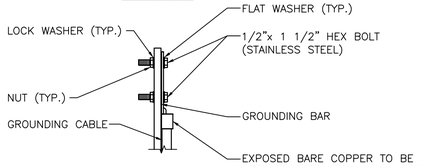


PLUMBING DIAGRAM

SCALE: N.T.S.



ELEVATION



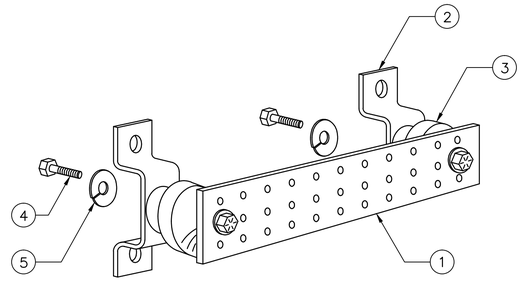
SECTION "A–A"

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.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT2106
SITE NAME: BRIDGEPORT NORTH

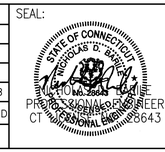
2 KAECHELE PLACE
BRIDGEPORT, CT 06606
FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/7/16	ISSUED FOR FILING	NJM	NDB	NDB

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

SEAL:



AT&T

DRAWING TITLE:
GROUNDING, ONE-LINE DIAGRAM & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
16044-EMP	G-1	A

Date: **November 22, 2016**

GPD Engineering and Architecture
Professional Corporation
520 South Main Street, Suite 2531
Akron, Ohio 44311
(216) 927-8663
dpalkovic@gpdgroup.com

Timothy Howell
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(980) 209-8242

Subject:	**Structural Modification Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Name:	BRIDGEPORT NORTH
	Carrier Site Number:	CT2106
Crown Castle Designation:	**Crown Castle BU Number:**	841288
	Crown Castle Site Name:	BRIDGEPORT NORTH
	Crown Castle JDE Job Number:	394228
	Crown Castle Work Order Number:	1318658
	Crown Castle Application Number:	360013 Rev. 0
Engineering Firm Designation:	**GPD Group Project Number:**	2016777.841288.06
Site Data:	**2 Kaechele Place, Bridgeport, Fairfield County, CT 06606**	
	Latitude *41° 13' 23.69"*, Longitude *-73° 13' 0.38"*	
	150 Foot – Modified Monopole Tower	

Dear Timothy Howell,

GPD is pleased to submit this **"Structural Modification Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 963497, in accordance with application 360013, 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:

LC4.5: Modified Structure w/ Existing + Proposed **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

All modifications designed by GPD (Project #: 2016777.841288.06, dated 11/22/2016, see Appendix D) and equipment proposed in the reports shall be installed in accordance with the attached drawings for the determined structural capacity to be effective.

We at *GPD* 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.

Structural analysis prepared by: Brendan Kelly

Respectfully submitted by:

Christopher J. Scheks, P.E.
Connecticut #: 0030026

11/22/2016

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1) INTRODUCTION

The existing 150' monopole has a 12-sided cross section and is evenly tapered from 37.36" (flat-flat) at the base to 15" flat-flat at the top. It has four major sections, with the bottom three sections being connected by slip joints and the top section attached with a flange plate. The tower is galvanized and does not have tower lighting.

Tower modifications found during the tower mapping consisting of adding 2.5" solid round members to reinforce the shaft have been considered in this analysis.

Modifications designed by GPD (Project #: 2008264.38, 10/16/2008), consisting of reinforcing the foundation, have been considered in this analysis. The shaft reinforcement and bridge stiffeners designed in these modifications were proposed to be removed in the 2013 modifications and have not been considered in this analysis.

The modifications designed by GPD (Project #: 2013801.02, dated 04/03/2013), consisting of reinforcing the tower shaft, replacing bridge stiffeners, and reinforcing the foundation, have been considered in this analysis.

The modifications designed by GPD (Project #: 2014777.841288.03, dated: 09/19/2014) consisting of installing new end connections for the ineffective solid round modifications at 51' and 98' to make the existing modifications effective, installing new shaft reinforcement plates from 0' to 47', installing four additional anchor rods with brackets to the existing tower base. These modifications were considered in this analysis.

The proposed tower modifications by GPD (Project #: 2016777.841288.06, dated 11/22/2016, see Appendix D) consist of installing new connection brackets for the dywidag rods at 2.42' and installing new step bolts and a safety line. These modifications were considered in this analysis.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

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
150.0	154.0	3	Quintel Tech	QS66512-2	2 1	3/4 3/8	1
		6	CCI Antennas	TPX-070821			
		3	Ericsson	RRUS 32			
		3	Ericsson	RRUS 32 B2			
		3	Kathrein	782 10253			
		1	Raycap	DC6-48-60-18-8F			

Notes:
1) See Appendix B for the proposed coax layout.

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
150.0	154.0	3	Powerwave	7770.00	12 2 1	1-5/8 3/4 3/8	1
		3	Powerwave	TT19-08BP111-001			
		3	Ericsson	RRUS-11 1900MHz			
		3	Powerwave	7770.00			
		3	Powerwave	P65-16-XLH-RR			
		3	Powerwave	TT19-08BP111-001			
	150.0	1	EEI	10.5' Platform w/ Side Arms			
147.0	147.0	3	Ericsson	RRUS 11			
		1	Raycap	TME-DC6-48-60-18-8F			
		1		Side Arm Mount [SO 102-3]			
138.0	143.0	1	Andrew	VHLP2-18	2 6	1/2 5/16	
		1	Andrew	VHLP2-23			
		2	Dragonwave	Horizon Compact			
	140.0	3	Argus Technologies	LLPX310R-V1			
		3	Samsung Telecommunications	RAS SPI-2213 RRH			
		1	Clearwire	CW JUNCTION BOX			
	138.0	1		Platform Mount [LP 1201-1]			
120.0	121.0	3	Kathrein	800 10504			
		3	Kathrein	860 10025			
	120.0	1		T-Arm Mount [TA 601-3]			
99.0	103.0	1	GPS	GPS_A	1 12	1/2 1-5/8	
	99.0	6	Antel	BXA-171063/8CF			
		6	Antel	BXA-70063/4CF			
		6	KMW Comm	KDXCV0012017			
		6	RFS Celwave	FD9R6004/2C-3L			
		1		T-Arm Mount [TA 602-3]			

Notes:
1) Equipment to be removed and was not considered in the analysis.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Mapping	GPD Project #: 2014777.841288.02 Rev. A, dated 09/19/2014	4710143	CCISITES
Foundation Mapping	FDH Project #: 08-09065E N1, dated 09/23/2008	5110783	CCISITES
Geotechnical Report	FDH Project #: 08-09065E G1, dated 09/23/2008	5110784	CCISITES
Modification Drawings	GPD Project #: 2008264.38, dated 10/16/2008	5237204	CCISITES
Modification Drawings	GPD Project #: 2013801.02, dated 04/03/2013	4945043	CCISITES
Modification Drawings	GPD Project #: 2014777.841288.03, dated: 09/19/2014	5303781	CCISITES
Legacy Modification Inspection	TEP Project #: 25567.24283, dated 10/22/2014	5401472	CCISITES
Modification Inspection	TEP Project #: 25567_26102, dated 6/5/2015	5739992	CCISITES
Modification Drawings	GPD Project #: 2016777.841288.06, dated 11/22/2016	Dan Palkovic	GPD

3.1) Analysis Method

tnxTower (version 7.0.7.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.

This analysis may be affected if any assumptions are not valid or have been made in error. GPD 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)	ø*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 145	Pole	TP15.7453x15x0.2188	Pole	-3.76	-	23.5	Pass
L2	145 - 140	Pole	TP16.4907x15.7453x0.2188	Pole	-4.06	-	37.5	Pass
L3	140 - 135	Pole	TP17.236x16.4907x0.2188	Pole	-8.01	-	54.7	Pass
L4	135 - 130	Pole	TP17.9814x17.236x0.2188	Pole	-8.43	-	70.0	Pass
L5	130 - 128.5	Pole	TP18.205x17.9814x0.2188	Pole	-8.56	-	74.2	Pass
L6	128.5 - 128.25	Pole + Reinf.	TP18.2422x18.205x0.6688	Reinf.	-8.62	-	48.6	Pass
L7	128.25 - 123.25	Pole + Reinf.	TP18.9876x18.2422x0.6438	Reinf.	-9.38	-	58.5	Pass
L8	123.25 - 118.25	Pole + Reinf.	TP19.7329x18.9876x0.6188	Reinf.	-10.98	-	68.5	Pass
L9	118.25 - 113.25	Pole + Reinf.	TP20.4783x19.7329x0.6063	Reinf.	-11.77	-	78.9	Pass
L10	113.25 - 109.75	Pole + Reinf.	TP21x20.4783x0.5938	Reinf.	-13.35	-	85.8	Pass
L11	109.75 - 109.5	Pole + Reinf.	TP21.0373x21x0.725	Reinf.	-13.41	-	65.4	Pass
L12	109.5 - 104.5	Pole + Reinf.	TP21.783x21.0373x0.7	Reinf.	-14.37	-	72.9	Pass
L13	104.5 - 101.67	Pole + Reinf.	TP22.205x21.783x0.6875	Reinf.	-14.93	-	77.0	Pass
L14	101.67 - 101.42	Pole + Reinf.	TP22.2423x22.205x0.675	Reinf.	-14.99	-	82.5	Pass
L15	101.42 - 96.42	Pole + Reinf.	TP22.988x22.2423x0.6625	Reinf.	-17.22	-	90.7	Pass
L16	96.42 - 95.41	Pole + Reinf.	TP23.1386x22.988x0.6625	Reinf.	-17.46	-	92.5	Pass
L17	95.41 - 95.16	Pole + Reinf.	TP23.1759x23.1386x0.7	Reinf.	-17.53	-	74.5	Pass
L18	95.16 - 90.16	Pole + Reinf.	TP23.9216x23.1759x0.6875	Reinf.	-18.62	-	81.5	Pass
L19	90.16 - 85.16	Pole + Reinf.	TP24.6672x23.9216x0.6625	Reinf.	-19.77	-	88.3	Pass
L20	85.16 - 80.5	Pole + Reinf.	TP25.3622x24.6672x0.65	Reinf.	-20.86	-	94.5	Pass
L21	80.5 - 80.25	Pole + Reinf.	TP25.3995x25.3622x0.975	Reinf.	-20.96	-	80.7	Pass
L22	80.25 - 75.25	Pole + Reinf.	TP26.1452x25.3995x0.9375	Reinf.	-22.50	-	86.8	Pass
L23	75.25 - 69.25	Pole + Reinf.	TP27.04x26.1452x0.925	Reinf.	-23.45	-	90.3	Pass
L24	69.25 - 67.25	Pole + Reinf.	TP26.897x26.0926x0.9875	Reinf.	-25.85	-	91.5	Pass
L25	67.25 - 66.75	Pole + Reinf.	TP26.9775x26.897x0.9875	Reinf.	-26.03	-	92.0	Pass
L26	66.75 - 66.5	Pole + Reinf.	TP27.0177x26.9775x1.0625	Reinf.	-26.12	-	78.9	Pass
L27	66.5 - 61.5	Pole + Reinf.	TP27.8221x27.0177x1.025	Reinf.	-27.93	-	83.3	Pass
L28	61.5 - 56.5	Pole + Reinf.	TP28.6265x27.8221x0.9875	Reinf.	-29.79	-	87.5	Pass
L29	56.5 - 51.5	Pole + Reinf.	TP29.431x28.6265x0.9625	Reinf.	-31.67	-	91.6	Pass
L30	51.5 - 49	Pole + Reinf.	TP29.8332x29.431x0.9625	Reinf.	-32.62	-	93.6	Pass
L31	49 - 48.75	Pole + Reinf.	TP29.8734x29.8332x1.7125	Reinf.	-32.78	-	56.6	Pass
L32	48.75 - 48.5	Pole + Reinf.	TP29.9136x29.8734x1.3125	Reinf.	-32.89	-	70.8	Pass
L33	48.5 - 44.25	Pole + Reinf.	TP30.5974x29.9136x1.2875	Reinf.	-34.82	-	73.5	Pass
L34	44.25 - 44	Pole + Reinf.	TP30.6376x30.5974x1.3875	Reinf.	-34.96	-	63.8	Pass
L35	44 - 39	Pole + Reinf.	TP31.442x30.6376x1.3375	Reinf.	-37.40	-	66.5	Pass
L36	39 - 30	Pole + Reinf.	TP32.89x31.442x1.3125	Reinf.	-39.88	-	69.3	Pass
L37	30 - 29	Pole + Reinf.	TP32.4654x31.6215x1.4063	Reinf.	-44.21	-	68.2	Pass
L38	29 - 24	Pole + Reinf.	TP33.3093x32.4654x1.3563	Reinf.	-46.93	-	70.4	Pass
L39	24 - 19	Pole + Reinf.	TP34.1532x33.3093x1.3313	Reinf.	-49.67	-	72.6	Pass
L40	19 - 14	Pole + Reinf.	TP34.9971x34.1532x1.3063	Reinf.	-52.45	-	74.7	Pass
L41	14 - 9	Pole + Reinf.	TP35.841x34.9971x1.2563	Reinf.	-55.26	-	76.7	Pass
L42	9 - 8.54	Pole + Reinf.	TP35.9186x35.841x1.2563	Reinf.	-55.53	-	76.9	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	ø*P_allow (K)	% Capacity	Pass / Fail
L43	8.54 - 8.29	Pole + Reinf.	TP35.9608x35.9186x1.2563	Reinf.	-55.67	-	77.0	Pass
L44	8.29 - 4.08	Pole + Reinf.	TP36.6714x35.9608x1.2313	Reinf.	-57.93	-	78.6	Pass
L45	4.08 - 3.83	Pole + Reinf.	TP36.7136x36.6714x1.2313	Reinf.	-58.08	-	78.7	Pass
L46	3.83 - 3.25	Pole + Reinf.	TP36.8115x36.7136x1.2313	Reinf.	-58.39	-	78.9	Pass
L47	3.25 - 3	Pole + Reinf.	TP36.8537x36.8115x0.8813	Reinf.	-58.50	-	87.5	Pass
L48	3 - 0.79167	Pole + Reinf.	TP37.2264x36.8537x0.8813	Reinf.	-59.41	-	88.3	Pass
L49	0.79167 - 0.54167	Pole + Reinf.	TP37.2686x37.2264x0.8813	Reinf.	-59.54	-	82.7	Pass
L50	0.54167 - 0	Pole + Reinf.	TP37.36x37.2686x0.8813	Reinf.	-59.76	-	82.9	Pass
						Summary	ELC:	Load Case 5
						Pole =	74.2	Pass
						Reinf. =	94.5	Pass
						Rating =	94.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC4.5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	109.75	55.5	Pass
1	Anchor Rods	0	68.6	Pass
1	Base Plate	0	59.4	Pass
1	Base Foundation (Soil Interaction)	0	97.6	Pass
1	Base Foundation (Reinforcement)	0	52.8	Pass

Structure Rating (max from all components) =	**97.6%**

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

4.1) Recommendations

The designs of the modified tower and its foundation will be sufficient for the proposed loading once the modifications designed by GPD (Project #: 2016777.841288.06, dated 11/22/2016, see Appendix D) are installed.

5) DISCLAIMER OF WARRANTIES

GPD GROUP has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD GROUP in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD GROUP does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD GROUP provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD GROUP, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

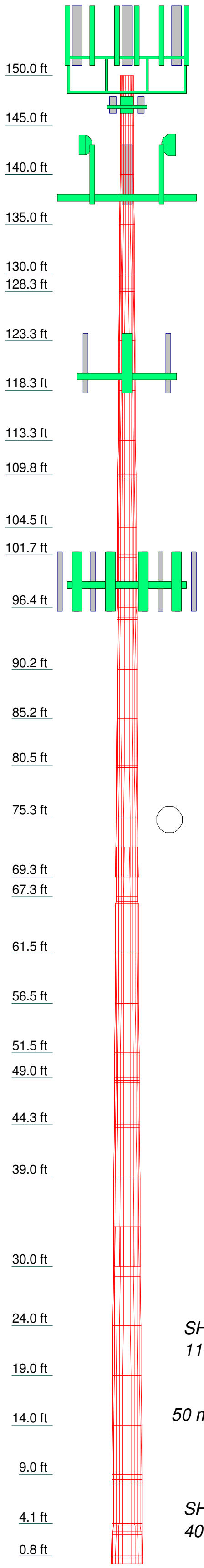
Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD GROUP makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD GROUP will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD GROUP pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	12	0.2188		15.0000	15.7453		0.2
2	5.00	12	0.2188		15.7453	16.4907		0.2
3	5.00	12	0.2188		16.4907	17.2360		0.2
4	5.00	12	[illegible]		[illegible]	[illegible]		0.2
5	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
6	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
7	5.00	12	[illegible]		[illegible]	[illegible]		0.6
8	5.00	12	0.6188		18.9876	19.7329		0.6
9	5.00	12	0.6062		19.7329	20.4783		0.6
10	3.50	12	[illegible]		[illegible]	[illegible]		0.4
11	[illegible]	12	[illegible]		[illegible]	[illegible]		0.0
12	5.00	12	0.7000		[illegible]	[illegible]		0.7
13	[illegible]	12	[illegible]		[illegible]	[illegible]		0.4
14	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
15	5.00	12	[illegible]		[illegible]	[illegible]		0.7
16	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
17	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
18	5.00	12	[illegible]		[illegible]	[illegible]		0.6
19	5.00	12	0.6625		23.9216	24.6672		0.7
20	4.66	12	[illegible]		[illegible]	[illegible]		0.6
21	0.25	12	[illegible]		[illegible]	[illegible]		0.1
22	5.00	12	0.9375		[illegible]	[illegible]		1.0
23	6.00	12	0.9250	3.00	26.1452	27.0400	A572-65	1.2
24	[illegible]	12	[illegible]		[illegible]	[illegible]		1.1
25	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
26	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
27	5.00	12	[illegible]		[illegible]	[illegible]		1.2
28	5.00	12	0.9875		27.8221	28.6265		1.2
29	5.00	12	0.9625		28.6265	29.4310		1.2
30	[illegible]	12	[illegible]		[illegible]	[illegible]		0.6
31	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
32	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
33	4.25	12	[illegible]		[illegible]	[illegible]		1.4
34	0.25	12	[illegible]		[illegible]	[illegible]		0.1
35	5.00	12	[illegible]		[illegible]	[illegible]		1.7
36	9.00	12	1.3125	4.00	31.4420	32.8900		3.2
37	5.00	12	[illegible]		[illegible]	[illegible]		1.9
38	5.00	12	[illegible]		[illegible]	[illegible]		1.9
39	5.00	12	1.3313		33.3093	34.1532		1.9
40	5.00	12	1.3062		34.1532	34.9971		2.0
41	5.00	12	[illegible]		[illegible]	[illegible]		2.0
42–50	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
								34.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
EEI 10.5' Platform w/ Side Arms (GPD)	150	LLPX310R-V1 w/ Mount Pipe	138
7770.00 w/ Mount Pipe	150	RAS SPI-2213 RRH	138
7770.00 w/ Mount Pipe	150	RAS SPI-2213 RRH	138
7770.00 w/ Mount Pipe	150	RAS SPI-2213 RRH	138
P65-16-XLH-RR w/ Mount Pipe	150	CW JUNCTION BOX	138
P65-16-XLH-RR w/ Mount Pipe	150	Horizon Compact	138
P65-16-XLH-RR w/ Mount Pipe	150	Horizon Compact	138
TT19-08BP111-001	150	Pipe Mount 7'x2.875"	138
TT19-08BP111-001	150	Pipe Mount 7'x2.875"	138
TT19-08BP111-001	150	Pipe Mount 7'x2.875"	138
QS66512-2 w/ Mount Pipe	150	8' Hor x 3" x 3" Angle Mount	138
QS66512-2 w/ Mount Pipe	150	8' Hor x 3" x 3" Angle Mount	138
QS66512-2 w/ Mount Pipe	150	8' Hor x 3" x 3" Angle Mount	138
(2) TPX-070821	150	VHLP2-23	138
(2) TPX-070821	150	VHLP2-18	138
(2) TPX-070821	150	800 10504 w/ Mount Pipe	120
RRUS 32	150	800 10504 w/ Mount Pipe	120
RRUS 32	150	860 10025	120
RRUS 32	150	860 10025	120
RRUS 32 B2	150	860 10025	120
RRUS 32 B2	150	(2) 6' x 2" Mount Pipe	120
RRUS 32 B2	150	(2) 6' x 2" Mount Pipe	120
782 10253	150	(2) 6' x 2" Mount Pipe	120
782 10253	150	T-Arm Mount [TA 601-3]	120
782 10253	150	800 10504 w/ Mount Pipe	120
DC6-48-60-18-8F Surge Suppression Unit	150	(2) Bridge Stiffener	110
		Bridge Stiffener	110
Pipe Mount 6'x2.375"	150	Bridge Stiffener	110
Pipe Mount 6'x2.375"	150	(2) BXA-70063/4CF w/ Mount Pipe	99
Pipe Mount 6'x2.375"	150	(2) BXA-70063/4CF w/ Mount Pipe	99
9' Ladder	150	(2) FD9R6004/2C-3L	99
Side Arm Mount [SO 102-3]	147	(2) FD9R6004/2C-3L	99
RRUS 11	147	(2) FD9R6004/2C-3L	99
RRUS 11	147	(2) KDXCV0012017	99
RRUS 11	147	(2) KDXCV0012017	99
TME-DC6-48-60-18-8F	147	(2) KDXCV0012017	99
3' x 2" Mount Pipe	147	GPS_A	99
3' x 2" Mount Pipe	147	(2) BXA-171063/8CF w/ Mount Pipe	99
3' x 2" Mount Pipe	147	(2) BXA-171063/8CF w/ Mount Pipe	99
Platform Mount [LP 1201-1]	138	(2) BXA-70063/4CF w/ Mount Pipe	99
LLPX310R-V1 w/ Mount Pipe	138	T-Arm Mount [TA 602-3]	99
LLPX310R-V1 w/ Mount Pipe	138	(2) BXA-171063/8CF w/ Mount Pipe	99

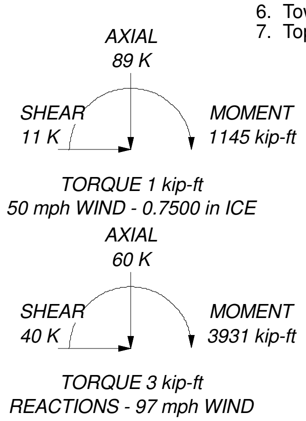
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft

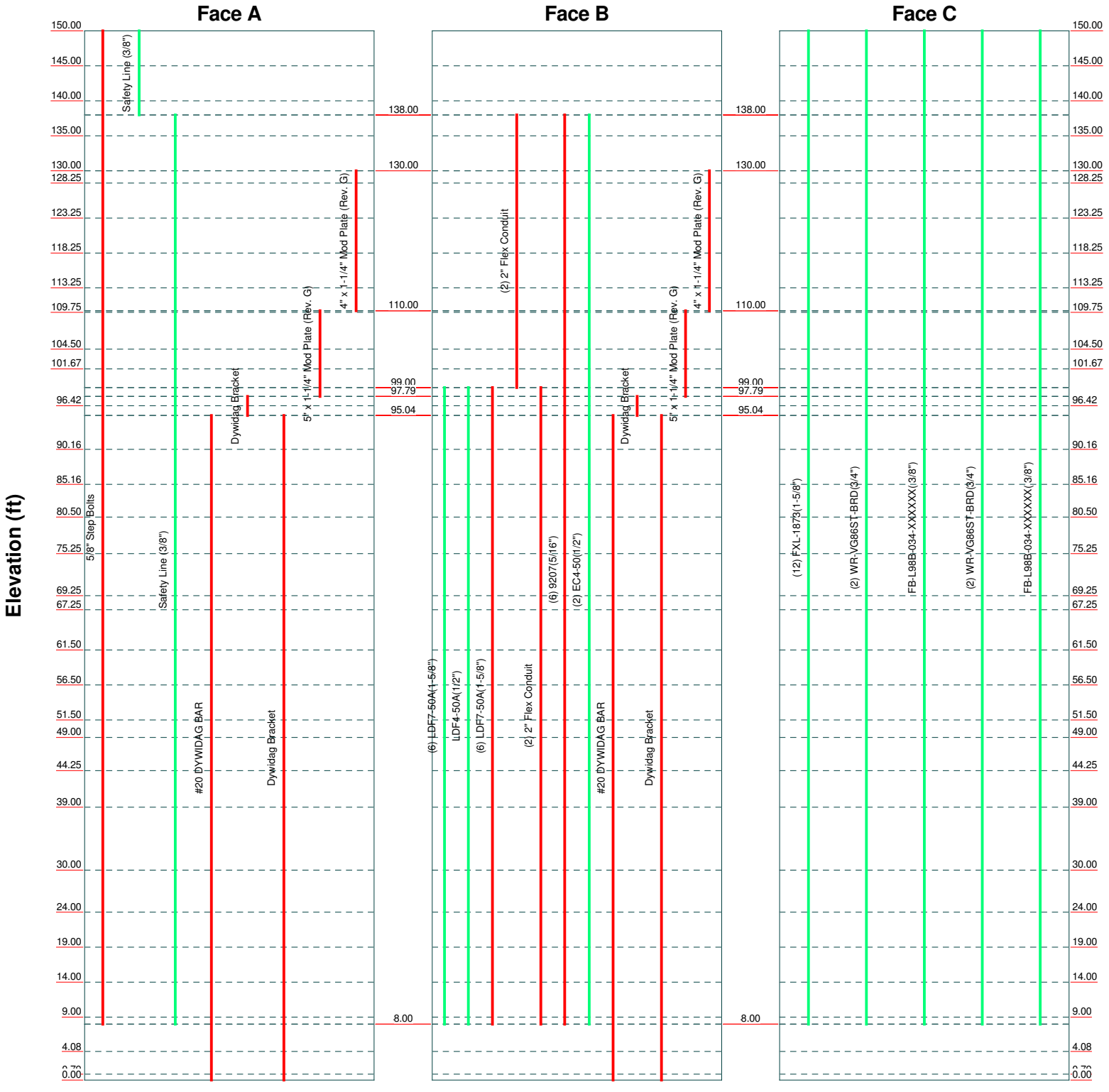
ALL REACTIONS ARE FACTORED



GPD 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (330) 572-2222 FAX: (330) 572-3722	Job: **BRIDGEPORT NORTH / BU#: 841288**		
	Project: **2016777.841288.06**		
	Client: Crown Castle USA, Inc.	Drawn by: bk	App'd:
	Code: TIA-222-G	Date: 11/22/16	Scale: NTS
	Path: T:\Crown\841288\06 MODS\Rev 0\TNX\Original\841288 mod.eri		Dwg No. E-1

Feed Line Distribution Chart
0' - 150'

Round | Flat | App In Face | App Out Face | Truss Leg



GPD
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Code: TIA-222-G		Date: 11/22/16	Scale: NTS
Path: T:\Crown\841288\06 MODS\Rev 0\TNX\Original\841288 mod.er			Dwg No. E-7

Tower Input Data

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

Tower is located in Fairfield County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
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		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
5/8" Step Bolts	A	Surface Ar (CaAa)	150.00 - 8.00	1	1	-0.250 0.250	0.4167		1.00
LDF7-50A(1-5/8")	B	Surface Ar (CaAa)	99.00 - 8.00	6	2	-0.200 0.000	1.9800		0.82
***									
2" Flex Conduit	B	Surface Ar (CaAa)	138.00 - 99.00	2	2	0.000 0.250	2.0000		0.32
2" Flex Conduit	B	Surface Ar (CaAa)	99.00 - 8.00	2	2	0.000 0.250	0.0000		0.32
9207(5/16")	B	Surface Ar (CaAa)	138.00 - 8.00	6	3	0.000 0.250	0.0000		0.60
***									
#20 DYWIDAG BAR	A	Surface Ar (CaAa)	95.04 - 0.00	1	1	-0.500 -0.500	1.9150		0.00
#20 DYWIDAG BAR	B	Surface Ar (CaAa)	95.04 - 0.00	1	1	0.000 0.000	1.9150		0.00
***									
Dywidag Bracket	A	Surface Af (CaAa)	97.79 - 95.04	1	1	-0.500 -0.500	2.3750	15.5000	9.41
Dywidag Bracket	A	Surface Af (CaAa)	95.04 - 0.00	1	1	-0.500 -0.500	2.3750	7.9310	9.41
Dywidag Bracket	B	Surface Af (CaAa)	97.79 - 95.04	1	1	0.000 0.000	2.3750	15.5000	9.41
Dywidag Bracket	B	Surface Af (CaAa)	95.04 - 0.00	1	1	0.000 0.000	2.3750	7.9310	9.41
***									
5" x 1-1/4" Mod Plate (Rev. G)	A	Surface Af (CaAa)	110.00 - 97.79	1	1	-0.500 -0.500	5.0000	12.5000	0.00
5" x 1-1/4" Mod Plate (Rev. G)	B	Surface Af (CaAa)	110.00 - 97.79	1	1	0.000 0.000	5.0000	12.5000	0.00
4" x 1-1/4" Mod Plate (Rev. G)	A	Surface Af (CaAa)	130.00 - 110.00	1	1	-0.500 -0.500	4.0000	10.5000	0.00
4" x 1-1/4" Mod Plate (Rev. G)	B	Surface Af (CaAa)	130.00 - 110.00	1	1	0.000 0.000	4.0000	10.5000	0.00
***									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Safety Line (3/8")	A	No	CaAa (Out Of Face)	150.00 - 138.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
Safety Line (3/8")	A	No	CaAa (Out Of Face)	138.00 - 8.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
***								
LDF7-50A(1-5/8")	B	No	Inside Pole	99.00 - 8.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF4-50A(1/2")	B	No	Inside Pole	99.00 - 8.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
EC4-50(1/2")	B	No	Inside Pole	138.00 - 8.00	2	No Ice	0.00	0.16
						1/2" Ice	0.00	0.16

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	0.16
*								
FXL-1873(1-5/8")	C	No	Inside Pole	150.00 - 8.00	12	No Ice	0.00	0.67
						1/2" Ice	0.00	0.67
						1" Ice	0.00	0.67
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	150.00 - 8.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
FB-L98B-034-XXXXXX (3/8")	C	No	Inside Pole	150.00 - 8.00	1	No Ice	0.00	0.05
						1/2" Ice	0.00	0.05
						1" Ice	0.00	0.05
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	150.00 - 8.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
FB-L98B-034-XXXXXX (3/8")	C	No	Inside Pole	150.00 - 8.00	1	No Ice	0.00	0.05
						1/2" Ice	0.00	0.05
						1" Ice	0.00	0.05
***								

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
EEI 10.5' Platform w/ Side Arms (GPD)	C	None			0.0000	150.00	No Ice	34.69	34.69	2.10
							1/2" Ice	56.08	56.08	2.70
							1" Ice	77.47	77.47	3.30
7770.00 w/ Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	5.84	4.35	0.06
							1/2" Ice	6.32	5.20	0.11
				4.00			1" Ice	6.77	5.92	0.16
7770.00 w/ Mount Pipe	B	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	5.84	4.35	0.06
							1/2" Ice	6.32	5.20	0.11
				4.00			1" Ice	6.77	5.92	0.16
7770.00 w/ Mount Pipe	C	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	5.84	4.35	0.06
							1/2" Ice	6.32	5.20	0.11
				4.00			1" Ice	6.77	5.92	0.16
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	8.37	6.36	0.08
							1/2" Ice	8.93	7.54	0.14
				4.00			1" Ice	9.46	8.43	0.22
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	8.37	6.36	0.08
							1/2" Ice	8.93	7.54	0.14
				4.00			1" Ice	9.46	8.43	0.22
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	8.37	6.36	0.08
							1/2" Ice	8.93	7.54	0.14
				4.00			1" Ice	9.46	8.43	0.22
TT19-08BP111-001	A	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	0.55	0.44	0.02
							1/2" Ice	0.64	0.53	0.02
				4.00			1" Ice	0.74	0.63	0.03
TT19-08BP111-001	B	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	0.55	0.44	0.02
							1/2" Ice	0.64	0.53	0.02
				4.00			1" Ice	0.74	0.63	0.03
TT19-08BP111-001	C	From Centroid-Leg	4.00	0.00	0.0000	150.00	No Ice	0.55	0.44	0.02
							1/2" Ice	0.64	0.53	0.02
				4.00			1" Ice	0.74	0.63	0.03
QS66512-2 w/ Mount Pipe	A	From	4.00		0.0000	150.00	No Ice	8.37	8.46	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Le	0.00			1/2" Ice	8.93	9.66	0.21
		g	4.00			1" Ice	9.46	10.55	0.30
QS66512-2 w/ Mount Pipe	B	From	4.00	0.0000	150.00	No Ice	8.37	8.46	0.14
		Centroid-Le	0.00			1/2" Ice	8.93	9.66	0.21
		g	4.00			1" Ice	9.46	10.55	0.30
QS66512-2 w/ Mount Pipe	C	From	4.00	0.0000	150.00	No Ice	8.37	8.46	0.14
		Centroid-Le	0.00			1/2" Ice	8.93	9.66	0.21
		g	4.00			1" Ice	9.46	10.55	0.30
(2) TPX-070821	A	From	4.00	0.0000	150.00	No Ice	0.47	0.10	0.01
		Centroid-Le	0.00			1/2" Ice	0.56	0.15	0.01
		g	4.00			1" Ice	0.66	0.20	0.02
(2) TPX-070821	B	From	4.00	0.0000	150.00	No Ice	0.47	0.10	0.01
		Centroid-Le	0.00			1/2" Ice	0.56	0.15	0.01
		g	4.00			1" Ice	0.66	0.20	0.02
(2) TPX-070821	C	From	4.00	0.0000	150.00	No Ice	0.47	0.10	0.01
		Centroid-Le	0.00			1/2" Ice	0.56	0.15	0.01
		g	4.00			1" Ice	0.66	0.20	0.02
RRUS 32	A	From	4.00	0.0000	150.00	No Ice	3.31	2.42	0.08
		Centroid-Le	0.00			1/2" Ice	3.56	2.64	0.10
		g	4.00			1" Ice	3.81	2.86	0.14
RRUS 32	B	From	4.00	0.0000	150.00	No Ice	3.31	2.42	0.08
		Centroid-Le	0.00			1/2" Ice	3.56	2.64	0.10
		g	4.00			1" Ice	3.81	2.86	0.14
RRUS 32	C	From	4.00	0.0000	150.00	No Ice	3.31	2.42	0.08
		Centroid-Le	0.00			1/2" Ice	3.56	2.64	0.10
		g	4.00			1" Ice	3.81	2.86	0.14
RRUS 32 B2	A	From	4.00	0.0000	150.00	No Ice	2.73	1.67	0.05
		Centroid-Le	0.00			1/2" Ice	2.95	1.86	0.07
		g	4.00			1" Ice	3.18	2.05	0.10
RRUS 32 B2	B	From	4.00	0.0000	150.00	No Ice	2.73	1.67	0.05
		Centroid-Le	0.00			1/2" Ice	2.95	1.86	0.07
		g	4.00			1" Ice	3.18	2.05	0.10
RRUS 32 B2	C	From	4.00	0.0000	150.00	No Ice	2.73	1.67	0.05
		Centroid-Le	0.00			1/2" Ice	2.95	1.86	0.07
		g	4.00			1" Ice	3.18	2.05	0.10
782 10253	A	From	4.00	0.0000	150.00	No Ice	0.11	0.06	0.00
		Centroid-Le	0.00			1/2" Ice	0.15	0.10	0.00
		g	4.00			1" Ice	0.20	0.14	0.01
782 10253	B	From	4.00	0.0000	150.00	No Ice	0.11	0.06	0.00
		Centroid-Le	0.00			1/2" Ice	0.15	0.10	0.00
		g	4.00			1" Ice	0.20	0.14	0.01
782 10253	C	From	4.00	0.0000	150.00	No Ice	0.11	0.06	0.00
		Centroid-Le	0.00			1/2" Ice	0.15	0.10	0.00
		g	4.00			1" Ice	0.20	0.14	0.01
DC6-48-60-18-8F Surge Suppression Unit	A	From	4.00	0.0000	150.00	No Ice	0.92	0.92	0.02
		Centroid-Le	0.00			1/2" Ice	1.46	1.46	0.04
		g	4.00			1" Ice	1.64	1.64	0.06
Pipe Mount 6'x2.375"	A	From	4.00	0.0000	150.00	No Ice	1.43	1.43	0.03
		Centroid-Le	0.00			1/2" Ice	1.92	1.92	0.04
		g	3.00			1" Ice	2.29	2.29	0.05
Pipe Mount 6'x2.375"	B	From	4.00	0.0000	150.00	No Ice	1.43	1.43	0.03
		Centroid-Le	0.00			1/2" Ice	1.92	1.92	0.04
		g	3.00			1" Ice	2.29	2.29	0.05
Pipe Mount 6'x2.375"	C	From	4.00	0.0000	150.00	No Ice	1.43	1.43	0.03
		Centroid-Le	0.00			1/2" Ice	1.92	1.92	0.04
		g	3.00			1" Ice	2.29	2.29	0.05
9' Ladder	C	From	2.00	0.0000	150.00	No Ice	4.50	2.25	0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral ft / Vert ft*	*Azimuth Adjustment °*	*Placement ft*		*C_AA_A Front ft^2*	*C_AA_A Side ft^2*	*Weight K*
		Centroid-Le	0.00			1/2" Ice	5.50	2.75	0.12
		g	-3.00			1" Ice	6.50	3.25	0.17
***									
Side Arm Mount [SO 102-3]	C	None		0.0000	147.00	No Ice	3.00	3.00	0.08
						1/2" Ice	3.48	3.48	0.11
						1" Ice	3.96	3.96	0.14
RRUS 11	A	From Face	1.00	0.0000	147.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
RRUS 11	B	From Face	1.00	0.0000	147.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
RRUS 11	C	From Face	1.00	0.0000	147.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
TME-DC6-48-60-18-8F	B	From Face	1.00	0.0000	147.00	No Ice	0.92	0.92	0.02
			0.00			1/2" Ice	1.46	1.46	0.04
			0.00			1" Ice	1.64	1.64	0.06
3' x 2" Mount Pipe	A	From Face	1.00	0.0000	147.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
3' x 2" Mount Pipe	B	From Face	1.00	0.0000	147.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
3' x 2" Mount Pipe	C	From Face	1.00	0.0000	147.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
***									
Platform Mount [LP 1201-1]	C	None		0.0000	138.00	No Ice	23.10	23.10	2.10
						1/2" Ice	26.80	26.80	2.50
						1" Ice	30.50	30.50	2.90
LLPX310R-V1 w/ Mount Pipe	A	From Centroid-Le g	4.00	0.0000	138.00	No Ice	5.60	4.26	0.07
			0.00			1/2" Ice	6.36	5.36	0.13
			2.00			1" Ice	6.93	6.12	0.18
LLPX310R-V1 w/ Mount Pipe	B	From Centroid-Le g	4.00	0.0000	138.00	No Ice	5.60	4.26	0.07
			0.00			1/2" Ice	6.36	5.36	0.13
			2.00			1" Ice	6.93	6.12	0.18
LLPX310R-V1 w/ Mount Pipe	C	From Centroid-Le g	4.00	0.0000	138.00	No Ice	5.60	4.26	0.07
			0.00			1/2" Ice	6.36	5.36	0.13
			2.00			1" Ice	6.93	6.12	0.18
RAS SPI-2213 RRH	A	From Centroid-Le g	4.00	0.0000	138.00	No Ice	1.56	0.73	0.03
			0.00			1/2" Ice	1.72	0.85	0.05
			2.00			1" Ice	1.88	0.97	0.06
RAS SPI-2213 RRH	B	From Centroid-Le g	4.00	0.0000	138.00	No Ice	1.56	0.73	0.03
			0.00			1/2" Ice	1.72	0.85	0.05
			2.00			1" Ice	1.88	0.97	0.06
RAS SPI-2213 RRH	C	From Centroid-Le g	4.00	0.0000	138.00	No Ice	1.56	0.73	0.03
			0.00			1/2" Ice	1.72	0.85	0.05
			2.00			1" Ice	1.88	0.97	0.06
CW JUNCTION BOX	B	From Centroid-Le g	4.00	0.0000	138.00	No Ice	1.20	0.60	0.00
			0.00			1/2" Ice	1.34	0.70	0.01
			2.00			1" Ice	1.48	0.81	0.02
Horizon Compact	B	From Centroid-Le g	4.00	0.0000	138.00	No Ice	0.72	0.37	0.01
			0.00			1/2" Ice	0.83	0.45	0.02
			5.00			1" Ice	0.94	0.54	0.03
Horizon Compact	C	From Centroid-Le	4.00	0.0000	138.00	No Ice	0.72	0.37	0.01
			0.00			1/2" Ice	0.83	0.45	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		g	5.00			1" Ice	0.94	0.54	0.03
Pipe Mount 7'x2.875"	A	From	4.00	0.0000	138.00	No Ice	2.01	2.01	0.05
		Centroid-Le	0.00			1/2" Ice	2.59	2.59	0.06
		g	3.00			1" Ice	3.02	3.02	0.08
Pipe Mount 7'x2.875"	B	From	4.00	0.0000	138.00	No Ice	2.01	2.01	0.05
		Centroid-Le	0.00			1/2" Ice	2.59	2.59	0.06
		g	3.00			1" Ice	3.02	3.02	0.08
Pipe Mount 7'x2.875"	C	From	4.00	0.0000	138.00	No Ice	2.01	2.01	0.05
		Centroid-Le	0.00			1/2" Ice	2.59	2.59	0.06
		g	3.00			1" Ice	3.02	3.02	0.08
8' Hor x 3" x 3" Angle Mount	A	From	4.00	0.0000	138.00	No Ice	2.80	0.12	0.26
		Centroid-Le	0.00			1/2" Ice	3.29	0.16	0.29
		g	5.00			1" Ice	3.78	0.20	0.32
8' Hor x 3" x 3" Angle Mount	B	From	4.00	0.0000	138.00	No Ice	2.80	0.12	0.26
		Centroid-Le	0.00			1/2" Ice	3.29	0.16	0.29
		g	5.00			1" Ice	3.78	0.20	0.32
8' Hor x 3" x 3" Angle Mount	C	From	4.00	0.0000	138.00	No Ice	2.80	0.12	0.26
		Centroid-Le	0.00			1/2" Ice	3.29	0.16	0.29
		g	5.00			1" Ice	3.78	0.20	0.32
***									
T-Arm Mount [TA 601-3]	C	None		0.0000	120.00	No Ice	10.90	10.90	0.73
						1/2" Ice	14.65	14.65	0.93
						1" Ice	18.40	18.40	1.13
800 10504 w/ Mount Pipe	A	From Face	4.00	0.0000	120.00	No Ice	3.47	3.06	0.04
			0.00			1/2" Ice	3.84	3.69	0.07
			1.00			1" Ice	4.23	4.34	0.10
800 10504 w/ Mount Pipe	B	From Face	4.00	0.0000	120.00	No Ice	3.47	3.06	0.04
			0.00			1/2" Ice	3.84	3.69	0.07
			1.00			1" Ice	4.23	4.34	0.10
800 10504 w/ Mount Pipe	C	From Face	4.00	0.0000	120.00	No Ice	3.47	3.06	0.04
			0.00			1/2" Ice	3.84	3.69	0.07
			1.00			1" Ice	4.23	4.34	0.10
860 10025	A	From Face	4.00	0.0000	120.00	No Ice	0.14	0.12	0.00
			0.00			1/2" Ice	0.19	0.17	0.00
			1.00			1" Ice	0.25	0.23	0.01
860 10025	B	From Face	4.00	0.0000	120.00	No Ice	0.14	0.12	0.00
			0.00			1/2" Ice	0.19	0.17	0.00
			1.00			1" Ice	0.25	0.23	0.01
860 10025	C	From Face	4.00	0.0000	120.00	No Ice	0.14	0.12	0.00
			0.00			1/2" Ice	0.19	0.17	0.00
			1.00			1" Ice	0.25	0.23	0.01
(2) 6' x 2" Mount Pipe	A	From Face	4.00	0.0000	120.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			1.00			1" Ice	2.29	2.29	0.05
(2) 6' x 2" Mount Pipe	B	From Face	4.00	0.0000	120.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			1.00			1" Ice	2.29	2.29	0.05
(2) 6' x 2" Mount Pipe	C	From Face	4.00	0.0000	120.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			1.00			1" Ice	2.29	2.29	0.05
***									
T-Arm Mount [TA 602-3]	C	None		0.0000	99.00	No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
(2) BXA-171063/8CF w/ Mount Pipe	A	From Face	4.00	0.0000	99.00	No Ice	3.37	3.74	0.03
			0.00			1/2" Ice	3.84	4.54	0.07
			0.00			1" Ice	4.28	5.22	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) BXA-171063/8CF w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	3.37 3.84 4.28	3.74 4.54 5.22	0.03 0.07 0.11
(2) BXA-171063/8CF w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	3.37 3.84 4.28	3.74 4.54 5.22	0.03 0.07 0.11
(2) BXA-70063/4CF w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	5.19 5.68 6.14	3.87 4.67 5.34	0.03 0.08 0.13
(2) BXA-70063/4CF w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	5.19 5.68 6.14	3.87 4.67 5.34	0.03 0.08 0.13
(2) BXA-70063/4CF w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	5.19 5.68 6.14	3.87 4.67 5.34	0.03 0.08 0.13
(2) FD9R6004/2C-3L	A	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) KDXCV0012017	A	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	0.18 0.24 0.31	0.36 0.43 0.52	0.01 0.01 0.01
(2) KDXCV0012017	B	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	0.18 0.24 0.31	0.36 0.43 0.52	0.01 0.01 0.01
(2) KDXCV0012017	C	From Face	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	0.18 0.24 0.31	0.36 0.43 0.52	0.01 0.01 0.01
GPS_A	C	From Face	4.00 0.00 4.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01
***									
(2) Bridge Stiffener	A	None		0.0000	110.00	No Ice 1/2" Ice 1" Ice	0.97 1.49 2.00	3.75 4.35 4.96	0.22 0.24 0.26
Bridge Stiffener	B	From Leg	0.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.22 0.24 0.26
Bridge Stiffener	C	From Leg	0.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.22 0.24 0.26
****									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft °	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
VHLP2-23	B	Paraboloid w/Shroud (HP)	From Centroid -Leg	4.00 0.00 5.00	60.0000		138.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.08
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Centroid -Leg	4.00 0.00 5.00	0.0000		138.00	2.00	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.07

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 145	27.992	44	1.9581	0.0034
L2	145 - 140	25.958	44	1.9220	0.0036
L3	140 - 135	23.979	44	1.8551	0.0033
L4	135 - 130	22.084	44	1.7596	0.0026
L5	130 - 128.5	20.305	44	1.6347	0.0019
L6	128.5 - 128.25	19.797	44	1.5934	0.0017
L7	128.25 - 123.25	19.714	44	1.5909	0.0017
L8	123.25 - 118.25	18.077	44	1.5348	0.0015
L9	118.25 - 113.25	16.504	44	1.4704	0.0013
L10	113.25 - 109.75	15.001	44	1.3989	0.0012
L11	109.75 - 109.5	13.995	44	1.3449	0.0011
L12	109.5 - 104.5	13.925	44	1.3416	0.0011
L13	104.5 - 101.67	12.557	44	1.2717	0.0009
L14	101.67 - 101.42	11.815	44	1.2301	0.0009
L15	101.42 - 96.42	11.751	44	1.2263	0.0009
L16	96.42 - 95.41	10.508	44	1.1480	0.0007
L17	95.41 - 95.16	10.266	44	1.1319	0.0007
L18	95.16 - 90.16	10.207	44	1.1281	0.0007
L19	90.16 - 85.16	9.068	44	1.0485	0.0006
L20	85.16 - 80.5	8.014	44	0.9635	0.0005
L21	80.5 - 80.25	7.114	44	0.8809	0.0005
L22	80.25 - 75.25	7.068	44	0.8778	0.0004
L23	75.25 - 69.25	6.182	44	0.8130	0.0004
L24	72.25 - 67.25	5.684	44	0.7732	0.0004
L25	67.25 - 66.75	4.895	44	0.7265	0.0003
L26	66.75 - 66.5	4.819	44	0.7199	0.0003
L27	66.5 - 61.5	4.781	44	0.7168	0.0003
L28	61.5 - 56.5	4.065	44	0.6523	0.0003
L29	56.5 - 51.5	3.416	44	0.5858	0.0002
L30	51.5 - 49	2.838	44	0.5181	0.0002
L31	49 - 48.75	2.576	44	0.4844	0.0002
L32	48.75 - 48.5	2.551	44	0.4824	0.0002
L33	48.5 - 44.25	2.525	44	0.4798	0.0002
L34	44.25 - 44	2.118	44	0.4358	0.0002
L35	44 - 39	2.095	44	0.4334	0.0002
L36	39 - 30	1.667	44	0.3837	0.0001
L37	34 - 29	1.292	44	0.3336	0.0001
L38	29 - 24	0.956	44	0.3040	0.0001
L39	24 - 19	0.664	44	0.2538	0.0001
L40	19 - 14	0.424	44	0.2037	0.0001
L41	14 - 9	0.237	44	0.1536	0.0000
L42	9 - 8.54	0.103	44	0.1026	0.0000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L43	8.54 - 8.29	0.094	44	0.0979	0.0000
L44	8.29 - 4.08	0.089	44	0.0954	0.0000
L45	4.08 - 3.83	0.023	44	0.0525	0.0000
L46	3.83 - 3.25	0.021	44	0.0500	0.0000
L47	3.25 - 3	0.015	44	0.0442	0.0000
L48	3 - 0.79167	0.013	44	0.0408	0.0000
L49	0.79167 - 0.54167	0.001	44	0.0107	0.0000
L50	0.54167 - 0	0.000	44	0.0073	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	EEI 10.5' Platform w/ Side Arms (GPD)	44	27.992	1.9581	0.0034	5465
147.00	Side Arm Mount [SO 102-3]	44	26.768	1.9389	0.0035	5465
143.00	VHLP2-23	44	25.158	1.8995	0.0035	4357
138.00	Platform Mount [LP 1201-1]	44	23.209	1.8193	0.0030	3077
120.00	T-Arm Mount [TA 601-3]	44	17.047	1.4934	0.0014	4376
110.00	(2) Bridge Stiffener	44	14.066	1.3483	0.0011	3911
99.00	T-Arm Mount [TA 602-3]	44	11.139	1.1890	0.0008	3685

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 145	131.473	24	9.2296	0.0151
L2	145 - 140	121.954	24	9.0584	0.0162
L3	140 - 135	112.686	24	8.7443	0.0148
L4	135 - 130	103.808	24	8.2956	0.0117
L5	130 - 128.5	95.465	24	7.7082	0.0086
L6	128.5 - 128.25	93.086	24	7.5137	0.0078
L7	128.25 - 123.25	92.695	24	7.5017	0.0077
L8	123.25 - 118.25	85.012	24	7.2370	0.0068
L9	118.25 - 113.25	77.623	24	6.9333	0.0059
L10	113.25 - 109.75	70.565	24	6.5956	0.0054
L11	109.75 - 109.5	65.841	24	6.3403	0.0053
L12	109.5 - 104.5	65.510	24	6.3248	0.0052
L13	104.5 - 101.67	59.080	24	5.9953	0.0050
L14	101.67 - 101.42	55.595	24	5.7991	0.0049
L15	101.42 - 96.42	55.292	24	5.7813	0.0049
L16	96.42 - 95.41	49.447	24	5.4117	0.0047
L17	95.41 - 95.16	48.313	24	5.3359	0.0046
L18	95.16 - 90.16	48.035	24	5.3178	0.0046
L19	90.16 - 85.16	42.674	24	4.9421	0.0044
L20	85.16 - 80.5	37.717	24	4.5409	0.0041
L21	80.5 - 80.25	33.482	24	4.1514	0.0038
L22	80.25 - 75.25	33.265	24	4.1367	0.0038
L23	75.25 - 69.25	29.099	24	3.8310	0.0035
L24	72.25 - 67.25	26.754	24	3.6432	0.0033
L25	67.25 - 66.75	23.038	24	3.4230	0.0031
L26	66.75 - 66.5	22.681	24	3.3916	0.0031
L27	66.5 - 61.5	22.504	24	3.3769	0.0031
L28	61.5 - 56.5	19.130	24	3.0728	0.0028

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L29	56.5 - 51.5	16.079	24	2.7593	0.0025
L30	51.5 - 49	13.358	24	2.4401	0.0022
L31	49 - 48.75	12.123	24	2.2812	0.0021
L32	48.75 - 48.5	12.004	24	2.2716	0.0021
L33	48.5 - 44.25	11.885	24	2.2596	0.0021
L34	44.25 - 44	9.967	24	2.0520	0.0019
L35	44 - 39	9.860	24	2.0406	0.0019
L36	39 - 30	7.847	24	1.8063	0.0016
L37	34 - 29	6.079	24	1.5706	0.0014
L38	29 - 24	4.498	24	1.4310	0.0013
L39	24 - 19	3.124	24	1.1947	0.0011
L40	19 - 14	1.997	24	0.9585	0.0009
L41	14 - 9	1.117	24	0.7226	0.0006
L42	9 - 8.54	0.486	24	0.4825	0.0004
L43	8.54 - 8.29	0.441	24	0.4608	0.0004
L44	8.29 - 4.08	0.417	24	0.4489	0.0004
L45	4.08 - 3.83	0.110	24	0.2470	0.0002
L46	3.83 - 3.25	0.097	24	0.2352	0.0002
L47	3.25 - 3	0.071	24	0.2078	0.0002
L48	3 - 0.79167	0.060	24	0.1917	0.0002
L49	0.79167 - 0.54167	0.004	24	0.0503	0.0000
L50	0.54167 - 0	0.002	24	0.0344	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	EEI 10.5' Platform w/ Side Arms (GPD)	24	131.473	9.2296	0.0151	1222
147.00	Side Arm Mount [SO 102-3]	24	125.744	9.1382	0.0159	1222
143.00	VHLP2-23	24	118.208	8.9525	0.0160	973
138.00	Platform Mount [LP 1201-1]	24	109.081	8.5761	0.0137	685
120.00	T-Arm Mount [TA 601-3]	24	80.173	7.0418	0.0062	955
110.00	(2) Bridge Stiffener	24	66.172	6.3564	0.0053	852
99.00	T-Arm Mount [TA 602-3]	24	52.415	5.6054	0.0048	798

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K
L1	150 - 145 (1)	TP15.7453x15x0.2188	5.00	0.00	0.0	10.9365	-3.76
L2	145 - 140 (2)	TP16.4907x15.7453x0.2188	5.00	0.00	0.0	11.4615	-4.06
L3	140 - 135 (3)	TP17.236x16.4907x0.2188	5.00	0.00	0.0	11.9865	-8.01
L4	135 - 130 (4)	TP17.9814x17.236x0.2188	5.00	0.00	0.0	12.5115	-8.43
L5	130 - 128.5 (5)	TP18.205x17.9814x0.2188	1.50	0.00	0.0	12.6690	-8.56
L6	128.5 - 128.25 (6)	TP18.2422x18.205x0.6688	0.25	0.00	0.0	37.8423	-8.62
L7	128.25 - 123.25 (7)	TP18.9876x18.2422x0.6438	5.00	0.00	0.0	38.0245	-9.38
L8	123.25 - 118.25 (8)	TP19.7329x18.9876x0.6188	5.00	0.00	0.0	38.0826	-10.98
L9	118.25 - 113.25 (9)	TP20.4783x19.7329x0.6063	5.00	0.00	0.0	38.7926	-11.77
L10	113.25 - 109.75 (10)	TP21x20.4783x0.5938	3.50	0.00	0.0	39.0142	-13.35
L11	109.75 - 109.5 (11)	TP21.0373x21x0.725	0.25	0.00	0.0	47.4190	-13.41

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u
	ft		ft	ft		in^2	K
L12	109.5 - 104.5 (12)	TP21.783x21.0373x0.7	5.00	0.00	0.0	47.5210	-14.37
L13	104.5 - 101.67 (13)	TP22.205x21.783x0.6875	2.83	0.00	0.0	47.6344	-14.93
L14	101.67 - 101.42 (14)	TP22.2423x22.205x0.675	0.25	0.00	0.0	46.8765	-14.99
L15	101.42 - 96.42 (15)	TP22.988x22.2423x0.6625	5.00	0.00	0.0	47.6258	-17.22
L16	96.42 - 95.41 (16)	TP23.1386x22.988x0.6625	1.01	0.00	0.0	47.9472	-17.46
L17	95.41 - 95.16 (17)	TP23.1759x23.1386x0.7	0.25	0.00	0.0	50.6607	-17.53
L18	95.16 - 90.16 (18)	TP23.9216x23.1759x0.6875	5.00	0.00	0.0	51.4344	-18.62
L19	90.16 - 85.16 (19)	TP24.6672x23.9216x0.6625	5.00	0.00	0.0	51.2081	-19.77
L20	85.16 - 80.5 (20)	TP25.3622x24.6672x0.65	4.66	0.00	0.0	51.7227	-20.86
L21	80.5 - 80.25 (21)	TP25.3995x25.3622x0.975	0.25	0.00	0.0	76.6807	-20.96
L22	80.25 - 75.25 (22)	TP26.1452x25.3995x0.9375	5.00	0.00	0.0	76.0957	-22.50
L23	75.25 - 69.25 (23)	TP27.04x26.1452x0.925	6.00	0.00	0.0	76.4509	-23.45
L24	69.25 - 67.25 (24)	TP26.897x26.0926x0.9875	5.00	0.00	0.0	82.3858	-25.85
L25	67.25 - 66.75 (25)	TP26.9775x26.897x0.9875	0.50	0.00	0.0	82.6416	-26.03
L26	66.75 - 66.5 (26)	TP27.0177x26.9775x1.0625	0.25	0.00	0.0	88.7992	-26.12
L27	66.5 - 61.5 (27)	TP27.8221x27.0177x1.025	5.00	0.00	0.0	88.4439	-27.93
L28	61.5 - 56.5 (28)	TP28.6265x27.8221x0.9875	5.00	0.00	0.0	87.8852	-29.79
L29	56.5 - 51.5 (29)	TP29.431x28.6265x0.9625	5.00	0.00	0.0	88.2309	-31.67
L30	51.5 - 49 (30)	TP29.8332x29.431x0.9625	2.50	0.00	0.0	89.4774	-32.62
L31	49 - 48.75 (31)	TP29.8734x29.8332x1.7125	0.25	0.00	0.0	155.2860	-32.78
L32	48.75 - 48.5 (32)	TP29.9136x29.8734x1.3125	0.25	0.00	0.0	120.8750	-32.89
L33	48.5 - 44.25 (33)	TP30.5974x29.9136x1.2875	4.25	0.00	0.0	121.5110	-34.82
L34	44.25 - 44 (34)	TP30.6376x30.5974x1.3875	0.25	0.00	0.0	130.6820	-34.96
L35	44 - 39 (35)	TP31.442x30.6376x1.3375	5.00	0.00	0.0	129.6530	-37.40
L36	39 - 30 (36)	TP32.89x31.442x1.3125	9.00	0.00	0.0	130.7350	-39.88
L37	30 - 29 (37)	TP32.4654x31.6215x1.4063	5.00	0.00	0.0	140.6400	-44.21
L38	29 - 24 (38)	TP33.3093x32.4654x1.3563	5.00	0.00	0.0	139.5430	-46.93
L39	24 - 19 (39)	TP34.1532x33.3093x1.3313	5.00	0.00	0.0	140.6950	-49.67
L40	19 - 14 (40)	TP34.9971x34.1532x1.3063	5.00	0.00	0.0	141.7080	-52.45
L41	14 - 9 (41)	TP35.841x34.9971x1.2563	5.00	0.00	0.0	139.9000	-55.26
L42	9 - 8.54 (42)	TP35.9186x35.841x1.2563	0.46	0.00	0.0	140.2140	-55.53
L43	8.54 - 8.29 (43)	TP35.9608x35.9186x1.2563	0.25	0.00	0.0	140.3840	-55.67
L44	8.29 - 4.08 (44)	TP36.6714x35.9608x1.2313	4.21	0.00	0.0	140.5070	-57.93
L45	4.08 - 3.83 (45)	TP36.7136x36.6714x1.2313	0.25	0.00	0.0	140.6740	-58.08
L46	3.83 - 3.25 (46)	TP36.8115x36.7136x1.2313	0.58	0.00	0.0	141.0620	-58.39
L47	3.25 - 3 (47)	TP36.8537x36.8115x0.8813	0.25	0.00	0.0	102.0760	-58.50
L48	3 - 0.79167 (48)	TP37.2264x36.8537x0.8813	2.21	0.00	0.0	103.1340	-59.41
L49	0.79167 - 0.54167 (49)	TP37.2686x37.2264x0.8813	0.25	0.00	0.0	103.2540	-59.54
L50	0.54167 - 0 (50)	TP37.36x37.2686x0.8813	0.54	0.00	0.0	103.5130	-59.76

Pole Bending Design Data

Section No.	Elevation	Size	M_{ux}	M_{uy}
	ft		kip-ft	kip-ft
L1	150 - 145 (1)	TP15.7453x15x0.2188	58.46	0.00
L2	145 - 140 (2)	TP16.4907x15.7453x0.2188	103.40	0.00
L3	140 - 135 (3)	TP17.236x16.4907x0.2188	164.30	0.00
L4	135 - 130 (4)	TP17.9814x17.236x0.2188	229.94	0.00
L5	130 - 128.5 (5)	TP18.205x17.9814x0.2188	249.99	0.00
L6	128.5 - 128.25 (6)	TP18.2422x18.205x0.6688	253.35	0.00
L7	128.25 - 123.25 (7)	TP18.9876x18.2422x0.6438	321.82	0.00
L8	123.25 - 118.25 (8)	TP19.7329x18.9876x0.6188	397.34	0.00
L9	118.25 - 113.25 (9)	TP20.4783x19.7329x0.6063	481.32	0.00
L10	113.25 - 109.75 (10)	TP21x20.4783x0.5938	542.07	0.00
L11	109.75 - 109.5 (11)	TP21.0373x21x0.725	546.59	0.00
L12	109.5 - 104.5 (12)	TP21.783x21.0373x0.7	639.11	0.00
L13	104.5 - 101.67 (13)	TP22.205x21.783x0.6875	693.12	0.00
L14	101.67 - 101.42 (14)	TP22.2423x22.205x0.675	697.95	0.00

Section No.	Elevation ft	Size	M_{ux} kip-ft	M_{uy} kip-ft
L15	101.42 - 96.42 (15)	TP22.988x22.2423x0.6625	804.10	0.00
L16	96.42 - 95.41 (16)	TP23.1386x22.988x0.6625	827.46	0.00
L17	95.41 - 95.16 (17)	TP23.1759x23.1386x0.7	833.28	0.00
L18	95.16 - 90.16 (18)	TP23.9216x23.1759x0.6875	952.27	0.00
L19	90.16 - 85.16 (19)	TP24.6672x23.9216x0.6625	1076.22	0.00
L20	85.16 - 80.5 (20)	TP25.3622x24.6672x0.65	1196.13	0.00
L21	80.5 - 80.25 (21)	TP25.3995x25.3622x0.975	1202.69	0.00
L22	80.25 - 75.25 (22)	TP26.1452x25.3995x0.9375	1336.45	0.00
L23	75.25 - 69.25 (23)	TP27.04x26.1452x0.925	1419.17	0.00
L24	69.25 - 67.25 (24)	TP26.897x26.0926x0.9875	1561.39	0.00
L25	67.25 - 66.75 (25)	TP26.9775x26.897x0.9875	1575.90	0.00
L26	66.75 - 66.5 (26)	TP27.0177x26.9775x1.0625	1583.18	0.00
L27	66.5 - 61.5 (27)	TP27.8221x27.0177x1.025	1731.28	0.00
L28	61.5 - 56.5 (28)	TP28.6265x27.8221x0.9875	1884.30	0.00
L29	56.5 - 51.5 (29)	TP29.431x28.6265x0.9625	2042.13	0.00
L30	51.5 - 49 (30)	TP29.8332x29.431x0.9625	2122.82	0.00
L31	49 - 48.75 (31)	TP29.8734x29.8332x1.7125	2130.95	0.00
L32	48.75 - 48.5 (32)	TP29.9136x29.8734x1.3125	2139.10	0.00
L33	48.5 - 44.25 (33)	TP30.5974x29.9136x1.2875	2279.45	0.00
L34	44.25 - 44 (34)	TP30.6376x30.5974x1.3875	2287.82	0.00
L35	44 - 39 (35)	TP31.442x30.6376x1.3375	2457.66	0.00
L36	39 - 30 (36)	TP32.89x31.442x1.3125	2632.19	0.00
L37	30 - 29 (37)	TP32.4654x31.6215x1.4063	2811.67	0.00
L38	29 - 24 (38)	TP33.3093x32.4654x1.3563	2995.75	0.00
L39	24 - 19 (39)	TP34.1532x33.3093x1.3313	3183.94	0.00
L40	19 - 14 (40)	TP34.9971x34.1532x1.3063	3375.98	0.00
L41	14 - 9 (41)	TP35.841x34.9971x1.2563	3571.67	0.00
L42	9 - 8.54 (42)	TP35.9186x35.841x1.2563	3589.84	0.00
L43	8.54 - 8.29 (43)	TP35.9608x35.9186x1.2563	3599.74	0.00
L44	8.29 - 4.08 (44)	TP36.6714x35.9608x1.2313	3767.17	0.00
L45	4.08 - 3.83 (45)	TP36.7136x36.6714x1.2313	3777.16	0.00
L46	3.83 - 3.25 (46)	TP36.8115x36.7136x1.2313	3800.35	0.00
L47	3.25 - 3 (47)	TP36.8537x36.8115x0.8813	3810.36	0.00
L48	3 - 0.79167 (48)	TP37.2264x36.8537x0.8813	3898.93	0.00
L49	0.79167 - 0.54167 (49)	TP37.2686x37.2264x0.8813	3908.97	0.00
L50	0.54167 - 0 (50)	TP37.36x37.2686x0.8813	3930.75	0.00

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	Actual T_u kip-ft
L1	150 - 145 (1)	TP15.7453x15x0.2188	8.55	0.20
L2	145 - 140 (2)	TP16.4907x15.7453x0.2188	9.33	0.53
L3	140 - 135 (3)	TP17.236x16.4907x0.2188	12.94	0.67
L4	135 - 130 (4)	TP17.9814x17.236x0.2188	13.32	0.66
L5	130 - 128.5 (5)	TP18.205x17.9814x0.2188	13.44	0.66
L6	128.5 - 128.25 (6)	TP18.2422x18.205x0.6688	13.45	0.66
L7	128.25 - 123.25 (7)	TP18.9876x18.2422x0.6438	13.94	0.66
L8	123.25 - 118.25 (8)	TP19.7329x18.9876x0.6188	16.44	0.24
L9	118.25 - 113.25 (9)	TP20.4783x19.7329x0.6063	17.17	0.27
L10	113.25 - 109.75 (10)	TP21x20.4783x0.5938	18.10	0.29
L11	109.75 - 109.5 (11)	TP21.0373x21x0.725	18.13	0.29
L12	109.5 - 104.5 (12)	TP21.783x21.0373x0.7	18.88	0.32
L13	104.5 - 101.67 (13)	TP22.205x21.783x0.6875	19.31	0.34
L14	101.67 - 101.42 (14)	TP22.2423x22.205x0.675	19.34	0.34
L15	101.42 - 96.42 (15)	TP22.988x22.2423x0.6625	23.04	0.38
L16	96.42 - 95.41 (16)	TP23.1386x22.988x0.6625	23.26	0.42
L17	95.41 - 95.16 (17)	TP23.1759x23.1386x0.7	23.31	0.43

Section No.	Elevation ft	Size	Actual V_u K	Actual T_u kip-ft
L18	95.16 - 90.16 (18)	TP23.9216x23.1759x0.6875	24.32	0.55
L19	90.16 - 85.16 (19)	TP24.6672x23.9216x0.6625	25.31	0.66
L20	85.16 - 80.5 (20)	TP25.3622x24.6672x0.65	26.22	0.78
L21	80.5 - 80.25 (21)	TP25.3995x25.3622x0.975	26.25	0.78
L22	80.25 - 75.25 (22)	TP26.1452x25.3995x0.9375	27.29	0.91
L23	75.25 - 69.25 (23)	TP27.04x26.1452x0.925	27.90	0.98
L24	69.25 - 67.25 (24)	TP26.897x26.0926x0.9875	29.00	1.10
L25	67.25 - 66.75 (25)	TP26.9775x26.897x0.9875	29.09	1.12
L26	66.75 - 66.5 (26)	TP27.0177x26.9775x1.0625	29.14	1.12
L27	66.5 - 61.5 (27)	TP27.8221x27.0177x1.025	30.14	1.25
L28	61.5 - 56.5 (28)	TP28.6265x27.8221x0.9875	31.12	1.37
L29	56.5 - 51.5 (29)	TP29.431x28.6265x0.9625	32.07	1.50
L30	51.5 - 49 (30)	TP29.8332x29.431x0.9625	32.54	1.56
L31	49 - 48.75 (31)	TP29.8734x29.8332x1.7125	32.58	1.56
L32	48.75 - 48.5 (32)	TP29.9136x29.8734x1.3125	32.63	1.57
L33	48.5 - 44.25 (33)	TP30.5974x29.9136x1.2875	33.47	1.68
L34	44.25 - 44 (34)	TP30.6376x30.5974x1.3875	33.50	1.68
L35	44 - 39 (35)	TP31.442x30.6376x1.3375	34.48	1.81
L36	39 - 30 (36)	TP32.89x31.442x1.3125	35.39	1.93
L37	30 - 29 (37)	TP32.4654x31.6215x1.4063	36.43	2.06
L38	29 - 24 (38)	TP33.3093x32.4654x1.3563	37.27	2.18
L39	24 - 19 (39)	TP34.1532x33.3093x1.3313	38.07	2.30
L40	19 - 14 (40)	TP34.9971x34.1532x1.3063	38.82	2.41
L41	14 - 9 (41)	TP35.841x34.9971x1.2563	39.53	2.52
L42	9 - 8.54 (42)	TP35.9186x35.841x1.2563	39.58	2.53
L43	8.54 - 8.29 (43)	TP35.9608x35.9186x1.2563	39.61	2.54
L44	8.29 - 4.08 (44)	TP36.6714x35.9608x1.2313	39.99	2.54
L45	4.08 - 3.83 (45)	TP36.7136x36.6714x1.2313	39.99	2.54
L46	3.83 - 3.25 (46)	TP36.8115x36.7136x1.2313	40.05	2.54
L47	3.25 - 3 (47)	TP36.8537x36.8115x0.8813	40.06	2.54
L48	3 - 0.79167 (48)	TP37.2264x36.8537x0.8813	40.23	2.54
L49	0.79167 - 0.54167 (49)	TP37.2686x37.2264x0.8813	40.22	2.54
L50	0.54167 - 0 (50)	TP37.36x37.2686x0.8813	40.27	2.54

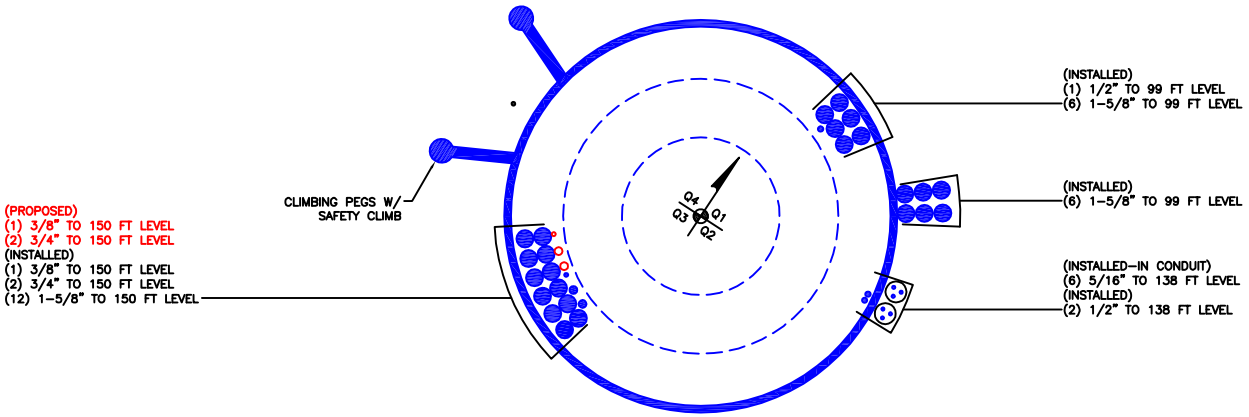
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 145	Pole	TP15.7453x15x0.2188	Pole	-3.76	-	23.5	Pass
L2	145 - 140	Pole	TP16.4907x15.7453x0.2188	Pole	-4.06	-	37.5	Pass
L3	140 - 135	Pole	TP17.236x16.4907x0.2188	Pole	-8.01	-	54.7	Pass
L4	135 - 130	Pole	TP17.9814x17.236x0.2188	Pole	-8.43	-	70.0	Pass
L5	130 - 128.5	Pole	TP18.205x17.9814x0.2188	Pole	-8.56	-	74.2	Pass
L6	128.5 - 128.25	Pole + Reinf.	TP18.2422x18.205x0.6688	Reinf.	-8.62	-	48.6	Pass
L7	128.25 - 123.25	Pole + Reinf.	TP18.9876x18.2422x0.6438	Reinf.	-9.38	-	58.5	Pass
L8	123.25 - 118.25	Pole + Reinf.	TP19.7329x18.9876x0.6188	Reinf.	-10.98	-	68.5	Pass
L9	118.25 - 113.25	Pole + Reinf.	TP20.4783x19.7329x0.6063	Reinf.	-11.77	-	78.9	Pass
L10	113.25 - 109.75	Pole + Reinf.	TP21x20.4783x0.5938	Reinf.	-13.35	-	85.8	Pass
L11	109.75 - 109.5	Pole + Reinf.	TP21.0373x21x0.725	Reinf.	-13.41	-	65.4	Pass
L12	109.5 - 104.5	Pole + Reinf.	TP21.783x21.0373x0.7	Reinf.	-14.37	-	72.9	Pass
L13	104.5 - 101.67	Pole + Reinf.	TP22.205x21.783x0.6875	Reinf.	-14.93	-	77.0	Pass
L14	101.67 - 101.42	Pole + Reinf.	TP22.2423x22.205x0.675	Reinf.	-14.99	-	82.5	Pass
L15	101.42 - 96.42	Pole + Reinf.	TP22.988x22.2423x0.6625	Reinf.	-17.22	-	90.7	Pass
L16	96.42 - 95.41	Pole + Reinf.	TP23.1386x22.988x0.6625	Reinf.	-17.46	-	92.5	Pass
L17	95.41 - 95.16	Pole + Reinf.	TP23.1759x23.1386x0.7	Reinf.	-17.53	-	74.5	Pass
L18	95.16 - 90.16	Pole + Reinf.	TP23.9216x23.1759x0.6875	Reinf.	-18.62	-	81.5	Pass
L19	90.16 - 85.16	Pole + Reinf.	TP24.6672x23.9216x0.6625	Reinf.	-19.77	-	88.3	Pass
L20	85.16 - 80.5	Pole + Reinf.	TP25.3622x24.6672x0.65	Reinf.	-20.86	-	94.5	Pass
L21	80.5 - 80.25	Pole + Reinf.	TP25.3995x25.3622x0.975	Reinf.	-20.96	-	80.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L22	80.25 - 75.25	Pole + Reinf.	TP26.1452x25.3995x0.9375	Reinf.	-22.50	-	86.8	Pass
L23	75.25 - 69.25	Pole + Reinf.	TP27.04x26.1452x0.925	Reinf.	-23.45	-	90.3	Pass
L24	69.25 - 67.25	Pole + Reinf.	TP26.897x26.0926x0.9875	Reinf.	-25.85	-	91.5	Pass
L25	67.25 - 66.75	Pole + Reinf.	TP26.9775x26.897x0.9875	Reinf.	-26.03	-	92.0	Pass
L26	66.75 - 66.5	Pole + Reinf.	TP27.0177x26.9775x1.0625	Reinf.	-26.12	-	78.9	Pass
L27	66.5 - 61.5	Pole + Reinf.	TP27.8221x27.0177x1.025	Reinf.	-27.93	-	83.3	Pass
L28	61.5 - 56.5	Pole + Reinf.	TP28.6265x27.8221x0.9875	Reinf.	-29.79	-	87.5	Pass
L29	56.5 - 51.5	Pole + Reinf.	TP29.431x28.6265x0.9625	Reinf.	-31.67	-	91.6	Pass
L30	51.5 - 49	Pole + Reinf.	TP29.8332x29.431x0.9625	Reinf.	-32.62	-	93.6	Pass
L31	49 - 48.75	Pole + Reinf.	TP29.8734x29.8332x1.7125	Reinf.	-32.78	-	56.6	Pass
L32	48.75 - 48.5	Pole + Reinf.	TP29.9136x29.8734x1.3125	Reinf.	-32.89	-	70.8	Pass
L33	48.5 - 44.25	Pole + Reinf.	TP30.5974x29.9136x1.2875	Reinf.	-34.82	-	73.5	Pass
L34	44.25 - 44	Pole + Reinf.	TP30.6376x30.5974x1.3875	Reinf.	-34.96	-	63.8	Pass
L35	44 - 39	Pole + Reinf.	TP31.442x30.6376x1.3375	Reinf.	-37.40	-	66.5	Pass
L36	39 - 30	Pole + Reinf.	TP32.89x31.442x1.3125	Reinf.	-39.88	-	69.3	Pass
L37	30 - 29	Pole + Reinf.	TP32.4654x31.6215x1.4063	Reinf.	-44.21	-	68.2	Pass
L38	29 - 24	Pole + Reinf.	TP33.3093x32.4654x1.3563	Reinf.	-46.93	-	70.4	Pass
L39	24 - 19	Pole + Reinf.	TP34.1532x33.3093x1.3313	Reinf.	-49.67	-	72.6	Pass
L40	19 - 14	Pole + Reinf.	TP34.9971x34.1532x1.3063	Reinf.	-52.45	-	74.7	Pass
L41	14 - 9	Pole + Reinf.	TP35.841x34.9971x1.2563	Reinf.	-55.26	-	76.7	Pass
L42	9 - 8.54	Pole + Reinf.	TP35.9186x35.841x1.2563	Reinf.	-55.53	-	76.9	Pass
L43	8.54 - 8.29	Pole + Reinf.	TP35.9608x35.9186x1.2563	Reinf.	-55.67	-	77.0	Pass
L44	8.29 - 4.08	Pole + Reinf.	TP36.6714x35.9608x1.2313	Reinf.	-57.93	-	78.6	Pass
L45	4.08 - 3.83	Pole + Reinf.	TP36.7136x36.6714x1.2313	Reinf.	-58.08	-	78.7	Pass
L46	3.83 - 3.25	Pole + Reinf.	TP36.8115x36.7136x1.2313	Reinf.	-58.39	-	78.9	Pass
L47	3.25 - 3	Pole + Reinf.	TP36.8537x36.8115x0.8813	Reinf.	-58.50	-	87.5	Pass
L48	3 - 0.79167	Pole + Reinf.	TP37.2264x36.8537x0.8813	Reinf.	-59.41	-	88.3	Pass
L49	0.79167 - 0.54167	Pole + Reinf.	TP37.2686x37.2264x0.8813	Reinf.	-59.54	-	82.7	Pass
L50	0.54167 - 0	Pole + Reinf.	TP37.36x37.2686x0.8813	Reinf.	-59.76	-	82.9	Pass
						Summary	ELC:	Load Case 5
						Pole =	74.2	Pass
						Reinf. =	94.5	Pass
						Rating =	94.5	Pass

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 841288 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

30/05/14	NEW BUILD PER WORK ORDER # 772281	KHL
30/05/14	UPDATED PER WORK ORDER # 748006	KHL
30/05/14	UPDATED PER WORK ORDER # 724177	KHL
07/07/14	UPDATED PER WORK ORDER # 795253	SLW
12/8/2014	UPDATED PER WORK ORDER 804179	MDP
8/1/2016	UPDATED PER WORK ORDER 1165016	CJR
22/09/16	UPDATED PER WORK ORDER 1303127	BMH

DRAWN BY: BAR
CHECKED BY:
DRAWING DATE: 29/05/14

SITE NUMBER:
SITE NAME:

SITE NAME

BRIDGEPORT NORTH

BUSINESS UNIT NUMBER

841288

SITE ADDRESS

2 KAECHELE PLACE
BRIDGEPRT, CT 06606
FAIRFIELD COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING	1" = 1'-0"	1

PLOT DATE: 9/22/2016 - FILE NAME: 841288_BASELEVEL.DWG
R:\TEMPLATES\TYPICAL BLOCKS FOR TEMPLATES\TITLE BLOCK STD-VER 5.1.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- G

Site BU: 841288

Work Order: 1318658

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	150	40.25	0	12	15	21	0.21875	0.875	A572-65
2	109.75	40.5	3	12	21.00	27.04	0.25	1	A572-65
3	72.25	42.25	4	12	26.09	32.89	0.3125	1.25	A572-65
4	34	34	0	12	31.62	37.36	0.40625	1.625	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	3.25	44.25	plate	CCI-SFP-065125	4		1			1			1			1	
2	44.25	66.75	plate	PL 5"x1-1/4" [18"]	4		1			1			1			1	
3	66.75	80.5	plate	PL 4"x1-1/4" [18"]	4			1			1			1			1
4	95.41	109.75	plate	PL 5"x1-1/4" [18"]	2		1			1							
5	95.41	101.67	plate	PL 5"x1-1/4" [18"]	2									1			1
6	101.67	109.75	plate	PL 5"x1-1/4" [18"]	2								1			1	
7	109.75	128.5	plate	PL 4"x1-1/4" [18"]	4		1			1			1			1	
8																	
9	0	0.79167	solid round	#20 Dywidag - 9.5"	8	1		1	1		1	1		1	1		1
10	0.79167	4.08	solid round	#20 Dywidag - 39.5"													
11	4.08	8.54	solid round	#20 Dywidag - 34.5"	8	1		1	1		1	1		1	1		1
12	8.54	49	solid round	#20 Dywidag - 30"	8	1		1	1		1	1		1	1		1
13	48.75	95.41	solid round	#20 Dywidag - 30"	4	1			1			1			1		
14																	
15	0.79167	4.08	solid round	#20 Dywidag - 20"	8	1		1	1		1	1		1	1		1
16																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
2	5	1.25	6.25	0.625	27.000	27.000	18.000	4.688	1.1875	A572-65
3	4	1.25	5	0.625	18.000	18.000	18.000	3.438	1.1875	A572-65
4	5	1.25	6.25	0.625	27.000	27.000	18.000	4.688	1.1875	A572-65
5	5	1.25	6.25	0.625	27.000	27.000	18.000	4.688	1.1875	A572-65
6	5	1.25	6.25	0.625	27.000	27.000	18.000	4.688	1.1875	A572-65
7	4	1.25	5	0.625	18.000	18.000	18.000	3.438	1.1875	A572-65
9	-	-	4.91	2.875	n/a	n/a	9.500	4.910	0.0000	80 ksi
10	-	-	4.91	2.875	n/a	n/a	39.500	4.910	0.0000	80 ksi
11	-	-	4.91	2.875	n/a	n/a	34.500	4.910	0.0000	80 ksi
12	-	-	4.91	2.875	n/a	n/a	30.000	4.910	0.0000	80 ksi
13	-	-	4.91	2.875	n/a	n/a	30.000	4.910	0.0000	80 ksi
15	-	-	4.91	2.875	n/a	n/a	20.000	4.910	0.0000	80 ksi

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
150 - 145	Pole	TP15.745x15x0.2188	Pole	23.5%	Pass
145 - 140	Pole	TP16.491x15.745x0.2188	Pole	37.5%	Pass
140 - 135	Pole	TP17.236x16.491x0.2188	Pole	54.7%	Pass
135 - 130	Pole	TP17.981x17.236x0.2188	Pole	70.0%	Pass
130 - 128.5	Pole	TP18.205x17.981x0.2188	Pole	74.2%	Pass
128.5 - 128.25	Pole + Reinf.	TP18.242x18.205x0.6688	Reinf. 7 Tension Rupture	48.6%	Pass
128.25 - 123.25	Pole + Reinf.	TP18.988x18.242x0.6438	Reinf. 7 Tension Rupture	58.5%	Pass
123.25 - 118.25	Pole + Reinf.	TP19.733x18.988x0.6188	Reinf. 7 Tension Rupture	68.5%	Pass
118.25 - 113.25	Pole + Reinf.	TP20.478x19.733x0.6063	Reinf. 7 Tension Rupture	78.9%	Pass
113.25 - 109.75	Pole + Reinf.	TP21x20.478x0.5938	Reinf. 7 Tension Rupture	85.8%	Pass
109.75 - 109.5	Pole + Reinf.	TP21.037x21x0.725	Reinf. 4 Tension Rupture	65.4%	Pass
109.5 - 104.5	Pole + Reinf.	TP21.783x21.037x0.7	Reinf. 4 Tension Rupture	72.9%	Pass
104.5 - 101.67	Pole + Reinf.	TP22.205x21.783x0.6875	Reinf. 4 Tension Rupture	77.0%	Pass
101.67 - 101.42	Pole + Reinf.	TP22.242x22.205x0.675	Reinf. 5 Tension Rupture	82.5%	Pass
101.42 - 96.42	Pole + Reinf.	TP22.988x22.242x0.6625	Reinf. 5 Tension Rupture	90.7%	Pass
96.42 - 95.41	Pole + Reinf.	TP23.139x22.988x0.6625	Reinf. 5 Tension Rupture	92.5%	Pass
95.41 - 95.16	Pole + Reinf.	TP23.176x23.139x0.7	Reinf. 13 Compression	74.5%	Pass
95.16 - 90.16	Pole + Reinf.	TP23.922x23.176x0.6875	Reinf. 13 Compression	81.5%	Pass
90.16 - 85.16	Pole + Reinf.	TP24.667x23.922x0.6625	Reinf. 13 Compression	88.3%	Pass
85.16 - 80.5	Pole + Reinf.	TP25.362x24.667x0.65	Reinf. 13 Compression	94.5%	Pass
80.5 - 80.25	Pole + Reinf.	TP25.4x25.362x0.975	Reinf. 3 Tension Rupture	80.7%	Pass
80.25 - 75.25	Pole + Reinf.	TP26.145x25.4x0.9375	Reinf. 3 Tension Rupture	86.8%	Pass
75.25 - 72.25	Pole + Reinf.	TP27.04x26.145x0.925	Reinf. 3 Tension Rupture	90.3%	Pass
72.25 - 67.25	Pole + Reinf.	TP26.897x26.093x0.9875	Reinf. 3 Tension Rupture	91.5%	Pass
67.25 - 66.75	Pole + Reinf.	TP26.977x26.897x0.9875	Reinf. 3 Tension Rupture	92.0%	Pass
66.75 - 66.5	Pole + Reinf.	TP27.018x26.977x1.0625	Reinf. 2 Tension Rupture	78.9%	Pass
66.5 - 61.5	Pole + Reinf.	TP27.822x27.018x1.025	Reinf. 2 Tension Rupture	83.3%	Pass
61.5 - 56.5	Pole + Reinf.	TP28.627x27.822x0.9875	Reinf. 2 Tension Rupture	87.5%	Pass
56.5 - 51.5	Pole + Reinf.	TP29.431x28.627x0.9625	Reinf. 2 Tension Rupture	91.6%	Pass
51.5 - 49	Pole + Reinf.	TP29.833x29.431x0.9625	Reinf. 2 Tension Rupture	93.6%	Pass
49 - 48.75	Pole + Reinf.	TP29.873x29.833x1.7125	Reinf. 2 Tension Rupture	56.6%	Pass
48.75 - 48.5	Pole + Reinf.	TP29.914x29.873x1.3125	Reinf. 2 Tension Rupture	70.8%	Pass
48.5 - 44.25	Pole + Reinf.	TP30.597x29.914x1.2875	Reinf. 2 Tension Rupture	73.5%	Pass
44.25 - 44	Pole + Reinf.	TP30.638x30.597x1.3875	Reinf. 1 Tension Rupture	63.8%	Pass
44 - 39	Pole + Reinf.	TP31.442x30.638x1.3375	Reinf. 1 Tension Rupture	66.5%	Pass
39 - 34	Pole + Reinf.	TP32.89x31.442x1.3125	Reinf. 1 Tension Rupture	69.3%	Pass
34 - 29	Pole + Reinf.	TP32.465x31.621x1.4063	Reinf. 1 Tension Rupture	68.2%	Pass
29 - 24	Pole + Reinf.	TP33.309x32.465x1.3563	Reinf. 1 Tension Rupture	70.4%	Pass
24 - 19	Pole + Reinf.	TP34.153x33.309x1.3313	Reinf. 1 Tension Rupture	72.6%	Pass
19 - 14	Pole + Reinf.	TP34.997x34.153x1.3063	Reinf. 1 Tension Rupture	74.7%	Pass
14 - 9	Pole + Reinf.	TP35.841x34.997x1.2563	Reinf. 1 Tension Rupture	76.7%	Pass
9 - 8.54	Pole + Reinf.	TP35.919x35.841x1.2563	Reinf. 1 Tension Rupture	76.9%	Pass
8.54 - 8.29	Pole + Reinf.	TP35.961x35.919x1.2563	Reinf. 1 Tension Rupture	77.0%	Pass
8.29 - 4.08	Pole + Reinf.	TP36.671x35.961x1.2313	Reinf. 1 Tension Rupture	78.6%	Pass
4.08 - 3.83	Pole + Reinf.	TP36.714x36.671x1.2313	Reinf. 1 Tension Rupture	78.7%	Pass
3.83 - 3.25	Pole + Reinf.	TP36.811x36.714x1.2313	Reinf. 1 Tension Rupture	78.9%	Pass
3.25 - 3	Pole + Reinf.	TP36.854x36.811x0.8813	Reinf. 15 Compression	87.5%	Pass
3 - 0.79	Pole + Reinf.	TP37.226x36.854x0.8813	Reinf. 15 Compression	88.3%	Pass
0.79 - 0.54	Pole + Reinf.	TP37.269x37.226x0.8813	Reinf. 9 Compression	82.7%	Pass
0.54 - 0	Pole + Reinf.	TP37.36x37.269x0.8813	Reinf. 9 Compression	82.9%	Pass
				Summary	
			Pole	74.2%	Pass
			Reinforcement	94.5%	Pass
			Overall	94.5%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity	Axial (kips)											
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R9	R10	R11	R12	R13	R15
150 - 145	337	n/a	337	10.92	n/a	10.92	23.5%													
145 - 140	388	n/a	388	11.45	n/a	11.45	37.5%													
140 - 135	444	n/a	444	11.97	n/a	11.97	54.7%													
135 - 130	505	n/a	505	12.49	n/a	12.49	70.0%													
130 - 128.5	524	n/a	524	12.65	n/a	12.65	74.2%													
128.5 - 128.25	527	965	1492	12.68	20.00	32.68	25.7%							100.6						
128.25 - 123.25	595	1039	1634	13.20	20.00	33.20	30.9%							121.0						
123.25 - 118.25	669	1115	1784	13.73	20.00	33.73	36.6%							141.8						
118.25 - 113.25	749	1195	1944	14.25	20.00	34.25	42.7%							163.1						
113.25 - 109.75	808	1252	2060	14.62	20.00	34.62	47.0%							177.6						
109.75 - 109.5	924	1580	2504	16.71	25.00	41.71	37.9%				184.4		184.4							
109.5 - 104.5	1027	1686	2713	17.31	25.00	42.31	42.4%				205.6		205.6							
104.5 - 101.67	1089	1747	2836	17.65	25.00	42.65	44.9%				217.2		217.2							
101.67 - 101.42	1104	1721	2824	17.68	25.00	42.68	49.3%				232.4	232.4								
101.42 - 96.42	1219	1830	3050	18.28	25.00	43.28	54.9%				255.8	255.8								
96.42 - 95.41	1244	1853	3097	18.40	25.00	43.40	56.1%				260.8	260.8								
95.41 - 95.16	1240	2062	3302	18.43	19.64	38.07	49.1%												217.3	
95.16 - 90.16	1365	2169	3534	19.03	19.64	38.67	54.7%												237.9	
90.16 - 85.16	1498	2279	3777	19.63	19.64	39.27	60.3%												257.8	
85.16 - 80.5	1629	2384	4014	20.19	19.64	39.83	65.4%												275.7	
80.5 - 80.25	1637	4180	5817	20.22	39.64	59.86	45.5%			167.1									191.5	
80.25 - 75.25	1787	4396	6183	20.82	39.64	60.46	49.5%			179.5									204.9	
75.25 - 72.25	1881	4529	6410	21.18	39.64	60.82	51.9%			186.9									212.9	
72.25 - 67.25	2416	4620	7036	26.71	39.64	66.35	49.2%			189.3									215.3	
67.25 - 66.75	2438	4644	7083	26.79	39.64	66.43	49.5%			190.4									216.5	
66.75 - 66.5	2449	5169	7618	26.83	44.64	71.47	46.3%		222.6										202.4	
66.5 - 61.5	2678	5444	8121	27.64	44.64	72.28	49.1%		234.8										212.7	
61.5 - 56.5	2919	5726	8646	28.45	44.64	73.09	52.1%		246.7										222.7	
56.5 - 51.5	3175	6016	9191	29.26	44.64	73.90	55.1%		258.3										232.4	
51.5 - 49	3309	6163	9472	29.66	44.64	74.30	56.6%		264.0										237.1	
49 - 48.75	3322	12428	15750	29.70	83.92	113.62	34.3%		159.7									143.4	143.4	
48.75 - 48.5	3336	9324	12659	29.74	64.28	94.02	42.9%		199.7									179.2		
48.5 - 44.25	3572	9700	13272	30.43	64.28	94.71	44.9%		207.4									185.7		
44.25 - 44	3587	10707	14294	30.47	71.78	102.25	42.0%	251.6										173.3		
44 - 39	3880	11209	15089	31.28	71.78	103.06	44.3%	262.5										180.2		
39 - 34	4188	11722	15911	32.09	71.78	103.87	46.6%	273.3										187.1		
34 - 29	5509	11864	17373	41.88	71.78	113.66	43.4%	269.2										184.1		
29 - 24	5956	12418	18374	42.98	71.78	114.76	44.9%	278.0										189.6		
24 - 19	6426	12985	19411	44.08	71.78	115.86	46.3%	286.6										194.9		
19 - 14	6920	13565	20485	45.18	71.78	116.96	47.7%	294.9										200.0		
14 - 9	7439	14158	21597	46.29	71.78	118.07	49.0%	302.8										204.9		
9 - 8.54	7488	14213	21701	46.39	71.78	118.17	49.2%	303.6										205.4		
8.54 - 8.29	7515	14243	21758	46.44	71.78	118.22	49.3%	304.0									205.6			
8.29 - 4.08	7974	14753	22728	47.37	71.78	119.15	50.7%	310.4									209.5			
4.08 - 3.83	8002	14784	22786	47.43	71.78	119.21	50.7%	310.7												209.8
3.83 - 3.25	8067	14855	22922	47.55	71.78	119.33	50.9%	311.6												210.3
3.25 - 3	8095	8928	17023	47.61	39.28	86.89	68.8%													284.2
3 - 0.79	8346	9085	17431	48.10	39.28	87.38	69.6%													286.5
0.79 - 0.54	8375	9103	17477	48.15	39.28	87.43	69.7%								286.8					
0.54 - 0	8437	9141	17578	48.27	39.28	87.55	69.9%								287.3					

Note: Section capacity checked in 5 degree increments.

Equivalent Wind Area for SR Reinforcement and Brackets

Size of Rod Connectors = 12" long, 6" angle

Intermediate Connectors		
Connector Projection from pole	5.375	in
Length of each Connector	7.5	in
Rod Width	2.72	in
Coax width	0	in

Termination Bracket		
Connector Projection from pole	5.375	in
Length of each Connector	33	in
Rod Width	2.72	in
Coax width	0	in

tnx		connectors				tnx		rods		tnx		coax		tnx	
Elevations	length of range (ft)	number of connectors	length of connectors (in)	Total Area (in2)	Equivalent Connector Projection (in)	Width of Connector (in)	Perimeter of Connector (in)	length of exposed rod (in)	Total Area (in2)	Equivalent Rod Width (in)	Equivalent Rod Perimeter (in)	length of exposed coax (in)	total area (in2)	Equivalent Coax Width (in)	Equivalent Coax Perimeter (in)
0'-95.04'	95.04	45	337.5	1814.0625	1.590613163	2.375	7.931	802.98	2184.106	1.915	6.016	802.98	0	0.000	0.000
95.04'-97.79'	2.75	1	33	177.375	5.4	2.375	15.500	0E+00	0	0.000	0.000	0	0	0.000	0.000
0'-49'	49	23	172.5	927.1875	1.57684949	2.375	7.904	415.5	1130.16	1.922	6.038	415.5	0	0.000	0.000
59'-51.75'	2.75	1	33	177.375	5.4	2.375	15.500	0E+00	0	0.000	0.000	0	0	0.000	0.000

GPD GROUP

Single Angle DYWIDAG Bracket Analysis

BRIDGEPORT NORTH / BU #: 841288

2016777.841288.06

Brackets Under Consideration:	Analysis at 85'

Tower and Reinforcement Data		
I of built-up Tower Cross Section=	3777	in^4
Pole Diameter=	24.67	in
Pole Thickness=	0.25	in
Pole, fy=	65	ksi
Pole, fu=	80	ksi
Bracket Spacing=	30	in
Rod Diameter=	2.72	in
Rod/Pole Spacing=	1.515	in
Rod Force=	257.8	kip
Pole Shear=	25.307	kip
Allowable Stress Ratio=	1.05	
Q=	88.37	in^3
Shear in Bracket (VQ/I*Spacing)=	17.76	kip

Single Angle Bracket Analysis		
Bracket Thickness=	0.375	in
Bracket length=	10	in
fy=	50	ksi
fu=	65	ksi
Z=	1.88	in^3
Aw=	3.75	in^2
ϕ=	0.9	
ϕVn=	101.3	kip
ϕMn=	84.5	kip-in
Vu=	17.8	kip
Mu=	11.1	kip-in
Combined Capacity=	30.7%	

U-Bolt Analysis (G-Code Section 4.9.6)		
Quantity per bracket=	2	
Diameter=	0.625	in
Material=	A36	
Fu=	58	ksi
Threads included=	Yes	
ϕ=	0.75	
Ab=	0.31	in^2
An=	0.23	in^2
ϕRnv=	6.01	kip
Vmax (per shear plane)=	5.41	kip
Combined Capacity=	90.0%	

U-Bolts Bearing on Angle Bracket (G-Code Section 4.9.6.2)		
d=	0.625	in
t=	0.375	in
Lc=	0.78125	in
ϕ=	0.8	
ϕRn=	21.94	kip
V (per shear plane)=	5.41	kip
Capacity=	24.7%	

Tower Bolt Analysis (G-Code Section 4.9.6)		
Bolt Quantity=	2	
Bolt Type=	Lindapter M16	
Shear Strength, ϕRnv=	23.44	kip
Tensile Strength, ϕRnt=	14.21	kip
Minimum distance (Bolt-to-heel of angle, Bolt-to-tip of angle)=	1.0000	in
Bolt-to-bolt distance =	7.50	in
T=	12.37	kip
V=	9.09	kip
Shear Capacity=	38.8%	
Tensile Capacity=	87.0%	
Combined Capacity=	90.8%	

Tower Bolts Bearing on Tower (G-Code Section 4.9.6.2)		
Sleeve Diameter=	1	in
t=	0.25	in
Lc=	6.4375	in
ϕ=	0.8	
ϕRn=	38.40	kip
V=	9.09	kip
Capacity=	23.7%	

Tower Bolts Bearing on Angle Bracket (G-Code Section 4.9.6.2)		
Sleeve Diameter=	1	in
t=	0.375	in
Lc=	0.46875	in
ϕ=	0.8	
ϕRn=	16.82	kip
V=	9.09	kip
Capacity=	54.0%	

Flange Bolt Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID #:	841288
Name:	BRIDGEPORT NORTH
App. #:	360013 Rev. 0

Pole Geometry		
Upper Pole OD:	21.00	in
Upper Pole Thick:	0.2188	in
Lower Pole OD:	21.00	in
Lower Pole Thick:	0.2500	in
Flange Plate OD:	28.50	in

Outer Bolt Group Data		
Quantity:	12	
Diameter:	1	in
Material:	A325	
Bolt Circle:	25.50	in
Bolt Group Area:	9.42	in^2
Bolt Group MOIx:	766	in^4

Reactions Seen by Outer Bolt Group		
Moment:	89.0	kip-ft
Axial:	13.4	kip
Shear:	5.8	kip

Outer Bolt Capacity Check		
Max Tension:	12.8	kip
Design Tension	54.5	kip
Max Shear:	0.5	kip
Design Shear	31.8	kip
Bolt Capacity	**23.6%**	Pass

Flange Height:	109.75	ft

System Reactions		
Moment:	542.1	kip-ft
Axial:	13.4	kip
Shear:	18.1	kip

Design Information	
TIA Code:	G
ASIF:	1.00
Failure At:	100%

Inner Bolt Group Data		
Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Inner Bolt Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Inner Bolt Capacity Check		
Max Tension:	0.0	kip
Design Tension	0.0	kip
Max Shear:	0.0	kip
Design Shear	0.0	kip
Bolt Capacity	**0.0%**	

Bridge Stiffener #1 Data		
Quantity:	4	
Type:	Write In	
Circle:	39.50	in
Individual Area:	5.00	in^2
BS #1 Group Area:	20.00	in^2
BS #1 Group MOIx:	3901	in^4

Reactions Seen by BS #1 Group		
Moment:	453.1	kip-ft
Axial:	0.0	kip
Shear:	12.3	kip

BS #1 Capacity Check		
Max Tension:	137.6	kip
Max Compression:	137.6	kip
Design Axial	248.2	kip
Max Shear:	2.1	kip
Design Shear	175.5	kip
Bolt Capacity	**55.5%**	Pass

BS #1 Upper Weld Capacity		
Eccentricity (ex):	9.250	in
Weld Length (l):	30.0	in
Weld Factor (a):	0.308	
Weld Size (D):	6	16TH
Weld Coef. (C):	3.05	
Electrode Coef. (C_1):	1.00	
Weld Capacity:	**33.4%**	Pass

BS #1 Lower Weld Capacity		
Eccentricity (ex):	9.250	in
Weld Length (l):	30.0	in
Weld Factor (a):	0.308	
Weld Size (D):	6	16TH
Weld Coef. (C):	3.05	
Electrode Coef. (C_1):	1.00	
Weld Capacity:	**33.4%**	Pass

Bridge Stiffener #2 Data		
Quantity:		
Type:		
Circle:	0.00	in
Individual Area:	0.00	in^2
BS #2 Group Area:	0.00	in^2
BS #2 Group MOIx:	0	in^4

Reactions Seen by BS #2 Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

BS #2 Capacity Check		
Max Tension:	0.0	kip
Max Compression:	0.0	kip
Design Axial	0.0	kip
Max Shear:	0.0	kip
Design Shear	0.0	kip
Bolt Capacity	**0.0%**	

BS #2 Upper Weld Capacity		
Eccentricity (ex):	N/A	in
Weld Length (l):	N/A	in
Weld Factor (a):	N/A	
Weld Size (D):	N/A	16TH
Weld Coef. (C):	N/A	
Electrode Coef. (C_1):	N/A	
Weld Capacity:	**N/A**	

BS #2 Lower Weld Capacity		
Eccentricity (ex):	N/A	in
Weld Length (l):	N/A	in
Weld Factor (a):	N/A	
Weld Size (D):	N/A	16TH
Weld Coef. (C):	N/A	
Electrode Coef. (C_1):	N/A	
Weld Capacity:	**N/A**	

Bridge Stiffener #3 Data		
Quantity:		
Type:		
Circle:	0.00	in
Individual Area:	0.00	in^2
BS #3 Group Area:	0.00	in^2
BS #3 Group MOIx:	0	in^4

Reactions Seen by BS #3 Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

BS #3 Capacity Check		
Max Tension:	0.0	kip
Max Compression:	0.0	kip
Design Axial	0.0	kip
Max Shear:	0.0	kip
Design Shear	0.0	kip
Bolt Capacity	**0.0%**	

BS #3 Upper Weld Capacity		
Eccentricity (ex):	N/A	in
Weld Length (l):	N/A	in
Weld Factor (a):	N/A	
Weld Size (D):	N/A	16TH
Weld Coef. (C):	N/A	
Electrode Coef. (C_1):	N/A	
Weld Capacity:	**N/A**	

BS #3 Lower Weld Capacity		
Eccentricity (ex):	N/A	in
Weld Length (l):	N/A	in
Weld Factor (a):	N/A	
Weld Size (D):	N/A	16TH
Weld Coef. (C):	N/A	
Electrode Coef. (C_1):	N/A	
Weld Capacity:	**N/A**	

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

Site Data

BU#: *841288*
Site Name: *BRIDGEPORT NORTH*
App #: *360013 Rev. 0*

Pole Manufacturer:	Other

Bolt Data

Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	25.5		

Plate Data

Diam:	28.5	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	5.63	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	21	in
Thick:	0.21875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions

Mu	88.983318	ft-kips
Axial, Pu:	13.351	kips
Shear, Vu:	5.7984042	kips
Elevation:	110.5	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
31.81

* Reactions have been adjusted to account for modifications

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	12.85	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.153	in	
Min PL "treq" for actual **T w/ Pry**:	0.416	in	
Min PL "t1" for actual **T w/o Pry**:	0.559	in	
T allowable with Prying:	48.24	kips	0≤α'≤1 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	12.85	kips	
Prying Bolt Stress Ratio=(Tu+q)/(B):	23.6%	**Pass**	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	14.7	ksi	Rigid
Allowable Plate Stress:	32.4	ksi	TIA G
Compression Plate Stress Ratio:	45.2%	**Pass**	φ*Fy
No Prying			Comp. Y.L. Length:
Tension Side Stress Ratio, (treq/t)^2:	17.3%	**Pass**	14.47

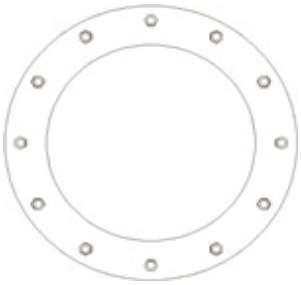
n/a

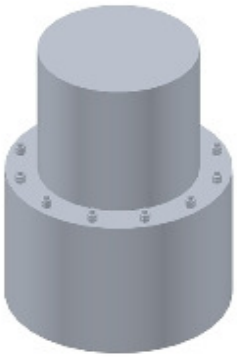
Stiffener Results

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

BRIDGE STIFFENER CALCULATIONS

Site Name: **Engineer:**

GPD Project #: **Date:**

Elevation(s)	109.75	ft

Axial Force

$\phi \cdot P_n$ =	137.6	kips

Stiffener Properties

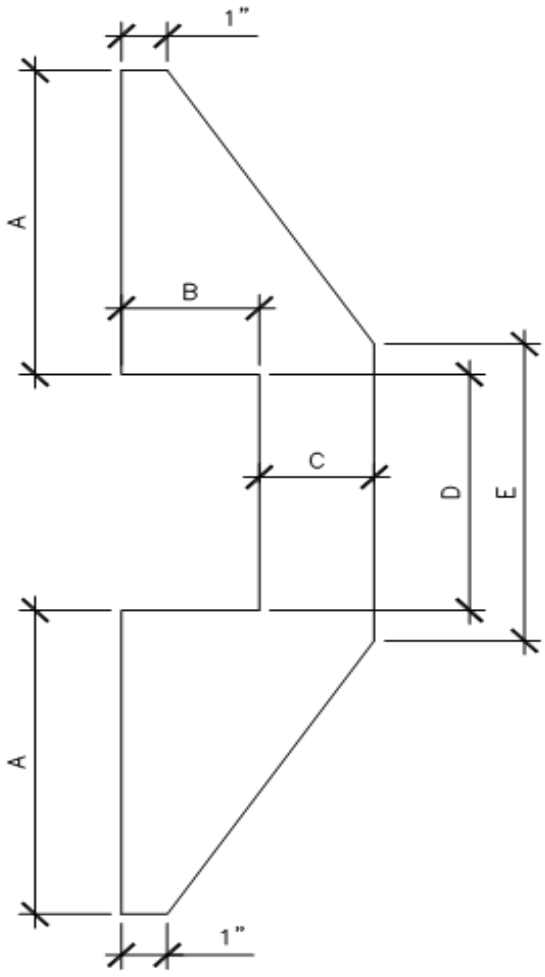
Quantity (n) =	1	per leg
A =	30	in
B =	6	in
C =	4	in
D =	15	in
E =	18	in
Thickness =	1.25	in
Yield, F_y =	65	ksi

Flexural Buckling (Compression Check)

A_g =	5.00	in^2	
Phi (ϕ) =	0.9		
K =	1		
L =	15	in	
r =	0.36	in	
KL/r =	41.57		
$4.71 \cdot (E/F_y)^{1/2}$ =	99.49		
F_e =	165.64	ksi	
F_{cr} =	55.15	ksi	(E3-2 or E3-3)
$\phi \cdot P_n$ =	248.19	kips	
$P_u = \phi \cdot P_{n\,(ANGLE)} / n$	137.60	kips	
Capacity, $P_u / \phi \cdot P_n$ =	55.4%	OK	

Fillet Weld Check

Weld Length =	30	in
Weld Thickness =	0.375	in
e =	8	in
a =	0.267	
D =	6	
C_1 =	1	
C =	3.24	
Phi (ϕ) =	0.75	
$\phi \cdot R_n$ =	436.95	kips
Capacity, $P_u / \phi \cdot R_n$ =	31.5%	OK



Tnx Forces

Moment (k*ft) =	3930.75
Axial (k) =	59.78
Shear (k) =	40.25

System Properties

Original Modified Monopole Properties

Area Pole + Reinf (in^2) =	87.55
MOI Pole + Reinf (in^4) =	17578.0

Original Modified Anchor Rod Properties

Number of Modified Ars =	8
Area of Single AR (in^2) =	4.91
Area of AR Group (in^2) =	39.28
MOI AR Group (in^4) =	9141.0
AR Bolt Circle (in) =	43.11

Force Distribution

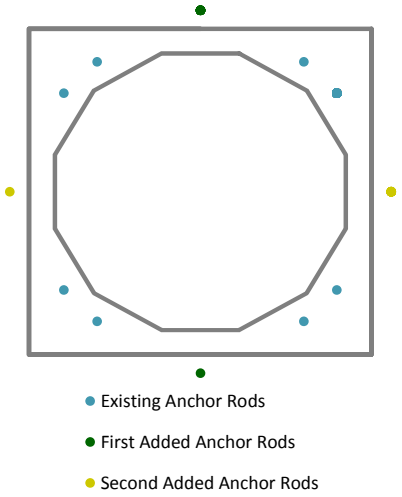
Moment in Pole (k*ft) =	1886.7
Axial in Pole (k) =	32.96
Shear in Pole (k) =	40.3
Moment in Modified ARs (k*ft) =	2044.1
Axial in Modified ARs (k) =	26.82
Shear in Modified ARs (k) =	0.00
Resultant Compression Force in AR (k) =	287.352
Resultant Tension Force in AR (k) =	280.646

Anchor Rod Interaction, TIA-222-G
Bridgeport North / BU #: 841288
2016777.841288.06

tnx Reactions		
Overturning Moment=	1886.66	k*ft
Axial Force =	32.96	k
Shear Force =	40.25	k

Existing Anchor Rods		
Number of Rods =	8	
Rod Circle =	44	in
Rod Diameter =	2.25	in
Est. Dist. b/w ea. Rod =	6	in
Plate Type =	Square	
Plate Width =	44	in

Pole		
Pole Diameter =	37.36	in
Number of Sides =	12	
Thickness =	0.40625	in



First Added Anchor Rods		
Number of Rods =	2	
Rod Circle =	49.00	in
Rod Diameter =	2.25	in
Anchor Rod Grade =	A193 B7	

Rod Number	Initial Angle
1	0
2	180

Second Added Anchor Rods		
Number of Rods =	2	
Rod Circle =	49.00	in
Rod Diameter =	2.25	in
Anchor Rod Grade =	A193 B7	

Rod Number	Initial Angle
1	90
2	270

First Added Anchor Rods		
Max Rod Compression =	166.87	k
ϕRnt =	325.00	k
Anchor Rod Capacity =	51.35%	**OK**

Second Added Anchor Rods		
Max Rod Compression =	166.87	k
ϕRnt =	325.00	k
Anchor Rod Capacity =	51.35%	**OK**

Reactions in Existing Rods		
Overturning Moment=	**1204.54**	k*ft
Axial Force =	**32.96**	k
Shear Force =	**40.25**	k
Centroid Offset =	**0.00**	in

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *841288*
Site Name: *BRIDGEPORT NORTH*
App #: *360013 Rev 0*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	44	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	44	in
Thick:	2.5	in
Grade:	50	ksi
Clip Distance:	0	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	37.36	in
Thick:	0.40625	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	1204.54	ft-kips
Factored Axial, Pu:	32.96	kips
Factored Shear, Vu:	40.25	kips

* Reactions have been adjusted to account for modifications.

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	178.4	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	68.6%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	26.7	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	59.4%	**Pass**

PL Ref. Data
Yield Line (in): 24.87
Max PL Length: 24.87

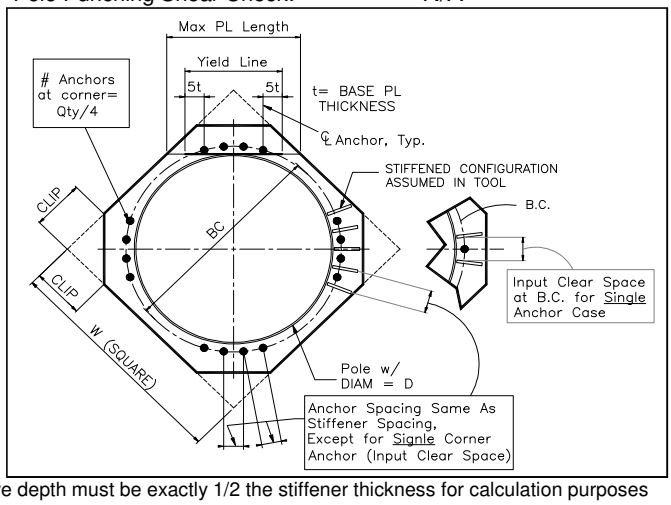
N/A - Unstiffened

Stiffener Results

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



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

ANCHOR ROD BRACKET CALCULATIONS

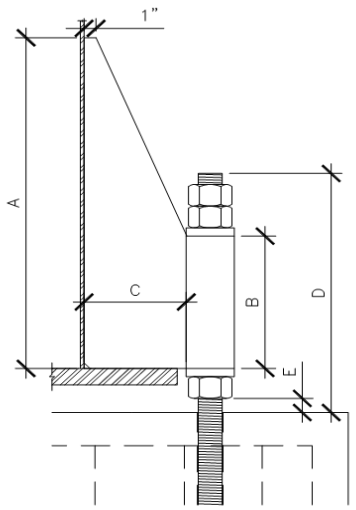
Site Name: Bridgeport North BU #: 841288

GPD Project No: 2016777.841288.06

(90 deg & 270 deg rods)

Anchor Rod Properties		
F_u =	125	ksi
F_y =	105	ksi
Diameter =	2.25	in
Rod Force =	166.87	kips

Bracket Plate Properties		
A =	18	in
B =	18	in
C =	3.25	in
E (max) =	2.25	in
Thickness =	1.25	in
F_y =	65	ksi



Pipe Yielding		
Pipe Size =	HSS5x5x1/2	
Outer Diameter =	5	in
Inner Diameter =	4.535	in
Area =	7.88	in^2
Yield Stress, F_y =	46	ksi
ϕP_n =	326.23	kips
Capacity =	51.2%	OK

Flexure and Combined Shear (Pipe-to-Plate)		
Plastic Modulus, Z =	101.25	in^3
Elastic Modulus, S =	67.50	in^3
F_{cr} =	63.7	ksi
ϕ =	0.9	
$\phi M_{n,\ combined\ shear}$ =	5806.3	kip-in
$\phi M_{n,\ yield,\ LTB}$ =	5911.3	kip-in
M_u =	417.2	kip-in
Capacity =	7.2%	OK

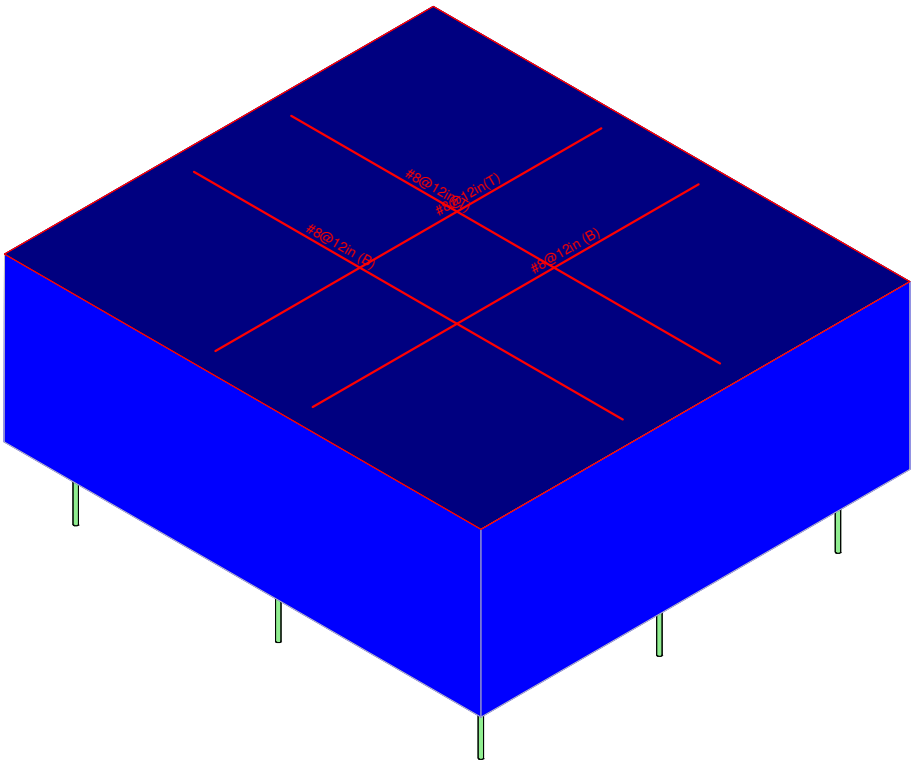
Shear Yielding (Pipe-to-Plate)		
A_w =	22.5	in^2
F_y =	65	ksi
ϕ =	0.9	
ϕV_n =	789.8	kip
V_u =	166.9	kip
Capacity =	21.1%	OK

Flexure and Combined Shear (Plate-to-Tower)		
Plastic Modulus, Z =	101.25	in^3
Elastic Modulus, S =	67.50	in^3
F_{cr} =	63.72	ksi
ϕ =	0.9	
$\phi M_{n,\ combined\ shear}$ =	5806.3	kip-in
$\phi M_{n,\ yield,\ LTB}$ =	5911.3	kip-in
M_u =	959.5	kip-in
Capacity =	16.5%	OK

Shear Yielding (Plate-to-Tower)		
A_w =	22.5	in^2
F_y =	65	ksi
ϕ =	0.9	
ϕV_n =	789.8	kip
V_u =	166.9	kip
Capacity =	21.1%	OK

Weld Check (Pipe-to-Plate)					
Weld Length =	18	in	D =	8	
Fillet Weld Size =	0.5	in	C1 =	1	
Weld Strength =	70	ksi	C =	3.68	
e =	2.5	in	ϕ =	0.75	
a =	0.139		ϕR_n =	397.56	k
			Capacity =	42.0%	OK

Weld Check (Plate-to-Tower)					
Weld Length =	18	in	D =	7	
Fillet Weld Size =	0.4375	in	C1 =	1	
Weld Strength =	70	ksi	C =	3.01	
e =	5.75	in	ϕ =	0.75	
a =	0.319		ϕR_n =	284.10	k
			Capacity =	58.7%	OK



Loads: DL - Dead Load
Results for LC 1, 1.2D+1.6W (0 deg)

GPD	BRIDGEPORT NORTH / BU #: 814288	SK - 1
btk		Nov 22, 2016 at 5:29 PM
2016777.814288.06		Rock Anchors-one slab.fnd

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	100
Mesh Size (in)	6
Subgrade Modulus (k/ft^3)	5184
Allowable Bearing (ksf) (Gross Allowable)	23.05
Max Iterations	10
Merge Tolerance (in)	.12
Solver	Sparse Accelerated
Coefficient of Friction	.3

No. of Shear Regions	4
Shear Region Spacing Increment (in)	4
Min 1 Bar Dia Spacing for Beams?	No
Optimize footings for OTM / Sliding?	Yes
Parme Beta Factor	.65
Concrete Stress Block	Rectangular
Concrete Rebar Set	ASTM A615
Concrete Code	ACI 318-11

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	f'c[ksi]	Lambda	Flex Steel[...	Shear Stee...
1	Conc3000NW	3156	1372	.15	.6	.15	3	1	60	60

Slabs

	Label	Thickness[in]	Material	Local Axis Angle[deg]
1	S1	82	Conc3000NW	0

General Design Parameters

	Label	Max Bending Chk	Max Shear Chk	Top Cover[in]	Bottom Cover[in]
1	Collar	2	2	3	3

Slab Rebar Parameters

	Label	Top...	Botto...	Max Top Bar Spa...	Min Top Bar Spacin...	Max Bot Bar Spacing[...	Min Bot Bar Spaci...	Spacing Incre...	Rebar Options
1	Collar	#8	#8	12	12	12	12	2	Optimize

Design Strips

	Label	Rebar Angle from Pl...	No. of Design Cuts	Design Rule
1	DS1	0	50	Collar
2	DS2	90	50	Collar

Point Loads and Moments (Cat 2 : LL)

	Label	Direction	Magnitude[k,k-ft]
1	N1	Y	59.8

Point Loads and Moments (Cat 3 : EL)

	Label	Direction	Magnitude[k,k-ft]
1	N6	Y	184
2	N7	Y	184
3	N8	Y	184
4	N9	Y	184
5	N10	Y	184
6	N11	Y	184

Point Loads and Moments (Cat 3 : EL) (Continued)

	Label	Direction	Magnitude[k,k-ft]
7	N12	Y	184
8	N13	Y	184

Point Loads and Moments (Cat 16 : OL1)

	Label	Direction	Magnitude[k,k-ft]
1	N1	X	-40.3
2	N1	MZ	3930.7

Point Loads and Moments (Cat 17 : OL2)

	Label	Direction	Magnitude[k,k-ft]
1	N1	X	-28.496
2	N1	Z	28.496
3	N1	MX	2779.425
4	N1	MZ	2779.425

Point Loads and Moments (Cat 18 : OL3)

	Label	Direction	Magnitude[k,k-ft]
1	N1	MX	3930.7
2	N1	Z	40.3

Load Combinations

	Label	Solve	Ser...	A...	SF	Cat...	Fa...	Cat...	Fa...	Cat...	Fa...	Cate...	Fa...	Cat...	Fa...	Cat...	Fa...	Cat...	Fa...	Cat...	Fa...	C...	F...	C...	F...
1	1.2D+1.6W (0 deg)	Yes				DL	1.2	LL	1	OL1	1	EL	1												
2	1.2D+1.6W (45 d...	Yes				DL	1.2	LL	1	OL2	1	EL	1												
3	1.2D+1.6W (90 d...	Yes				DL	1.2	LL	1	OL3	1	EL	1												
4	0.9D+1.6W (0 deg)	Yes				DL	.9	LL	.75	OL1	1	EL	1												
5	0.9D+1.6W (45 d...	Yes				DL	.9	LL	.75	OL2	1	EL	1												
6	0.9D+1.6W (90 d...	Yes				DL	.9	LL	.75	OL3	1	EL	1												
7	1.2D+1.6W (0 deg)	Yes	Yes			DL	1.2	LL	1	OL1	1	EL	1												
8	1.2D+1.6W (45 d...	Yes	Yes			DL	1.2	LL	1	OL2	1	EL	1												
9	1.2D+1.6W (90 d...	Yes	Yes			DL	1.2	LL	1	OL3	1	EL	1												
10	0.9D+1.6W (0 deg)	Yes	Yes			DL	.9	LL	.75	OL1	1	EL	1												
11	0.9D+1.6W (45 d...	Yes	Yes			DL	.9	LL	.75	OL2	1	EL	1												
12	0.9D+1.6W (90 d...	Yes	Yes			DL	.9	LL	.75	OL3	1	EL	1												

Envelope Slab Soil Pressures

	Label	UC	LC	Soil Pressure[ksf]	Allowable Bearing[ksf]	Point
1	S1	.495	8	11.408	23.05	N4

Pile Design Checks

	Label	Pile	Shear UC	Shear[k]	Shear LC	Comp UC	Comp[k]	Comp LC	Tens UC	Tens[k]	Tens LC
1	N6	Rock Anch...	0	0	NC	0	0	NC	0	0	NC
2	N7	Rock Anch...	0	0	NC	0	0	NC	0	0	NC
3	N8	Rock Anch...	0	0	NC	0	0	NC	0	0	NC
4	N9	Rock Anch...	0	0	NC	0	0	NC	0	0	NC
5	N13	Rock Anch...	0	0	NC	0	0	NC	0	0	NC
6	N12	Rock Anch...	0	0	NC	0	0	NC	0	0	NC
7	N11	Rock Anch...	0	0	NC	0	0	NC	0	0	NC
8	N10	Rock Anch...	0	0	NC	0	0	NC	0	0	NC

Slab Overturning Safety Factors

	LC	Slab	Angle[deg]	Mo-xx[k-ft]	Ms-xx[k-ft]	Mo-zz[k-ft]	Ms-zz[k-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
1	7	S1	0	0	17771.4	4206.083	19746	9.999+	4.695
2	8	S1	0	2974.15	17771.4	2974.15	19746	5.975	6.639
3	9	S1	0	4206.083	17771.4	0	19746	4.225	9.999+
4	10	S1	0	0	16640.55	4206.083	18489.5	9.999+	4.396
5	11	S1	0	2974.15	16640.55	2974.15	18489.5	5.595	6.217
6	12	S1	0	4206.083	16640.55	0	18489.5	3.956	9.999+

Strip Reinforcing

	Label	UC Top	Top Bars	Governing Design ...	UC Bot	Bot Bars/Mi...	Gove...	UC Shear	Governing Design Cut for UC S...
1	DS1	.456	#8@12in	DS1-X24	.198	#8@12in	DS1-...	.328	DS1-X26
2	DS2	.528	#8@12in	DS2-X27	.239	#8@12in	DS2-...	.358	DS2-X46

Rock/Soil Anchor Calculations

BRIDGEPORT NORTH / BU #: 841288

2016777.841288.06

Loads		
Compression	0	k
Uplift	0	k

Analysis Code	
TIA Revision:	TIA-222-G
Analysis/Design?	Analysis

Rock/Soil Anchors		
Rock Anchor Quantity	1	
Manufacturer & Grade	Williams 150 KSI	
Size	1-3/4"	
Nominal Diameter	1.75	in
Net Area (A_{net})	2.60	in^2
Ultimate Strength (F_uA_{net})	390.0	k
Yield Strength (F_yA_{net})	332.0	k
Φ(Rupture)	0.50	
Φc(Yield)	0.75	
Φt(Yield)	0.80	
Design Compression Load	195.0	k
Design Tension Load	195.0	k
Maximum Lock-Off Load	273.0	k
Lock-Off Load	184	k
Locked off to:	Concrete	
Maximum Test Load	312.0	k
Max. Compression/Pile	0.0	k
Max. Tension/Pile	184.0	k
Compression Capacity	**N/A**	**%**
Tensile Capacity	**94.4**	**%**

Load Factors	
Uplift	0.90
Compression	1.20

Summary of Results		
Stiffness	117.1	kip/in
Steel Capacity	94.4%	OK
Grout/Steel Capacity	73.5%	OK
Ground/Grout Capacity	97.6%	OK
Rock/Soil Capacity	0.0%	OK

Rock/Soil Properties						
Layer	C, psf	ϕ, degrees	τ_ω, psi	γ_{soil}, pcf	$\gamma_{concrete}$, pcf	d, ft
1		28	100	100	150	2
2		30	100	105	150	2
3		40	100	135	150	1
4	15000		100	140	150	50
Ignored Depth	15	ft		Water Table	99	ft

Rock/Soil		
Rock Cone	Single	
Pile Cap Shape	Rectangular	
Length	0	ft
Width	0	ft
Depth (Below Grade)	0	ft
Height (Above Grade)	0	ft
Concrete Weight	0.0	k
Soil Weight	25.4	k
Additional Soil Resistance	188.5	k
Φ (Rock/Soil)	0.50	
Rock/Soil Capacity	**0.0**	**%**

Grout Bond		
Hole Diameter	5	in
Grout Strength (f_c')	4000	psi
Ultimate Ground-Grout Bond	377	k
Ultimate Grout-Steel Bond (f_{bu})	379	psi
Min Design Bond Length (L_b)	16	ft
Bond Length	20	ft
Unbonded Length	15	ft
Φ (Grout-Steel)	0.50	
Grout-Steel Capacity	**73.5**	**%**
Φ (Ground-Grout)	0.50	
Ground-Grout Capacity	**97.6**	**%**

Version 1.4

APPENDIX D

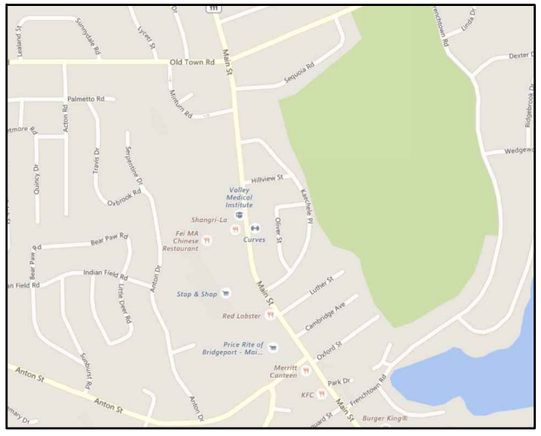
MODIFICATION DRAWINGS

MONOPOLE REINFORCEMENT DRAWINGS

PREPARED FOR
CROWN CASTLE

SITE NAME: BRIDGEPORT NORTH
BU NUMBER: 841288

SITE ADDRESS:
2 KAECHELE PLACE
BRIDGEPORT, CT 06606
FAIRFIELD COUNTY, USA



DIRECTIONS: I-91 S TOWARD NEW HAVEN/(?)NEW YORK CITY 16. TAKE EXIT 17 FOR CT-15 S/(?)W CROSS PKWY 0.4 MI 17. MERGE ONTO CT-15 S 33.7 MI 18. TAKE EXIT 48 FOR CT-111/(?)MAIN ST 0.1 MI 19. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR BRIDGEPORT 220 FT 20. TURN LEFT ONTO MAIN ST 0.8 MI 21. TURN LEFT ONTO KAECHELE PL DRIVE AROUND KAECHELE PLACE AND YOU WILL SEE A SHORT SMALL DRIVEWAY/ACCESS ROAD ON AN INCLINE LEADING TO THE TOWER GATE.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT 800-788-7011.

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM GPD TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES PLEASE CONTACT GPD AT CROWNMODS@GPDGROUP.COM.

PROJECT CONTACTS:

1. CROWN PROJECT MANAGER
   DAN VADNEY
   (518) 373-3510
   DAN.VADNEY@CROWNCASTLE.COM
   3 CORPORATE PARK DRIVE, SUITE 101
   CLIFTON PARK, NY 12065
2. CROWN CONSTRUCTION MANAGER
   JASON D'AMICO
   (860) 209-0104
   JASON.D'AMICO@CROWNCASTLE.COM
   3 CORPORATE PARK DRIVE, SUITE 101
   CLIFTON PARK, NY 12065
3. ENGINEER OF RECORD:
   GPD ENGINEERING AND ARCHITECTURE
   PROFESSIONAL CORPORATION
   520 SOUTH MAIN STREET, SUITE 2531
   AKRON, OH 44311
   FOR QUESTIONS PLEASE EMAIL:
   CROWNMODS@GPDGROUP.COM

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S-1	TITLE PAGE
S-2	MODIFICATION INSPECTION CHECKLIST
S-3	NOTES
S-4	NexGen2™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE
S-5	TOWER ELEVATION
S-6	TOWER SECTIONS
S-7	STEP BOLT STANDARD

TOWER INFORMATION

TOWER MAPPING / PROJ #::	GPD/PROJ #: 2014777.841288.02 REV. A
TOWER HEIGHT / TYPE:	150 FT MODIFIED MONOPOLE TOWER
TOWER LOCATION:	LAT: 41° 13' 24.04"
DATUM: (NAD 1983)	LONG: -73° 13' 0.38"
	ELEV: 242 FT AMSL
STRUCTURAL DESIGN DRAWING:	CCI/WO #: 1318658
STRUCTURAL ANALYSIS REPORT:	PJF/WO #: 1303128
STRUCTURAL ANALYSIS DATE:	10/10/16
APPLICATION ID:	360013 REV #: 0
CCISITES DOCUMENT ID:	6495705

CODE COMPLIANCE

GOVERNING CODES:	TIA-222-G, 2012 IBC, & 2016 CSBC
WIND SPEEDS:	125 MPH 3-SECOND GUST (ULTIMATE)
	97 MPH 3-SECOND GUST (NOMINAL)
	50 MPH 3-SECOND GUST (W/ ICE)
ICE THICKNESS:	3/4"
RISK CATEGORY:	II
EXPOSURE CATEGORY:	C
TOPO CATEGORY:	1

NO.	DATE	DESCRIPTION	BY

REVISIONS

STATE OF CONNECTICUT
CHRISTOPHER J. SCHEKS
No. 30026
LICENSED
PROFESSIONAL ENGINEER

11/22/16

GPD Engineering and Architecture Professional Corporation
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 330.572.2101

GPD PROJECT NUMBER
2016777.841288.06

SITE NAME: BRIDGEPORT NORTH

BU NUMBER: 841288

WO NUMBER: 1318658

SITE ADDRESS:
2 KAECHELE PLACE
BRIDGEPORT, CT 06606
FAIRFIELD COUNTY, USA

ENG/QA BY: BK DATE: 11/22/16

DFT BY: SES DATE: 11/22/16

DFT/QA BY: CB DATE: 11/22/16

APRV'D BY: CJS DATE: 11/22/16

SCALE: N.T.S.

TITLE PAGE

S-1

REV 0

MODIFICATION INSPECTION NOTES

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING
X	EOR REVIEW
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE PER ENG-SOW-10033
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION AND NDE REPORTS
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

GENERAL

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

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

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE CROWN ENG-BUL-10173, "APPROVED MI VENDORS".

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO CROWN ENG-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

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

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

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

GENERAL CONTRACTOR

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

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

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND CROWN ENG-SOW-10007.

RECOMMENDATIONS

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

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

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY, NOR FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

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

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

MI VERIFICATION INSPECTIONS

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

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH CROWN ENG-SOW-10007.

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

REQUIRED PHOTOS

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

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

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

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO CROWN ENG-SOW-10007.

NO.	DATE	DESCRIPTION	BY

REVISIONS

STATE OF CONNECTICUT
CHRISTOPHER J. SCHEKS
No. 30026
PROFESSIONAL ENGINEER

11/22/16

GPD Engineering and Architecture Professional Corporation
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 330.572.2101

GPD PROJECT NUMBER
2016777.841288.06

SITE NAME: BRIDGEPORT NORTH

BU NUMBER: 841288

WO NUMBER: 1318658

SITE ADDRESS:
2 KAECHELE PLACE
BRIDGEPORT, CT 06606
FAIRFIELD COUNTY, USA

ENG/QA BY: BK DATE: 11/22/16

DFT BY: SES DATE: 11/22/16

DFT/QA BY: CB DATE: 11/22/16

APRV'D BY: CJS DATE: 11/22/16

SCALE: N.T.S.

MODIFICATION INSPECTION CHECKLIST

S-2

REV 0

GENERAL NOTES

1. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, THAT HE IS PROPERLY LICENSED, AND THAT HE IS PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.
2. THE GENERAL NOTES AND TYPICAL DETAILS ARE APPLICABLE TO ALL PARTS OF THE STRUCTURE AND SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS AND PROJECT SPECIFICATIONS.
3. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVALS FROM ALL AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT AND SHALL NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER 24 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
5. ERECT GUARDS AND BARRIERS PER APPLICABLE LABOR AND CONSTRUCTION SAFETY REGULATIONS.
6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, POSSIBLE INTERFERENCES, AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO THE ENGINEER OF RECORD (EOR) AND FIELD PERSONNEL IMMEDIATELY. ANY AND ALL FIELD CHANGES SHALL BE APPROVED AND DOCUMENTED BY THE EOR PRIOR TO FIELD IMPLEMENTATION.
7. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR TWO (2) YEARS FROM THE DATE OF COMPLETED CONSTRUCTION.
8. USE ONLY THE LATEST ISSUES OF ANY APPLICABLE CODES, STANDARDS, OR REGULATIONS MENTIONED IN THE FOLLOWING NOTES AND SPECIFICATIONS, UNO.
9. ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH ANSI, ASTM, ACI, TIA, AND AISC STANDARDS AS REFERENCED IN THE APPLICABLE CODE.
10. STRUCTURAL ELEMENTS SHOWN ON THESE DRAWINGS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE BUILDING CODES/STANDARDS. ALL CONSTRUCTION, EXCEPT WHERE NOTED OTHERWISE, SHALL COMPLY WITH THOSE CODES/STANDARDS.
11. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE DULY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER OF RECORD PRIOR TO FABRICATION AND INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
12. ALL MANUFACTURER'S HARDWARE ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER, AND ALL OTHER APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS.
14. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA 1019 (LATEST EDITION), OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.
15. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIAL ACCESS, WITH THE RESIDENT LEASING AGENT.
16. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES OR BURIED SERVICES AFFECTED BY THIS CONSTRUCTION. CONTRACTOR IS ALSO RESPONSIBLE FOR TEMPORARILY RELOCATING ANY LINES OR STRUTS AS NECESSARY TO COMPLETE THE REQUIRED WORK.
17. STRUCTURAL DESIGN IS FOR THE COMPLETE CONDITION ONLY. THE CONTRACTOR MUST BE COGNIZANT THAT THE REMOVAL OF ANY STRUCTURAL COMPONENT OF AN EXISTING TOWER HAS THE POTENTIAL TO CAUSE THE PARTIAL OR COMPLETE COLLAPSE OF THE STRUCTURE. ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO ENSURE STRUCTURAL INTEGRITY, INCLUDING, BUT NOT LIMITED TO, ENGINEERING ASSESSMENT OF CONSTRUCTION STRESSES WITH INSTALLATION MAXIMUM WIND SPEED AND/OR TEMPORARY BRACING AND SHORING.
18. DO NOT SCALE DRAWINGS.
19. THE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN CASTLE, THEY MAY NOT BE REPRODUCED IN ANY FORM WITHOUT THE EXPRESSED WRITTEN CONSENT/PERMISSION OF CROWN CASTLE
20. FOR THIS ANALYSIS AND MODIFICATION, THE TOWER HAS BEEN ASSUMED TO BE IN GOOD CONDITION WITHOUT ANY DEFECTS. IF THE CONTRACTOR DISCOVERS ANY INDICATION OF AN EXISTING STRUCTURAL DEFECT, CONTACT THE ENGINEER OF RECORD IMMEDIATELY.
21. MODIFICATION WORK SHALL BE COMPLETED IN CALM WIND CONDITIONS / OR APPROPRIATE WIND SPEED FOR THE TYPE OF MODIFICATION WORK TO BE INSTALLED.
22. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD.
23. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.

WELDING NOTES

1. ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL".
2. THE CERTIFIED WELD INSPECTOR SHALL INDICATE, IN A WRITTEN CWI REPORT, THAT ALL WELDING OPERATIONS, PRE-DURING-POST, WERE CONDUCTED IN ACCORDANCE WITH AWS D1.1 WITH PHOTOGRAPHS AND DOCUMENTATION SUPPORTING THE ACCEPTANCE OR REJECTION OF ALL WELDING. FOR INFORMATION, SEE ENG-STD-10069: GC INSPECTION STANDARD FOR FABRICATION AND FIELD WELDING OF STRUCTURAL STEEL AND ENG-SOW-10007 POST MODIFICATION INSPECTION SOW. ALL CWI WELD INSPECTION DOCUMENTATION AND PHOTOS SHALL BE SUBMITTED TO THE PMI INSPECTOR.
3. ALL NDE SHALL BE IN ACCORDANCE WITH AWS D1.1.
4. FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.
5. FOR NEW FLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'-0"
6. FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD. GC SHALL REFERENCE THE MI CHECKLIST FOR APPLICABILITY. PLEASE SEE ENG-SOW-10033: *TOWER BASE PLATE NDE*, AND ENG-BUL-10051: *NDE REQUIREMENTS FOR MONOPOLE BASEPLATE TO PREVENT CONNECTION FAILURE*. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE.
7. ALL TESTING LIMITATIONS SHALL BE DETAILED IN THE NDE REPORT.
8. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
9. ALL ARC WELDING ON CROWN STRUCTURES SHALL BE DONE IN ACCORDANCE WITH THE CROWN ENG-PLN-10015, "CUTTING AND WELDING SAFETY PLAN" AND AWS D1.1 (LATEST EDITION). THIS SHALL INCLUDE A CERTIFIED WELDING INSPECTOR (CWI) FOR ACCEPTANCE OR REJECTION OF ALL WELDING OPERATIONS, PRE-DURING-POST, USING THE ACCEPTANCE CRITERIA OF AWS D1.1. THE CWI SHALL WORK WITH THE GC ON THE LEVEL OF INTERACTION NEEDED TO CONDUCT THE WELDING INSPECTION. THE CERTIFIED WELDING INSPECTION IS THE RESPONSIBILITY OF THE GC.
10. FOR ALL WELDING, USE E70XX ELECTRODES FOR SMAW PROCESS AND E7XT-XX ELECTRODES FOR FCAW PROCESS, UNO.
11. SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING. GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING.
12. DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0° F. WHEN THE TEMPERATURE IS BETWEEN 0° F AND 32° F, PREHEAT AND MAINTAIN THE STEEL IN THE VICINITY OF THE WELD AREA AT 70° F DURING THE WELDING PROCESS.
13. DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.
14. WELDING CERTIFICATES MUST BE PROVIDED TO CWI AND GPD GROUP PRIOR TO WELDING CONTRACTOR BEGINNING WORK ON SITE. CERTIFICATE WILL BE ASKED FOR AS PART OF INSPECTION PROCESS. ALL WELDING SHOULD BE PERFORMED BY AN AWS QUALIFIED WELDER WHO HAS EXPERIENCE WITH GALVANIZED SURFACES AND IN ACCORDANCE WITH ANSI/AWS D1.1 AND ANSI Z 49.1 OR LATEST EDITIONS.
15. OXY FUEL GAS WELDING OR BRAZING IS STRICTLY PROHIBITED. SPECIFICALLY, NO TORCH CUTTING IS PERMITTED ON SITE. ALL HOLES SHALL BE CUT WITH A GRINDER.
16. INSTALL 3000° (NFPA 701) FIRE BLANKET AROUND ALL COAX.
17. MORE SPLATTER AND SPARKS SHALL BE ANTICIPATED GIVEN THE PREVIOUSLY GALV. SURFACE.
18. COAX IS FLAMMABLE AND CAN CATCH FIRE IF PROPER PRECAUTIONS ARE NOT MADE TO SHIELD COAX FROM ALL WELDING PROCEDURES. ALL COAX SHALL BE SHIELDED AT AND BELOW EACH WELDING PROCEDURE AND ELEVATION. IN ADDITION, COAX SHALL BE PUSHED AWAY FROM TOWER FACE WHERE WELDING IS BEING PERFORMED.
19. FUMES CREATED FROM WELDING ON A PREVIOUSLY GALV. SURFACE CAN BE HAZARDOUS.
20. PRIOR TO WELDING, ALL SURFACES SHALL BE PROPERLY GROUND TO REMOVE GALVANIZING.
21. ALL FIELD WELDS SHALL BE TOUCHED UP WITH A GALVANIZING PAINT REPAIR (ZRC OR APPROVED EQUIVALENT).
22. WATER SHALL BE ON SITE, OF ADEQUATE AMOUNT, AND AVAILABLE AT SHORT NOTICE AT ALL TIMES DURING WELDING ACTIVITY. A MINIMUM OF 500 GAL. OF WATER SHALL BE PROVIDED. WATER SHALL BE CAPABLE OF REACHING HEIGHT WHERE WELDING IS BEING PERFORMED. IN ADDITION, A MINIMUM OF SIX (6) 10 LB. CLASS ABC MULTIPURPOSE FIRE EXTINGUISHERS FULLY CHARGED AND CAPABLE OF DISCHARGE WITHIN 30 SECONDS OF DETECTING A FIRE SHALL BE PROVIDED. FIRE EXTINGUISHERS SHALL BE STRATEGICALLY LOCATED AROUND COMPOUND AND IN THE AIR (I.E. ON THE MAN LIFT WHERE WELDING IS BEING PERFORMED).

STRUCTURAL STEEL NOTES

1. DESIGN, FABRICATION, ERECTION, ALTERATION AND MAINTENANCE SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE (UNO).
   A. TIA-222-G: STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   B. TIA-1019-A: INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   C. AISC: MANUAL OF STEEL CONSTRUCTION
2. ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS, UNO.
   A. PLATE, ASTM A572 GRADE 50
   B. U-BOLTS, ASTM A307
   C. ALL BOLTS, ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS
   D. ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS
   E. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS
   F. LOCKING DEVICES, SPLIT WASHER/PAL NUT
3. HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER OF RECORD.
4. ALL FASTENERS SHALL NOT BE REUSED.
5. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED ASTM A325 BOLTS. ALL BOLTS, INCLUDING U-BOLTS, SHALL BE TIGHTENED IN ACCORDANCE WITH AISC "SNUG TIGHT" REQUIREMENTS, U.N.O.
6. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
7. HOT-DIP GALVANIZE ALL ITEMS, UNO.
   GALVANIZE PER ASTM A123, ASTM A153/A153M OR ASTM A653 G90, AS APPLICABLE.
8. FOR A LIST OF CROWN APPROVED COLD GALVANIZING COMPOUNDS, REFER TO CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN".
9. AFTER FINAL INSPECTION, ALL EXPOSED STRUCTURAL STEEL AS THE RESULT OF THIS SCOPE OF WORK INCLUDING WELDS, FIELD DRILLED HOLES, AND SHAFT INTERIORS (WHERE ACCESSIBLE), SHALL BE CLEANED AND COLD GALVANIZING APPLIED BY BRUSH IN ACCORDANCE WITH CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN". PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR
10. ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING PAINTED STEEL. FOR A LIST OF CROWN APPROVED PAINT COATINGS, REFER TO CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN".

NO.	DATE	DESCRIPTION	BY

REVISIONS

STATE OF CONNECTICUT
CHRISTOPHER J. SCHEKS
No. 30026
LICENSED
PROFESSIONAL ENGINEER

11/22/16

GPD Engineering and Architecture Professional Corporation
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 330.572.2101

GPD PROJECT NUMBER
2016777.841288.06

SITE NAME: BRIDGEPORT NORTH

BU NUMBER: 841288

WO NUMBER: 1318658

SITE ADDRESS:
2 KAECHELE PLACE
BRIDGEPORT, CT 06606
FAIRFIELD COUNTY, USA

ENG/QA BY: BK	DATE: 11/22/16
DFT BY: SES	DATE: 11/22/16
DFT/QA BY: CB	DATE: 11/22/16
APRV'D BY: CJS	DATE: 11/22/16

SCALE: N.T.S.

NOTES

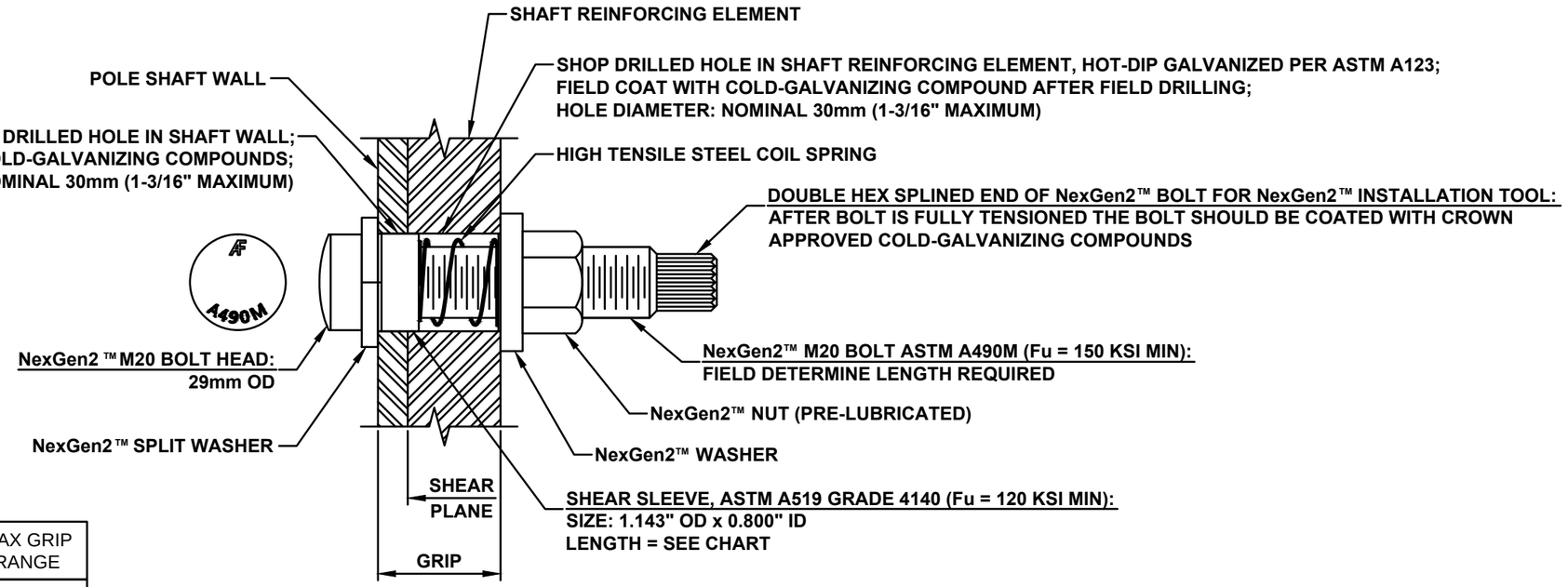
S-3

REV 0

INTERIOR OF POLE SHAFT | EXTERIOR OF POLE SHAFT

NEXGEN2 BLIND BOLT ASSEMBLY

- PATENT PENDING -



PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
M20x36	M20x95	11/16"	15/16"	1-7/16"
M20x48	M20x95	1-3/16"	1-7/16"	1-7/8"
M20x57	M20x95	1-5/8"	1-7/8"	2-1/4"
M20x68	M20x135	2"	2-1/4"	2-11/16"
M20x96	M20x135	2-7/16"	2-11/16"	3-3/4"
M20x127	M20x165	3"	3-3/4"	5"
M20x212	M20x250	4"	5"	8-5/16"

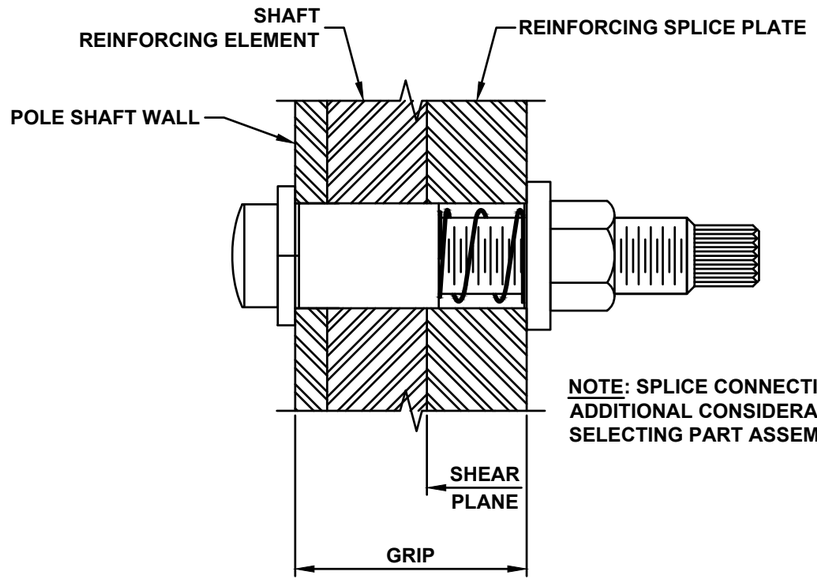
MANUFACTURER:
ALLFASTENERS
15401 COMMERCE PARK DRIVE, BROOKPARK, OHIO, USA 44142
PHONE: 440-232-6060
WEBSITE: WWW.ALLFASTENERS.COM

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

NOTE: NexGen2™ COMPLETE ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AS APPROPRIATE.

NOTE: INSTALL PER MANUFACTURER'S INSTRUCTIONS.

TYPICAL NG2™ BOLT DETAIL



NOTE: SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

NO.	DATE	DESCRIPTION	BY

REVISIONS

STATE OF CONNECTICUT · CHRISTOPHER J. SCHEKS · No. 30026 · REGISTERED PROFESSIONAL ENGINEER

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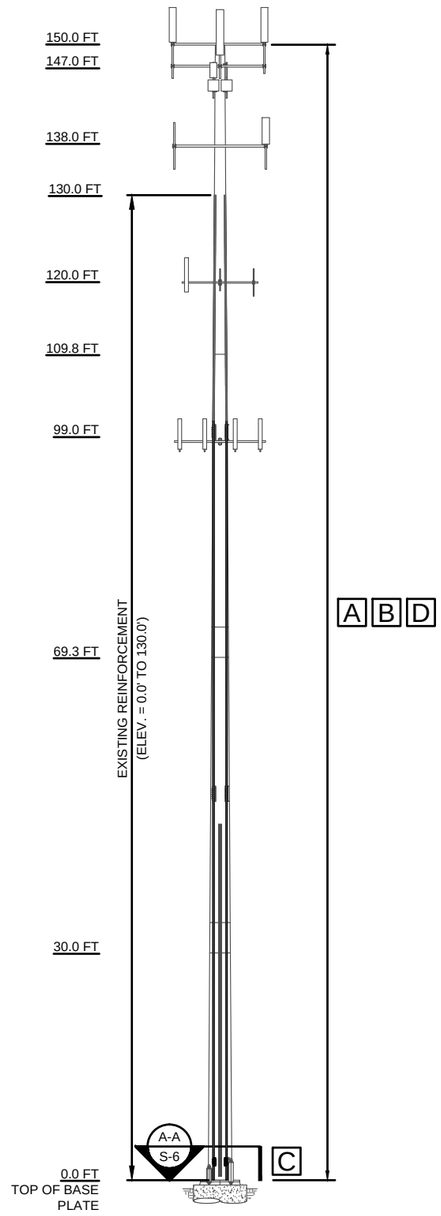
NexGen2™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

S-4

REV 0



POLE ELEVATION

MANUFACTURER POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED MONOPLE
TAPER:	0.14157
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A572 GRADE 50
ANCHOR RODS:	2-1/4"Ø #18J ASTM A615 GR 75

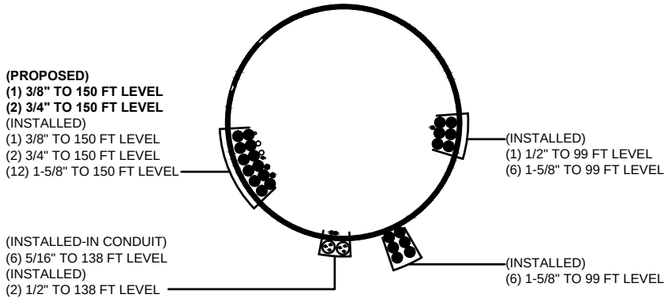
POLE MODIFICATION SCHEDULE

	ELEVATION (FT)	MODIFICATION	REFERENCE SHEET
A	0.0 - 150.0	**INSTALL NEW BOLT-ON STEP PEGS AS REQUIRED**	S-7
B	0.0 - 150.0	**INSTALL NEW SAFETY CLIMB PROVIDED BY TUF-TUG**	S-6
C	2.44	**INSTALL NEW INTERMEDIATE CONNECTION BRACKETS TO THE EXISTING DYWIDAG RODS**	S-6
D	0.0 - 150.0	**PAINT NEW & EXISTING STEEL TO MATCH EXISTING TOWER CONDITIONS**	-

MANUFACTURER SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	POLE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	40.25	0.21875	36.00 48.00	15.0000	21.0000
2	40.50	0.25000		21.0000	27.0400
3	42.25	0.31250		26.0926	32.8900
4	34.00	0.40625		31.6215	37.3600

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES



COAX LAYOUT

NO.	DATE	DESCRIPTION	BY

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CHRISTOPHER J. SCHEKSNAYDER
No. 30026
LICENSED
PROFESSIONAL ENGINEER

11/22/16

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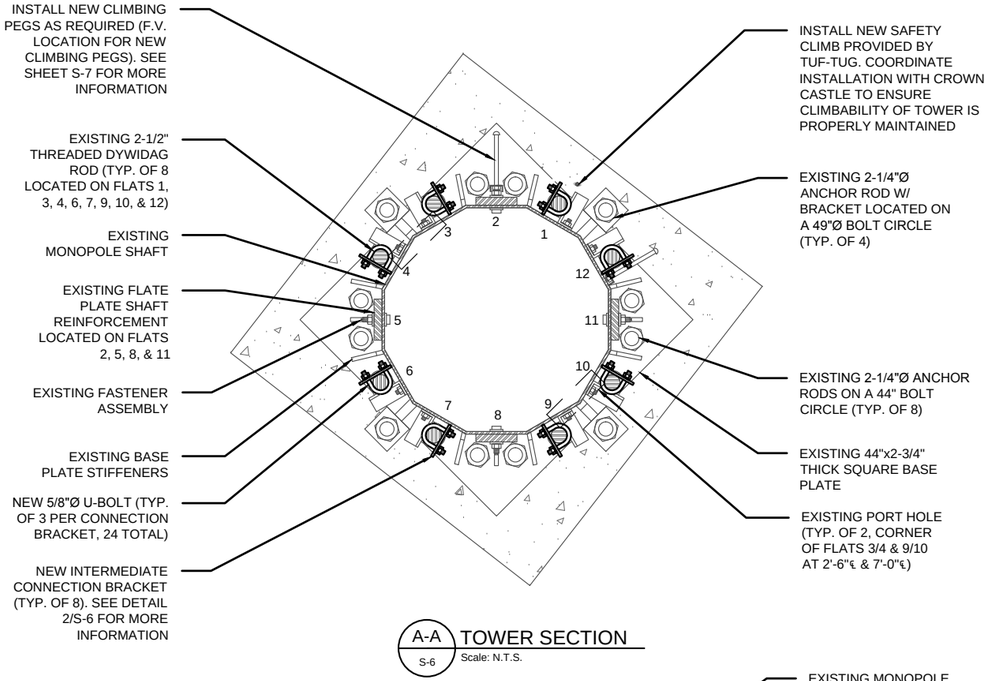
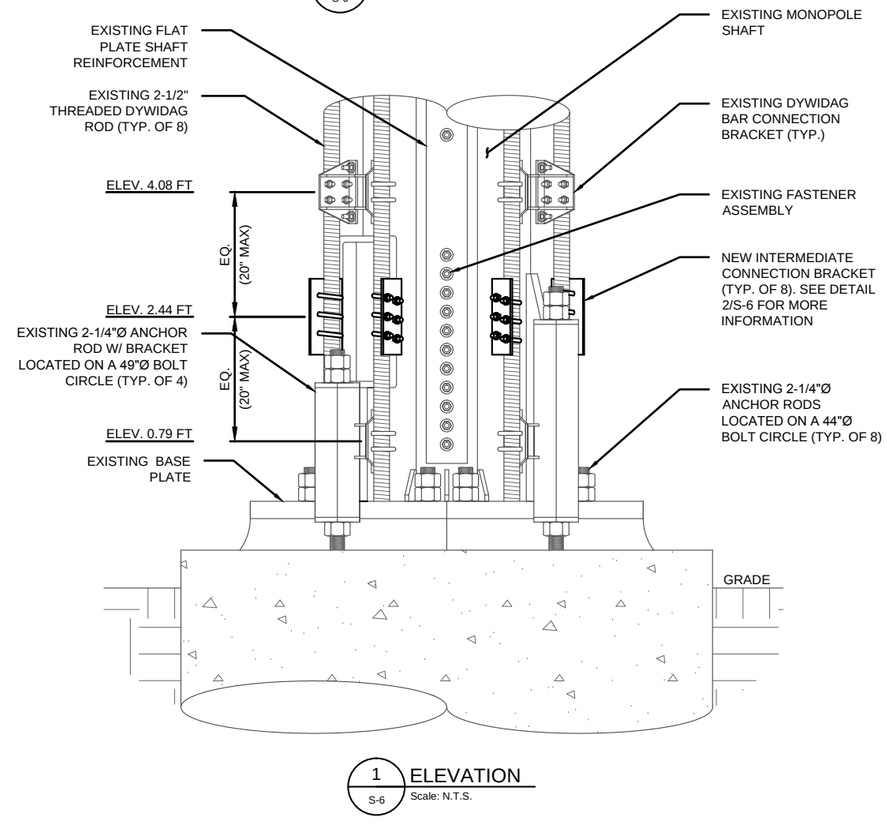
TOWER ELEVATION

S-5

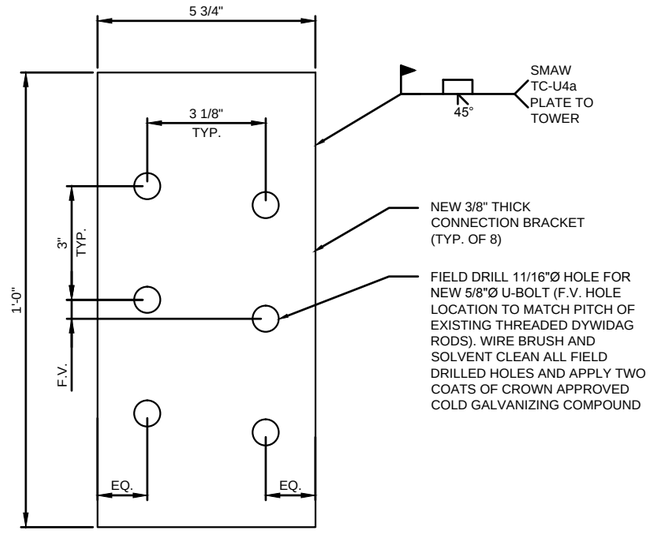
REV 0



A-A / S-6 TOWER SECTION
Scale: N.T.S.



1 / S-6 ELEVATION
Scale: N.T.S.



2 / S-6 CONNECTION BRACKET
Scale: N.T.S.

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STATE OF CONNECTICUT
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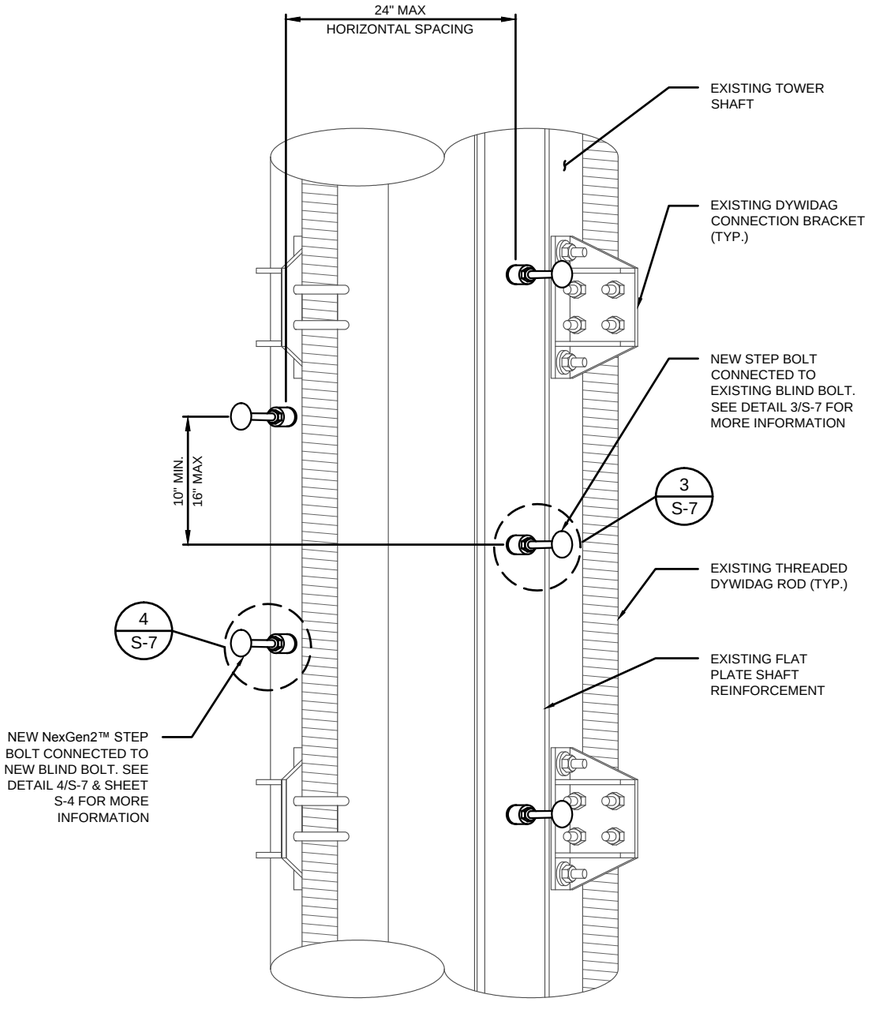
LICENSED PROFESSIONAL ENGINEER

11/22/16

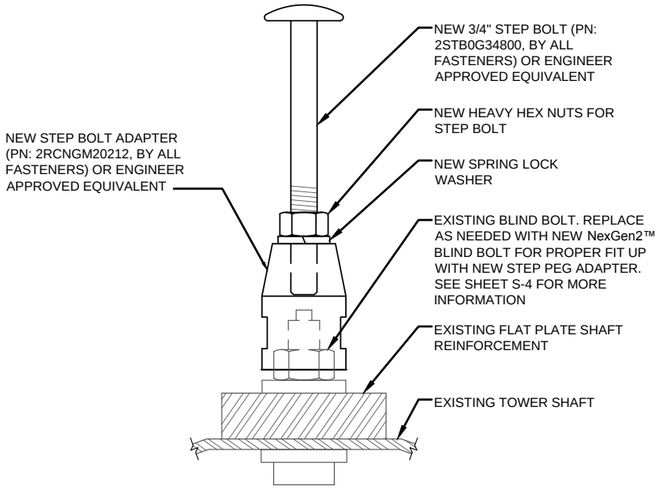
TOWER SECTIONS

S-6

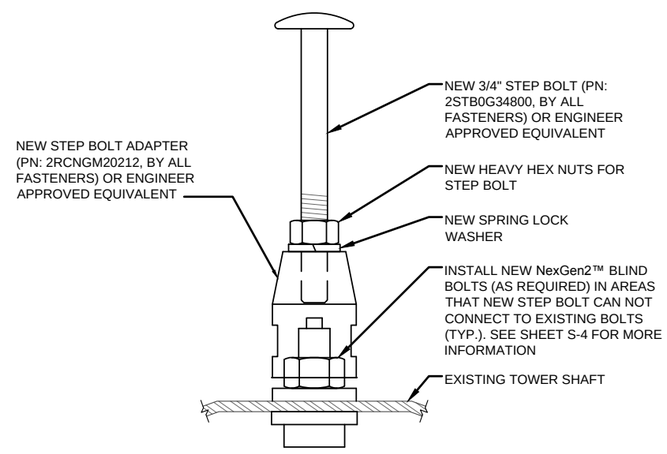
REV 0



NOTE:
1. ELEVATION IS FOR DETAIL REFERENCE ONLY AND NOT ACCURATE REPRESENTATION OF REQUIRED STEP BOLT LAYOUT (F.V. REQUIRED LOCATION OF NEW STEP BOLTS)



3 / S-7 STEP PEG DETAIL
Scale: N.T.S.



4 / S-7 STEP PEG DETAIL
Scale: N.T.S.

STEP PEG CONNECTION NOTES

1. THREAD AND SHANK DIMENSIONS AND TOLERANCES TO BE IN ACCORDANCE WITH ANSI B.18.2.1 FOR HEAVY HEX STRUCTURAL BOLTS. OVERSIZE SHANKS (UP TO 0.700") MAY BE USED ON 0.625" DIA. BOLTS.
2. USES ONE HEAVY HEX NUT IN ACCORDANCE WITH ANSI B.18.2.2 AND REGULAR SPRING LOCK WASHER PER ANSI B27.1
3. BOLT MATERIAL (EXCEPT NUTS & LW) SHALL CONFORM TO MATERIAL SPECIFICATIONS CONTAINED IN ASTM A325, TYPE 1 OR 2.
4. CONTRACTOR SHALL TAKE GREAT CARE NOT TO DAMAGE EXISTING STEEL DURING REMOVAL OF STEP PEGS CLIPS.
5. ALL EXISTING AREAS DAMAGED DURING THE REMOVAL STEP PEGS INCLUDING WELDS SHALL WILL BE WIRE BRUSHED CLEAN, REPAIRED BY COLD GALVANIZING BRUSH APPLIED PAINT (ZRC OR EQUAL), AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).
6. ABSOLUTELY NO TORCH CUTTING, OR OPEN FLAME OF ANY TYPE IS PERMITTED ON THIS STRUCTURE. SEE WELD NOTES ON SHEET S-4 FOR MORE INFORMATION.

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SCALE: N.T.S.

STEP BOLT STANDARD

S-7 REV 0

EBI Consulting
environmental | engineering | due diligence

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

AT&T Existing Facility

Site ID: CT2106

Bridgeport North
2 Kaechele Place
Bridgeport, CT 06606

December 11, 2016

EBI Project Number: 6216005746

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	9.24 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

December 11, 2016

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

Emissions Analysis for Site: **CT2106 – Bridgeport North**

EBI Consulting was directed to analyze the proposed AT&T facility located at **2 Kaechele Place, Bridgeport, 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 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (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 **2 Kaechele Place, Bridgeport, 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) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (2300 MHz (WCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) 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.

8) For the following calculations the sample point was the top of a 6-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.

9) The antennas used in this modeling are the **Powerwave 7770, Quintel QS66512-2 and the Powerwave P65-16-XLH-RR** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. 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.

10) The antenna mounting height centerlines of the proposed antennas are **154 feet** above ground level (AGL) for **Sector A**, **154 feet** above ground level (AGL) for **Sector B** and **154 feet** above ground level (AGL) for Sector C.

11) 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.

AT&T Site Inventory and Power Data by Antenna

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 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**154 feet**	Height (AGL):	**154 feet**	Height (AGL):	**154 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**0.46 %**	Antenna B1 MPE%	**0.46 %**	Antenna C1 MPE%	**0.46 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2
Gain:	11.35 / 14.85 / 13.85 dBd	Gain:	11.35 / 14.85 / 13.85 dBd	Gain:	11.35 / 14.85 / 13.85 dBd
Height (AGL):	**154 feet**	Height (AGL):	**154 feet**	Height (AGL):	**154 feet**
Frequency Bands	850 MHz / 2300 MHz (WCS) / 1900 MHz (PCS)	Frequency Bands	850 MHz / 2300 MHz (WCS) / 1900 MHz (PCS)	Frequency Bands	850 MHz / 2300 MHz (WCS) / 1900 MHz (PCS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	300 Watts	Total TX Power(W):	300 Watts	Total TX Power(W):	300 Watts
ERP (W):	7,396.59	ERP (W):	7,396.59	ERP (W):	7,396.59
Antenna A2 MPE%	**1.32 %**	Antenna B2 MPE%	**1.32 %**	Antenna C2 MPE%	**1.32 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave P65-16-XLH-RR	Make / Model:	Powerwave P65-16-XLH-RR	Make / Model:	Powerwave P65-16-XLH-RR
Gain:	12.7 dBd	Gain:	12.7 dBd	Gain:	12.7 dBd
Height (AGL):	**154 feet**	Height (AGL):	**154 feet**	Height (AGL):	**154 feet**
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,234.50	ERP (W):	2,234.50	ERP (W):	2,234.50
Antenna A3 MPE%	**0.79 %**	Antenna B3 MPE%	**0.79 %**	Antenna C3 MPE%	**0.79 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**2.56 %**
Verizon	4.80 %
Clearwire	0.17 %
MetroPCS	1.71 %
Site Total MPE %:	**9.24 %**

AT&T Sector A Total:	2.56 %
AT&T Sector B Total:	2.56 %
AT&T Sector C Total:	2.56 %
Site Total:	9.24 %

AT&T _ Frequency Band / Technology 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	2	414.12	154	1.36	850 MHz	567	0.24%
AT&T 1900 MHz (PCS) UMTS	2	656.33	154	2.15	1900 MHz (PCS)	1000	0.22%
AT&T 850 MHz GSM	2	409.37	154	1.34	850 MHz	567	0.24%
AT&T 2300 MHz (WCS) LTE	2	1,832.95	154	6.02	2300 MHz (WCS)	1000	0.60%
AT&T 1900 MHz (PCS) LTE	2	1,455.97	154	4.78	1900 MHz (PCS)	1000	0.48%
AT&T 700 MHz LTE	2	1,117.25	154	3.67	700 MHz	467	0.79%
						Total:*	2.56%

*NOTE: Totals may vary by 0.01% due to summing of remainders

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 A:	2.56 %
Sector B:	2.56 %
Sector C:	2.56 %
AT&T Maximum Total (per sector):	2.56 %
Site Total:	9.24 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **9.24 %** 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.