STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

March 21, 2011

Douglas L. Culp, Real Estate Consultant
New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067-3900

RE: **EM-CING-027-110225** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 48 Cow Hill Road, Clinton, Connecticut.

Dear Mr. Culp:

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

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated February 24, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable William W. Fritz, Jr., First Selectman, Town of Clinton
Thomas Lane, Zoning Enforcement Officer, Town of Clinton
Crown Castle USA, Inc.

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

March 7, 2011

The Honorable William W. Fritz, Jr.
First Selectman
Town of Clinton
54 East Main Street
Clinton, CT 06413

RE: **EM-CING-027-110225** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 48 Cow Hill Road, Clinton, Connecticut.

Dear First Selectman Fritz:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by March 21, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Thomas Lane, Zoning Enforcement Officer, Town of Clinton

EM-CING-027-110225

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant

ORIGINAL

HAND DELIVERED

February 24, 2011

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

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing tele-communications facility located at 48 Cow Hill Road Clinton, CT (owner Crown Atlantic)

Dear Ms. Roberts:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

UMTS technology offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the Internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

LTE is a new high-performance air interface for cellular mobile communications. It is the last step toward the 4th generation (4G) of radio technologies, designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

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

1. The height of the overall structure will be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than some enlarged equipment pads as may be noted in the attachments.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. Radio frequency power density may increase due to use of one or more GSM channel for UMTS transmissions. Moreover, LTE will utilize additional radio frequencies newly-licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, New Cingular Wireless respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (860) 463-5511 with questions concerning this matter. Thank you for your consideration.

Sincerely,

Douglas L. Culp
Real Estate Consultant

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

48 Cow Hill Road Clinton, CT
Site Number 2024
Exempt Mod 03/02, 07/07 and 08/07

Tower Owner/Manager: Crown Atlantic

Equipment configuration: SSLT

Current and/or approved: Six PowerWave antennas @ 190 ft
Six PowerWave TMA's @ 190 ft
Twelve runs 1 5/8 inch coax to 190 ft
Equipment Shelter

Planned Modifications: Retain existing Antennas, TMA and Coax Cabling
Install three LTE KMW14-65 antennas or equivalent @ 190 ft
Install PowerWave Twin BP TMA's @ 190 ft
Install six remote radio heads and one surge arrestors @ 190 ft
Install one fiber and two DC power cables to @ 190 ft
Install one new cabinet and surge suppressor in existing equipment shelter

Power Density:

Worst-case calculations for existing wireless operations at the site, using standard parameters for other carriers, indicate a radio frequency electromagnetic radiation power density, measured at ground level beside the Tower, of approximately 33.2% of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 37.1 % of the standard.

Existing

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users							31.28
AT&T UMTS	190	800 Band	1	500	0.0050	1.0000	0.50
AT&T GSM	190	800Band	2	296	0.0059	1.0000	0.59
AT&T GSM	190	1900 Band	2	427	0.0085	1.0000	0.85
Total							**33.2%**

* Data for other users are from Siting Council records.

Proposed

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users							31.28
AT&T UMTS	190	800 Band	1	500	0.0050	1.0000	0.50
AT&T GSM	190	1900 Band	3	427	0.0128	1.0000	1.28
AT&T GSM	190	880 - 894	6	296	0.0177	0.5867	3.02
AT&T LTE	190	740 - 746	1	500	0.0050	0.4933	1.01
Total							**37.1%**

* Data for other users are from Siting Council records.

Structural information:

The attached structural analysis demonstrates that the monopole and foundation have adequate structural capacity to accommodate the proposed modifications. (Paul J. Ford and Company dated 1-28-11)

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE ADDRESS:	49 COW HILL RD. CLINTON, CT 06413
LATITUDE:	41.288936 N 41° 17' 20.17" N
LONGITUDE:	-72.538471 W -72° 32' 18.5" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
NOC#	866-915-5600

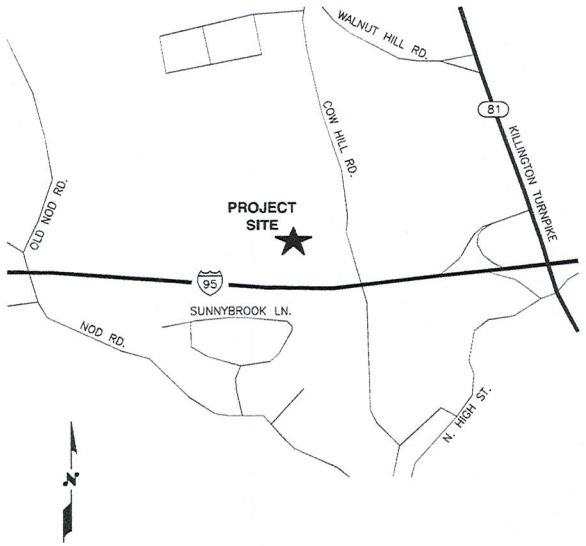
SITE NUMBER: CT2024
SITE NAME: CLINTON

DRAWING INDEX

		REV
T-1	TITLE SHEET	1
GN-1	GENERAL NOTES	1
A-1	COMPOUND & EQUIPMENT PLANS	1
A-2	ANTENNA LAYOUT AND ELEVATION	1
A-3	DETAILS	1
G-1	PLUMBING DIAGRAM & DETAILS	1

VICINITY MAP

FROM ROCKY HILL, CT: MERGE ONTO I-91 S VIA THE RAMP ON THE LEFT TOWARD NEW HAVEN. 3.8 MILES. MERGE ONTO CT-9 S VIA EXIT 22S ON THE LEFT TOWARD MIDDLETOWN / OLD SAYBROOK. 13.9 MILES. TAKE THE CT-81 EXIT- EXIT 9- TOWARD KILLINGWORTH / CLINTON. 0.2 MILES. TURN RIGHT ONTO KILLINGWORTH RD / CT-81. CONTINUE TO FOLLOW CT-81. PASS THROUGH 1 ROUNDABOUT. 12.5 MILES. TURN RIGHT ONTO WOODLAND DR. 0.3 MILES. TURN LEFT ONTO COW HILL RD. 0.6 MILES. END AT 49 COW HILL RD. CLINTON, CT 06413.



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.

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.

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.

CALL

BEFORE YOU DIG

CALL TOLL FREE 800-922-4455

UNDERGROUND SERVICE ALERT

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2024
SITE NAME: CLINTON
49 COW HILL RD.
CLINTON, CT 06413
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	01/13/11	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN DESIGNED BY: DC DRAWN BY: JG

DANIEL P. HAMM No. 24175 LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2024.01	T-1	1

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.

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 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 SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR – SAI
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY

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. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. 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.

9. 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.

10. 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.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF 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.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. 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) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

17. 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.

18. 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 SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS 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 ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. APPLICABLE BUILDING CODES:
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.
BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT & 2009 CT AMENDMENTS
ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

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, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

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.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW	TBR	TO BE REMOVED
EXISTING	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF	REFERENCE	TYP	TYPICAL
EGR	EQUIPMENT GROUND RING	REQ	REQUIRED		

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20-NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2024
SITE NAME: CLINTON
49 COW HILL RD.
CLINTON, CT 06413
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

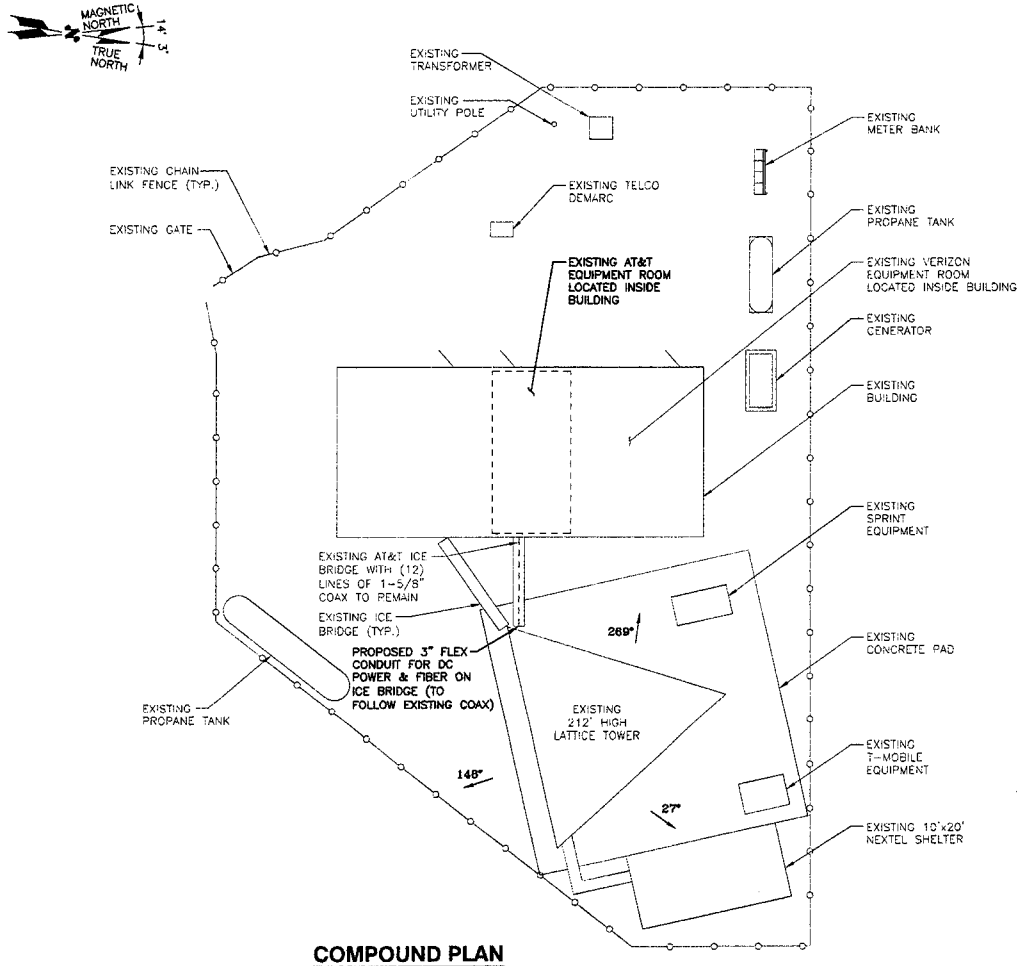
NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	01/13/11	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

GENERAL NOTES (LTE)

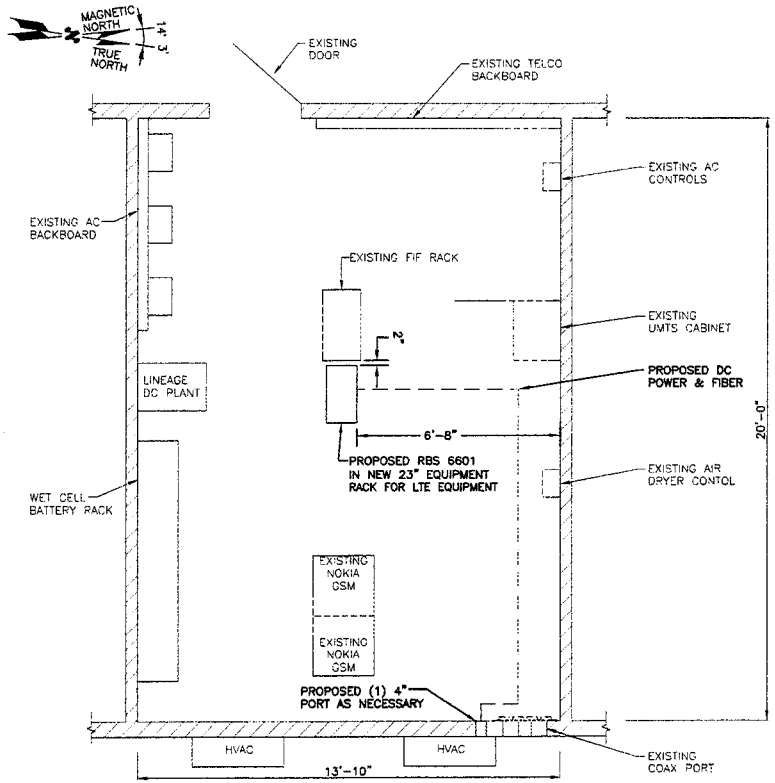
JOB NUMBER	DRAWING NUMBER	REV
2024.01	GN-1	1



COMPOUND PLAN

SCALE: 1/8"=1'-0"

0 4'-0" 8'-0" 16'-0" 24'-0"



EQUIPMENT PLAN

SCALE: 1/2"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5536

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2024
SITE NAME: CLINTON
49 COW HILL RD.
CLINTON, CT 06413
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	01/13/11	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

COMPOUND & EQUIPMENT PLAN (LTE)

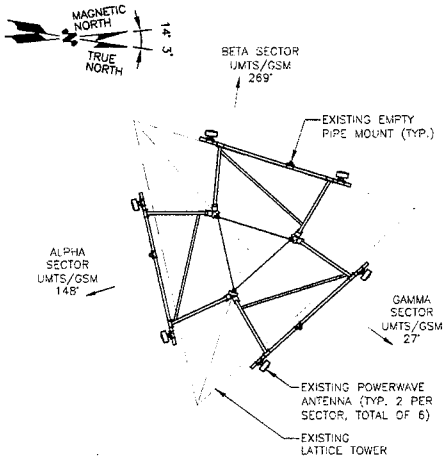
JOB NUMBER	DRAWING NUMBER	REV
2024.01	A-1	1

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

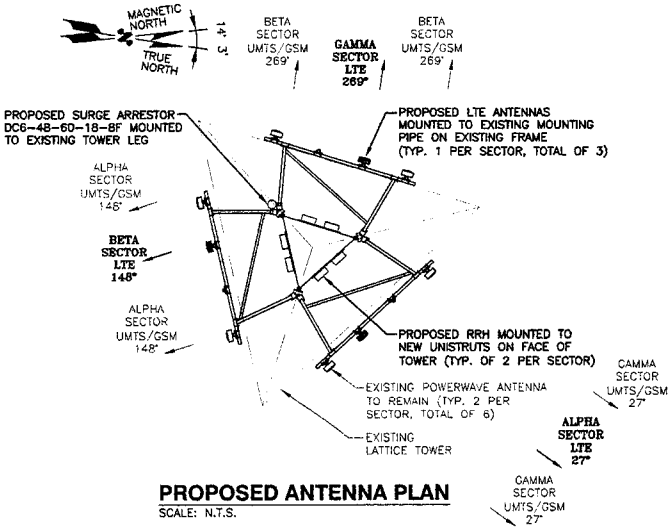
*NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA CONFIGURATION



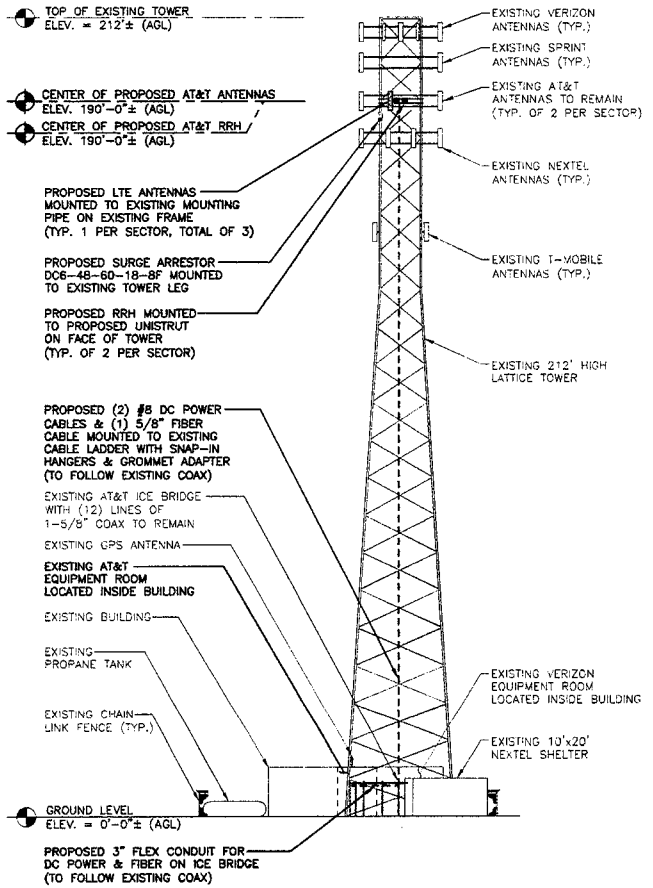
EXISTING ANTENNA PLAN

SCALE: N.T.S.



PROPOSED ANTENNA PLAN

SCALE: N.T.S.



PROPOSED EAST ELEVATION

SCALE: 1/16"=1'-0"

0 8'-0" 16'-0" 32'-0" 48'-0"

Hudson Design Group LLC
1600 OGDOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2024
SITE NAME: CLINTON
49 COW HILL RD.
CLINTON, CT 06413
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

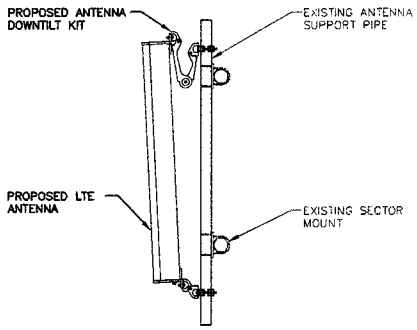
NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	01/13/11	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

ANTENNA LAYOUT AND ELEVATION (LTE)

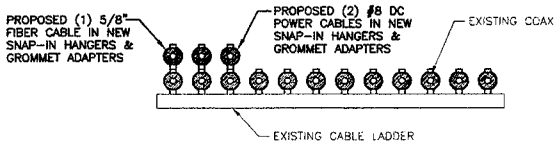
JOB NUMBER	DRAWING NUMBER	REV
2024.01	A-2	1



PROPOSED ANTENNA DETAIL

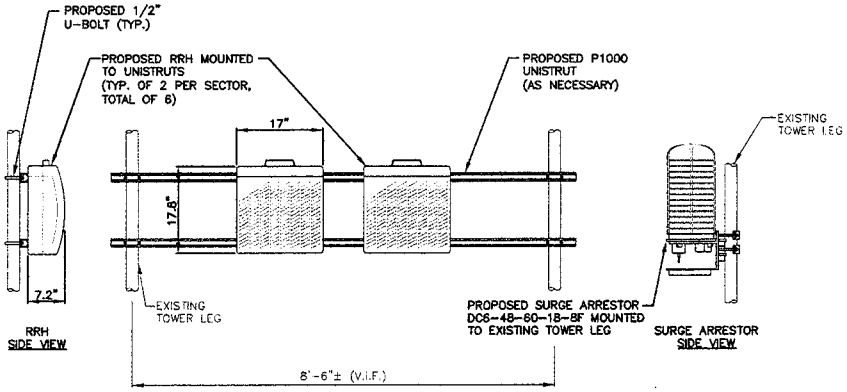
SCALE: 1" = 1'-0"

0 0'-6" 1'-0" 2'-0" 3'-0"



CABLE MOUNTING DETAIL

SCALE: N.T.S.



PROPOSED RRH & SURGE ARRESTOR MOUNTING DETAIL

SCALE: N.T.S.

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2024
SITE NAME: CLINTON
49 COW HILL RD.
CLINTON, CT 06413
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

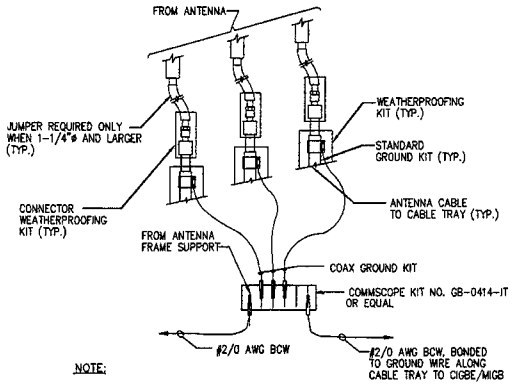
NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	01/13/11	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

DETAILS (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2024.01	A-3	1

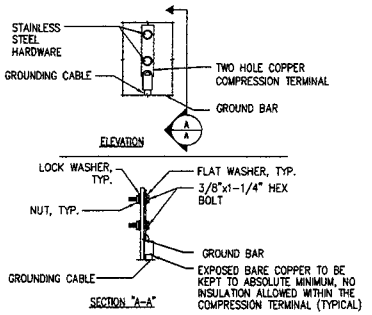


NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

1 — N.T.S.

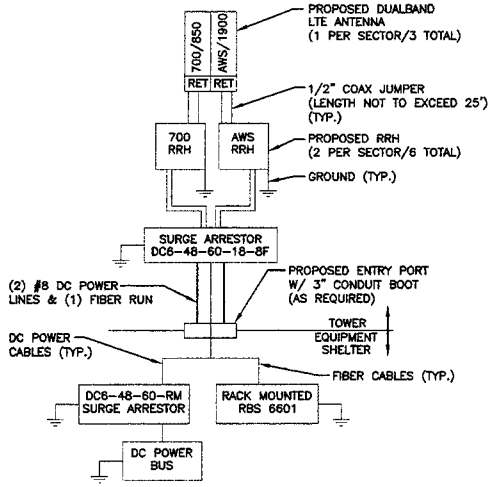


NOTE:

1. "DOUBLING UP" OR "STACKING " OF CONNECTION 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

2 — N.T.S.

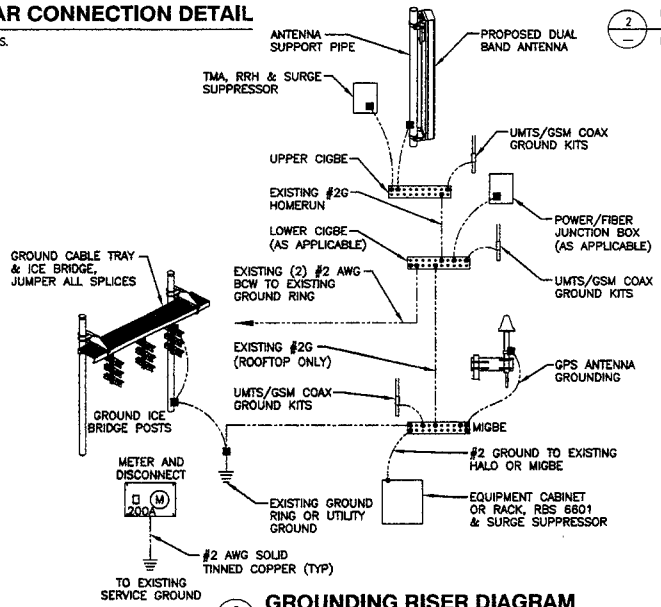


NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

PLUMBING DIAGRAM

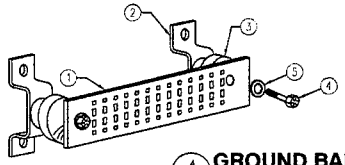
3 — N.T.S.



GROUNDING RISER DIAGRAM

5 — N.T.S.

WIRELESS SOLUTIONS INC.			
NO.	REQ.	PART NO.	DESCRIPTION
1	1	HLGB-0420-IS	SOLID GND. BAR (20"x4"x1/4")
2	2	———	WALL MTG. BRKT.
3	2	———	INSULATORS
4	4	———	5/8"-11x1" H.H.C.S.
5	4	———	5/8 LOCKWASHER



GROUND BAR - DETAIL

4 — N.T.S.

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)

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2024
SITE NAME: CLINTON
49 COW HILL RD.
CLINTON, CT 06413
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	01/13/11	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

PLUMBING DIAGRAM & DETAILS (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2024.01	G-1	1

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

Date: **January 28, 2011**

Veronica Harris
Crown Castle USA Inc.
1200 McArthur Blvd
Mahwah, NJ 07430
201-236-9094

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, OH 43215
614.221.6679
chedges@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	2024
	Carrier Site Name:	Clinton-Cow Hill Road
Crown Castle Designation:	**Crown Castle BU Number:**	806363
	Crown Castle Site Name:	HRT 105 943201
	Crown Castle JDE Job Number:	148577
	Crown Castle Work Order Number:	383908
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37511-0144
Site Data:	**48 COW HILL ROAD, CLINTON, Middlesex County, CT** **Latitude *41° 17' 20.2"*, Longitude *-72° 32' 18.5"*** **212.625 Foot - Self Support Tower**	

Dear Veronica Harris,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 402527, in accordance with application 115359, revision 4.

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:

LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Christina Hedges, E.I.T
Structural Engineer

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER
JAN 28 2011

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Antenna and Cable Information
Table 2 - Existing and Reserved Antenna and Cable Information

3) ANALYSIS PROCEDURE
Table 3 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 4 - Section Capacity (Summary)
Table 5 - Tower Component Stresses vs. Capacity
4.1) Recommendations

5) APPENDIX A
RISATower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 212.625 ft Self Support tower designed by ROHN in July of 1992. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
190	190	6	ericsson	RRUS-11	2 1	7/8* 1/4*	
		3	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			

*Installed inside (1) 3" conduit

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
208	209	3	swedcom	ALP 9212-N w/ Mount Pipe	15	1 5/8	1
		5	decibel	DB948F85T2E-M w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe			2
		1	decibel	DB948F85T2E-M w/ Mount Pipe			
	208	2	adc	ClearGain Dual Band 800/1900 MHz			
		12	bam mla	BAM MLA_ANTENNA w/ Mount Pipe	12	1 5/8	3
		1	tower mounts	Sector Mount [SM 510-3]			1
202	204	1	sinclair	SD310-HL	2 1	11/32 7/8	2
	202	2	radiowaves	HP2-4.7NS			
		2	tower mounts	Pipe Mount [PM 501-1]			
197	198	6	decibel	DB980H90E-M w/ Mount Pipe	6	1 5/8	1
	197	1	tower mounts	Sector Mount [SM 505-3]			
190	190	6	adc	DUAL BAND 800/1900 FULL BAND MASTHEAD	12	1 5/8	1
		6	powerwave tech	7770.00 w/ Mount Pipe			
		6	powerwave tech	LGP13519			
		1	tower mounts	Sector Mount [SM 602-3]			
182	182	3	kathrein	742 213	6	1 5/8	1
		1	tower mounts	Pipe Mount [PM 501-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
175	176	12	decibel	DB844H90E-XY w/ Mount Pipe	12	1 1/4	1
	175	1	tower mounts	Sector Mount [SM 510-3]			
165	173	1	rfs celwave	1151-3			2
	165	1	tower mounts	Side Arm Mount [SO 308-1]	1	7/8	1
145	149	1	bird tech group	OA20-67-DIN			2
	145	1	tower mounts	Side Arm Mount [SO 308-1]	1	7/8	1
137	137	3	ems wireless	RR90-17-02DP w/ Mount Pipe	6	1 1/4	1
		3	rfs celwave	ATMAA1412D-1A20	6	1 5/8	2
		3	rfs celwave	ATMPP1412D-1CWA			
		1	tower mounts	Side Arm Mount [SO 201-3]			1
133	133	1	andrew	PL6-59W	1	EW52	1
		1	tower mounts	Pipe Mount [PM 601-1]			
125	133	1	rfs celwave	1142-2C	1	7/8	1
	125	1	tower mounts	Side Arm Mount [SO 308-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) MLA Equipment does not control

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti Assoc., 7/6/92		262276
4-POST-MODIFICATION INSPECTION	Vertical Structures, 10/30/07	2007-004-163	2146143
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, 8/11/92	28529JC	262273
4-TOWER MANUFACTURER DRAWINGS	Rohn, 7/17/92	28529JC	262274
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Structures, 6/29/07	2007-004-075	2169576
4-TOWER STRUCTURAL ANALYSIS REPORTS	Crown, 9/21/10	358390	2723036

3.1) Analysis Method

RISATower (version 5.4.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	212.625 - 202.458	Leg	Pipe 2.875" x 0.203" (2.5 STD)	1	-2053	37412	8.6	Pass
T2	202.458 - 182.292	Leg	Pipe 3.5" x 0.300" (3 XS)	28	-23018	83436	27.6	Pass
T3	182.292 - 162.104	Leg	Pipe 4.5" x 0.337" (4 XS)	67	-62249	139661	44.6	Pass
T4	162.104 - 141.896	Leg	Pipe 5.5" x 0.375" (5 EH)	106	-99436	203696	48.8	Pass
T5	141.896 - 121.688	Leg	Pipe 6.625" x 0.340" (6 EHS)	145	-128278	212984	60.2	Pass
T6	121.688 - 101.479	Leg	Pipe 6.625" x 0.432" (6 XS)	172	-160943	265263	60.7	Pass
T7	101.479 - 81.2708	Leg	Pipe 6.625" x 0.432" (6 XS)	199	-190012	265235	71.6	Pass
T8	81.2708 - 61	Leg	Pipe 8.75" x 0.375" (8 EHS)	226	-218021	339206	64.3	Pass
T9	61 - 40.6667	Leg	Pipe 8.75" x 0.375" (8 EHS)	253	-246254	338973	72.6	Pass
T10	40.6667 - 20.3333	Leg	Pipe 8.75" x 0.500" (8 EH)	280	-260673	443805	58.7	Pass
T11	20.3333 - 0	Leg	Pipe 8.75" x 0.500" (8 EH)	313	-287759	443805	64.8	Pass
T1	212.625 - 202.458	Diagonal	Pipe 2.375" x 0.154" (2 STD)	14	-2862	21598	13.3	Pass
T2	202.458 - 182.292	Diagonal	Pipe 2.375" x 0.154" (2 STD)	39	-9730	15455	63.0	Pass
T3	182.292 - 162.104	Diagonal	Pipe 2.375" x 0.154" (2 STD)	77	-9693	13700	70.8	Pass
T4	162.104 - 141.896	Diagonal	Pipe 2.375" x 0.154" (2 STD)	111	-9628	11720	82.2	Pass
T5	141.896 - 121.688	Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	149	-12425	14738	84.3	Pass
T6	121.688 - 101.479	Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	176	-11341	12881	88.0	Pass
T7	101.479 - 81.2708	Diagonal	Pipe 3.5" x 0.216" (3 STD)	203	-10977	22060	49.8	Pass
T8	81.2708 - 61	Diagonal	Pipe 3.5" x 0.216" (3 STD)	230	-12044	19594	61.5	Pass
T9	61 - 40.6667	Diagonal	Pipe 3.5" x 0.216" (3 STD)	257	-12486	17160	72.8	Pass
T10	40.6667 - 20.3333	Diagonal	Pipe 3.5" x 0.216" (3 STD)	284	-18360	28340	64.8	Pass
T11	20.3333 - 0	Diagonal	Pipe 3.5" x 0.216" (3 STD)	317	-17828	26700	66.8	Pass
T1	212.625 - 202.458	Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	13	-2052	20302	10.1	Pass
T2	202.458 - 182.292	Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	37	-5213	20252	25.7	Pass
T3	182.292 -	Horizontal	Pipe 1.9" x 0.145" (1.5	76	-6082	17348	35.1	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
	162.104		STD)					
T4	162.104 - 141.896	Horizontal	Pipe 2.375" x 0.154" (2 STD)	109	-6654	24621	27.0	Pass
T5	141.896 - 121.688	Horizontal	Pipe 2.375" x 0.154" (2 STD)	148	-7513	20379	36.9	Pass
T6	121.688 - 101.479	Horizontal	Pipe 2.375" x 0.154" (2 STD)	175	-7471	14811	50.4	Pass
T7	101.479 - 81.2708	Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	202	-7700	25160	30.6	Pass
T8	81.2708 - 61	Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	229	-8826	19693	44.8	Pass
T9	61 - 40.6667	Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	256	-9462	15682	60.3	Pass
T10	40.6667 - 20.3333	Horizontal	Pipe 3.5" x 0.216" (3 STD)	283	-10122	27796	36.4	Pass
T11	20.3333 - 0	Horizontal	Pipe 3.5" x 0.216" (3 STD)	316	-10595	22886	46.3	Pass
T1	212.625 - 202.458	Top Girt	Pipe 1.9" x 0.145" (1.5 STD)	6	-128	20345	0.6	Pass
T10	40.6667 - 20.3333	Redund Horz 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	304	-4524	11680	38.7	Pass
T11	20.3333 - 0	Redund Horz 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	337	-4994	9928	50.3	Pass
T10	40.6667 - 20.3333	Redund Diag 1 Bracing	Pipe 2.375" x 0.154" (2 STD)	305	-4116	7973	51.6	Pass
T11	20.3333 - 0	Redund Diag 1 Bracing	Pipe 2.375" x 0.154" (2 STD)	319	-4250	7442	57.1	Pass
T10	40.6667 - 20.3333	Redund Hip 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	308	-50	10674	0.5	Pass
T11	20.3333 - 0	Redund Hip 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	341	-47	8915	0.5	Pass
T10	40.6667 - 20.3333	Redund Hip Diagonal Bracing	Pipe 2.875" x 0.203" (2.5 STD)	307	-57	6996	0.8	Pass
T11	20.3333 - 0	Redund Hip Diagonal Bracing	Pipe 2.875" x 0.203" (2.5 STD)	340	-57	6286	0.9	Pass
T1	212.625 - 202.458	Inner Bracing	L 2 x 2 x 1/8	16	-3	5830	0.3	Pass
T2	202.458 - 182.292	Inner Bracing	L 2 x 2 x 1/8	40	-7	5727	0.3	Pass
T3	182.292 - 162.104	Inner Bracing	L 2 x 2 x 1/8	79	-6	4209	0.3	Pass
T4	162.104 - 141.896	Inner Bracing	L 2 x 2 x 1/8	118	-7	2886	0.4	Pass
T5	141.896 - 121.688	Inner Bracing	L 2 x 2 x 1/8	158	-8	2178	0.4	Pass
T6	121.688 - 101.479	Inner Bracing	L 2.5 x 2.5 x 3/16	185	-6	3443	0.5	Pass
T7	101.479 - 81.2708	Inner Bracing	L 3 x 3 x 3/16	213	-9	4507	0.5	Pass
T8	81.2708 - 61	Inner Bracing	L 3.5 x 3.5 x 1/4	238	-10	7336	0.5	Pass
T9	61 - 40.6667	Inner Bracing	L 3.5 x 3.5 x 1/4	265	-10	5885	0.6	Pass
T10	40.6667 - 20.3333	Inner Bracing	Pipe 3.5" x 0.216" (3 STD)	310	-12	19664	0.5	Pass
T11	20.3333 - 0	Inner Bracing	Pipe 3.5" x 0.216" (3 STD)	343	-13	16278	0.5	Pass
							Summary	
						Leg (T9)	72.6	Pass
						Diagonal (T6)	88.0	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
						Horizontal (T9)	60.3	Pass
						Top Girt (T1)	0.6	Pass
						Redund Horz 1 Bracing (T11)	50.3	Pass
						Redund Diag 1 Bracing (T11)	57.1	Pass
						Redund Hip 1 Bracing (T11)	0.5	Pass
						Redund Hip Diagonal Bracing (T11)	0.9	Pass
						Inner Bracing (T9)	0.6	Pass
						Bolt Checks	59.3	Pass
						Rating =	88.0	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
	Anchor Rods		55.6	Pass
	Base Foundation		70.2	Pass
	Base Foundation Soil Interaction		55.1	Pass

Structure Rating (max from all components) =	88%

APPENDIX A

RISA TOWER OUTPUT

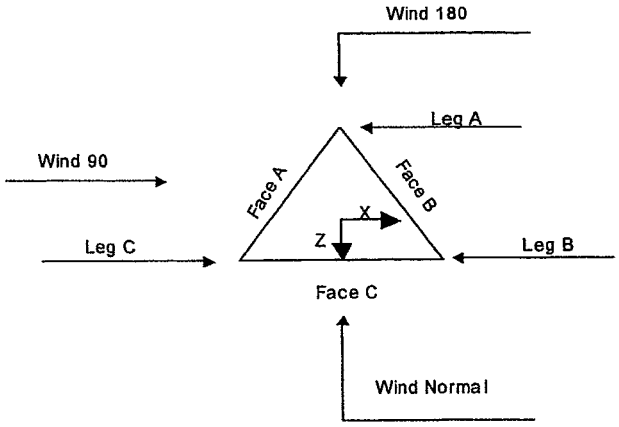
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 212.63 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.50 ft at the top and 30.18 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

4) Tower is located in Middlesex County, Connecticut.
5) Basic wind speed of 85.00 mph.
6) Nominal ice thickness of 0.750 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56 pcf.
9) A wind speed of 37.60 mph is used in combination with ice.
10) Deflections calculated using a wind speed of 50.00 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in tower member design is 1.333.
14) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	212.63-202.46		B056	8.50	1	10.17
T2	202.46-182.29		B087	8.54	1	20.17
T3	182.29-162.10		C034	8.63	1	20.19
T4	162.10-141.90		D054	10.71	1	20.21
T5	141.90-121.69		E066	12.79	1	20.21
T6	121.69-101.48		F020	15.04	1	20.21
T7	101.48-81.27		G023	17.54	1	20.21
T8	81.27-61.00		H029	20.18	1	20.27
T9	61.00-40.67		J035	22.68	1	20.33
T10	40.67-20.33		K004	25.18	1	20.33
T11	20.33-0.00		L075	27.68	1	20.33

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	212.63-202.46	5.08	K Brace Down	No	Yes	0.000	0.000
T2	202.46-182.29	6.72	K Brace Down	No	Yes	0.000	0.000
T3	182.29-162.10	6.59	K Brace Down	No	Yes	5.000	0.000
T4	162.10-141.90	6.60	K Brace Down	No	Yes	5.000	0.000
T5	141.90-121.69	9.90	K Brace Down	No	Yes	5.000	0.000
T6	121.69-101.48	9.90	K Brace Down	No	Yes	5.000	0.000
T7	101.48-81.27	9.90	K Brace Down	No	Yes	5.000	0.000
T8	81.27-61.00	9.93	K Brace Down	No	Yes	5.000	0.000
T9	61.00-40.67	9.96	K Brace Down	No	Yes	5.000	0.000
T10	40.67-20.33	19.92	K1 Down	No	Yes	5.000	0.000
T11	20.33-0.00	19.92	K1 Down	No	Yes	5.000	0.000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 212.63-202.46	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T2 202.46-182.29	Pipe	Pipe 3.5" x 0.300" (3 XS)	A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T3 182.29-162.10	Pipe	Pipe 4.5" x 0.337" (4 XS)	A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T4 162.10-141.90	Pipe	Pipe 5.5" x 0.375" (5 EH)	A513-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T5 141.90-121.69	Pipe	Pipe 6.625" x 0.340" (6 EHS)	A513-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T6 121.69-101.48	Pipe	Pipe 6.625" x 0.432" (6 XS)	A513-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T7 101.48-81.27	Pipe	Pipe 6.625" x 0.432" (6 XS)	A513-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)
T8 81.27-61.00	Pipe	Pipe 8.75" x 0.375" (8 EHS)	A500-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)
T9 61.00-40.67	Pipe	Pipe 8.75" x 0.375" (8 EHS)	A500-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)
T10 40.67-20.33	Pipe	Pipe 8.75" x 0.500" (8 EH)	A500-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)
T11 20.33-0.00	Pipe	Pipe 8.75" x 0.500" (8 EH)	A500-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 212.63-202.46	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 1.9" x 0.145" (1.5 STD)	A618-50 (50 ksi)
T2 202.46-182.29	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 1.9" x 0.145" (1.5 STD)	A618-50 (50 ksi)
T3 182.29-162.10	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 1.9" x 0.145" (1.5 STD)	A618-50 (50 ksi)
T4 162.10-141.90	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T5 141.90-121.69	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T6 121.69-101.48	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.375" x 0.154" (2 STD)	A618-50 (50 ksi)
T7 101.48-81.27	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T8 81.27-61.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T9 61.00-40.67	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A618-50 (50 ksi)
T10 40.67-20.33	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)
T11 20.33-0.00	None	Pipe		A618-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 212.63-202.46	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T2 202.46-182.29	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T3 182.29-162.10	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T4 162.10-141.90	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T5 141.90-121.69	Pipe		A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/8	A36 (36 ksi)
T6 121.69-101.48	Pipe		A618-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T7 101.48-81.27	Pipe		A618-50 (50 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T8 81.27-61.00	Pipe		A618-50 (50 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)
T9 61.00-40.67	Pipe		A618-50 (50 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)
T10 40.67-20.33	Pipe		A618-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)
T11 20.33-0.00	Pipe		A618-50 (50 ksi)	Pipe	Pipe 3.5" x 0.216" (3 STD)	A618-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T10 40.67-20.33	A53-B-35 (35 ksi)	Horizontal (1)	Pipe	Pipe 1.9" x 0.145" (1.5 STD)	1
		Diagonal (1)	Pipe		1
		Hip (1)	Pipe	Pipe 2.375" x 0.154" (2 STD)	1
		Hip Diagonal			1
				Pipe 1.9" x 0.145" (1.5 STD)	
				Pipe 2.875" x 0.203" (2.5 STD)	
T11 20.33-0.00	A53-B-35 (35 ksi)	Horizontal (1)	Pipe	Pipe 1.9" x 0.145" (1.5 STD)	1
		Diagonal (1)	Pipe		1
		Hip (1)	Pipe	Pipe 2.375" x 0.154" (2 STD)	1
		Hip Diagonal			1
				Pipe 1.9" x 0.145" (1.5 STD)	
				Pipe 2.875" x 0.203" (2.5 STD)	

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 212.63-202.46	0.00	0.250	A36 (36 ksi)	1	1	1.05	6.000	6.000
T2 202.46-182.29	0.00	0.250	A36 (36 ksi)	1	1	1.05	36.000	36.000
T3 182.29-162.10	0.00	0.250	A36 (36 ksi)	1	1	1.05	36.000	36.000
T4 162.10-141.90	0.00	0.250	A36 (36 ksi)	1	1	1.1	6.000	6.000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T5 141.90-121.69	0.00	0.250	A36 (36 ksi)	1	1	1.1	36.000	36.000
T6 121.69-101.48	0.00	0.375	A36 (36 ksi)	1	1	1.1	36.000	36.000
T7 101.48-81.27	0.00	0.375	A36 (36 ksi)	1	1	1.1	36.000	36.000
T8 81.27-61.00	0.00	0.375	A36 (36 ksi)	1	1	1.15	36.000	36.000
T9 61.00-40.67	0.00	0.375	A36 (36 ksi)	1	1	1.15	36.000	36.000
T10 40.67-20.33	0.00	0.375	A36 (36 ksi)	1	1	1.25	36.000	36.000
T11 20.33-0.00	0.00	0.375	A36 (36 ksi)	1	1	1.25	36.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 212.63-202.46	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 202.46-182.29	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 182.29-162.10	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 162.10-141.90	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 141.90-121.69	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 121.69-101.48	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 101.48-81.27	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 81.27-61.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 61.00-40.67	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 40.67-20.33	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T11 20.33-0.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 212.63-202.46	Flange	0.750 A325N	4	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T2 202.46-182.29	Flange	0.875 A325N	4	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T3 182.29-162.10	Flange	1.000 A325N	4	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T4 162.10-141.90	Flange	1.000 A325N	6	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T5 141.90-121.69	Flange	1.000 A325N	6	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T6 121.69-101.48	Flange	1.000 A325N	6	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T7 101.48-81.27	Flange	1.000 A325N	8	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T8 81.27-61.00	Flange	1.000 A325N	8	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T9 61.00-40.67	Flange	1.000 A325N	8	0.625 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	2	0.000 A325N	0
T10 40.67-20.33	Flange	1.000 A325N	8	0.750 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.750 A325N	2	0.625 A325N	1
T11 20.33-0.00	Flange	1.000 A354-BC	10	0.750 A325N	3	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.750 A325N	2	0.625 A325N	1

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1.5" flat Cable Ladder Rail	A	Yes	Af (CfAe)	197.00 - 5.00	0.000	0.4	2	2	18.000 1.500	1.500	6.000	1.80
LDF7-50A (1 5/8" foam)	A	Yes	Ar (CfAe)	197.00 - 5.00	0.000	0.4	6	6	0.270	1.980		0.92
1.5" flat Cable Ladder Rail	A	Yes	Af (CfAe)	190.00 - 5.00	0.000	-0.4	2	2	18.000 1.500	1.500	6.000	1.80
LDF7-50A (1 5/8" foam)	A	Yes	Ar (CfAe)	190.00 - 5.00	0.000	-0.42	12	6	0.270	1.980		0.92
LDF5-50A (7/8" foam)	A	Yes	Ar (CfAe)	125.00 - 5.00	0.000	-0.36	4	4	1.090	1.090		0.33
LDF5-50A (7/8" foam)	A	Yes	Ar (CfAe)	145.00 - 125.00	0.000	-0.36	3	3	1.090	1.090		0.33
LDF5-50A (7/8" foam)	A	Yes	Ar (CfAe)	165.00 - 145.00	0.000	-0.36	2	2	1.090	1.090		0.33
LDF5-50A (7/8" foam)	A	Yes	Ar (CfAe)	202.00 - 165.00	0.000	-0.36	1	1	1.090	1.090		0.33
(11/32 Foam)	A	Yes	Ar (CfAe)	202.00 - 5.00	0.000	-0.38	2	2	0.410	0.410		0.10
3" Conduit	A	Yes	Ar (CfAe)	190.00 - 5.00	0.000	-0.45	1	1	3.000	3.000		0.95
1.5" flat Cable Ladder Rail	C	Yes	Af (CfAe)	208.00 - 5.00	0.000	0.4	2	2	18.000 1.500	1.500	6.000	1.80
LDF7-50A (1 5/8" foam)	C	Yes	Ar (CfAe)	208.00 - 5.00	0.000	0.42	6	6	0.270	1.980		0.92
LDF7-50A (1 5/8" foam)	C	Yes	Ar (CfAe)	208.00 - 5.00	0.000	0.38	9	6	0.270	1.980		0.92
EW52(ELLIPTICAL)	C	Yes	Ar (CfAe)	133.00 - 5.00	0.000	0.4	1	1	2.210	2.210		0.59
1.5" flat Cable Ladder Rail	C	Yes	Af (CfAe)	182.00 - 5.00	0.000	-0.45	2	2	18.000 1.500	1.500	6.000	1.80
LDF7-50A (1 5/8" foam)	C	Yes	Ar (CfAe)	182.00 - 5.00	0.000	-0.45	6	6	0.270	1.980		0.92
1.5" flat Cable Ladder Rail	B	Yes	Af (CfAe)	175.00 - 5.00	0.000	0.45	2	2	18.000 1.500	1.500	6.000	1.80
LDF6-50 (1	B	Yes	Ar (CfAe)	175.00 - 5.00	0.000	0.45	12	9	0.700	1.550		0.66

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1/4" foam) 1.5" flat Cable Ladder Rail	B	Yes	Af (CfAe)	137.00 - 5.00	0.000	-0.45	2	2	18.000 1.500	1.500	6.000	1.80
LDF7-50A (1 5/8" foam) **	B	Yes	Ar (CfAe)	137.00 - 5.00	0.000	-0.45	12	6	0.270	1.980		0.92

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
LDF5-50A (7/8" foam)	A	No	CaAa (In Face)	190.00 - 5.00	0.000	-0.45	2	No Ice	0.00	0.33
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
LDF1-50 (1/4" foam)	A	No	CaAa (In Face)	190.00 - 5.00	0.000	-0.45	1	No Ice	0.00	0.06
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
**										

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) DB948F85T2E-M w/ Mount Pipe	A	From Leg	4.00 0 1	0.000	208.00	No Ice	2.13	4.45	27
						1/2" Ice	2.49	5.12	57
						1" Ice	2.86	5.80	96
						2" Ice	3.62	7.22	192
						4" Ice	5.36	10.31	486
ALP 9212-N w/ Mount Pipe	A	From Leg	4.00 0 1	0.000	208.00	No Ice	6.02	7.05	37
						1/2" Ice	6.51	7.83	94
						1" Ice	6.99	8.59	161
						2" Ice	7.99	10.15	317
						4" Ice	10.13	13.50	746
(2) ClearGain Dual Band 800/1900 MHz	A	From Leg	4.00 0 0	0.000	208.00	No Ice	1.54	0.80	23
						1/2" Ice	1.71	0.94	34
						1" Ice	1.89	1.08	47
						2" Ice	2.27	1.39	81
						4" Ice	3.14	2.11	184
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0 1	0.000	208.00	No Ice	4.56	10.73	46
						1/2" Ice	5.11	11.99	110
						1" Ice	5.61	12.97	185
						2" Ice	6.65	14.98	363
						4" Ice	8.83	19.22	857
DB948F85T2E-M w/ Mount Pipe	B	From Leg	4.00 0 1	0.000	208.00	No Ice	2.13	4.45	27
						1/2" Ice	2.49	5.12	57
						1" Ice	2.86	5.80	96

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						1" Ice	3.62	7.22	192
						2" Ice	5.36	10.31	486
						4" Ice			
ALP 9212-N w/ Mount Pipe	B	From Leg	4.00 0 1	0.000	208.00	No Ice	6.02	7.05	37
						1/2" Ice	6.51	7.83	94
						1" Ice	6.99	8.59	161
						2" Ice	7.99	10.15	317
						4" Ice	10.13	13.50	746
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0 1	0.000	208.00	No Ice	4.56	10.73	46
						1/2" Ice	5.11	11.99	110
						1" Ice	5.61	12.97	185
						2" Ice	6.65	14.98	363
						4" Ice	8.83	19.22	857
DB948F85T2E-M w/ Mount Pipe	B	From Leg	4.00 0 1	0.000	208.00	No Ice	2.13	4.45	27
						1/2" Ice	2.49	5.12	57
						1" Ice	2.86	5.80	96
						2" Ice	3.62	7.22	192
						4" Ice	5.36	10.31	486
(2) DB948F85T2E-M w/ Mount Pipe	C	From Leg	4.00 0 1	0.000	208.00	No Ice	2.13	4.45	27
						1/2" Ice	2.49	5.12	57
						1" Ice	2.86	5.80	96
						2" Ice	3.62	7.22	192
						4" Ice	5.36	10.31	486
ALP 9212-N w/ Mount Pipe	C	From Leg	4.00 0 1	0.000	208.00	No Ice	6.02	7.05	37
						1/2" Ice	6.51	7.83	94
						1" Ice	6.99	8.59	161
						2" Ice	7.99	10.15	317
						4" Ice	10.13	13.50	746
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0 1	0.000	208.00	No Ice	4.56	10.73	46
						1/2" Ice	5.11	11.99	110
						1" Ice	5.61	12.97	185
						2" Ice	6.65	14.98	363
						4" Ice	8.83	19.22	857
Sector Mount [SM 510-3]	C	None		0.000	208.00	No Ice	40.10	40.10	2396
						1/2" Ice	57.33	57.33	3089
						1" Ice	74.56	74.56	3782
						2" Ice	109.02	109.02	5167
						4" Ice	177.94	177.94	7937
**									
Pipe Mount [PM 501-1]	A	From Leg	0.00 0 0	0.000	202.00	No Ice	3.47	1.67	52
						1/2" Ice	4.45	2.10	59
						1" Ice	5.43	2.53	66
						2" Ice	7.39	3.39	80
						4" Ice	11.31	5.11	108
Sinclair SD310-HL	A	From Leg	0.00 0 2	0.000	202.00	No Ice	1.46	1.46	33
						1/2" Ice	2.35	2.35	50
						1" Ice	3.24	3.24	67
						2" Ice	5.02	5.02	101
						4" Ice	8.58	8.58	169
Pipe Mount [PM 501-1]	C	From Leg	0.00 0 0	0.000	202.00	No Ice	3.47	1.67	52
						1/2" Ice	4.45	2.10	59
						1" Ice	5.43	2.53	66
						2" Ice	7.39	3.39	80
						4" Ice	11.31	5.11	108
**									

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 lb
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00 0 1	0.000	197.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	30 64 107 216 549
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00 0 1	0.000	197.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	30 64 107 216 549
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00 0 1	0.000	197.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	30 64 107 216 549
Sector Mount [SM 505-3]	C	None		0.000	197.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	34.86 49.79 64.72 94.58 154.30	34.86 49.79 64.72 94.58 154.30	1725 2317 2909 4092 6458
(3) 4' x 2" Pipe Mount	A	From Leg	4.00 0 0	0.000	197.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.79 1.03 1.28 1.81 3.11	0.79 1.03 1.28 1.81 3.11	29 35 44 72 167
(3) 4' x 2" Pipe Mount	B	From Leg	4.00 0 0	0.000	197.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.79 1.03 1.28 1.81 3.11	0.79 1.03 1.28 1.81 3.11	29 35 44 72 167
(3) 4' x 2" Pipe Mount	C	From Leg	4.00 0 0	0.000	197.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.79 1.03 1.28 1.81 3.11	0.79 1.03 1.28 1.81 3.11	29 35 44 72 167
**									
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	A	From Leg	4.00 0 0	0.000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	27 38 52 86 189
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	55 101 155 287 665
(2) LGP13519	A	From Leg	4.00 0 0	0.000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	5 8 12 24 71
(2) RRUS-11	A	From Leg	4.00 0 0	0.000	190.00	No Ice 1/2" Ice 1" Ice	4.42 4.71 5.00 5.61	1.19 1.35 1.53 1.90	55 81 110 179

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	6.94	2.75	368
						4" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	190.00	No Ice	5.74	4.02	35
						1/2" Ice	6.20	4.63	78
						1" Ice	6.66	5.28	130
						2" Ice	7.62	6.68	254
						4" Ice	9.67	9.74	610
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	B	From Leg	4.00 0 0	0.000	190.00	No Ice	1.55	0.81	27
						1/2" Ice	1.72	0.94	38
						1" Ice	1.90	1.09	52
						2" Ice	2.28	1.40	86
						4" Ice	3.14	2.12	189
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	190.00	No Ice	6.12	4.25	55
						1/2" Ice	6.63	5.01	101
						1" Ice	7.13	5.71	155
						2" Ice	8.16	7.16	287
						4" Ice	10.36	10.41	665
(2) LGP13519	B	From Leg	4.00 0 0	0.000	190.00	No Ice	0.34	0.21	5
						1/2" Ice	0.42	0.28	8
						1" Ice	0.51	0.36	12
						2" Ice	0.73	0.55	24
						4" Ice	1.25	1.03	71
(2) RRUS-11	B	From Leg	4.00 0 0	0.000	190.00	No Ice	4.42	1.19	55
						1/2" Ice	4.71	1.35	81
						1" Ice	5.00	1.53	110
						2" Ice	5.61	1.90	179
						4" Ice	6.94	2.75	368
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	190.00	No Ice	5.74	4.02	35
						1/2" Ice	6.20	4.63	78
						1" Ice	6.66	5.28	130
						2" Ice	7.62	6.68	254
						4" Ice	9.67	9.74	610
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	C	From Leg	4.00 0 0	0.000	190.00	No Ice	1.55	0.81	27
						1/2" Ice	1.72	0.94	38
						1" Ice	1.90	1.09	52
						2" Ice	2.28	1.40	86
						4" Ice	3.14	2.12	189
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	190.00	No Ice	6.12	4.25	55
						1/2" Ice	6.63	5.01	101
						1" Ice	7.13	5.71	155
						2" Ice	8.16	7.16	287
						4" Ice	10.36	10.41	665
(2) LGP13519	C	From Leg	4.00 0 0	0.000	190.00	No Ice	0.34	0.21	5
						1/2" Ice	0.42	0.28	8
						1" Ice	0.51	0.36	12
						2" Ice	0.73	0.55	24
						4" Ice	1.25	1.03	71
(2) RRUS-11	C	From Leg	4.00 0 0	0.000	190.00	No Ice	4.42	1.19	55
						1/2" Ice	4.71	1.35	81
						1" Ice	5.00	1.53	110
						2" Ice	5.61	1.90	179
						4" Ice	6.94	2.75	368
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	190.00	No Ice	5.74	4.02	35
						1/2" Ice	6.20	4.63	78
						1" Ice	6.66	5.28	130

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 lb
							1" Ice	7.62	6.68	254
							2" Ice	9.67	9.74	610
							4" Ice			
DC6-48-60-18-8F	C	From Leg	4.00	0.000		190.00	No Ice	1.27	1.27	20
			0				1/2"	1.46	1.46	35
			0				Ice	1.66	1.66	53
							1" Ice	2.09	2.09	95
							2" Ice	3.10	3.10	215
							4" Ice			
Sector Mount [SM 602-3]	C	None		0.000		190.00	No Ice	33.11	33.11	1541
							1/2"	44.90	44.90	2159
							Ice	56.69	56.69	2777
							1" Ice	80.27	80.27	4014
							2" Ice	127.43	127.43	6487
							4" Ice			
4' x 2" Pipe Mount	A	From Leg	4.00	0.000		190.00	No Ice	0.79	0.79	29
			0				1/2"	1.03	1.03	35
			0				Ice	1.28	1.28	44
							1" Ice	1.81	1.81	72
							2" Ice	3.11	3.11	167
							4" Ice			
4' x 2" Pipe Mount	B	From Leg	4.00	0.000		190.00	No Ice	0.79	0.79	29
			0				1/2"	1.03	1.03	35
			0				Ice	1.28	1.28	44
							1" Ice	1.81	1.81	72
							2" Ice	3.11	3.11	167
							4" Ice			
4' x 2" Pipe Mount	C	From Leg	4.00	0.000		190.00	No Ice	0.79	0.79	29
			0				1/2"	1.03	1.03	35
			0				Ice	1.28	1.28	44
							1" Ice	1.81	1.81	72
							2" Ice	3.11	3.11	167
							4" Ice			
**										
742 213	A	From Leg	1.00	0.000		182.00	No Ice	5.14	2.87	22
			0				1/2"	5.61	3.48	47
			0				Ice	6.09	3.95	78
							1" Ice	7.07	4.89	158
							2" Ice	9.13	6.88	394
							4" Ice			
742 213	B	From Leg	1.00	0.000		182.00	No Ice	5.14	2.87	22
			0				1/2"	5.61	3.48	47
			0				Ice	6.09	3.95	78
							1" Ice	7.07	4.89	158
							2" Ice	9.13	6.88	394
							4" Ice			
742 213	C	From Leg	1.00	0.000		182.00	No Ice	5.14	2.87	22
			0				1/2"	5.61	3.48	47
			0				Ice	6.09	3.95	78
							1" Ice	7.07	4.89	158
							2" Ice	9.13	6.88	394
							4" Ice			
Pipe Mount [PM 501-3]	C	None		0.000		182.00	No Ice	5.78	5.78	156
							1/2"	7.37	7.37	177
							Ice	8.96	8.96	198
							1" Ice	12.14	12.14	240
							2" Ice	18.50	18.50	324
							4" Ice			
**										
(4) DB844H90E-XY w/ Mount Pipe	A	From Leg	4.00	0.000		175.00	No Ice	3.30	4.92	32
			0				1/2"	3.69	5.60	70
			1				Ice	4.12	6.28	116
							1" Ice	5.01	7.71	228
							2" Ice	6.92	10.83	557
							4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(4) DB844H90E-XY w/ Mount Pipe	B	From Leg	4.00 0 1	0.000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.30 3.69 4.12 5.01 6.92	4.92 5.60 6.28 7.71 10.83	32 70 116 228 557
(4) DB844H90E-XY w/ Mount Pipe	C	From Leg	4.00 0 1	0.000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.30 3.69 4.12 5.01 6.92	4.92 5.60 6.28 7.71 10.83	32 70 116 228 557
Sector Mount [SM 510-3]	C	None		0.000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	40.10 57.33 74.56 109.02 177.94	40.10 57.33 74.56 109.02 177.94	2396 3089 3782 5167 7937
** 1151-3	B	From Leg	6.00 0 8	0.000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.18 5.73 7.30 10.48 14.75	4.18 5.73 7.30 10.48 14.75	16 47 87 197 541
Side Arm Mount [SO 308-1]	B	From Leg	3.00 0 0	0.000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	3.03 5.22 7.41 11.79 20.55	53 79 105 156 259
OA20-67-DIN	A	From Leg	6.00 0 4	0.000	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.22 7.00 8.79 12.43 17.95	5.22 7.00 8.79 12.43 17.95	49 87 135 267 669
Side Arm Mount [SO 308-1]	A	From Leg	3.00 0 0	0.000	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	3.03 5.22 7.41 11.79 20.55	53 79 105 156 259
** RR90-17-02DP w/ Mount Pipe	A	From Leg	2.00 0 0	0.000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34 69 114 224 557
ATMAA1412D-1A20	A	From Leg	2.00 0 0	0.000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	13 21 30 56 137
ATMPP1412D-1CWA	A	From Leg	2.00 0 0	0.000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.32 1.48 1.82 2.61	0.42 0.53 0.65 0.92 1.57	13 20 28 52 131
RR90-17-02DP w/ Mount Pipe	B	From Leg	2.00 0 0	0.000	137.00	No Ice 1/2" Ice	4.59 5.09 5.58	3.32 4.09 4.78	34 69 114

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						1" Ice	6.59	6.23	224
						2" Ice	8.73	9.31	557
						4" Ice			
ATMAA1412D-1A20	B	From Leg	2.00 0 0	0.000	137.00	No Ice	1.17	0.47	13
						1/2" Ice	1.31	0.57	21
						1" Ice	1.47	0.69	30
						2" Ice	1.81	0.95	56
						4" Ice	2.58	1.57	137
ATMPP1412D-1CWA	B	From Leg	2.00 0 0	0.000	137.00	No Ice	1.17	0.42	13
						1/2" Ice	1.32	0.53	20
						1" Ice	1.48	0.65	28
						2" Ice	1.82	0.92	52
						4" Ice	2.61	1.57	131
RR90-17-02DP w/ Mount Pipe	C	From Leg	2.00 0 0	0.000	137.00	No Ice	4.59	3.32	34
						1/2" Ice	5.09	4.09	69
						1" Ice	5.58	4.78	114
						2" Ice	6.59	6.23	224
						4" Ice	8.73	9.31	557
ATMAA1412D-1A20	C	From Leg	2.00 0 0	0.000	137.00	No Ice	1.17	0.47	13
						1/2" Ice	1.31	0.57	21
						1" Ice	1.47	0.69	30
						2" Ice	1.81	0.95	56
						4" Ice	2.58	1.57	137
ATMPP1412D-1CWA	C	From Leg	2.00 0 0	0.000	137.00	No Ice	1.17	0.42	13
						1/2" Ice	1.32	0.53	20
						1" Ice	1.48	0.65	28
						2" Ice	1.82	0.92	52
						4" Ice	2.61	1.57	131
Side Arm Mount [SO 201-3]	A	None		0.000	137.00	No Ice	5.71	5.71	288
						1/2" Ice	7.91	7.91	351
						1" Ice	10.11	10.11	414
						2" Ice	14.51	14.51	541
						4" Ice	23.31	23.31	793
**									
Pipe Mount [PM 601-1]	B	None		0.000	133.00	No Ice	3.00	0.90	65
						1/2" Ice	3.74	1.12	79
						1" Ice	4.48	1.34	93
						2" Ice	5.96	1.78	122
						4" Ice	8.92	2.66	178
**									
1142-2C	A	From Leg	6.00 0 8	0.000	125.00	No Ice	2.09	2.09	24
						1/2" Ice	3.37	3.37	41
						1" Ice	4.67	4.67	66
						2" Ice	7.32	7.32	140
						4" Ice	10.79	10.79	392
Side Arm Mount [SO 308-1]	A	From Leg	3.00 0 0	0.000	125.00	No Ice	0.98	3.03	53
						1/2" Ice	1.70	5.22	79
						1" Ice	2.42	7.41	105
						2" Ice	3.86	11.79	156
						4" Ice	6.74	20.55	259
**									

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 lb
HP2-4.7NS	A	Paraboloid w/Shroud (HP)	From Leg	0.50 0 0	90.000		202.00	2.04	No Ice	3.27	27
									1/2" Ice	3.55	45
									1" Ice	3.82	63
									2" Ice	4.36	100
									4" Ice	5.46	173
HP2-4.7NS	C	Paraboloid w/Shroud (HP)	From Leg	0.50 0 0	73.000		202.00	2.04	No Ice	3.27	27
									1/2" Ice	3.55	45
									1" Ice	3.82	63
									2" Ice	4.36	100
									4" Ice	5.46	173
PL6-59W	B	Paraboloid w/Radome	From Leg	0.50 0 0	-90.000		133.00	6.00	No Ice	28.27	143
									1/2" Ice	29.07	290
									1" Ice	29.86	440
									2" Ice	31.44	740
									4" Ice	34.60	1340

**

Load Combinations

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

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	10	311690	32395	-18453
	Max. H_x	10	311690	32395	-18453
	Max. H_z	3	-222802	-23121	16704
	Min. Vert	4	-259194	-28555	16277
	Min. H_x	4	-259194	-28555	16277
	Min. H_z	10	311690	32395	-18453
Leg B	Max. Vert	6	307919	-32371	-17907
	Max. H_x	12	-259604	28747	15768
	Max. H_z	13	-222853	23460	15832
	Min. Vert	12	-259604	28747	15768
	Min. H_x	6	307919	-32371	-17907
	Min. H_z	6	307919	-32371	-17907
Leg A	Max. Vert	2	308696	-538	37058
	Max. H_x	11	21515	4735	1906
	Max. H_z	2	308696	-538	37058
	Min. Vert	8	-261510	504	-33004
	Min. H_x	5	21778	-4792	1942
	Min. H_z	8	-261510	504	-33004

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	67167	0	0	9670	20532	0
Dead+Wind 0 deg - No Ice	67167	37	-60958	-7482387	15528	-28076
Dead+Wind 30 deg - No Ice	67167	30151	-52127	-6414955-	3695481	-10106
Dead+Wind 60 deg - No Ice	67167	51859	-29899	-3675906-	6375082	9085
Dead+Wind 90 deg - No Ice	67167	59985	35	15977	-7367752	25073
Dead+Wind 120 deg - No Ice	67167	52660	30478	3755010-	6448513	35987
Dead+Wind 150 deg - No Ice	67167	30028	52113	6431899-	3679822	36311
Dead+Wind 180 deg - No Ice	67167	3	60049	7419444	17461	26264
Dead+Wind 210 deg - No Ice	67167	-30249	52245	6449352	3751493	8999
Dead+Wind 240 deg - No Ice	67167	-53103	30621	3773886	6551394	-11690
Dead+Wind 270 deg - No Ice	67167	-60215	103	22845	7440140	-27458
Dead+Wind 300 deg - No Ice	67167	-51770	-29682	-3647224	6403989	-36529
Dead+Wind 330 deg - No Ice	67167	-30030	-51826	-6372034	3721783	-37078
Dead+Ice	125789	0	0	44993	55186	1
Dead+Wind 0 deg+Ice	125789	17	-17950	-2164969	52884	-4907
Dead+Wind 30 deg+Ice	125789	8437	-14568	-1767308	-994487	-928
Dead+Wind 60 deg+Ice	125789	14249	-8213	-980082	-1723605	2514
Dead+Wind 90 deg+Ice	125789	16793	-1	45068	-2032612	5274
Dead+Wind 120 deg+Ice	125789	15531	8967	1148837-	1855885	7520
Dead+Wind 150 deg+Ice	125789	8399	14560	1856428	-989048	6428
Dead+Wind 180 deg+Ice	125789	-7	16468	2102308	56217	4000
Dead+Wind 210 deg+Ice	125789	-8460	14596	1861572	1109041	705
Dead+Wind 240 deg+Ice	125789	-15631	9011	1155423	1981293	-3389
Dead+Wind 270 deg+Ice	125789	-16846	30	49491	2150888	-5755
Dead+Wind 300 deg+Ice	125789	-14226	-8155	-971912	1831190	-6759
Dead+Wind 330 deg+Ice	125789	-8399	-14500	-1757467	1100141	-6579
Dead+Wind 0 deg - Service	67167	13	-21093	-2582762	18832	-9712
Dead+Wind 30 deg - Service	67167	10433	-18037	-2213398-	1265243	-3498
Dead+Wind 60 deg - Service	67167	17944	-10346	-1265595-	2192462	3133
Dead+Wind 90 deg - Service	67167	20756	12	11884	-2535956	8677
Dead+Wind 120 deg - Service	67167	18222	10546	1305674-	2217903	12457
Dead+Wind 150 deg - Service	67167	10391	18032	2231928-	1259875	12568
Dead+Wind 180 deg - Service	67167	1	20778	2573643	19523	9080

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 210 deg - Service	67167	-10467	18078	2237979	1311594	3112
Dead+Wind 240 deg - Service	67167	-18375	10595	1312214	2280439	-4042
Dead+Wind 270 deg - Service	67167	-20836	36	14263	2587944	-9498
Dead+Wind 300 deg - Service	67167	-17913	-10271	-1255662	2229400	-12645
Dead+Wind 330 deg - Service	67167	-10391	-17933	-2198603	1301253	-12834

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
T1	212.625 - 202.458	5.29	35	0.216	0.046
T2	202.458 - 182.292	4.82	35	0.216	0.046
T3	182.292 - 162.104	3.89	35	0.205	0.040
T4	162.104 - 141.896	3.02	35	0.182	0.030
T5	141.896 - 121.688	2.25	35	0.156	0.022
T6	121.688 - 101.479	1.63	35	0.128	0.017
T7	101.479 - 81.2708	1.11	35	0.104	0.013
T8	81.2708 - 61	0.71	35	0.078	0.010
T9	61 - 40.6667	0.40	35	0.056	0.008
T10	40.6667 - 20.3333	0.18	35	0.034	0.005
T11	20.3333 - 0	0.06	27	0.017	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
208.00	(2) DB948F85T2E-M w/ Mount Pipe	35	5.08	0.216	0.046	188967
202.00	HP2-4.7NS	35	4.80	0.215	0.046	114809
197.00	(2) DB980H90E-M w/ Mount Pipe	35	4.57	0.214	0.045	266092
190.00	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	35	4.24	0.211	0.043	154701
182.00	742 213	35	3.88	0.205	0.040	62727
175.00	(4) DB844H90E-XY w/ Mount Pipe	35	3.56	0.197	0.037	55187
165.00	1151-3	35	3.14	0.186	0.031	49686
145.00	OA20-67-DIN	35	2.36	0.160	0.023	33019
137.00	RR90-17-02DP w/ Mount Pipe	35	2.09	0.149	0.021	34842
133.00	PL6-59W	35	1.96	0.144	0.020	38572
125.00	1142-2C	35	1.72	0.133	0.018	48986

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	212.625 - 202.458	15.17	10	0.617	0.134
T2	202.458 - 182.292	13.84	10	0.616	0.133
T3	182.292 - 162.104	11.17	10	0.586	0.116
T4	162.104 - 141.896	8.67	10	0.521	0.087
T5	141.896 - 121.688	6.48	10	0.448	0.064
T6	121.688 - 101.479	4.68	10	0.368	0.050
T7	101.479 - 81.2708	3.18	10	0.298	0.038
T8	81.2708 - 61	2.04	10	0.224	0.030
T9	61 - 40.6667	1.16	10	0.161	0.022
T10	40.6667 - 20.3333	0.53	10	0.096	0.015
T11	20.3333 - 0	0.16	10	0.049	0.007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
208.00	(2) DB948F85T2E-M w/ Mount Pipe	10	14.57	0.617	0.134	66928
202.00	HP2-4.7NS	10	13.78	0.616	0.133	40869
197.00	(2) DB980H90E-M w/ Mount Pipe	10	13.12	0.612	0.130	100156
190.00	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	10	12.18	0.602	0.125	57486
182.00	742 213	10	11.13	0.585	0.115	22452
175.00	(4) DB844H90E-XY w/ Mount Pipe	10	10.24	0.565	0.105	19607
165.00	1151-3	10	9.02	0.532	0.090	17502
145.00	OA20-67-DIN	10	6.79	0.460	0.067	11546
137.00	RR90-17-02DP w/ Mount Pipe	10	6.01	0.429	0.060	12177
133.00	PL6-59W	10	5.64	0.412	0.057	13481
125.00	1142-2C	10	4.95	0.380	0.052	17122

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	212.625	Leg	A325N	0.750	4	0	19439	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	954	6443	0.148 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	1044	6443	0.162 ✓	1.333	Bolt Shear
T2	202.458	Leg	A325N	0.875	4	4024	26458	0.152 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	3243	6443	0.503 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	2621	6443	0.407 ✓	1.333	Bolt Shear
T3	182.292	Leg	A325N	1.000	4	12763	34557	0.369 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	3231	6443	0.502 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	3041	6443	0.472 ✓	1.333	Bolt Shear
T4	162.104	Leg	A325N	1.000	6	14241	34557	0.412 ✓	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.625	3	3301	6443	0.512 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	3327	6443	0.516 ✓	1.333	Bolt Shear
T5	141.896	Leg	A325N	1.000	6	18489	34557	0.535 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	4142	6443	0.643 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	3756	6443	0.583 ✓	1.333	Bolt Shear
T6	121.688	Leg	A325N	1.000	6	23273	34557	0.673 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	3819	6443	0.593 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	3736	6443	0.580 ✓	1.333	Bolt Shear
T7	101.479	Leg	A325N	1.000	8	20541	34558	0.594 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	3686	6443	0.572 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	3850	6443	0.598 ✓	1.333	Bolt Shear
T8	81.2708	Leg	A325N	1.000	8	23420	34557	0.678 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	4015	6443	0.623 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	4440	6443	0.689 ✓	1.333	Bolt Shear
T9	61	Leg	A325N	1.000	8	26286	34557	0.761 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	3	4162	6443	0.646 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.625	2	4817	6443	0.748 ✓	1.333	Bolt Shear
T10	40.6667	Leg	A325N	1.000	8	27312	34556	0.790 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.750	3	6120	9278	0.660 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.750	2	5061	9278	0.546 ✓	1.333	Bolt Shear
T11	20.3333	Leg	A354-BC	1.000	10	23991	32398	0.741 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.750	3	5942	9278	0.641 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.750	2	5297	9278	0.571 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	212.625 - 202.458	Pipe 2.875" x 0.203" (2.5 STD)	10.17	5.08	64.4 K=1.00	21.95	1.704	-2424	37412	0.065 ✓
T2	202.458 - 182.292	Pipe 3.5" x 0.300" (3 XS)	20.17	6.72	71.0 K=1.00	20.75	3.016	-23018	62592	0.368 ✓
T3	182.292 - 162.104	Pipe 4.5" x 0.337" (4 XS)	20.22	6.60	53.7 K=1.00	23.77	4.407	-62249	104772	0.594 ✓
T4	162.104 - 141.896	Pipe 5.5" x 0.375" (5 EH)	20.24	6.61	43.7 K=1.00	25.31	6.038	-99436	152810	0.651 ✓
T5	141.896 - 121.688	Pipe 6.625" x 0.340" (6 EHS)	20.25	9.92	53.5 K=1.00	23.80	6.713	-128278	159778	0.803 ✓
T6	121.688 - 101.479	Pipe 6.625" x 0.432" (6 XS)	20.26	9.92	54.2 K=1.00	23.68	8.405	-160943	198997	0.809 ✓
T7	101.479 - 81.2708	Pipe 6.625" x 0.432" (6 XS)	20.27	9.92	54.3 K=1.00	23.67	8.405	-190012	198976	0.955 ✓
T8	81.2708 - 61	Pipe 8.75" x 0.375" (8 EHS)	20.32	9.95	40.3 K=1.00	25.79	9.867	-218021	254468	0.857 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T9	61 - 40.6667	Pipe 8.75" x 0.375" (8 EHS)	20.38	9.98	40.4 K=1.00	25.77	9.867	-246254	254293	0.968 ✓
T10	40.6667 - 20.3333	Pipe 8.75" x 0.500" (8 EH)	20.38	9.98	41.0 K=1.00	25.69	12.959	-260673	332937	0.783 ✓
T11	20.3333 - 0	Pipe 8.75" x 0.500" (8 EH)	20.38	9.98	41.0 K=1.00	25.69	12.959	-287759	332937	0.864 ✓

* DL controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	212.625 - 202.458	Pipe 2.375" x 0.154" (2 STD)	6.64	6.45	98.4 K=1.00	15.08	1.075	-2862	16203	0.177 ✓
T2	202.458 - 182.292	Pipe 2.375" x 0.154" (2 STD)	7.99	7.72	117.6 K=1.00	10.79	1.075	-9730	11595	0.839 ✓
T3	182.292 - 162.104	Pipe 2.375" x 0.154" (2 STD)	8.49	8.20	125.0 K=1.00	9.56	1.075	-9693	10277	0.943 ✓
T4	162.104 - 141.896	Pipe 2.375" x 0.154" (2 STD)	9.19	8.86	135.1 K=1.00	8.18	1.075	-9628	8792	1.095 ✓
T5	141.896 - 121.688	Pipe 2.875" x 0.203" (2.5 STD)	12.43	11.98	151.7 K=1.00	6.49	1.704	-12425	11057	1.124 ✓
T6	121.688 - 101.479	Pipe 2.875" x 0.203" (2.5 STD)	13.23	12.81	162.3 K=1.00	5.67	1.704	-11341	9663	1.174 ✓
T7	101.479 - 81.2708	Pipe 3.5" x 0.216" (3 STD)	14.14	13.75	141.8 K=1.00	7.43	2.228	-10977	16549	0.663 ✓
T8	81.2708 - 61	Pipe 3.5" x 0.216" (3 STD)	15.07	14.59	150.5 K=1.00	6.60	2.228	-12044	14699	0.819 ✓
T9	61 - 40.6667	Pipe 3.5" x 0.216" (3 STD)	16.06	15.59	160.8 K=1.00	5.78	2.228	-12486	12873	0.970 ✓
T10	40.6667 - 20.3333	Pipe 3.5" x 0.216" (3 STD)	24.26	12.13	125.1 K=1.00	9.54	2.228	-18360	21260	0.864 ✓
T11	20.3333 - 0	Pipe 3.5" x 0.216" (3 STD)	25.00	12.50	128.9 K=1.00	8.99	2.228	-17828	20030	0.890 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	212.625 - 202.458	Pipe 1.9" x 0.145" (1.5 STD)	8.52	4.14	79.8 K=1.00	19.05	0.799	-2052	15231	0.135 ✓
T2	202.458 - 182.292	Pipe 1.9" x 0.145" (1.5 STD)	8.60	4.15	80.0 K=1.00	19.00	0.799	-5213	15193	0.343 ✓
T3	182.292 - 162.104	Pipe 1.9" x 0.145" (1.5 STD)	10.03	4.83	93.0 K=1.00	16.28	0.799	-6082	13015	0.467 ✓
T4	162.104 - 141.896	Pipe 2.375" x 0.154" (2 STD)	12.11	5.83	88.8 K=1.00	17.19	1.075	-6654	18470	0.360 ✓
T5	141.896 - 121.688	Pipe 2.375" x 0.154" (2 STD)	13.94	6.69	102.1 K=1.00	14.23	1.075	-7513	15288	0.491 ✓
T6	121.688 - 101.479	Pipe 2.375" x 0.154" (2 STD)	16.32	7.88	120.2 K=1.00	10.34	1.075	-7471	11111	0.672 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T7	101.479 - 81.2708	Pipe 2.875" x 0.203" (2.5 STD)	18.89	9.17	116.1 K=1.00	11.08	1.704	-7700	18875	0.408 ✓
T8	81.2708 - 61	Pipe 2.875" x 0.203" (2.5 STD)	21.45	10.36	131.2 K=1.00	8.67	1.704	-8826	14774	0.597 ✓
T9	61 - 40.6667	Pipe 2.875" x 0.203" (2.5 STD)	23.95	11.61	147.1 K=1.00	6.90	1.704	-9462	11764	0.804 ✓
T10	40.6667 - 20.3333	Pipe 3.5" x 0.216" (3 STD)	25.23	12.25	126.3 K=1.00	9.36	2.228	-10122	20852	0.485 ✓
T11	20.3333 - 0	Pipe 3.5" x 0.216" (3 STD)	27.73	13.50	139.2 K=1.00	7.70	2.228	-10595	17169	0.617 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	212.625 - 202.458	Pipe 1.9" x 0.145" (1.5 STD)	8.50	4.13	79.6 K=1.00	19.09	0.799	-128	15263	0.008 ✓

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T10	40.6667 - 20.3333	Pipe 1.9" x 0.145" (1.5 STD)	6.31	5.94	114.5 K=1.00	10.96	0.799	-4524	8762	0.516 ✓
T11	20.3333 - 0	Pipe 1.9" x 0.145" (1.5 STD)	6.93	6.57	126.6 K=1.00	9.32	0.799	-4994	7448	0.670 ✓

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T10	40.6667 - 20.3333	Pipe 2.375" x 0.154" (2 STD)	11.48	10.74	163.8 K=1.00	5.57	1.075	-4116	5981	0.688 ✓
T11	20.3333 - 0	Pipe 2.375" x 0.154" (2 STD)	11.80	11.12	169.5 K=1.00	5.20	1.075	-4250	5583	0.761 ✓

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T10	40.6667 - 20.3333	Pipe 1.9" x 0.145" (1.5 STD)	6.31	6.31	121.6 K=1.00	10.02	0.799	-50	8007	0.006 ✓
T11	20.3333 - 0	Pipe 1.9" x 0.145" (1.5 STD)	6.93	6.93	133.6 K=1.00	8.37	0.799	-47	6688	0.007 ✓

Redundant Hip Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	Pipe 2.875" x 0.203" (2.5 STD)	15.06	15.06	190.7 K=1.00	4.11	1.704	-57	6996	0.008* ✓
T11	20.3333 - 0	Pipe 2.875" x 0.203" (2.5 STD)	15.88	15.88	201.2 K=1.00	3.69	1.704	-57	6286	0.009* ✓

* DL controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	L 2 x 2 x 1/8	4.26	4.26	128.6 K=1.00	9.03	0.484	-3	4374	0.001 ✓
T2	202.458 - 182.292	L 2 x 2 x 1/8	4.30	4.30	129.8 K=1.00	8.87	0.484	-7	4296	0.002 ✓
T3	182.292 - 162.104	L 2 x 2 x 1/8	5.01	5.01	151.4 K=1.00	6.52	0.484	-6	3158	0.002 ✓
T4	162.104 - 141.896	L 2 x 2 x 1/8	6.06	6.06	182.8 K=1.00	4.47	0.484	-7	2165	0.003 ✓
T5	141.896 - 121.688	L 2 x 2 x 1/8	6.97	6.97	210.4 K=1.00	3.37	0.484	-8	1634	0.005 ✓
T6	121.688 - 101.479	L 2.5 x 2.5 x 3/16	8.16	8.16	197.8 K=1.00	3.82	0.902	-8	3443	0.002 ✓
T7	101.479 - 81.2708	L 3 x 3 x 3/16	9.44	9.44	190.0 K=1.00	4.14	1.090	-9	4507	0.002* ✓
T8	81.2708 - 61	L 3.5 x 3.5 x 1/4	10.73	10.73	185.5 K=1.00	4.34	1.690	-10	7336	0.001* ✓
T9	61 - 40.6667	L 3.5 x 3.5 x 1/4	11.98	11.98	207.1 K=1.00	3.48	1.690	-10	5885	0.002* ✓
T10	40.6667 - 20.3333	Pipe 3.5" x 0.216" (3 STD)	12.61	12.61	130.1 K=1.00	8.82	2.228	-17	19664	0.001 ✓
T11	20.3333 - 0	Pipe 3.5" x 0.216" (3 STD)	13.86	13.86	143.0 K=1.00	7.30	2.228	-13	16278	0.001* ✓

* DL controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	202.458 - 182.292	Pipe 3.5" x 0.300" (3 XS)	20.17	6.72	71.0	30.00	3.016	16097	90478	0.178 ✓
T3	182.292 - 162.104	Pipe 4.5" x 0.337" (4 XS)	20.22	6.60	53.7	30.00	4.407	51050	132223	0.386

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T4	162.104 - 141.896	Pipe 5.5" x 0.375" (5 EH)	20.24	6.61	43.7	30.00	6.038	85444	181132	0.472
T5	141.896 - 121.688	Pipe 6.625" x 0.340" (6 EHS)	20.25	9.92	53.5	30.00	6.713	110934	201398	0.551
T6	121.688 - 101.479	Pipe 6.625" x 0.432" (6 XS)	20.26	9.92	54.2	30.00	8.405	139637	252148	0.554
T7	101.479 - 81.2708	Pipe 6.625" x 0.432" (6 XS)	20.27	9.92	54.3	30.00	8.405	164332	252148	0.652
T8	81.2708 - 61	Pipe 8.75" x 0.375" (8 EHS)	20.32	9.95	40.3	30.00	9.867	187361	295997	0.633
T9	61 - 40.6667	Pipe 8.75" x 0.375" (8 EHS)	20.38	9.98	40.4	30.00	9.867	210288	295997	0.710
T10	40.6667 - 20.3333	Pipe 8.75" x 0.500" (8 EH)	20.38	9.98	41.0	30.00	12.959	222541	388772	0.572
T11	20.3333 - 0	Pipe 8.75" x 0.500" (8 EH)	20.38	9.98	41.0	30.00	12.959	243405	388772	0.626

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	Pipe 2.375" x 0.154" (2 STD)	6.64	6.45	98.4	30.00	1.075	2799	32236	0.087
T2	202.458 - 182.292	Pipe 2.375" x 0.154" (2 STD)	7.99	7.72	117.6	30.00	1.075	9667	32236	0.300
T3	182.292 - 162.104	Pipe 2.375" x 0.154" (2 STD)	8.49	8.20	125.0	30.00	1.075	9615	32236	0.298
T4	162.104 - 141.896	Pipe 2.375" x 0.154" (2 STD)	8.73	8.40	128.1	30.00	1.075	9807	32236	0.304
T5	141.896 - 121.688	Pipe 2.875" x 0.203" (2.5 STD)	12.43	11.98	151.7	30.00	1.704	12257	51122	0.240
T6	121.688 - 101.479	Pipe 2.875" x 0.203" (2.5 STD)	12.83	12.41	157.2	30.00	1.704	11262	51122	0.220
T7	101.479 - 81.2708	Pipe 3.5" x 0.216" (3 STD)	13.68	13.30	137.1	30.00	2.228	10742	66854	0.161
T8	81.2708 - 61	Pipe 3.5" x 0.216" (3 STD)	15.07	14.59	150.5	30.00	2.228	11589	66854	0.173
T9	61 - 40.6667	Pipe 3.5" x 0.216" (3 STD)	16.06	15.59	160.8	30.00	2.228	11959	66854	0.179
T10	40.6667 - 20.3333	Pipe 3.5" x 0.216" (3 STD)	24.26	12.13	125.1	30.00	2.228	17594	66854	0.263
T11	20.3333 - 0	Pipe 3.5" x 0.216" (3 STD)	25.00	12.50	128.9	30.00	2.228	17086	66854	0.256

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	Pipe 1.9" x 0.145" (1.5 STD)	8.52	4.14	79.8	30.00	0.799	2089	23984	0.087
T2	202.458 -	Pipe 1.9" x 0.145" (1.5	8.60	4.15	80.0	30.00	0.799	5241	23984	0.219

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
	182.292	STD)								✓
T3	182.292 - 162.104	Pipe 1.9" x 0.145" (1.5 STD)	10.03	4.83	93.0	30.00	0.799	6069	23984	0.253 ✓
T4	162.104 - 141.896	Pipe 2.375" x 0.154" (2 STD)	12.11	5.83	88.8	30.00	1.075	6644	32236	0.206 ✓
T5	141.896 - 121.688	Pipe 2.375" x 0.154" (2 STD)	13.94	6.69	102.1	30.00	1.075	7374	32236	0.229 ✓
T6	121.688 - 101.479	Pipe 2.375" x 0.154" (2 STD)	16.32	7.88	120.2	30.00	1.075	7382	32236	0.229 ✓
T7	101.479 - 81.2708	Pipe 2.875" x 0.203" (2.5 STD)	18.89	9.17	116.1	30.00	1.704	7659	51122	0.150 ✓
T8	81.2708 - 61	Pipe 2.875" x 0.203" (2.5 STD)	21.45	10.36	131.2	30.00	1.704	8881	51122	0.174 ✓
T9	61 - 40.6667	Pipe 2.875" x 0.203" (2.5 STD)	23.95	11.61	147.1	30.00	1.704	9634	51122	0.188 ✓
T10	40.6667 - 20.3333	Pipe 3.5" x 0.216" (3 STD)	25.23	12.25	126.3	30.00	2.228	9888	66854	0.148 ✓
T11	20.3333 - 0	Pipe 3.5" x 0.216" (3 STD)	27.73	13.50	139.2	30.00	2.228	10165	66854	0.152 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	Pipe 1.9" x 0.145" (1.5 STD)	8.50	4.13	79.6	30.00	0.799	128	23984	0.005 ✓

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	Pipe 1.9" x 0.145" (1.5 STD)	6.31	5.94	114.5	21.00	0.799	4524	16789	0.269 ✓
T11	20.3333 - 0	Pipe 1.9" x 0.145" (1.5 STD)	6.93	6.57	126.6	21.00	0.799	4994	16789	0.297 ✓

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	Pipe 2.375" x 0.154" (2 STD)	11.48	10.74	163.8	21.00	1.075	4116	22565	0.182 ✓
T11	20.3333 - 0	Pipe 2.375" x 0.154" (2 STD)	11.80	11.12	169.5	21.00	1.075	4250	22565	0.188 ✓

Redundant Hip Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	Pipe 2.875" x 0.203" (2.5 STD)	15.06	15.06	190.7	21.00	1.704	92	35785	0.003 ✓
T11	20.3333 - 0	Pipe 2.875" x 0.203" (2.5 STD)	15.88	15.88	201.2	21.00	1.704	84	35785	0.002 ✓

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	L 2 x 2 x 1/8	4.26	4.26	81.6	21.60	0.484	3	10463	0.000 ✓
T2	202.458 - 182.292	L 2 x 2 x 1/8	4.30	4.30	82.4	21.60	0.484	6	10463	0.001 ✓
T3	182.292 - 162.104	L 2 x 2 x 1/8	4.33	4.33	83.0	21.60	0.484	5	10463	0.000 ✓
T4	162.104 - 141.896	L 2 x 2 x 1/8	5.38	5.38	103.0	21.60	0.484	6	10463	0.001 ✓
T5	141.896 - 121.688	L 2 x 2 x 1/8	6.42	6.42	123.0	21.60	0.484	3	10463	0.000 ✓
T6	121.688 - 101.479	L 2.5 x 2.5 x 3/16	7.55	7.55	116.3	21.60	0.902	2	19483	0.000 ✓
T7	101.479 - 81.2708	L 3 x 3 x 3/16	8.80	8.80	112.4	21.60	1.090	0	23541	0.000 ✓

Section Capacity Table

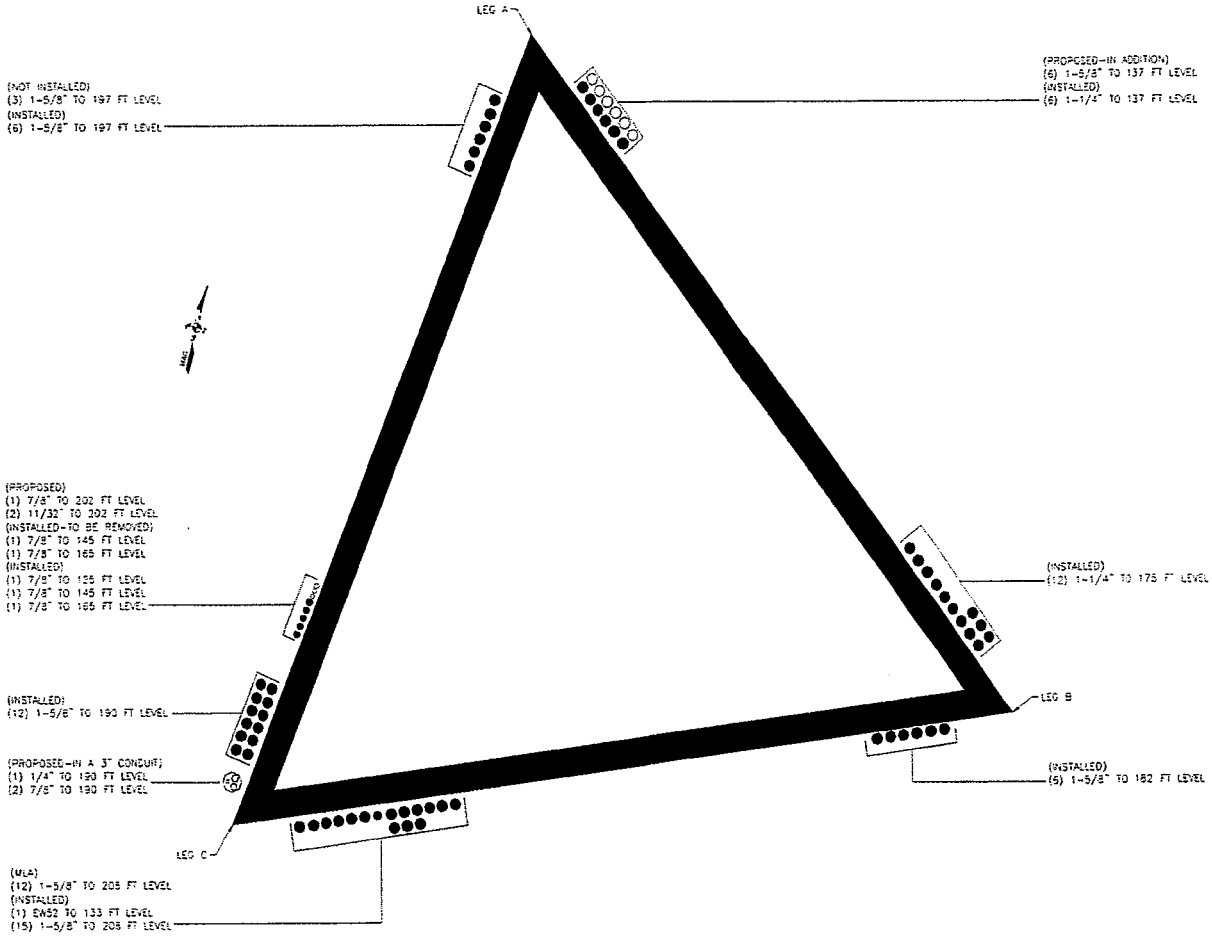
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	212.625 - 202.458	Leg	Pipe 2.875" x 0.203" (2.5 STD)	1	-2053	37412	8.6	Pass
T2	202.458 - 182.292	Leg	Pipe 3.5" x 0.300" (3 XS)	28	-23018	83436	27.6	Pass
T3	182.292 - 162.104	Leg	Pipe 4.5" x 0.337" (4 XS)	67	-62249	139661	44.6	Pass
T4	162.104 - 141.896	Leg	Pipe 5.5" x 0.375" (5 EH)	106	-99436	203696	48.8	Pass
T5	141.896 - 121.688	Leg	Pipe 6.625" x 0.340" (6 EHS)	145	-128278	212984	60.2	Pass
T6	121.688 - 101.479	Leg	Pipe 6.625" x 0.432" (6 XS)	172	-160943	265263	60.7	Pass
T7	101.479 - 81.2708	Leg	Pipe 6.625" x 0.432" (6 XS)	199	-190012	265235	71.6	Pass
T8	81.2708 - 61	Leg	Pipe 8.75" x 0.375" (8 EHS)	226	-218021	339206	64.3	Pass
T9	61 - 40.6667	Leg	Pipe 8.75" x 0.375" (8 EHS)	253	-246254	338973	72.6	Pass
T10	40.6667 - 20.3333	Leg	Pipe 8.75" x 0.500" (8 EH)	280	-260673	443805	58.7	Pass
T11	20.3333 - 0	Leg	Pipe 8.75" x 0.500" (8 EH)	313	-287759	443805	64.8	Pass
T1	212.625 - 202.458	Diagonal	Pipe 2.375" x 0.154" (2 STD)	14	-2862	21598	13.3	Pass
T2	202.458 - 182.292	Diagonal	Pipe 2.375" x 0.154" (2 STD)	39	-9730	15455	63.0	Pass
T3	182.292 - 162.104	Diagonal	Pipe 2.375" x 0.154" (2 STD)	77	-9693	13700	70.8	Pass
T4	162.104 -	Diagonal	Pipe 2.375" x 0.154" (2 STD)	111	-9628	11720	82.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
	141.896							
T5	141.896 - 121.688	Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	149	-12425	14738	84.3	Pass
T6	121.688 - 101.479	Diagonal	Pipe 2.875" x 0.203" (2.5 STD)	176	-11341	12881	88.0	Pass
T7	101.479 - 81.2708	Diagonal	Pipe 3.5" x 0.216" (3 STD)	203	-10977	22060	49.8	Pass
T8	81.2708 - 61	Diagonal	Pipe 3.5" x 0.216" (3 STD)	230	-12044	19594	61.5	Pass
T9	61 - 40.6667	Diagonal	Pipe 3.5" x 0.216" (3 STD)	257	-12486	17160	72.8	Pass
T10	40.6667 - 20.3333	Diagonal	Pipe 3.5" x 0.216" (3 STD)	284	-18360	28340	64.8	Pass
T11	20.3333 - 0	Diagonal	Pipe 3.5" x 0.216" (3 STD)	317	-17828	26700	66.8	Pass
T1	212.625 - 202.458	Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	13	-2052	20302	10.1	Pass
T2	202.458 - 182.292	Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	37	-5213	20252	25.7	Pass
T3	182.292 - 162.104	Horizontal	Pipe 1.9" x 0.145" (1.5 STD)	76	-6082	17348	35.1	Pass
T4	162.104 - 141.896	Horizontal	Pipe 2.375" x 0.154" (2 STD)	109	-6654	24621	27.0	Pass
T5	141.896 - 121.688	Horizontal	Pipe 2.375" x 0.154" (2 STD)	148	-7513	20379	36.9	Pass
T6	121.688 - 101.479	Horizontal	Pipe 2.375" x 0.154" (2 STD)	175	-7471	14811	50.4	Pass
T7	101.479 - 81.2708	Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	202	-7700	25160	30.6	Pass
T8	81.2708 - 61	Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	229	-8826	19693	44.8	Pass
T9	61 - 40.6667	Horizontal	Pipe 2.875" x 0.203" (2.5 STD)	256	-9462	15682	60.3	Pass
T10	40.6667 - 20.3333	Horizontal	Pipe 3.5" x 0.216" (3 STD)	283	-10122	27796	36.4	Pass
T11	20.3333 - 0	Horizontal	Pipe 3.5" x 0.216" (3 STD)	316	-10595	22886	46.3	Pass
T1	212.625 - 202.458	Top Girt	Pipe 1.9" x 0.145" (1.5 STD)	6	-128	20345	0.6	Pass
T10	40.6667 - 20.3333	Redund Horz 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	304	-4524	11680	38.7	Pass
T11	20.3333 - 0	Redund Horz 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	337	-4994	9928	50.3	Pass
T10	40.6667 - 20.3333	Redund Diag 1 Bracing	Pipe 2.375" x 0.154" (2 STD)	305	-4116	7973	51.6	Pass
T11	20.3333 - 0	Redund Diag 1 Bracing	Pipe 2.375" x 0.154" (2 STD)	319	-4250	7442	57.1	Pass
T10	40.6667 - 20.3333	Redund Hip 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	308	-50	10674	0.5	Pass
T11	20.3333 - 0	Redund Hip 1 Bracing	Pipe 1.9" x 0.145" (1.5 STD)	341	-47	8915	0.5	Pass
T10	40.6667 - 20.3333	Redund Hip Diagonal Bracing	Pipe 2.875" x 0.203" (2.5 STD)	307	-57	6996	0.8	Pass
T11	20.3333 - 0	Redund Hip Diagonal Bracing	Pipe 2.875" x 0.203" (2.5 STD)	340	-57	6286	0.9	Pass
T1	212.625 - 202.458	Inner Bracing	L 2 x 2 x 1/8	16	-3	5830	0.3	Pass
T2	202.458 - 182.292	Inner Bracing	L 2 x 2 x 1/8	40	-7	5727	0.3	Pass
T3	182.292 - 162.104	Inner Bracing	L 2 x 2 x 1/8	79	-6	4209	0.3	Pass
T4	162.104 - 141.896	Inner Bracing	L 2 x 2 x 1/8	118	-7	2886	0.4	Pass
T5	141.896 - 121.688	Inner Bracing	L 2 x 2 x 1/8	158	-8	2178	0.4	Pass
T6	121.688 - 101.479	Inner Bracing	L 2.5 x 2.5 x 3/16	185	-6	3443	0.5	Pass
T7	101.479 - 81.2708	Inner Bracing	L 3 x 3 x 3/16	213	-9	4507	0.5	Pass
T8	81.2708 - 61	Inner Bracing	L 3.5 x 3.5 x 1/4	238	-10	7336	0.5	Pass
T9	61 - 40.6667	Inner Bracing	L 3.5 x 3.5 x 1/4	265	-10	5885	0.6	Pass
T10	40.6667 - 20.3333	Inner Bracing	Pipe 3.5" x 0.216" (3 STD)	310	-12	19664	0.5	Pass
T11	20.3333 - 0	Inner Bracing	Pipe 3.5" x 0.216" (3 STD)	343	-13	16278	0.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
						Summary		
						Leg (T9)	72.6	Pass
						Diagonal (T6)	88.0	Pass
						Horizontal (T9)	60.3	Pass
						Top Girt (T1)	0.6	Pass
						Redund Horz 1 Bracing (T11)	50.3	Pass
						Redund Diag 1 Bracing (T11)	57.1	Pass
						Redund Hip 1 Bracing (T11)	0.5	Pass
						Redund Hip Diagonal Bracing (T11)	0.9	Pass
						Inner Bracing (T9)	0.6	Pass
						Bolt Checks	59.3	Pass
						RATING =	**88.0**	**Pass**

APPENDIX B

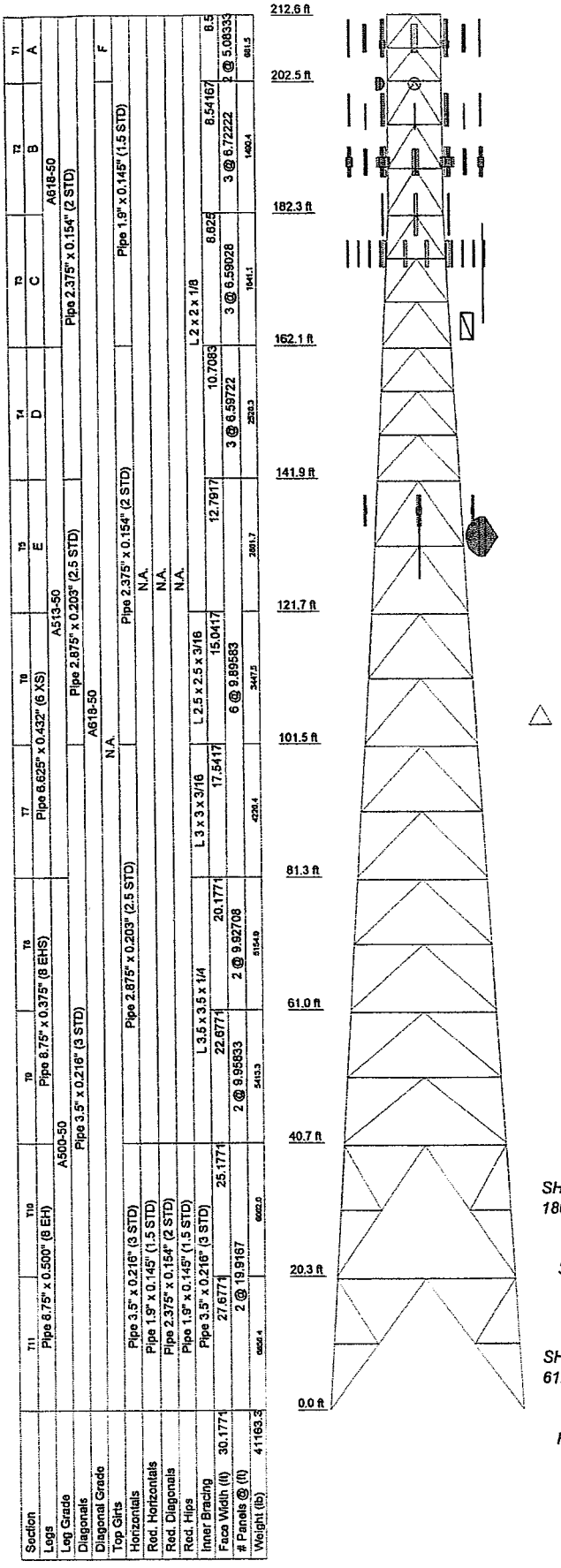
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Program Version 5.4.2.0 - 6/17/2010 File:T:/375_Crown_Castle/2011/37511-0144 BU 806363/37511-0144.eri



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB948F85T2E-M w/ Mount Pipe	208	(2) LGP13519	190
ALP 9212-N w/ Mount Pipe	208	(2) RRUS-11	190
(2) ClearGain Dual Band 800/1900 MHz	208	AM-X-CD-14-65-00T-RET w/ Mount Pipe	190
(2) LPA-80080/6CF w/ Mount Pipe	208	DC6-48-60-18-8F	190
DB948F85T2E-M w/ Mount Pipe	208	Sector Mount [SM 602-3]	190
ALP 9212-N w/ Mount Pipe	208	4' x 2" Pipe Mount	190
(2) LPA-80080/6CF w/ Mount Pipe	208	4' x 2" Pipe Mount	190
DB948F85T2E-M w/ Mount Pipe	208	4' x 2" Pipe Mount	190
(2) DB948F85T2E-M w/ Mount Pipe	208	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	190
ALP 9212-N w/ Mount Pipe	208		
(2) LPA-80080/6CF w/ Mount Pipe	208	(2) 7770.00 w/ Mount Pipe	190
Sector Mount [SM 510-3]	208	742 213	182
Pipe Mount [PM 501-1]	202	Pipe Mount [PM 501-3]	182
Sinclair SD310-HL	202	742 213	182
Pipe Mount [PM 501-1]	202	742 213	182
HP2-4.7NS	202	(4) DB844H90E-XY w/ Mount Pipe	175
HP2-4.7NS	202	Sector Mount [SM 510-3]	175
(2) DB980H90E-M w/ Mount Pipe	197	(4) DB844H90E-XY w/ Mount Pipe	175
Sector Mount [SM 505-3]	197	(4) DB844H90E-XY w/ Mount Pipe	175
(3) 4' x 2" Pipe Mount	197	1151-3	165
(3) 4' x 2" Pipe Mount	197	Side Arm Mount [SO 308-1]	165
(3) 4' x 2" Pipe Mount	197	OA20-67-DIN	145
(2) DB980H90E-M w/ Mount Pipe	197	Side Arm Mount [SO 308-1]	145
(2) DB980H90E-M w/ Mount Pipe	197	ATMPP1412D-1CWA	137
(2) LGP13519	190	RR90-17-02DP w/ Mount Pipe	137
(2) RRUS-11	190	ATMAA1412D-1A20	137
AM-X-CD-14-65-00T-RET w/ Mount Pipe	190	ATMPP1412D-1CWA	137
		RR90-17-02DP w/ Mount Pipe	137
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	190	ATMAA1412D-1A20	137
		ATMPP1412D-1CWA	137
(2) 7770.00 w/ Mount Pipe	190	Side Arm Mount [SO 201-3]	137
(2) LGP13519	190	RR90-17-02DP w/ Mount Pipe	137
(2) RRUS-11	190	ATMAA1412D-1A20	137
AM-X-CD-14-65-00T-RET w/ Mount Pipe	190	Pipe Mount [PM 601-1]	133
		PL6-59W	133
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	190	1142-2C	125
		Side Arm Mount [SO 308-1]	125
(2) 7770.00 w/ Mount Pipe	190		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pipe 2.875" x 0.203" (2.5 STD)	D	Pipe 5.5" x 0.375" (5 EH)
B	Pipe 3.5" x 0.300" (3 XS)	E	Pipe 6.625" x 0.340" (6 EHS)
C	Pipe 4.5" x 0.337" (4 XS)	F	Pipe 1.9" x 0.145" (1.5 STD)

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A618-50	50 ksi	70 ksi	A500-50	50 ksi	62 ksi
A513-50	50 ksi	66 ksi			

UPLIFT: -261510 lb

SHEAR: 37080 lb

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 88%

SHEAR 18043 lb

TORQUE 7520 lb-ft
37.60 mph WIND - 0.750 in ICE
AXIAL
67167 lb

SHEAR 61299 lb

MOMENT 7560621 lb-ft

TORQUE 37078 lb-ft
REACTIONS - 85.00 mph WIND

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

Job:	*212 ft Clinton, CT S/S Tower*
Project:	*BU #806363 (PJF #37511-0144)*
Client: Crown Castle	Drawn by: Christina Hedges App'd:
Code: TIA/EIA-222-F	Date: 01/27/11 Scale: NTS
Path: T:\375 Crown Castle\2011\37511-0144 BU 806363\37511-0144.eri	Dwg No. E-1

PJF job no. **37511-0144** Project name **BU806363**

foundation loads

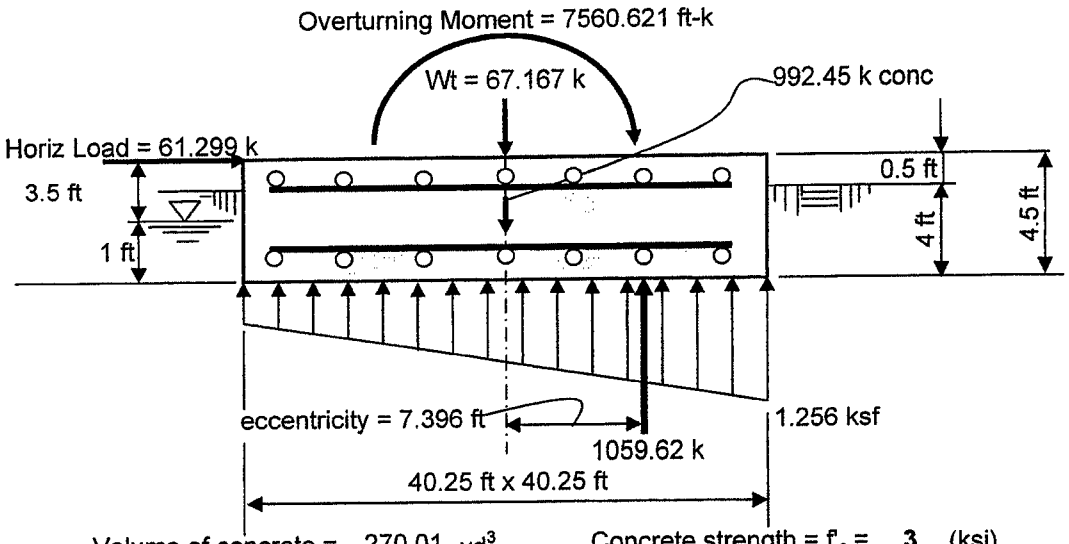
Tower or Pole Weight =	**67.167**	kips
Total Horizontal Force =	**61.299**	kips
Overturning Moment =	**7560.6**	ft-kips

soil properties

Safety factor against overturning =	**1.5**	
Soil density =	**120**	pcf
Allowable soil bearing =	**4**	ksf
Depth to water table =	**3**	ft

mat dimensions

depth to bottom of footing =	**4**	ft
Footing thickness =	**4.5**	ft
Footing Width =	**40.25**	ft
Footing Length =	**40.25**	ft
Tower/Pole Center Offset =	**0**	ft



Volume of concrete = 270.01 yd^3 Concrete strength = f'_c = **3** (ksi)

Rebar = (220) #7 bars by 39.75 ft long

reinforcing steel = **(55) #7 @ 8.83 in o.c. ea way top and bottom**

Summary of analysis results

Rebar strength = F_y = **60** (ksi)

minimum cover over rebar = **3** inches

Overturning Moment: (Stress Ratio = 0.551)

Calculated Overturning Moment = 7836.5 ft-kips

Resisting Moment = 21324.8 ft-kips

Factor of Safety against overturning = 2.721 **> 1.5 okay**

Soil Bearing (Stress Ratio = 0.314)

Net Soil Bearing Resistance = 4 ksf

Calculated Soil Bearing Pressure = 1.256 **ksf < 4 ksf okay**

Bending Moment (Stress Ratio = 0.702) **< CONTROLLING CRITERIA**

Ultimate Bending Moment Resistance = 7259 ft-kips

Calculated Ultimate Bending Moment = 5092 **ft-kips < 7259 ft-kips okay**

Bending Shear (Stress Ratio = 0.17)

Ultimate Bending Shear Resistance = 2235 kips

Calculated Ultimate Bending Shear = 381 **kips < 2235 kips okay**

AM-X-CD-14-65-00T-RET (4' 65° Dual Broadband Antenna)

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65° / V17.0°
1710 ~ 2170MHz, X-pol., H65° / V8.5°

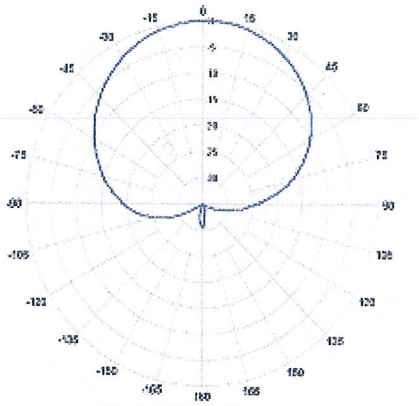
Electrical Specification

Frequency Range		698~894MHz	1710~2170MHz
Impedance		50Ω	
Polarization		Dual, Slant ±45°	
Gain		14.0dBi / 11.85dBd @ 698-806MHz 14.8dBi / 12.65dBd @ 824-894MHz	16.1dBi / 13.95dBd @1710-1755MHz 16.3dBi / 14.15dBd @1850-1900MHz 16.0dBi / 13.85dBd @2110-2155MHz
Beamwidth	Horizontal	67° @ 698-806MHz 65° @ 824-894MHz	60° @ 1710-1755MHz 61° @ 1850-1900MHz 64° @ 2110-2155MHz
	Vertical	17.5 @ 698-806MHz 16.5° @ 824-894MHz	8.8° @ 1710-1755MHz 8.5° @ 1850-1900MHz 8.0° @ 2110-2155MHz
VSWR		≤1.5:1	
Front-to-Back Ratio		≥28 dB	
Electrical Downtilt Range		2° ~ 16°	0° ~ 10°
Isolation Between Ports		≥30 dB	
Isolation Between Ports of Different Frequency Elements		≥35 dB	
Cross Pole Discrimination		10.0 dB @ ±60° 15.0 dBi @ 0°	
First Upper Side Lobe Suppression		16dB	
Side Lobe Suppression		> 16dB @ 0-6° Tilt > 18dB @ 7-12° Tilt (Up to 15° from Boresight)	> 16dB @ 0-6° Tilt > 18dB @ 7-10° Tilt (Up to 15° from Boresight)
Passive Intermodulation		≤ -150 dBc @ 2x20w	
Input Maximum CW Power		500 W	300 W
Environmental Compliance		IP65 for Radome IP67 for Connectors	
RET Motor Configuration		Field Replaceable RET Electronic Control Module / RET Motor is internal to antenna & not field replaceable	
Compliant with AISG 1.1 and 2.0		AISG 1.1 and 2.0	

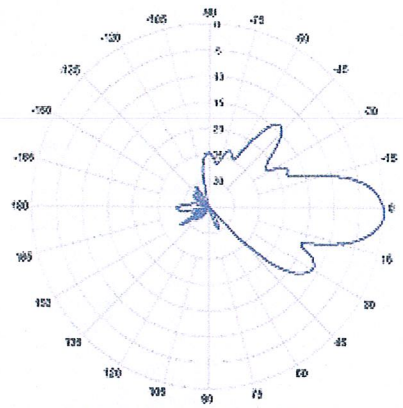
Mechanical Specification

Dimension (W×D×H)	11.8×5.9×48 inches (300×150×1219mm)
Weight (Without clamp)	16.5 kg (36.4 lbs)
Connector	4 x 7/16 DIN(F), Long Neck
Max Wind Speed	150mph
Wind Load (@150 mph)	1260 N

AM-X-CD-14-65-00T-RET (4' 65° Dual Broadband Antenna)

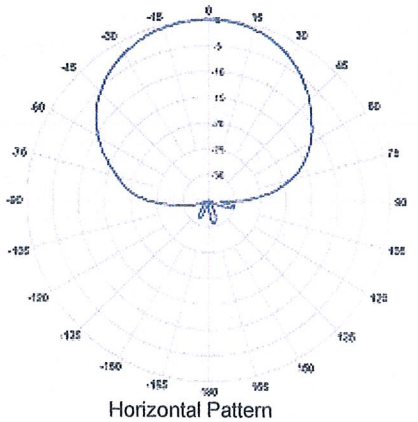


Horizontal Pattern

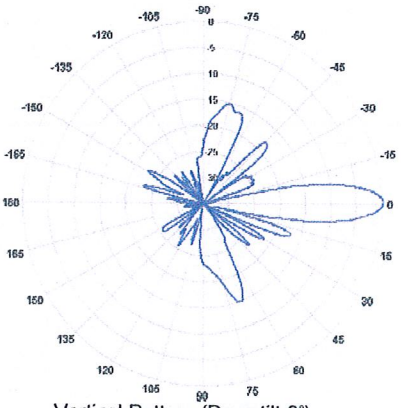


Vertical Pattern (Downtilt 2°)

700MHz band Pattern

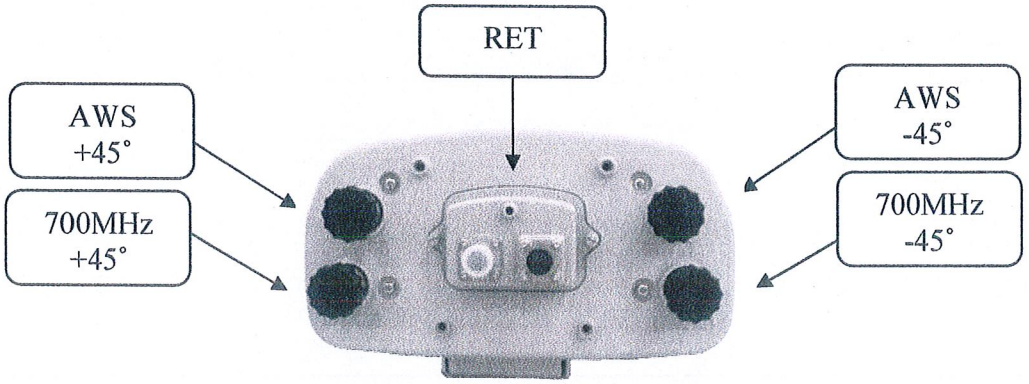


Horizontal Pattern



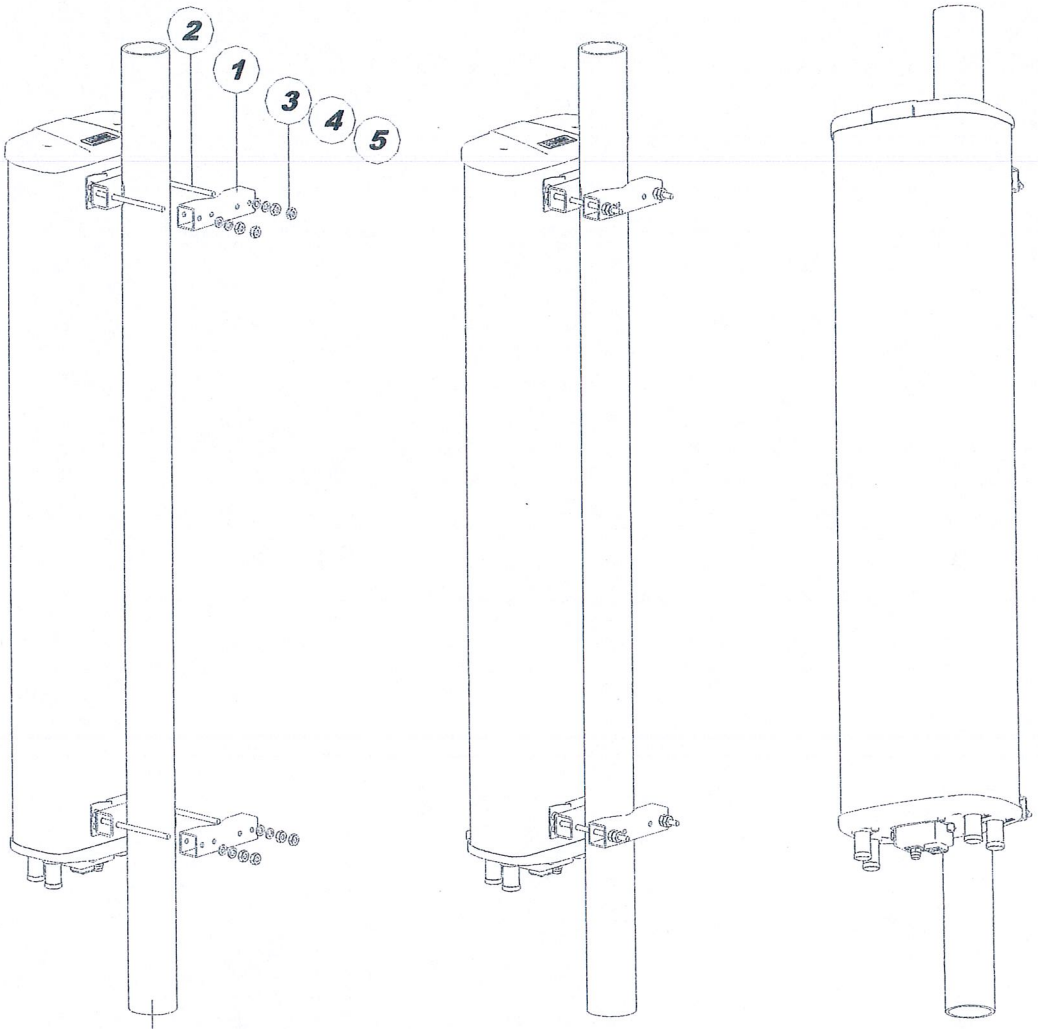
Vertical Pattern (Downtilt 0°)

AWS band Pattern



AM-X-CD-14-65-00T-RET (4' 65° Dual Broadband Antenna)

Antenna Drawings and Installation Diagram



MOUNT POLE
Ø1.97 ~ 3.15inch OD.
(50 ~ 80mm OD.)

STANDARD MOUNTING KITS

No.	PART NAME	Q'TY	Recommending Torque
1	FIXED CLAMP	4	
2	Hex. Cap Bolt, M10	4	17mm Spanner 208lbf.inch 240kgf.cm
3	Plain Washer, M10	4	
4	Spring Washer, M10	4	
5	Hex. Nut, M10	8	

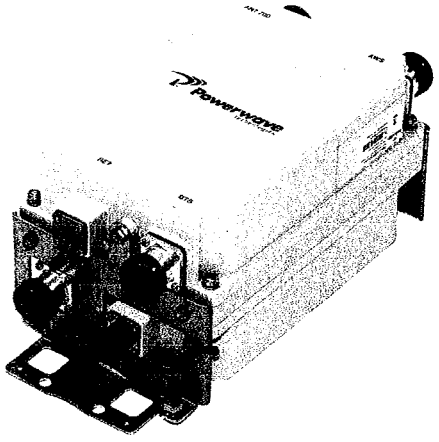
TT19-08BP111-001 | TMA Twin 1900 with 850 Bypass 12 dB AISG 1.1

ELECTRICAL SPECIFICATIONS	
UL Frequency Range (MHz)	1850-1910 with 824-894 bypass
UL Rejection	>77 dB
UL Gain(dB)	12
UL Return Loss	>18
UL Noise Figure	<1.7 dB, Typical
UL Output 3rd Order Intercept Point(dBm)	>+23
UL Bypass Loss(dB)	2.5, Typical
UL Max Input Power (dBm)	+14 dBm
DL Frequency Range (MHz)	1930-1990 with 824-894 bypass
DL Return Loss	>18
DL Insertion Loss (dB)	850 MHz, <0.3; 1900 MHz, <0.5
Intermodulation	@ 2 x +43 dBm TX carriers, in receive band, <160 dBc, reffered to antenna port
Input Voltage (V)	AISG Mode: 10-30; Current alarm mode: 8 -17
Alarm Functionality	AISG compatible or in case of no AISG command received, current alarm mode 170-190 mA
Power Consumption	<1.1W @12V
Power Handling, RMS	850: >57 dBm; 1900: >55 dBm
AISG Compatibility	AISG 1.1 fully upgreadable to AISG 2.0 (AISG version only dependent on loaded SW version) TT19-08BP112-001 has AISG 2.0 loaded from factory

MECHANICAL SPECIFICATIONS	
Dimension HxWxD mm(ft)	250x169x137 mm (9.9"x6.7"x5.4")
Weight(lbs)	<16
Colors	Off white (NCS 1502-R)
RF Connectors	DIN 7/16 female, long neck
Mounting Kit	Mounting kit for pole and wall is included

ENVIRONMENTAL SPECIFICATIONS	
Temperature Range	-40° C to +65° C (-40° F to +149° F)
Operational	ETS 300 019-1-4
Transportation	ETS 300 019-1-2
Storage	ETS 300 019-1-1
Lightning Protection	3 kA 10/350 µs; 20 kA (Shield)
Housing	Aluminum
MTBF	>1 million hours per TMA
Ingress Protection	IP65 and IP68

APPROVAL AND TESTS	
Safety	EN60950
EMC	3GPP: TS 25.113



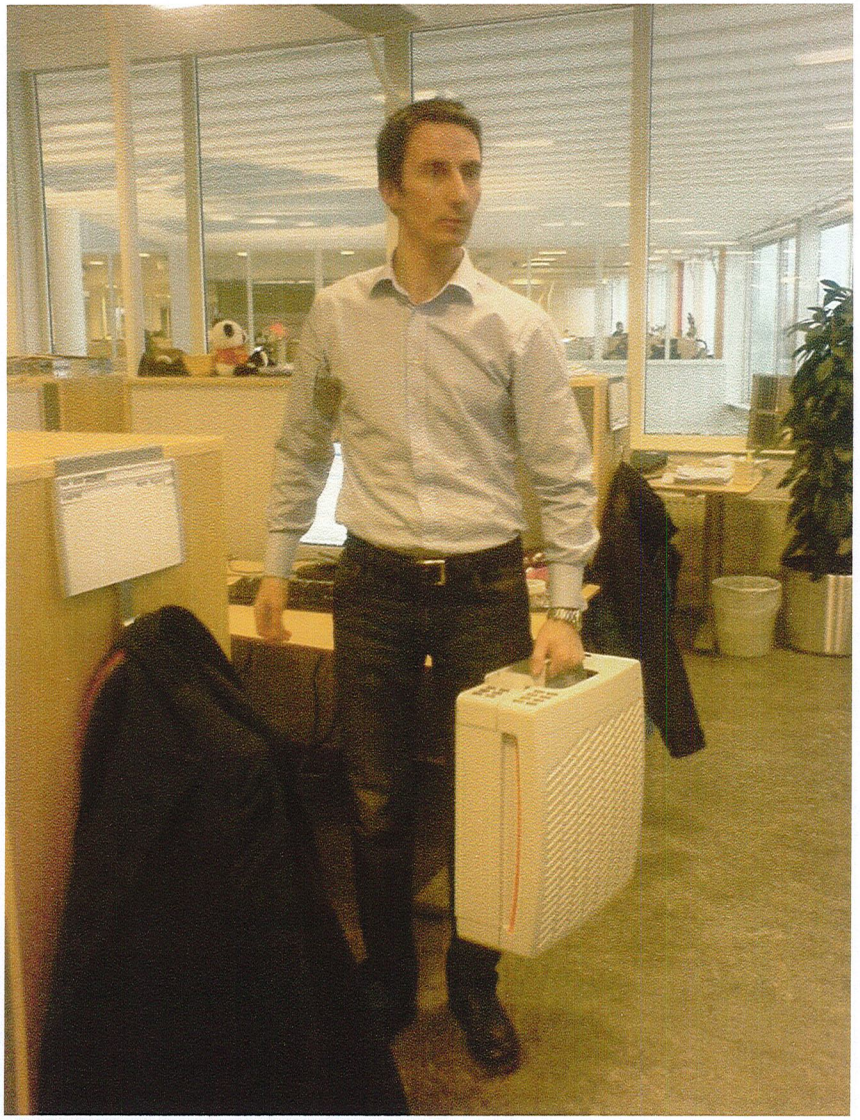
*All specifications subject to change without notice. Contact your Powerwave representative for complete performance data.

RRUS 11 – Dual PA RRU.

Technical Data

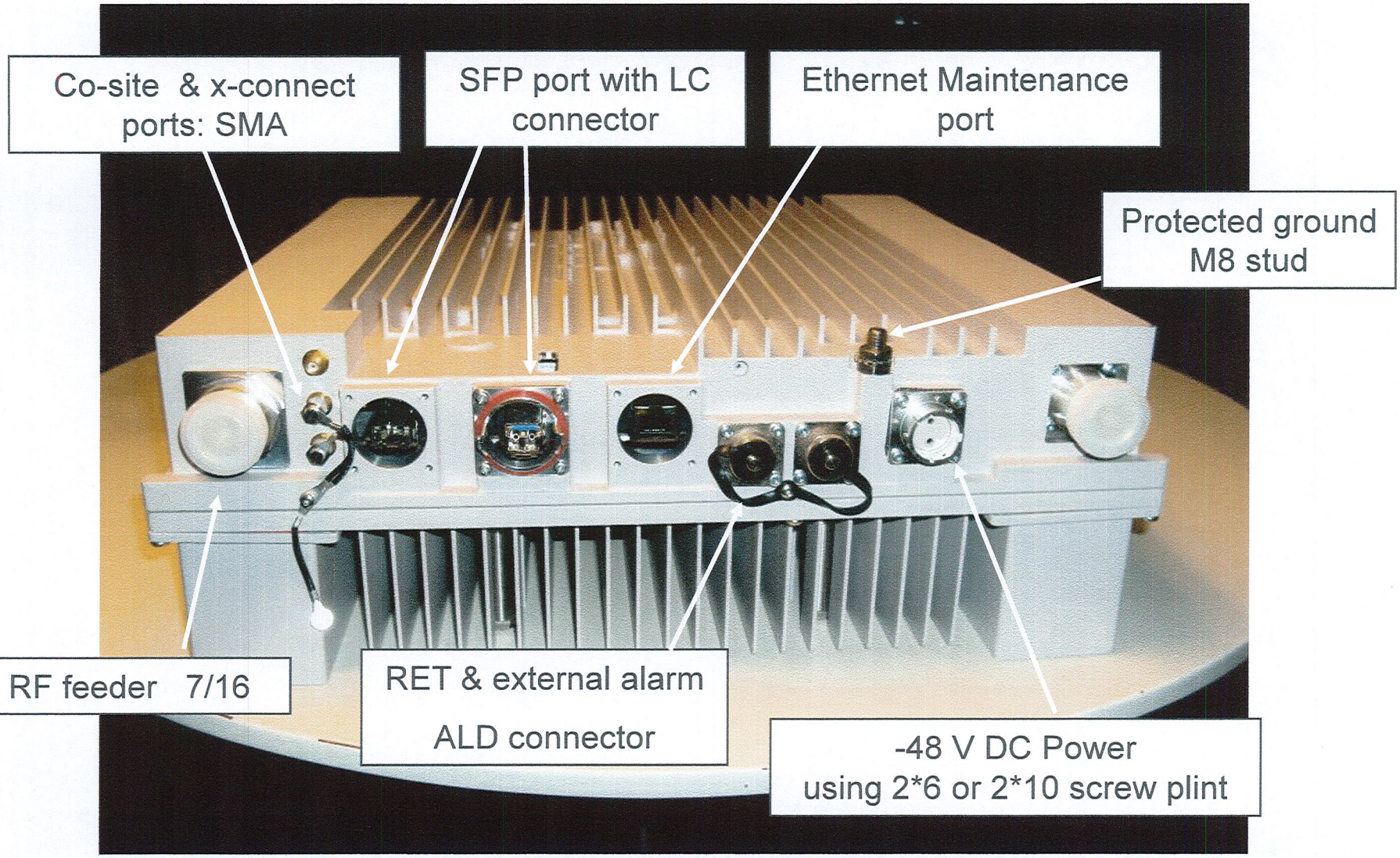
RBS6000

- Multi standard
- RF: 2x30 Watts
- Carrier BW: 1.4 – 20 MHz
- Alarms: 2
- Dimensions (with sunshield):
  - Width: 17.0 in
  - Height: 17.8 in
  - Depth: 7.2 in
  - Weight: 55 lbs (Band 12)
  - Weight: 50 lbs (Band 4)
- Temperature: -40 to +131 F
- Cooling: Self convection
- Power: -48 VDC
- Rec. fuse size 20 Amp
  - Rec. DC cable:
    - 6 mm^2 up to 60 meters
    - 10 mm^2 over 60 meters
    - Shielded
- Power Cons: 200 Watts typ.



RRUS-11 I/F

RBS6000



DC6-48-60-18-8F

DC Power Surge Protection

Electrical Specifications	
Model Number	DC6-48-60-18-8F
Nominal Operating Voltage	48 VDC
Nominal Discharge Current (I_n)	20 kA 8/20 µs
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs
Maximum Continuous Operating Voltage (U_c)	75 VDC
Voltage Protection Rating	400 V

Mechanical Specifications	
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum
Fiber Connection Method	LC-LC Single mode duplex
Environmental Rating	IP 68, 7m 72hrs
Operating Temperature	-40° C to + 80° C
Storage Temperature	-70° C to + 80° C
Cold Temperature Cycling	IEC 61300-2-22e -30° C to + 60° C 200 hrs @ 5 psi
Resistance to Aggressive Materials	CEI IEC 61073-2 including acids and bases
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs
Weight	20 lbs without Mounting Bracket

STANDARDS

Strikesorb modules are compliant to the following Surge Protection Device (SPD) Standards:

- ANSI/UL 1449 – 3rd Edition
- IEEE C62.41
- NEMA LS-1, IEC 61643-1:2005 2nd Edition:2005
- IEC 61643-12
- EN 61643-11:2002 (including A11:2007)

GS-07F-0435V

Certified to ISO 9001:2000

TÜV Rheinland of North America

Raycap, Inc. 806 W. Clearwater Loop • Post Falls • Idaho • 83854 • USA
Phone 208 777 1166 • Toll Free 800 890 2569 • Fax 208 777 4466 • www.raycapsurgeprotection.com

POWER

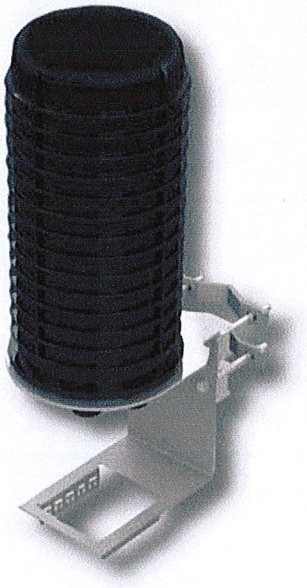
DC6-48-60-18-8F

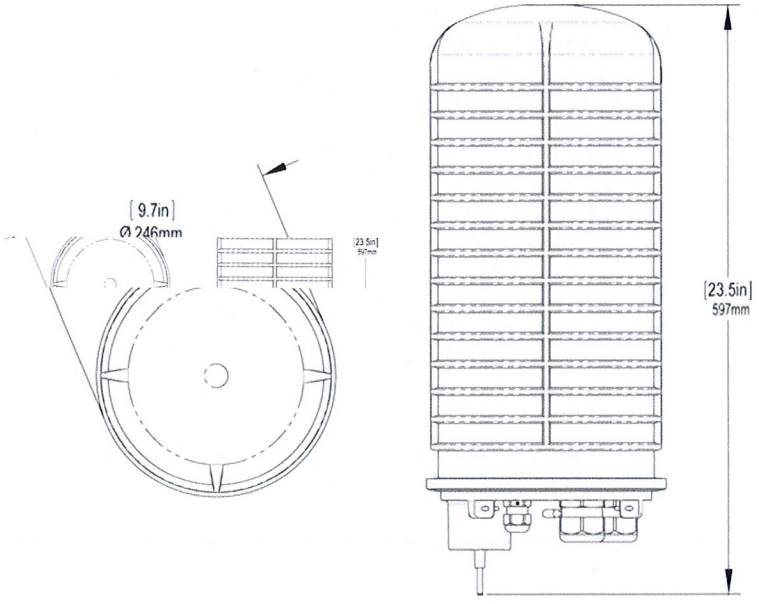
DC Surge Suppression Solution

The DC6-48-60-18 is a dual chambered, DC surge suppression system for use in multi-circuit, Distributed Antenna Systems. The system will protect up to 6 Remote Radio Heads from voltage surges and lightning, and connect up to 18 fiber pairs. The system is enclosed in a NEMA 4 rated, waterproof enclosure.

FEATURES

- Protects up to 6 Remote Radio Heads, each with its own protection circuit.
- Flexible design allows for installation at the top of a tower for Remote Radio Head protection.
- Includes fiber connections for up to 18 pairs of fiber.
- LED indicators on individual circuits provide visual indication of suppressor status.
- Form 'C' relays allow for remote monitoring of the suppressor status.
- Patented Strikesorb technology provides over 60 kA of surge current capacity per circuit.
- Strikesorb suppression modules are fully recognized to UL 1449-3rd Edition Safety Standard, meeting all intermediate and high current fault requirements to facilitate use in OEM applications.
- Raycap recommends that DC protection system be installed within 2 meters or 6 feet of the radio.
- Dome design is lightweight and aerodynamic providing maximum flexibility for installation on top of towers.





Raycap

Phone 208.777.1166 Toll Free 800.890.2569 Fax 208.777.4466 www.raycapsurgeprotection.com

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant

February 25, 2011

Honorable William W. Fritz
1st Selectman, Town of Clinton
Clinton Town Hall
54 East Main Street
Clinton, CT 06413

Re: Telecommunications Facility – 48 Cow Hill Road Clinton, CT

Dear Mr. Fritz:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review AT&T's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes Cingular's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures; please call me at (860) 463-5511 or Ms. Linda Roberts, Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Douglas L. Culp
Real Estate Consultant

Enclosure