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

October 28, 2008

Carrie L. Larson, Esq.
Pullman & Comley, LLC
90 State House Square
Hartford, CT 06103-3702

RE: **EM-POCKET-047-081006** – Youghiogheny Communications-Northeast, LLC d/b/a Pocket Communications notice of intent to modify an existing telecommunications facility located at 232 South Main Street, East Windsor, Connecticut.

Dear Attorney Larson:

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.

The proposed modifications are to be implemented as specified here and in your notice dated October 3, 2008, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Thank you for your attention and cooperation.

Very truly yours,

S/Derek Phelps
Executive Director

SDP/CML/jb

c: The Honorable Denise Sabotka Menard, First Selectman, Town of East Windsor
Laurie Whitten, Town Planner, Town of East Windsor
Balch Bridge Street Corporation

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

October 14, 2008

The Honorable Denise Sabotka Menard
First Selectman
Town of East Windsor
Town Hall
11 Rye Street
P. O. Box 213
Broad Brook, CT 06016-0389

RE: **EM-POCKET-047-081006** – Youghiogheny Communications-Northeast, LLC d/b/a Pocket Communications notice of intent to modify an existing telecommunications facility located at 232 South Main Street, East Windsor, Connecticut.

Dear Ms. Menard:

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 October 22, 2008.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/jb

Enclosure: Notice of Intent

c: Laurie Whitten, Town Planner, Town of East Windsor

PULLMAN & COMLEY
ATTORNEYS AT LAW

EM-POCKET-047-081006

ORIGINAL

CARRIE L. LARSON
90 State House Square
Hartford, CT 06103-3702
p (860) 424-4312
f (860) 424-4370

www.pullcom.com

October 3, 2008

Via Federal Express

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

Re: Notice of Exempt Modification
Balch Bridge Street Corporation Telecommunications Facility
232 South Main Street, East Windsor, Connecticut

Dear Mr. Phelps:

Youghiogheny Communications-Northeast, LLC, doing business as Pocket Communications ("Pocket"), intends to install antennas and appurtenant equipment at the existing 188-foot lattice tower facility owned by Balch Bridge Street Corporation and located at 232 South Main Street, East Windsor, Connecticut ("Facility"). Pocket Communications provides prepaid, flat rate wireless voice and data services to more than a quarter of a million subscribers. Pocket is licensed by the Federal Communications Commission (FCC) to provide PCS wireless telecommunications service in the State of Connecticut, which includes the area to be served by the proposed installation. This installation constitutes an exempt modification pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes Section 16-50g et. seq. (PUESA), and Section 16-50j-72(b)(2) of the Regulations of the Connecticut State Agencies adopted pursuant to PUESA. In accordance with R.C.S.A. Section 16-50j-73, a copy of this notice has been sent to Denise Menard, First Selectman, Town of East Windsor.

The existing Facility consists of a 188-foot self-supporting lattice tower capable of supporting multiple carriers within a fenced compound. The coordinates for the Facility are **Lat: 41°-52'-37" and Long: 72°–36'-38".** The tower is located in the southwest corner of East Windsor, roughly 2,000 feet east of the Windsor town line (center of Connecticut River) and roughly 3,200 feet north of the South Windsor town line. The Facility is approximately 280 feet west of South Main Street (Route 5), roughly 1,000 feet south of South Main Street's intersection with Abbe Road (see Site Map, attached as Exhibit A). The tower currently supports Sprint antennas at the one hundred twenty four foot (124') level centerline AGL (above ground level), Verizon antennas at the one hundred forty four foot level (144') AGL, T-Mobile antennas at the one hundred fifty three foot level (153') AGL, AT&T antennas at the one hundred sixty eight foot level (168') AGL, and Nextel antennas at the one hundred eighty eight foot level (188') AGL. A whip style antenna is mounted to the top of the tower with a centerline of one

hundred ninety three feet, six inches (193'-6"). Pocket proposes to install three RFS APXV18-206517S-C flush mount antennas on the tower at the one hundred seventy seven foot centerline (177') AGL, and a Nortel CDMA Micro BTS 3231 cabinet, mounted on an "H-Frame," contained within a six foot by six foot (6'-0" x 6'-0") lease area. A small GPS antenna will be mounted to an ice bridge which will run from the lease area to the tower. Utilities will be run via a proposed underground conduit from an existing utility backboard, within the compound (See Design Drawings and Equipment Specifications, attached as Exhibits B and C respectively).

For the following reasons, the proposed modifications to the South Main Street Facility meet the exempt modification criteria set forth in R.C.S.A. Section 16-50j-72(b)(2):

1. The proposed modification will not increase the height of the tower as Pocket's antennas will be installed at a center line height of approximately 177 feet .

2. The installation of Pocket's equipment and shelter will not require an extension of the site boundaries.

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

4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes and MPE limits established by the Federal Communications Commission. The worst-case RF power density calculations for the proposed Pocket antennas would be 21.72% of the FCC standard (see general power density calculations table, attached as Exhibit D).

Also attached, Exhibit E, is a structural analysis confirming that the tower can support the existing and proposed antennas and associated equipment.

For the foregoing reasons, Pocket respectfully submits that the proposed antenna installation and equipment at the East Windsor Facility constitutes an exempt modification under R.C.S.A. Section 16-50j-72(b)(2).

Respectfully Submitted,

Carrie L. Larson

cc: First Selectman, Town of East Windsor
Jim Balch, Balch Bridge Street Corporation, underlying property owner

Exhibit A

Site Map

Pocket Site HFCT1470A

232 South Main Street

East Windsor, Connecticut

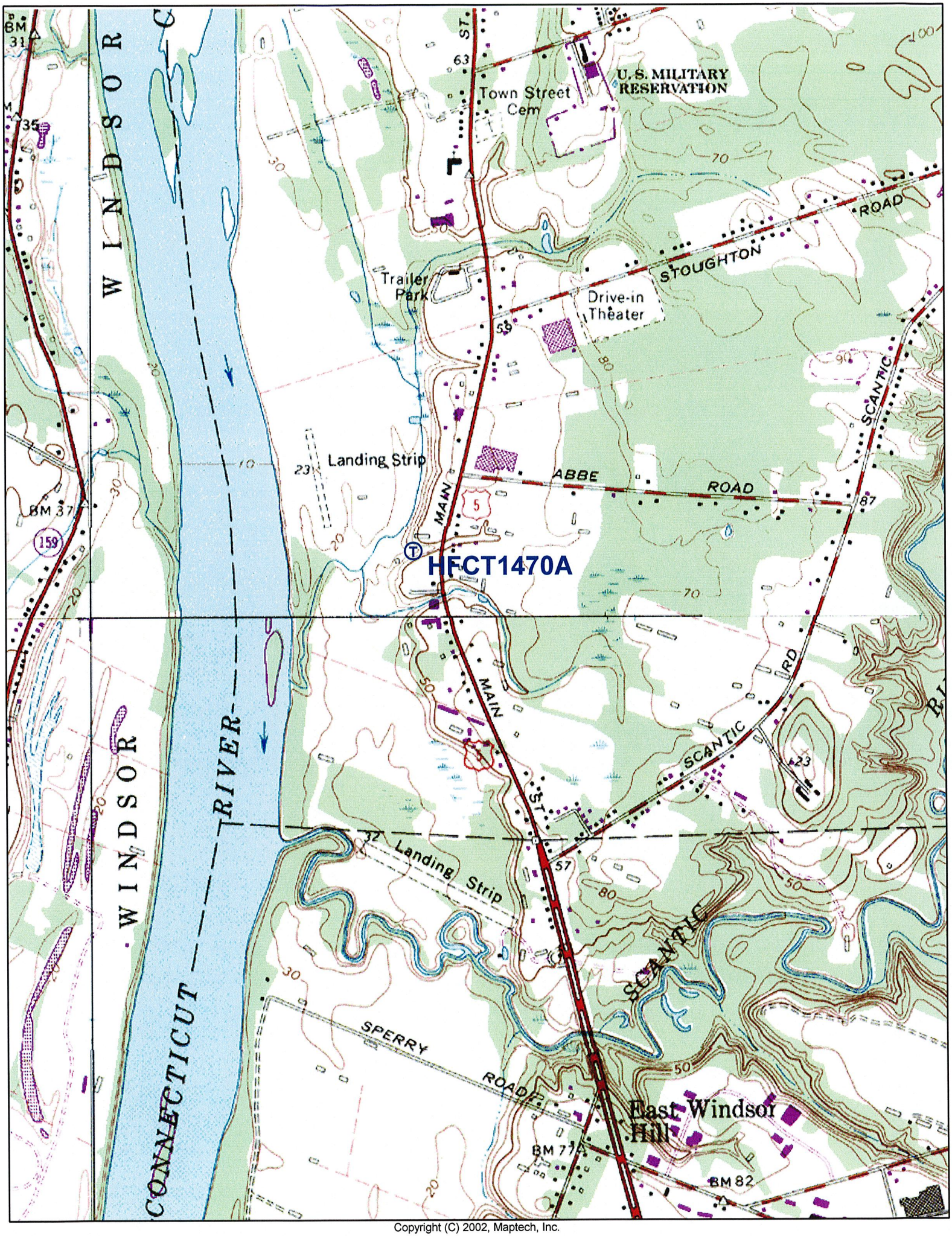


Exhibit B

Design Drawings

Pocket Site HFCT1470A

232 South Main Street

East Windsor, Connecticut

PROJECT INFORMATION

TOWER OWNER:	BALCH BRIDGE STREET CO. 250 SOUTH MAIN STREET EAST WINDSOR, CT 06088
OWNER SITE ID#:	N/A
APPLICANT:	YOUGHIOGHENY COMMUNICATIONS-NORTHEAST LLC 2819 NW LOOP 410 SAN ANTONIO, TX 78230
SITE ADDRESS:	232 SOUTH MAIN STREET EAST WINDSOR, CT 06088
COUNTY:	HARTFORD
LATITUDE:	41.8772
LONGITUDE:	-72.6108
STRUCTURE HEIGHT:	188' AGL
ZONING CLASSIFICATION:	N/A
ZONING JURISDICTION:	CONNECTICUT SITING COUNCIL
POWER COMPANY	CL&P 1-860-947-2121
TELEPHONE COMPANY:	AT&T 1-888-727-8368
DESIGN FIRM:	URS CORPORATION AES 500 ENTERPRISE DRIVE, SUITE 3B ROCKY HILL, CT 06067 PHONE: 860-529-8882

pocket™
SMART WIRELESS

HFCT1470
232 SOUTH MAIN STREET
188' LATTICE TOWER

DRAWING INDEX

STRUCTURAL REVIEW

A TOWER ANALYSIS HAS NOT BEEN PERFORMED FOR THE PREPARATION OF THESE PLANS. AS OF THE ISSUANCE OF THESE DRAWINGS, THE EXISTING TOWER HAS NOT BEEN EVALUATED FOR REPLACEMENT/ADDITION OF ANTENNAS, COAX CABLES AND EQUIPMENT. NO WORK SHALL OCCUR ON THIS TOWER PRIOR TO THE ISSUANCE OF A PASSING STRUCTURAL TOWER ANALYSIS. A COPY OF THE TOWER ANALYSIS SHALL BE FORWARDED TO URS CORPORATION. ALL REINFORCEMENT (IF REQUIRED) SHALL BE PERFORMED PRIOR TO ANY WORK UNDER THIS CONTRACT BEING PERFORMED.

APPROVALS

_____ REAL ESTATE

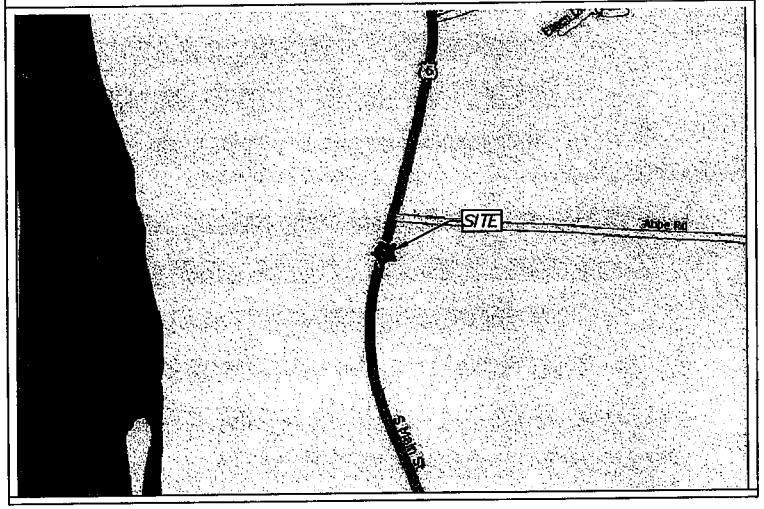
_____ RF

_____ OPS/CONSTRUCTION

_____ LEGAL/COMPLIANCE

_____ NET DESIGN

LOCATION MAP



DRIVING DIRECTIONS

FROM HARTFORD:
TAKE I-91 NORTH TOWARD SPRINGFIELD. MERGE ONTO I-291 S VIA EXIT 35A TOWARD MANCHESTER. TAKE THE US-5 N EXIT, EXIT 4. TURN LEFT ONTO JOHN FITCH BLVD N/US-5 N. CONTINUE TO FOLLOW US-5 N, SOUTH MAIN STREET. FOR APPROXIMATELY 5.4 MILES. THE SITE IS ON THE LEFT.

APPLICABLE BUILDING CODES AND STANDARDS

CONTRACTOR'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:
CONNECTICUT STATE BUILDING CODE
- 2003 INTERNATIONAL BUILDING CODE
- 2003 INTERNATIONAL PLUMBING CODE
- 2003 INTERNATIONAL MECHANICAL CODE
- 2003 INTERNATIONAL EXISTING BUILDING CODE
- 2005 CONNECTICUT SUPPLEMENT

ELECTRICAL CODE:
- 2005 NATIONAL ELECTRICAL CODE

CONNECTICUT STATE FIRE SAFETY CODE
- 2003 INTERNATIONAL FIRE CODE

CONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST APPROVED 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 STANDARD FOR STRUCTURAL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:

TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM

IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1275 GENERAL INSTALLATION REQUIREMENTS

TELCORDIA GR-1503 COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION

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.

SITE NOTES

1. THIS SITE IS UNMANNED AND IS RESTRICTED TO OUTDOOR EQUIPMENT. IT WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNALS FOR THE PURPOSE OF PROVIDING PUBLIC CELLULAR SERVICE.
2. POCKET COMMUNICATIONS CERTIFIES THAT THIS TELEPHONE EQUIPMENT FACILITY WILL BE SERVICED ONLY BY POCKET COMMUNICATIONS EMPLOYEES AND THE WORK ASSOCIATED WITH ANY EQUIPMENT CANNOT BE PERFORMED BY HANDICAPPED PERSONS. THIS FACILITY WILL BE FREQUENTED ONLY BY SERVICE PERSONNEL FOR REPAIR PURPOSED ONLY. THIS FACILITY IS EXEMPT FROM THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA) APPENDIX B, SECTION 4.11.(5)(B)
3. NO POTABLE WATER SUPPLY IS TO BE PROVIDED AT THIS LOCATION.
4. NO WASTE WATER WILL BE GENERATED AT THIS LOCATION.
5. NO SOLID WASTE WILL BE GENERATED AT THIS LOCATION.
6. POCKET COMMUNICATIONS MAINTENANCE CREW (TYPICALLY ONE PERSON) WILL MAKE AN AVERAGE OF ONE TRIP PER MONTH AT ONE HOUR PER VISIT.

CALL before you DIG FOR CT 1-800-922-4455

STATE OF CONNECTICUT — IGNACIO C. ARIAS — No. 8704 — LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
0	09-10-08	ISSUED FOR CONSTRUCTION	JCF

pocket SMART WIRELESS

PROJECT: HFCT1470, 232 SOUTH MAIN STREET
SHEET: TITLE SHEET

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

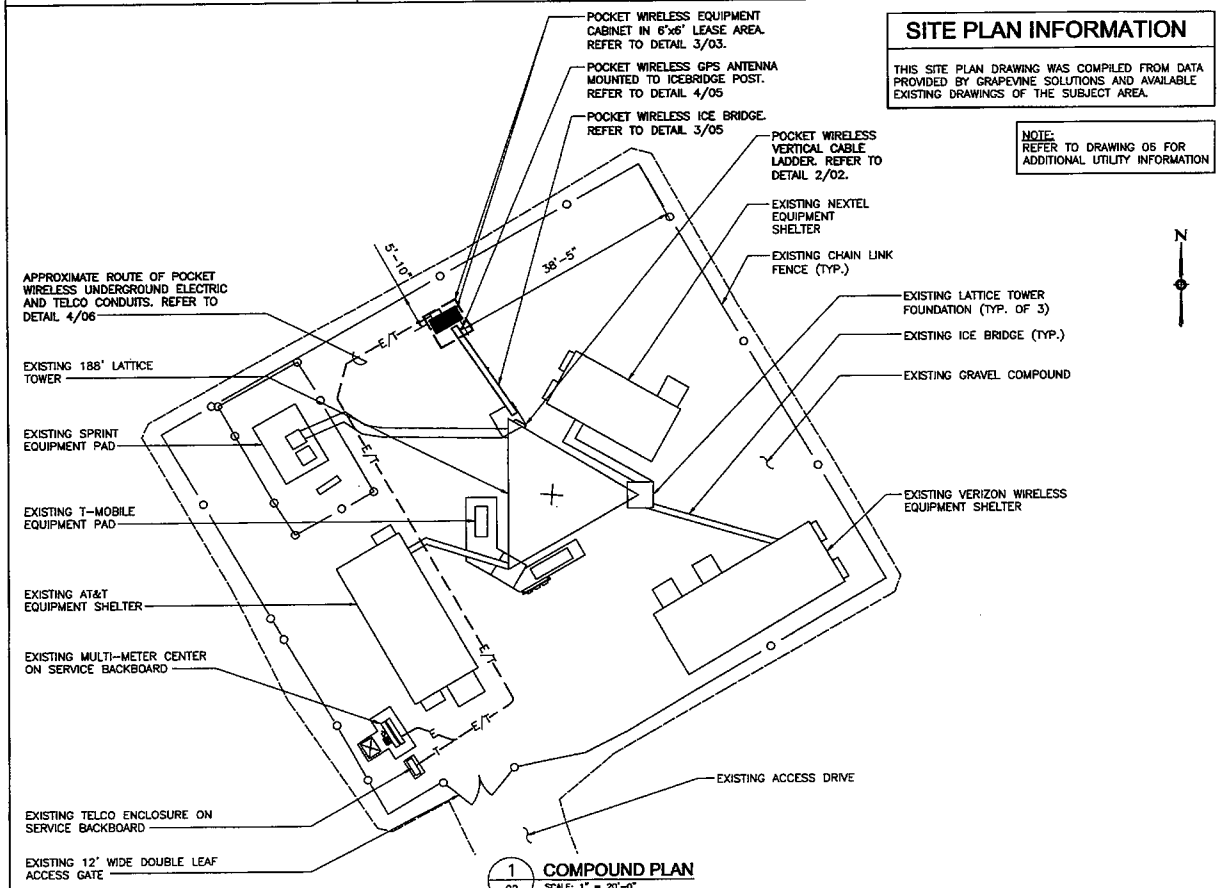
CHECKED BY: JCF
DRAWN BY: JES
DATE: 08/29/08
URS JOB NUMBER: CC1017/36923937
DRAWING NUMBER: 01

CONSTRUCTION NOTES

1. FIELD VERIFICATION: CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, POCKET COMMUNICATIONS ANTENNA MOUNT LOCATION AND ANTENNAS TO BE INSTALLED.
2. COORDINATION OF WORK: CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH POCKET COMMUNICATIONS.
3. GRAVEL SURFACE IN AREAS OF COMPOUND THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL CONDITION BY CONTRACTOR.

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – POCKET COMMUNICATIONS
   OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO BECOME FAMILIAR 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 THE CONSTRUCTION MANAGER AND THE ENGINEER.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR 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.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
7. CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, AND GROUNDING CABLES AS SHOWN ON THE SITE PLAN
8. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
9. CONTRACTOR 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.
10. CONTRACTOR TO OBTAIN REQUIRED NOTICE TO PROCEED DOCUMENTS FROM THE TOWER OWNER BEFORE COMMENCING CONSTRUCTION.

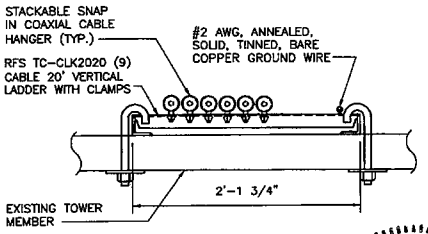


1/02 COMPOUND PLAN
SCALE: 1" = 20'-0"

SITE PLAN INFORMATION

THIS SITE PLAN DRAWING WAS COMPILED FROM DATA PROVIDED BY GRAPEVINE SOLUTIONS AND AVAILABLE EXISTING DRAWINGS OF THE SUBJECT AREA.

NOTE:
REFER TO DRAWING 05 FOR ADDITIONAL UTILITY INFORMATION



2/02 VERTICAL CABLE LADDER DETAIL
SCALE: N.T.S.

STATE OF CONNECTICUT
IGNACIO C. A...
No. 8704
LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
0	09-10-08	ISSUED FOR CONSTRUCTION	JCF

pocket SMART WIRELESS

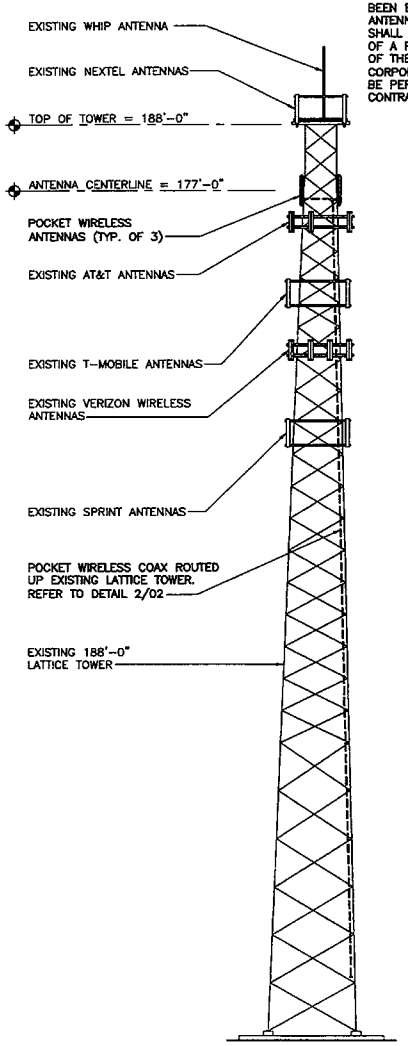
PROJECT NAME: HFCT1470, 232 SOUTH MAIN STREET
SHEET: SITE PLAN, DETAILS AND NOTES

URS

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

CHECKED BY: JCF
DRAWN BY: JES
DATE: 08/29/08
URS JOB NUMBER: PC1017/36923937
DRAWING NUMBER: 02

A TOWER ANALYSIS HAS NOT BEEN PERFORMED FOR THE PREPARATION OF THESE PLANS. AS OF THE ISSUANCE OF THESE DRAWINGS, THE EXISTING TOWER HAS NOT BEEN EVALUATED FOR REPLACEMENT/ADDITION OF ANTENNAS, COAX CABLES AND EQUIPMENT. NO WORK SHALL OCCUR ON THIS TOWER PRIOR TO THE ISSUANCE OF A PASSING STRUCTURAL TOWER ANALYSIS. A COPY OF THE TOWER ANALYSIS SHALL BE FORWARDED TO URS CORPORATION. ALL REINFORCEMENT (IF REQUIRED) SHALL BE PERFORMED PRIOR TO ANY WORK UNDER THIS CONTRACT BEING PERFORMED.



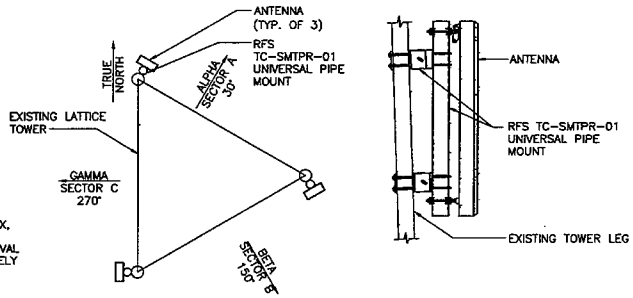
1 / 03 **TOWER ELEVATION**
SCALE: 1" = 25'-0"

ANTENNA KEY

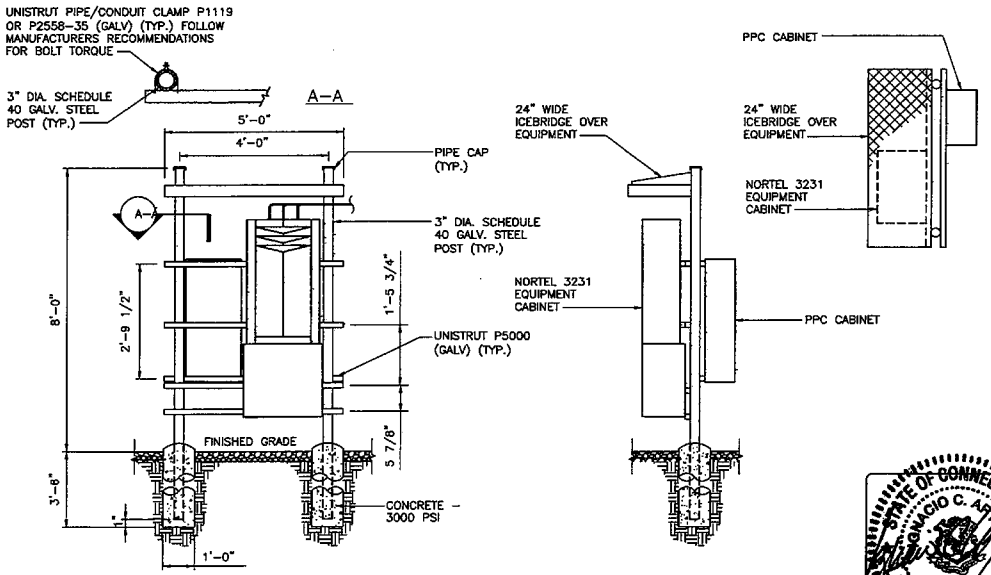
	# ANTENNAS PER SECTOR	ANTENNA NUMBER	COAX COLOR CODE	ANTENNA VENDOR	MODEL NUMBER	AZIMUTH	C/L HEIGHT	MECHANICAL DOWNTILT	COAX SIZE	NO. COAX PER ANTENNA	COAX MANUFACTURER
ALPHA	1	A-1	(1) RED BAND	RFS	APXV18-206517S-C	30°	177'-0"	0°	1 5/8"ø	2	RFS
BETA	1	B-1	(1) BLUE BAND	RFS	APXV18-206517S-C	150°	177'-0"	0°	1 5/8"ø	2	RFS
GAMMA	1	C-1	(1) BROWN BAND	RFS	APXV18-206517S-C	270°	177'-0"	0°	1 5/8"ø	2	RFS

TOWER NOTES:
1. FOR DETAILED TOWER INFORMATION, REFER TO TOWER ERECTION DRAWINGS BY OTHERS. THE TOWER SHOWN ON THIS SHEET IS SHOWN FOR GENERAL CONFIGURATION PURPOSES ONLY.
2. ANTENNA CONFIGURATION IS SUBJECT TO CHANGE. VERIFY ANTENNA HEIGHT, DOWN-TILT, AND AZIMUTH WITH PROJECT MANAGER PRIOR TO CONSTRUCTION.

ANTENNA NOTES:
1. ALL COAX SHALL BE COLOR CODED AT THE ANTENNA AND AT THE EQUIPMENT CABINET.
2. (2) COLOR BANDS DENOTES TRANSMIT.
3. PRIOR TO ORDERING ANY ANTENNAS OR COAX, CONTRACTOR SHALL CONTACT POCKETS CONSTRUCTION MANAGER AND OBTAIN APPROVAL FOR MATERIALS LISTED. CONTRACTOR IS SOLELY RESPONSIBLE FOR THIS COORDINATION.



2 / 03 **ANTENNA SECTOR PLAN**
SCALE: N.T.S.



3 / 03 **CABINET SUPPORT FRAME**
SCALE: N.T.S.

STATE OF CONNECTICUT
IGNAZIO C. ARENA
No. 8704
LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
0	09-10-08	ISSUED FOR CONSTRUCTION	JCF

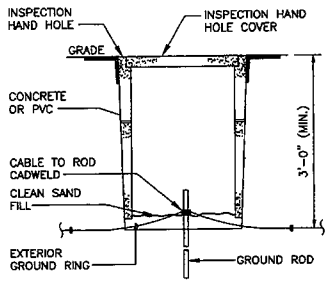
pocket. SMART WIRELESS

PROJECT NAME: HFCT1470, 232 SOUTH MAIN STREET

SHEET: TOWER ELEVATION, ANTENNA PLAN AND DETAILS

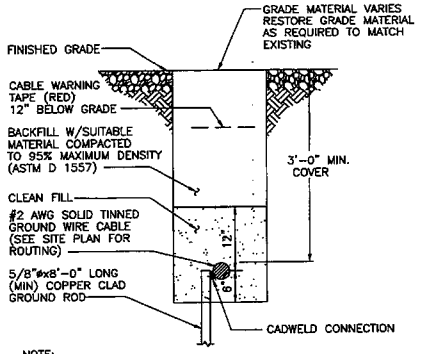
URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

CHECKED BY: JCF
DRAWN BY: JES
DATE: 08/29/08
URS JOB NUMBER: PC1017/36923937
DRAWING NUMBER: 03



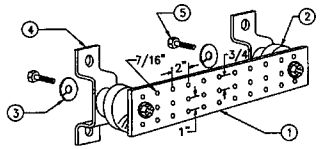
NOTE:
INSPECTION HAND HOLE MAY BE CONCRETE OR PVC AND SHALL BE A MINIMUM OF 8" IN WIDTH/DIAMETER

7/04 GROUND ROD WITH INSPECTION HANDHOLE
SCALE: N.T.S.



NOTE:
1. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.
2. CADWELD GROUND ROD TO GROUND RING AFTER GROUND ROD HAS BEEN DRIVEN INTO PLACE

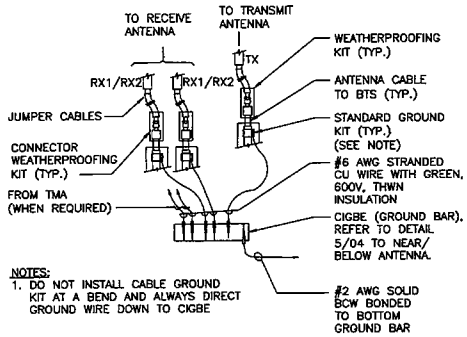
6/04 EGR DETAIL
SCALE: N.T.S.



LEGEND

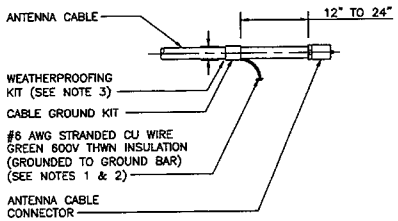
1– COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. CAT. NO. B–6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (ACTUAL GROUND BAR SIZE WILL VARY BASED ON NUMBER OF GROUND CONNECTIONS)
2– INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061–4 OR EQUAL
3– 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015–8 OR EQUAL
4– WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A–6056 OR EQUAL
5– 5/8–11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012–1 OR EQUAL

5/04 MASTER/EQUIPMENT GROUND BAR DETAIL
SCALE: N.T.S.



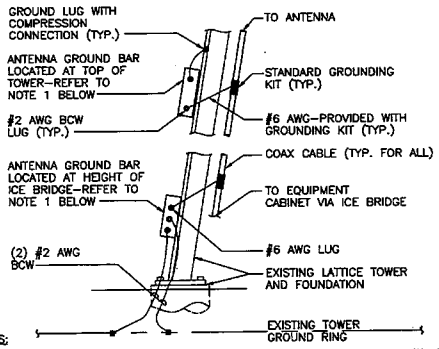
NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

4/04 CONNECTION OF GROUND WIRE TO GROUND BAR
SCALE: N.T.S.



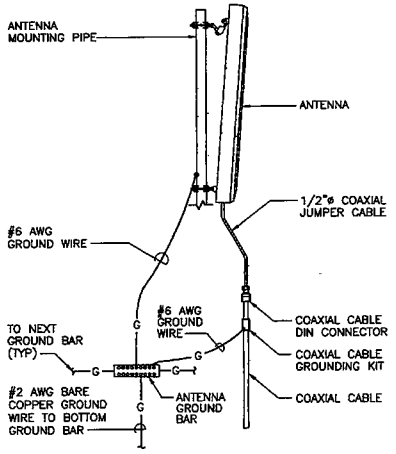
NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

3/04 CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE
SCALE: N.T.S.



NOTES:
1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER. ANTENNA LOCATIONS AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. NO WELDING OR DRILLING SHALL BE ALLOWED ON THE TOWER.
3. DO NOT INSTALL ANTENNA GROUND KIT ON CABLE BEND (TYP.)

2/04 LATTICE TOWER - ANTENNA CABLE GROUNDING
SCALE: N.T.S.



1/04 TYPICAL ANTENNA GROUNDING DETAIL
SCALE: N.T.S.

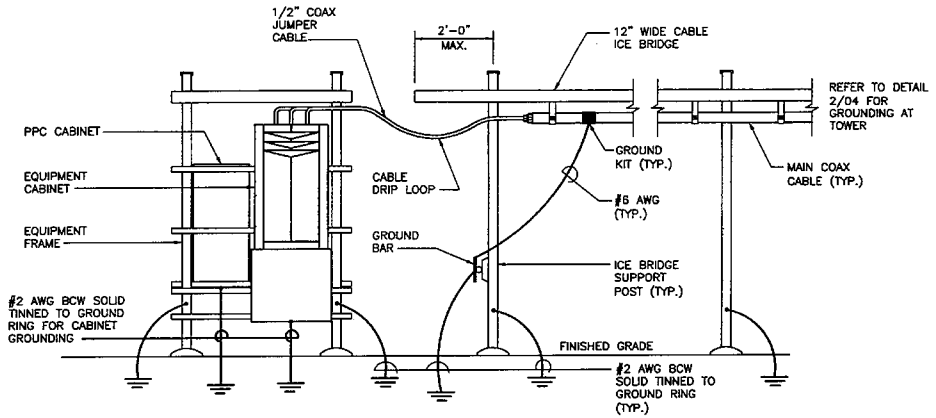
pocket. SMART WIRELESS

PROJECT: HFCT1470, 232 SOUTH MAIN STREET
SHEET: GROUNDING DETAILS

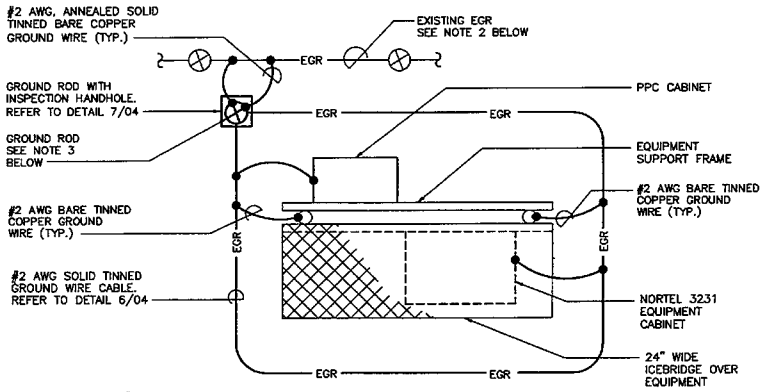
NO.	DATE	REVISIONS	BY
0	08-10-08	ISSUED FOR CONSTRUCTION	JCF

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

CHECKED BY: JCF
DRAWN BY: JES
DATE: 08/29/08
URS JOB NUMBER: PC1017/36923937
DRAWING NUMBER: 04



1 05 **GROUNDING AT EQUIPMENT CABINET**
SCALE: N.T.S.

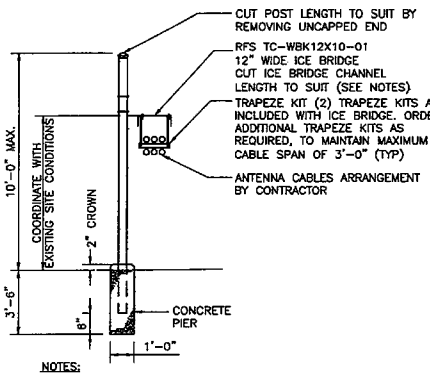


NOTES:

1. SEE SHEET 02 FOR EQUIPMENT ORIENTATION AND LOCATION.
2. EXISTING EGR, VERIFY LOCATION IN FIELD. CONTRACTOR SHALL HAND DIG AND LOCATE EXISTING EGR. IF ANY DAMAGE IS CAUSED TO EXISTING EGR, THE CONTRACTOR SHALL REPAIR THE DAMAGE AT HIS OWN COST TO THE SATISFACTION OF RESPECTIVE CELL ENGINEERS.
3. GROUNDING ELECTRODE SHALL BE 5/8" DIA. x 8'-0"L. COPPER CLAD STEEL ROD. ADJUST LOCATION OF GROUNDING ELECTRODE IF SOIL CONDITION IS NOT CONDUCTIVE (GRAVEL, SANDY SOIL, ROCKS). SPACING OF GROUNDING ELECTRODES SHALL NOT BE LESS THAN 8' O.C. ELECTRODES SHALL BE DRIVEN ONLY WITH PROPER DRIVER SLEEVE TO PREVENT MUSHROOMING TOP OF ROD. WHEN ROCK BOTTOM IS ENCOUNTERED, THE ELECTRODE SHALL BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM THE VERTICAL AWAY FROM STRUCTURES. TOP OF GROUNDING ELECTRODE SHALL BE MIN. 3'-6" BELOW FINISH GRADE. IF IT IS IMPRACTICAL TO DRIVE THE 8'-0" GROUND ROD, CONTRACTOR SHALL INSTALL THE GROUND ROD HORIZONTALLY IN A TRENCH AWAY FROM STRUCTURE, NOT LESS THEN 36" BELOW FINISHED GRADE. UNDER NO CIRCUMSTANCES SHALL THE GROUND ROD BE CUT OR MODIFIED TO ACCOMMODATE VERTICAL INSTALLATION INTO LEDGE. REFER TO THE NEC 2005, ARTICLE #250 FOR MORE INFORMATION ON GROUNDING.

2 05 **EQUIPMENT GROUNDING PLAN**
SCALE: N.T.S.

*INSTALL DRIP LOOP ON ANTENNA CABLES AT BOTTOM OF TOWER/MONOPOLE. BENDING RADIUS PER MANUFACTURER'S STANDARDS



NOTES:

MAXIMUM ALLOWABLE SPAN BETWEEN SUPPORTS ON A CONTINUOUS SINGLE SECTION OF BRIDGE CHANNEL SHALL BE 8 FEET FOR 10 FEET BRIDGE CHANNEL.

FOR SPLICING BRIDGE CHANNEL SECTIONS, THE SPLICE SHOULD BE PROVIDED AT THE SUPPORT, IF POSSIBLE, OR AT A MAXIMUM OF 2 FEET FROM THE SUPPORT.

SUPPORT SHOULD BE PROVIDED AS CLOSE AS POSSIBLE TO THE ENDS OF ICE BRIDGES, WITH A MAXIMUM CANTILEVER DISTANCE OF 2 FEET FROM THE SUPPORT TO THE FREE END OF THE ICE BRIDGE.

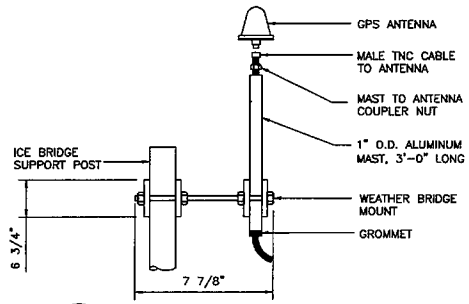
CUT BRIDGE CHANNEL SECTIONS SHALL HAVE RAW EDGES TREATED WITH A MATERIAL TO RESTORE THESE EDGES TO THE ORIGINAL CHANNEL, OR EQUIVALENT, FINISH.

ICE BRIDGES MAY BE CONSTRUCTED WITH COMPONENTS FROM MANUFACTURERS OTHER THAN RFS, PROVIDED THE MANUFACTURER'S INSTALLATION GUIDELINES ARE FOLLOWED.

DEVIATIONS FROM STANDARDS FOR COMPONENT INSTALLATIONS ARE PERMITTED WITH THE RESPECTIVE MANUFACTURER'S APPROVAL.

DEVIATIONS FROM ICE BRIDGE FOUNDATIONS REQUIRE ENGINEERING APPROVAL.

3 05 **ICE BRIDGE DETAIL**
SCALE: N.T.S.



4 05 **GPS MOUNTING DETAIL**
SCALE: N.T.S.

NO.	DATE	ISSUED FOR CONSTRUCTION	BY
0	09-10-08	REVISIONS	JCF

pocket
SMART WIRELESS

PROJECT NAME: HFCT1470, 232 SOUTH MAIN STREET

SHEET: GROUNDING PLAN AND DETAILS

URS

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

CHECKED BY: JCF
DRAWN BY: JES
DATE: 08/29/08
URS JOB NUMBER: PC1017/36923937
DRAWING NUMBER: 05

PANEL SSC

LOAD DESCRIPTION	LOAD (kVA)	BRKR SIZE	CCT NO.	PHASE A	PHASE B	CCT NO.	BRKR SIZE	LOAD (kVA)	LOAD DESCRIPTION
BTS CABINET	2.5	30/2	1			2	30/2	2.2	BTS CABINET
	2.5		3			4		2.2	
LIGHTING	1.9	10/1	5			6	20/1	0.2	GFI OUTLET
SPACE	–	–	7			8	–	–	SPACE
SPACE	–	–	9			10	–	–	SPACE
SPACE	–	–	11			12	–	–	SPACE
SPACE	–	–	13			14	–	–	SPACE
SPACE	–	–	15			16	–	–	SPACE
SPACE	–	–	17			18	–	–	SPACE
SPACE	–	–	19			20	–	–	SPACE
SPACE	–	–	21			22	–	–	SPACE
SPACE	–	–	23			24	–	–	SPACE
LOAD SUB–TOTAL	6.9	LOAD TOTAL		11.5 kVA				4.6	LOAD SUB–TOTAL

100A MCB, 120/208/240V, 1ø, 3 WIRE, 65,000 AIC

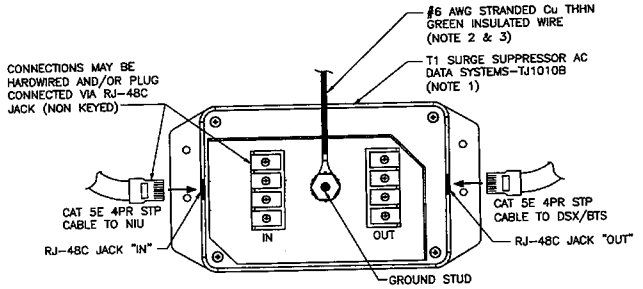
TOTAL CONNECTED LOAD	11.5 KW	
25% OF LARGEST CONT. LOAD	1.25 KW	
TOTAL LOADS	12.75 KW	

NOTE: ALL NON–OPTIONAL BREAKERS PROVIDED BY SSC MFR

1 / 06 **PANEL SCHEDULE**
SCALE: N.T.S.

GENERAL ELECTRIC NOTES:

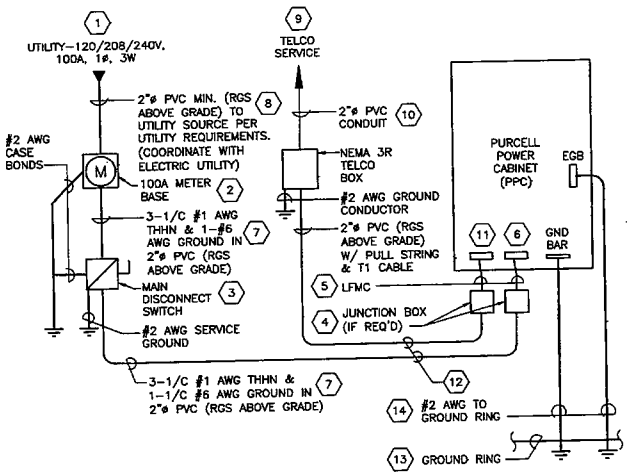
1. ALL ELECTRICAL AND GROUNDING WORK SHALL BE PERFORMED IN ACCORDANCE WITH PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONDUIT ROUTINGS ARE SCHEMATIC, CONTRACTOR SHALL VERIFY ROUTING AND LENGTHS PRIOR TO CONSTRUCTION.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
4. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
5. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES, AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.



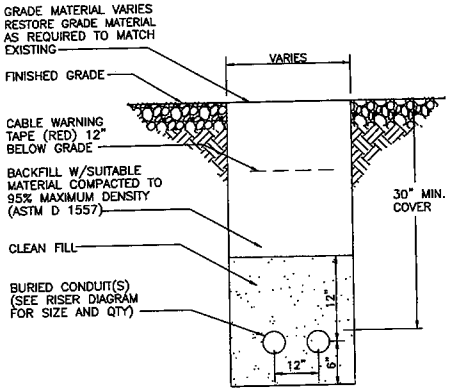
NOTES:

1. MOUNT T1–TVSS UNIT ON EQUIPMENT FRAME HOUSING THE DSX UNIT. USE APPROPRIATE STAINLESS STEEL BOLTS WITH FLAT WASHERS AND A LOCK WASHER ON THE NUT SIDE. THE TVSS MAY BE LOCATED ON THE TELCO BACKBOARD. REFER TO MANUFACTURER'S INSTRUCTIONS.
2. ATTACH RING TERMINAL FROM SUPPLIED GROUND CONDUCTOR TO TVSS GROUND STUD SECURELY FASTEN WITH SUPPLIED WASHER AND NUT. REFER TO MANUFACTURER'S INSTRUCTIONS. FOR PROPER PERFORMANCE, THE GROUND CONDUCTOR LENGTH SHOULD BE LIMITED WITH NO SHARP BENDS ON COILS.
3. WHEN TVSS IS MOUNTED ON EQUIPMENT FRAME, BOND THE GROUND CONDUCTOR TO THE EQUIPMENT FRAME GROUND. ENSURE PROPER GROUNDING SURFACES. WHEN TVSS IS MOUNTED ON THE TELCO BACK BOARD, BOND THE GROUND CONDUCTOR TO THE TELCO (BOARD) GROUND BAR OR NEAREST GROUND BAR.

3 / 06 **TVSS DETAIL**
SCALE: N.T.S.



2 / 06 **POWER, TELCO, GROUND SINGLE LINE DIAGRAM FOR OUTDOOR CABINET**
SCALE: N.T.S.



ELECTRICAL/TELEPHONE TRENCH DETAIL NOTES:

1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION. THE TRENCH SHALL BE BACKFILLED IMMEDIATELY FOLLOWING PLACEMENT OF THE CONDUITS.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

4 / 06 **TYPICAL ELECTRICAL/ TELEPHONE TRENCH DETAIL**
SCALE: N.T.S.

REFERENCE NOTES:

1. ELECTRICAL DEMARCATION POINT. ELECTRICAL CONTRACTOR TO COORDINATE WITH LOCAL UTILITY COMPANY FOR SERVICE TO METER.
2. CONTRACTOR TO SUPPLY AND INSTALL A 100A, 120/208/240V 1ø, 3W METER BASE. METER BASE TO BE NEMA 3R RATED AND ACCEPTABLE TO LOCAL UTILITY. PROVIDE WITH MECHANICALLY ATTACHED ENGRAVED IDENTIFICATION LABEL INDICATING "POCKET COMMUNICATIONS METER".
3. CONTRACTOR TO SUPPLY AND INSTALL NEMA 3R 100A FUSIBLE DISCONNECT SWITCH WITH LOCKABLE HANDLE. PROVIDE WITH TWO (2) 100A FUSES. AIC RATING TO COORDINATE WITH LOCAL UTILITY REQUIREMENTS. PROVIDE WITH MECHANICALLY ATTACHED ENGRAVED IDENTIFICATION LABEL INDICATING "POCKET COMMUNICATIONS SERVICE DISCONNECT".
4. WEATHER TIGHT NEMA 3R JUNCTION BOX (IF REQUIRED). SIZE TO NEC CODE FOR APPLICATION.
5. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT W/ WEATHER TIGHT FITTINGS AND SUPPORTS. SIZE AND CONTENTS TO MATCH ASSOCIATED USE (POWER OR TELCO) SEE NOTE #5 BELOW
6. UTILITY POWER ENTRY INTO CABINET. COORDINATE TERMINATION WITH CABINET MANUFACTURER.
7. CONTRACTOR SHALL SUPPLY AND INSTALL 2" GRC. AFG AND PVC 36" BFG C/W 3–#1 & 1–#6G AWG THHN FOR UTILITY SERVICE.
8. CONTRACTOR SHALL SUPPLY AND INSTALL 2" GRC. AFG AND PVC 36" BFG C/W 3–#1 & 1–#6G. AWG THHN FOR UTILITY SERVICE.
9. TELCO DEMARCATION POINT. ELECTRICAL CONTRACTOR TO COORDINATE WITH LOCAL TELCO FOR SERVICE TO TELCO BOX OR CABINET.
10. CONTRACTOR TO SUPPLY AND INSTALL (1) 2" GRC AFG AND PVC 36" BFG C/W PULL CORDS FOR TELCO SERVICE TO CABINET TERMINATION POINT.
11. TELCO SERVICE ENTRY INTO CABINET. COORDINATE TERMINATION WITH CABINET MANUFACTURER.
12. CONTRACTOR TO ARRANGE AND PAY FOR UNDERGROUND UTILITY LOCATION SURVEYS FOR ALL TRENCHING. REUSE NATIVE BACKFILL AND RE–INSTATE TO ORIGINAL CONDITION. INSTALL 6" WIDE METALLIC LINED RED PLASTIC MARK TAPE 8" ABOVE ALL BURIED CONDUIT.
13. PORTION OF EXTERIOR GROUND RING
14. (1) #2 SOLID BARE TINNED COPPER EQUIPMENT GROUND CONDUCTOR BONDED TO 5/8"x8' COPPER CLAD STEEL GROUNDING ELECTRODES. LOCATE GROUNDING ELECTRODE ADJACENT TO CABINET. BOND GROUNDING ELECTRODE SYSTEM TO CABINET GROUND RING.

NOTES:

1. CONTRACTOR SHALL PROVIDE 100 AMP, SINGLE PHASE, 120/208/240 VAC, 60 HZ ELECTRIC SERVICE FOR SITE
2. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY BEFORE THE START OF CONSTRUCTION. POWER AND TELCO CONDUIT SHALL BE PROVIDED AND INSTALLED PER UTILITY REQUIREMENTS.
3. FOR COMPLETE INTERNAL WIRING AND ARRANGEMENT REFER TO DRAWINGS PROVIDED BY AC OR TELCO PANEL MANUFACTURER.
4. ALL SERVICE EQUIPMENT AND INSTALLATIONS SHALL COMPLY WITH THE N.E.C. AND UTILITY COMPANY AND LOCAL CODE REQUIREMENTS.
5. CONTRACTOR SHALL INSTALL SUFFICIENT LENGTHS OF LFMC (NOT EXCEEDING 6'–0") INCLUDING ALL CONDUIT FITTINGS (NUTS, REDUCING BUSHINGS, ELBOWS, COUPLINGS, ETC.) NECESSARY FOR CONNECTION FROM IMC CONDUIT TO THE PURCELL POWER CABINET, (PPC).
6. CONTRACTOR SHALL PROVIDE ELECTRICAL SERVICE EQUIPMENT WITH FAULT CURRENT RATINGS GREATER THAN THE AVAILABLE FAULT CURRENT FROM THE POWER UTILITY.
7. CONTRACTOR SHALL VERIFY THAT THE MAIN BONDING JUMPER AND GROUNDING ELECTRODE CONDUCTOR IS INSTALLED PROPERLY IN MAIN DISCONNECT SWITCH.

STATE OF CONNECTION — JOSEPH C. [illegible] — No. 8704 — LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
0	06–10–08	ISSUED FOR CONSTRUCTION	

pocket — SMART WIRELESS

PROJECT NAME: HFCT1470, 232 SOUTH MAIN STREET

SHEET: ELECTRICAL DETAILS

URS

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

CHECKED BY: JCF
DRAWN BY: JES
DATE: 08/29/08
URS JOB NUMBER: PC1017/38923937
DRAWING NUMBER: 06

Exhibit C

Equipment Specifications

Pocket Site HFCT1470A

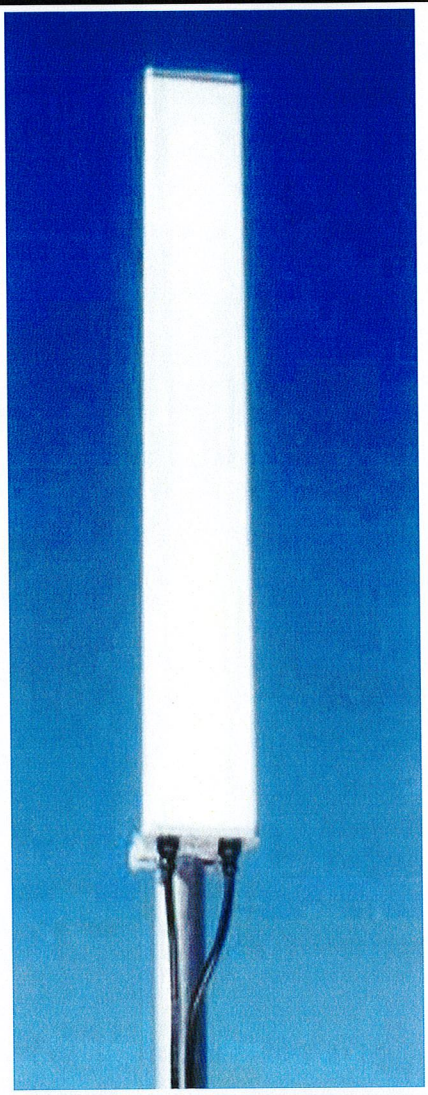
232 South Main Street

East Windsor, Connecticut

Technical Data Sheet APXV18-206517S-C

Product Description

This variable tilt antenna provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features null fill and a wide downtilt range with optional remote tilt.



Features/Benefits

- Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.
- High Suppression of all Upper Sidelobes (Typically <-20dB).
- Optional remote tilt - can be retrofitted.
- Broadband design.
- Dual polarization.
- Low profile for low visual impact.

Technical Features

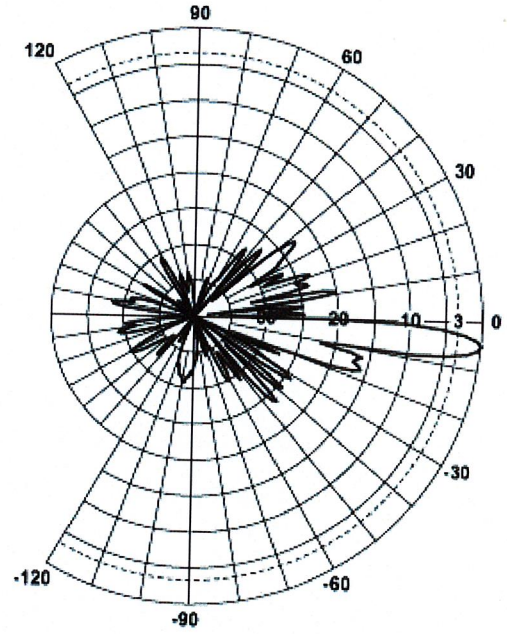
Frequency Band	3G/UMTS (Single, Broad, Dual and Triple-Band)
Horizontal Pattern	Directional
Antenna Type	Panel Dual Polarized
Electrical Down Tilt Option	Variable

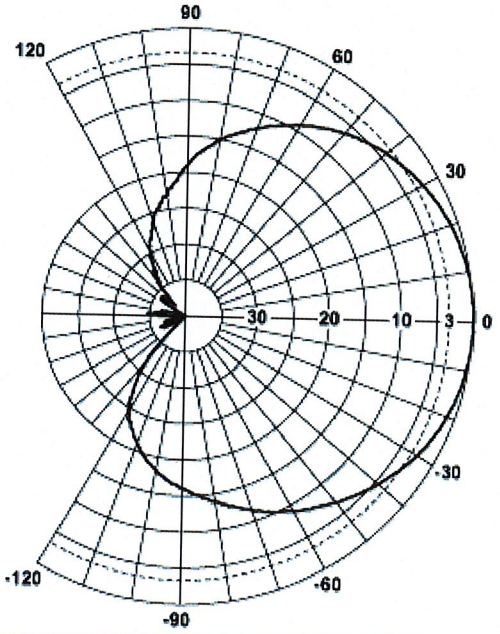
Technical Data Sheet	APXV18-206517S-C

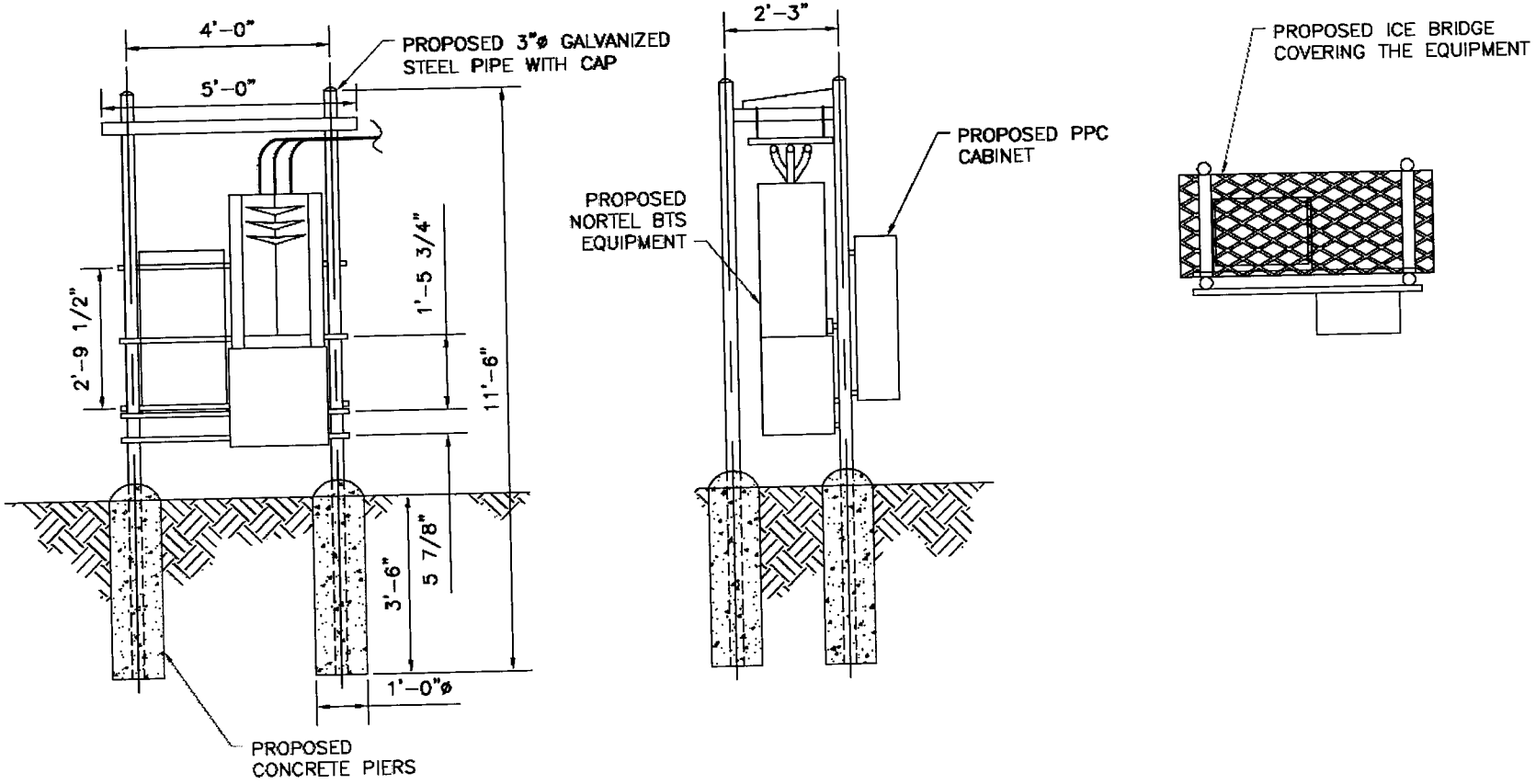
Gain, dBi (dBd)	18.8 (16.7) , 19.0 (16.9)
Frequency Range, MHz	1710-1900, 1900-2170
Connector Type	(2) 7-16 DIN Female
Connector Location	Bottom
Mount Type	Downtilt
Electrical Downtilt, deg	0-10
Horizontal Beamwidth, deg	67 , 63
Mounting Hardware	APM40-2
Rated Wind Speed, km/h (mph)	160 (100)
VSWR	< 1.5:1
Vertical Beamwidth, deg	5.0 , 4.6
Upper Sidelobe Suppression, dB	>17 , >18 all (Typically >20)
Polarization	Dual pol +/-45°
Front-To-Back Ratio, dB	>30
Maximum Power Input, W	300
Isolation between Ports, dB	>30
Lightning Protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBc	>150
7th Order IMP @ 2x46 dBm, dBc	>170
Impedance, Ohms	50
Overall Length, m (ft)	1.85 (6.06)
Mounting Hardware Weight, kg (lb)	3.4 (7.5)
Dimensions - HxWxD, mm (in)	1850 x 175 x 80 (72.0 x 6.8 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	12 (26.4)
Weight w/ Mtg Hardware, kg (lb)	14.8 (32.5)
Radiating Element Material	Brass
Radome Color	Light Grey RAL7035
Radome Material	Fiberglass
Mounting Hardware Material	Diecasted Aluminum
Reflector Material	Aluminum
Max Wind Loading Area, m^2 (ft^2)	0.31 (3.3)
Survival Wind Speed, km/h (mph)	200 (125)
Maximum Thrust @ Rated Wind, N (lbf)	558 (125)
Front Thrust @ Rated Wind, N (lbf)	558 (125)
Shipping Weight, kg (lb)	18.3 (39.8)
Packing Dimensions, HxWxD, mm (in)	2021 x 260 x 200 (79.5 x 10.2 x 7.8)
Packing Dimensions - HxWxD, m (ft)	2.0 x 0.26 x 0.2 (6.6 x 0.85 x 0.65)

Notes

For additional mounting information please click "External Document Link" below.







Pocket/Youghiogheny Communications – Northeast, LLC

Rack Detail

>BUSINESS MADE **SIMPLE**

NORTEL

CDMA BTS 3231 AWS 1.7/2.1 GHz (Outdoor/Indoor)

CDMA BTS 3231

Industry's Highest Capacity AWS Micro BTS

The CDMA BTS 3231 is the latest extension to Nortel Networks BTS (Base Transceiver Station) portfolio providing the ideal solution for urban, sub-urban and rural deployments. The CDMA BTS 3231 is a 3-carrier, 3-sector outdoor/indoor BTS operating at the AWS band of 1.7/2.1 GHz supporting IS-95, 1XRTT and 1xEV-DO simultaneously. BTS 3231 provides flexible deployments solutions including floor, rack, and wall mount options. The power consumption of BTS3231 is industry leading consuming only 630W for 3C3S. The BTS 3231 is also very light at 240lbs making it easy to transport to hard to reach locations such as the top of a high rise building.

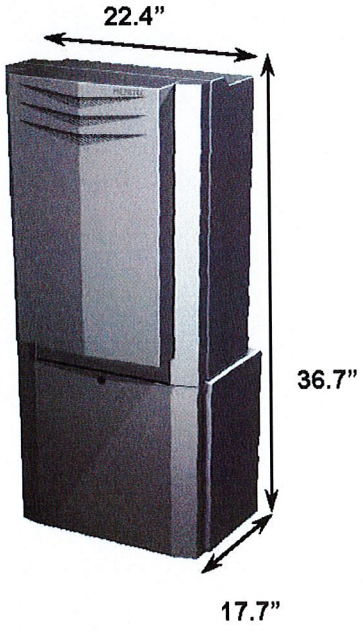


Exhibit D

Power Density Calculations

Pocket Site HFCT1470A

232 South Main Street

East Windsor, Connecticut

C Squared Systems, LLC
920 Candia Road
Manchester, NH 03109
Phone: (603) 657 9702
E-mail:
support@csquaredsystems.com

Calculated Radio Frequency Emissions

CT-1470

232 South Main Street, East Windsor, CT

Table of Contents

List of Tables

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Pocket antennas to be installed on the existing tower at 232 South Main Street, East Windsor, CT.

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are much more conservative (higher) than the actual signal levels will be from the finished installation.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (mW/ cm^2). The number of mW/cm^2 emitted is called the power density. The general population exposure limit for the cellular band is 0.567-0.593 mW/ cm^2, and the general population exposure limit for the PCS/AWS band is 1.0 mW/ cm^2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

The FCC general population / uncontrolled limits set the maximum exposure to which most people may be subjected. General population / uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Higher exposure limits are permitted under the occupational / controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure (through training), and they must be able to exercise control over their exposure. General population / uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals."

The FCC describes exposure to radio frequency (RF) energy in terms of percentage of maximum permissible exposure (MPE) with 100% being the maximum allowed. Rather than the FCC presenting the user specification in terms of complex power density figures over a specified surface area, this MPE measure is particularly useful, and even more so when considering that power density limits actually vary by frequency because of the different absorptive properties of the human body at different frequencies.

MPE limits are specified as time-averaged exposure limits. This means that exposure can be averaged over 30 minutes for general population / uncontrolled exposure (or 6 minutes for occupational / controlled exposure). However, for the case of exposure of the general public, time averaging is usually not applied because of uncertainties over exact exposure conditions and difficulty in controlling time of exposure. Therefore, the typical conservative approach is to assume that any RF exposure to the general public will be continuous.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population / uncontrolled exposure and for occupational / controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include limits for Maximum Permissible Exposure (MPE) for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP), the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit. As shown in these excerpts, each frequency band has different exposure limits, requiring power density to be reported as a percent of Maximum Permissible Exposure (MPE) when dealing with carriers transmitting in different frequency bands.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{EIRP}{\pi \times R^2}\right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna

V = Vertical Distance from bottom of antenna

Off Beam Loss is determined by the selected antenna patterns

4. Calculation Results

Table 1 below outlines the power density information for the site. All information for carriers other than Pocket was obtained from current CSC database.

Carrier	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Antenna Height (Feet)	Operating Frequency (MHz)	Total ERP (Watts)	Power Density (mw/cm^2)	Limit	%MPE
AT&T UMTS	1	500	170	880	500	0.0062	0.5867	1.06%
AT&T/GSM	2	296	170	880	592	0.0074	0.5867	1.26%
AT&T/GSM	1	427	170	1900	427	0.0053	1.0000	0.53%
Town	1	400	207	33	400	0.0034	0.2000	1.68%
T-Mobile	8	247	155	1935	1,976	0.0296	1.0000	2.96%
Nextel	12	100	183	851	1,200	0.0129	0.5673	2.27%
Sprint	11	135	126	1962.5	1,485	0.0336	1.0000	3.36%
Verizon	9	200	144	869	1,800	0.0312	0.5793	5.39%
Verizon	3	200	144	1900	600	0.0104	1.0000	1.04%
Pocket	3	631	177	2130-2133.75	1,893	0.0217	1.0000	2.17%
							Total	21.72%

Table 1: Proposed Carrier Information

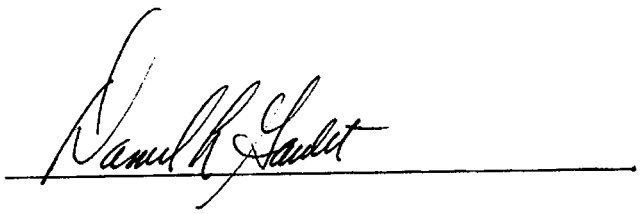
5. Conclusion

The above analysis verifies that emissions from the proposed site will be well below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 21.72% of the FCC limit.

As noted in the introduction, obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished installation.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



September 4, 2008
Date

Daniel l. Goulet
C Squared Systems, LLC

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits For Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure

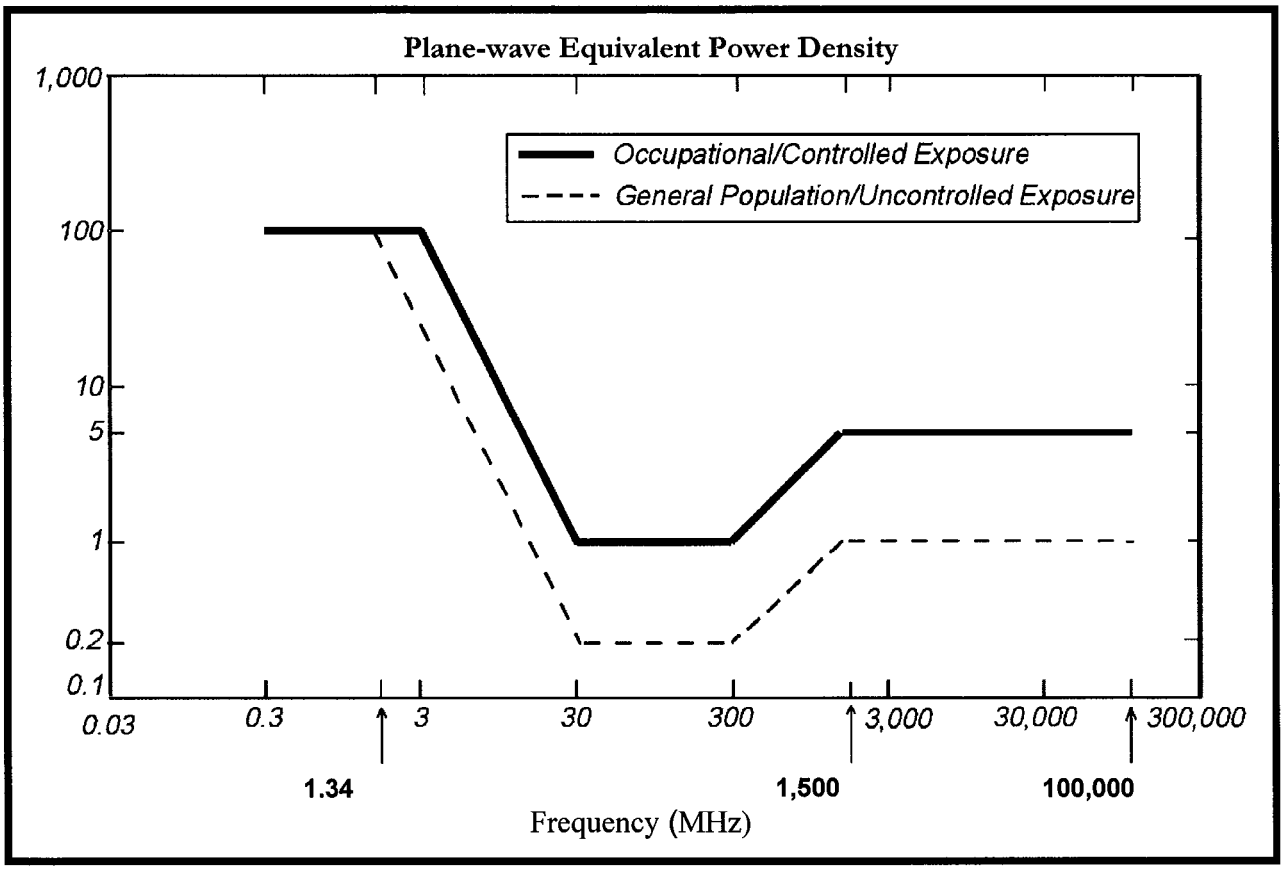
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



• FCC Limits for Maximum Permissible Exposure (MPE)

Exhibit E

Structural Analysis

Pocket Site HFCT1470A

232 South Main Street

East Windsor, Connecticut

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 188' ROHN SSV LATTICE TOWER FOR PROPOSED ANTENNA ARRANGEMENT

Site I.D: **CT-1470**
Address: **232 S. Main St,**
East Windsor, CT

prepared for

POCKET WIRELESS
2810 NW Loop 410
San Antonio, Texas 06108

prepared by

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36923534.00000
PWS-004

September 30, 2008

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 188' self-supporting lattice tower structure located at 232 S. Main St in East Windsor, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 80 mph (fastest mile) and 60 mph (fastest mile) concurrent with 0.5" ice. The antenna loading considered in this analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report. The proposed modification is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Install: **Alpha Sector** **(1) RFS APXV18-206517S-C** **Beta Sector** **(1) RFS APXV18-206517S-C** **Gamma Sector** **(1) RFS APXV18-206517S-C**	**Pocket Wireless (Proposed)**	**@ 177'**

The results of the analysis indicate that the tower superstructure steel stresses are within the allowable limits, the tower foundation meets the minimum safety factor of two required to resist overturning as stipulated by Chapter 31, Section 3108.4.2 of the 2003 International Building Code (IBC). Therefore, the overall tower structure is deemed structurally adequate with the wind load classification specified above and the proposed antenna loading.

1. EXECUTIVE SUMMARY - *continued*

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower geometry and structural member sizes obtained from manufacturer's erection drawing prepared by ROHN Industries, dated September 30, 1996.
3) Foundation geometry obtained from manufacturer's foundation design drawings prepared by ROHN Industries, dated September 30, 1996.
4) Previous structural letter prepared by Malouf Engineering Intl., INC., on behalf of AT&T, dated September 21, 2007.
5) Site documentation and visual verification of existing appurtenances conducted from existing grade by URS during August 2008.
6) Antenna and mount configuration as specified within Section 2 and 6 of this report.
7) Coax cable orientation as specified in section 6 of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation

Richard A. Sambor, P.E.
Manager Facilities Design

RAS/kab

cc: AA, DR, ICA – URS
CF/Book

2. INTRODUCTION

The subject tower is located at 232 S. Main St, East Windsor, Connecticut. The structure is an existing 188' self supporting steel tapered lattice tower, designed and manufactured by ROHN Industries.

The inventory is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Antel BCD-8701010 Omni-Directional Antenna	Unknown (existing)	Leg Mounted	193.5	(1) 7/8"
(9) RR90-17-D2Dp Panels	Nextel (existing)	13' Platform	188	(9) 1-5/8"
(3) RFS APXV18-206517S-C	**Pocket Wireless (proposed)**	**RFS TC-SOBPA48-01**	**177**	**(6) 1-5/8"**
(6) CSS DU01417-8686 Panels	AT&T (existing)	(3) 15' Sector Mounts	168	(9) 1-5/8" (3) 1-1/4" FZ (1) 3/8" (I)
(3) 7770 Panel Antennas	AT&T (existing)	(3) 15' Sector Mounts	168	
(3) LGP 13519 Diplexers	AT&T (existing)	(3) 15' Sector Mounts	168	
(1) Powerwave 7060 CILOC	AT&T (existing)	(3) 15' Sector Mounts	168	
(3) Powerwave 7020 RCU/RET's	AT&T (existing)	(3) 15' Sector Mounts	168	
(6) TMA's	AT&T (existing)	(3) 15' Sector Mounts	168	
(9) ALP7250.03 Panels	T-Mobile (existing)	(2) 12' Sector Mounts	153	(12) 1-5/8"
(9) ALP-9011 Panels	Verizon (existing)	(3) 15' Sector Mounts	144	(15) 1-5/8"
(6) DB980H90 Panels	Sprint (existing)	(3) 10' Sector Mounts	124	(6) 1-5/8"

This structural analysis of the communications tower was performed by URS Corporation (URS) for Force 3 Communications. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F - Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction - Allowable Stress Design (ASD).

The analysis was conducted using RISA Tower 5.0.2. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 80 mph (fastest mile) Wind Load + Tower Dead Load
Load Condition 2 = 60 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Stresses on the tower structure were evaluated to compare with allowable stresses in accordance with AISC. The results of the analysis indicate that the calculated stresses under the proposed loading were below the allowable stresses for the tower superstructure (see table below). In addition, the tower foundation meets the minimum safety factor of two required to resist overturning as stipulated by Chapter 31, Section 3108.4.2 of the 2003 International Building Code (IBC). Detailed analysis and calculations for the proposed load condition are provided in section 6 of this report. The tower anchor bolts were found to be structurally adequate.

Tower Base reactions:
For detailed proposed tower reactions, see drawing no. E-1 in section 6 of this report.

Tower Base Reactions:

Base Reactions	Original Tower Reactions	Proposed Tower Reactions
Axial Load (kips)	-	73
Shear per Leg (kips)	-	30
Total Shear (kips)	63.8	49
Uplift per Leg (kips)	-	210
Comp.per Leg (kips)	-	248
O.T. Moment (ft-kips)	6790.7	5052

Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/Fail	Comments:
Tower Leg (T6)	Compression/80'-100'	58.3%	**Pass**	
Diagonal (T10)	Bolt Shear/0'-20'	98.6%	**Pass**	
Top Girt (T1)	Compression/180'-188'	2.8%	**Pass**	
Anchor Bolts	Tension	43%	**Pass**	

Foundation Summary:

Foundation	Component	Stress (% capacity/FOS)	Pass/Fail	Comments:
Reinf. Concrete Pad	Uplift	89.7%/2.23	**Pass**	Min. F.O.S of 2.0 req'd per IBC 2003 Section 3108.4.2

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that the tower superstructure steel stresses are within the allowable limits. Also, the tower foundation meets the minimum safety factor of two required to resist overturning as stipulated by Chapter 31, Section 3108.4.2 of the 2003 International Building Code (IBC). Therefore, the overall tower structure is deemed structurally adequate with the wind load classification specified above and the proposed antenna loading.

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

5. CONCLUSIONS AND RECOMMENDATIONS - *continued*

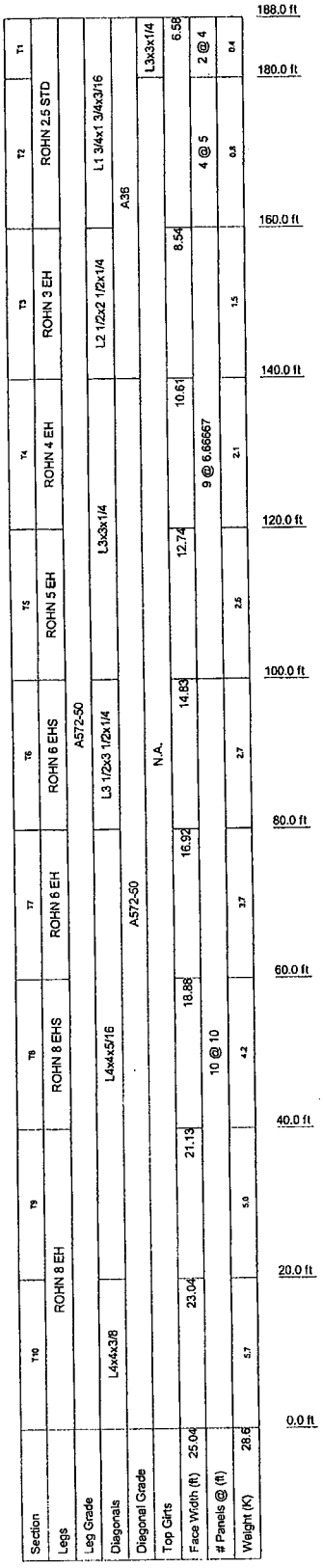
Ongoing and Periodic Inspection and Maintenance:

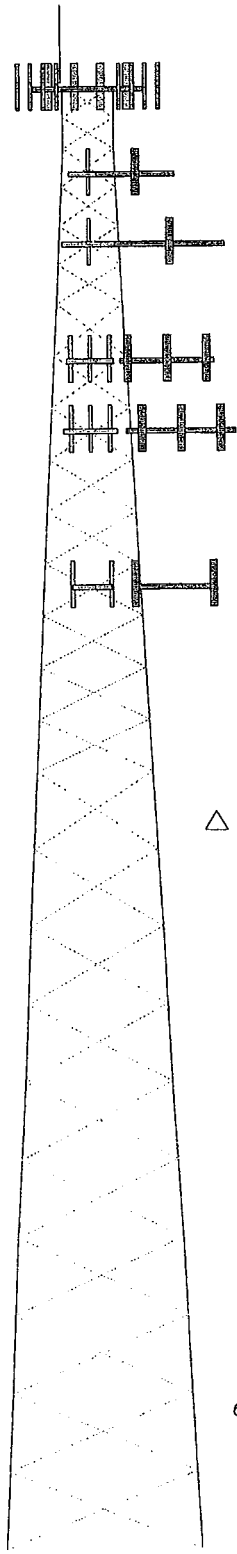
After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading condition.

6. DRAWINGS AND DATA

RISA TOWER INPUT / OUTPUT SUMMARY





DESIGNED APPURTENANCE LOADING

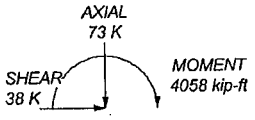
TYPE	ELEVATION	TYPE	ELEVATION
BCD-87010__ (Unknown)	193.5	(2) LGP214nn TMA (ATI)	168
(4) RR90-17-02DP w/Mount Pipe (Unknown (Existing))	188	(2) LGP214nn TMA (ATI)	168
		(2) LGP214nn TMA (ATI)	168
(4) RR90-17-02DP w/Mount Pipe (Unknown (Existing))	188	(3) 7250.03 w/Mount Pipe (Unknown (Existing))	153
Pirod 15' Low Profile Platform (Unknown (Existing))	188	(3) 7250.03 w/Mount Pipe (Unknown (Existing))	153
(4) RR90-17-02DP w/Mount Pipe (Unknown (Existing))	188	Rohn 12 Foot Sector Frame (Unknown (Existing))	153
APXV18-206517S-C w/ mounting hardware (Pocket Wireless (Proposed))	177	Rohn 12 Foot Sector Frame (Unknown (Existing))	153
		Rohn 12 Foot Sector Frame (Unknown (Existing))	153
APXV18-206517S-C w/ mounting hardware (Pocket Wireless (Proposed))	177	(3) 7250.03 w/Mount Pipe (Unknown (Existing))	153
APXV18-206517S-C w/ mounting hardware (Pocket Wireless (Proposed))	177	(3) ALP-E 9011-DIN w/Mount Pipe (Unknown (Existing))	144
4'x4" Pipe Mount (Unknown (Existing))	177	Rohn 15 Foot Sector Frame (Unknown (Existing))	144
4'x4" Pipe Mount (Unknown (Existing))	177	(3) ALP-E 9011-DIN w/Mount Pipe (Unknown (Existing))	144
4'x4" Pipe Mount (Unknown (Existing))	177	(3) ALP-E 9011-DIN w/Mount Pipe (Unknown (Existing))	144
Rohn 15 Foot Sector Frame (Unknown (Existing))	168	Rohn 15 Foot Sector Frame (Unknown (Existing))	144
Rohn 15 Foot Sector Frame (Unknown (Existing))	168	Rohn 15 Foot Sector Frame (Unknown (Existing))	144
Rohn 15 Foot Sector Frame (Unknown (Existing))	168	Rohn 12 Foot Sector Frame (Unknown (Existing))	124
7770 Panel Antenna (ATI)	168	Rohn 12 Foot Sector Frame (Unknown (Existing))	124
7770 Panel Antenna (ATI)	168	(2) DB980H90A-M w/Mount Pipe (Unknown (Existing))	124
7770 Panel Antenna (ATI)	168	(2) DB980H90A-M w/Mount Pipe (Unknown (Existing))	124
LGP 13519 Diplexer (ATI)	168	Rohn 12 Foot Sector Frame (Unknown (Existing))	124
LGP 13519 Diplexer (ATI)	168	(2) DB980H90A-M w/Mount Pipe (Unknown (Existing))	124
LGP 13519 Diplexer (ATI)	168		
7060 CILOC (ATI)	168		
7020 RCU/RETs (ATI)	168		
7020 RCU/RETs (ATI)	168		
7020 RCU/RETs (ATI)	168		

MATERIAL STRENGTH

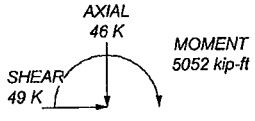
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 60 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 60 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 98.6%
   UPLIFT: -270 K
   SHEAR: 30 K



TORQUE 34 kip-ft
60 mph WIND - 0.5000 in ICE



TORQUE 40 kip-ft
REACTIONS - 80 mph WIND

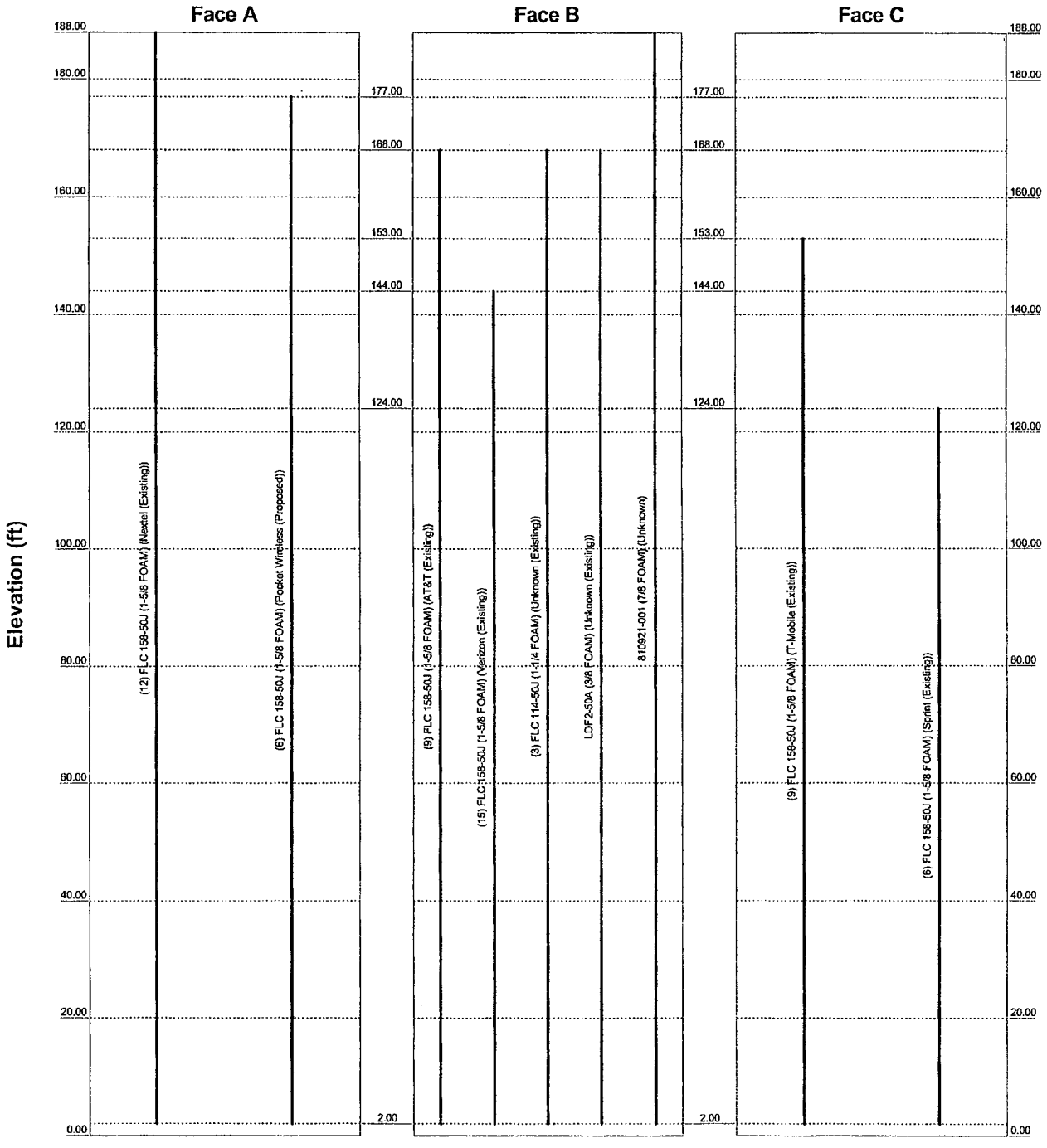
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: *188' SSV Rohn Tower*			
Project: *232 S. Main St, East Windsor, CT*			
Client: Force 3 Communications	Drawn by: Kevin Barker	App'd:	
Code: TIA/EIA-222-F	Date: 09/30/08	Scale: NTS	
Path: P:\08ERI Files\188 SSV Rohn Tower.eri		Dwg No. E-1	

RISA TOWER FEEDLINE DISTRIBUTION CHART

Feedline Distribution Chart
0' - 188'

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

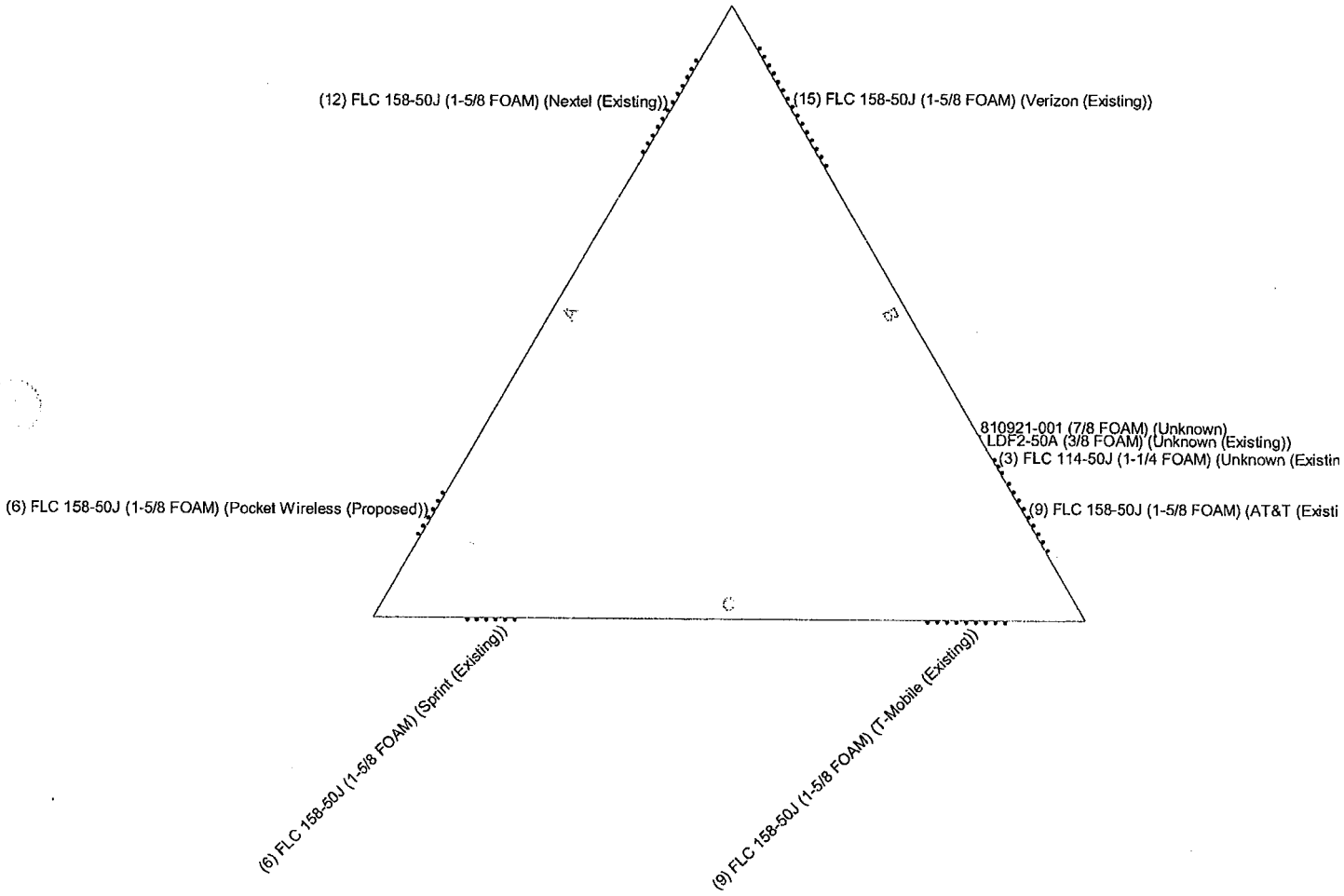


URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job: ***188' SSV Rohn Tower***		
	Project: ***232 S. Main St, East Windsor, CT***		
	Client: Force 3 Communications	Drawn by: Kevin Barker	App'd:
	Code: TIA/EIA-222-F	Date: 09/30/08	Scale: NTS
	Path: P:\08\ERI Files\188 SSV Rohn Tower.eri		Dwg No. E-7

RISA TOWER FEEDLINE PLAN

Feedline Plan

_____ Round _____ Flat _____ App In Face ..... App Out Face



URS Corporation
500 Enterprise Drive, Suite 3B
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Job: *188' SSV Rohn Tower*			
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Client: Force 3 Communications	Drawn by: Kevin Barker	App'd:	
Code: TIA/EIA-222-F	Date: 09/30/08	Scale: NTS	
Path: P:\08\ERI Files\188 SSV Rohn Tower.eri		Dwg No. E-7	

RISA TOWER DETAILED OUTPUT

URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

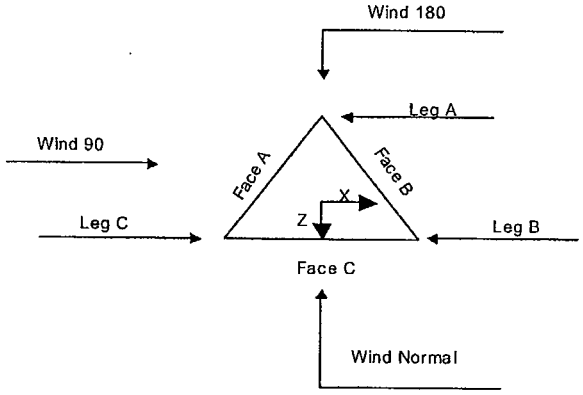
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 188.00 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 6.58 ft at the top and 25.04 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 80 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 60 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
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	188.00-180.00			6.58	1	8.00
T2	180.00-160.00			6.58	1	20.00
T3	160.00-140.00			8.54	1	20.00
T4	140.00-120.00			10.61	1	20.00
T5	120.00-100.00			12.74	1	20.00
T6	100.00-80.00			14.83	1	20.00
T7	80.00-60.00			16.92	1	20.00
T8	60.00-40.00			18.88	1	20.00
T9	40.00-20.00			21.13	1	20.00
T10	20.00-0.00			23.04	1	20.00

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	188.00-180.00	4.00	X Brace	No	No	0.0000	0.0000
T2	180.00-160.00	5.00	X Brace	No	No	0.0000	0.0000
T3	160.00-140.00	6.67	X Brace	No	No	0.0000	0.0000
T4	140.00-120.00	6.67	X Brace	No	No	0.0000	0.0000
T5	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	100.00-80.00	10.00	X Bracc	No	No	0.0000	0.0000
T7	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T8	60.00-40.00	10.00	X Bracc	No	No	0.0000	0.0000
T9	40.00-20.00	10.00	X Bracc	No	No	0.0000	0.0000
T10	20.00-0.00	10.00	X Bracc	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 188.00-180.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180.00-160.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 160.00-140.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 140.00-120.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T5 120.00-100.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T6 100.00-80.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T7 80.00-60.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T8 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T9 40.00-20.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T10 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x3/8	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

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
T1 188.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 80.00-60.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000

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
T8 60.00-40.00	0.00	0.0000	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 40.00-20.00	0.00	0.0000	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 20.00-0.00	0.00	0.0000	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	36.0000

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 188.00-180.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 20.00-0.00	Yes	Yes	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 Net Width Deduct in	U	Diagonal Net Width Deduct in	U	Top Girt Net Width Deduct in	U	Bottom Girt Net Width Deduct in	U	Mid Girt Net Width Deduct in	U	Long Horizontal Net Width Deduct in	U	Short Horizontal Net Width Deduct in	U
T1 188.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T2 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

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.
T1 188.00-180.00	Flange	0.6250 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 180.00-160.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 160.00-140.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 140.00-120.00	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 120.00-100.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 100.00-80.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 60.00-40.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 40.00-20.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 20.00-0.00	Flange	1.0000 A325N	10	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

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

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
FLC 158-50J (1-5/8 FOAM) (Nextel (Existing))	A	No	Ar (CfAe)	188.00 - 2.00	0.0000	0.3333	12	12	2.0200	2.0200		0.92
FLC 158-50J (1-5/8 FOAM) (AT&T (Existing))	B	No	Ar (CfAc)	168.00 - 2.00	0.0000	0.3333	9	9	2.0200	2.0200		0.92
FLC 158-50J (1-5/8 FOAM) (T-Mobile (Existing))	C	No	Ar (CfAe)	153.00 - 2.00	0.0000	-0.3333	9	9	2.0200	2.0200		0.92
FLC 158-50J (1-5/8 FOAM) (Verizon (Existing))	B	No	Ar (CfAc)	144.00 - 2.00	0.0000	-0.3333	15	15	2.0200	2.0200		0.92
FLC 158-50J (1-5/8 FOAM) (Sprint (Existing))	C	No	Ar (CfAe)	124.00 - 2.00	0.0000	0.3333	6	6	2.0200	2.0200		0.92
FLC 114-50J (1-1/4 FOAM) (Unknown (Existing))	B	No	Ar (CfAe)	168.00 - 2.00	0.0000	0.25	3	3	1.5800	1.5800		0.70
LDF2-50A (3/8 FOAM) (Unknown (Existing))	B	No	Ar (CfAe)	168.00 - 2.00	0.0000	0.22	1	1	0.4400	0.4400		0.08
FLC 158-50J (1-5/8 FOAM) (Pocket Wireless (Proposed))	A	No	Ar (CfAe)	177.00 - 2.00	0.0000	-0.3333	6	6	2.0200	2.0200		0.92
810921-001 (7/8 FOAM) (Unknown)	B	No	Ar (CfAe)	188.00 - 2.00	0.0000	0.2	1	1	1.1100	1.1100		0.40

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	188.00-180.00	A	16.160	0.000	0.000	0.000	0.09
		B	0.740	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	57.570	0.000	0.000	0.000	0.31
		B	17.423	0.000	0.000	0.000	0.09
		C	0.000	0.000	0.000	0.000	0.00
T3	160.00-140.00	A	60.600	0.000	0.000	0.000	0.33
		B	50.883	0.000	0.000	0.000	0.27
		C	19.695	0.000	0.000	0.000	0.11
T4	140.00-120.00	A	60.600	0.000	0.000	0.000	0.33
		B	91.283	0.000	0.000	0.000	0.49
		C	34.340	0.000	0.000	0.000	0.19
T5	120.00-100.00	A	60.600	0.000	0.000	0.000	0.33
		B	91.283	0.000	0.000	0.000	0.49
		C	50.500	0.000	0.000	0.000	0.28

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T6	100.00-80.00	A	60.600	0.000	0.000	0.000	0.33
		B	91.283	0.000	0.000	0.000	0.49
		C	50.500	0.000	0.000	0.000	0.28
T7	80.00-60.00	A	60.600	0.000	0.000	0.000	0.33
		B	91.283	0.000	0.000	0.000	0.49
		C	50.500	0.000	0.000	0.000	0.28
T8	60.00-40.00	A	60.600	0.000	0.000	0.000	0.33
		B	91.283	0.000	0.000	0.000	0.49
		C	50.500	0.000	0.000	0.000	0.28
T9	40.00-20.00	A	60.600	0.000	0.000	0.000	0.33
		B	91.283	0.000	0.000	0.000	0.49
		C	50.500	0.000	0.000	0.000	0.28
T10	20.00-0.00	A	54.540	0.000	0.000	0.000	0.30
		B	82.155	0.000	0.000	0.000	0.44
		C	45.450	0.000	0.000	0.000	0.25

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	188.00-180.00	A	0.500	24.160	0.000	0.000	0.000	0.24
		B		1.407	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	0.500	86.070	0.000	0.000	0.000	0.84
		B		27.757	0.000	0.000	0.000	0.26
		C		0.000	0.000	0.000	0.000	0.00
T3	160.00-140.00	A	0.500	90.600	0.000	0.000	0.000	0.89
		B		79.217	0.000	0.000	0.000	0.75
		C		29.445	0.000	0.000	0.000	0.29
T4	140.00-120.00	A	0.500	90.600	0.000	0.000	0.000	0.89
		B		139.617	0.000	0.000	0.000	1.34
		C		51.340	0.000	0.000	0.000	0.50
T5	120.00-100.00	A	0.500	90.600	0.000	0.000	0.000	0.89
		B		139.617	0.000	0.000	0.000	1.34
		C		75.500	0.000	0.000	0.000	0.74
T6	100.00-80.00	A	0.500	90.600	0.000	0.000	0.000	0.89
		B		139.617	0.000	0.000	0.000	1.34
		C		75.500	0.000	0.000	0.000	0.74
T7	80.00-60.00	A	0.500	90.600	0.000	0.000	0.000	0.89
		B		139.617	0.000	0.000	0.000	1.34
		C		75.500	0.000	0.000	0.000	0.74
T8	60.00-40.00	A	0.500	90.600	0.000	0.000	0.000	0.89
		B		139.617	0.000	0.000	0.000	1.34
		C		75.500	0.000	0.000	0.000	0.74
T9	40.00-20.00	A	0.500	90.600	0.000	0.000	0.000	0.89
		B		139.617	0.000	0.000	0.000	1.34
		C		75.500	0.000	0.000	0.000	0.74
T10	20.00-0.00	A	0.500	81.540	0.000	0.000	0.000	0.80
		B		125.655	0.000	0.000	0.000	1.21
		C		67.950	0.000	0.000	0.000	0.66

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	188.00-180.00	-2.1604	-12.1188	-2.0732	-12.3190
T2	180.00-160.00	-2.4164	-8.8850	-2.1254	-8.8585
T3	160.00-140.00	6.7955	-4.7901	7.4154	-4.8618
T4	140.00-120.00	8.5765	-10.4867	9.3503	-10.9056
T5	120.00-100.00	6.3338	-8.6486	7.0934	-9.0662
T6	100.00-80.00	7.1195	-9.7254	8.0973	-10.3529
T7	80.00-60.00	7.6501	-10.4535	8.7842	-11.2340
T8	60.00-40.00	7.9265	-10.8339	9.2550	-11.8387
T9	40.00-20.00	8.5765	-11.7247	10.0295	-12.8316
T10	20.00-0.00	8.6568	-11.8363	10.2024	-13.0544

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(4) RR90-17-02DP w/Mount Pipe	A	From Leg	3.71 0.00	30.0000	188.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	0.04 0.08
(Unknown (Existing))			0.00						
(3) 7250.03 w/Mount Pipe	A	Stand-Off	5.20	30.0000	153.00	No Ice	4.45	3.54	0.04
(Unknown (Existing))		Left	3.00 0.00			1/2" Ice	5.03	4.72	0.08
(3) ALP-E 9011-DIN w/Mount Pipe	A	Stand-Off Left	6.50 3.75	30.0000	144.00	No Ice 1/2" Ice	3.53 4.21	5.01 6.07	0.05 0.09
(Unknown (Existing))			0.00						
(2) DB980H90A-M w/Mount Pipe	A	Stand-Off	4.33	30.0000	124.00	No Ice	4.27	3.86	0.03
(Unknown (Existing))		Left	2.50 0.00			1/2" Ice	4.86	4.95	0.07
(4) RR90-17-02DP w/Mount Pipe	B	From Leg	3.71	30.0000	188.00	No Ice	4.91	3.64	0.04
(Unknown (Existing))			0.00 0.00			1/2" Ice	5.57	4.70	0.08
(3) 7250.03 w/Mount Pipe	B	Stand-Off	5.20	30.0000	153.00	No Ice	4.45	3.54	0.04
(Unknown (Existing))		Left	3.00 0.00			1/2" Ice	5.03	4.72	0.08
(3) ALP-E 9011-DIN w/Mount Pipe	B	Stand-Off Left	6.50 3.75	30.0000	144.00	No Ice 1/2" Ice	3.53 4.21	5.01 6.07	0.05 0.09
(Unknown (Existing))			0.00						
(2) DB980H90A-M w/Mount Pipe	B	Stand-Off	4.33	30.0000	124.00	No Ice	4.27	3.86	0.03
(Unknown (Existing))		Left	2.50 0.00			1/2" Ice	4.86	4.95	0.07
(4) RR90-17-02DP w/Mount Pipe	C	From Leg	3.71	30.0000	188.00	No Ice	4.91	3.64	0.04
(Unknown (Existing))			0.00 0.00			1/2" Ice	5.57	4.70	0.08
(3) 7250.03 w/Mount Pipe	C	Stand-Off	5.20	30.0000	153.00	No Ice	4.45	3.54	0.04
(Unknown (Existing))		Left	3.00 0.00			1/2" Ice	5.03	4.72	0.08
(3) ALP-E 9011-DIN w/Mount Pipe	C	Stand-Off Left	6.50 3.75	30.0000	144.00	No Ice 1/2" Ice	3.53 4.21	5.01 6.07	0.05 0.09
(Unknown (Existing))			0.00						
(2) DB980H90A-M w/Mount Pipe	C	Stand-Off	4.33	30.0000	124.00	No Ice	4.27	3.86	0.03
(Unknown (Existing))		Left	2.50 0.00			1/2" Ice	4.86	4.95	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 15' Low Profile Platform (Unknown (Existing))	C	None		0.0000	188.00	No Ice	24.90	24.90	1.81
						1/2" Ice	30.70	30.70	2.35
APXV18-206517S-C w/ mounting hardware (Pocket Wireless (Proposed))	A	Stand-Off Left	2.60 1.50 0.00	30.0000	177.00	No Ice	5.17	3.62	0.04
						1/2" Ice	5.62	4.24	0.08
APXV18-206517S-C w/ mounting hardware (Pocket Wireless (Proposed))	B	Stand-Off Left	2.60 1.50 0.00	30.0000	177.00	No Ice	5.17	3.62	0.04
						1/2" Ice	5.62	4.24	0.08
APXV18-206517S-C w/ mounting hardware (Pocket Wireless (Proposed))	C	Stand-Off Left	2.60 1.50 0.00	30.0000	177.00	No Ice	5.17	3.62	0.04
						1/2" Ice	5.62	4.24	0.08
4'x4" Pipe Mount (Unknown (Existing))	A	Stand-Off Left	2.60 1.50 0.00	30.0000	177.00	No Ice	1.32	1.32	0.04
						1/2" Ice	1.58	1.58	0.06
4'x4" Pipe Mount (Unknown (Existing))	B	Stand-Off Left	2.60 1.50 0.00	30.0000	177.00	No Ice	1.32	1.32	0.04
						1/2" Ice	1.58	1.58	0.06
4'x4" Pipe Mount (Unknown (Existing))	C	Stand-Off Left	2.60 1.50 0.00	30.0000	177.00	No Ice	1.32	1.32	0.04
						1/2" Ice	1.58	1.58	0.06
Rohn 15 Foot Sector Frame (Unknown (Existing))	A	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice	13.90	3.08	0.39
						1/2" Ice	20.00	5.13	0.53
Rohn 15 Foot Sector Frame (Unknown (Existing))	B	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice	13.90	3.08	0.39
						1/2" Ice	20.00	5.13	0.53
Rohn 15 Foot Sector Frame (Unknown (Existing))	C	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice	13.90	3.08	0.39
						1/2" Ice	20.00	5.13	0.53
Rohn 12 Foot Sector Frame (Unknown (Existing))	A	Stand-Off Left	5.20 3.00 0.00	30.0000	153.00	No Ice	12.20	3.08	0.36
						1/2" Ice	17.60	5.13	0.49
Rohn 12 Foot Sector Frame (Unknown (Existing))	B	Stand-Off Left	5.20 3.00 0.00	30.0000	153.00	No Ice	12.20	3.08	0.36
						1/2" Ice	17.60	5.13	0.49
Rohn 12 Foot Sector Frame (Unknown (Existing))	C	Stand-Off Left	5.20 3.00 0.00	30.0000	153.00	No Ice	12.20	3.08	0.36
						1/2" Ice	17.60	5.13	0.49
Rohn 15 Foot Sector Frame (Unknown (Existing))	A	Stand-Off Left	6.50 3.75 0.00	30.0000	144.00	No Ice	13.90	3.08	0.39
						1/2" Ice	20.00	5.13	0.53
Rohn 15 Foot Sector Frame (Unknown (Existing))	B	Stand-Off Left	6.50 3.75 0.00	30.0000	144.00	No Ice	13.90	3.08	0.39
						1/2" Ice	20.00	5.13	0.53
Rohn 15 Foot Sector Frame (Unknown (Existing))	C	Stand-Off Left	6.50 3.75 0.00	30.0000	144.00	No Ice	13.90	3.08	0.39
						1/2" Ice	20.00	5.13	0.53
Rohn 12 Foot Sector Frame (Unknown (Existing))	A	Stand-Off Left	4.33 2.50 0.00	30.0000	124.00	No Ice	12.20	3.08	0.36
						1/2" Ice	17.60	5.13	0.49
Rohn 12 Foot Sector Frame (Unknown (Existing))	B	Stand-Off Left	4.33 2.50 0.00	30.0000	124.00	No Ice	12.20	3.08	0.36
						1/2" Ice	17.60	5.13	0.49
Rohn 12 Foot Sector Frame (Unknown (Existing))	C	Stand-Off Left	4.33 2.50 0.00	30.0000	124.00	No Ice	12.20	3.08	0.36
						1/2" Ice	17.60	5.13	0.49

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	K
7770 Panel Antenna (AT&T)	A	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
7770 Panel Antenna (AT&T)	B	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
7770 Panel Antenna (AT&T)	C	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
LGP 13519 Diplexer (AT&T)	A	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	0.27 0.34	0.13 0.18	0.01 0.01
LGP 13519 Diplexer (AT&T)	B	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	0.27 0.34	0.13 0.18	0.01 0.01
LGP 13519 Diplexer (AT&T)	C	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	0.27 0.34	0.13 0.18	0.01 0.01
7060 CILOC (AT&T)	A	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	0.07 0.11	0.06 0.09	0.00 0.00
7020 RCU/RETs (AT&T)	A	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	0.40 0.49	0.12 0.17	0.00 0.01
7020 RCU/RETs (AT&T)	B	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	0.40 0.49	0.12 0.17	0.00 0.01
7020 RCU/RETs (AT&T)	C	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	0.40 0.49	0.12 0.17	0.00 0.01
(2) LGP214nn TMA (AT&T)	A	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	1.29 1.45	0.23 0.31	0.00 0.01
(2) LGP214nn TMA (AT&T)	B	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	1.29 1.45	0.23 0.31	0.00 0.01
(2) LGP214nn TMA (AT&T)	C	Stand-Off Left	6.50 3.75 0.00	30.0000	168.00	No Ice 1/2" Ice	1.29 1.45	0.23 0.31	0.00 0.01
BCD-87010__ (Unknown)	C	From Leg	0.25 0.00 0.00	0.0000	193.50	No Ice 1/2" Ice	1.92 2.68	1.92 2.68	0.03 0.04

Tower Pressures - No Ice

$G_H = 1.118$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 188.00-180.00	184.00	1.634	27	54.557	A	5.913	19.993	3.833	14.80	0.000	0.000
					B	5.913	4.573		36.55	0.000	0.000
					C	5.913	3.833		39.33	0.000	0.000
T2 180.00-160.00	170.00	1.597	26	155.997	A	10.246	67.169	9.599	12.40	0.000	0.000
					B	10.246	27.022		25.76	0.000	0.000
					C	10.246	9.599		48.37	0.000	0.000
T3 160.00-140.00	150.00	1.541	25	197.341	A	14.160	72.287	11.687	13.52	0.000	0.000
					B	14.160	62.571		15.23	0.000	0.000
					C	14.160	31.382		25.66	0.000	0.000
T4 140.00-120.00	130.00	1.48	24	241.011	A	19.550	75.628	15.028	15.79	0.000	0.000
					B	19.550	106.312		11.94	0.000	0.000
					C	19.550	49.368		21.81	0.000	0.000
T5 120.00-100.00	110.00	1.411	23	284.984	A	22.226	79.177	18.577	18.32	0.000	0.000
					B	22.226	109.860		14.06	0.000	0.000
					C	22.226	69.077		20.35	0.000	0.000
T6 100.00-80.00	90.00	1.332	22	328.557	A	21.164	82.723	22.123	21.30	0.000	0.000
					B	21.164	113.407		16.44	0.000	0.000
					C	21.164	72.623		23.59	0.000	0.000
T7 80.00-60.00	70.00	1.24	20	369.055	A	26.500	82.719	22.119	20.25	0.000	0.000
					B	26.500	113.402		15.81	0.000	0.000
					C	26.500	72.619		22.32	0.000	0.000
T8 60.00-40.00	50.00	1.126	18	414.498	A	28.816	89.411	28.811	24.37	0.000	0.000
					B	28.816	120.094		19.35	0.000	0.000
					C	28.816	79.311		26.65	0.000	0.000
T9 40.00-20.00	30.00	1	16	456.091	A	31.276	89.394	28.794	23.86	0.000	0.000
					B	31.276	120.077		19.02	0.000	0.000
					C	31.276	79.294		26.04	0.000	0.000
T10 20.00-0.00	10.00	1	16	495.193	A	33.681	83.338	28.798	24.61	0.000	0.000
					B	33.681	110.953		19.91	0.000	0.000
					C	33.681	74.248		26.68	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.118$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 188.00-180.00	184.00	1.634	15	0.5000	55.223	A	5.913	32.328	5.167	13.51	0.000	0.000
						B	5.913	9.575		33.36	0.000	0.000
						C	5.913	8.168		36.69	0.000	0.000
T2 180.00-160.00	170.00	1.597	15	0.5000	157.666	A	10.246	104.862	12.937	11.24	0.000	0.000
						B	10.246	46.549		22.78	0.000	0.000
						C	10.246	18.792		44.55	0.000	0.000
T3 160.00-140.00	150.00	1.541	14	0.5000	199.010	A	14.160	111.291	15.027	11.98	0.000	0.000
						B	14.160	99.908		13.17	0.000	0.000
						C	14.160	50.136		23.37	0.000	0.000
T4 140.00-120.00	130.00	1.48	14	0.5000	242.680	A	19.550	115.484	18.368	13.60	0.000	0.000
						B	19.550	164.501		9.98	0.000	0.000
						C	19.550	76.224		19.18	0.000	0.000
T5 120.00-100.00	110.00	1.411	13	0.5000	286.653	A	22.226	119.925	21.916	15.42	0.000	0.000
						B	22.226	168.942		11.46	0.000	0.000
						C	22.226	104.825		17.25	0.000	0.000
T6 100.00-80.00	90.00	1.332	12	0.5000	330.226	A	21.164	122.110	25.463	17.77	0.000	0.000
						B	21.164	171.126		13.24	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	21.164	107.010		19.87	0.000	0.000
T7 80.00-60.00	70.00	1.24	11	0.5000	370.724	A	26.500	122.682	25.457	17.06	0.000	0.000
						B	26.500	171.699		12.84	0.000	0.000
						C	26.500	107.582		18.99	0.000	0.000
T8 60.00-40.00	50.00	1.126	10	0.5000	416.167	A	28.816	129.955	32.151	20.25	0.000	0.000
						B	28.816	178.972		15.47	0.000	0.000
						C	28.816	114.855		22.38	0.000	0.000
T9 40.00-20.00	30.00	1	9	0.5000	457.760	A	31.276	130.551	32.132	19.86	0.000	0.000
						B	31.276	179.568		15.24	0.000	0.000
						C	31.276	115.451		21.90	0.000	0.000
T10 20.00-0.00	10.00	1	9	0.5000	496.862	A	33.681	122.097	32.137	20.63	0.000	0.000
						B	33.681	166.212		16.08	0.000	0.000
						C	33.681	108.507		22.60	0.000	0.000

Tower Pressure - Service

$G_H = 1.118$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 188.00-180.00	184.00	1.634	15	54.557	A	5.913	19.993	3.833	14.80	0.000	0.000
					B	5.913	4.573		36.55	0.000	0.000
					C	5.913	3.833		39.33	0.000	0.000
T2 180.00-160.00	170.00	1.597	15	155.997	A	10.246	67.169	9.599	12.40	0.000	0.000
					B	10.246	27.022		25.76	0.000	0.000
					C	10.246	9.599		48.37	0.000	0.000
T3 160.00-140.00	150.00	1.541	14	197.341	A	14.160	72.287	11.687	13.52	0.000	0.000
					B	14.160	62.571		15.23	0.000	0.000
					C	14.160	31.382		25.66	0.000	0.000
T4 140.00-120.00	130.00	1.48	14	241.011	A	19.550	75.628	15.028	15.79	0.000	0.000
					B	19.550	106.312		11.94	0.000	0.000
					C	19.550	49.368		21.81	0.000	0.000
T5 120.00-100.00	110.00	1.411	13	284.984	A	22.226	79.177	18.577	18.32	0.000	0.000
					B	22.226	109.860		14.06	0.000	0.000
					C	22.226	69.077		20.35	0.000	0.000
T6 100.00-80.00	90.00	1.332	12	328.557	A	21.164	82.723	22.123	21.30	0.000	0.000
					B	21.164	113.407		16.44	0.000	0.000
					C	21.164	72.623		23.59	0.000	0.000
T7 80.00-60.00	70.00	1.24	11	369.055	A	26.500	82.719	22.119	20.25	0.000	0.000
					B	26.500	113.402		15.81	0.000	0.000
					C	26.500	72.619		22.32	0.000	0.000
T8 60.00-40.00	50.00	1.126	10	414.498	A	28.816	89.411	28.811	24.37	0.000	0.000
					B	28.816	120.094		19.35	0.000	0.000
					C	28.816	79.311		26.65	0.000	0.000
T9 40.00-20.00	30.00	1	9	456.091	A	31.276	89.394	28.794	23.86	0.000	0.000
					B	31.276	120.077		19.02	0.000	0.000
					C	31.276	79.294		26.04	0.000	0.000
T10 20.00-0.00	10.00	1	9	495.193	A	33.681	83.338	28.798	24.61	0.000	0.000
					B	33.681	110.953		19.91	0.000	0.000
					C	33.681	74.248		26.68	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	0.43	A	0.475	1.935	0.685	1	1	19.609	1.14	141.93	A
			B	0.192	2.622	0.589	1	1	8.606			
			C	0.179	2.669	0.586	1	1	8.161			
T2 180.00-160.00	0.41	0.81	A	0.496	1.905	0.696	1	1	56.968	3.18	158.76	A
			B	0.239	2.471	0.599	1	1	26.435			
			C	0.127	2.857	0.578	1	1	15.796			
T3 160.00-140.00	0.71	1.47	A	0.438	1.994	0.668	1	1	62.439	3.51	175.70	A
			B	0.389	2.087	0.647	1	1	54.650			
			C	0.231	2.496	0.597	1	1	32.901			
T4 140.00-120.00	1.01	2.09	A	0.395	2.074	0.65	1	1	68.673	4.82	240.90	B
			B	0.522	1.873	0.709	1	1	94.934			
			C	0.286	2.334	0.612	1	1	49.748			
T5 120.00-100.00	1.10	2.60	A	0.356	2.158	0.635	1	1	72.469	4.89	244.30	B
			B	0.463	1.952	0.68	1	1	96.882			
			C	0.32	2.243	0.622	1	1	65.216			
T6 100.00-80.00	1.10	2.67	A	0.316	2.254	0.621	1	1	72.534	4.77	238.29	B
			B	0.41	2.045	0.656	1	1	95.508			
			C	0.285	2.335	0.612	1	1	65.577			
T7 80.00-60.00	1.10	3.73	A	0.296	2.307	0.615	1	1	77.344	4.76	237.89	B
			B	0.379	2.107	0.643	1	1	99.450			
			C	0.269	2.383	0.607	1	1	70.564			
T8 60.00-40.00	1.10	4.18	A	0.285	2.336	0.611	1	1	83.490	4.66	233.23	B
			B	0.359	2.15	0.636	1	1	105.175			
			C	0.261	2.405	0.605	1	1	76.776			
T9 40.00-20.00	1.10	4.99	A	0.265	2.395	0.606	1	1	85.421	4.32	215.94	B
			B	0.332	2.215	0.626	1	1	106.463			
			C	0.242	2.46	0.6	1	1	78.850			
T10 20.00-0.00	0.99	5.65	A	0.236	2.479	0.598	1	1	83.557	4.32	215.94	B
			B	0.292	2.317	0.614	1	1	101.751			
			C	0.218	2.537	0.594	1	1	77.801			
Sum Weight:	8.71	28.61						OTM	3607.58 kip-ft	40.35		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	0.43	A	0.475	1.935	0.685	0.825	1	18.574	1.08	134.44	A
			B	0.192	2.622	0.589	0.825	1	7.572			
			C	0.179	2.669	0.586	0.825	1	7.126			
T2 180.00-160.00	0.41	0.81	A	0.496	1.905	0.696	0.825	1	55.175	3.08	153.76	A
			B	0.239	2.471	0.599	0.825	1	24.642			
			C	0.127	2.857	0.578	0.825	1	14.003			
T3 160.00-140.00	0.71	1.47	A	0.438	1.994	0.668	0.825	1	59.961	3.37	168.73	A
			B	0.389	2.087	0.647	0.825	1	52.172			
			C	0.231	2.496	0.597	0.825	1	30.423			
T4 140.00-120.00	1.01	2.09	A	0.395	2.074	0.65	0.825	1	65.252	4.64	232.22	B
			B	0.522	1.873	0.709	0.825	1	91.512			
			C	0.286	2.334	0.612	0.825	1	46.327			
T5 120.00-100.00	1.10	2.60	A	0.356	2.158	0.635	0.825	1	68.580	4.69	234.50	B
			B	0.463	1.952	0.68	0.825	1	92.993			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.32	2.243	0.622	0.825	1	61.326			
T6 100.00-80.00	1.10	2.67	A	0.316	2.254	0.621	0.825	1	68.830	4.58	229.05	B
			B	0.41	2.045	0.656	0.825	1	91.804			
			C	0.285	2.335	0.612	0.825	1	61.873			
T7 80.00-60.00	1.10	3.73	A	0.296	2.307	0.615	0.825	1	72.707	4.54	226.80	B
			B	0.379	2.107	0.643	0.825	1	94.812			
			C	0.269	2.383	0.607	0.825	1	65.926			
T8 60.00-40.00	1.10	4.18	A	0.285	2.336	0.611	0.825	1	78.447	4.44	222.05	B
			B	0.359	2.15	0.636	0.825	1	100.132			
			C	0.261	2.405	0.605	0.825	1	71.733			
T9 40.00-20.00	1.10	4.99	A	0.265	2.395	0.606	0.825	1	79.948	4.10	204.84	B
			B	0.332	2.215	0.626	0.825	1	100.990			
			C	0.242	2.46	0.6	0.825	1	73.377			
T10 20.00-0.00	0.99	5.65	A	0.236	2.479	0.598	0.825	1	77.663	4.07	203.43	B
			B	0.292	2.317	0.614	0.825	1	95.857			
			C	0.218	2.537	0.594	0.825	1	71.907			
Sum Weight:	8.71	28.61						OTM	3461.99 kip-ft	38.58		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	0.43	A	0.475	1.935	0.685	0.8	1	18.426	1.07	133.37	A
			B	0.192	2.622	0.589	0.8	1	7.424			
			C	0.179	2.669	0.586	0.8	1	6.978			
T2 180.00-160.00	0.41	0.81	A	0.496	1.905	0.696	0.8	1	54.919	3.06	153.05	A
			B	0.239	2.471	0.599	0.8	1	24.386			
			C	0.127	2.857	0.578	0.8	1	13.747			
T3 160.00-140.00	0.71	1.47	A	0.438	1.994	0.668	0.8	1	59.607	3.35	167.73	A
			B	0.389	2.087	0.647	0.8	1	51.818			
			C	0.231	2.496	0.597	0.8	1	30.069			
T4 140.00-120.00	1.01	2.09	A	0.395	2.074	0.65	0.8	1	64.763	4.62	230.98	B
			B	0.522	1.873	0.709	0.8	1	91.024			
			C	0.286	2.334	0.612	0.8	1	45.838			
T5 120.00-100.00	1.10	2.60	A	0.356	2.158	0.635	0.8	1	68.024	4.66	233.10	B
			B	0.463	1.952	0.68	0.8	1	92.437			
			C	0.32	2.243	0.622	0.8	1	60.771			
T6 100.00-80.00	1.10	2.67	A	0.316	2.254	0.621	0.8	1	68.301	4.55	227.73	B
			B	0.41	2.045	0.656	0.8	1	91.275			
			C	0.285	2.335	0.612	0.8	1	61.344			
T7 80.00-60.00	1.10	3.73	A	0.296	2.307	0.615	0.8	1	72.044	4.50	225.21	B
			B	0.379	2.107	0.643	0.8	1	94.150			
			C	0.269	2.383	0.607	0.8	1	65.264			
T8 60.00-40.00	1.10	4.18	A	0.285	2.336	0.611	0.8	1	77.727	4.41	220.45	B
			B	0.359	2.15	0.636	0.8	1	99.411			
			C	0.261	2.405	0.605	0.8	1	71.012			
T9 40.00-20.00	1.10	4.99	A	0.265	2.395	0.606	0.8	1	79.166	4.07	203.25	B
			B	0.332	2.215	0.626	0.8	1	100.208			
			C	0.242	2.46	0.6	0.8	1	72.595			
T10 20.00-0.00	0.99	5.65	A	0.236	2.479	0.598	0.8	1	76.821	4.03	201.64	B
			B	0.292	2.317	0.614	0.8	1	95.015			
			C	0.218	2.537	0.594	0.8	1	71.065			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	8.71	28.61						OTM	3441.19 kip-ft	38.33		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	0.43	A	0.475	1.935	0.685	0.85	1	18.722	1.08	135.51	A
			B	0.192	2.622	0.589	0.85	1	7.719			
			C	0.179	2.669	0.586	0.85	1	7.274			
T2 180.00-160.00	0.41	0.81	A	0.496	1.905	0.696	0.85	1	55.431	3.09	154.47	A
			B	0.239	2.471	0.599	0.85	1	24.898			
			C	0.127	2.857	0.578	0.85	1	14.259			
T3 160.00-140.00	0.71	1.47	A	0.438	1.994	0.668	0.85	1	60.315	3.39	169.73	A
			B	0.389	2.087	0.647	0.85	1	52.526			
			C	0.231	2.496	0.597	0.85	1	30.777			
T4 140.00-120.00	1.01	2.09	A	0.395	2.074	0.65	0.85	1	65.741	4.67	233.46	B
			B	0.522	1.873	0.709	0.85	1	92.001			
			C	0.286	2.334	0.612	0.85	1	46.816			
T5 120.00-100.00	1.10	2.60	A	0.356	2.158	0.635	0.85	1	69.135	4.72	235.90	B
			B	0.463	1.952	0.68	0.85	1	93.548			
			C	0.32	2.243	0.622	0.85	1	61.882			
T6 100.00-80.00	1.10	2.67	A	0.316	2.254	0.621	0.85	1	69.359	4.61	230.37	B
			B	0.41	2.045	0.656	0.85	1	92.334			
			C	0.285	2.335	0.612	0.85	1	62.402			
T7 80.00-60.00	1.10	3.73	A	0.296	2.307	0.615	0.85	1	73.369	4.57	228.38	B
			B	0.379	2.107	0.643	0.85	1	95.475			
			C	0.269	2.383	0.607	0.85	1	66.589			
T8 60.00-40.00	1.10	4.18	A	0.285	2.336	0.611	0.85	1	79.167	4.47	223.65	B
			B	0.359	2.15	0.636	0.85	1	100.852			
			C	0.261	2.405	0.605	0.85	1	72.453			
T9 40.00-20.00	1.10	4.99	A	0.265	2.395	0.606	0.85	1	80.730	4.13	206.43	B
			B	0.332	2.215	0.626	0.85	1	101.772			
			C	0.242	2.46	0.6	0.85	1	74.158			
T10 20.00-0.00	0.99	5.65	A	0.236	2.479	0.598	0.85	1	78.505	4.10	205.22	B
			B	0.292	2.317	0.614	0.85	1	96.699			
			C	0.218	2.537	0.594	0.85	1	72.749			
Sum Weight:	8.71	28.61						OTM	3482.79 kip-ft	38.84		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.25	0.70	A	0.692	1.776	0.815	1	1	32.247	0.96	120.50	A
			B	0.28	2.349	0.61	1	1	11.755			
			C	0.255	2.423	0.603	1	1	10.840			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2 180.00-160.00	1.10	1.31	A	0.73	1.781	0.842	1	1	98.522	2.89	144.38	A
			B	0.36	2.148	0.636	1	1	39.859			
			C	0.184	2.65	0.587	1	1	21.282			
T3 160.00-140.00	1.92	2.10	A	0.63	1.788	0.773	1	1	100.151	2.84	142.20	A
			B	0.573	1.823	0.738	1	1	87.847			
			C	0.323	2.236	0.623	1	1	45.407			
T4 140.00-120.00	2.73	2.93	A	0.556	1.837	0.728	1	1	103.611	4.41	220.57	B
			B	0.758	1.791	0.863	1	1	161.571			
			C	0.395	2.075	0.649	1	1	69.052			
T5 120.00-100.00	2.96	3.57	A	0.496	1.905	0.695	1	1	105.624	4.05	202.61	B
			B	0.667	1.778	0.797	1	1	156.842			
			C	0.443	1.985	0.67	1	1	92.478			
T6 100.00-80.00	2.96	3.63	A	0.434	2.001	0.666	1	1	102.489	3.70	184.80	B
			B	0.582	1.816	0.743	1	1	148.298			
			C	0.388	2.088	0.647	1	1	90.381			
T7 80.00-60.00	2.96	4.85	A	0.402	2.059	0.653	1	1	106.560	3.55	177.37	B
			B	0.535	1.859	0.716	1	1	149.397			
			C	0.362	2.145	0.637	1	1	94.999			
T8 60.00-40.00	2.96	5.45	A	0.382	2.102	0.644	1	1	112.537	3.39	169.36	B
			B	0.499	1.901	0.697	1	1	153.584			
			C	0.345	2.183	0.631	1	1	101.265			
T9 40.00-20.00	2.96	6.34	A	0.354	2.163	0.634	1	1	114.011	3.09	154.27	B
			B	0.461	1.957	0.678	1	1	153.058			
			C	0.321	2.243	0.622	1	1	103.132			
T10 20.00-0.00	2.67	7.08	A	0.314	2.261	0.62	1	1	109.397	3.02	150.80	B
			B	0.402	2.059	0.653	1	1	142.142			
			C	0.286	2.333	0.612	1	1	100.062			
Sum Weight:	23.47	37.96						OTM	2987.13 kip-ft	31.89		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.25	0.70	A	0.692	1.776	0.815	0.825	1	31.212	0.93	116.63	A
			B	0.28	2.349	0.61	0.825	1	10.721			
			C	0.255	2.423	0.603	0.825	1	9.805			
T2 180.00-160.00	1.10	1.31	A	0.73	1.781	0.842	0.825	1	96.729	2.84	141.76	A
			B	0.36	2.148	0.636	0.825	1	38.066			
			C	0.184	2.65	0.587	0.825	1	19.489			
T3 160.00-140.00	1.92	2.10	A	0.63	1.788	0.773	0.825	1	97.673	2.77	138.68	A
			B	0.573	1.823	0.738	0.825	1	85.369			
			C	0.323	2.236	0.623	0.825	1	42.929			
T4 140.00-120.00	2.73	2.93	A	0.556	1.837	0.728	0.825	1	100.190	4.32	215.90	B
			B	0.758	1.791	0.863	0.825	1	158.150			
			C	0.395	2.075	0.649	0.825	1	65.631			
T5 120.00-100.00	2.96	3.57	A	0.496	1.905	0.695	0.825	1	101.734	3.95	197.59	B
			B	0.667	1.778	0.797	0.825	1	152.953			
			C	0.443	1.985	0.67	0.825	1	88.589			
T6 100.00-80.00	2.96	3.63	A	0.434	2.001	0.666	0.825	1	98.785	3.60	180.18	B
			B	0.582	1.816	0.743	0.825	1	144.594			
			C	0.388	2.088	0.647	0.825	1	86.677			
T7 80.00-60.00	2.96	4.85	A	0.402	2.059	0.653	0.825	1	101.923	3.44	171.86	B
			B	0.535	1.859	0.716	0.825	1	144.759			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.362	2.145	0.637	0.825	1	90.361			
T8 60.00-40.00	2.96	5.45	A	0.382	2.102	0.644	0.825	1	107.494	3.28	163.80	B
			B	0.499	1.901	0.697	0.825	1	148.541			
			C	0.345	2.183	0.631	0.825	1	96.222			
T9 40.00-20.00	2.96	6.34	A	0.354	2.163	0.634	0.825	1	108.538	2.98	148.75	B
			B	0.461	1.957	0.678	0.825	1	147.585			
			C	0.321	2.243	0.622	0.825	1	97.659			
T10 20.00-0.00	2.67	7.08	A	0.314	2.261	0.62	0.825	1	103.503	2.89	144.55	B
			B	0.402	2.059	0.653	0.825	1	136.248			
			C	0.286	2.333	0.612	0.825	1	94.168			
Sum Weight:	23.47	37.96						OTM	2912.61 kip-ft	30.99		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.25	0.70	A	0.692	1.776	0.815	0.8	1	31.064	0.93	116.08	A
			B	0.28	2.349	0.61	0.8	1	10.573			
			C	0.255	2.423	0.603	0.8	1	9.658			
T2 180.00-160.00	1.10	1.31	A	0.73	1.781	0.842	0.8	1	96.473	2.83	141.38	A
			B	0.36	2.148	0.636	0.8	1	37.810			
			C	0.184	2.65	0.587	0.8	1	19.233			
T3 160.00-140.00	1.92	2.10	A	0.63	1.788	0.773	0.8	1	97.319	2.76	138.18	A
			B	0.573	1.823	0.738	0.8	1	85.015			
			C	0.323	2.236	0.623	0.8	1	42.575			
T4 140.00-120.00	2.73	2.93	A	0.556	1.837	0.728	0.8	1	99.701	4.30	215.23	B
			B	0.758	1.791	0.863	0.8	1	157.661			
			C	0.395	2.075	0.649	0.8	1	65.142			
T5 120.00-100.00	2.96	3.57	A	0.496	1.905	0.695	0.8	1	101.178	3.94	196.87	B
			B	0.667	1.778	0.797	0.8	1	152.397			
			C	0.443	1.985	0.67	0.8	1	88.033			
T6 100.00-80.00	2.96	3.63	A	0.434	2.001	0.666	0.8	1	98.256	3.59	179.52	B
			B	0.582	1.816	0.743	0.8	1	144.065			
			C	0.388	2.088	0.647	0.8	1	86.148			
T7 80.00-60.00	2.96	4.85	A	0.402	2.059	0.653	0.8	1	101.260	3.42	171.08	B
			B	0.535	1.859	0.716	0.8	1	144.097			
			C	0.362	2.145	0.637	0.8	1	89.699			
T8 60.00-40.00	2.96	5.45	A	0.382	2.102	0.644	0.8	1	106.774	3.26	163.00	B
			B	0.499	1.901	0.697	0.8	1	147.821			
			C	0.345	2.183	0.631	0.8	1	95.501			
T9 40.00-20.00	2.96	6.34	A	0.354	2.163	0.634	0.8	1	107.756	2.96	147.96	B
			B	0.461	1.957	0.678	0.8	1	146.803			
			C	0.321	2.243	0.622	0.8	1	96.877			
T10 20.00-0.00	2.67	7.08	A	0.314	2.261	0.62	0.8	1	102.661	2.87	143.66	B
			B	0.402	2.059	0.653	0.8	1	135.406			
			C	0.286	2.333	0.612	0.8	1	93.326			
Sum Weight:	23.47	37.96						OTM	2901.97 kip-ft	30.87		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.25	0.70	A	0.692	1.776	0.815	0.85	1	31.360	0.94	117.18	A
			B	0.28	2.349	0.61	0.85	1	10.868			
			C	0.255	2.423	0.603	0.85	1	9.953			
T2 180.00-160.00	1.10	1.31	A	0.73	1.781	0.842	0.85	1	96.986	2.84	142.13	A
			B	0.36	2.148	0.636	0.85	1	38.322			
			C	0.184	2.65	0.587	0.85	1	19.746			
T3 160.00-140.00	1.92	2.10	A	0.63	1.788	0.773	0.85	1	98.027	2.78	139.19	A
			B	0.573	1.823	0.738	0.85	1	85.723			
			C	0.323	2.236	0.623	0.85	1	43.283			
T4 140.00-120.00	2.73	2.93	A	0.556	1.837	0.728	0.85	1	100.679	4.33	216.56	B
			B	0.758	1.791	0.863	0.85	1	158.638			
			C	0.395	2.075	0.649	0.85	1	66.120			
T5 120.00-100.00	2.96	3.57	A	0.496	1.905	0.695	0.85	1	102.290	3.97	198.30	B
			B	0.667	1.778	0.797	0.85	1	153.508			
			C	0.443	1.985	0.67	0.85	1	89.144			
T6 100.00-80.00	2.96	3.63	A	0.434	2.001	0.666	0.85	1	99.314	3.62	180.84	B
			B	0.582	1.816	0.743	0.85	1	145.123			
			C	0.388	2.088	0.647	0.85	1	87.206			
T7 80.00-60.00	2.96	4.85	A	0.402	2.059	0.653	0.85	1	102.585	3.45	172.65	B
			B	0.535	1.859	0.716	0.85	1	145.422			
			C	0.362	2.145	0.637	0.85	1	91.024			
T8 60.00-40.00	2.96	5.45	A	0.382	2.102	0.644	0.85	1	108.215	3.29	164.59	B
			B	0.499	1.901	0.697	0.85	1	149.262			
			C	0.345	2.183	0.631	0.85	1	96.942			
T9 40.00-20.00	2.96	6.34	A	0.354	2.163	0.634	0.85	1	109.319	2.99	149.54	B
			B	0.461	1.957	0.678	0.85	1	148.367			
			C	0.321	2.243	0.622	0.85	1	98.441			
T10 20.00-0.00	2.67	7.08	A	0.314	2.261	0.62	0.85	1	104.345	2.91	145.44	B
			B	0.402	2.059	0.653	0.85	1	137.090			
			C	0.286	2.333	0.612	0.85	1	95.010			
Sum Weight:	23.47	37.96						OTM	2923.26 kip-ft	31.12		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	0.43	A	0.475	1.935	0.685	1	1	19.609	0.64	79.84	A
			B	0.192	2.622	0.589	1	1	8.606			
			C	0.179	2.669	0.586	1	1	8.161			
T2 180.00-160.00	0.41	0.81	A	0.496	1.905	0.696	1	1	56.968	1.79	89.30	A
			B	0.239	2.471	0.599	1	1	26.435			
			C	0.127	2.857	0.578	1	1	15.796			
T3 160.00-140.00	0.71	1.47	A	0.438	1.994	0.668	1	1	62.439	1.98	98.83	A
			B	0.389	2.087	0.647	1	1	54.650			
			C	0.231	2.496	0.597	1	1	32.901			
T4 140.00-120.00	1.01	2.09	A	0.395	2.074	0.65	1	1	68.673	2.71	135.51	B
			B	0.522	1.873	0.709	1	1	94.934			
			C	0.286	2.334	0.612	1	1	49.748			
T5 120.00-100.00	1.10	2.60	A	0.356	2.158	0.635	1	1	72.469	2.75	137.42	B
			B	0.463	1.952	0.68	1	1	96.882			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T6 100.00-80.00	1.10	2.67	C	0.32	2.243	0.622	1	1	65.216	2.68	134.04	B
			A	0.316	2.254	0.621	1	1	72.534			
			B	0.41	2.045	0.656	1	1	95.508			
T7 80.00-60.00	1.10	3.73	C	0.285	2.335	0.612	1	1	65.577			
			A	0.296	2.307	0.615	1	1	77.344	2.68	133.81	B
			B	0.379	2.107	0.643	1	1	99.450			
T8 60.00-40.00	1.10	4.18	C	0.269	2.383	0.607	1	1	70.564			
			A	0.285	2.336	0.611	1	1	83.490	2.62	131.19	B
			B	0.359	2.15	0.636	1	1	105.175			
T9 40.00-20.00	1.10	4.99	C	0.261	2.405	0.605	1	1	76.776			
			A	0.265	2.395	0.606	1	1	85.421	2.43	121.47	B
			B	0.332	2.215	0.626	1	1	106.463			
T10 20.00-0.00	0.99	5.65	C	0.242	2.46	0.6	1	1	78.850			
			A	0.236	2.479	0.598	1	1	83.557	2.43	121.47	B
			B	0.292	2.317	0.614	1	1	101.751			
			C	0.218	2.537	0.594	1	1	77.801			
Sum Weight:	8.71	28.61						OTM	2029.27 kip-ft	22.70		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	0.43	A	0.475	1.935	0.685	0.825	1	18.574	0.60	75.62	A
			B	0.192	2.622	0.589	0.825	1	7.572			
T2 180.00-160.00	0.41	0.81	C	0.179	2.669	0.586	0.825	1	7.126			
			A	0.496	1.905	0.696	0.825	1	55.175	1.73	86.49	A
			B	0.239	2.471	0.599	0.825	1	24.642			
T3 160.00-140.00	0.71	1.47	C	0.127	2.857	0.578	0.825	1	14.003			
			A	0.438	1.994	0.668	0.825	1	59.961	1.90	94.91	A
			B	0.389	2.087	0.647	0.825	1	52.172			
T4 140.00-120.00	1.01	2.09	C	0.231	2.496	0.597	0.825	1	30.423			
			A	0.395	2.074	0.65	0.825	1	65.252	2.61	130.63	B
			B	0.522	1.873	0.709	0.825	1	91.512			
T5 120.00-100.00	1.10	2.60	C	0.286	2.334	0.612	0.825	1	46.327			
			A	0.356	2.158	0.635	0.825	1	68.580	2.64	131.90	B
			B	0.463	1.952	0.68	0.825	1	92.993			
T6 100.00-80.00	1.10	2.67	C	0.32	2.243	0.622	0.825	1	61.326			
			A	0.316	2.254	0.621	0.825	1	68.830	2.58	128.84	B
			B	0.41	2.045	0.656	0.825	1	91.804			
T7 80.00-60.00	1.10	3.73	C	0.285	2.335	0.612	0.825	1	61.873			
			A	0.296	2.307	0.615	0.825	1	72.707	2.55	127.57	B
			B	0.379	2.107	0.643	0.825	1	94.812			
T8 60.00-40.00	1.10	4.18	C	0.269	2.383	0.607	0.825	1	65.926			
			A	0.285	2.336	0.611	0.825	1	78.447	2.50	124.90	B
			B	0.359	2.15	0.636	0.825	1	100.132			
T9 40.00-20.00	1.10	4.99	C	0.261	2.405	0.605	0.825	1	71.733			
			A	0.265	2.395	0.606	0.825	1	79.948	2.30	115.22	B
			B	0.332	2.215	0.626	0.825	1	100.990			
T10 20.00-0.00	0.99	5.65	C	0.242	2.46	0.6	0.825	1	73.377			
			A	0.236	2.479	0.598	0.825	1	77.663	2.29	114.43	B
			B	0.292	2.317	0.614	0.825	1	95.857			
			C	0.218	2.537	0.594	0.825	1	71.907			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	8.71	28.61						OTM	1947.37 kip-ft	21.70		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	0.43	A	0.475	1.935	0.685	0.8	1	18.426	0.60	75.02	A
			B	0.192	2.622	0.589	0.8	1	7.424			
			C	0.179	2.669	0.586	0.8	1	6.978			
T2 180.00-160.00	0.41	0.81	A	0.496	1.905	0.696	0.8	1	54.919	1.72	86.09	A
			B	0.239	2.471	0.599	0.8	1	24.386			
			C	0.127	2.857	0.578	0.8	1	13.747			
T3 160.00-140.00	0.71	1.47	A	0.438	1.994	0.668	0.8	1	59.607	1.89	94.35	A
			B	0.389	2.087	0.647	0.8	1	51.818			
			C	0.231	2.496	0.597	0.8	1	30.069			
T4 140.00-120.00	1.01	2.09	A	0.395	2.074	0.65	0.8	1	64.763	2.60	129.93	B
			B	0.522	1.873	0.709	0.8	1	91.024			
			C	0.286	2.334	0.612	0.8	1	45.838			
T5 120.00-100.00	1.10	2.60	A	0.356	2.158	0.635	0.8	1	68.024	2.62	131.12	B
			B	0.463	1.952	0.68	0.8	1	92.437			
			C	0.32	2.243	0.622	0.8	1	60.771			
T6 100.00-80.00	1.10	2.67	A	0.316	2.254	0.621	0.8	1	68.301	2.56	128.10	B
			B	0.41	2.045	0.656	0.8	1	91.275			
			C	0.285	2.335	0.612	0.8	1	61.344			
T7 80.00-60.00	1.10	3.73	A	0.296	2.307	0.615	0.8	1	72.044	2.53	126.68	B
			B	0.379	2.107	0.643	0.8	1	94.150			
			C	0.269	2.383	0.607	0.8	1	65.264			
T8 60.00-40.00	1.10	4.18	A	0.285	2.336	0.611	0.8	1	77.727	2.48	124.00	B
			B	0.359	2.15	0.636	0.8	1	99.411			
			C	0.261	2.405	0.605	0.8	1	71.012			
T9 40.00-20.00	1.10	4.99	A	0.265	2.395	0.606	0.8	1	79.166	2.29	114.33	B
			B	0.332	2.215	0.626	0.8	1	100.208			
			C	0.242	2.46	0.6	0.8	1	72.595			
T10 20.00-0.00	0.99	5.65	A	0.236	2.479	0.598	0.8	1	76.821	2.27	113.43	B
			B	0.292	2.317	0.614	0.8	1	95.015			
			C	0.218	2.537	0.594	0.8	1	71.065			
Sum Weight:	8.71	28.61						OTM	1935.67 kip-ft	21.56		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 188.00-180.00	0.09	0.43	A	0.475	1.935	0.685	0.85	1	18.722	0.61	76.23	A
			B	0.192	2.622	0.589	0.85	1	7.719			
			C	0.179	2.669	0.586	0.85	1	7.274			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2 180.00-160.00	0.41	0.81	A	0.496	1.905	0.696	0.85	1	55.431	1.74	86.89	A
			B	0.239	2.471	0.599	0.85	1	24.898			
			C	0.127	2.857	0.578	0.85	1	14.259			
T3 160.00-140.00	0.71	1.47	A	0.438	1.994	0.668	0.85	1	60.315	1.91	95.47	A
			B	0.389	2.087	0.647	0.85	1	52.526			
			C	0.231	2.496	0.597	0.85	1	30.777			
T4 140.00-120.00	1.01	2.09	A	0.395	2.074	0.65	0.85	1	65.741	2.63	131.32	B
			B	0.522	1.873	0.709	0.85	1	92.001			
			C	0.286	2.334	0.612	0.85	1	46.816			
T5 120.00-100.00	1.10	2.60	A	0.356	2.158	0.635	0.85	1	69.135	2.65	132.69	B
			B	0.463	1.952	0.68	0.85	1	93.548			
			C	0.32	2.243	0.622	0.85	1	61.882			
T6 100.00-80.00	1.10	2.67	A	0.316	2.254	0.621	0.85	1	69.359	2.59	129.59	B
			B	0.41	2.045	0.656	0.85	1	92.334			
			C	0.285	2.335	0.612	0.85	1	62.402			
T7 80.00-60.00	1.10	3.73	A	0.296	2.307	0.615	0.85	1	73.369	2.57	128.46	B
			B	0.379	2.107	0.643	0.85	1	95.475			
			C	0.269	2.383	0.607	0.85	1	66.589			
T8 60.00-40.00	1.10	4.18	A	0.285	2.336	0.611	0.85	1	79.167	2.52	125.80	B
			B	0.359	2.15	0.636	0.85	1	100.852			
			C	0.261	2.405	0.605	0.85	1	72.453			
T9 40.00-20.00	1.10	4.99	A	0.265	2.395	0.606	0.85	1	80.730	2.32	116.11	B
			B	0.332	2.215	0.626	0.85	1	101.772			
			C	0.242	2.46	0.6	0.85	1	74.158			
T10 20.00-0.00	0.99	5.65	A	0.236	2.479	0.598	0.85	1	78.505	2.31	115.44	B
			B	0.292	2.317	0.614	0.85	1	96.699			
			C	0.218	2.537	0.594	0.85	1	72.749			
Sum Weight:	8.71	28.61						OTM	1959.07 kip-ft	21.85		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	13.56					
Bracing Weight	15.05					
Total Member Self-Weight	28.61			-12.91	-8.72	
Total Weight	45.51			-12.91	-8.72	
Wind 0 deg - No Ice		0.00	-49.23	-5040.73	-8.74	22.09
Wind 30 deg - No Ice		23.86	-41.32	-4259.07	-2460.27	2.42
Wind 45 deg - No Ice		33.56	-33.56	-3465.18	-3461.01	-7.52
Wind 60 deg - No Ice		40.88	-23.60	-2443.64	-4218.88	-16.81
Wind 90 deg - No Ice		47.72	-0.00	-12.92	-4911.78	-31.92
Wind 120 deg - No Ice		42.64	24.62	2500.99	-4362.96	-39.80
Wind 135 deg - No Ice		33.56	33.56	3439.34	-3460.99	-37.33
Wind 150 deg - No Ice		23.86	41.32	4233.24	-2460.23	-34.34
Wind 180 deg - No Ice		-0.00	47.21	4848.53	-8.70	-20.93
Wind 210 deg - No Ice		-23.86	41.32	4233.26	2442.82	-2.42
Wind 225 deg - No Ice		-33.56	33.56	3439.37	3443.57	7.52
Wind 240 deg - No Ice		-42.64	24.62	2501.03	4345.53	17.71
Wind 270 deg - No Ice		-47.72	0.00	-12.89	4894.33	31.92
Wind 300 deg - No Ice		-40.88	-23.60	-2443.61	4201.41	37.74
Wind 315 deg - No Ice		-33.56	-33.56	-3465.15	3443.54	37.33
Wind 330 deg - No Ice		-23.86	-41.32	-4259.05	2442.79	34.34

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Member Ice	9.35					
Total Weight Ice	73.49			-34.45	-24.52	
Wind 0 deg - Ice		0.00	-38.32	-4043.86	-24.53	19.58
Wind 30 deg - Ice		18.77	-32.52	-3451.39	-1997.31	3.03
Wind 45 deg - Ice		26.46	-26.46	-2816.85	-2806.93	-5.57
Wind 60 deg - Ice		32.29	-18.65	-1996.58	-3423.04	-13.71
Wind 90 deg - Ice		37.55	-0.00	-34.46	-3970.07	-26.98
Wind 120 deg - Ice		33.18	19.16	1970.24	-3496.78	-33.76
Wind 135 deg - Ice		26.46	26.46	2747.93	-2806.91	-32.43
Wind 150 deg - Ice		18.77	32.52	3382.48	-1997.28	-30.01
Wind 180 deg - Ice		-0.00	37.29	3889.80	-24.50	-18.91
Wind 210 deg - Ice		-18.77	32.52	3382.50	1948.27	-3.03
Wind 225 deg - Ice		-26.46	26.46	2747.95	2757.89	5.57
Wind 240 deg - Ice		-33.18	19.16	1970.27	3447.75	14.18
Wind 270 deg - Ice		-37.55	0.00	-34.43	3921.04	26.98
Wind 300 deg - Ice		-32.29	-18.65	-1996.56	3373.99	32.62
Wind 315 deg - Ice		-26.46	-26.46	-2816.83	2757.87	32.43
Wind 330 deg - Ice		-18.77	-32.52	-3451.38	1948.25	30.01
Total Weight	45.51			-12.91	-8.72	
Wind 0 deg - Service		0.00	-27.69	-2828.09	0.10	12.43
Wind 30 deg - Service		13.42	-23.24	-2388.40	-1378.88	1.36
Wind 45 deg - Service		18.88	-18.88	-1941.84	-1941.80	-4.23
Wind 60 deg - Service		23.00	-13.28	-1367.22	-2368.10	-9.46
Wind 90 deg - Service		26.84	-0.00	0.05	-2757.86	-17.96
Wind 120 deg - Service		23.98	13.85	1414.13	-2449.15	-22.39
Wind 135 deg - Service		18.88	18.88	1941.95	-1941.79	-21.00
Wind 150 deg - Service		13.42	23.24	2388.52	-1378.86	-19.32
Wind 180 deg - Service		-0.00	26.56	2734.62	0.12	-11.77
Wind 210 deg - Service		-13.42	23.24	2388.53	1379.11	-1.36
Wind 225 deg - Service		-18.88	18.88	1941.97	1942.03	4.23
Wind 240 deg - Service		-23.98	13.85	1414.15	2449.38	9.96
Wind 270 deg - Service		-26.84	0.00	0.07	2758.08	17.96
Wind 300 deg - Service		-23.00	-13.28	-1367.21	2368.31	21.23
Wind 315 deg - Service		-18.88	-18.88	-1941.83	1942.01	21.00
Wind 330 deg - Service		-13.42	-23.24	-2388.39	1379.09	19.32

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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice

Comb. No.	Description
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	188 - 180	Leg	Max Tension	15	2.09	-0.01	0.01
			Max. Compression	2	-3.91	-0.00	0.10
			Max. Mx	6	-0.94	-0.10	0.00
			Max. My	2	-3.91	-0.00	0.10
			Max. Vy	6	-0.81	0.00	-0.00
			Max. Vx	10	-0.82	-0.00	0.00
		Diagonal	Max Tension	3	1.28	0.00	0.00
			Max. Compression	11	-1.31	0.00	0.00
			Max. Mx	19	0.76	0.01	-0.00
			Max. My	13	-1.04	0.00	-0.00
			Max. Vy	19	-0.01	0.01	-0.00
			Max. Vx	13	0.00	0.00	0.00
		Top Girt	Max Tension	2	0.48	0.00	0.00
			Max. Compression	15	-0.51	0.00	0.00
			Max. Mx	18	-0.03	-0.04	0.00
			Max. My	23	-0.03	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T2	180 - 160	Leg	Max Tension	15	15.24	-0.19	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-19.21	0.00	-0.00
			Max. Mx	10	11.12	0.38	-0.00
			Max. My	6	-1.30	-0.01	-0.38
			Max. Vy	10	-0.29	-0.20	-0.00
			Max. Vx	6	0.31	-0.01	0.21
		Diagonal	Max Tension	11	2.79	0.00	0.00
			Max. Compression	11	-2.78	0.00	0.00
			Max. Mx	33	1.36	0.01	-0.00
			Max. My	22	-2.01	0.01	0.00
			Max. Vy	33	0.01	0.01	-0.00
			Max. Vx	22	-0.00	0.00	0.00
T3	160 - 140	Leg	Max Tension	5	33.41	-0.39	0.00
			Max. Compression	2	-40.61	0.48	-0.02
			Max. Mx	10	32.64	0.61	0.02
			Max. My	11	-2.82	-0.02	-0.56
			Max. Vy	10	-0.54	-0.10	0.03
			Max. Vx	14	-0.51	-0.00	-0.03
		Diagonal	Max Tension	9	4.42	0.00	0.00
			Max. Compression	9	-4.50	0.00	0.00
			Max. Mx	19	2.80	0.04	-0.00
			Max. My	22	-2.65	0.02	0.01
			Max. Vy	19	-0.02	0.04	-0.00
			Max. Vx	22	-0.00	0.00	0.00
T4	140 - 120	Leg	Max Tension	5	57.05	-0.41	0.02
			Max. Compression	2	-67.77	0.40	-0.02
			Max. Mx	10	40.66	-0.53	0.02
			Max. My	6	-5.16	-0.02	0.45
			Max. Vy	10	-0.30	-0.41	0.03
			Max. Vx	6	0.31	-0.02	0.40
		Diagonal	Max Tension	9	5.77	0.00	0.00
			Max. Compression	9	-5.86	0.00	0.00
			Max. Mx	19	3.50	0.07	-0.01
			Max. My	32	-4.20	0.03	-0.01
			Max. Vy	22	0.03	0.06	0.01
			Max. Vx	32	0.00	0.00	0.00
T5	120 - 100	Leg	Max Tension	5	82.87	-0.24	0.01
			Max. Compression	2	-97.20	0.52	-0.04
			Max. Mx	13	-96.57	0.52	-0.03
			Max. My	6	-5.45	-0.02	0.45
			Max. Vy	10	0.08	-0.49	0.04
			Max. Vx	7	-0.10	-0.25	0.42
		Diagonal	Max Tension	9	6.77	0.00	0.00
			Max. Compression	9	-6.80	0.00	0.00
			Max. Mx	21	3.49	0.07	0.01
			Max. My	32	-5.03	0.05	-0.01
			Max. Vy	22	0.04	0.07	0.01
			Max. Vx	32	0.00	0.00	0.00
T6	100 - 80	Leg	Max Tension	5	106.35	-0.41	0.02
			Max. Compression	2	-123.71	0.72	-0.05
			Max. Mx	13	-122.94	0.73	-0.04
			Max. My	6	-7.08	-0.05	0.72
			Max. Vy	13	-0.10	0.73	-0.04
			Max. Vx	6	-0.12	-0.05	0.72
		Diagonal	Max Tension	9	8.09	0.00	0.00
			Max. Compression	9	-8.21	0.00	0.00
			Max. Mx	19	5.02	0.13	-0.01
			Max. My	33	-6.26	0.04	-0.02
			Max. Vy	22	0.05	0.12	0.01
			Max. Vx	33	0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	5	132.03	-0.43	0.02
			Max. Compression	2	-153.41	0.78	-0.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	27	98.34	-0.94	0.03
			Max. My	6	-8.52	-0.05	0.66
			Max. Vy	27	0.13	-0.94	0.03
			Max. Vx	6	-0.11	-0.05	0.66
		Diagonal	Max Tension	9	9.08	0.00	0.00
			Max. Compression	9	-9.22	0.00	0.00
			Max. Mx	19	5.53	0.19	-0.02
			Max. My	32	-6.53	0.11	-0.03
			Max. Vy	22	0.07	0.19	0.02
			Max. Vx	32	0.00	0.00	0.00
T8	60 - 40	Leg	Max Tension	5	156.01	-1.00	0.02
			Max. Compression	2	-181.95	0.71	-0.02
			Max. Mx	27	115.79	-2.22	0.03
			Max. My	6	-10.22	-0.05	1.04
			Max. Vy	30	0.32	1.65	-0.01
			Max. Vx	6	-0.15	-0.05	1.04
		Diagonal	Max Tension	9	9.11	0.00	0.00
			Max. Compression	9	-9.20	0.00	0.00
			Max. Mx	22	4.78	0.21	0.02
			Max. My	32	-6.01	0.14	-0.03
			Max. Vy	22	0.08	0.20	0.03
			Max. Vx	32	0.00	0.00	0.00
T9	40 - 20	Leg	Max Tension	5	180.44	-0.91	0.01
			Max. Compression	2	-211.32	1.39	-0.05
			Max. Mx	22	135.79	-5.51	0.03
			Max. My	6	-12.24	-0.07	0.90
			Max. Vy	27	0.84	-5.51	0.04
			Max. Vx	6	0.12	-0.07	0.90
		Diagonal	Max Tension	9	10.55	0.00	0.00
			Max. Compression	9	-10.80	0.00	0.00
			Max. Mx	22	4.93	0.25	0.03
			Max. My	24	-1.96	0.23	0.03
			Max. Vy	22	0.08	0.25	0.03
			Max. Vx	24	-0.00	0.00	0.00
T10	20 - 0	Leg	Max Tension	5	204.45	-0.93	0.02
			Max. Compression	2	-240.91	0.00	0.00
			Max. Mx	30	-188.77	5.74	-0.00
			Max. My	6	-14.35	-0.13	2.00
			Max. Vy	27	-1.05	-5.51	0.04
			Max. Vx	6	0.29	-0.13	2.00
		Diagonal	Max Tension	26	12.20	0.00	0.00
			Max. Compression	26	-11.35	0.00	0.00
			Max. Mx	21	2.09	0.38	0.04
			Max. My	33	-10.57	0.29	-0.05
			Max. Vy	21	0.11	0.38	0.04
			Max. Vx	33	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	13	246.91	25.71	-15.32
	Max. H_x	13	246.91	25.71	-15.32
	Max. H_z	4	-203.44	-21.47	13.79
	Min. Vert	5	-210.17	-22.58	13.48
	Min. H_x	5	-210.17	-22.58	13.48

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_z	13	246.91	25.71	-15.32
Leg B	Max. Vert	7	247.61	-25.47	-15.77
	Max. H_x	15	-209.47	22.32	13.89
	Max. H_z	16	-202.74	21.12	14.38
	Min. Vert	15	-209.47	22.32	13.89
	Min. H_x	7	247.61	-25.47	-15.77
	Min. H_z	7	247.61	-25.47	-15.77
Leg A	Max. Vert	2	248.15	0.51	29.95
	Max. H_x	14	15.77	4.73	1.31
	Max. H_z	2	248.15	0.51	29.95
	Min. Vert	10	-208.93	-0.48	-26.27
	Min. H_x	6	15.77	-4.71	1.31
	Min. H_z	10	-208.93	-0.48	-26.27

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	45.51	0.00	-0.00	-12.91	-8.72	-0.00
Dead+Wind 0 deg - No Ice	45.51	0.00	-49.23	-5052.32	-8.79	22.12
Dead+Wind 30 deg - No Ice	45.51	23.85	-41.32	-4268.86	-2465.86	2.42
Dead+Wind 45 deg - No Ice	45.51	33.56	-33.56	-3473.14	-3468.88	-7.53
Dead+Wind 60 deg - No Ice	45.51	40.88	-23.60	-2449.25	-4228.49	-16.84
Dead+Wind 90 deg - No Ice	45.51	47.71	0.00	-12.96	-4923.04	-31.97
Dead+Wind 120 deg - No Ice	45.51	42.63	24.61	2506.68	-4373.03	-39.86
Dead+Wind 135 deg - No Ice	45.51	33.56	33.56	3447.19	-3469.03	-37.37
Dead+Wind 150 deg - No Ice	45.51	23.86	41.32	4242.89	-2465.98	-34.38
Dead+Wind 180 deg - No Ice	45.51	-0.00	47.20	4859.61	-8.76	-20.96
Dead+Wind 210 deg - No Ice	45.51	-23.86	41.32	4242.94	2448.47	-2.42
Dead+Wind 225 deg - No Ice	45.51	-33.56	33.56	3447.24	3451.54	7.54
Dead+Wind 240 deg - No Ice	45.51	-42.63	24.61	2506.74	4355.54	17.74
Dead+Wind 270 deg - No Ice	45.51	-47.71	0.00	-12.93	4905.56	31.97
Dead+Wind 300 deg - No Ice	45.51	-40.88	-23.60	-2449.25	4210.98	37.79
Dead+Wind 315 deg - No Ice	45.51	-33.56	-33.56	-3473.15	3451.34	37.37
Dead+Wind 330 deg - No Ice	45.51	-23.85	-41.32	-4268.87	2448.30	34.38
Dead+Ice+Temp	73.49	-0.00	0.00	-34.47	-24.52	0.00
Dead+Wind 0 deg+Ice+Temp	73.49	0.00	-38.31	-4057.97	-24.63	19.64
Dead+Wind 30 deg+Ice+Temp	73.49	18.77	-32.51	-3463.44	-2004.23	3.03
Dead+Wind 45 deg+Ice+Temp	73.49	26.45	-26.45	-2826.68	-2816.67	-5.59
Dead+Wind 60 deg+Ice+Temp	73.49	32.29	-18.64	-2003.55	-3434.93	-13.76
Dead+Wind 90 deg+Ice+Temp	73.49	37.54	0.00	-34.59	-3983.91	-27.07
Dead+Wind 120 deg+Ice+Temp	73.49	33.17	19.15	1977.08	-3509.00	-33.86
Dead+Wind 135 deg+Ice+Temp	73.49	26.45	26.45	2757.49	-2816.77	-32.53
Dead+Wind 150 deg+Ice+Temp	73.49	18.77	32.51	3394.25	-2004.32	-30.10
Dead+Wind 180 deg+Ice+Temp	73.49	-0.00	37.28	3903.34	-24.62	-18.96
Dead+Wind 210 deg+Ice+Temp	73.49	-18.77	32.51	3394.27	1955.10	-3.03
Dead+Wind 225 deg+Ice+Temp	73.49	-26.45	26.45	2757.52	2767.56	5.59
Dead+Wind 240 deg+Ice+Temp	73.49	-33.17	19.15	1977.11	3459.80	14.22
Dead+Wind 270 deg+Ice+Temp	73.49	-37.54	0.00	-34.57	3934.72	27.07
Dead+Wind 300 deg+Ice+Temp	73.49	-32.29	-18.64	-2003.56	3385.72	32.72
Dead+Wind 315 deg+Ice+Temp	73.49	-26.45	-26.45	-2826.70	2767.44	32.53
Dead+Wind 330 deg+Ice+Temp	73.49	-18.77	-32.51	-3463.46	1954.99	30.10
Dead+Wind 0 deg - Service	45.51	0.00	-27.69	-2847.59	-8.76	12.44
Dead+Wind 30 deg - Service	45.51	13.42	-23.24	-2406.90	-1390.89	1.36
Dead+Wind 45 deg - Service	45.51	18.88	-18.88	-1959.31	-1955.10	-4.23
Dead+Wind 60 deg - Service	45.51	22.99	-13.28	-1383.37	-2382.38	-9.47

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 90 deg - Service	45.51	26.84	0.00	-12.95	-2773.05	-17.98
Dead+Wind 120 deg - Service	45.51	23.98	13.85	1404.37	-2463.64	-22.41
Dead+Wind 135 deg - Service	45.51	18.88	18.88	1933.41	-1955.13	-21.02
Dead+Wind 150 deg - Service	45.51	13.42	23.24	2380.99	-1390.92	-19.34
Dead+Wind 180 deg - Service	45.51	-0.00	26.55	2727.90	-8.74	-11.79
Dead+Wind 210 deg - Service	45.51	-13.42	23.24	2381.01	1373.44	-1.36
Dead+Wind 225 deg - Service	45.51	-18.88	18.88	1933.43	1937.65	4.23
Dead+Wind 240 deg - Service	45.51	-23.98	13.85	1404.39	2446.16	9.97
Dead+Wind 270 deg - Service	45.51	-26.84	0.00	-12.93	2755.57	17.98
Dead+Wind 300 deg - Service	45.51	-22.99	-13.28	-1383.36	2364.88	21.26
Dead+Wind 315 deg - Service	45.51	-18.88	-18.88	-1959.31	1937.59	21.02
Dead+Wind 330 deg - Service	45.51	-13.42	-23.24	-2406.90	1373.37	19.34

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-45.51	0.00	-0.00	45.51	0.00	0.000%
2	0.00	-45.51	-49.23	-0.00	45.51	49.23	0.009%
3	23.86	-45.51	-41.32	-23.85	45.51	41.32	0.009%
4	33.56	-45.51	-33.56	-33.56	45.51	33.56	0.010%
5	40.88	-45.51	-23.60	-40.88	45.51	23.60	0.010%
6	47.72	-45.51	-0.00	-47.71	45.51	-0.00	0.009%
7	42.64	-45.51	24.62	-42.63	45.51	-24.61	0.009%
8	33.56	-45.51	33.56	-33.56	45.51	-33.56	0.009%
9	23.86	-45.51	41.32	-23.86	45.51	-41.32	0.009%
10	-0.00	-45.51	47.21	0.00	45.51	-47.20	0.010%
11	-23.86	-45.51	41.32	23.86	45.51	-41.32	0.009%
12	-33.56	-45.51	33.56	33.56	45.51	-33.56	0.009%
13	-42.64	-45.51	24.62	42.63	45.51	-24.61	0.009%
14	-47.72	-45.51	0.00	47.71	45.51	-0.00	0.009%
15	-40.88	-45.51	-23.60	40.88	45.51	23.60	0.010%
16	-33.56	-45.51	-33.56	33.56	45.51	33.56	0.010%
17	-23.86	-45.51	-41.32	23.85	45.51	41.32	0.009%
18	0.00	-73.49	0.00	0.00	73.49	-0.00	0.000%
19	0.00	-73.49	-38.32	-0.00	73.49	38.31	0.010%
20	18.77	-73.49	-32.52	-18.77	73.49	32.51	0.010%
21	26.46	-73.49	-26.46	-26.45	73.49	26.45	0.010%
22	32.29	-73.49	-18.65	-32.29	73.49	18.64	0.010%
23	37.55	-73.49	-0.00	-37.54	73.49	-0.00	0.010%
24	33.18	-73.49	19.16	-33.17	73.49	-19.15	0.010%
25	26.46	-73.49	26.46	-26.45	73.49	-26.45	0.010%
26	18.77	-73.49	32.52	-18.77	73.49	-32.51	0.010%
27	-0.00	-73.49	37.29	0.00	73.49	-37.28	0.010%
28	-18.77	-73.49	32.52	18.77	73.49	-32.51	0.010%
29	-26.46	-73.49	26.46	26.45	73.49	-26.45	0.010%
30	-33.18	-73.49	19.16	33.17	73.49	-19.15	0.010%
31	-37.55	-73.49	0.00	37.54	73.49	-0.00	0.010%
32	-32.29	-73.49	-18.65	32.29	73.49	18.64	0.010%
33	-26.46	-73.49	-26.46	26.45	73.49	26.45	0.010%
34	-18.77	-73.49	-32.52	18.77	73.49	32.51	0.010%
35	0.00	-45.51	-27.69	-0.00	45.51	27.69	0.007%
36	13.42	-45.51	-23.24	-13.42	45.51	23.24	0.007%
37	18.88	-45.51	-18.88	-18.88	45.51	18.88	0.007%
38	23.00	-45.51	-13.28	-22.99	45.51	13.28	0.007%
39	26.84	-45.51	-0.00	-26.84	45.51	-0.00	0.007%
40	23.98	-45.51	13.85	-23.98	45.51	-13.85	0.007%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
41	18.88	-45.51	18.88	-18.88	45.51	-18.88	0.006%
42	13.42	-45.51	23.24	-13.42	45.51	-23.24	0.007%
43	-0.00	-45.51	26.56	0.00	45.51	-26.55	0.007%
44	-13.42	-45.51	23.24	13.42	45.51	-23.24	0.007%
45	-18.88	-45.51	18.88	18.88	45.51	-18.88	0.006%
46	-23.98	-45.51	13.85	23.98	45.51	-13.85	0.007%
47	-26.84	-45.51	0.00	26.84	45.51	-0.00	0.007%
48	-23.00	-45.51	-13.28	22.99	45.51	13.28	0.007%
49	-18.88	-45.51	-18.88	18.88	45.51	18.88	0.007%
50	-13.42	-45.51	-23.24	13.42	45.51	23.24	0.007%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00014058	0.00032273
3	Yes	4	0.00014978	0.00034366
4	Yes	4	0.00015575	0.00035715
5	Yes	4	0.00015816	0.00036261
6	Yes	4	0.00014985	0.00034378
7	Yes	4	0.00014063	0.00032280
8	Yes	4	0.00014356	0.00032966
9	Yes	4	0.00015022	0.00034348
10	Yes	4	0.00015810	0.00036252
11	Yes	4	0.00014974	0.00034360
12	Yes	4	0.00014357	0.00032969
13	Yes	4	0.00014056	0.00032273
14	Yes	4	0.00014984	0.00034385
15	Yes	4	0.00015820	0.00036277
16	Yes	4	0.00015577	0.00035722
17	Yes	4	0.00015025	0.00034360
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00023649	0.00053714
20	Yes	4	0.00024389	0.00055346
21	Yes	4	0.00024886	0.00056439
22	Yes	4	0.00025093	0.00056894
23	Yes	4	0.00024409	0.00055371
24	Yes	4	0.00023651	0.00053690
25	Yes	4	0.00023864	0.00054171
26	Yes	4	0.00024359	0.00055262
27	Yes	4	0.00025055	0.00056807
28	Yes	4	0.00024399	0.00055258
29	Yes	4	0.00023842	0.00054146
30	Yes	4	0.00023620	0.00053650
31	Yes	4	0.00024394	0.00055367
32	Yes	4	0.00025097	0.00056925
33	Yes	4	0.00024886	0.00056456
34	Yes	4	0.00024382	0.00055346
35	Yes	4	0.00000001	0.00032989
36	Yes	4	0.00000001	0.00034142
37	Yes	4	0.00000001	0.00034901
38	Yes	4	0.00000001	0.00035213
39	Yes	4	0.00000001	0.00034152
40	Yes	4	0.00000001	0.00032983
41	Yes	4	0.00000001	0.00033356

42	Yes	4	0.00000001	0.00034116
43	Yes	4	0.00000001	0.00035192
44	Yes	4	0.00000001	0.00034122
45	Yes	4	0.00000001	0.00033355
46	Yes	4	0.00000001	0.00032976
47	Yes	4	0.00000001	0.00034158
48	Yes	4	0.00000001	0.00035228
49	Yes	4	0.00000001	0.00034909
50	Yes	4	0.00000001	0.00034142

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	188 - 180	6.272	35	0.3030	0.0366
T2	180 - 160	5.758	35	0.3002	0.0363
T3	160 - 140	4.518	35	0.2692	0.0315
T4	140 - 120	3.435	35	0.2312	0.0279
T5	120 - 100	2.507	35	0.1922	0.0236
T6	100 - 80	1.723	35	0.1565	0.0180
T7	80 - 60	1.101	35	0.1182	0.0135
T8	60 - 40	0.640	35	0.0838	0.0101
T9	40 - 20	0.315	35	0.0520	0.0066
T10	20 - 0	0.101	35	0.0267	0.0031

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.50	BCD-87010__	35	6.272	0.3030	0.0366	275292
188.00	(4) RR90-17-02DP w/Mount Pipe	35	6.272	0.3030	0.0366	275292
177.00	APXV18-206517S-C w/ mounting hardware	35	5.566	0.2976	0.0358	92765
168.00	Rohn 15 Foot Sector Frame	35	5.000	0.2843	0.0337	38462
153.00	(3) 7250.03 w/Mount Pipe	35	4.119	0.2559	0.0300	27235
144.00	(3) ALP-E 9011-DIN w/Mount Pipe	35	3.638	0.2389	0.0285	30276
124.00	(2) DB980H90A-M w/Mount Pipe	35	2.681	0.1997	0.0246	34211

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	188 - 180	11.123	2	0.5370	0.0651
T2	180 - 160	10.213	2	0.5322	0.0645
T3	160 - 140	8.015	2	0.4773	0.0560
T4	140 - 120	6.094	2	0.4100	0.0496
T5	120 - 100	4.447	2	0.3408	0.0419
T6	100 - 80	3.057	2	0.2775	0.0320

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T7	80 - 60	1.954	2	0.2096	0.0239
T8	60 - 40	1.137	2	0.1486	0.0179
T9	40 - 20	0.560	2	0.0922	0.0118
T10	20 - 0	0.179	2	0.0474	0.0055

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.50	BCD-87010_	2	11.123	0.5370	0.0651	158625
188.00	(4) RR90-17-02DP w/Mount Pipe	2	11.123	0.5370	0.0651	158625
177.00	APXV18-206517S-C w/ mounting hardware	2	9.873	0.5275	0.0637	52792
168.00	Rohn 15 Foot Sector Frame	2	8.870	0.5041	0.0598	21753
153.00	(3) 7250.03 w/Mount Pipe	2	7.308	0.4538	0.0534	15377
144.00	(3) ALP-E 9011-DIN w/Mount Pipe	2	6.454	0.4237	0.0507	17083
124.00	(2) DB980H90A-M w/Mount Pipe	2	4.756	0.3542	0.0437	19312

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	188	Leg	A325N	0.6250	4	0.21	13.49	0.016 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	1.31	6.44	0.203 ✓	1.333	Bolt Shear
T2	180	Leg	A325N	0.7500	4	1.15	19.44	0.059 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	2.79	6.44	0.433 ✓	1.333	Bolt Shear
T3	160	Leg	A325N	0.8750	4	5.07	26.46	0.192 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	4.50	6.44	0.698 ✓	1.333	Bolt Shear
T4	140	Leg	A325N	1.0000	4	10.22	34.56	0.296 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	5.86	6.44	0.909 ✓	1.333	Bolt Shear
T5	120	Leg	A325N	1.0000	6	10.91	34.56	0.316 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	6.80	9.28	0.733 ✓	1.333	Bolt Shear
T6	100	Leg	A325N	1.0000	8	11.68	34.56	0.338 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	8.21	9.28	0.885 ✓	1.333	Bolt Shear
T7	80	Leg	A325N	1.0000	8	14.91	34.56	0.431 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	9.22	9.28	0.994 ✓	1.333	Bolt Shear
T8	60	Leg	A325N	1.0000	8	18.05	34.56	0.522 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	9.20	9.28	0.992 ✓	1.333	Bolt Shear
T9	40	Leg	A325N	1.0000	8	21.02	34.56	0.608 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	10.80	9.28	1.165 ✓	1.333	Bolt Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T10	20	Leg	A325N	1.0000	10	19.29	34.56	0.558 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	12.20	9.28	1.315 ✔	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 K	Allow. P_a K	Ratio P / P_a
T1	188 - 180	ROHN 2.5 STD	8.00	4.00	50.7 K=1.00	24.247	1.7040	-3.91	41.32	0.095 ✔
T2	180 - 160	ROHN 2.5 STD	20.03	5.01	63.4 K=1.00	22.123	1.7040	-19.21	37.70	0.510 ✔
T3	160 - 140	ROHN 3 EH	20.04	6.68	70.5 K=1.00	20.840	3.0159	-40.61	62.85	0.646 ✔
T4	140 - 120	ROHN 4 EH	20.04	6.68	54.3 K=1.00	23.670	4.4074	-67.77	104.32	0.650 ✔
T5	120 - 100	ROHN 5 EH	20.04	6.68	43.6 K=1.00	25.320	6.1120	-97.20	154.75	0.628 ✔
T6	100 - 80	ROHN 6 EHS	20.04	10.02	54.0 K=1.00	23.712	6.7133	-123.71	159.18	0.777 ✔
T7	80 - 60	ROHN 6 EH	20.03	10.02	54.8 K=1.00	23.592	8.4049	-153.41	198.29	0.774 ✔
T8	60 - 40	ROHN 8 EHS	20.04	10.02	41.2 K=1.00	25.665	9.7193	-181.94	249.44	0.729 ✔
T9	40 - 20	ROHN 8 EH	20.03	10.02	41.8 K=1.00	25.583	12.7627	-211.32	326.51	0.647 ✔
T10	20 - 0	ROHN 8 EH	20.03	10.02	41.8 K=1.00	25.582	12.7627	-240.91	326.50	0.738 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	188 - 180	L1 3/4x1 3/4x3/16	7.70	3.54	123.8 K=1.00	9.731	0.6211	-1.31	6.04	0.217 ✔
T2	180 - 160	L1 3/4x1 3/4x3/16	9.69	4.68	163.5 K=1.00	5.586	0.6211	-2.78	3.47	0.802 ✔
T3	160 - 140	L2 1/2x2 1/2x1/4	12.24	5.99	146.3 K=1.00	6.977	1.1900	-4.50	8.30	0.542 ✔
T4	140 - 120	L3x3x1/4	14.07	6.86	139.0	7.733	1.4400	-5.86	11.14	0.526

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T5	120 - 100	L3x3x1/4	15.94	7.74	K=1.00 156.9 K=1.00	6.064	1.4400	-6.80	8.73	0.779 ✓
T6	100 - 80	L3 1/2x3 1/2x1/4	19.21	9.42	162.9 K=1.00	5.628	1.6900	-8.21	9.51	0.863 ✓
T7	80 - 60	L4x4x5/16	20.93	10.27	155.7 K=1.00	6.157	2.4000	-9.22	14.78	0.624 ✓
T8	60 - 40	L4x4x5/16	22.87	11.18	169.6 K=1.00	5.189	2.4000	-9.20	12.45	0.739 ✓
T9	40 - 20	L4x4x5/16	24.68	12.04	182.7 K=1.00	4.475	2.4000	-10.80	10.74	1.006 ✓
T10	20 - 0	L4x4x3/8	26.50	12.97	197.4 K=1.00	3.830	2.8600	-11.32	10.96	1.034 ✓

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	188 - 180	L3x3x1/4	6.58	6.34	125.2 K=0.97	9.519	1.4400	-0.51	13.71	0.038 ✓

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	188 - 180	ROHN 2.5 STD	8.00	4.00	50.7	30.000	1.7040	2.09	51.12	0.041 ✓
T2	180 - 160	ROHN 2.5 STD	20.03	5.01	63.4	30.000	1.7040	15.24	51.12	0.298 ✓
T3	160 - 140	ROHN 3 EH	20.04	6.68	70.5	30.000	3.0159	33.41	90.48	0.369 ✓
T4	140 - 120	ROHN 4 EH	20.04	6.68	54.3	30.000	4.4074	57.05	132.22	0.431 ✓
T5	120 - 100	ROHN 5 EH	20.04	6.68	43.6	30.000	6.1120	82.87	183.36	0.452 ✓
T6	100 - 80	ROHN 6 EHS	20.04	10.02	54.0	30.000	6.7133	106.35	201.40	0.528 ✓
T7	80 - 60	ROHN 6 EH	20.03	10.02	54.8	30.000	8.4049	132.03	252.15	0.524 ✓
T8	60 - 40	ROHN 8 EHS	20.04	10.02	41.2	30.000	9.7193	156.01	291.58	0.535 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	40 - 20	ROHN 8 EH	20.03	10.02	41.8	30.000	12.7627	180.44	382.88	0.471 ✓
T10	20 - 0	ROHN 8 EH	20.03	10.02	41.8	30.000	12.7627	204.45	382.88	0.534 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	188 - 180	L1 3/4x1 3/4x3/16	7.70	3.54	82.9	29.000	0.3604	1.28	10.45	0.123 ✓
T2	180 - 160	L1 3/4x1 3/4x3/16	9.69	4.68	108.3	29.000	0.3604	2.79	10.45	0.267 ✓
T3	160 - 140	L2 1/2x2 1/2x1/4	12.24	5.99	96.0	29.000	0.7519	4.42	21.80	0.203 ✓
T4	140 - 120	L3x3x1/4	14.07	6.86	90.6	32.500	0.9394	5.77	30.53	0.189 ✓
T5	120 - 100	L3x3x1/4	15.94	7.74	102.0	32.500	0.9159	6.77	29.77	0.228 ✓
T6	100 - 80	L3 1/2x3 1/2x1/4	19.21	9.42	105.5	32.500	1.1034	8.09	35.86	0.226 ✓
T7	80 - 60	L4x4x5/16	20.93	10.27	101.0	32.500	1.5949	9.08	51.84	0.175 ✓
T8	60 - 40	L4x4x5/16	22.87	11.18	109.8	32.500	1.5949	9.11	51.84	0.176 ✓
T9	40 - 20	L4x4x5/16	24.68	12.04	118.1	32.500	1.5949	10.55	51.84	0.204 ✓
T10	20 - 0	L4x4x3/8	26.50	12.97	128.1	32.500	1.8989	12.20	61.71	0.198 ✓

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	188 - 180	L3x3x1/4	6.58	6.34	81.8	21.600	1.4400	0.48	31.10	0.016 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	188 - 180	Leg	ROHN 2.5 STD	3	-3.91	55.08	7.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T2	180 - 160	Leg	ROHN 2.5 STD	21	-19.21	50.25	38.2	Pass
T3	160 - 140	Leg	ROHN 3 EH	48	-40.61	83.78	48.5	Pass
T4	140 - 120	Leg	ROHN 4 EH	69	-67.77	139.06	48.7	Pass
T5	120 - 100	Leg	ROHN 5 EH	90	-97.20	206.28	47.1	Pass
T6	100 - 80	Leg	ROHN 6 EHS	111	-123.71	212.19	58.3	Pass
T7	80 - 60	Leg	ROHN 6 EH	126	-153.41	264.32	58.0	Pass
T8	60 - 40	Leg	ROHN 8 EHS	141	-181.94	332.51	54.7	Pass
T9	40 - 20	Leg	ROHN 8 EH	156	-211.32	435.24	48.6	Pass
T10	20 - 0	Leg	ROHN 8 EH	171	-240.91	435.22	55.4	Pass
T1	188 - 180	Diagonal	L1 3/4x1 3/4x3/16	12	-1.31	8.06	16.3	Pass
T2	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	27	-2.78	4.62	60.2	Pass
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	51	-4.50	11.07	40.6	Pass
T4	140 - 120	Diagonal	L3x3x1/4	72	-5.86	14.84	52.4 (b) 39.5	Pass
T5	120 - 100	Diagonal	L3x3x1/4	93	-6.80	11.64	68.2 (b) 58.4	Pass
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	114	-8.21	12.68	64.8	Pass
T7	80 - 60	Diagonal	L4x4x5/16	129	-9.22	19.70	66.4 (b) 46.8	Pass
T8	60 - 40	Diagonal	L4x4x5/16	144	-9.20	16.60	74.6 (b) 55.4	Pass
T9	40 - 20	Diagonal	L4x4x5/16	159	-10.80	14.32	74.4 (b) 75.5	Pass
T10	20 - 0	Diagonal	L4x4x3/8	174	-11.32	14.60	87.4 (b) 77.5	Pass
T1	188 - 180	Top Girt	L3x3x1/4	6	-0.51	18.27	98.6 (b) 2.8	Pass
							Summary	
						Leg (T6)	58.3	Pass
						Diagonal (T10)	98.6	Pass
						Top Girt (T1)	2.8	Pass
						Bolt Checks	98.6	Pass
						RATING =	**98.6**	**Pass**

ANCHOR BOLT ANALYSIS

URS

Job	188' SSV Rohn Tower - East Windsor, CT	Project No.	PWS-004	Page	of
Description	Anchor Bolt Analysis	Computed by	KAB	Sheet 1	of 3
		Checked by		Date 09/30/08	
				Date	

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	$Uplift := 210 \cdot kips$	*user input*
Shear:	$Shear := 30 \cdot kips$	*user input*
Compression:	$Compression := 248 \cdot kips$	*user input*

Anchor Bolt Data:

Use ASTM A687

Number of Anchor Bolts = N	$N := 10$	*user input*	
Bolt Ultimate Strength:	$F_u := 150 \cdot ksi$	*user input*	
Bolt Yield Strength:	$Fy := 105 \cdot ksi$	*user input*	
Bolt Modulus:	$E := 29000 \cdot ksi$	*user input*	
Thickness of Anchor Bolts	$D := 1in$	*user input*	
Threads per Inch:	$n := 7$	*user input*	
Coefficient of Friction:	$\mu := 0.55$	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4}\cdot D^2 \qquad A_g = 0.785\cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2 \qquad A_n = 0.582\cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.333\cdot\left(0.33\cdot A_g\cdot F_u\right) \qquad AllowableTension = 51.8\cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.333\cdot\left(0.60\cdot A_n\cdot Fy\right) \qquad F_{net.area} = 48.9\cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 21.0\cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.43$$

$$Condition1 := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed"\right)$$

Condition1 = "OK"

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 2.6 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 0.9 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 5.8 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.4$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.2$$

Condition3 = "OK"

Units

Angular

$rad \equiv 1$ $\qquad deg \equiv \pi \cdot \frac{rad}{180}$

Weight

$lb \equiv lbf$

$kips \equiv 1000 \cdot lb$ $\qquad k \equiv kips$

$tons \equiv 2000 \cdot lb$

Unit Weight

$plf \equiv \frac{lb}{ft}$ $\qquad klf \equiv \frac{kips}{ft}$

Pressure

$psf \equiv \frac{lb}{ft^2}$ $\qquad psi \equiv \frac{lb}{in^2}$

$ksf \equiv \frac{kips}{ft^2}$ $\qquad ksi \equiv \frac{kips}{in^2}$

Density

$pcf \equiv \frac{lb}{ft^3}$

FOUNDATION ANALYSIS

URS

Job	188' SSV Rohn Tower - East Winsor	Project No.	PWS-004	Page	of
Description	Square Pier with Square Mat Footing - Rev 1	Computed by	KAB	Sheet 1	of 4
		Checked by		Date	09/30/08

DEFINE VARIABLES:

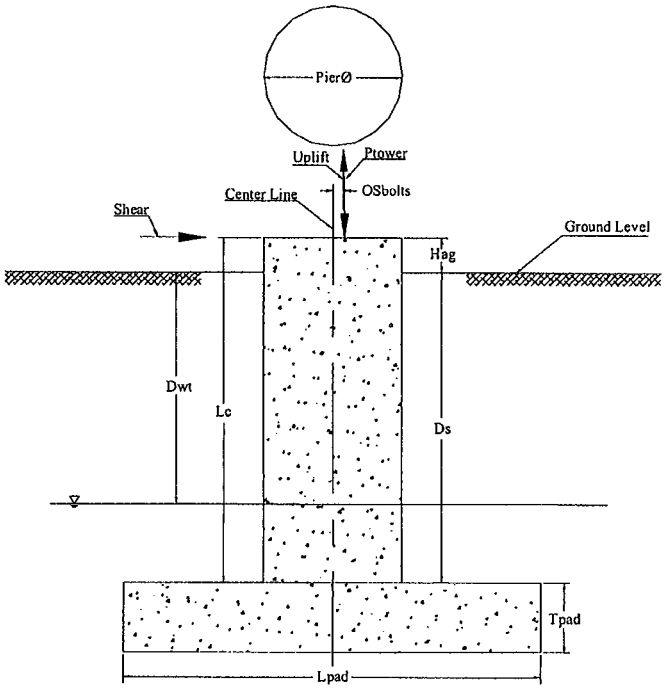
Steel Reinf. Yield Strength: $f_y := 60 \cdot ksi$

Concrete Compressive Strength: $f'_c := 3 \cdot ksi$

Max Uplift Force of Tower: $Uplift := 210 \cdot kip$

Max Shear at Base of Tower: $Shear := 49 \cdot kip$

Max Compressive Force of Tower: $P_{Tower} := 248 \cdot kip$



Diameter of Pier: $Pier\phi := 4.5 \cdot ft$

Length of Pier: $L_c := 12.0 \cdot ft$

Height of Pier Above Grade: $H_{ag} := 0.5 \cdot ft$

Length of Pad: $L_{Pad} := 11.75 \cdot ft$

Thickness of Pad: $T_{Pad} := 2.5 \cdot ft$

Distance to Water Table: $D_{wt} := 20 \cdot ft$

NOTE: SET Dwt TO A VALUE GREATER THAN TOTAL DEPTH OF PAD IF WATER TABLE DOES NOT AFFECT FOOTING

Eccentricity of Anchor Bolts from Center Line of Pier: $OS_{bolts} := 0 \cdot in$

Diameter of Reinforcing Bars in Pad: $d_{bar} := 0.875 \cdot in$

$\gamma_s := 100 \cdot \frac{lb}{ft^3}$ $\gamma_c := 150 \cdot \frac{lb}{ft^3}$ $\gamma_w := 62.4 \cdot \frac{lb}{ft^3}$

Soil Internal Friction Angle: $\phi := 30 \cdot deg$

Allowable Soil Pressure: $q_u := 4 \cdot ksf$

Active Pressure of Soil Acting along Length of Pier: $K_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $P_{Active} := \frac{1}{2} \cdot (L_c + T_{Pad})^2 \cdot Pier\phi \cdot \gamma_s \cdot K_a$ $P_{Active} = 15.77 \cdot kip$

Passive Pressure of Soil Acting along Length of Pier: $K_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $P_{Passive} := \frac{1}{2} \cdot (L_c + T_{Pad})^2 \cdot Pier\phi \cdot \gamma_s \cdot K_p$ $P_{Passive} = 141.92 \cdot kip$

Distance from Grade to Bottom of Pier: $D_s := L_c - H_{ag}$ $D_s = 11.5\,ft$

Area and Volume of Pier: $A_c := \frac{\pi \cdot Pier\phi^2}{4}$ $V_c := A_c \cdot L_c$ $V_c = 190.85\,ft^3$

Area and Volume of Pad: $A_p := L_{Pad}^2$ $V_p := T_{Pad} \cdot A_p$ $V_p = 345.16\,ft^3$

ALLOWABLE SOIL PRESSURE

Assume water table is below bottom of footing

$D_{wtp} := if\left[\left(D_s + T_{Pad}\right) > D_{wt}, T_{Pad}, 0\cdot ft\right]$ $D_{wtp} = 0\,ft$

$W_p := \left(V_p\cdot\gamma_c\right) - D_{wtp}\cdot A_p\cdot\gamma_w$ $W_p = 51.77\cdot kip$

$D_{wtc} := if\left[D_s < D_{wt}, 0\cdot ft, \left(D_s - D_{wt}\right)\right]$ $D_{wtc} = 0\,ft$

$W_c := \left(V_c\cdot\gamma_c\right) - D_{wtc}\cdot A_c\cdot\gamma_w$ $W_c = 28.63\cdot kip$

$W_s := \left[\left(D_s\right)\cdot\left(A_p - A_c\right)\cdot\gamma_s\right]$ $W_s = 140.48\cdot kip$

$P_{Total} := W_p + W_c + W_s + P_{Tower}$ $P_{Total} = 468.88\cdot kip$

$q_{gr} := \frac{P_{Total}}{A_p}$ $q_{gr} = 3.4\cdot ksf$

$q_n := q_{gr} - \left(D_s + T_{Pad}\right)\cdot\gamma_s$ $q_n = 2\cdot ksf$

$SoilPressure := if\left(q_n < q_u, \text{"Okay"}, \text{"No Good"}\right)$

SoilPressure = "Okay"

PUNCHING SHEAR:

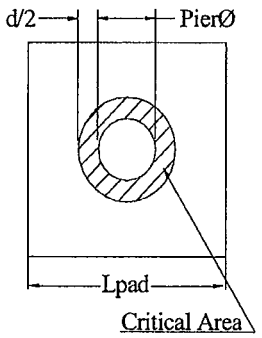
Critical section is located at a distance d/2 from the face of Pier

$$p_u := \left(\frac{1.3\cdot P_{Tower} + V_c\cdot\gamma_c}{L_{Pad}^{\,2}}\right) + \left[\frac{Shear\cdot\left(L_c + T_{Pad}\right) + P_{Tower}\cdot OS_{bolts} + \left(P_{Active} - P_{Passive}\right)\cdot\frac{L_c + T_{Pad}}{3}}{\frac{1}{6}\cdot L_{Pad}^{\,3}}\right]\cdot 1.333$$

$p_u = 3.04\cdot ksf$

$d := T_{Pad} - \left(3\cdot in + d_{bar}\right)$ $d = 2.18\,ft$

$b_o := \left(Pier\phi + d\right)\cdot\pi$ $b_o = 20.98\,ft$



$Aout_{bo} := L_{Pad}^{\,2} - \frac{\pi\cdot\left(Pier\phi + d\right)^2}{4}$

$Aout_{bo} = 103.05\,ft^2$

$V_u := Aout_{bo}\cdot p_u$ $V_u = 313.2\cdot kip$

$\phi V_c := .85\cdot 4\cdot\sqrt{f'_c\cdot\frac{lb}{in^2}}\cdot b_o\cdot d$ $\phi V_c = 1.22\times 10^3\cdot kip$

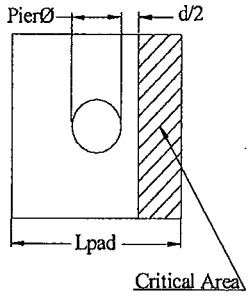
$PunchingShear := if\left(V_u < \phi V_c, \text{"Okay"}, \text{"No Good "}\right)$ PunchingShear = "Okay"

BEAM SHEAR:

Critical section is located at a distance d/2 from the face of the Pier

$$V_u := p_u \cdot L_{Pad} \cdot \left(\frac{L_{Pad} - Pier\phi}{2} - \frac{d}{2} \right) \qquad V_u = 90.58 \cdot kip$$

$$\phi V_c := .85 \cdot 2 \cdot \sqrt{f'_c \cdot \frac{lb}{in^2}} \cdot L_{Pad} \cdot d \qquad \phi V_c = 342.99 \cdot kip$$



BeamShear := if($V_u < \phi V_c$, "Okay", "No Good ")

BeamShear = "Okay"

BENDING:

Critical section extends across width of footing at the face of Pier

$A_{bar} := .875 \cdot in^2$ NoOfBar := 52 *user input*

$As_{provided} := NoOfBar \cdot A_{bar}$ $\qquad As_{provided} = 45.5 \cdot in^2$

$$M_{Req} := p_u \cdot \frac{5}{6} \cdot L_{Pad} \cdot \left(\frac{L_{Pad} - Pier\phi}{2} \right)^2 \cdot \frac{1}{2}$$

$M_{Req} = 195.54 \cdot kip \cdot ft$

$$a := \frac{As_{provided} \cdot f_y}{.85 \cdot f'_c \cdot L_{Pad}}$$

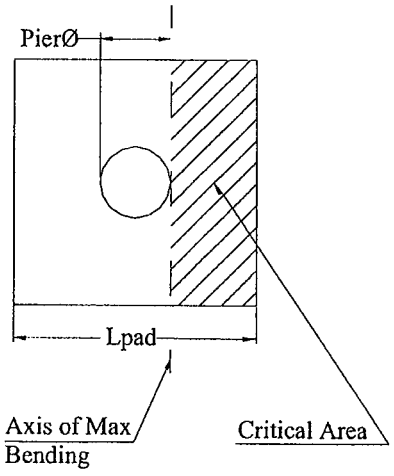
$a = 7.59 \cdot in$

$$M_{Avail} := 0.9 \cdot As_{provided} \cdot f_y \cdot \left(d - \frac{a}{2} \right)$$

$M_{Avail} = 4.57 \times 10^3 \cdot kip \cdot ft$

Bending := if($M_{Avail} > M_{Req}$, "Okay", "No Good")

Bending = "Okay"



CHECK UPLIFT:

$Soil_1 := \left[(D_s)\cdot\left(L_{Pad}^2 - A_c\right)\cdot\gamma_s\right]$ $Soil_1 = 140.48\cdot kip$ Soil volume above footing

$Soil_2 := 4\cdot\left[(D_s)^2\cdot L_{Pad}\cdot\frac{\tan(\phi)}{2}\right]\cdot\gamma_s$ $Soil_2 = 179.43\cdot kip$ Soil wedge at back face of footing

$Soil_3 := 4\cdot\left[(D_s)^3\cdot\frac{\tan(\phi)^2}{3}\right]\cdot\gamma_s$ $Soil_3 = 67.59\cdot kip$

$WT_{soil} := Soil_1 + Soil_2 + Soil_3$ $WT_{soil} = 387.51\cdot kip$

$WT_{conc} := W_p + W_c$ $WT_{conc} = 80.4\cdot kip$

$Case_1 := \frac{WT_{soil}}{2.0} + \frac{WT_{conc}}{1.25}$ $Case_1 = 258.08\cdot kip$

$Case_2 := \frac{WT_{soil} + WT_{conc}}{2.0}$ $Case_2 = 233.96\cdot kip$

$UpliftCheck := \begin{cases} \text{"OK"} & \text{if } Case_1 \geq Uplift \wedge Case_2 \geq Uplift \\ \text{"No Good"} & \text{otherwise} \end{cases}$ UpliftCheck = "OK"

$UpLiftSafetyFactor_{prov} := \frac{WT_{soil} + WT_{conc}}{Uplift}$ $UpLiftSafetyFactor_{prov} = 2.23$

CHECK OVERTURNING MOMENT:

$SafetyFactor_{req} := 2.0$

$OTM := Shear\cdot\left(L_c + T_{Pad}\right) + Uplift\cdot\left(\frac{L_{Pad}}{2} - OS_{bolts}\right) + P_{Active}\cdot\frac{L_c + T_{Pad}}{3}$

$OTM = 2.02\times 10^3\cdot kip\cdot ft$

$RM := \left(P_{Tower}\right)\cdot\left(\frac{L_{Pad}}{2} - OS_{bolts}\right) + \left(WT_{conc} + Soil_1\right)\cdot\frac{L_{Pad}}{2} + P_{Passive}\cdot\left(\frac{L_c + T_{Pad}}{3}\right) + Soil_2\cdot\left(L_{Pad} + \frac{D_s\cdot\tan(\phi)}{3}\right)$

$RM = 5.95\times 10^3\cdot kip\cdot ft$

$OMSafetyFactor_{Prov} := \frac{RM}{OTM}$ $OMSafetyFactor_{Prov} = 2.94$

$OTMCheck := if\left(OMSafetyFactor_{Prov} < SafetyFactor_{req}, \text{"No Good"}, \text{"Okay"}\right)$ OTMCheck = "Okay"

$psf \equiv \frac{lb}{ft^2}$ $ksf \equiv \frac{1000 \cdot lb}{ft^2}$ $kip \equiv 1000 \cdot lb$ $ksi \equiv \frac{1000 \cdot lb}{in^2}$