ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

March 20, 2013

David Martin
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-080-121010 – Cellco Partnership d/b/a Verizon Wireless**
651 Paddock Avenue, Meriden, Connecticut

Dear Mr. Martin:

On November 1, 2012, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its telecommunications facility at 651 Paddock Avenue in Meriden. The modification involved the replacement of certain antennas and coax cable diplexers.

As a condition of the acknowledgement, Cellco was required to provide the Council with a letter stating that the recommendations specified in the structural report were implemented. Attached is a Tower Modification Certification Letter verifying that these conditions have been satisfied. All construction associated with these modifications has now been completed.

If you have any questions please do not hesitate to contact me or Rachel Mayo.

Sincerely,

Kenneth C. Baldwin

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

CENTEK engineering

Centered on Solutions℠

March 19, 2013

Mr. Mark Gauger
Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

Re: Existing Telecommunications Facility Tower Modification Certification Letter

Project:	**Verizon ~Meriden SE** 651 Paddock Avenue Meriden, CT
Tower Owner:	**SBA Communications Corporation** 5900 Broken Sound Parkway NW Boca Raton, Florida 33487
Engineer:	**FDH Engineering** 2730 Rowland Ave Raleigh, NC 27615

Centek Project No.: 13008.CO6

Dear Mr. Gauger,

We are providing this "Existing Telecommunications Facility Tower Modification Certification Letter" with regard to the antenna upgrade by Verizon Wireless at the above referenced project.

The following are the basis for substantiating compliance with the design documents prepared by FDH Engineering:

- Review of the FDH structural analysis dated 10/5/2012.
- Field observations by Centek personnel of the coax installation on 3/18/2013 which determined all coax lines were installed in general compliance with the recommendations of the structural analysis report prepared by FDH on 10/5/2012.

The work under this Contract has been reviewed and found, to the Engineer's best knowledge, information and belief, to be completed in general compliance with the documents referenced above.

Sincerely,

STATE OF CONNECTICUT
CARLO F. CENTORE
No.16694
LICENSED
PROFESSIONAL ENGINEER

Carlo F. Centore, PE
Principal ~Structural Engineer

CC: Rachel Mayo, Tim Parks, Jim Smith, Brian Ragozzine

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
www.ct.gov/csc

November 1, 2012

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

RE: **EM-VER-080-121010** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 651 Paddock Avenue, Meriden, Connecticut.

Dear Attorney Baldwin:

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

- The coax lines shall be installed in accordance with the recommendations made in the Structural Analysis Report prepared by FDH Engineering dated October 5, 2012 and stamped by Christopher Murphy;
- Following the installation of the proposed equipment, Verizon shall provide documentation certifying that the installation complied with the engineer's recommendation;
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated October 9, 2012. 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 no frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/jbw

c: The Honorable Michael S. Rohde, Mayor, City of Meriden
Lawrence Kendzior, City Manager, City of Meriden
Dominick Caruso, City Planner, City of Meriden
Sean Gormley, SBA

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
www.ct.gov/csc

October 11, 2012

The Honorable Michael S. Rohde
Mayor
City of Meriden
City Hall
142 East Main Street
Room 124
Meriden, CT 06450

RE: **EM-VER-080-121010** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 651 Paddock Avenue, Meriden, Connecticut.

Dear Mayor Rohde:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72. A copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by October 25, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/jbw

c: Lawrence Kendzior, City Manager, City of Meriden
Dominick Caruso, City Planner, City of Meriden

CSC
CONNECTICUT SITING COUNCIL

ROBINSON & COLE

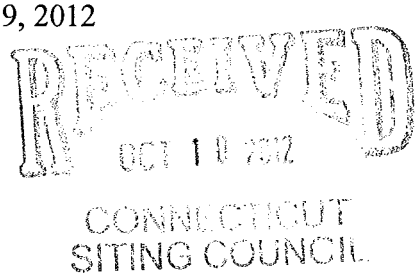
EM-VER-080-121010

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

October 9, 2012



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

Re: **Notice of Exempt Modification – Antenna Modification**
651 Paddock Avenue, Meriden, Connecticut

Dear Ms. Roberts:

On August 29, 2007, the Siting Council ("Council") approved an application by OptaSite Towers LLC and Omnipoint Communications, Inc. to construct a 120-foot monopole tower at 651 Paddock Avenue in Meriden, Connecticut (Council Docket No. 329). Condition No. 2 of the Council's Decision and Order requires all antennas to be installed in a "flush-mounted" configuration. In 2008, Cellco Partnership d/b/a Verizon Wireless ("Cellco") received the Council's approval to install three (3) flush-mounted antennas (one (1) antenna per sector) at the 107-foot level on the Paddock Avenue tower.[1]

In order to provide enhanced wireless services in southeast Meriden, Cellco intends to modify its existing Paddock Avenue facility. These modifications will require the removal of Cellco's three (3) existing antennas, replacing them with nine (9) antennas (three (3) antennas per sector) in a clustered flush-mounted configuration. Attached behind Tab 1 is the Flush Antenna Mount Plan and Tower Elevation drawings showing the proposed clustered flush-mounted antenna configuration. At the Paddock Road facility, Cellco will install three (3) model BXA-70063/6CF cellular antennas; three (3) model BXA-171063-12BF PCS antennas; and

[1] In October of 2009, Clearwire Corporation ("Clearwire") filed a notice of exempt modification with the Council (EM-CLEARWIRE-080-091015) seeking permission to install three (3) panel and three (3) dish antennas on T-Arm mounting structures at the 97-foot level on the tower. The Council approved Clearwire's flush-mounted antenna configuration on December 23, 2009.

three (3) model BXA-80063/CF LTE antennas, all at the same 107-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers directly behind its antennas on the antenna mounting bracket. Specifications for the new antennas and cable diplexers are attached behind Tab 2.

This nine (9) antenna flush-mounted configuration is identical to the flush-mounted configuration approved by the Council for Cellco's 85 Quaker Farms Road cell site in Oxford, Connecticut. (A copy of Cellco's EM-VER-108-120227 filing and the Council's approval of this flush-mounted configuration is attached behind Tab 3).

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Michael S. Rohde, Mayor of the City of Meriden. A copy of this letter is also being sent to the First Assembly of God Church of Meriden, the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's new antennas will be located at the 107-foot level on the existing 120-foot tower.

2. The proposed modifications will not involve a change to ground-mounted equipment and, therefore, will not require the extension of the site boundaries.

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

4. The operation of the of the new antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is attached behind Tab 4.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed modifications. (Tab 5).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Michael S. Rohde, Meriden Mayor
First Assembly of God Church of Meriden
Sandy M. Carter

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

MERIDEN SE
651 PADDOCK AVENUE
MERIDEN, CT 06450

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE EAST HARTFORD, CONNECTICUT **TO:** 651 PADDOCK AVENUE MERIDEN, CONNECTICUT

– START OUT GOING SOUTHEAST ON EAST RIVER DRIVE TOWARD PITKIN STREET.	1.3 MI.
– MERGE ONTO US–5 S / CT–15 S TOWARD 1–91 S / NEW HAVEN.	1.1 MI.
– MERGE ONTO 1–91 S VIA EXIT 86 TOWARD NEW HAVEN / N.Y. CITY.	17.1 MI.
– MERGE ONTO CT–15 S / WILBUR CROSS PKY VIA EXIT 17.	2.1 MI.
– TAKE THE EXIT TOWARD CONN. D.O.T. MAINTENANCE FACILITY.	0.4 MI.
– TURN RIGHT ONTO MILLER AVENUE.	0.2 MI.
– TURN RIGHT ONTO PADDOCK AVENUE.	0.02 MI.
– 651 PADDOCK AVENUE IS ON THE RIGHT.	

GENERAL NOTES

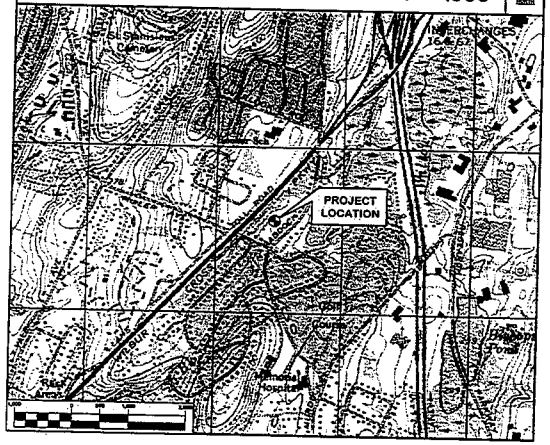
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED CELLCO PARTNERSHIP ANTENNA UPGRADE TO CONSIST OF THE REMOVAL OF THREE (3) EXISTING PANEL ANTENNAS AND THE EXISTING ANTENNA MOUNT AND REPLACING WITH A NEW ANTENNA MOUNT AND NINE (9) DIRECTIONAL PANEL ANTENNAS MOUNTED AT THE SAME ELEVATION AS EXISTING CELLCO PARTNERSHIP ANTENNAS.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	MERIDEN SE
SITE ADDRESS:	651 PADDOCK AVENUE MERIDEN, CT 06450
LESSEE:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	SANDY CARTER CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
ENGINEER:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT 06405 (203) 488–0580
TOWER COORDINATES:	LATITUDE 41°–30'–45.94" LONGITUDE 72°–46'–46.05" GROUND ELEVATION: 325'± A.M.S.L. COORDINATES AND GROUND ELEVATIONS ARE REFERENCED FROM CONNECTICUT SITING COUNCIL DATABASE.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T–1	TITLE SHEET	0
C–1	TOWER ELEVATIONS	0
C–2	ANTENNA MOUNTING CONFIGURATION	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/20/12	TSP	DMD	ISSUED FOR CSC–CLIENT REVIEW

DESIGNED BY: CFC
DRAWN BY: DMD
CHK'D BY: CFC

Cellco Partnership d.b.a. Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
MERIDEN SE
651 PADDOCK AVENUE
MERIDEN, CT 06450

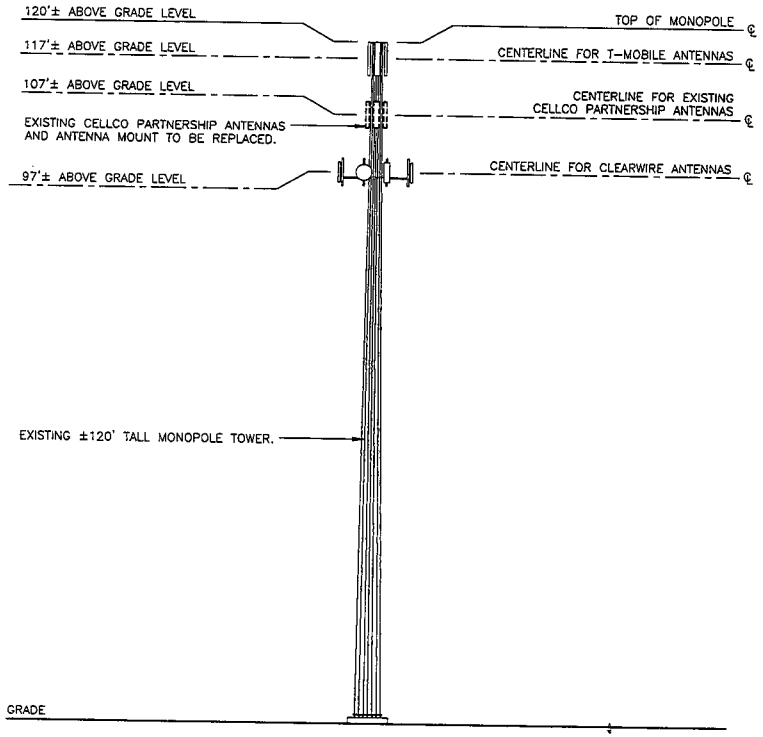
C=NT=K Engineering
Centered on Success
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

DATE: 09/18/12
SCALE: AS NOTED
JOB NO. TBD

TITLE SHEET

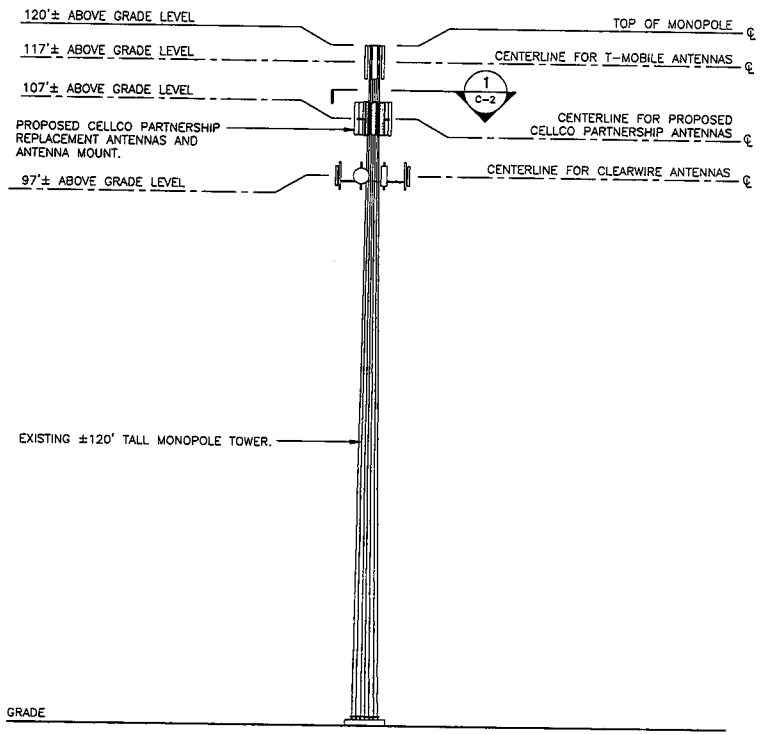
T–1

Sheet No. 1 of 3



1 / C-1 **TOWER ELEVATION - EXISTING**
SCALE: 1" = 10'

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.



2 / C-1 **TOWER ELEVATION - PROPOSED**
SCALE: 1" = 10'

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/20/12	TSP	DMD	ISSUED FOR CSC-CLIENT REVIEW

DESIGNED BY: CFC
DRAWN BY: TJB
CHK'D BY: DMD

Cellco Partnership d.b.a. Verizon Wireless

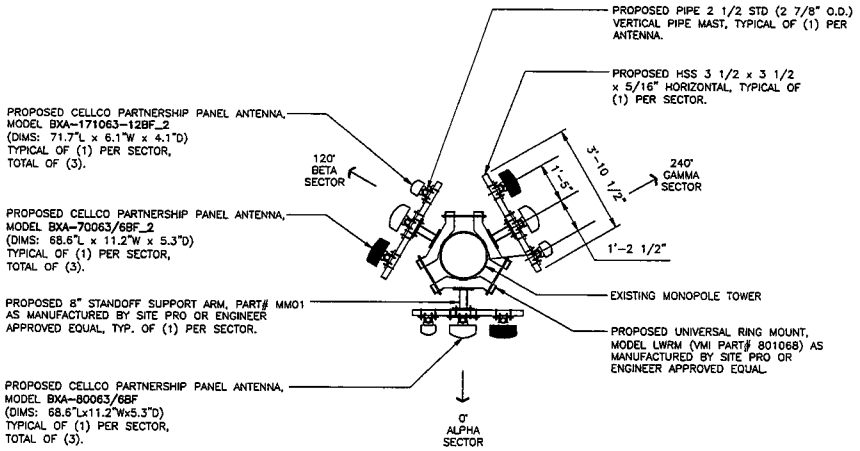
C=NT=K Engineering Services Incorporated
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
MERIDEN SE
651 PADDOCK AVENUE
MERIDEN, CT 06450

DATE: 09/18/12
SCALE: AS NOTED
JOB NO. TBD

TOWER ELEVATIONS

C-1
Sheet No. 2 of 3



1 / C-2 **PROPOSED ANTENNA MOUNTING CONFIGURATION**

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

GRAPHIC SCALE

2 0 1 2 4 8

(IN FEET)
1 inch = 2 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/20/12	TSP	DMD	ISSUED FOR CSC-CLIENT REVIEW

DESIGNED BY: CFC
DRAWN BY: TJB
CHK'D BY: DMD

Cellco Partnership d.b.a. Verizon Wireless

C=NT=K engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
MERIDEN SE
651 PADDOCK AVENUE
MERIDEN, CT 06450

DATE: 08/18/12
SCALE: AS NOTED
JOB NO. TBD

ANTENNA MOUNTING CONFIG.

C-2

Sheet No. 3 of 3

Amphenol ANTENNA SOLUTIONS

BXA-70063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

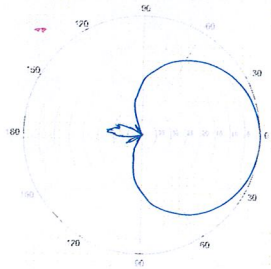
Antenna is also available with N connector(s). Replace "EDIN" with "N" in the model number when ordering.

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with N connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or N / Female / Bottom	

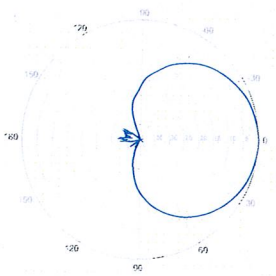
Mechanical Characteristics		
Dimensions Length x Width x Depth	1742 x 285 x 135 mm	68.6 x 11.2 x 5.3 in
Depth with z-brackets	175 mm	6.9 in
Weight without mounting brackets	8.7 kg	19.2 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.50 m² Side: 0.24 m²	Front: 5.3 ft² Side: 2.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 733 N Side: 386 N	Front: 164 lbf Side: 88 lbf

Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6BF-EDIN-X-FP		

BXA-70063-6BF-EDIN-X

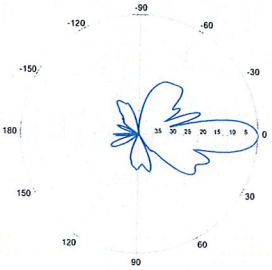


Horizontal | 750 MHz

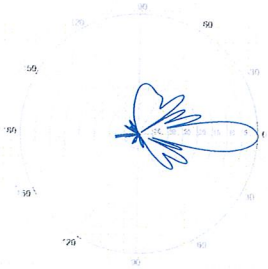


Horizontal | 850 MHz

BXA-70063-6BF-EDIN-0

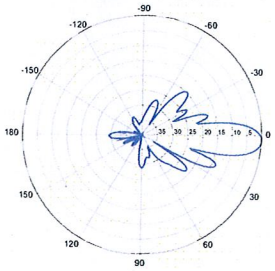


0° | Vertical | 750 MHz

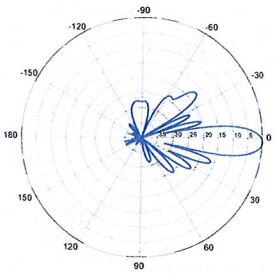


0° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-2



2° | Vertical | 750 MHz

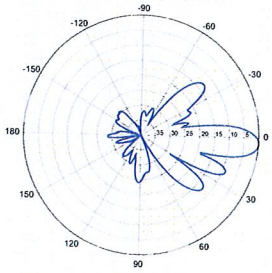


2° | Vertical | 850 MHz

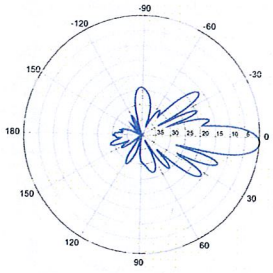
BXA-70063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6BF-EDIN-3

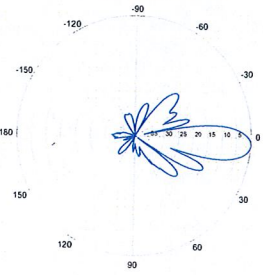


3° | Vertical | 750 MHz

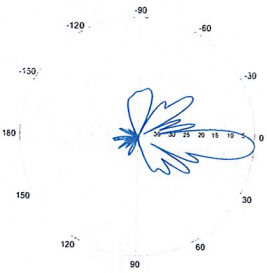


3° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-4

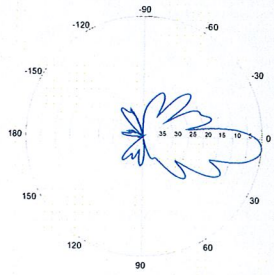


4° | Vertical | 750 MHz

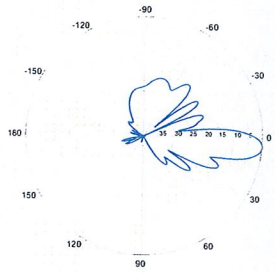


4° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-5

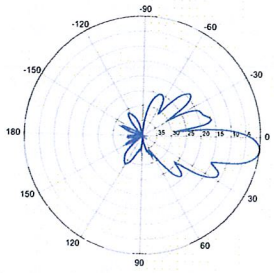


5° | Vertical | 750 MHz

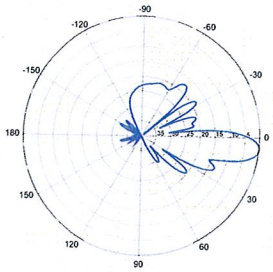


5° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-6

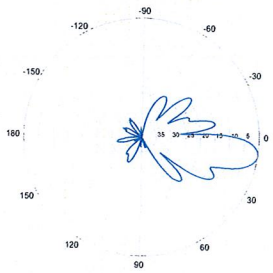


6° | Vertical | 750 MHz

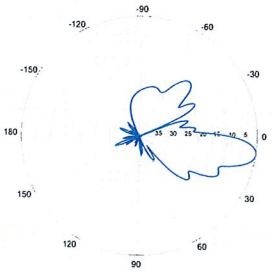


6° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-8

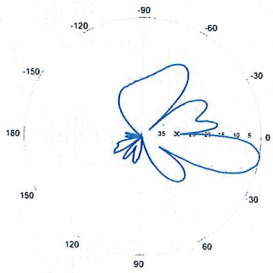


8° | Vertical | 750 MHz

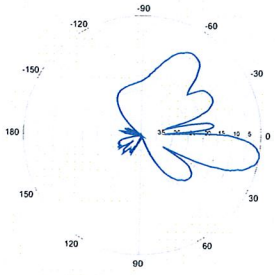


8° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

Amphenol ANTENNA SOLUTIONS

BXA-171063-12BF-EDIN-X

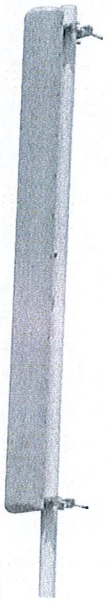
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 19.0 dBi

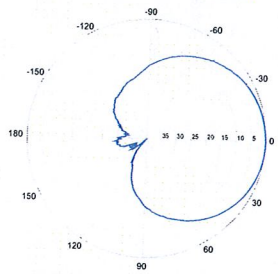
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1820 x 154 x 105 mm	71.7 x 6.1 x 4.1 in
Depth with z-brackets	133 mm	5.2 in
Weight without mounting brackets	6.8 kg	15 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²	Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf Side: 68 lbf

Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12BF-EDIN-X-FP		

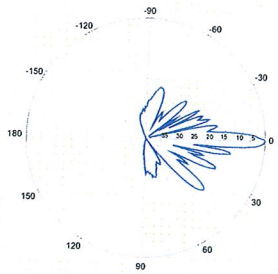


BXA-171063-12BF-EDIN-X



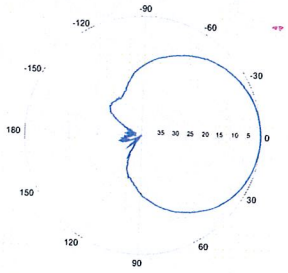
Horizontal | 1710-1880 MHz

BXA-171063-12BF-EDIN-0



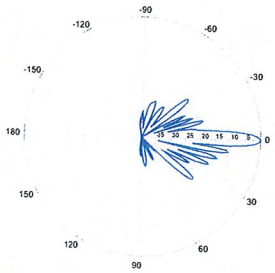
0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-X



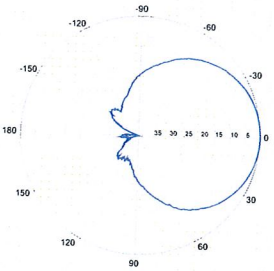
Horizontal | 1850-1990 MHz

BXA-171063-12BF-EDIN-0



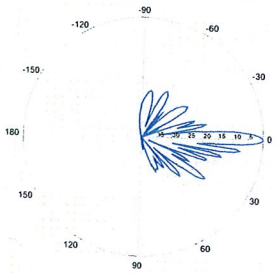
0° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171063-12BF-EDIN-0

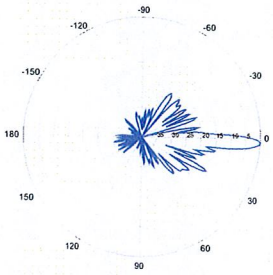


0° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-X

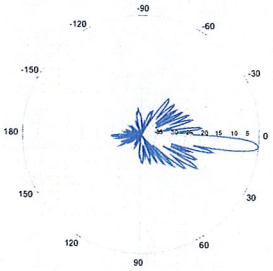
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12BF-EDIN-2



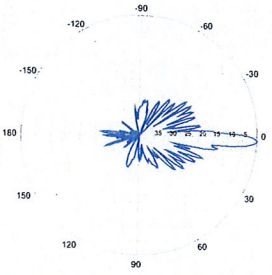
2° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-5



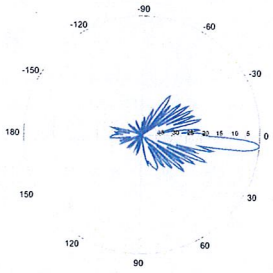
5° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-2



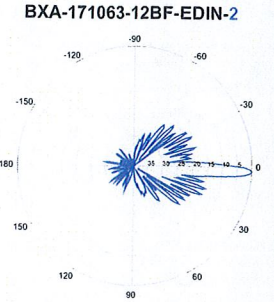
2° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-5



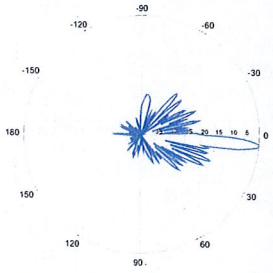
5° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-5



5° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-80063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

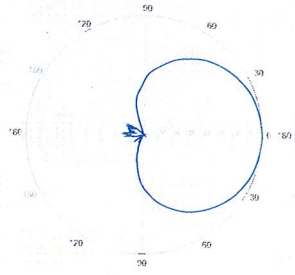
Replace "X" with desired electrical downtilt.

Antenna is also available with N connector(s). Replace "EDIN" with "N" in the model number when ordering.

Electrical Characteristics		
Frequency bands	806-900 MHz*	
*Optional frequency band for iDEN	806-941 MHz (specify when ordering)	
Polarization	±45°	
Horizontal beamwidth	63°	
Vertical beamwidth	11°	
Gain	14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10, 15	
Impedance	50Ω	
VSWR	≤1.4:1	
Upper sidelobe suppression (0°)	-18.2 dB	
Front-to-back ratio (+/-30°)	-36.3 dB	
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with N connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or N / Female / Bottom	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1742 x 285 x 135 mm	68.6 x 11.2 x 5.3 in
Depth with z-brackets	175 mm	6.9 in
Weight without mounting brackets	8.7 kg	19.2 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.50 m² Side: 0.24 m²	Front: 5.3 ft² Side: 2.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 733 N Side: 386 N	Front: 164 lbf Side: 88 lbf

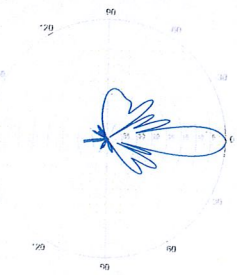
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-80063-6BF-EDIN-X-FP		

BXA-80063-6BF-EDIN-X



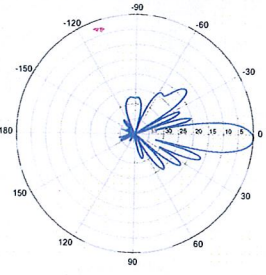
Horizontal

BXA-80063-6BF-EDIN-0



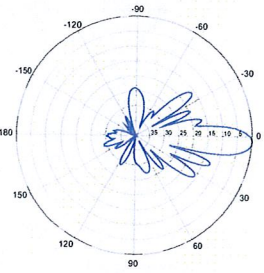
0° | Vertical

BXA-80063-6BF-EDIN-2



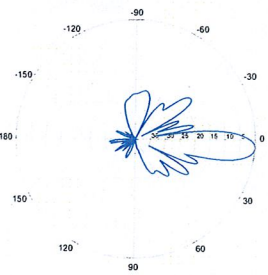
2° | Vertical

BXA-80063-6BF-EDIN-3



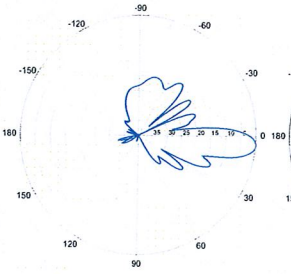
3° | Vertical

BXA-80063-6BF-EDIN-4



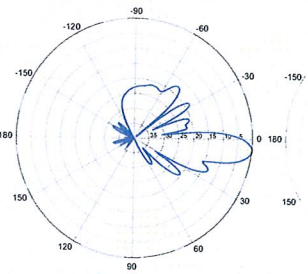
4° | Vertical

BXA-80063-6BF-EDIN-5



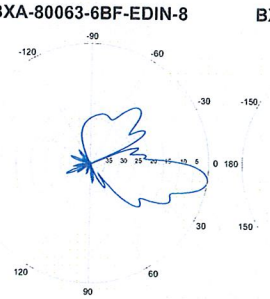
5° | Vertical

BXA-80063-6BF-EDIN-6



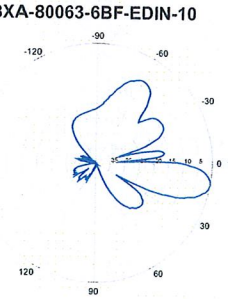
6° | Vertical

BXA-80063-6BF-EDIN-8



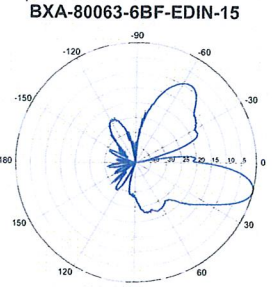
8° | Vertical

BXA-80063-6BF-EDIN-10



10° | Vertical

BXA-80063-6BF-EDIN-15



15° | Vertical

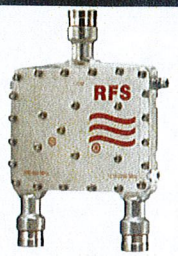
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

Product Data Sheet **FD9R6004/2C-3L**

ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Product Description

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



Features/Benefits

- **LTE ready design**
- **Extremely Low Insertion Loss**
- **High level of Rejection between bands – Protection against interferences**
- **Extremely High Power Handling Capability**
- **Integrated DC block/bypass versions available**
- **Very compact & small size design – Easy installation and reduced tower load**
- **In-line long-neck connectors for easy connection & waterproofing**
- **Exceptional reliability & environmental protection (IP 67)**
- **Equipped with 1 * Breathable Vent – Prevent any humidity inside the product**
- **Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)**
- **Grounding already provided through the mounting bracket**
- **Kit available for easy dual mount**

Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss, Path 1, dB	0.07 typ.
Insertion Loss, Path 2, dB	0.13 typ.
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 57/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

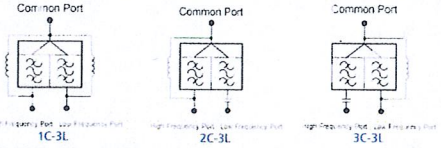
Notes

ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Other Documentation

FD9R6004/2C-3L Installation Instructions: Wideband_Diplexer_Installation_Rev5.pdf

Selection Guide Diplexer 698-960 / 1710-2200MHz					
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information		
Model Number	Description	
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)	
SEM2-3	Assembly kit for 2 pcs of FD9R6004/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)	
CA020-2	Ground Cable, 2m, includes lugs (Optional)	
CA030-2	Ground Cable, 2m, includes lugs (Optional)	
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)	

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
www.ct.gov/csc

March 13, 2012

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

RE: **EM-VER-108-120227** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 85 Quaker Farms Road, Oxford, Connecticut.

Dear Attorney Baldwin:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated February 21, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,

Linda Roberts LMB

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable George R. Temple, First Selectman, Town of Oxford
Vincent Vizzo, Planning & Zoning Chairman, Town of Oxford
Christopher B. Fisher, Esq., Cuddy & Feder LLP

ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

February 21, 2012

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

Re: **Notice of Exempt Modification – LTE Antenna Addition**
85 Quaker Farms Road, Oxford, Connecticut

Dear Ms. Roberts:

On December 22, 2003, the Council approved an application by AT&T Wireless to construct a 150-foot monopole tower at 85 Quaker Farms Road in Oxford, CT (Council Docket No. 261). Condition No. 1 of the Council's Decision and Order requires all antennas to be installed in a "flush-mounted" configuration. In 2007, Cellco Partnership d/b/a Verizon Wireless ("Cellco") received the Council's approval to install six (6) flush-mounted antennas (two (2) antennas per sector) at the 120-foot level on the 150-foot tower.

Cellco now intends to install three (3) model BXA-70063-4CF LTE antennas (one additional antenna per sector), at the same 120-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers on each antenna mounting bracket. Specifications for the new LTE antennas and cable diplexers are included behind Tab 1. Each LTE antenna will be mounted between and aligned with the two existing antennas in each sector. As shown on Project Plan Sheet C-1, the nine (9) antenna array (three (3) antennas per sector) remains in the required flush-mounted configuration. None of the new LTE antennas extend beyond the limits of the horizontal footprint of the existing flush-mounted array. (*See* project plans attached behind Tab 2).

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to George R. Temple, First Selectman of the Town of Oxford. A copy of this letter is

also being sent to James and Elaine Schiave, the owners of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's new LTE antennas will be located at the 120-foot level on the existing 150-foot tower.

2. The proposed modifications will not involve a change to ground-mounted equipment and, therefore, will not require the extension of the site boundaries.

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

4. The operation of the of the existing and new LTE antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 3.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed modifications. (See Tab 4).

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

Sincerely,

Kenneth C. Baldwin

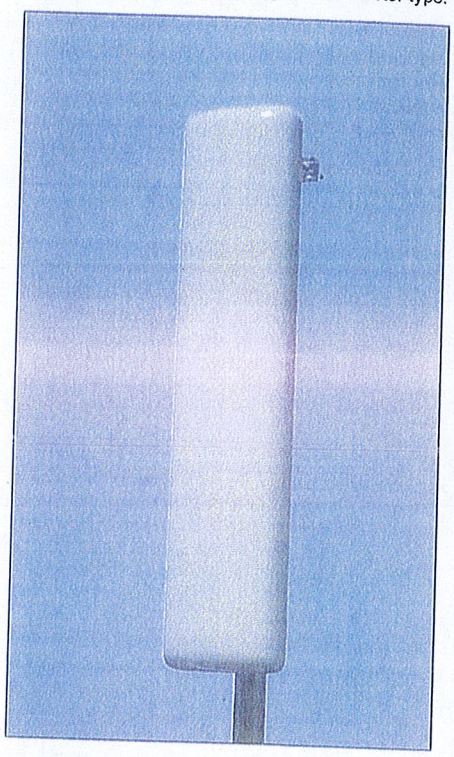
Enclosures
Copy to:

George R. Temple, Oxford First Selectman
James and Elaine Schiave
Sandy M. Carter

TAB 1

Slant ±45° Dual Polarized FET Panel 63° / 13 dBd
696-900 MHz

BXA-70063/4CF ___
When ordering replace "__" with connector type.



Mechanical specifications

Length	1205 mm	47.4 in
Width	285 mm	11.2 in
Depth	126 mm	5.0 in
Depth with z-bracket	166 mm	6.5 in
Weight [4]	4.5 kg	9.9 lbs
Wind Area Fore/Aft	0.36 m²	3.9 ft²
Wind Area Side	0.15 m²	1.7 ft²
Max Wind Survivability	>201 km/hr	>125 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	522 N	117 lbf
Side	244 N	55 lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-160 mm; Ø2.0-6.3 in.

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

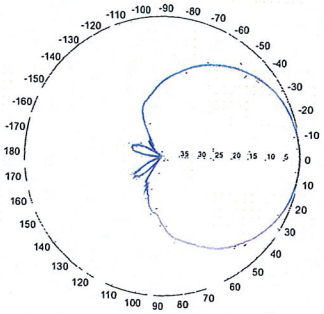
Frequency Range	696-900 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 2 ports / Center
VSWR [1]	≤ 1.4:1
Polarization	Slant ±45°
Isolation Between Ports [1]	< -30 dB
Gain [1]	13.0 dBd 15.0 dBi
Power Rating [2]	500 W
Half Power Angle [1]	
Horizontal Beamwidth	63°
Vertical Beamwidth	15°
Electrical downtilt [5]	0°
Null fill [1]	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

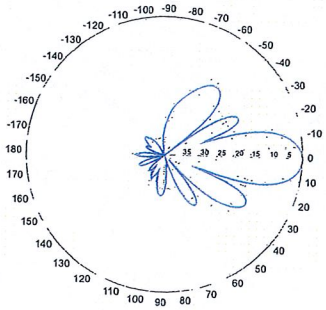
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern
750 MHz

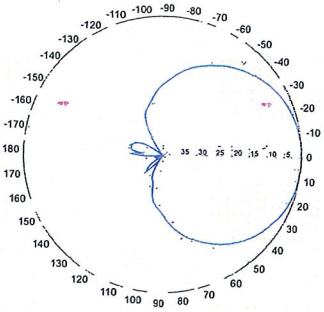


Horizontal

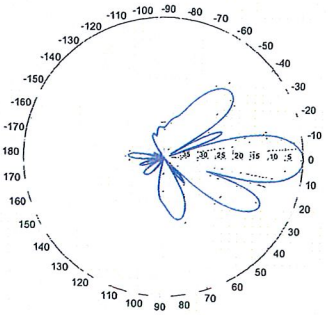


Vertical

850 MHz



Horizontal



Vertical

696-900 MHz

Featuring our Exclusive 3T Technology™ Antenna Design:

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

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date 10/7/08

815.399.0001 • antel@antelinc.com • www.antelinc.com

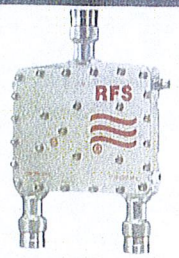
Amphenol Antel, Inc. The Antenna Technology Company

Product Data Sheet FD9R6004/2C-3L

ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Product Description

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



Features/Benefits

- **LTE ready design**
- **Extremely Low Insertion Loss**
- **High level of Rejection between bands – Protection against interferences**
- **Extremely High Power Handling Capability**
- **Integrated DC block/bypass versions available**
- **Very compact & small size design – Easy installation and reduced tower load**
- **In-line long-neck connectors for easy connection & waterproofing**
- **Exceptional reliability & environmental protection (IP 67)**
- **Equipped with 1 * Breathable Vent – Prevent any humidity inside the product**
- **Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)**
- **Grounding already provided through the mounting bracket**
- **Kit available for easy dual mount**

Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss, Path 1, dB	0.07 typ.
Insertion Loss, Path 2, dB	0.13 typ.
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 60/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

Notes

TAB 2

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

SEYMOUR WEST CT
85 QUAKER FARMS ROAD
OXFORD, CT 06478

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 85 QUAKER FARMS ROAD, OXFORD, CONNECTICUT

1. START AT 99 E RIVER DR TOWARD E RIVER DR	<0.1 MI.
2. TURN LEFT ON E RIVER DR.	0.3 MI.
3. TURN LEFT ON CONNECTICUT BLVD (US-44).	0.2 MI.
4. TAKE RAMP ONTO I-84 W.	38.0 MI.
5. TAKE EXIT #16/SOUTHFORD.	0.2 MI.
6. TURN LEFT ON CT-188.	8.3 MI.
7. ARRIVE AT 85 QUAKER FARMS RD.	

GENERAL NOTES

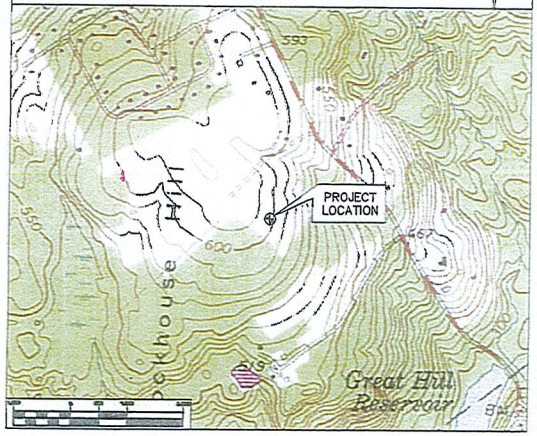
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF (3) ADDITIONAL PANEL ANTENNAS TO THE EXISTING (6) ANTENNA ARRAY FOR A TOTAL OF (9) ANTENNAS. THE PROPOSED ANTENNAS WILL BE MOUNTED TO THE EXISTING FLUSH MOUNTS.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	SEYMOUR WEST CT
SITE ADDRESS:	85 QUAKER FARMS ROAD OXFORD, CT 06478
LESSEE/TENANT:	CELLCO PARTNERSHIP d.b.a. CELLCO PARTNERSHIP WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	SANDY CARTER CELLCO PARTNERSHIP (860) 803-8219
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD ROAD BRANFORD, CT 06405 (203) 488-0580
TOWER COORDINATES:	LATITUDE: 41°-23'-2.39" LONGITUDE: 73°-08'-14.53" COORDINATES BASED ON 2C CERTIFICATION LETTER PREPARED BY MARTINEZ COUCH AND ASSOCIATES L.L.C., DATED 9/19/2007.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	0
C-1	ELEVATION AND ANTENNA CONFIGURATION PLANS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	01/20/12	FLO	DMD	ISSUED FOR CSC
0	01/19/12	FLO	DMD	ISSUED FOR CSC-CLIENT REVIEW

DESIGNED BY: FLO
DRAWN BY: DMD
CHK'D BY: CFC

Cellco Partnership d.b.a. Verizon Wireless

WIRELESS COMMUNICATIONS FACILITY

SEYMOUR WEST
85 QUAKER FARMS ROAD
OXFORD, CT 06478

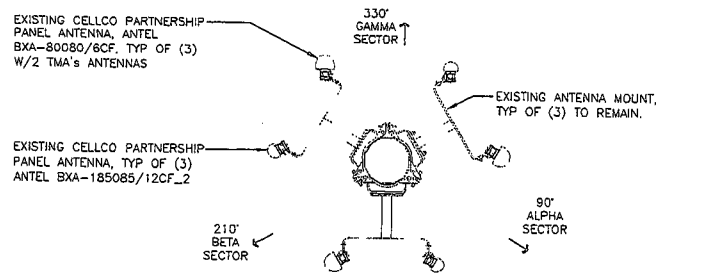
DATE: 01/19/12
SCALE: AS NOTED
JOB NO. 12001/17

TITLE SHEET

T-1

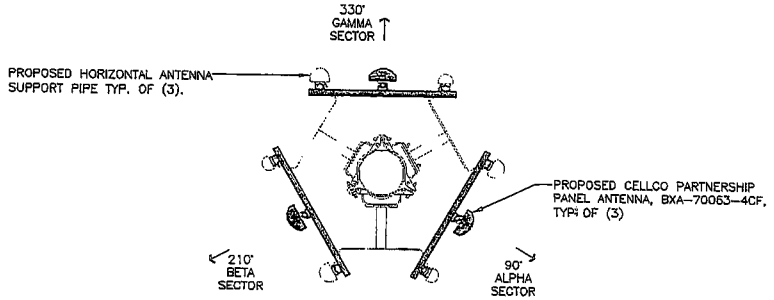
Sheet No. 1 of 2

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com



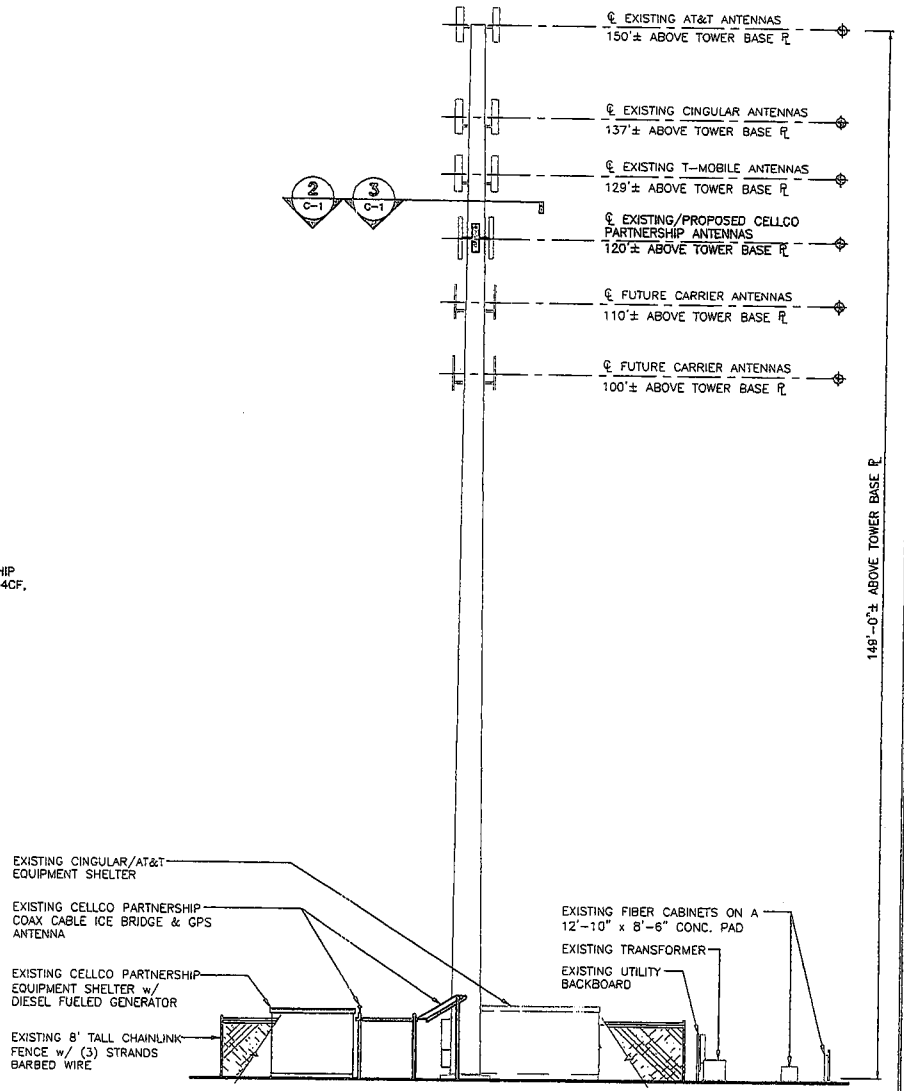
2 C-1 ANTENNA FLUSH MOUNTING CONFIGURATION - EXISTING
SCALE: 1/2" = 1'-0"

TRUE NORTH



3 C-1 ANTENNA FLUSH MOUNTING CONFIGURATION - PROPOSED
SCALE: 1/2" = 1'-0"

TRUE NORTH



1 C-1 EAST ELEVATION - PROPOSED
SCALE: 1/8" = 1'-0"

GRAPHIC SCALE
(IN FEET)
1/8 inch = 1 ft.

REV	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	01/20/12	FLO	DMD	ISSUED FOR CSC
0	01/19/12	FLO	DMD	ISSUED FOR CSC-CLIENT REVIEW

DESIGNED BY: FLO
DRAWN BY: DMD
CHK'D BY: CFC

Cellco Partnership d/b/a Verizon Wireless

WIRELESS COMMUNICATIONS FACILITY

SEYMOUR WEST

85 QUAKER FARMS ROAD
OXFORD, CT 06478

DATE: 01/19/12
SCALE: AS NOTED
JOB NO. 12001/17

ELEVATION
AND ANTENNA
CONFIG. PLANS

C-1

Sheet No. 2 of 2

TAB 3

	General	Power	Density					
Site Name: Seymour West								
Tower Height: Verizon @ 120ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*New Cingular	2	296	150	0.0095	850	0.5667	1.67%	
*New Cingular	1	427	150	0.0068	1900	1.0000	0.68%	
*New Cingular	2	296	140	0.0109	850	0.5667	1.92%	
*New Cingular	1	427	140	0.0078	1900	1.0000	0.78%	
*T-Mobile	8	113	129	0.0195	1945	1.0000	1.95%	
Verizon PCS	**7**	**330**	**120**	**0.0577**	**1970**	**1.0000**	**5.77%**	
Verizon Cellular	**9**	**276**	**120**	**0.0620**	**869**	**0.5793**	**10.71%**	
Verizon AWS	**1**	**825**	**120**	**0.0167**	**2145**	**1.0000**	**1.67%**	
Verizon 700	**1**	**644**	**120**	**0.0161**	**698**	**0.4653**	**3.46%**	
								28.61%
* Source: Siting Council								

TAB 4

February 9, 2012

Ms. Charlotte Malone
AT&T Towers
5895 Winward Pkwy, Suite 250
Alpharetta, GA 30004
(770) 708-6144

B&T Engineering, Inc.
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ctuttle@btengineering.com

Subject: **Structural Analysis Report**

Carrier Designation:

***Verizon Wireless* Co-Locate**
Carrier Site Number: N/A
Carrier Site Name: Seymore West

AT&T Designation:

Site Number: 82940-A
Site Name: Oxford Quaker Farms

Engineering Firm Designation:

B&T Engineering, Inc. Project Number: 84017

Site Data:

Oxford-Quaker Farms, Oxford, CT, New Haven County
Latitude *41° 23' 5.6"*, Longitude *-73° 8' 17.156"*
149 Foot - Monopole Tower

Dear Ms. Malone,

B&T Engineering, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

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

Sufficient Capacity
Tower: 78.2%
Foundation: 76.9%.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2003 IBC; 2003 IRC (State Building Code, 2005 CT supplement) based upon a wind speed of 85 mph fastest mile.

All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *B&T Engineering, Inc.* appreciate the opportunity of providing our continuing professional services to you and AT&T Towers. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Zach Smith
Engineering Technician

Chad E. Tuttle, P.E
President

tnxTower Report - version 6.0.3.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 149 ft. monopole tower designed by Paul J. Ford in April of 2005. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	120.0	3	Antel	BXA-70063/4CF	6	1 5/8	Verizon
		3	--	Pipe Mount			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	150.0	6	Powerwave	LGP21401			
		3	Powerwave	7770.00	6	1 5/8	AT&T
149.0	149.0	3	--	Pipe Mount			
	150.0	6	Powerwave	P65-16-XLH-RR	3	7/8	AT&T
		3	Ericsson	RRU-11			Future
138.7	139.3	6	Andrew	850/1900 dual band TMA			
		3	Powerwave	7770.00	6	1 5/8	AT&T
	138.7	6	--	Pipe Mount			
128.8	131.5	3	Powerwave	Unknown TMA			
		3	Celwave	APXV18-209014-C	6	1 5/8	T-Mobile
	128.8	6	--	Pipe Mount			
		6	Andrew	PCS 1900 Dual Band			
120.0	120.0	3	Antel	BXA-185085/12CF	12	1 5/8	Verizon
		3	Antel	BXA-80080/6CF			
		6	--	Pipe Mount			
108.33	108.33	6	--	Pipe Mount	--	--	Empty
98.33	98.33	6	--	Pipe Mount	--	--	Empty
		1	--	FO150-3			
80.0	80.0	1	PCTEL	MPRD2449	1	1 1/4	Town of
		2	--	Pipe Mount	1	1/2	Seymour

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
148.5	148.5	3	--	T-Arms	---	--
		6	Allgon	7920		
139	139	9	--	48"x12"x3"	--	--
		3	--	T-Arms		
129	129	9	--	48"x12"x3"	--	--
		3	--	T-Arms		
119	119	9	--	48"x12"x3"	--	--
		3	--	T-Arms		
109	109	6	--	48"x12"x3"	--	--
		3	--	Tri- Arm Support Assembly		
99	99	6	--	48"x12"x3"	--	--
		3	--	Tri- Arm Support Assembly		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Tower Data	Tower Design by Paul J Ford # 29205-0063	Date:4/15/2005	Siterra
Foundation Data	Foundation Mapping by WEI Project No. 2009-863	Date:7/30/2009	Siterra
Soil Properties	Geotech Report by WEI Project No. 2009-863	Date:7/30/2009	Siterra
Existing Loading	NOC2	Date:12/14/2011	Siterra
Proposed Loading	Site Lease Application	Date:1/23/2012	Siterra
Previous Analysis	GPD Associates	Date: 8/5/2009	Siterra
Previous Analysis	Paul J. Ford and Company	Date: 9/28/2007	Siterra

3.1) Analysis Method

tnxTower (version 6.0.3.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount areas and weights are assumed based on photographs provided.
6) AT&T antennas are installed on split levels based on recent photographs and 8/5/09 analysis by GPD.
7) Town of Seymour loading was provided by Charlotte Malone e-mail and verified by photographs.

This analysis may be affected if any assumptions are not valid or have been made in error. B&T Engineering, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	149 - 111.5	Pole	TP29.487x23x0.188	1	-3.665	879.472	37.0	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.463x0.219	2	-8.385	1215.799	73.1	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.281	3	-14.330	1851.524	78.2	Pass
L4	39.75 - 0	Pole	TP47.4x39.615x0.375	4	-24.807	2909.792	73.1	Pass
							Summary	
						Pole (L3)	78.2	Pass
						Rating =	78.2	Pass

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	76.2	Pass
1	Base Plate	Base	61.8	Pass
1	Base Foundation	Base	76.9	Pass

Structure Rating (max from all components) =	78.2%

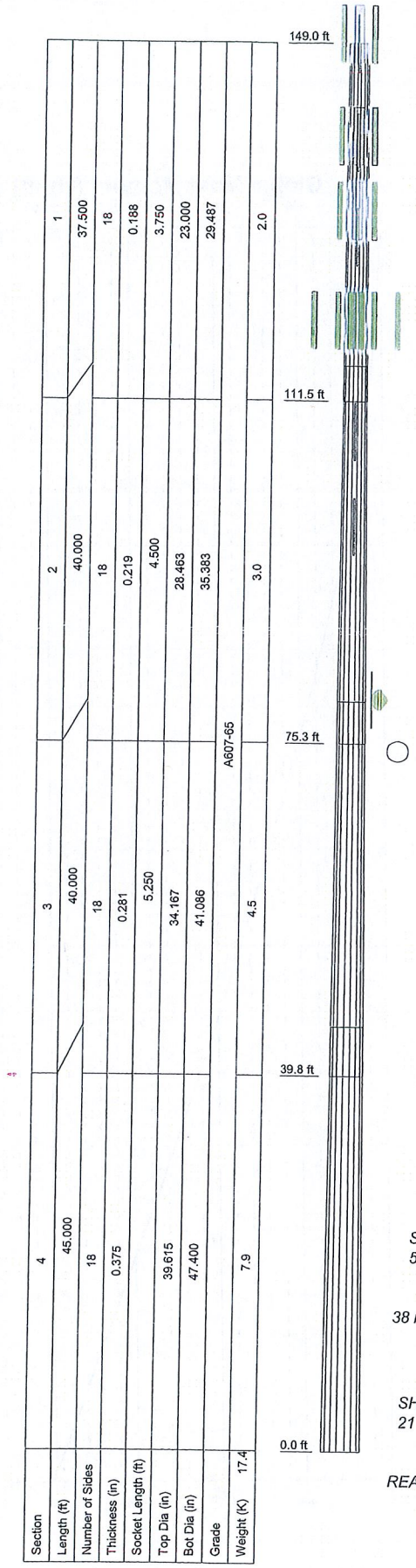
Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

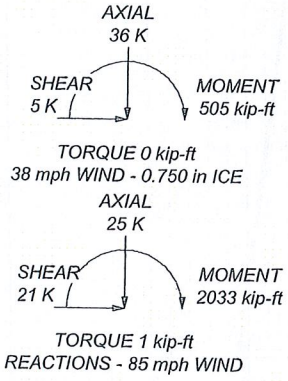
N/A

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4	A607-65
Length (ft)	37.500	40.000	40.000	45.000	
Number of Sides	18	18	18	18	
Thickness (in)	0.188	0.219	0.281	0.375	
Socket Length (ft)	3.750	4.500	5.250		
Top Dia (in)	23.000	28.463	34.167	39.615	
Bot Dia (in)	29.487	35.383	41.086	47.400	
Grade					
Weight (K)	2.0	3.0	4.5	7.9	17.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
7770.00 w/ Mount Pipe (ATI - E)	150	5' x 2' Pipe Mount (T-Mobile - E)	128.75
7770.00 w/ Mount Pipe (ATI - E)	150	5' x 2' Pipe Mount (T-Mobile - E)	128.75
7770.00 w/ Mount Pipe (ATI - E)	150	5' x 2' Pipe Mount (T-Mobile - E)	128.75
(2) LGP21401 (ATI - E)	150	BXA-185085/12CF w/ Mount Pipe (Verizon - E)	120
(2) LGP21401 (ATI - E)	150		
(2) LGP21401 (ATI - E)	150	BXA-185085/12CF w/ Mount Pipe (Verizon - E)	120
P65-16-XLH-RR w/ Mount Pipe (ATI - Future)	150	BXA-185085/12CF w/ Mount Pipe (Verizon - E)	120
P65-16-XLH-RR w/ Mount Pipe (ATI - Future)	150	BXA-80080/6CF w/Mount Pipe (Verizon - E)	120
P65-16-XLH-RR w/ Mount Pipe (ATI - Future)	150	BXA-80080/6CF w/Mount Pipe (Verizon - E)	120
RRU-11 (ATI - Future)	150	BXA-80080/6CF w/Mount Pipe (Verizon - E)	120
RRU-11 (ATI - Future)	150	BXA-70063/4CF w/ Mount Pipe (Verizon - P)	120
RRU-11 (ATI - Future)	150	BXA-70063/4CF w/ Mount Pipe (Verizon - P)	120
Side Arm Mount [SO 102-3] (ATI - E)	149	BXA-70063/4CF w/ Mount Pipe (Verizon - P)	120
7770.00 w/ Mount Pipe (ATI - E)	139.33	(2) PCS 1900 Dual Band TMA (Verizon - E)	120
7770.00 w/ Mount Pipe (ATI - E)	139.33	(2) PCS 1900 Dual Band TMA (Verizon - E)	120
7770.00 w/ Mount Pipe (ATI - E)	139.33	(2) PCS 1900 Dual Band TMA (Verizon - E)	120
(2) 850/1900 dual band TMA (ATI - E)	139.33	Side Arm Mount [SO 102-3] (Verizon - E)	120
(2) 850/1900 dual band TMA (ATI - E)	139.33	Side Arm Mount [SO 102-3] (E)	108.33
(2) 850/1900 dual band TMA (ATI - E)	139.33	(2) 5' x 2' Pipe Mount (E)	108.33
Side Arm Mount [SO 102-3] (ATI - E)	138.67	(2) 5' x 2' Pipe Mount (E)	108.33
5' x 2' Pipe Mount (ATI - E)	138.67	(2) 5' x 2' Pipe Mount (E)	108.33
5' x 2' Pipe Mount (ATI - E)	138.67	Side Arm Mount [SO 102-3] (E)	98.33
5' x 2' Pipe Mount (ATI - E)	138.67	(2) 5' x 2' Pipe Mount (E)	98.33
APXV18-209014-C w/Mount Pipe (T-Mobile - E)	131.5	(2) 5' x 2' Pipe Mount (E)	98.33
APXV18-209014-C w/Mount Pipe (T-Mobile - E)	131.5	(2) 5' x 2' Pipe Mount (E)	98.33
APXV18-209014-C w/Mount Pipe (T-Mobile - E)	131.5	FO150-3 (Seymour - E)	80
TMA (T-Mobile - E)	131.5	(2) Pipe Mount [PM 601-1] (Seymour - E)	80
TMA (T-Mobile - E)	131.5	MPRD2449 (Seymour-E)	80
TMA (T-Mobile - E)	131.5		
Side Arm Mount [SO 102-3] (T-Mobile - E)	128.75		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

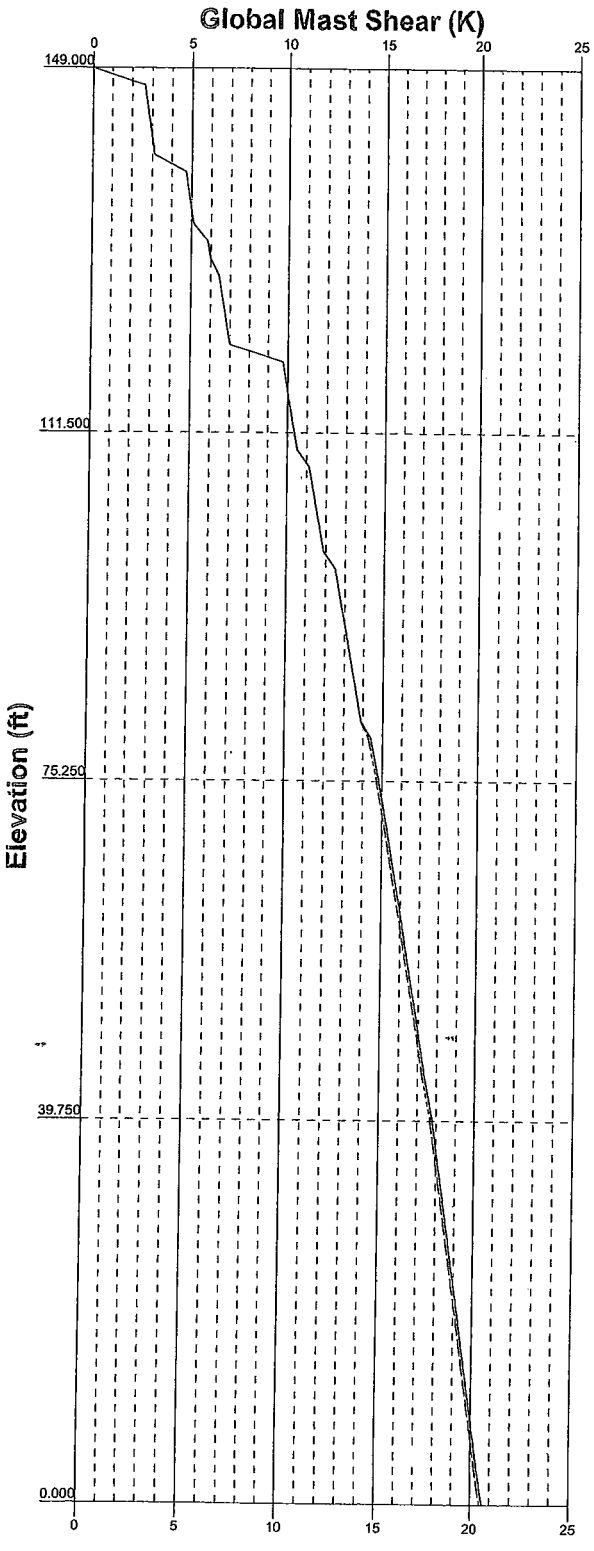
1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. RE:Feedline Distribution Chart for transmission lines distribution.
6. TOWER RATING: 78.2%

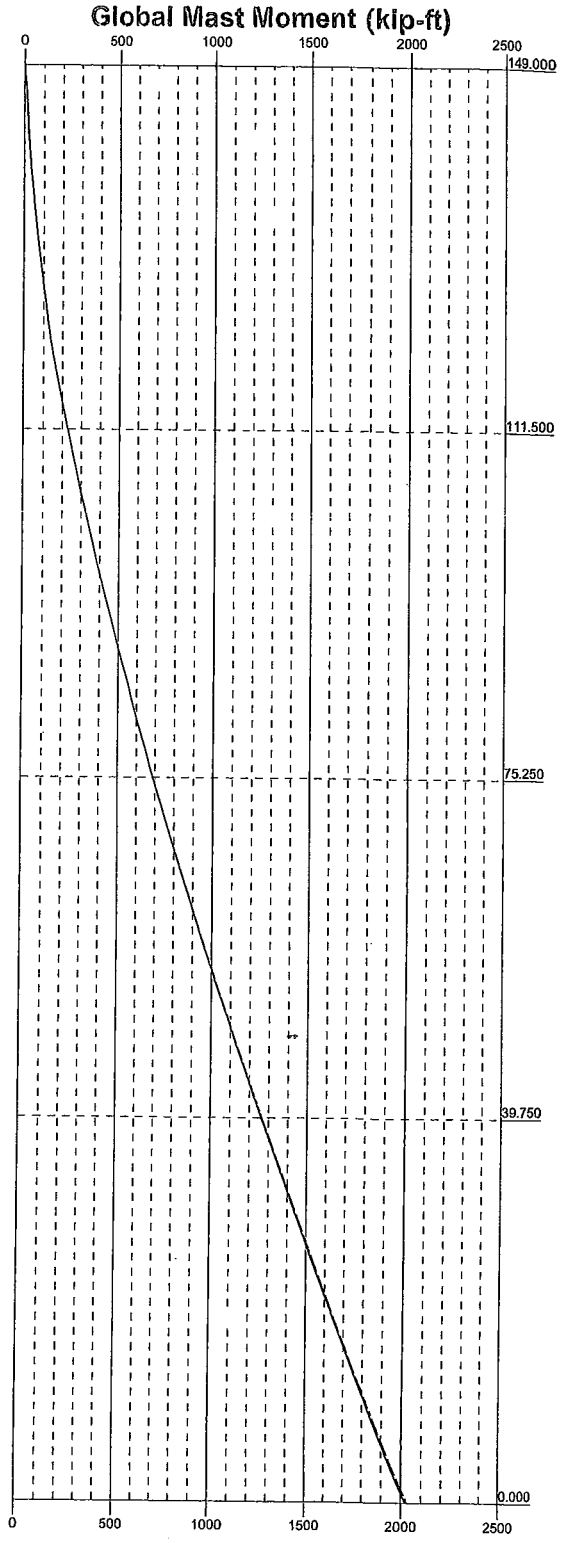
B&T Engineering Inc.
1717 S. Boulder Ave.
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 84017 - Oxford Quaker Farms, CT (Site# 82940-A		
Project: 149' PennSummit MP / Verizon Wireless Co-Locate		
Client: AT&T Towers	Drawn by: zsmith	App'd:
Code: TIA/EIA-222-F	Date: 02/06/12	Scale: NTS
Path:		Dwg No. E-1

Vx ---------- Vz

——— Mx ---------- Mz



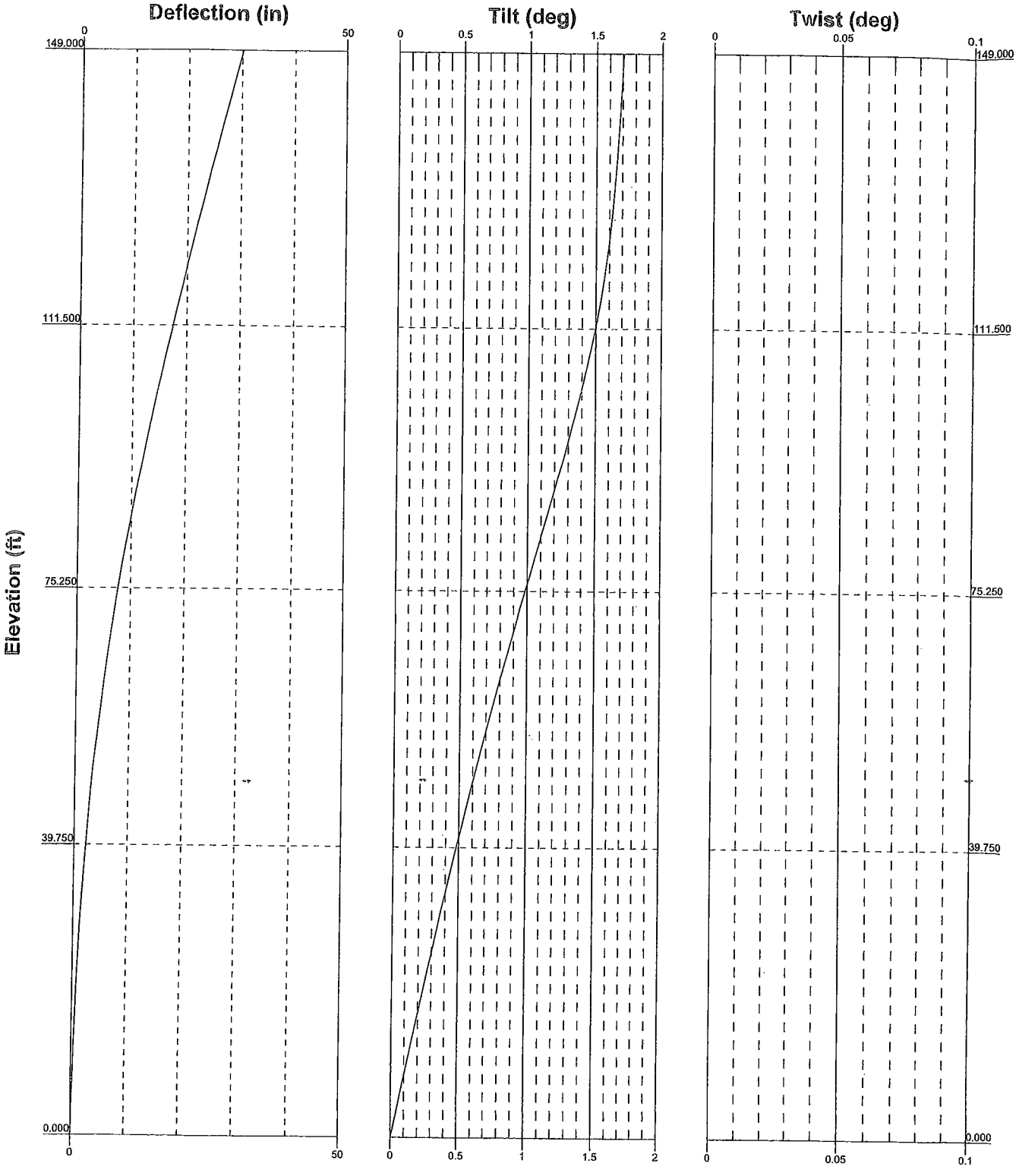


B&T Engineering Inc.
1717 S. Boulder Ave.
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 84017 - Oxford Quaker Farms, CT (Site# 82940-			
Project: 149' PennSummit MP / Verizon Wireless Co-Locate			
Client: AT&T Towers	Drawn by: zsmith	App'd:	
Code: TIA/EIA-222-F	Date: 02/06/12	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values

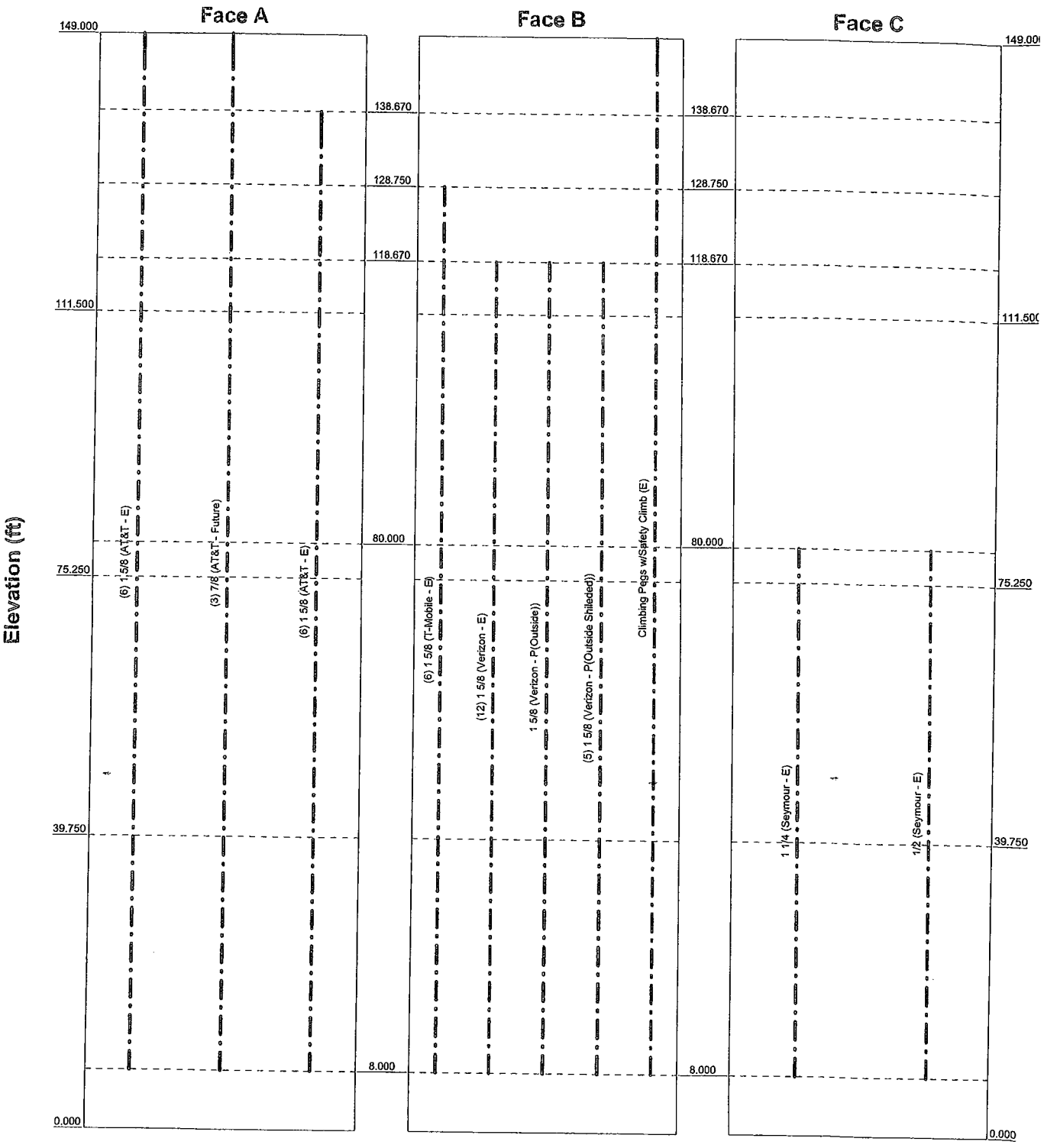


B&T Engineering Inc.
1717 S. Boulder Ave.
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 84017 - Oxford Quaker Farms, CT (Site# 82940-A			
Project: 149' PennSummit MP / Verizon Wireless Co-Locate			
Client: AT&T Towers	Drawn by: zsmith	App'd:	
Code: TIA/EIA-222-F	Date: 02/06/12	Scale: NTS	
Path:		Dwg No. E-5	

0" = 149'

Round Flat App In Face App Out Face Truss Leg



B&T Engineering Inc.
1717 S. Boulder Ave.
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 84017 - Oxford Quaker Farms, CT (Site# 82940-4			
Project: 149' PennSummit MP / Verizon Wireless Co-Locate			
Client: AT&T Towers	Drawn by: zsmith	App'd:	
Code: TIA/EIA-222-F	Date: 02/06/12	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
RE:Feedline Distribution Chart for transmission lines distribution..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

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				

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	149.000-111.500	37.500	3.750	18	23.000	29.487	0.188	0.750	A607-65 (65 ksi)
L2	111.500-75.250	40.000	4.500	18	28.463	35.383	0.219	0.875	A607-65 (65 ksi)
L3	75.250-39.750	40.000	5.250	18	34.167	41.086	0.281	1.125	A607-65 (65 ksi)
L4	39.750-0.000	45.000		18	39.615	47.400	0.375	1.500	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	23.355	13.576	892.615	8.098	11.684	76.396	1786.405	6.789	3.718	19.829
	29.942	17.437	1891.151	10.401	14.979	126.250	3784.791	8.720	4.860	25.918
L2	29.561	19.611	1976.498	10.027	14.459	136.693	3955.597	9.807	4.625	21.141
	35.929	24.415	3814.139	12.483	17.975	212.196	7633.297	12.210	5.842	26.708
L3	35.485	30.249	4388.231	12.029	17.357	252.824	8782.237	15.128	5.518	19.621
	41.720	36.426	7662.475	14.486	20.872	367.123	15335.032	18.216	6.736	23.951
L4	41.149	46.706	9086.057	13.930	20.125	451.490	18184.069	23.357	6.312	16.833
	48.131	55.972	15637.310	16.694	24.079	649.412	31295.196	27.991	7.682	20.486

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 149.000-111.500				1	1	1		
L2 111.500-75.250				1	1	1		
L3 75.250-39.750				1	1	1		
L4 39.750-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
1 5/8 (AT&T - E)	A	No	Inside Pole	149.000 - 8.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
7/8 (AT&T - Future)	A	No	Inside Pole	149.000 - 8.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
****								
1 5/8 (AT&T - E)	A	No	Inside Pole	138.670 - 8.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
****								
1 5/8 (T-Mobile - E)	B	No	Inside Pole	128.750 - 8.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
****								
1 5/8	B	No	Inside Pole	118.670 - 8.000	12	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(Verizon - E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
1 5/8 (Verizon - P(Outside))	B	No	CaAa (Out Of Face)	118.670 - 8.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
1 5/8 (Verizon - P(Outside Shileded))	B	No	CaAa (Out Of Face)	118.670 - 8.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030
****								
1 1/4 (Seymour - E)	C	No	Inside Pole	80.000 - 8.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
1/2 (Seymour - E)	C	No	Inside Pole	80.000 - 8.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
****								
Climbing Pegs w/Safety Climb (E)	B	No	CaAa (Out Of Face)	149.000 - 8.000	1	No Ice	0.088	0.001
						1/2" Ice	0.188	0.002
						1" Ice	0.287	0.003
						2" Ice	0.487	0.008
						4" Ice	0.887	0.024

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	149.000-111.500	A	0.000	0.000	0.000	0.000	0.464
		B	0.000	0.000	0.000	4.701	0.262
		C	0.000	0.000	0.000	0.000	0.000
L2	111.500-75.250	A	0.000	0.000	0.000	0.000	0.511
		B	0.000	0.000	0.000	10.349	0.924
		C	0.000	0.000	0.000	0.000	0.004
L3	75.250-39.750	A	0.000	0.000	0.000	0.000	0.501
		B	0.000	0.000	0.000	10.135	0.905
		C	0.000	0.000	0.000	0.000	0.032
L4	39.750-0.000	A	0.000	0.000	0.000	0.000	0.448
		B	0.000	0.000	0.000	9.065	0.810
		C	0.000	0.000	0.000	0.000	0.029

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	149.000-111.500	A	0.884	0.000	0.000	0.000	0.000	0.464
		B		0.000	0.000	0.000	12.597	0.472
		C		0.000	0.000	0.000	0.000	0.000
L2	111.500-75.250	A	0.849	0.000	0.000	0.000	0.000	0.511
		B		0.000	0.000	0.000	23.165	1.681
		C		0.000	0.000	0.000	0.000	0.004
L3	75.250-39.750	A	0.802	0.000	0.000	0.000	0.000	0.501
		B		0.000	0.000	0.000	22.196	1.611
		C		0.000	0.000	0.000	0.000	0.032
L4	39.750-0.000	A	0.750	0.000	0.000	0.000	0.000	0.448
		B		0.000	0.000	0.000	19.244	1.398
		C		0.000	0.000	0.000	0.000	0.029

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	149.000-111.500	0.159	0.092	0.365	0.211
L2	111.500-75.250	0.335	0.194	0.642	0.371
L3	75.250-39.750	0.340	0.196	0.654	0.378
L4	39.750-0.000	0.274	0.158	0.530	0.306

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
7770.00 w/ Mount Pipe (AT&T - E)	C	From Leg	1.000 0.000 0.000	30.000	150.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe (AT&T - E)	B	From Leg	1.000 0.000 0.000	30.000	150.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe (AT&T - E)	A	From Leg	1.000 0.000 0.000	30.000	150.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) LGP21401 (AT&T - E)	C	From Leg	1.000 0.000	0.000	150.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) LGP21401 (AT&T - E)	B	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) LGP21401 (AT&T - E)	A	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
P65-16-XLH-RR w/ Mount Pipe (AT&T - Future)	C	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice	8.637	6.362	0.079
						1/2" Ice	9.290	7.538	0.141
						1" Ice	9.910	8.427	0.216
						2" Ice	11.176	10.239	0.393
						4" Ice	13.829	14.099	0.886
P65-16-XLH-RR w/ Mount Pipe (AT&T - Future)	B	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice	8.637	6.362	0.079
						1/2" Ice	9.290	7.538	0.141
						1" Ice	9.910	8.427	0.216
						2" Ice	11.176	10.239	0.393
						4" Ice	13.829	14.099	0.886
P65-16-XLH-RR w/ Mount Pipe (AT&T - Future)	A	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice	8.637	6.362	0.079
						1/2" Ice	9.290	7.538	0.141
						1" Ice	9.910	8.427	0.216
						2" Ice	11.176	10.239	0.393
						4" Ice	13.829	14.099	0.886
RRU-11 (AT&T - Future)	C	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice	1.912	1.472	0.044
						1/2" Ice	2.102	1.645	0.060
						1" Ice	2.301	1.827	0.078
						2" Ice	2.725	2.218	0.123
						4" Ice	3.676	3.102	0.254
RRU-11 (AT&T - Future)	B	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice	1.912	1.472	0.044
						1/2" Ice	2.102	1.645	0.060
						1" Ice	2.301	1.827	0.078
						2" Ice	2.725	2.218	0.123
						4" Ice	3.676	3.102	0.254
RRU-11 (AT&T - Future)	A	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice	1.912	1.472	0.044
						1/2" Ice	2.102	1.645	0.060
						1" Ice	2.301	1.827	0.078
						2" Ice	2.725	2.218	0.123
						4" Ice	3.676	3.102	0.254
Side Arm Mount [SO 102-3] (AT&T - E)	C	None		0.000	149.000	No Ice	3.000	3.000	0.081
						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
						4" Ice	6.840	6.840	0.321
****									
****									
****									
****									
7770.00 w/ Mount Pipe (AT&T - E)	C	From Leg	1.000 0.000 0.000	30.000	139.330	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665

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
7770.00 w/ Mount Pipe (AT&T - E)	B	From Leg	1.000 0.000 0.000	30.000	139.330	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe (AT&T - E)	A	From Leg	1.000 0.000 0.000	30.000	139.330	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 850/1900 dual band TMA (AT&T - E)	C	From Leg	1.000 0.000 0.000	0.000	139.330	No Ice	2.151	0.476	0.031
						1/2" Ice	2.348	0.603	0.042
						1" Ice	2.554	0.738	0.056
						2" Ice	2.992	1.035	0.091
						4" Ice	3.972	1.733	0.197
(2) 850/1900 dual band TMA (AT&T - E)	B	From Leg	1.000 0.000 0.000	0.000	139.330	No Ice	2.151	0.476	0.031
						1/2" Ice	2.348	0.603	0.042
						1" Ice	2.554	0.738	0.056
						2" Ice	2.992	1.035	0.091
						4" Ice	3.972	1.733	0.197
(2) 850/1900 dual band TMA (AT&T - E)	A	From Leg	1.000 0.000 0.000	0.000	139.330	No Ice	2.151	0.476	0.031
						1/2" Ice	2.348	0.603	0.042
						1" Ice	2.554	0.738	0.056
						2" Ice	2.992	1.035	0.091
						4" Ice	3.972	1.733	0.197
Side Arm Mount [SO 102-3] (AT&T - E)	C	None		0.000	138.670	No Ice	3.000	3.000	0.081
						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
						4" Ice	6.840	6.840	0.321
5' x 2' Pipe Mount (AT&T - E)	C	None		0.000	138.670	No Ice	1.188	1.188	0.018
						1/2" Ice	1.496	1.496	0.027
						1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
5' x 2' Pipe Mount (AT&T - E)	B	None		0.000	138.670	No Ice	1.188	1.188	0.018
						1/2" Ice	1.496	1.496	0.027
						1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
5' x 2' Pipe Mount (AT&T - E)	A	None		0.000	138.670	No Ice	1.188	1.188	0.018
						1/2" Ice	1.496	1.496	0.027
						1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
****									
APXV18-209014-C w/Mount Pipe (T-Mobile - E)	C	From Leg	1.000 0.000 0.000	0.000	131.500	No Ice	3.946	3.428	0.041
						1/2" Ice	4.421	4.251	0.074
						1" Ice	4.902	4.951	0.117
						2" Ice	5.931	6.400	0.222
						4" Ice	8.122	9.513	0.547
APXV18-209014-C w/Mount Pipe (T-Mobile - E)	B	From Leg	1.000 0.000 0.000	0.000	131.500	No Ice	3.946	3.428	0.041
						1/2" Ice	4.421	4.251	0.074
						1" Ice	4.902	4.951	0.117
						2" Ice	5.931	6.400	0.222
						4" Ice	8.122	9.513	0.547
APXV18-209014-C w/Mount	A	From Leg	1.000	0.000	131.500	No Ice	3.946	3.428	0.041

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe (T-Mobile - E)			0.000 0.000			1/2" Ice	4.421	4.251	0.074
						1" Ice	4.902	4.951	0.117
						2" Ice	5.931	6.400	0.222
						4" Ice	8.122	9.513	0.547
TMA (T-Mobile - E)	C	From Leg	1.000 0.000 0.000	0.000	131.500	No Ice	0.780	0.290	0.010
						1/2" Ice	0.820	0.390	0.020
						1" Ice	0.860	0.490	0.030
						2" Ice	0.940	0.690	0.050
						4" Ice	1.100	1.090	0.090
TMA (T-Mobile - E)	B	From Leg	1.000 0.000 0.000	0.000	131.500	No Ice	0.780	0.290	0.010
						1/2" Ice	0.820	0.390	0.020
						1" Ice	0.860	0.490	0.030
						2" Ice	0.940	0.690	0.050
						4" Ice	1.100	1.090	0.090
TMA (T-Mobile - E)	A	From Leg	1.000 0.000 0.000	0.000	131.500	No Ice	0.780	0.290	0.010
						1/2" Ice	0.820	0.390	0.020
						1" Ice	0.860	0.490	0.030
						2" Ice	0.940	0.690	0.050
						4" Ice	1.100	1.090	0.090
Side Arm Mount [SO 102-3] (T-Mobile - E)	C	None		0.000	128.750	No Ice	3.000	3.000	0.081
						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
						4" Ice	6.840	6.840	0.321
5' x 2' Pipe Mount (T-Mobile - E)	C	None		0.000	128.750	No Ice	1.188	1.188	0.018
						1/2" Ice	1.496	1.496	0.027
						1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
5' x 2' Pipe Mount (T-Mobile - E)	B	None		0.000	128.750	No Ice	1.188	1.188	0.018
						1/2" Ice	1.496	1.496	0.027
						1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
5' x 2' Pipe Mount (T-Mobile - E)	A	None		0.000	128.750	No Ice	1.188	1.188	0.018
						1/2" Ice	1.496	1.496	0.027
						1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
****									
BXA-185085/12CF w/ Mount Pipe (Verizon - E)	C	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	5.009	5.310	0.039
						1/2" Ice	5.563	6.481	0.082
						1" Ice	6.083	7.371	0.137
						2" Ice	7.146	9.172	0.271
						4" Ice	9.412	12.974	0.675
BXA-185085/12CF w/ Mount Pipe (Verizon - E)	B	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	5.009	5.310	0.039
						1/2" Ice	5.563	6.481	0.082
						1" Ice	6.083	7.371	0.137
						2" Ice	7.146	9.172	0.271
						4" Ice	9.412	12.974	0.675
BXA-185085/12CF w/ Mount Pipe (Verizon - E)	A	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	5.009	5.310	0.039
						1/2" Ice	5.563	6.481	0.082
						1" Ice	6.083	7.371	0.137
						2" Ice	7.146	9.172	0.271
						4" Ice	9.412	12.974	0.675
BXA-80080/6CF w/Mount Pipe	C	From Leg	1.000 0.000	90.000	120.000	No Ice	8.143	5.600	0.048
						1/2" Ice	8.794	6.776	0.105

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
(Verizon - E)			0.000			1" Ice	9.414	7.672	0.175
						2" Ice	10.677	9.482	0.340
						4" Ice	13.325	13.301	0.809
BXA-80080/6CF w/Mount Pipe (Verizon - E)	B	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	8.143	5.600	0.048
						1/2" Ice	8.794	6.776	0.105
						1" Ice	9.414	7.672	0.175
						2" Ice	10.677	9.482	0.340
						4" Ice	13.325	13.301	0.809
BXA-80080/6CF w/Mount Pipe (Verizon - E)	A	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	8.143	5.600	0.048
						1/2" Ice	8.794	6.776	0.105
						1" Ice	9.414	7.672	0.175
						2" Ice	10.677	9.482	0.340
						4" Ice	13.325	13.301	0.809
BXA-70063/4CF w/ Mount Pipe (Verizon - P)	C	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	5.399	3.616	0.028
						1/2" Ice	5.844	4.217	0.068
						1" Ice	6.299	4.834	0.116
						2" Ice	7.240	6.161	0.233
						4" Ice	9.261	9.183	0.573
BXA-70063/4CF w/ Mount Pipe (Verizon - P)	B	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	5.399	3.616	0.028
						1/2" Ice	5.844	4.217	0.068
						1" Ice	6.299	4.834	0.116
						2" Ice	7.240	6.161	0.233
						4" Ice	9.261	9.183	0.573
BXA-70063/4CF w/ Mount Pipe (Verizon - P)	A	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	5.399	3.616	0.028
						1/2" Ice	5.844	4.217	0.068
						1" Ice	6.299	4.834	0.116
						2" Ice	7.240	6.161	0.233
						4" Ice	9.261	9.183	0.573
(2) PCS 1900 Dual Band TMA (Verizon - E)	C	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	0.461	1.075	0.020
						1/2" Ice	0.587	1.227	0.027
						1" Ice	0.722	1.388	0.035
						2" Ice	1.017	1.736	0.059
						4" Ice	1.712	2.534	0.137
(2) PCS 1900 Dual Band TMA (Verizon - E)	B	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	0.461	1.075	0.020
						1/2" Ice	0.587	1.227	0.027
						1" Ice	0.722	1.388	0.035
						2" Ice	1.017	1.736	0.059
						4" Ice	1.712	2.534	0.137
(2) PCS 1900 Dual Band TMA (Verizon - E)	A	From Leg	1.000 0.000 0.000	90.000	120.000	No Ice	0.461	1.075	0.020
						1/2" Ice	0.587	1.227	0.027
						1" Ice	0.722	1.388	0.035
						2" Ice	1.017	1.736	0.059
						4" Ice	1.712	2.534	0.137
Side Arm Mount [SO 102-3] (Verizon - E)	C	None		0.000	120.000	No Ice	3.000	3.000	0.081
						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
						4" Ice	6.840	6.840	0.321
****									
Side Arm Mount [SO 102-3] (E)	C	None		0.000	108.330	No Ice	3.000	3.000	0.081
						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
						4" Ice	6.840	6.840	0.321
(2) 5' x 2' Pipe Mount (E)	C	None		0.000	108.330	No Ice	1.188	1.188	0.018
						1/2" Ice	1.496	1.496	0.027
						1" Ice	1.807	1.807	0.040

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							2" Ice	2.458	2.458	0.076
							4" Ice	3.919	3.919	0.196
(2) 5' x 2' Pipe Mount (E)	B	None			0.000	108.330	No Ice	1.188	1.188	0.018
							1/2" Ice	1.496	1.496	0.027
							1" Ice	1.807	1.807	0.040
							2" Ice	2.458	2.458	0.076
							4" Ice	3.919	3.919	0.196
(2) 5' x 2' Pipe Mount (E)	A	None			0.000	108.330	No Ice	1.188	1.188	0.018
							1/2" Ice	1.496	1.496	0.027
							1" Ice	1.807	1.807	0.040
							2" Ice	2.458	2.458	0.076
							4" Ice	3.919	3.919	0.196
****										
Side Arm Mount [SO 102-3] (E)	C	None			0.000	98.330	No Ice	3.000	3.000	0.081
							1/2" Ice	3.480	3.480	0.111
							1" Ice	3.960	3.960	0.141
							2" Ice	4.920	4.920	0.201
							4" Ice	6.840	6.840	0.321
(2) 5' x 2' Pipe Mount (E)	C	None			0.000	98.330	No Ice	1.188	1.188	0.018
							1/2" Ice	1.496	1.496	0.027
							1" Ice	1.807	1.807	0.040
							2" Ice	2.458	2.458	0.076
							4" Ice	3.919	3.919	0.196
(2) 5' x 2' Pipe Mount (E)	B	None			0.000	98.330	No Ice	1.188	1.188	0.018
							1/2" Ice	1.496	1.496	0.027
							1" Ice	1.807	1.807	0.040
							2" Ice	2.458	2.458	0.076
							4" Ice	3.919	3.919	0.196
(2) 5' x 2' Pipe Mount (E)	A	None			0.000	98.330	No Ice	1.188	1.188	0.018
							1/2" Ice	1.496	1.496	0.027
							1" Ice	1.807	1.807	0.040
							2" Ice	2.458	2.458	0.076
							4" Ice	3.919	3.919	0.196
****										
FO150-3 (Seymour - E)	B	From Leg	1.000	0.000	2.000	80.000	No Ice	1.000	1.000	0.010
							1/2" Ice	1.248	1.248	0.019
							1" Ice	1.505	1.505	0.031
							2" Ice	2.046	2.046	0.064
							4" Ice	3.422	3.422	0.171
(2) Pipe Mount [PM 601-1] (Seymour - E)	B	From Leg	0.000	0.000	0.000	80.000	No Ice	3.000	0.900	0.065
							1/2" Ice	3.740	1.120	0.079
							1" Ice	4.480	1.340	0.093
							2" Ice	5.960	1.780	0.122
							4" Ice	8.920	2.660	0.178
****										

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter		Aperture Area	Weight
				ft	°	°	ft	ft		ft^2	K
MPRD2449 (Seymour-E)	B	Paraboloid w/Radome	From Leg	1.000 0.000 0.000	0.000		80.000	2.167	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.142 3.409 3.676 4.211 5.280	0.020 0.040 0.026 0.043 0.077

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	149 - 111.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-8.294	-0.279	-0.161
			Max. Mx	5	-3.666	-189.791	-0.049
			Max. My	8	-3.668	-0.076	-189.753
			Max. Vy	5	10.036	-189.791	-0.049
			Max. Vx	8	10.035	-0.076	-189.753
			Max. Torque	3			-0.036
L2	111.5 - 75.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-15.437	-1.738	-1.003
			Max. Mx	5	-8.389	-622.761	-0.374
			Max. My	8	-8.398	-0.602	-622.452
			Max. Vy	11	-14.398	621.677	-0.262
			Max. Vx	2	-14.285	-0.487	621.834
			Max. Torque	3			-0.499
L3	75.25 - 39.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-23.291	-3.040	-1.755
			Max. Mx	5	-14.333	-1174.228	-3.252
			Max. My	2	-14.337	2.264	1170.051
			Max. Vy	11	-17.323	1173.728	2.244
			Max. Vx	2	-17.209	2.264	1170.051
			Max. Torque	3			-0.595
L4	39.75 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-36.052	-4.487	-2.591
			Max. Mx	11	-24.807	2028.186	5.493
			Max. My	2	-24.808	5.844	2019.552
			Max. Vy	11	-20.622	2028.186	5.493
			Max. Vx	2	-20.510	5.844	2019.552
			Max. Torque	3			-0.695

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	19	36.052	-4.256	-2.457
	Max. H_x	11	24.821	20.606	0.076
	Max. H_z	2	24.821	0.087	20.493
	Max. M_x	2	2019.552	0.087	20.493
	Max. M_z	5	2027.873	-20.570	-0.076
	Max. Torsion	9	0.695	10.225	-17.676
	Min. Vert	1	24.821	0.000	0.000
	Min. H_x	5	24.821	-20.570	-0.076
	Min. H_z	8	24.821	-0.069	-20.460
	Min. M_x	8	-2018.359	-0.069	-20.460
	Min. M_z	11	-2028.186	20.606	0.076
	Min. Torsion	3	-0.695	-10.196	17.693

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	24.821	0.000	0.000	0.718	-1.244	0.000
Dead+Wind 0 deg - No Ice	24.821	-0.087	-20.493	-2019.552	5.844	0.611
Dead+Wind 30 deg - No Ice	24.821	10.196	-17.693	-1744.489	-1007.302	0.695
Dead+Wind 60 deg - No Ice	24.821	17.754	-10.170	-1003.192	-1751.409	0.608
Dead+Wind 90 deg - No Ice	24.821	20.570	0.076	6.939	-2027.873	0.363
Dead+Wind 120 deg - No Ice	24.821	17.863	10.313	1016.294	-1760.274	0.000
Dead+Wind 150 deg - No Ice	24.821	10.351	17.776	1752.721	-1019.946	-0.363
Dead+Wind 180 deg - No Ice	24.821	0.069	20.460	2018.359	-6.914	-0.608
Dead+Wind 210 deg - No Ice	24.821	-10.225	17.676	1744.594	1007.121	-0.695
Dead+Wind 240 deg - No Ice	24.821	-17.791	10.171	1004.716	1751.906	-0.611
Dead+Wind 270 deg - No Ice	24.821	-20.606	-0.076	-5.493	2028.186	-0.361
Dead+Wind 300 deg - No Ice	24.821	-17.881	-10.324	-1015.707	1759.256	0.000
Dead+Wind 330 deg - No Ice	24.821	-10.369	-17.807	-1753.715	1018.851	0.361
Dead+Ice+Temp	36.052	0.000	0.000	2.591	-4.487	0.000
Dead+Wind 0 deg+Ice+Temp	36.052	-0.023	-4.878	-493.843	-2.615	0.213
Dead+Wind 30 deg+Ice+Temp	36.052	2.426	-4.210	-426.171	-251.756	0.243
Dead+Wind 60 deg+Ice+Temp	36.052	4.227	-2.418	-243.923	-434.778	0.212
Dead+Wind 90 deg+Ice+Temp	36.052	4.899	0.021	4.351	-502.818	0.125
Dead+Wind 120 deg+Ice+Temp	36.052	4.256	2.457	252.366	-437.110	0.000
Dead+Wind 150 deg+Ice+Temp	36.052	2.468	4.233	433.277	-255.177	-0.125
Dead+Wind 180 deg+Ice+Temp	36.052	0.019	4.870	498.490	-6.146	-0.212
Dead+Wind 210 deg+Ice+Temp	36.052	-2.433	4.206	431.113	243.197	-0.243
Dead+Wind 240 deg+Ice+Temp	36.052	-4.236	2.419	249.186	426.374	-0.213
Dead+Wind 270 deg+Ice+Temp	36.052	-4.907	-0.021	0.894	494.372	-0.125
Dead+Wind 300 deg+Ice+Temp	36.052	-4.260	-2.459	-247.315	428.362	0.000
Dead+Wind 330 deg+Ice+Temp	36.052	-2.472	-4.239	-428.585	246.412	0.125
Dead+Wind 0 deg - Service	24.821	-0.030	-7.091	-698.992	1.186	0.212
Dead+Wind 30 deg - Service	24.821	3.528	-6.122	-603.722	-349.717	0.242
Dead+Wind 60 deg - Service	24.821	6.143	-3.519	-346.975	-607.439	0.211
Dead+Wind 90 deg - Service	24.821	7.118	0.026	2.885	-703.195	0.126
Dead+Wind 120 deg - Service	24.821	6.181	3.568	352.479	-610.512	0.000
Dead+Wind 150 deg - Service	24.821	3.582	6.151	607.542	-354.096	-0.126
Dead+Wind 180 deg - Service	24.821	0.024	7.080	699.545	-3.231	-0.211
Dead+Wind 210 deg - Service	24.821	-3.538	6.116	604.725	347.980	-0.242
Dead+Wind 240 deg - Service	24.821	-6.156	3.519	348.469	605.938	-0.212
Dead+Wind 270 deg - Service	24.821	-7.130	-0.026	-1.418	701.630	-0.125
Dead+Wind 300 deg - Service	24.821	-6.187	-3.572	-351.310	608.486	0.000
Dead+Wind 330 deg - Service	24.821	-3.588	-6.161	-606.920	352.043	0.125

Solution Summary

Load Comb.	Sum of Applied Forces PX K	 PY K	 PZ K	Sum of Reactions PX K	 PY K	 PZ K	% Error
1	0.000	-24.821	0.000	0.000	24.821	0.000	0.000%
2	-0.087	-24.821	-20.493	0.087	24.821	20.493	0.000%
3	10.196	-24.821	-17.693	-10.196	24.821	17.693	0.000%
4	17.754	-24.821	-10.170	-17.754	24.821	10.170	0.000%
5	20.570	-24.821	0.076	-20.570	24.821	-0.076	0.000%
6	17.863	-24.821	10.313	-17.863	24.821	-10.313	0.000%
7	10.351	-24.821	17.776	-10.351	24.821	-17.776	0.000%
8	0.069	-24.821	20.460	-0.069	24.821	-20.460	0.000%
9	-10.225	-24.821	17.676	10.225	24.821	-17.676	0.000%
10	-17.791	-24.821	10.171	17.791	24.821	-10.171	0.000%
11	-20.606	-24.821	-0.076	20.606	24.821	0.076	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
12	-17.881	-24.821	-10.324	17.881	24.821	10.324	0.000%
13	-10.369	-24.821	-17.807	10.369	24.821	17.807	0.000%
14	0.000	-36.052	0.000	-0.000	36.052	-0.000	0.000%
15	-0.023	-36.052	-4.878	0.023	36.052	4.878	0.000%
16	2.426	-36.052	-4.210	-2.426	36.052	4.210	0.000%
17	4.227	-36.052	-2.418	-4.227	36.052	2.418	0.000%
18	4.899	-36.052	0.021	-4.899	36.052	-0.021	0.000%
19	4.256	-36.052	2.457	-4.256	36.052	-2.457	0.000%
20	2.468	-36.052	4.233	-2.468	36.052	-4.233	0.000%
21	0.019	-36.052	4.870	-0.019	36.052	-4.870	0.000%
22	-2.433	-36.052	4.206	2.433	36.052	-4.206	0.000%
23	-4.236	-36.052	2.419	4.236	36.052	-2.419	0.000%
24	-4.907	-36.052	-0.021	4.907	36.052	0.021	0.000%
25	-4.260	-36.052	-2.459	4.260	36.052	2.459	0.000%
26	-2.472	-36.052	-4.239	2.472	36.052	4.239	0.000%
27	-0.030	-24.821	-7.091	0.030	24.821	7.091	0.000%
28	3.528	-24.821	-6.122	-3.528	24.821	6.122	0.000%
29	6.143	-24.821	-3.519	-6.143	24.821	3.519	0.000%
30	7.118	-24.821	0.026	-7.118	24.821	-0.026	0.000%
31	6.181	-24.821	3.568	-6.181	24.821	-3.568	0.000%
32	3.582	-24.821	6.151	-3.582	24.821	-6.151	0.000%
33	0.024	-24.821	7.080	-0.024	24.821	-7.080	0.000%
34	-3.538	-24.821	6.116	3.538	24.821	-6.116	0.000%
35	-6.156	-24.821	3.519	6.156	24.821	-3.519	0.000%
36	-7.130	-24.821	-0.026	7.130	24.821	0.026	0.000%
37	-6.187	-24.821	-3.572	6.187	24.821	3.572	0.000%
38	-3.588	-24.821	-6.161	3.588	24.821	6.161	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00013324
3	Yes	5	0.00000001	0.00022721
4	Yes	5	0.00000001	0.00022170
5	Yes	4	0.00000001	0.00016044
6	Yes	5	0.00000001	0.00022620
7	Yes	5	0.00000001	0.00022783
8	Yes	4	0.00000001	0.00022258
9	Yes	5	0.00000001	0.00022144
10	Yes	5	0.00000001	0.00022671
11	Yes	4	0.00000001	0.00008011
12	Yes	5	0.00000001	0.00022558
13	Yes	5	0.00000001	0.00022429
14	Yes	4	0.00000001	0.00001749
15	Yes	5	0.00000001	0.00008298
16	Yes	5	0.00000001	0.00010165
17	Yes	5	0.00000001	0.00010117
18	Yes	5	0.00000001	0.00008441
19	Yes	5	0.00000001	0.00010325
20	Yes	5	0.00000001	0.00010330
21	Yes	5	0.00000001	0.00008387
22	Yes	5	0.00000001	0.00010026
23	Yes	5	0.00000001	0.00010094
24	Yes	5	0.00000001	0.00008285

25	Yes	5	0.00000001	0.00010020
26	Yes	5	0.00000001	0.00009998
27	Yes	4	0.00000001	0.00004096
28	Yes	4	0.00000001	0.00060188
29	Yes	4	0.00000001	0.00057134
30	Yes	4	0.00000001	0.00003670
31	Yes	4	0.00000001	0.00059571
32	Yes	4	0.00000001	0.00060391
33	Yes	4	0.00000001	0.00004553
34	Yes	4	0.00000001	0.00056778
35	Yes	4	0.00000001	0.00059903
36	Yes	4	0.00000001	0.00003316
37	Yes	4	0.00000001	0.00058874
38	Yes	4	0.00000001	0.00058041

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	30.223	31	1.706	0.001
L2	115.25 - 75.25	18.571	31	1.533	0.001
L3	79.75 - 39.75	8.714	31	1.057	0.001
L4	45 - 0	2.725	31	0.552	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	7770.00 w/ Mount Pipe	31	30.223	1.706	0.001	37953
149.000	Side Arm Mount [SO 102-3]	31	30.223	1.706	0.001	37953
139.330	7770.00 w/ Mount Pipe	31	26.778	1.675	0.001	19624
138.670	Side Arm Mount [SO 102-3]	31	26.544	1.672	0.001	18370
131.500	APXV18-209014-C w/Mount Pipe	31	24.027	1.643	0.001	10843
128.750	Side Arm Mount [SO 102-3]	31	23.076	1.629	0.001	9370
120.000	BXA-185085/12CF w/ Mount Pipe	31	20.120	1.573	0.001	6542
108.330	Side Arm Mount [SO 102-3]	31	16.401	1.461	0.001	5175
98.330	Side Arm Mount [SO 102-3]	31	13.464	1.334	0.001	4641
80.000	MPRD2449	31	8.771	1.061	0.001	3916

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	86.966	6	4.913	0.002
L2	115.25 - 75.25	53.465	6	4.417	0.002
L3	79.75 - 39.75	25.103	6	3.044	0.002
L4	45 - 0	7.853	6	1.590	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	7770.00 w/ Mount Pipe	6	86.966	4.913	0.002	13343
149.000	Side Arm Mount [SO 102-3]	6	86.966	4.913	0.002	13343
139.330	7770.00 w/ Mount Pipe	6	77.062	4.824	0.002	6898
138.670	Side Arm Mount [SO 102-3]	6	76.390	4.817	0.002	6457
131.500	APXV18-209014-C w/Mount Pipe	6	69.155	4.732	0.002	3810
128.750	Side Arm Mount [SO 102-3]	6	66.419	4.693	0.002	3292
120.000	BXA-185085/12CF w/ Mount Pipe	6	57.919	4.532	0.002	2297
108.330	Side Arm Mount [SO 102-3]	6	47.223	4.210	0.002	1814
98.330	Side Arm Mount [SO 102-3]	6	38.774	3.842	0.002	1625
80.000	MPRD2449	6	25.268	3.055	0.002	1368

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	149 - 111.5 (1)	TP29.487x23x0.188	37.500	0.000	0.0	38.6943	17.051	-3.665	659.769	0.006
L2	111.5 - 75.25 (2)	TP35.383x28.463x0.219	40.000	0.000	0.0	38.2030	23.875	-8.385	912.077	0.009
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.281	40.000	0.000	0.0	39.0000	35.615	-14.330	1388.990	0.010
L4	39.75 - 0 (4)	TP47.4x39.615x0.375	45.000	0.000	0.0	39.0000	55.972	-24.807	2182.890	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	149 - 111.5 (1)	TP29.487x23x0.188	189.806	18.8699	38.6943	0.488	0.000	0.0000	38.6943	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.463x0.219	622.885	36.8431	38.2030	0.964	0.000	0.0000	38.2030	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.281	1176.358	40.2278	39.0000	1.031	0.000	0.0000	39.0000	0.000
L4	39.75 - 0 (4)	TP47.4x39.615x0.375	2032.592	37.5587	39.0000	0.963	0.000	0.0000	39.0000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	149 - 111.5 (1)	TP29.487x23x0.188	10.036	0.5886	26.0000	0.045	0.000	0.0000	26.0000	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.463x0.219	14.420	0.6040	26.0000	0.046	0.000	0.0000	26.0000	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.281	17.344	0.4870	26.0000	0.037	0.000	0.0000	26.0000	0.000
L4	39.75 - 0 (4)	TP47.4x39.615x0.375	20.643	0.3688	26.0000	0.028	0.000	0.0000	26.0000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 111.5 (1)	0.006	0.488	0.000	0.045	0.000	0.494 ✓	1.333	H1-3+VT ✓
L2	111.5 - 75.25 (2)	0.009	0.964	0.000	0.046	0.000	0.974 ✓	1.333	H1-3+VT ✓
L3	75.25 - 39.75 (3)	0.010	1.031	0.000	0.037	0.000	1.042 ✓	1.333	H1-3+VT ✓
L4	39.75 - 0 (4)	0.011	0.963	0.000	0.028	0.000	0.975 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
L1	149 - 111.5	Pole	TP29.487x23x0.188	1	-3.665	879.472	37.0	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.463x0.219	2	-8.385	1215.799	73.1	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.281	3	-14.330	1851.524	78.2	Pass
L4	39.75 - 0	Pole	TP47.4x39.615x0.375	4	-24.807	2909.792	73.1	Pass
							Summary	
						Pole (L3)	78.2	Pass
						RATING =	**78.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

PROJECT NUMBER: 84017

APPENDIX C

ADDITIONAL CALCULATIONS

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

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

Site Data

Site#: *82940-A*
Site Name: *Oxford Quaker Farms, CT*

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2033	ft-kips
Unfactored Axial, P:	25	kips
Unfactored Shear, V:	21	kips

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	54	in
Anchor Spacing:	6	in

Anchor Rod Results

TIA F --> Maximum Rod Tension	148.5 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	76.2% Pass

Plate Data		
W=Side:	53	in
Thick:	2.75	in
Grade:	60	ksi
Clip Distance:	0	in

Base Plate Results

	Flexural Check
Base Plate Stress:	37.1 ksi
Allowable PL Bending Stress:	60.0 ksi
Base Plate Stress Ratio:	61.8% Pass

PL Ref. Data
Yield Line (in): 27.55
Max PL Length: 27.55

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:	Fillet	**
Groove Depth:	0.375	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	24	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

N/A - Unstiffened

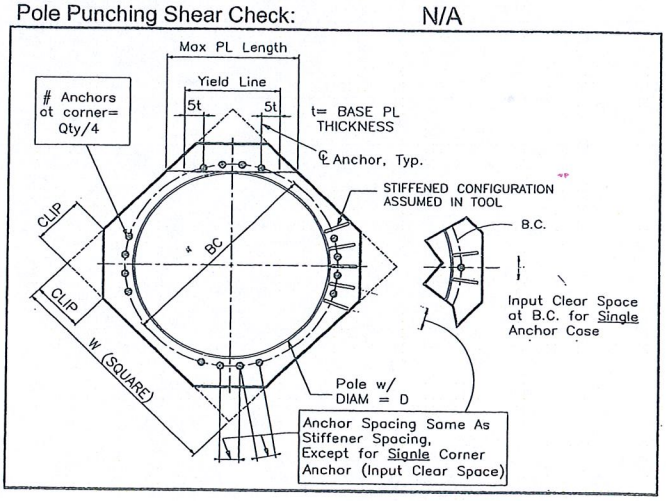
Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Diam:	47.4	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round



Stress Increase Factor		
ASD ASIF:	1.333	

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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: *82940-A*
Site Name: *Oxford Quaker Farms, CT*
App #:

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	3	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	7.5	ft
Pad Thickness, T:	3.5	ft
Pad Width=Length, L:	20	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	7	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	49.00	ft^2
Pier Height:	4.50	ft
Soil (above pad) Height:	4.00	ft

Soil Parameters		
Unit Weight, γ:	120.0	pcf
Ultimate Bearing Capacity, qn:	30.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	0.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	22.50	ksf
Passive Pres. Coeff., Kp	1.00	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	28.4	kips
Pad Force Location Above D:	1.57	ft
ϕ(Passive Pressure Moment):	44.58	ft-kips
Factored O.T. M(WL), "1.6W":	2978.4	ft-kips
Factored OT (MW-Msoil), M1	2933.86	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	0.00	ft
Sum of Soil Wedges Wt:	0.00	kips
Soil Wedges ecc, K1:	0.00	ft
Ftg+Soil above Pad wt:	411.6	kips
Unfactored (Total ftg-soil Wt):	411.56	kips
1.2D. **No Soil Wedges.**	523.87	kips
0.9D. **With Soil Wedges**	392.90	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	25	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	21	kips
Unfactored WL Moment, M:	2033	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	30	kips
0.90	0.9D+1.6W, Pu:	22.5	kips
1.35	Vu:	28.35	kips
	Mu:	2744.55	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	523.87	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	2933.86	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	5.60	ft
Orthogonal qu=	2.98	ksf
qu/ϕ*qn Ratio=	**13.23%**	Pass

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	3.96	ft
Diagonal qu=	3.59	ksf
qu/ϕ*qn Ratio=	**15.95%**	Pass

Run <-- Press Upon Completing All Input

Overturning Stability Check

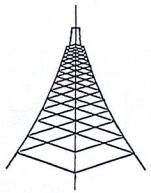
0.9D+1.6W Load Combination, Bearing Results:

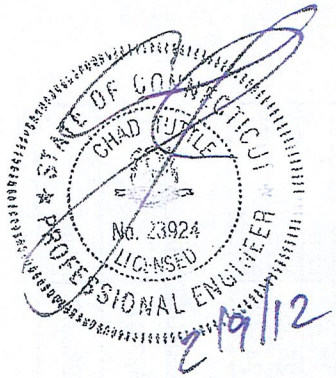
(w/ Soil Wedges) [Reaction+Conc+Soil]	392.90	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	2933.86	ft-kips

Orthogonal ecc3 = M2/P2 =	7.47	ft
Ortho Non Bearing Length,NBL=	14.93	ft
Orthogonal qu=	3.88	ksf
Diagonal qu=	4.41	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	2033.00		
M Orthogonal:	2643.08	**76.92%**	Pass
M Diagonal:	2643.08	**76.92%**	Pass

at&t





Letter of Explanation (LOE)
MUST be attached to any Structural Analysis

Site Name	Oxford Quaker Farms
Site Number	82940
PE of Record	Chad E. Tuttle, P.E.

ALL STRUCTURES	Statement in COL A is Correct	VARIANCE from Col A	N/A	Alternate Value / Concept Used	Explanation	Yes	No	N/A	Comments / Reference
Structure Analyzed to F Code	X								
Note: ALL G analyses MUST be justified. A simple notation of jurisdiction requirement will suffice. F BUILT TOWERS in G Code jurisdictions MUST Have the new "5% Grace" Test Applied.G to be applied ONLY where this is exceeded. This 5% test applies to "like for like" only									
Guy Tensions Adjusted Within Code to Find Optimum tension / Minimum Reinforcement (Applies to Guyed Tower Failures Only). Note : AT&T requires a pulse chart for altered Tensions			X		Monopole				
Antenna Azimuths Inputted Per AT&T Information. NOTE that new antennas should be calculated at 0 degrees to allow flexibility.	X								
All Yield Stresses > = 50 ksi (legs)			X		Monopole				
All Yield Stresses > = 36 ksi (Diagonals and Horizontals))			X		Monopole				
Structures Designated Class II (G Only)			X						
Exposure B Rating Used (Topography)			X						
K value for Slenderness ratio < 1.0			X		Monopole				
Shielding of All Appurtenances Used when Appropriate PER 2.6.9.4 (G Code Only)			X						
0.75 Reduction "Shape" Factor (Figure 2.6) for platform mounts, 0.8 for T-Boom Mounts Used (G Only)			X						
Pipes and round Members have 1.0 Drag Factors. Note if Pipe is attached to flat antenna, these must be considered separately if differing Drag factors are Used		X			Appropriate Drag Factors used from Table 3 of the TIA-222-F Code				
Are Tower Diagonals Designed as "Tension Only"			X						

MODIFICATION SECTION	Statement in COL A is Correct	Deviation from Col A	N/A	Alternate Value / Concept Used	Explanation	Yes	No	N/A	Comments / Reference
Guyed									
Guyed Only: Reinforcement Recommendation accompanies Optimum Guy Tensioning Scenario.									
Compression Failing Legs / Diagonals / Horizontals: Effective Length Reduced by U-Bolted Member									
NOTE: Welded Solution Must be Explained and will only be considered in cases where other reinforcing methods will not work.									
Self Supporting									
Compression Failing Legs / Diagonals / Horizontals: Effective Length Reduced by U-Bolted Member									
NOTE: Welded Solution Must be Explained and will only be considered in cases where other reinforcing methods will not work.									
Monopole									
Compression Collars									
NOTE: Welded Solution Must be Explained and will only be considered in cases where other reinforcing methods will not work.									
Foundation									
Guyed Anchor Failure: Berm Solution									
SS Foundation Pad and Pier Failure Berm									
SS Foundation Caisson / Concrete Cap									
Monopole: Cap									

	General	Power	Density					
Site Name: Meriden SE								
Tower Height: Verizon @ 107Ft.								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*T-Mobile GSM	8	170	117	0.0357	1945	1.0000	3.57%	
*T-Mobile UMTS	2	679	117	0.0357	2100	1.0000	3.57%	
*Clearwire	2	153	97	0.0117	2496	1.0000	1.17%	
*Clearwire	1	211	97	0.0081	11 GHz	1.0000	0.81%	
Verizon PCS	**7**	**264**	**107**	**0.0580**	**1970**	**1.0000**	**5.80%**	
Verizon Cellular	**9**	**266**	**107**	**0.0752**	**869**	**0.5793**	**12.98%**	
Verizon AWS	**1**	**640**	**107**	**0.0201**	**2145**	**1.0000**	**2.01%**	
Verizon 700	**1**	**867**	**107**	**0.0272**	**698**	**0.4653**	**5.85%**	
								35.76%
* Source: Siting Council								

FDH Engineering, Inc., 6521 Meridien Drive Raleigh, NC 27616, Ph. 919.755.1012

Structural Analysis for SBA Network Services, Inc.

119' Monopole Tower

SBA Site Name: Meriden
SBA Site ID: CT13069-A
Verizon Site ID: 179857
Verizon Site Name: Meriden SE

FDH Project Number 12-09391E S1

Analysis Results

Tower Components	71.7%	Sufficient
Foundation	86.5%	Sufficient

Prepared By:

Logan Poe, EI
Project Engineer

Reviewed By:

Christopher M Murphy, PE
President
CT PE License No. 25842

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012
info@fdh-inc.com

October 5, 2012

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut Building Code

TABLE OF CONTENTS

EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Engineering, Inc. performed a structural analysis of the monopole located in Meriden, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads pursuant to the *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA/EIA-222-F and the 2005 Connecticut State Building Code (CBC).* Information pertaining to the existing/proposed antenna loading, current tower geometry, geotechnical data, and member sizes was obtained from:

- Sabre Communications Corporation (Job No. 08-10201) original design drawings dated November 9, 2007
- Sabre Communications Corporation (Job No. 08-10201) Stamped Permit Drawings dated November 7, 2007
- FDH, Inc. (Job No. 08-07134T) TIA Inspection Report dated October 7, 2008
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and the *2005 CBC* is 85 mph without ice and 38 mph with 1 - 1/4" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from Verizon in place at 107 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and the *2005 CBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (see Sabre Job No. 08-10201), the foundation should have the necessary capacity to support the existing and proposed loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Engineering, Inc. is accurate (i.e., the steel data, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

Recommendation

To ensure the requirements of the *TIA/EIA-222-F* standards and the *2005 CBC* are met with the existing and proposed loading in place, we have the following recommendation:

1. Proposed coax should be installed inside the monopole's shaft.

APPURTENANCE LISTING

The proposed and existing antennas with their corresponding cables/coax lines are shown in **Table 1**. *If the actual layout determined in the field deviates from the layout, FDH Engineering, Inc. should be contacted to perform a revised analysis.*

Table 1 - Appurtenance Loading

Existing Loading:

Antenna Elevation (ft)	Description	Coax and Lines[1]	Carrier	Mount Elevation (ft)	Mount Type
117	(3) RFS APX16PV-16PVL-E (6) OneBase Twin TMAs	(12) 1-5/8" (1) 1/4"	T-Mobile	117	(3) 7' x 2.39" Pipe Mounts
107	(12) Jaybeam X65-13-04	(12) 1-5/8"	Verizon	107	(3) T-Arms (assumed)
97	(3) Argus LLPX310R (2) Andrew VHLP2-18 Dishes (1) Andrew VHLP1-23 Dish (3) Samsung 2.5 Ghz RRHs	(9) 5/16" (3) 1/2"	Clearwire	97	(3) T-Arms (CaAa = 2.78 ft^2 each)

1. Coax installed inside the pole's shaft unless otherwise noted.

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
107	(3) Antel BXA-70063-6CF (3) Antel BXA-80063/6CF (3) Antel BXA-171063/12CF (6) RFS FD9R6004/2C-3L Diplexers	(12) 1-5/8"	Verizon	107	(1) Site Pro Ring Mount (Part # 801068)

RESULTS

The following yield strength of steel for individual members was used for analysis:

Table 2 - Material Strength

Member Type	Yield Strength
Tower Shaft Sections	65 ksi
Base Plate	60 ksi
Anchor Bolts	75 ksi

Table 3 displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. *Note: Capacities up to 100% are considered acceptable.* **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Engineering, Inc. should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Appendix** for detailed modeling information

Table 3 - Summary of Working Percentage of Structural Components

Section No.	Elevation ft	Component Type	Size	% Capacity*	Pass Fail
L1	119 - 98.75	Pole	TP28.14x24.86x0.1875	9.1	Pass
L2	98.75 - 48.75	Pole	TP35.87x27.1981x0.25	42.8	Pass
L3	48.75 - 0	Pole	TP43.26x34.6406x0.25	71.7	Pass
		Anchor Bolts	(8) 2.25" Ø w/ BC = 49.125" Ø	48.2	Pass
		Base Plate	47" square PL x 2.25" thk.	60.1	Pass

*Capacities include 1/3 allowable stress increase for wind per TIA/EIA-222-F standards.

Table 4 - Maximum Base Reactions

Base Reactions	Current Analysis *(TIA/EIA-222-F)*	Original Design *(ANSI/TIA-222-G)*
Axial	16 k	19 k
Shear	13 k	27 k
Moment	1,042 k-ft	1,627 k-ft

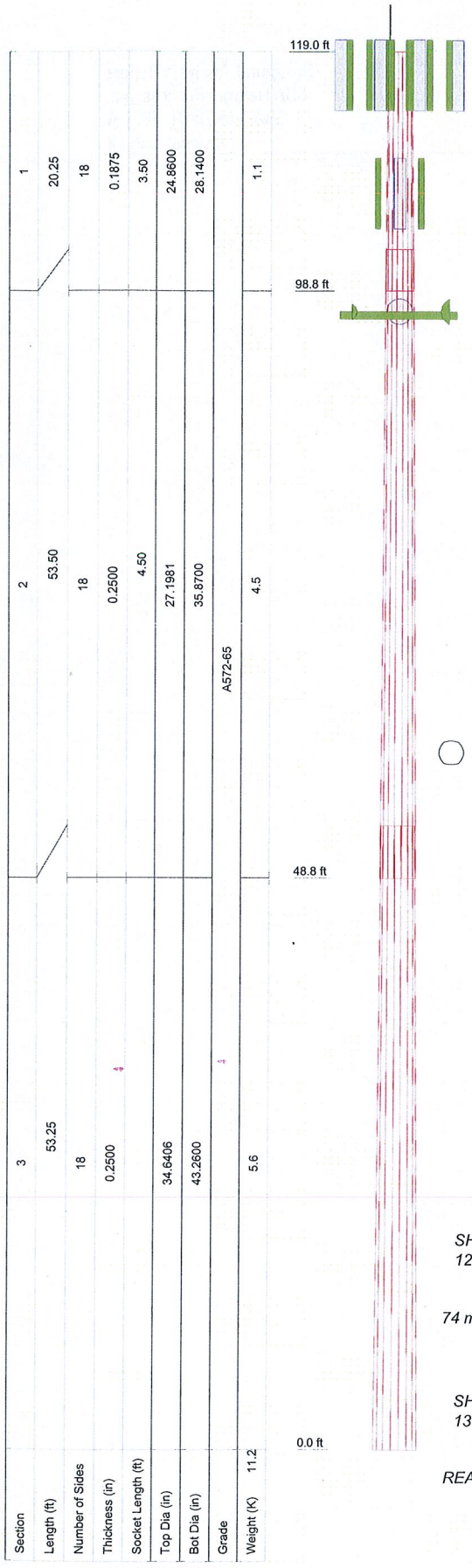
GENERAL COMMENTS

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Engineering, Inc. should be notified immediately to perform a revised analysis.

LIMITATIONS

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Engineering, Inc.

APPENDIX



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	20.25	18	0.1875	3.50	24.8600	28.1400	A572-65	1.1
2	53.50	18	0.2500	4.50	27.1981	35.8700		4.5
3	53.25	18	0.2500		34.6406	43.2600		5.6
								11.2

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	119	BXA-171063/12CF w/ Mount Pipe	107
APX16PV-16PVL-E w/Mount Pipe	117	(2) FD9R6004/2C-3L Diplexer	107
APX16PV-16PVL-E w/Mount Pipe	117	(2) FD9R6004/2C-3L Diplexer	107
APX16PV-16PVL-E w/Mount Pipe	117	(2) FD9R6004/2C-3L Diplexer	107
(2) OneBase Twin TMA	117	Ring Mount	107
(2) OneBase Twin TMA	117	LLPX310R w/ Mount Pipe	97
(2) OneBase Twin TMA	117	LLPX310R w/ Mount Pipe	97
BXA-70063-6CF-2 w/ Mount Pipe	107	LLPX310R w/ Mount Pipe	97
BXA-70063-6CF-2 w/ Mount Pipe	107	2.5 Ghx RRH	97
BXA-70063-6CF-2 w/ Mount Pipe	107	2.5 Ghx RRH	97
BXA-80063/6CF w/ Mount Pipe	107	2.5 Ghx RRH	97
BXA-80063/6CF w/ Mount Pipe	107	(3) T-Arms	97
BXA-80063/6CF w/ Mount Pipe	107	VHLP2-18	97
BXA-171063/12CF w/ Mount Pipe	107	VHLP2-18	97
BXA-171063/12CF w/ Mount Pipe	107	VHLP1-23	97

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 71.7%

FDH Engineering
6521 Meridian Drive
Raleigh, NC 27616
Phone: (919)-755-1012
FAX: (919)-755-1031
Tower Analysis

Job: MERIDEN CT - CT1306-A			
Project: 12-09391ES1			
Client: SBA Network Services, Inc.	Drawn by: Logan Poe	App'd:	
Code: TIA/EIA-222-F	Date: 10/05/12	Scale: NTS	
Path: \\FDH-SERVER\Projects\2012 Projects\9 - Replicated\12-09391ES\Meriden, CT\S1 - SA, Verizon\Analysis\Meriden, CT - CT1306-A.eri		Dwg No. E-1	