

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

March 26, 2012

RECEIVED
MAR 27 2012
CONNECTICUT
SITING COUNCIL

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

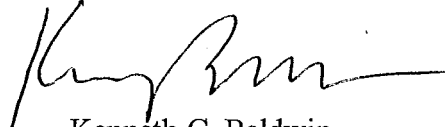
Re: **Completion of Construction Activity**
EM-VER-097-111110 – Rt. 34, Newtown, Connecticut
EM-VER-085-111219 – 474 Main Street, Monroe, Connecticut
EM-VER-082-111209 – 484 Meriden Road, Middlefield, Connecticut
EM-VER-054-120106 – 175 Dickson Road, Glastonbury, Connecticut
EM-VER-067-111108 – 107 Buck Road, Hebron, Connecticut
EM-VER-079-111110 – 43 North Main Street, Marlborough, Connecticut

Dear Ms. Roberts:

The purpose of this letter is to notify you and the Connecticut Siting Council that construction activity associated with each of the above-referenced facility modification filings has now been completed.

If you have any questions or need any additional information regarding these facilities please do not hesitate to contact me.

Sincerely,



Kenneth C. Baldwin

Copy to:
Sandy M. Carter



Law Offices

BOSTON

PROVIDENCE

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STAMFORD

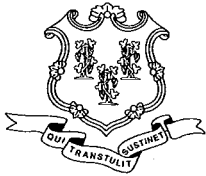
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STATE OF CONNECTICUT

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 30, 2011

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

RE: **EM-VER-079-111110** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 43 North Main Street, Marlborough, Connecticut.

Dear Attorney Baldwin:

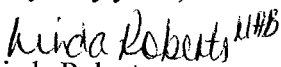
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- 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 November 9, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,


Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Bill Black, First Selectman, Town of Marlborough
Peter F. Hughes, Zoning Enforcement Officer, Town of Marlborough
Crown Castle USA, Inc.



280 Trumbull Street
Hartford, CT 06103-3597
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November 9, 2011

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

Re: **Notice of Exempt Modification – Antenna Swap**
43 North Main Street, Marlborough, Connecticut

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NOV 10 2011
CONNECTICUT
SITING COUNCIL

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains wireless telecommunications antennas at the 158-foot level on the existing 165-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s use of the existing tower in Docket No. 169 in 1995. Cellco now intends to modify its installation by replacing eight (8) of its existing antennas with two (2) model LPA-80063/6CF cellular antennas; two (2) model BXA-171063-12BF PCS antennas; one (1) model BXA-171063-8BF PCS antenna; and three (3) BXA-70063/4CF LTE antennas, all at the same 158-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers on its antenna platform. Attached behind Tab 1 are the specifications for the proposed replacement antennas and cable diplexers.

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 William Black, First Selectman of the Town of Marlborough. A copy of this letter is also being sent to Village Properties LLC, the owner of the property on which the tower is located.

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



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Linda Roberts
November 9, 2011
Page 2

1. The proposed modifications will not result in an increase in the overall height of the existing tower. Cellco's antennas and diplexers will be located at the same 158-foot level on the existing tower.

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

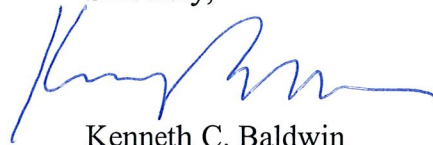
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels 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 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antennas modification. (See Tab 3).

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:

William Black, Marlborough First Selectman
Village Properties LLC
Sandy M. Carter



LPA-80063-6CF-EDIN-X

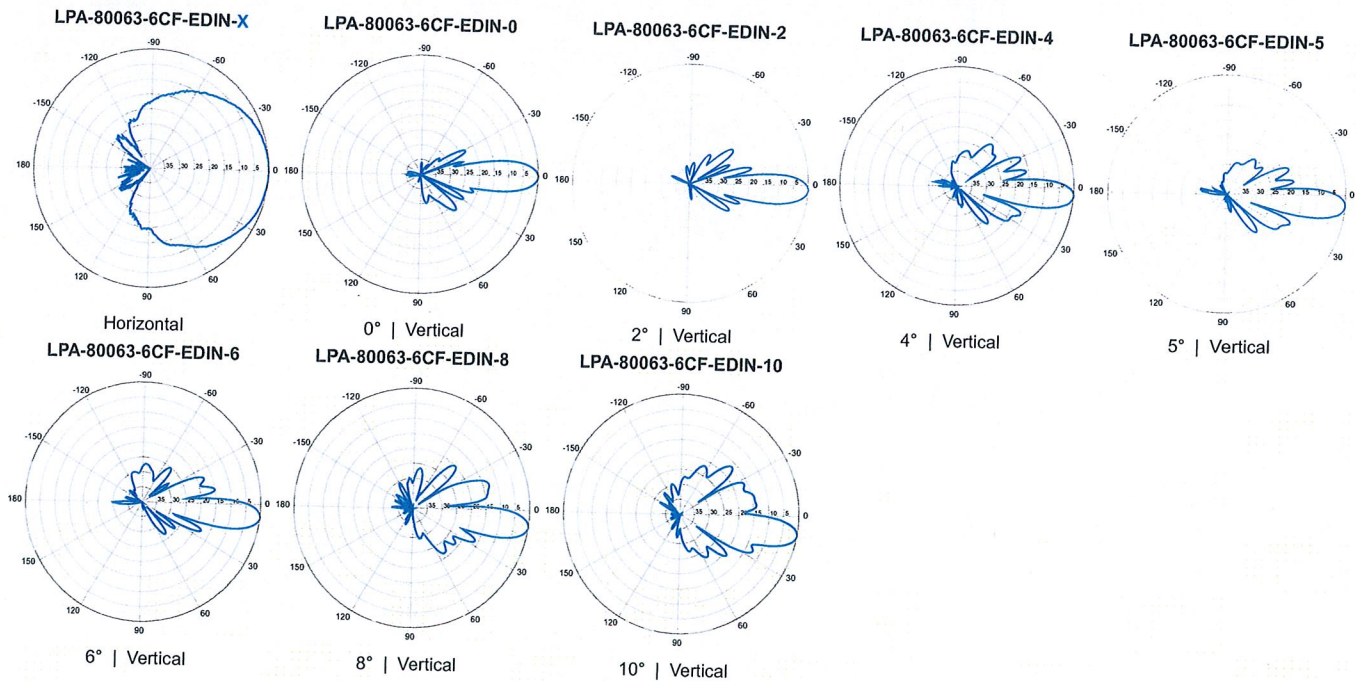
V-Pol | Log Periodic | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

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



Electrical Characteristics		
Frequency bands	806-960 MHz	
Polarization	Vertical	
Horizontal beamwidth	63°	
Vertical beamwidth	10°	
Gain	14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.4:1	
Null fill	5% (-26.02 dB)	
Input power	500 W	
Lightning protection	Direct Ground	
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1805 x 385 x 332 mm 71.1 x 15.2 x 13.1 in	
Depth of antenna with z-bracket	372 mm 14.6 in	
Weight without mounting brackets	12.3 kg 27 lbs	
Survival wind speed	> 201 km/hr > 125 mph	
Wind area	Front: 0.70 m ² Side: 0.59 m ² Front: 7.5 ft ² Side: 6.3 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 885 N Side: 757 N Front: 199 lbf Side: 170 lbf	
Mounting Options		
Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit (0-20°)	21700000 50-102 mm 2.0-4.0 in	11 kg 25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.	



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.

BXA-171063-12BF-EDIN-X

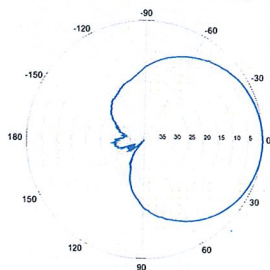
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 19.0 dBi

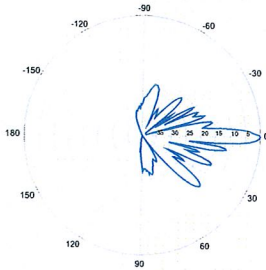
Electrical Characteristics	1710-2170 MHz		
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
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 m ² Side: 0.19 m ²	Front: 3.1 ft ² Side: 2.1 ft ²	
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

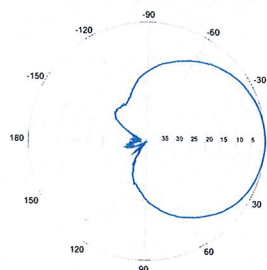


Horizontal | 1710-1880 MHz
BXA-171063-12BF-EDIN-0

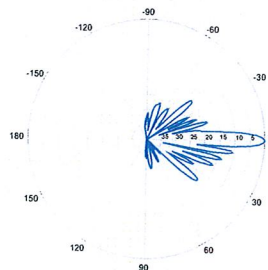


0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-X

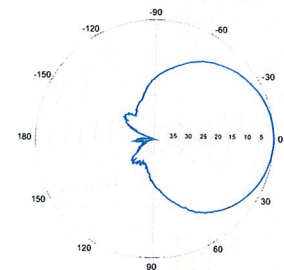


Horizontal | 1850-1990 MHz
BXA-171063-12BF-EDIN-0

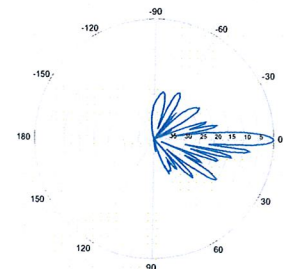


0° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



Horizontal | 1920-2170 MHz
BXA-171063-12BF-EDIN-0



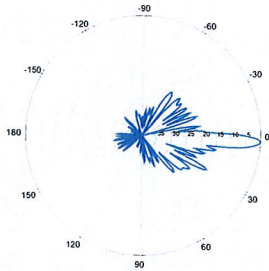
0° | Vertical | 1920-2170 MHz

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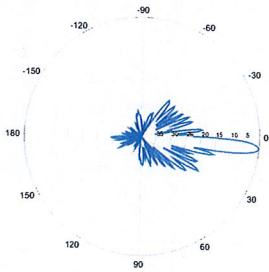
BXA-171063-12BF-EDIN-X

X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12BF-EDIN-2

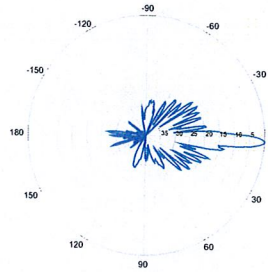


2° | Vertical | 1710-1880 MHz
BXA-171063-12BF-EDIN-5

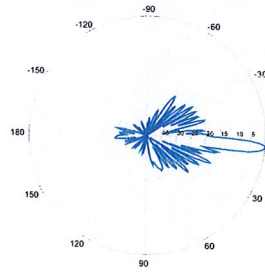


5° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-2

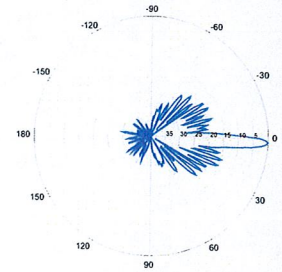


2° | Vertical | 1850-1990 MHz
BXA-171063-12BF-EDIN-5

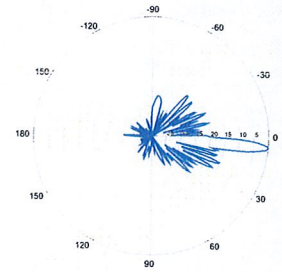


5° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz
BXA-171063-12BF-EDIN-5



5° | Vertical | 1920-2170 MHz

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BXA-171063-8BF-EDIN-X

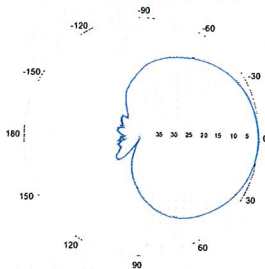
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 17.4 dBi

Electrical Characteristics	1710-2170 MHz		
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)		0, 2, 4, 8	
Impedance		50Ω	
VSWR		≤1.5:1	
First upper sidelobe		< -17 dB	
Front-to-back isolation		> 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	1232 x 154 x 105 mm		48.5 x 6.1 x 4.1 in
Depth with t-brackets	133 mm		5.2 in
Weight without mounting brackets	4.8 kg		10.5 lbs
Survival wind speed	296 km/hr		184 mph
Wind area	Front: 0.19 m ² Side: 0.14 m ²	Front: 2.0 ft ² Side: 1.5 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf	
Mounting Options			
2-Point Mounting Bracket Kit	Part Number	Fits Pipe Diameter	Weight
	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-171063-8BF-EDIN-X-FP		

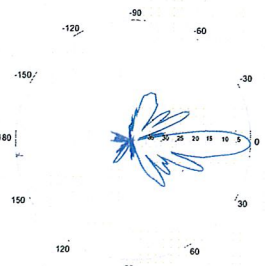


BXA-171063-8BF-EDIN-X



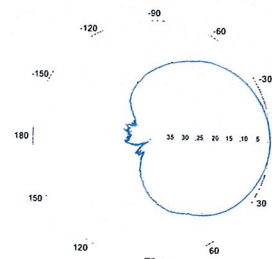
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



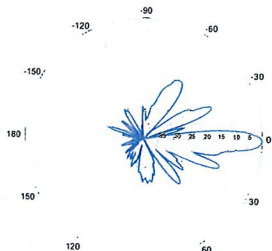
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



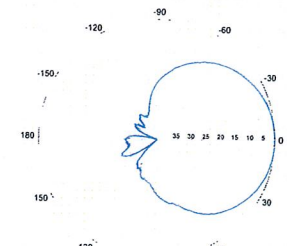
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-0



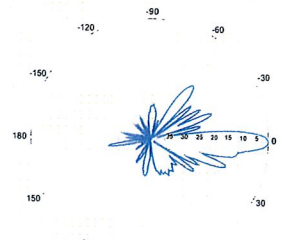
0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



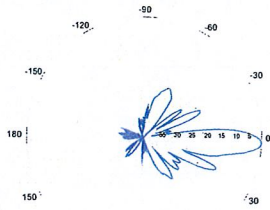
0° | Vertical | 1920-2170 MHz

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BXA-171063-8BF-EDIN-X

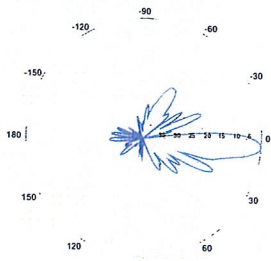
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



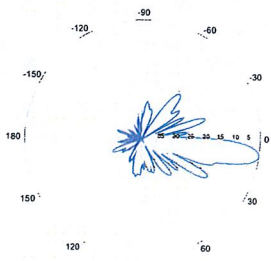
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



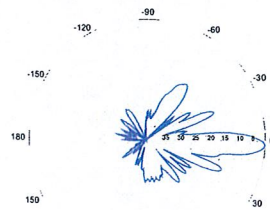
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



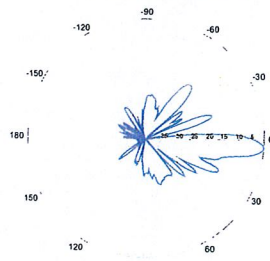
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



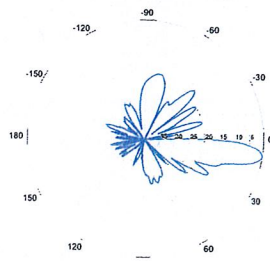
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



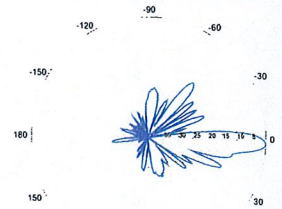
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8



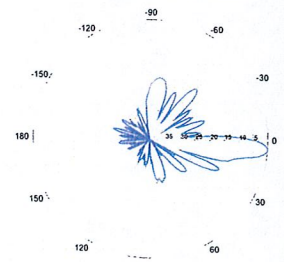
8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



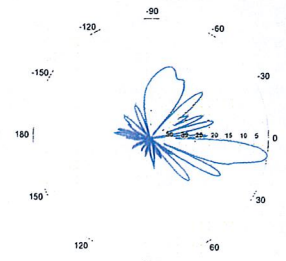
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1920-2170 MHz

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.

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 m ²	3.9 ft ²
Wind Area Side	0.15 m ²	1.7 ft ²
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 fiberglass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter $\varnothing 50$ -160 mm; $\varnothing 2.0$ -6.3 in.

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

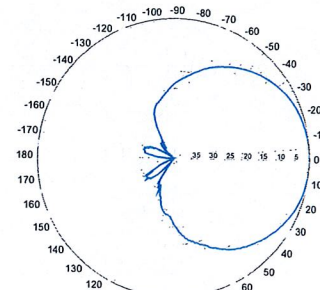
Frequency Range	696-900 MHz
Impedance	50 Ω
Connector ³⁾	NE or E-DIN Female 2 ports / Center
VSWR ¹⁾	$\leq 1.4:1$
Polarization	Slant $\pm 45^\circ$
Isolation Between Ports ¹⁾	< -30 dB
Gain ¹⁾	13.0 dBd 15.0 dBi
Power Rating ²⁾	500 W
Half Power Angle ¹⁾	
Horizontal Beamwidth	63 $^\circ$
Vertical Beamwidth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

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

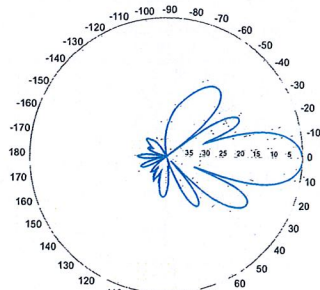
- 1) Typical values.
- 2) Power rating limited by connector only.
- 3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
- 4) Antenna weight does not include brackets.
- 5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern¹⁾
750 MHz

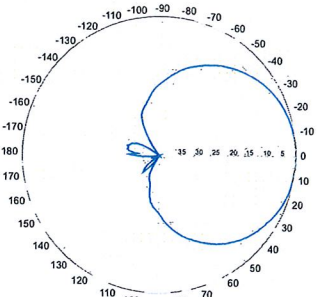


Horizontal

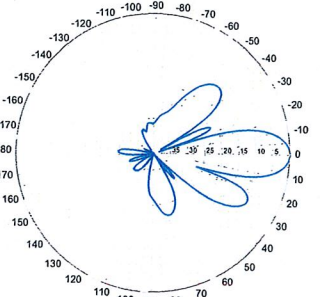


Vertical

850 MHz



Horizontal

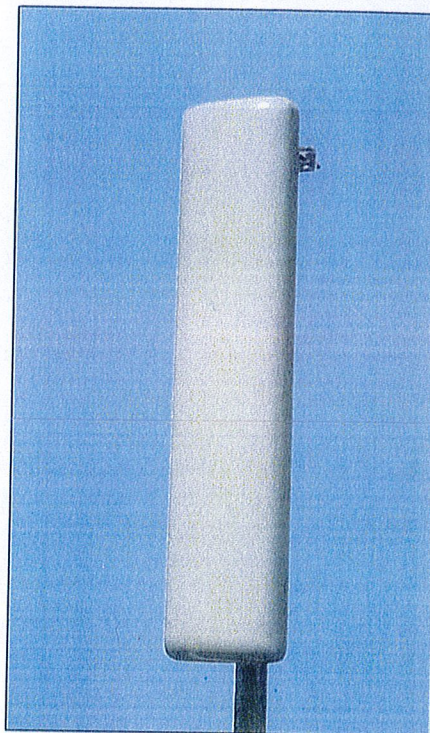


Vertical

696-900 MHz

BXA-70063/4CF

When ordering replace "___" with connector type.



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 bandwidth 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.

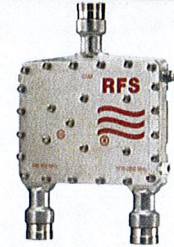
Revision Date 10/27/08



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

All information contained in the present datasheet is subject to confirmation at time of ordering

RFS The Clear Choice®

FD9R6004/2C-3L

Rev: --

Print Date: 12.10.2011

Please visit us on the internet at <http://www.rfsworld.com/>

Radio Frequency Systems

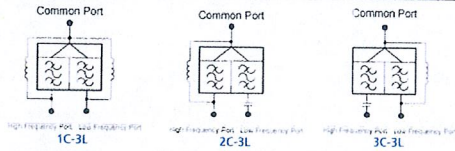


ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

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)

All information contained in the present datasheet is subject to confirmation at time of ordering

General		Power	Density					
Site Name: Marlborough Tower Height: Verizon @ 158ft								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*AT&T UMTS	1	500	146	0.0084	880	0.5867	1.44%	
*AT&T GSM	4	296	146	0.0200	880	0.5867	3.40%	
*AT&T GSM	2	427	146	0.0144	1930	1.0000	1.44%	
*Pocket	3	631	135	0.0373	2130	1.0000	3.73%	
*Omniport			100	0.0351	1930	1.0000	3.51%	
*Town			130					
*Sprint Nextel - IDEN	12	100	168	0.0153	851	0.5673	6.03%	
*Sprint Nextel - CDMA	11	411	164	0.0604	1962	1.0000	2.69%	
Verizon PCS	7	268	158	0.0270	1970	1.0000	6.04%	
Verizon Cellular	9	332	158	0.0430	869	0.5793	2.70%	
Verizon AWS	1	670	158	0.0097	2145	1.0000	7.43%	
Verizon 700	2	695	158	0.0200	698	0.4653	0.97%	
* Source: Siting Council								43.69%

Date: **October 05, 2011**



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

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
724-416-2000

Subject: Structural Analysis Report

Carrier Designation: **Verizon Wireless Co-Locate**

Carrier Site Name: Marlborough, CT

Crown Castle Designation:

Crown Castle BU Number: 806366
Crown Castle Site Name: HRT 107(C) 943204
Crown Castle JDE Job Number: 166777
Crown Castle Work Order Number: 438134

Engineering Firm Designation: **Crown Castle Project Number:** 438134

Site Data: **NORTH MAIN STREET, MARLBOROUGH, Hartford County, CT**
Latitude 41° 37' 47.3", Longitude -72° 27' 59.4"
165.5 Foot - Monopole Tower

Dear James Williams,

Crown Castle is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 438134, in accordance with application 131165, revision 0.

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

LC1: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 80 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 *Crown Castle* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Eric Anderson, E.I.T./TS

Respectfully submitted by:

Douglas K. Pineo, P.E.
Manager Structural Design



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Additional Calculations

1) INTRODUCTION

This tower is an existing 155.5 ft Monopole tower designed by FWT INC. in January of 1998. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower is considered to be extended to 165.5 ft in this analysis to accommodate reserved loading.

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 80 mph with no ice, 37.6 mph with 1 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
156	160	2	antel	BXA-171063-12BF w/ Mount Pipe	-	-	-
		1	antel	BXA-171063-8BF-2 w/ Mount Pipe			
		3	antel	BXA-70063/4CF w/ Mount Pipe			
		2	antel	LPA-80063/6CF-2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			

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
166	168	12	decibel	DB846G90A-XY w/ Mount Pipe	12	1-5/8	2
	166	1	tower mounts	Platform Mount [LP 602-1]			
156	160	4	antel	LPA-80080/6CF w/ Mount Pipe	-	-	1
		2	antel	LPA-80080/6CF w/ Mount Pipe	-	-	4
		3	decibel	DB809K-Y	3	1-5/8	1
	158	6	decibel	DB948F85T2E-M w/ Mount Pipe	-	-	4
		12	bam mla	BAM MLA ANTENNA w/ Mount Pipe	12	1-5/8	3
		1	tower mounts	Platform Mount [LP 713-1]	12	1-5/8	1
142	144	6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1
		6	powerwave technologies	LGP 17201			
		6	powerwave technologies	LGP21903			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
135	142	1	tower mounts	Platform Mount [LP 713-1]	6	1-1/4	1
	135	3	kathrein	742 213 w/ Mount Pipe			
	135	1	tower mounts	Pipe Mount [PM 601-3]			
126	128	6	decibel	DB980H90E-M w/ Mount Pipe	6	1-1/4	1
	126	2	tower mounts	T-Arm Mount [TA 601-3]	5	1/2	5
	120	3	decibel	DB809K-Y			
100	100	6	ems wireless	RR90-17-02DP w/ Mount Pipe	6	1-5/8	1
	100	1	tower mounts	Side Arm Mount [SO 701-3]			

- Notes:
 1) Existing Equipment
 2) Reserved Equipment
 3) MLA Equipment not controlling
 4) Equipment to be removed, feedlines to remain
 5) Abandoned Equipment, considered in this analysis.

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)
157.75	157.75	12	swedcom	ALP-9212-N	-	-
144.25	144.25	9	swedcom	ALP-9212-N	-	-
132	132	9	decibel	DB980	-	-
		1	rfs celwave	PD1142		
		1	rfs celwave	PD201		
		2	rfs celwave	PD220		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering	2208816	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FWT, inc.	823125	CCISITES
4-TOWER MANUFACTURER DRAWINGS	FWT, inc.	823126	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle 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	165.5 - 155.5	Pole	TP58.6x58.6x0.375	1	-6.11	2767.21	2.7	Pass	
L2	155.5 - 110	Pole	TP64.606x58.6x0.375	2	-20.54	3194.44	19.7	Pass	
L3	110 - 72.5	Pole	TP68.805x62.8x0.4375	3	-35.87	4260.83	33.7	Pass	
L4	72.5 - 36	Pole	TP72.748x66.8082x0.5	4	-53.77	5424.19	43.2	Pass	
L5	36 - 0	Pole	TP76.5x70.56x0.5	5	-77.60	5547.27	64.0	Pass	
							Summary		
							Pole (L5)	64.0	Pass
							Rating =	64.0	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	63.5	Pass
1	Base Plate	0	31.5	Pass
1	Base Foundation	0	48.3	Pass
Structure Rating (max from all components) =				64.0%

Notes:

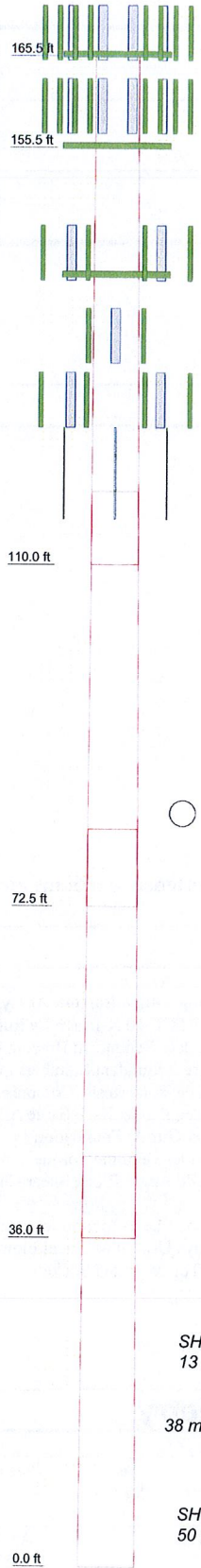
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A
RISA TOWER OUTPUT

Section	1	2	3	4	5
Length (ft)	10.00	45.50	45.50	45.00	45.00
Number of Sides	1	12	12	12	12
Thickness (in)	0.3750	0.3750	0.4375	0.5000	0.5000
Socket Length (ft)	0.3750	8.00	8.50	9.00	70.5600
Top Dia (in)	58.6000	58.6000	62.8000	66.8082	76.5000
Bot Dia (in)	58.6000	64.6060	68.8050	72.7480	76.5000
Grade			A572-65		
Weight (K)	2.3	11.4	14.3	17.1	18.0



DESIGNED APPURTENANCE LOADING

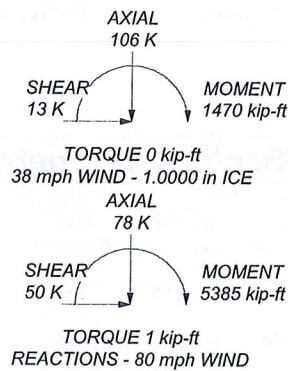
TYPE	ELEVATION	TYPE	ELEVATION
(4) DB846G90A-XY w/ Mount Pipe	166	(2) 7770.00 w/ Mount Pipe	142
(4) DB846G90A-XY w/ Mount Pipe	166	(2) LGP 17201	142
(4) DB846G90A-XY w/ Mount Pipe	166	(2) LGP21903	142
Platform Mount [LP 602-1]	166	(2) 7770.00 w/ Mount Pipe	142
(2) LPA-80080/6CF w/ Mount Pipe	156	(2) LGP 17201	142
DB809K-Y	156	(2) LGP21903	142
DB809K-Y	156	Platform Mount [LP 713-1]	142
(2) LPA-80080/6CF w/ Mount Pipe	156	742 213 w/ Mount Pipe	135
DB809K-Y	156	742 213 w/ Mount Pipe	135
BXA-171063-12BF w/ Mount Pipe	156	742 213 w/ Mount Pipe	135
BXA-70063/4CF w/ Mount Pipe	156	Pipe Mount [PM 601-3]	135
(2) FD9R6004/2C-3L	156	DB809K-Y	126
BXA-171063-8BF-2 w/ Mount Pipe	156	DB809K-Y	126
BXA-70063/4CF w/ Mount Pipe	156	DB809K-Y	126
(2) LPA-80063/6CF-2 w/ Mount Pipe	156	(2) DB980H90E-M w/ Mount Pipe	126
(2) FD9R6004/2C-3L	156	(2) DB980H90E-M w/ Mount Pipe	126
BXA-171063-12BF w/ Mount Pipe	156	(2) DB980H90E-M w/ Mount Pipe	126
BXA-70063/4CF w/ Mount Pipe	156	(2) T-Arm Mount [TA 601-3]	126
(2) FD9R6004/2C-3L	156	(2) RRR90-17-02DP w/ Mount Pipe	100
Platform Mount [LP 713-1]	156	(2) RRR90-17-02DP w/ Mount Pipe	100
(2) 7770.00 w/ Mount Pipe	142	(2) RRR90-17-02DP w/ Mount Pipe	100
(2) LGP 17201	142	Side Arm Mount [SO 701-3]	100
(2) LGP21903	142		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 64%



<p>Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 We Are Solutions Phone: 724-416-2000 FAX:</p>	Job: BU #806366		
	Project:		
	Client: Crown Castle	Drawn by: EAnderson	App'd:
	Code: TIA/EIA-222-F	Date: 10/03/11	Scale: NTS
	Path: R:\SA Models - Letters\Work Area\EAnderson\806366\806366.dwg		
			Dwg No. E-1

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: 724-416-2000 FAX:	Job BU #806366	Page 1 of 15
	Project	Date 16:52:08 10/03/11
	Client Crown Castle	Designed by EAnderson

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 Hartford County, Connecticut.
 Basic wind speed of 80 mph.
 Nominal ice thickness of 1.0000 in.
 Ice thickness is considered to increase with height.
 Ice density of 56 pcf.
 A wind speed of 38 mph is used in combination with ice.
 Temperature drop of 50 °F.
 Deflections calculated using a wind speed of 50 mph.
 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
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
✓ Use Code Stress Ratios
✓ Use Code Safety Factors - Guys
✓ Escalate Ice
Always Use Max Kz
Use Special Wind Profile
Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
Add IBC .6D+W Combination | Distribute Leg Loads As Uniform
Assume Legs Pinned
✓ Assume Rigid Index Plate
✓ Use Clear Spans For Wind Area
Use Clear Spans For KL/r
Retension Guys To Initial Tension
✓ Bypass Mast Stability Checks
✓ Use Azimuth Dish Coefficients
✓ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
SR Members Have Cut Ends
✓ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing | Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
✓ Consider Feedline Torque
Include Angle Block Shear Check
Poles
✓ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets |
|--|--|---|

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	165.50-155.50	10.00	0.00	Round	58.6000	58.6000	0.3750		A572-65 (65 ksi)
L2	155.50-110.00	45.50	8.00	12	58.6000	64.6060	0.3750	1.5000	A572-65 (65 ksi)
L3	110.00-72.50	45.50	8.50	12	62.8000	68.8050	0.4375	1.7500	A572-65 (65 ksi)
L4	72.50-36.00	45.00	9.00	12	66.8082	72.7480	0.5000	2.0000	A572-65 (65 ksi)
L5	36.00-0.00	45.00		12	70.5600	76.5000	0.5000	2.0000	A572-65 (65 ksi)

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: 724-416-2000 FAX:	Job	BU #806366	Page	2 of 15
	Project		Date	16:52:08 10/03/11
	Client	Crown Castle	Designed by	EAnderson

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	l in ⁴	r in	C in	I/C in ³	J in ⁴	l/Q in ²	w in	w/t
L1	58.6000	68.5947	29090.5753	20.6117	29.3000	992.8524	58101.8996	34.2769	0.0000	0
	58.6000	68.5947	29090.5753	20.6117	29.3000	992.8524	58101.8996	34.2769	0.0000	0
L2	60.6672	70.3067	30422.9680	20.8446	30.3548	1002.2457	61645.1813	34.6028	14.6998	39.199
	66.8851	77.5589	40842.0131	22.9947	33.4659	1220.4065	82756.9913	38.1721	16.3094	43.492
L3	66.1084	87.8532	43610.4361	22.3258	32.5304	1340.6056	88366.5670	43.2387	15.6579	35.789
	71.2322	96.3127	57460.4440	24.4756	35.6410	1612.2011	116430.437	47.4022	17.2672	39.468
L4	70.3265	106.7562	59911.9263	23.7383	34.6066	1731.2263	121397.805	52.5421	16.5646	33.129
	75.3143	116.3193	77497.7893	25.8648	37.6835	2056.5463	157031.531	57.2488	18.1565	36.313
L5	74.2790	112.7967	70668.0195	25.0815	36.5501	1933.4563	143192.566	55.5151	17.5701	35.14
	79.1986	122.3600	90209.5680	27.2080	39.6270	2276.4673	182789.041	60.2219	19.1620	38.324

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1				1	1	1		
165.50-155.50								
L2				1	1	1		
155.50-110.00								
L3				1	1	1		
110.00-72.50								
L4 72.50-36.00				1	1	1		
L5 36.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _{AA}	Weight	
				ft		ft ² /ft	plf	
LDF7-50A(1-5/8")	A	No	Inside Pole	165.50 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
561(1-5/8")	B	No	Inside Pole	156.00 - 0.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35
LDF7-50A(1-5/8")	B	No	Inside Pole	156.00 - 0.00	3	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_{AA} ft ² /ft	Weight plf
FXL 1873 PE(1 5/8")	B	No	Inside Pole	142.00 - 0.00	12	No Ice	0.00	0.01
						1/2" Ice	0.00	0.01
						1" Ice	0.00	0.01
						2" Ice	0.00	0.01
						4" Ice	0.00	0.01
AVA6-50(1-1/4")	A	No	Inside Pole	135.00 - 0.00	6	No Ice	0.00	0.45
						1/2" Ice	0.00	0.45
						1" Ice	0.00	0.45
						2" Ice	0.00	0.45
						4" Ice	0.00	0.45
LDF4-50A(1/2")	C	No	Inside Pole	126.00 - 0.00	5	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF6-50A(1-1/4")	C	No	Inside Pole	126.00 - 0.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF7-50A(1-5/8")	C	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	165.50-155.50	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L2	155.50-110.00	A	0.000	0.000	0.000	0.000	0.52
		B	0.000	0.000	0.000	0.000	0.85
		C	0.000	0.000	0.000	0.000	0.08
L3	110.00-72.50	A	0.000	0.000	0.000	0.000	0.47
		B	0.000	0.000	0.000	0.000	0.70
		C	0.000	0.000	0.000	0.000	0.31
L4	72.50-36.00	A	0.000	0.000	0.000	0.000	0.46
		B	0.000	0.000	0.000	0.000	0.68
		C	0.000	0.000	0.000	0.000	0.35
L5	36.00-0.00	A	0.000	0.000	0.000	0.000	0.45
		B	0.000	0.000	0.000	0.000	0.67
		C	0.000	0.000	0.000	0.000	0.35

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	165.50-155.50	A	1.209	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L2	155.50-110.00	A	1.182	0.000	0.000	0.000	0.000	0.52
		B		0.000	0.000	0.000	0.000	0.85
		C		0.000	0.000	0.000	0.000	0.08
L3	110.00-72.50	A	1.130	0.000	0.000	0.000	0.000	0.47
		B		0.000	0.000	0.000	0.000	0.70
		C		0.000	0.000	0.000	0.000	0.31
L4	72.50-36.00	A	1.062	0.000	0.000	0.000	0.000	0.46
		B		0.000	0.000	0.000	0.000	0.68
		C		0.000	0.000	0.000	0.000	0.35
L5	36.00-0.00	A	1.000	0.000	0.000	0.000	0.000	0.45
		B		0.000	0.000	0.000	0.000	0.67
		C		0.000	0.000	0.000	0.000	0.35

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	165.50-155.50	0.0000	0.0000	0.0000	0.0000
L2	155.50-110.00	0.0000	0.0000	0.0000	0.0000
L3	110.00-72.50	0.0000	0.0000	0.0000	0.0000
L4	72.50-36.00	0.0000	0.0000	0.0000	0.0000
L5	36.00-0.00	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
(4) DB846G90A-XY w/ Mount Pipe	A	From Leg	4.00	0.0000	166.00	No Ice	5.23	7.53	0.04
			0.00			1/2" Ice	5.78	8.72	0.09
			2.00			1" Ice	6.30	9.62	0.16
						2" Ice	7.37	11.45	0.32
						4" Ice	9.69	15.60	0.77
(4) DB846G90A-XY w/ Mount Pipe	B	From Leg	4.00	0.0000	166.00	No Ice	5.23	7.53	0.04
			0.00			1/2" Ice	5.78	8.72	0.09
			2.00			1" Ice	6.30	9.62	0.16
						2" Ice	7.37	11.45	0.32
						4" Ice	9.69	15.60	0.77
(4) DB846G90A-XY w/ Mount Pipe	C	From Leg	4.00	0.0000	166.00	No Ice	5.23	7.53	0.04
			0.00			1/2" Ice	5.78	8.72	0.09
			2.00			1" Ice	6.30	9.62	0.16
						2" Ice	7.37	11.45	0.32
						4" Ice	9.69	15.60	0.77
Platform Mount [LP 602-1]	C	None		0.0000	166.00	No Ice	32.03	32.03	1.34
						1/2" Ice	38.71	38.71	1.80
						1" Ice	45.39	45.39	2.26
						2" Ice	58.75	58.75	3.17

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
						4" Ice	85.47	85.47	5.00
**									

(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
DB809K-Y	A	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.85 4.03 5.21 7.17 10.06	2.85 4.03 5.21 7.17 10.06	0.03 0.05 0.08 0.16 0.42
DB809K-Y	B	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.85 4.03 5.21 7.17 10.06	2.85 4.03 5.21 7.17 10.06	0.03 0.05 0.08 0.16 0.42
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
DB809K-Y	C	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.85 4.03 5.21 7.17 10.06	2.85 4.03 5.21 7.17 10.06	0.03 0.05 0.08 0.16 0.42
BXA-171063-12BF w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.52 6.04 7.09 9.36	5.23 6.39 7.26 9.05 12.82	0.04 0.08 0.14 0.27 0.67
BXA-70063/4CF w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.62 4.22 4.83 6.16 9.18	0.03 0.07 0.12 0.23 0.57
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0.03 0.06 0.10 0.19 0.49
BXA-70063/4CF w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.62 4.22 4.83 6.16 9.18	0.03 0.07 0.12 0.23 0.57
(2) LPA-80063/6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	10.55 11.21 11.84 13.13	10.65 11.91 12.88 14.89	0.05 0.14 0.24 0.48

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Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral	Vert					
			ft	ft	ft					
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.0000	156.00	4" Ice	15.83	19.13	1.09	
			0.00			No Ice	0.37	0.08	0.00	
			4.00			1/2" Ice	0.45	0.14	0.01	
						1" Ice	0.54	0.20	0.01	
						2" Ice	0.75	0.34	0.02	
BXA-171063-12BF w/ Mount Pipe	C	From Leg	4.00	0.0000	156.00	4" Ice	1.28	0.74	0.06	
			0.00			No Ice	4.97	5.23	0.04	
			4.00			1/2" Ice	5.52	6.39	0.08	
						1" Ice	6.04	7.26	0.14	
						2" Ice	7.09	9.05	0.27	
BXA-70063/4CF w/ Mount Pipe	C	From Leg	4.00	0.0000	156.00	4" Ice	9.36	12.82	0.67	
			0.00			No Ice	5.40	3.62	0.03	
			4.00			1/2" Ice	5.84	4.22	0.07	
						1" Ice	6.30	4.83	0.12	
						2" Ice	7.24	6.16	0.23	
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.0000	156.00	4" Ice	9.26	9.18	0.57	
			0.00			No Ice	0.37	0.08	0.00	
			4.00			1/2" Ice	0.45	0.14	0.01	
						1" Ice	0.54	0.20	0.01	
						2" Ice	0.75	0.34	0.02	
Platform Mount [LP 713-1]	C	None		0.0000	156.00	4" Ice	1.28	0.74	0.06	
						No Ice	31.27	31.27	1.51	
						1/2" Ice	39.68	39.68	1.93	
						1" Ice	48.09	48.09	2.35	
						2" Ice	64.91	64.91	3.19	
***						4" Ice	98.55	98.55	4.86	

(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	142.00	No Ice	6.12	4.25	0.06	
			0.00			1/2" Ice	6.63	5.01	0.10	
			2.00			1" Ice	7.13	5.71	0.16	
						2" Ice	8.16	7.16	0.29	
						4" Ice	10.36	10.41	0.66	
(2) LGP 17201	A	From Leg	4.00	0.0000	142.00	No Ice	1.95	0.52	0.03	
			0.00			1/2" Ice	2.13	0.64	0.04	
			2.00			1" Ice	2.33	0.77	0.06	
						2" Ice	2.75	1.06	0.09	
						4" Ice	3.69	1.73	0.19	
(2) LGP21903	A	From Leg	4.00	0.0000	142.00	No Ice	0.27	0.18	0.01	
			0.00			1/2" Ice	0.34	0.25	0.01	
			2.00			1" Ice	0.43	0.32	0.02	
						2" Ice	0.62	0.49	0.03	
						4" Ice	1.10	0.94	0.07	
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	142.00	No Ice	6.12	4.25	0.06	
			0.00			1/2" Ice	6.63	5.01	0.10	
			2.00			1" Ice	7.13	5.71	0.16	
						2" Ice	8.16	7.16	0.29	
						4" Ice	10.36	10.41	0.66	
(2) LGP 17201	B	From Leg	4.00	0.0000	142.00	No Ice	1.95	0.52	0.03	
			0.00			1/2" Ice	2.13	0.64	0.04	
			2.00			1" Ice	2.33	0.77	0.06	
						2" Ice	2.75	1.06	0.09	
						4" Ice	3.69	1.73	0.19	
(2) LGP21903	B	From Leg	4.00	0.0000	142.00	No Ice	0.27	0.18	0.01	
			0.00			1/2" Ice	0.34	0.25	0.01	
			2.00			1" Ice	0.43	0.32	0.02	
						2" Ice	0.62	0.49	0.03	
						4" Ice	1.10	0.94	0.07	

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00		0.0000	142.00	4" Ice	1.10	0.94	0.07
			0.00				No Ice	6.12	4.25	0.06
			2.00				1/2" Ice	6.63	5.01	0.10
							1" Ice	7.13	5.71	0.16
							2" Ice	8.16	7.16	0.29
(2) LGP 17201	C	From Leg	4.00		0.0000	142.00	4" Ice	10.36	10.41	0.66
			0.00				No Ice	1.95	0.52	0.03
			2.00				1/2" Ice	2.13	0.64	0.04
							1" Ice	2.33	0.77	0.06
							2" Ice	2.75	1.06	0.09
(2) LGP21903	C	From Leg	4.00		0.0000	142.00	4" Ice	3.69	1.73	0.19
			0.00				No Ice	0.27	0.18	0.01
			2.00				1/2" Ice	0.34	0.25	0.01
							1" Ice	0.43	0.32	0.02
							2" Ice	0.62	0.49	0.03
Platform Mount [LP 713-1]	C	None			0.0000	142.00	4" Ice	1.10	0.94	0.07
							No Ice	31.27	31.27	1.51
							1/2" Ice	39.68	39.68	1.93
							1" Ice	48.09	48.09	2.35
							2" Ice	64.91	64.91	3.19
		4" Ice	98.55	98.55	4.86					

742 213 w/ Mount Pipe	A	From Leg	1.00		0.0000	135.00	No Ice	5.37	4.62	0.05
			0.00				1/2" Ice	5.95	6.00	0.09
			0.00				1" Ice	6.50	6.98	0.14
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	B	From Leg	1.00		0.0000	135.00	No Ice	5.37	4.62	0.05
			0.00				1/2" Ice	5.95	6.00	0.09
			0.00				1" Ice	6.50	6.98	0.14
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	C	From Leg	1.00		0.0000	135.00	No Ice	5.37	4.62	0.05
			0.00				1/2" Ice	5.95	6.00	0.09
			0.00				1" Ice	6.50	6.98	0.14
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
Pipe Mount [PM 601-3]	C	None			0.0000	135.00	No Ice	4.39	4.39	0.20
							1/2" Ice	5.48	5.48	0.24
							1" Ice	6.57	6.57	0.28
							2" Ice	8.75	8.75	0.36
							4" Ice	13.11	13.11	0.53

**										
DB809K-Y	A	From Leg	4.00		0.0000	126.00	No Ice	2.85	2.85	0.03
			0.00				1/2" Ice	4.03	4.03	0.05
			-6.00				1" Ice	5.21	5.21	0.08
							2" Ice	7.17	7.17	0.16
							4" Ice	10.06	10.06	0.42
DB809K-Y	B	From Leg	4.00		0.0000	126.00	No Ice	2.85	2.85	0.03
			0.00				1/2" Ice	4.03	4.03	0.05
			-6.00				1" Ice	5.21	5.21	0.08
							2" Ice	7.17	7.17	0.16
							4" Ice	10.06	10.06	0.42
DB809K-Y	C	From Leg	4.00		0.0000	126.00	No Ice	2.85	2.85	0.03
			0.00				1/2" Ice	4.03	4.03	0.05

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			ft	°	ft	ft ²	ft ²	K
			-6.00			1" Ice 5.21	5.21	0.08
						2" Ice 7.17	7.17	0.16
						4" Ice 10.06	10.06	0.42
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00	0.0000	126.00	No Ice 4.04	3.62	0.03
			0.00			1/2" Ice 4.50	4.48	0.06
			2.00			1" Ice 4.95	5.22	0.11
						2" Ice 5.87	6.74	0.22
						4" Ice 8.05	10.00	0.55
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00	0.0000	126.00	No Ice 4.04	3.62	0.03
			0.00			1/2" Ice 4.50	4.48	0.06
			2.00			1" Ice 4.95	5.22	0.11
						2" Ice 5.87	6.74	0.22
						4" Ice 8.05	10.00	0.55
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00	0.0000	126.00	No Ice 4.04	3.62	0.03
			0.00			1/2" Ice 4.50	4.48	0.06
			2.00			1" Ice 4.95	5.22	0.11
						2" Ice 5.87	6.74	0.22
						4" Ice 8.05	10.00	0.55
(2) T-Arm Mount [TA 601-3]	C	None		0.0000	126.00	No Ice 10.90	10.90	0.73
						1/2" Ice 14.65	14.65	0.93
						1" Ice 18.40	18.40	1.13
						2" Ice 25.90	25.90	1.52
						4" Ice 40.90	40.90	2.32

(2) RR90-17-02DP w/ Mount Pipe	A	From Leg	3.00	0.0000	100.00	No Ice 4.59	3.32	0.03
			0.00			1/2" Ice 5.09	4.09	0.07
			0.00			1" Ice 5.58	4.78	0.11
						2" Ice 6.59	6.23	0.22
						4" Ice 8.73	9.31	0.56
(2) RR90-17-02DP w/ Mount Pipe	B	From Leg	3.00	0.0000	100.00	No Ice 4.59	3.32	0.03
			0.00			1/2" Ice 5.09	4.09	0.07
			0.00			1" Ice 5.58	4.78	0.11
						2" Ice 6.59	6.23	0.22
						4" Ice 8.73	9.31	0.56
(2) RR90-17-02DP w/ Mount Pipe	C	From Leg	3.00	0.0000	100.00	No Ice 4.59	3.32	0.03
			0.00			1/2" Ice 5.09	4.09	0.07
			0.00			1" Ice 5.58	4.78	0.11
						2" Ice 6.59	6.23	0.22
						4" Ice 8.73	9.31	0.56
Side Arm Mount [SO 701-3]	C	None		0.0000	100.00	No Ice 2.83	2.83	0.20
						1/2" Ice 3.92	3.92	0.24
						1" Ice 5.01	5.01	0.28
						2" Ice 7.19	7.19	0.36
						4" Ice 11.55	11.55	0.53

Load Combinations

Comb. No.	Description
1	Dead Only

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	165.5 - 155.5	Pole	Max Tension	14	0.00	0.00	0.00
			Max. Compression	14	-13.32	-0.51	-0.29
			Max. Mx	11	-6.11	82.62	1.07
			Max. My	2	-6.12	1.09	81.39
			Max. Vy	11	-11.52	82.62	1.07
			Max. Vx	2	-11.25	1.09	81.39
			Max. Torque	9			-0.57
			Max Tension	1	0.00	0.00	0.00
L2	155.5 - 110	Pole	Max. Compression	14	-35.65	-0.51	-0.29
			Max. Mx	11	-20.55	778.51	9.79
			Max. My	2	-20.56	9.81	767.23
			Max. Vy	11	-25.93	778.51	9.79
			Max. Vx	2	-25.66	9.81	767.23
			Max. Torque	9			-0.57
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.98	-0.51	-0.29
L3	110 - 72.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.98	-0.51	-0.29

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	72.5 - 36	Pole	Max. Mx	11	-35.87	1908.22	18.47
			Max. My	2	-35.88	18.49	1886.92
			Max. Vy	11	-34.98	1908.22	18.47
			Max. Vx	2	-34.71	18.49	1886.92
			Max. Torque	9			-0.57
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-77.98	-0.51	-0.29
			Max. Mx	11	-53.78	3299.04	26.92
			Max. My	2	-53.79	26.95	3267.97
			Max. Vy	11	-42.06	3299.04	26.92
L5	36 - 0	Pole	Max. Vx	2	-41.79	26.95	3267.97
			Max. Torque	9			-0.57
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-106.45	-0.51	-0.29
			Max. Mx	11	-77.60	5363.23	37.40
			Max. My	2	-77.60	37.42	5320.07
			Max. Vy	11	-49.50	5363.23	37.40
			Max. Vx	2	-49.24	37.42	5320.07
			Max. Torque	9			-0.57

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	106.45	0.00	0.00
	Max. H _x	11	77.62	49.48	0.23
	Max. H _z	2	77.62	0.23	49.22
	Max. M _x	2	5320.07	0.23	49.22
	Max. M _z	5	5363.11	-49.48	-0.23
	Max. Torsion	3	0.57	-24.54	42.51
	Min. Vert	1	77.62	0.00	0.00
	Min. H _x	5	77.62	-49.48	-0.23
	Min. H _z	8	77.62	-0.23	-49.22
	Min. M _x	8	-5320.01	-0.23	-49.22
	Min. M _z	11	-5363.23	49.48	0.23
	Min. Torsion	9	-0.57	24.54	-42.51

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	77.62	0.00	0.00	-0.03	0.06	0.00
Dead+Wind 0 deg - No Ice	77.62	-0.23	-49.22	-5320.07	37.42	-0.48
Dead+Wind 30 deg - No Ice	77.62	24.54	-42.51	-4588.64	-2649.18	-0.57
Dead+Wind 60 deg - No Ice	77.62	42.74	-24.41	-2627.69	-4625.91	-0.51
Dead+Wind 90 deg - No Ice	77.62	49.48	0.23	37.33	-5363.11	-0.30
Dead+Wind 120 deg - No Ice	77.62	42.97	24.81	2692.33	-4663.26	0.00
Dead+Wind 150 deg - No Ice	77.62	24.94	42.74	4625.93	-2713.88	0.30
Dead+Wind 180 deg - No Ice	77.62	0.23	49.22	5320.01	-37.31	0.51
Dead+Wind 210 deg - No Ice	77.62	-24.54	42.51	4588.58	2649.29	0.57
Dead+Wind 240 deg - No Ice	77.62	-42.74	24.41	2627.63	4626.03	0.48

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Load Combination	Vertical	Shear _x	Shear _y	Overturning Moment, M _x	Overturning Moment, M _y	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 270 deg - No Ice	77.62	-49.48	-0.23	-37.40	5363.23	0.27
Dead+Wind 300 deg - No Ice	77.62	-42.97	-24.81	-2692.40	4663.37	0.00
Dead+Wind 330 deg - No Ice	77.62	-24.94	-42.74	-4625.99	2714.00	-0.27
Dead+Ice+Temp	106.45	0.00	0.00	0.29	-0.51	0.00
Dead+Wind 0 deg+Ice+Temp	106.45	-0.06	-12.76	-1453.08	8.61	-0.16
Dead+Wind 30 deg+Ice+Temp	106.45	6.36	-11.02	-1253.80	-724.58	-0.18
Dead+Wind 60 deg+Ice+Temp	106.45	11.08	-6.33	-718.48	-1263.76	-0.16
Dead+Wind 90 deg+Ice+Temp	106.45	12.82	0.06	9.43	-1464.45	-0.09
Dead+Wind 120 deg+Ice+Temp	106.45	11.13	6.43	734.90	-1272.89	0.00
Dead+Wind 150 deg+Ice+Temp	106.45	6.46	11.08	1263.53	-740.40	0.09
Dead+Wind 180 deg+Ice+Temp	106.45	0.06	12.76	1453.69	-9.66	0.16
Dead+Wind 210 deg+Ice+Temp	106.45	-6.36	11.02	1254.40	723.53	0.18
Dead+Wind 240 deg+Ice+Temp	106.45	-11.08	6.33	719.09	1262.71	0.16
Dead+Wind 270 deg+Ice+Temp	106.45	-12.82	-0.06	-8.83	1463.40	0.09
Dead+Wind 300 deg+Ice+Temp	106.45	-11.13	-6.43	-734.30	1271.84	0.00
Dead+Wind 330 deg+Ice+Temp	106.45	-6.46	-11.08	-1262.93	739.35	-0.09
Dead+Wind 0 deg - Service	77.62	-0.09	-19.23	-2078.37	14.65	-0.19
Dead+Wind 30 deg - Service	77.62	9.59	-16.60	-1792.63	-1034.90	-0.22
Dead+Wind 60 deg - Service	77.62	16.69	-9.53	-1026.56	-1807.13	-0.19
Dead+Wind 90 deg - Service	77.62	19.33	0.09	14.56	-2095.13	-0.11
Dead+Wind 120 deg - Service	77.62	16.78	9.69	1051.78	-1821.73	0.00
Dead+Wind 150 deg - Service	77.62	9.74	16.69	1807.16	-1060.18	0.11
Dead+Wind 180 deg - Service	77.62	0.09	19.23	2078.30	-14.54	0.19
Dead+Wind 210 deg - Service	77.62	-9.59	16.60	1792.56	1035.01	0.22
Dead+Wind 240 deg - Service	77.62	-16.69	9.53	1026.49	1807.25	0.19
Dead+Wind 270 deg - Service	77.62	-19.33	-0.09	-14.63	2095.25	0.11
Dead+Wind 300 deg - Service	77.62	-16.78	-9.69	-1051.84	1821.84	0.00
Dead+Wind 330 deg - Service	77.62	-9.74	-16.69	-1807.22	1060.29	-0.11

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-77.62	0.00	0.00	77.62	0.00	0.000%
2	-0.23	-77.62	-49.22	0.23	77.62	49.22	0.000%
3	24.54	-77.62	-42.51	-24.54	77.62	42.51	0.000%
4	42.74	-77.62	-24.41	-42.74	77.62	24.41	0.000%
5	49.48	-77.62	0.23	-49.48	77.62	-0.23	0.000%
6	42.97	-77.62	24.81	-42.97	77.62	-24.81	0.000%
7	24.94	-77.62	42.74	-24.94	77.62	-42.74	0.000%
8	0.23	-77.62	49.22	-0.23	77.62	-49.22	0.000%
9	-24.54	-77.62	42.51	24.54	77.62	-42.51	0.000%
10	-42.74	-77.62	24.41	42.74	77.62	-24.41	0.000%
11	-49.48	-77.62	-0.23	49.48	77.62	0.23	0.000%
12	-42.97	-77.62	-24.81	42.97	77.62	24.81	0.000%
13	-24.94	-77.62	-42.74	24.94	77.62	42.74	0.000%
14	0.00	-106.45	0.00	0.00	106.45	0.00	0.000%
15	-0.06	-106.45	-12.76	0.06	106.45	12.76	0.000%
16	6.36	-106.45	-11.02	-6.36	106.45	11.02	0.000%
17	11.08	-106.45	-6.33	-11.08	106.45	6.33	0.000%
18	12.82	-106.45	0.06	-12.82	106.45	-0.06	0.000%
19	11.13	-106.45	6.43	-11.13	106.45	-6.43	0.000%
20	6.46	-106.45	11.08	-6.46	106.45	-11.08	0.000%
21	0.06	-106.45	12.76	-0.06	106.45	-12.76	0.000%
22	-6.36	-106.45	11.02	6.36	106.45	-11.02	0.000%
23	-11.08	-106.45	6.33	11.08	106.45	-6.33	0.000%
24	-12.82	-106.45	-0.06	12.82	106.45	0.06	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
25	-11.13	-106.45	-6.43	11.13	106.45	6.43	0.000%
26	-6.46	-106.45	-11.08	6.46	106.45	11.08	0.000%
27	-0.09	-77.62	-19.23	0.09	77.62	19.23	0.000%
28	9.59	-77.62	-16.60	-9.59	77.62	16.60	0.000%
29	16.69	-77.62	-9.53	-16.69	77.62	9.53	0.000%
30	19.33	-77.62	0.09	-19.33	77.62	-0.09	0.000%
31	16.78	-77.62	9.69	-16.78	77.62	-9.69	0.000%
32	9.74	-77.62	16.69	-9.74	77.62	-16.69	0.000%
33	0.09	-77.62	19.23	-0.09	77.62	-19.23	0.000%
34	-9.59	-77.62	16.60	9.59	77.62	-16.60	0.000%
35	-16.69	-77.62	9.53	16.69	77.62	-9.53	0.000%
36	-19.33	-77.62	-0.09	19.33	77.62	0.09	0.000%
37	-16.78	-77.62	-9.69	16.78	77.62	9.69	0.000%
38	-9.74	-77.62	-16.69	9.74	77.62	16.69	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	0.00005393
3	Yes	4	0.00000001	0.00073407
4	Yes	4	0.00000001	0.00076450
5	Yes	4	0.00000001	0.00003803
6	Yes	4	0.00000001	0.00078736
7	Yes	4	0.00000001	0.00077700
8	Yes	4	0.00000001	0.00003978
9	Yes	4	0.00000001	0.00076278
10	Yes	4	0.00000001	0.00073878
11	Yes	4	0.00000001	0.00004723
12	Yes	4	0.00000001	0.00078749
13	Yes	4	0.00000001	0.00079116
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00081751
16	Yes	4	0.00000001	0.00084272
17	Yes	4	0.00000001	0.00084644
18	Yes	4	0.00000001	0.00082503
19	Yes	4	0.00000001	0.00085835
20	Yes	4	0.00000001	0.00085502
21	Yes	4	0.00000001	0.00081812
22	Yes	4	0.00000001	0.00084284
23	Yes	4	0.00000001	0.00084564
24	Yes	4	0.00000001	0.00082398
25	Yes	4	0.00000001	0.00085698
26	Yes	4	0.00000001	0.00085388
27	Yes	4	0.00000001	0.00001913
28	Yes	4	0.00000001	0.00006244
29	Yes	4	0.00000001	0.00006700
30	Yes	4	0.00000001	0.00001850
31	Yes	4	0.00000001	0.00006784
32	Yes	4	0.00000001	0.00006646
33	Yes	4	0.00000001	0.00001865
34	Yes	4	0.00000001	0.00006700
35	Yes	4	0.00000001	0.00006290
36	Yes	4	0.00000001	0.00001879
37	Yes	4	0.00000001	0.00006786

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38 Yes 4 0.00000001 0.00006874

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	165.5 - 155.5	12.308	37	0.5310	0.0002
L2	155.5 - 110	11.197	37	0.5296	0.0002
L3	118 - 72.5	7.166	37	0.4847	0.0001
L4	81 - 36	3.731	37	0.3834	0.0001
L5	45 - 0	1.291	37	0.2437	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
166.00	(4) DB846G90A-XY w/ Mount Pipe	37	12.308	0.5310	0.0002	407348
156.00	(2) LPA-80080/6CF w/ Mount Pipe	37	11.252	0.5298	0.0002	205563
142.00	(2) 7770.00 w/ Mount Pipe	37	9.709	0.5211	0.0002	62537
135.00	742 213 w/ Mount Pipe	37	8.950	0.5132	0.0002	46006
126.00	DB809K-Y	37	7.993	0.4997	0.0002	34337
100.00	(2) RR90-17-02DP w/ Mount Pipe	37	5.407	0.4412	0.0001	23532

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	165.5 - 155.5	31.499	12	1.3591	0.0006
L2	155.5 - 110	28.656	12	1.3555	0.0006
L3	118 - 72.5	18.340	12	1.2406	0.0003
L4	81 - 36	9.551	12	0.9813	0.0002
L5	45 - 0	3.306	12	0.6237	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
166.00	(4) DB846G90A-XY w/ Mount Pipe	12	31.499	1.3591	0.0006	159540
156.00	(2) LPA-80080/6CF w/ Mount Pipe	12	28.798	1.3559	0.0006	80498
142.00	(2) 7770.00 w/ Mount Pipe	12	24.848	1.3336	0.0005	24468
135.00	742 213 w/ Mount Pipe	12	22.905	1.3135	0.0005	17998
126.00	DB809K-Y	12	20.456	1.2791	0.0004	13431
100.00	(2) RR90-17-02DP w/ Mount Pipe	12	13.840	1.1292	0.0003	9202

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Section No.	Elevation ft	Ratio P	Ratio f_{bx}	Ratio f_{by}	Ratio f_v	Ratio f_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	165.5 - 155.5 (1)	0.003	0.033	0.000	0.013	0.000	0.036	1.333	H1-3+VT ✓
L2	155.5 - 110 (2)	0.009	0.254	0.000	0.027	0.000	0.262	1.333	H1-3+VT ✓
L3	110 - 72.5 (3)	0.011	0.438	0.000	0.029	0.000	0.449	1.333	H1-3+VT ✓
L4	72.5 - 36 (4)	0.013	0.562	0.000	0.029	0.000	0.576	1.333	H1-3+VT ✓
L5	36 - 0 (5)	0.019	0.835	0.000	0.032	0.000	0.853	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	165.5 - 155.5	Pole	TP58.6x58.6x0.375	1	-6.11	2767.21	2.7	Pass	
L2	155.5 - 110	Pole	TP64.606x58.6x0.375	2	-20.54	3194.44	19.7	Pass	
L3	110 - 72.5	Pole	TP68.805x62.8x0.4375	3	-35.87	4260.83	33.7	Pass	
L4	72.5 - 36	Pole	TP72.748x66.8082x0.5	4	-53.77	5424.19	43.2	Pass	
L5	36 - 0	Pole	TP76.5x70.56x0.5	5	-77.60	5547.27	64.0	Pass	
							Summary		
							Pole (L5)	64.0	Pass
							RATING =	64.0	Pass

APPENDIX B
BASE LEVEL DRAWING



(INSTALLED)
(6) 1-1/4" TO 100 FT LEVEL

(INSTALLED)
(6) 1-1/4" TO 135 FT LEVEL

(INSTALLED)
(6) 1-1/4" TO 126 FT LEVEL

(RESERVED)
(12) 1-5/8" TO 166 FT LEVEL

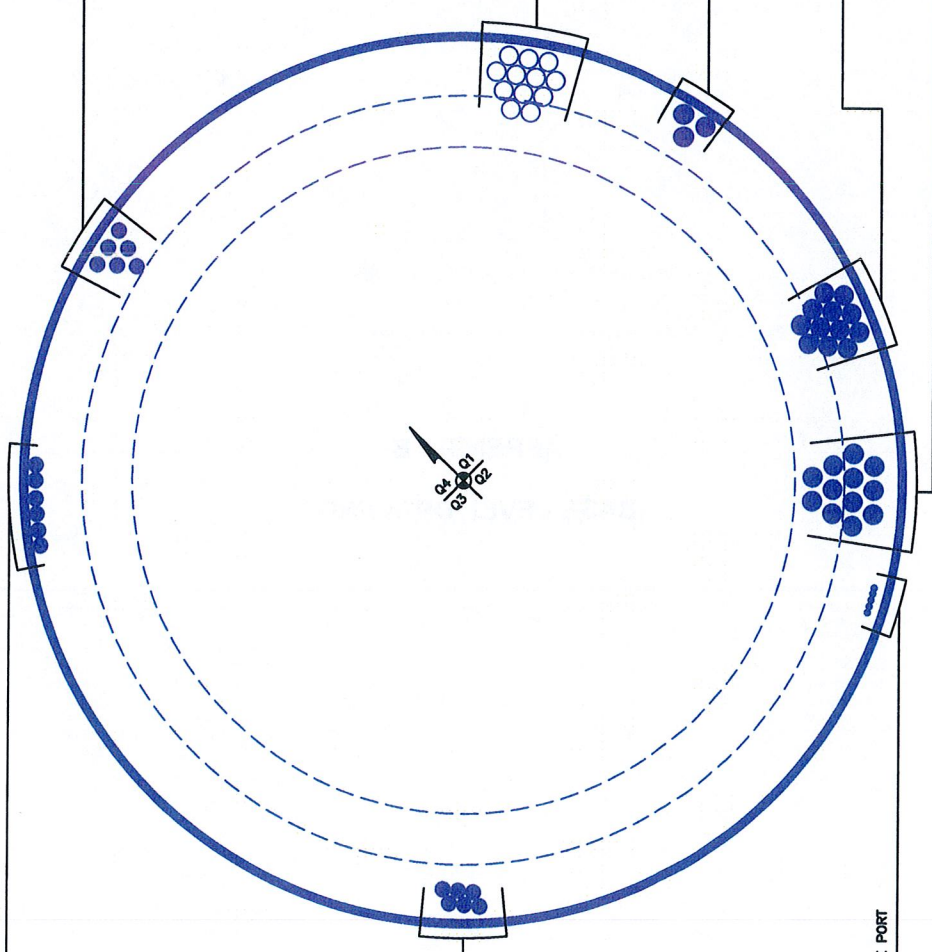
(INSTALLED)
(3) 1-5/8" TO 156 FT LEVEL

(INSTALLED)
(12) 1-5/8" TO 142 FT LEVEL

(ABANDONED) - TERMINATE JUST OUTSIDE PORT
(5) 1/2" TO 126 FT LEVEL

(MLA)
(12) 1-5/8" TO 156 FT LEVEL

(INSTALLED)
(12) 1-5/8" TO 156 FT LEVEL



: SCALE :

BUSINESS UNIT: 806366 TOWER ID: C_BASLEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = **-78.00** kips

Pier Properties		Material Properties	
Concrete:		Concrete compressive strength =	4000 psi
Pier Diameter =	9.0 ft	Reinforcement yield strength =	60000 psi
Concrete Area =	9160.9 in ²	Modulus of elasticity =	29000 ksi
Reinforcement:		Reinforcement yield strain =	0.00207
Clear Cover =	3.00 in	Limiting compressive strain =	0.003
Cage Diameter =	8.38 ft	Seismic Properties	
Bar Size =	11	Seismic Zone =	1
Bar Diameter =	1.41 in		
Bar Area =	1.56 in ²		
Number of Bars =	59		

Minimum Area of Steel

Required area of steel = 45.80 in²

Provided area of steel = 92.04 in² **OK**

Axial Loading

Load factor = **1.3**

Reduction factor = 0.9

Factored axial load = -112.667 kips

Neutral Axis

Distance from extreme edge to neutral axis = **18.32** in

Equivalent compression zone factor = 0.85

Distance from extreme edge to

equivalent compression zone factor = 15.57 in

Distance from centroid to neutral axis = 35.68 in

Compression Zone

Area of steel in compression zone = 20.28 in²

Angle from centroid of pier to intersection of

equivalent compression zone and edge of pier = 44.63 deg

Area of concrete in compression = 813.65 in²

Force in concrete = $0.85 * f'c * Acc$ = 2766.41 kips

Total reinforcement forces = -2653.74 kips

Factored axial load = -112.67 kips

Force in concrete = -2766.41 kips

Sum of the forces in concrete = 0.00 kips **OK**

Maximum Moment

First moment of the concrete

area in compression about the centroid = 36403.22 in³

Distance between centroid of concrete

in compression and centroid of pier = 44.74 in

Moment of concrete in compression = 123770.93 in-kips

Total reinforcement moment = 112216.99 in-kips

Nominal moment strength of column = 235987.92 in-kips

Factored moment strength of column = 163376.25 in-kips

Maximum Allowable Moment = 13614.69 ft-kips

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in ²)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-35.68	-38.43	-0.0058426	0.00	-60.00	-93.60
2	6.10	5.35	-30.33	-33.08	-0.0049672	0.00	-60.00	-93.60
3	12.20	10.63	-25.05	-27.80	-0.0041017	0.00	-60.00	-93.60
4	18.31	15.80	-19.88	-22.63	-0.0032559	0.00	-60.00	-93.60
5	24.41	20.78	-14.90	-17.65	-0.0024395	0.00	-60.00	-93.60
6	30.51	25.53	-10.15	-12.89	-0.0016615	0.00	-48.18	-75.17
7	36.61	29.99	-5.69	-8.43	-0.000931	0.00	-27.00	-42.12
8	42.71	34.12	-1.56	-4.31	-0.0002561	0.00	-7.43	-11.59
9	48.81	37.85	2.17	-0.58	0.0003555	0.00	10.31	16.08
10	54.92	41.16	5.48	2.73	0.0008968	1.56	26.01	35.27
11	61.02	44.00	8.32	5.57	0.0013619	1.56	39.49	56.31
12	67.12	46.34	10.66	7.91	0.0017452	1.56	50.61	73.65
13	73.22	48.15	12.47	9.73	0.0020426	1.56	59.24	87.10
14	79.32	49.42	13.74	11.00	0.0022507	1.56	60.00	88.30
15	85.42	50.13	14.45	11.71	0.002367	1.56	60.00	88.30
16	91.53	50.28	14.60	11.85	0.0023904	1.56	60.00	88.30
17	97.63	49.85	14.17	11.42	0.0023204	1.56	60.00	88.30
18	103.73	48.86	13.18	10.43	0.002158	1.56	60.00	88.30
19	109.83	47.31	11.63	8.88	0.0019049	1.56	55.24	80.87
20	115.93	45.23	9.55	6.80	0.001564	1.56	45.36	65.45
21	122.03	42.64	6.96	4.21	0.0011392	1.56	33.04	46.24
22	128.14	39.56	3.88	1.13	0.0006353	1.56	18.43	23.44
23	134.24	36.03	0.35	-2.39	5.805E-05	0.00	1.68	2.63
24	140.34	32.10	-3.58	-6.33	-0.0005861	0.00	-17.00	-26.52
25	146.44	27.80	-7.88	-10.62	-0.0012898	0.00	-37.40	-58.35
26	152.54	23.19	-12.49	-15.24	-0.0020451	0.00	-59.31	-92.52
27	158.64	18.32	-17.36	-20.11	-0.0028434	0.00	-60.00	-93.60
28	164.75	13.23	-22.45	-25.19	-0.0036757	0.00	-60.00	-93.60
29	170.85	8.00	-27.68	-30.43	-0.0045326	0.00	-60.00	-93.60
30	176.95	2.68	-33.00	-35.75	-0.0054043	0.00	-60.00	-93.60
31	183.05	-2.68	-38.36	-41.10	-0.006281	0.00	-60.00	-93.60
32	189.15	-8.00	-43.68	-46.43	-0.0071527	0.00	-60.00	-93.60
33	195.25	-13.23	-48.91	-51.66	-0.0080095	0.00	-60.00	-93.60
34	201.36	-18.32	-54.00	-56.74	-0.0088419	0.00	-60.00	-93.60
35	207.46	-23.19	-58.87	-61.62	-0.0096402	0.00	-60.00	-93.60
36	213.56	-27.80	-63.48	-66.23	-0.0103955	0.00	-60.00	-93.60
37	219.66	-32.10	-67.78	-70.53	-0.0110992	0.00	-60.00	-93.60
38	225.76	-36.03	-71.71	-74.46	-0.0117433	0.00	-60.00	-93.60
39	231.86	-39.56	-75.24	-77.99	-0.0123206	0.00	-60.00	-93.60
40	237.97	-42.64	-78.32	-81.06	-0.0128245	0.00	-60.00	-93.60
41	244.07	-45.23	-80.91	-83.66	-0.0132493	0.00	-60.00	-93.60
42	250.17	-47.31	-82.99	-85.74	-0.0135902	0.00	-60.00	-93.60
43	256.27	-48.86	-84.54	-87.29	-0.0138433	0.00	-60.00	-93.60
44	262.37	-49.85	-85.53	-88.28	-0.0140057	0.00	-60.00	-93.60
45	268.47	-50.28	-85.96	-88.70	-0.0140757	0.00	-60.00	-93.60
46	274.58	-50.13	-85.81	-88.56	-0.0140523	0.00	-60.00	-93.60
47	280.68	-49.42	-85.10	-87.85	-0.013936	0.00	-60.00	-93.60

Monopole Pier and Pad Foundation

BU #: 806366
 Site Name: HRT 107(C) 943204
 App. Number: 131165



Design Reactions		
Shear, S:	50	kips
Moment, M:	5385	ft-kips
Tower Height, H:	5	ft
Tower Weight, W:	78	kips
Base Diameter, BD:	6.375	ft

Foundation Dimensions		
Depth, D:	7.5	ft
Pad Width, W:	33.25	ft
Neglected Depth, N:	2.5	ft
Thickness, T:	4.50	ft
Pier Diameter, Pd:	9.00	ft
Ext. Above Grade, E:	0.50	ft
Clear Cover, Cc:	3.0	in

Soil Properties		
Soil Unit Weight, γ :	0.130	kcf
Bearing Capacity, Bc:	10.5	ksf
Angle of Friction, Φ :	40	deg
Cohesion, Co:	0.000	ksf
Passive Pressure, Pp:	0.000	kcf
Base Friction, μ :	0.40	

Material Properties		
Rebar Yield Strength, Fy:	60000	psi
Concrete Strength, Fc:	4000	psi
Concrete Unit Weight, δ_c :	0.150	kcf
Seismic Zone, z:	1	

Rebar Properties		
Pier Rebar Size, Sp:	11	
Pier Rebar Quantity, mp:	59	30
Pad Rebar Size, Spad:	11	
Pad Rebar Quantity, mpad:	25	13
Pier Tie Size, St:	5	5
Tie Quantity, mt:	7	5

Design Checks				
Req'd Pier Diam. (ft)	9	Capacity/Availability	8.375	Check
Overturning (ft-kips)	15239.22		5785.00	OK
Shear Capacity (kips)	266.52		50.00	OK
Bearing (ksf)	10.50		2.15	OK
Pad Shear - 1-way (kips)	2538.39		1077.89	OK
Pad Shear - 2-way (kips)	6327.50		1652.52	OK
Pier Rebar Area (in ²)	92.04		45.80	OK
Pad Rebar Area (in ²)	39.00		27.31	OK
Pier Moment Capacity (ft-k)	13614.69		5560.00	OK
Pier Bar Spacing (in)	4.02		18 > s > 2	OK
Pad Bar Spacing (in)	14.91		18 > s > 2	OK
Pier Development Length (in)	39		26.75	OK
Pad Development Length (in)	51		26.75	OK
Hook Development Length (in)	196.50		18.73	OK
Rebar Hook Length (in)	145.50		23.97	OK

Modification Checks				
Sleeve Rebar Area (in ²):	15.6	Capacity/Availability	0.00	Check
Sleeve Moment Capacity (k-ft):	13614.69		5560.00	Not Used
Sleeve Rebar Spacing (in):	N/A		18 > s > 2	Not Used
Sleeve Tie Spacing (in):	N/A		9 > s > 4.5	Not Used
Minimum Extra Thickness (in):	0		0	Not Used
Pad Rebar Area-short (in ²):	0.44		0.00	Not Used
Pad Rebar Area-long (in ²):	0.44		0.00	Not Used
Pad Rebar Spacing-short (in):	130.5		18 > s > 2	Not Used
Pad Rebar Spacing-long (in):	130.5		18 > s > 2	Not Used
End Cap Width (ft):	0		0	Not Used
End Cap Rebar Area (in ²):	3.16		0	Not Used
Rebar Spacing (in):	-3.00		18 > s > 2	Not Used
Tie Spacing (in):	27.57		393 > s > 4.5	Not Used
Dowel Area (in ²):	2.2		0.00	Not Used
Dowel Embedment (in):	9		6	Not Used
Cone Shear Strength (kips):	25.15		23.76	Not Used
Dowel Edge Dist (in):	12.00		4.78	Not Used
Dowel Spacing (in):	93.75		18.00	Not Used
Dowel Edge Dist (vert) (in):	27.00		4.78	Not Used
Dowel Devel. Length (in):	-3.00		13.32	Not Used

Modifications				
Pier Sleeve, ds:	0	in	End Cap Width, Wec:	0
Revised Pier Diameter, dc:	9	ft	Revised Width, Wz:	33.25
PS Rebar Size, Ss:	8		EC Rebar Size, Sec:	8
Rebar Quantity, ms:	20		Rebar Quantity, mec:	4
Tie Size, Sst:	3		EC Tie Size, Sect:	4
Tie Quantity, mst:	9		Tie Quantity, mect:	15
Pad Thickness, Te:	0	in	EC Dowel Size, Seec:	6
Revised Pier Thickness, Tc:	4.50	ft	Dowel Quantity, mecd:	5
Rebar Size, Se:	3		Rows of Dowels, Nd:	1
Rebar Quantity (long), me:	4		Dowel Depth, decd:	9
Rebar Quantity (short), mec:	4		Edge Distance, eecd:	12
Dowel Size, Sed:	3			
Dowel Quantity, mecd:	0			

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

TIA Rev F

Site Data

BU#:	806366
Site Name:	HRT 107(C) 943204
App #:	131165
Pole Manufacturer:	Other

Reactions		
Moment:	5385	ft-kips
Axial:	78	kips
Shear:	50	kips

Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	84.75	in

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

Anchor Rod Results

Maximum Rod Tension: 123.8 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 63.5% **Pass**

Rigid
Service ASD
Fty*ASIF

Plate Data

Diam:	91	in
Thick:	3.25	in
Grade:	60	ksi
Single-Rod B-eff:	10.25	in

Base Plate Results

Base Plate Stress: 18.9 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 31.5% **Pass**

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
36.47

Stiffener Data (Welding at both sides)

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

n/a

Stiffener Results

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

Pole Results

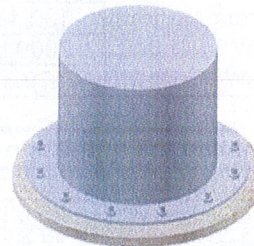
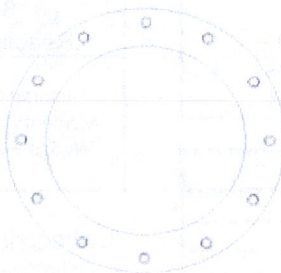
Pole Punching Shear Check: n/a

Pole Data

Diam:	76.5	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333
-------	-------



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

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

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

Site Data

BU#: 806366
Site Name: HRT 107@ 943204
App #: 131165

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:	0	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	7.5	ft
Pad Thickness, T:	4.5	ft
Pad Width=Length, L:	33.25	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	4.5	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	20.25	ft^2
Pier Height:	3.50	ft
Soil (above pad) Height:	3.00	ft

Soil Parameters		
Unit Weight, γ :	130.0	pcf
Ultimate Bearing Capacity, q_n :	10.50	ksf
Strength Reduct. factor, ϕ :	0.5	
Angle of Friction, Φ :	40.0	degrees
Undrained Shear Strength, c_u :	0.00	ksf
Allowable Bearing: $\phi * q_n$:	5.25	ksf
Passive Pres. Coeff., K_p :	4.60	

Forces/Moments due to Wind and Lateral Soil		
Minimum of ($\phi * \text{Ultimate Pad Passive Force, } V_u$):	67.5	kips
Pad Force Location Above D:	1.93	ft
ϕ (Passive Pressure Moment):	130.18	ft-kips
Factored O.T. M(WL), "1.6W":	7809.8	ft-kips
Factored OT (MW-Msoil), M1	7679.57	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	2.52	ft
Sum of Soil Wedges Wt:	29.09	kips
Soil Wedges ecc, K1:	14.98	ft
Ftg+Soil above Pad wt:	1180.2	kips
Unfactored (Total ftg-soil Wt):	1209.25	kips
1.2D. No Soil Wedges.	1509.79	kips
0.9D. With Soil Wedges	1158.52	kips

Resistance due to Cohesion (Vertical)		
$\phi * (1/2 * c_u) (\text{Total Vert. Planes})$	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	78	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	50	kips
Unfactored WL Moment, M:	5385	ft-kips

Load Factor	Shaft Factored Loads	
1.20	1.2D+1.6W, Pu:	93.6 kips
0.90	0.9D+1.6W, Pu:	70.2 kips
1.35	Vu:	67.5 kips
	Mu:	7269.75 ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	1509.79	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	7679.57	ft-kips

Orthogonal Direction:

$ecc1 = M1/P1 = 5.09 \text{ ft}$
 $Orthogonal qu = 2.20 \text{ ksf}$
 $qu/\phi * q_n \text{ Ratio} = 41.93\% \text{ Pass}$

Diagonal Direction:

$ecc2 = (0.707M1)/P1 = 3.60 \text{ ft}$
 $Diagonal qu = 2.22 \text{ ksf}$
 $qu/\phi * q_n \text{ Ratio} = 42.35\% \text{ Pass}$

<-- Press Upon Completing All Input

Overtuning Stability Check

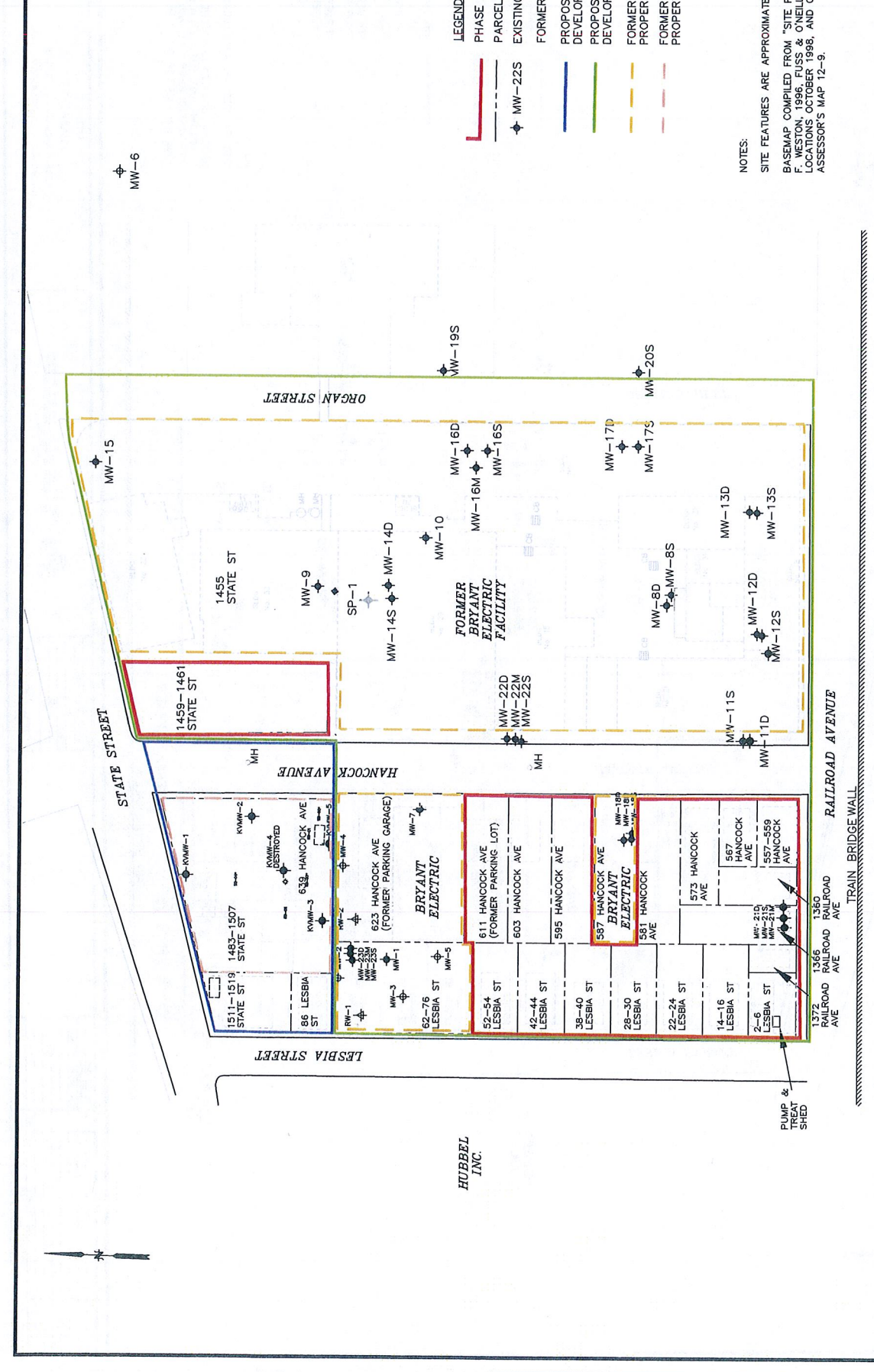
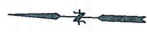
0.9D+1.6W Load Combination, Bearing Results:

(w/ Soil Wedges) [Reaction+Conc+Soil]	1158.52	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	7287.27	ft-kips

$Orthogonal ecc3 = M2/P2 = 6.29 \text{ ft}$
 $Ortho Non Bearing Length, NBL = 12.58 \text{ ft}$
 $Orthogonal qu = 1.84 \text{ ksf}$
 $Diagonal qu = 1.95 \text{ ksf}$

Max Reaction Moment (ft-kips) so that $qu = \phi * q_n = 100\%$ Capacity Rating

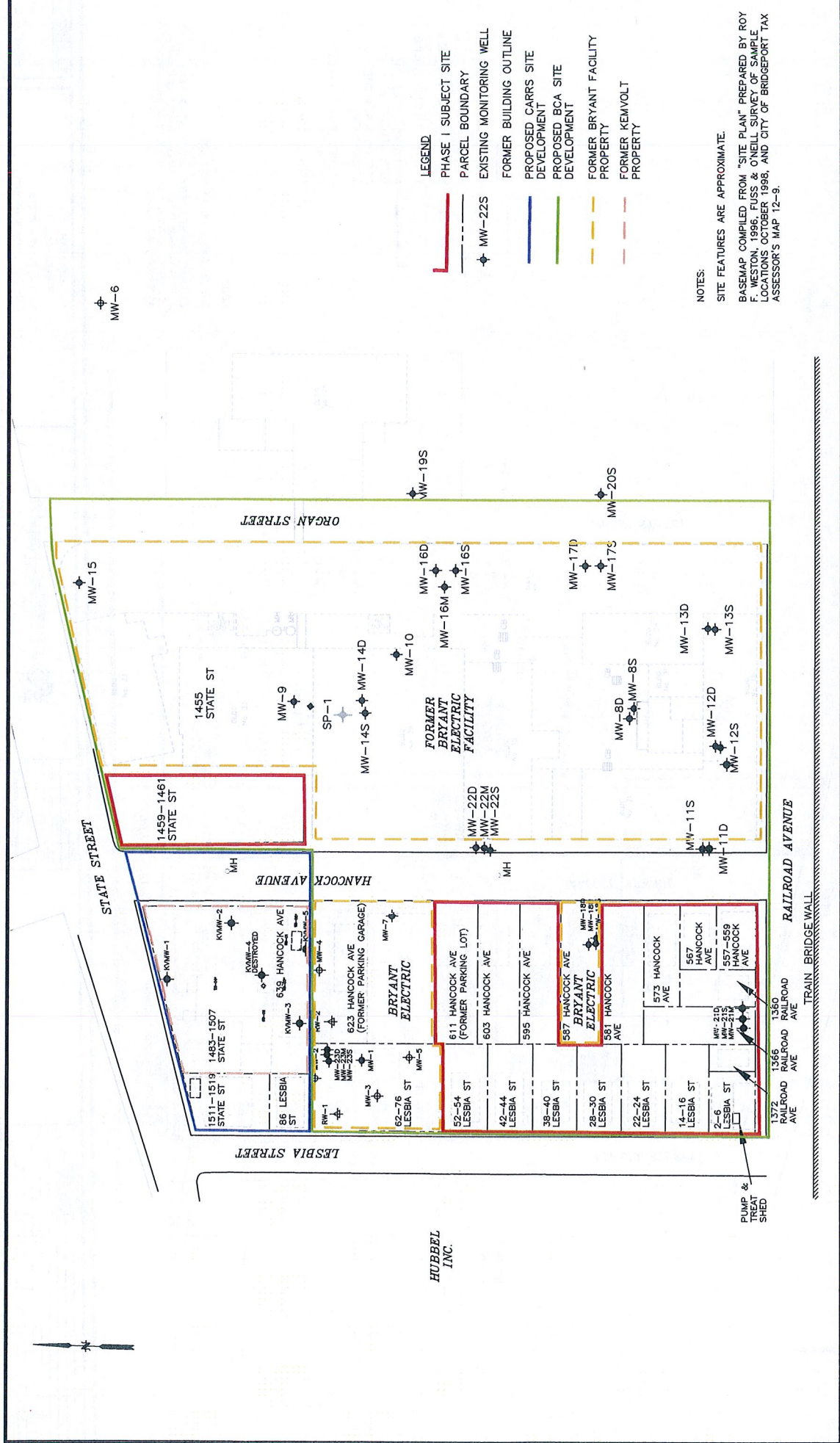
Actual M:	5385.00		
M Orthogonal:	11414.72	47.18%	Pass
M Diagonal:	11156.50	48.27%	Pass



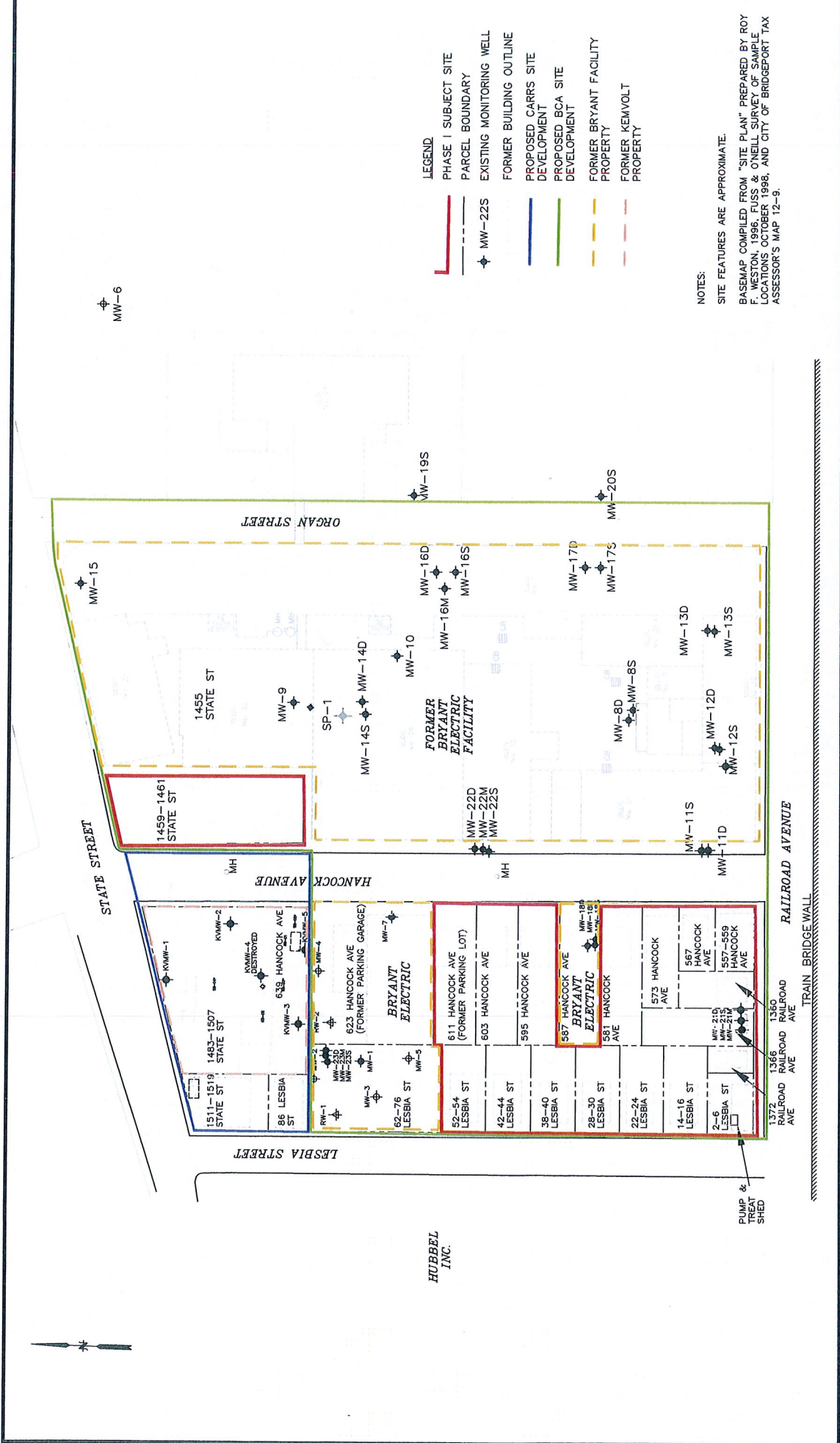
- LEGEND**
- PHASE I SUBJECT SITE
 - - - PARCEL BOUNDARY
 - ◆ MW-22S
 - EXISTING MONITORING WELL
 - FORMER BUILDING OUTLINE
 - PROPOSED CARRS SITE DEVELOPMENT
 - PROPOSED BCA SITE DEVELOPMENT
 - FORMER BRYANT FACILITY PROPERTY
 - FORMER KEMVOLT PROPERTY

NOTES:
 SITE FEATURES ARE APPROXIMATE.
 BASEMAP COMPILED FROM "SITE PLAN" PREPARED BY ROY F. WESTON, 1996. FUSS & O'NEILL SURVEY OF SAMPLE LOCATIONS, OCTOBER 1988, AND CITY OF BRIDGEPORT TAX ASSESSOR'S MAP 12-9.

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">PROJ. NO.: 9709040</td> <td style="width: 50%;">DATE: MARCH 2003</td> </tr> <tr> <td colspan="2" style="text-align: center;"> FIGURE 2 </td> </tr> </table>	PROJ. NO.: 9709040	DATE: MARCH 2003	FIGURE 2		<p>SITE PLAN PHASE I ESA LESBIA AND STATE STREETS, RAILROAD AND HANCOCK AVENUES</p>	BRIDGEPORT CONNECTICUT						
PROJ. NO.: 9709040	DATE: MARCH 2003											
FIGURE 2												
 <p>FUSS & O'NEILL INC. Consulting Engineers 50 QUARRY ROAD, BRIDGEPORT, CONNECTICUT 06605 www.foss.com</p>												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SCALE:</td> <td>HORIZ. 1" = 80'</td> </tr> <tr> <td>DATE:</td> <td>VERT. 1" = 20'</td> </tr> <tr> <td>NO.:</td> <td>GRAPHIC SCALE</td> </tr> <tr> <td>DATE:</td> <td>BY:</td> </tr> <tr> <td>DESCRIPTION:</td> <td>REVISIONS:</td> </tr> </table>			SCALE:	HORIZ. 1" = 80'	DATE:	VERT. 1" = 20'	NO.:	GRAPHIC SCALE	DATE:	BY:	DESCRIPTION:	REVISIONS:
SCALE:	HORIZ. 1" = 80'											
DATE:	VERT. 1" = 20'											
NO.:	GRAPHIC SCALE											
DATE:	BY:											
DESCRIPTION:	REVISIONS:											



SCALE: HORIZ. 1" = 60' VERT. 1" = 10' DATUM: NAD 83 UTM ZONE: 18Q GRAPHIC SCALE: 0 20 40 60 80		FUS & O'NEILL INC. Consulting Engineers 55 QUARRY ROAD, BRIDGEPORT, CONNECTICUT 06610 www.fuso.com	BRIDGEPORT, CONNECTICUT														
REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				NO.	DATE	DESCRIPTION	BY										
NO.	DATE	DESCRIPTION	BY														
PROJECT NUMBER: _____ PROJECT MANAGER: _____ REVIEWED BY: _____ DATE: _____		SITE PLAN PHASE I ESA LESBIA AND STATE STREETS, RAILROAD AND HANCOCK AVENUES	FIGURE 2														



PROJ. NO. 9703000 DATE: MARCH 2003	
FIGURE 2	
SITE PLAN PHASE I ESA LESBIA AND STATE STREETS, RAILROAD AND HANCOCK AVENUES	
BRIDGEPORT CONNECTICUT	
FUSS & O'NEILL INC. Consulting Engineers 51 QUARRY ROAD, WESTFIELD, CONNECTICUT 06097 WWW.FUO.COM	
SCALE: HORIZ. 1" = 80' DATE: _____ VERT. _____	GRAPHIC SCALE 0 20 40 80
DESIGNED BY: _____ CHECKED BY: _____ DATE: _____	REVISIONS NO. DATE DESCRIPTION BY

