



DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND

CBL: 415 B006001

BUILDING PERMIT # 2010-10-2364

BUILDING PERMIT

This is to certify that GLOBAL SIGNAL Located At 517 PRESUMPCOT STREET
has permission to TO SWAP 12 EXISTING ANTENNAS FOR NEW ONES
provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be procured prior to occupancy.

Fire Prevention Officer

[Signature] 10/14/11

Code Enforcement Officer / Plan Reviewer

**THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY.
PENALTY FOR REMOVING THIS CARD.**

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No: 2011-10-2364-ALTCOMM	Date Applied: 09/23/2011	CBL: 415- B-006-001	
Location of Construction: 517 PRESUMPCOT ST	Owner Name: Global Signal	Owner Address: PMB 353-4017 WASHINGTON RD McMurray, PA 15317	Phone:
Business Name: Verizon Wireless	Contractor Name: John McGilicuddy	Contractor Address: 49 Brattle ST., Arlington, MA 02474	Phone: 617-388-6324
Lessee/Buyer's Name:	Phone:	Permit Type: BLDG -	Zone: I-M
Past Use: Communications tower	Proposed Use: Same: Communications tower - to swap existing antennas with new ones- no change to antenna location or quantity	Cost of Work: \$10,000.00	CEO District:
		Fire Dept: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied <input type="checkbox"/> N/A	Inspection: Use Group: Type: Cell Tower DKC-2009 Signature: JMB 10/13/11
Proposed Project Description: replace existing antennas		Pedestrian Activities District (P.A.D.)	

Permit Taken By: Gayle	Zoning Approval		
<p>1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.</p> <p>2. Building Permits do not include plumbing, septic or electrical work.</p> <p>3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.</p>	<p>Special Zone or Reviews</p> <p><input type="checkbox"/> Shoreland</p> <p><input type="checkbox"/> Wetlands</p> <p><input type="checkbox"/> Flood Zone</p> <p><input type="checkbox"/> Subdivision</p> <p><input type="checkbox"/> Site Plan</p> <p>___ Maj ___ Min ___ MM</p> <p>Date: <i>OK 10/7/11</i></p>	<p>Zoning Appeal</p> <p><input type="checkbox"/> Variance</p> <p><input type="checkbox"/> Miscellaneous</p> <p><input type="checkbox"/> Conditional Use</p> <p><input type="checkbox"/> Interpretation</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Denied</p> <p>Date:</p>	<p>Historic Preservation</p> <p><input checked="" type="checkbox"/> Not in Dist or Landmark</p> <p><input type="checkbox"/> Does not Require Review</p> <p><input type="checkbox"/> Requires Review</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Approved w/Conditions</p> <p><input type="checkbox"/> Denied</p> <p>Date: <i>[Signature]</i></p>
	CERTIFICATION		

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693(ONLY)

Or email buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the City of Portland Inspection Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months, if the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a “Stop Work Order” and subsequent release to continue with construction.**

1. Final Inspection

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OR CIRCUMSTANCES.

517 PRESUMPCOT ST

BP# 2010-10-2364

CBL: 415 B006001



PORTLAND MAINE

Strengthening a Remarkable City, Building a Community for Life • www.portlandmaine.gov

*Director of Planning and Urban Development
Penny St. Louis*

*Inspection Services, Director
Tammy Munson*

517 Presumpscot

Conditions of Approval:

Building:

1. Application approval based upon information provided by applicant. Any deviation from approved plans requires separate review and approval prior to work.
2. Antenna mounting and anchoring shall be inspected by an engineer and a letter of compliance shall be submitted to this office prior to the final inspection

2011 102364 By Mail



General Building Permit Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: 517 Presumpscot ST I-M		
Total Square Footage of Proposed Structure/Area		Square Footage of Lot
Tax Assessor's Chart, Block & Lot Chart# Block# Lot#	Applicant * must be owner, Lessee or Buyer* Name Verizon wireless Address 400 Friberg PKwy City, State & Zip Westborough MA	Telephone: 617-780- 5746
415 B006002		
Lessee/DBA (If Applicable) Verizon wireless	Owner (if different from Applicant) Name Global Signal Address Washington Rd City, State & Zip McMurray PA	Cost Of Work: \$ 10,000 C of O Fees: \$ Total Fee: \$ 120.00
Current legal use (i.e. single family)		<div style="font-size: 2em; color: red; font-weight: bold;">RECEIVED</div> <div style="font-size: 1.2em; color: red; font-weight: bold;">SEP 23 2011</div> <div style="font-size: 0.8em; color: red; font-weight: bold;">Dept. of Building Inspections City of Portland Maine</div>
If vacant, what was the previous use?		
Proposed Specific use:		
Is property part of a subdivision? _____ If yes, please name _____		
Project description: Swap existing antennas with new ones. No change to antenna location or quantity		
Contractor's name: John McGillicuddy		
Address: 49 Brattle St.		
City, State & Zip: Arlington MA 02474		Telephone: 617-388-6324
Who should we contact when the permit is ready: Kristin Champagne		Telephone: 781-464-9134
Mailing address: 49 Brattle St. Arlington MA 02474		

Please submit all of the information outlined on the applicable Checklist. Failure to do so will result in the automatic denial of your permit.

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information or to download copies of this form and other applications visit the Inspections Division on-line at www.portlandmaine.gov, or stop by the Inspections Division office, room 315 City Hall or call 874-8703.

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature: John McGillicuddy Date: 8-3-11

This is not a permit; you may not commence ANY work until the permit is issued



Certificate of Design Application

From Designer: Hudson Design Group LLC
 Date: 8-12-11
 Job Name: Falmouth, ME (Verizon Wireless)
 Address of Construction: 503-545 Presumpscot Street, Portland, ME

2003 International Building Code

Construction project was designed to the building code criteria listed below:

Building Code & Year IBC 2009 Use Group Classification (s) Mixed Use - Utility
 Type of Construction No Change - Swapping existing antennas for Verizon Wireless
 Will the Structure have a Fire suppression system in Accordance with Section 903.3.1 of the 2003 IRC N/A
 Is the Structure mixed use? Yes If yes, separated or non separated or non separated (section 302.3) Non-separated
 Supervisory alarm System? N/A Geotechnical/Soils report required? (See Section 1802.2) N/A

Structural Design Calculations

N/A Submitted for all structural members (106.1 - 106.11)

Design Loads on Construction Documents (1603)

Uniformly distributed floor live loads (7603.11, 1607.7)

Floor Area Use	Loads Shown
N/A	N/A

Wind loads (1603.1.4, 1609)

Yes Design option utilized (1609.1.1, 1609.6)
80 MPH Basic wind speed (1609.3)
N/A Building category and wind importance factor, I_w (table 1604.5, 1609.5)
Exposure C Wind exposure category (1609.4)
N/A Internal pressure coefficient (ASCE 7)
N/A Component and cladding pressures (1609.1.1, 1609.6.2.2)
N/A Main force wind pressures (7603.1.1, 1609.6.2.1)

Earth design data (1603.1.5, 1614-1623)

N/A Design option utilized (1614.1)
 Seismic use group ("Category")
 Spectral response coefficients, S_D & S_1 (1615.1)
 Site class (1615.1.5)

N/A Live load reduction
 Roof live loads (1603.1.2, 1607.11)
 Roof snow loads (1603.2.3, 1608)
 Ground snow load, P_g (1608.2)
 If $P_g > 10$ psf, flat-roof snow load p_f
 If $P_g > 10$ psf, snow exposure factor, C_e
 If $P_g > 10$ psf, snow load importance factor, I_s
 Roof thermal factor, C_t (1608.4)
 Sloped roof snowload, P_s (1608.4)
 Seismic design category (1616.3)
 Basic seismic force resisting system (1617.6.2)
 Response modification coefficient, R , and
 deflection amplification factor, C_d (1617.6.2)
 Analysis procedure (1616.6, 1617.5)
 Design base shear (1617.4, 1617.5.1)

Flood loads (1803.1.6, 1612)

N/A Flood hazard area (1612.3)
 Elevation of structure

Other loads

N/A Concentrated loads (1607.4)
 Partition loads (1607.5)
 Misc. loads (Table 1607.8, 1607.6.1, 1607.7, 1607.12, 1607.13, 1610, 1611, 2404)



Accessibility Building Code Certificate

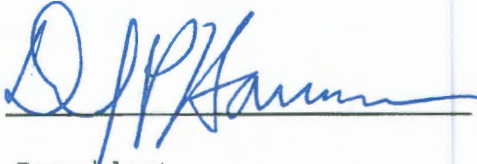
Designer: Daniel P. Hamm, P.E.

Address of Project: 503-545 Presumpscot Street, Portland, ME

Nature of Project: Antenna modification work to existing telecommunication site.

The technical submissions covering the proposed construction work as described above have been designed in compliance with applicable referenced standards found in the Maine Human Rights Law and Federal Americans with Disability Act. Residential Buildings with 4 units or more must conform to the Federal Fair Housing Accessibility Standards. Please provide proof of compliance if applicable.



Signature: 

Title: President

Firm: Hudson Design Group LLC

Address: 1600 Osgood St, Suite 2-101 Bld 20N
N. Andover, MA 01845

Phone: 978-557-5553

For more information or to download this form and other permit applications visit the Inspections Division on our website at www.portlandmaine.gov



Certificate of Design

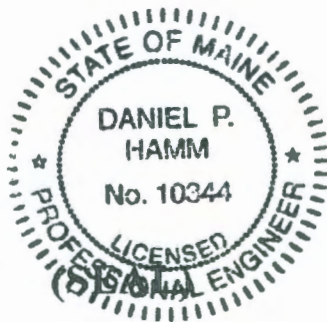
Date: 8-12-11

From: Daniel P. Hamm, P.E.

These plans and / or specifications covering construction work on:

Antenna modification work to existing telecommunication site.

Have been designed and drawn up by the undersigned, a Maine registered Architect / Engineer according to the *2003 International Building Code* and local amendments.



Signature: 

Title: President

Firm: Hudson Design Group LLC

Address: 1600 Osgood St, Suite 2-101 Bld 20N

N. Andover, MA 01845

Phone: 978-557-5553

For more information or to download this form and other permit applications visit the Inspections Division on our website at www.portlandmaine.gov

Assessor's Office | 389 Congress Street | Portland, Maine 04101 | Room 115 | (207) 874-8486

[City](#) [Home](#) [Departments](#) [City Council](#) [E-Services](#) [Calendar](#) [Jobs](#)

This page contains a detailed description of the Parcel ID you selected. Press the **New Search** button at the bottom of the screen to submit a new query.

Current Owner Information:

Services

[Applications](#)

[Doing Business](#)

[Maps](#)

[Tax Relief](#)

[Tax Roll](#)

[Q & A](#)

[browse city services a-z](#)

[browse facts and links a-z](#)

CBL	415 B006002
Land Use Type	MULTI-USE COMMERCIAL
Property Location	517 PRESUMPCOT ST
Owner Information	GLOBAL SIGNAL ACQUISITIONS IV LLC PMB 353 4017 WASHINGTON RD MCMURRAY PA 15317
Book and Page	24735/177
Legal Description	415-B-6 419A-A-5 PRESUMPCOT ST 511-525 OCEAN AVE BLDG ON LEASED LAND
Acres	0

Current Assessed Valuation:

TAX ACCT NO.	46342	OWNER OF RECORD AS OF APRIL 2011
LAND VALUE	\$0.00	GLOBAL SIGNAL ACQUISITIONS IV LLC
BUILDING VALUE	\$47,200.00	PMB 353 4017 WASHINGTON RD
NET TAXABLE - REAL ESTATE	\$47,200.00	MCMURRAY PA 15317
TAX AMOUNT	\$862.82	

Any information concerning tax payments should be directed to the Treasury office at 874-8490 or [e-mailed](#).



Best viewed at 800x600, with Internet Explorer



[View Map](#)

Outbuildings/Yard Improvements:

Card 1	
Year Built	1992
Structure	FENCE CHAIN
Size	1X2080
Units	1
Grade	C
Condition	3

Card 1	
Year Built	1992
Structure	UTITILY STONE

Size 10X20
Units 1
Grade A
Condition 4

Sales Information:

Sale Date	Type	Price	Book/Page
1/3/2007	LAND + BUILDING	\$625,000.00	24735/177

[New Search!](#)

12 existing - to be remove + replaced



Product Description

The Celwave® Optimizer is a log periodic dipole antenna with continuously adjustable electrical downtilt. By utilizing the patented adjustable electrical downtilt feature ESMR, cellular, and paging system performance can be optimized in the field. This optimization is done simply and easily by turning a dial on the back of the antenna. The Optimizer features our patented CELLite® technology, which eliminates cables and soldered joints, often the cause of reduced system performance due to potential long-term IM issues. The Optimizer also features a high front-to-back ratio which reduces co-channel interference. The Optimizer has been shown to significantly reduce interference in actual field performance. Patent number 5,798,675.



Features/Benefits

- Continuous dial-turn adjustment allows electrical tilt to be changed easily without the hassles of changing out the whole antenna.
- Easy optimization of system performance and minimization of co-channel interference with continuously adjustable electrical downtilt footprint.
- High front-to-back ratio minimizes co-channel interference towards rear of site.
- Pilot pollution minimized in CDMA systems.
- High reliability, no solder joints.

Technical Features

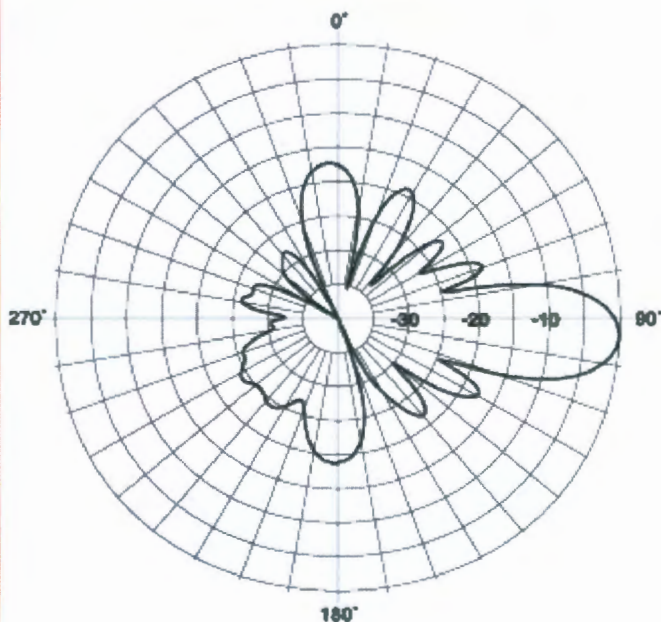
Frequency Band	Trunking/SMR (806-824, 851-869 MHz), Cellular (824-849, 869-894 MHz)
Horizontal Pattern	Directional
Antenna Type	Panel Log Periodic
Electrical Down Tilt Option	Manual Variable
Gain, dBi (dBd)	13.6 (11.5)
Frequency Range, MHz	806-941
Connector Type	7-16 DIN Female
Connector Location	Back
Mount Type	Downtilt
Electrical Downtilt, deg	0-14
Horizontal Beamwidth, deg	90
Mounting Hardware	10228 Clamp Set
Rated Wind Speed, km/h (mph)	200 (125)
VSWR	< 1.5:1
Vertical Beamwidth, deg	16
Polarization	Vertical

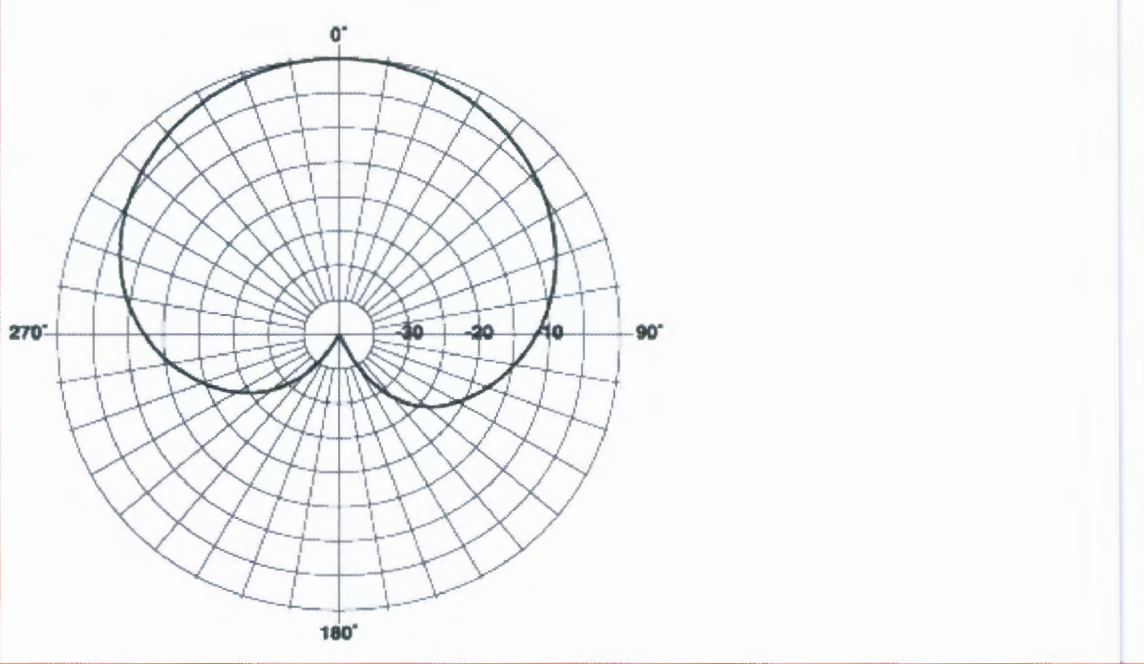


Front-To-Back Ratio, dB	40
Maximum Power Input, W	500
Lightning Protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBm	< -100
Impedance, Ohms	50
Overall Length, m (ft)	1.22 (2.1)
Dimensions - HxWxD, mm (in)	1227 x 257 x 197 (48.3 x 10.1 x 7.75)
Weight w/o Mtg Hardware, kg (lb)	8 (18)
Weight w/ Mtg Hardware, kg (lb)	10(22)
Radiating Element Material	Aluminum Alloy
Radome Material	UV Resistant ABS
Reflector Material	Aluminum Alloy
Max Wind Loading Area, m ² (ft ²)	0.39 (4.2)
Survival Wind Speed, km/h (mph)	200 (125)
Maximum Thrust @ Rated Wind, N (lbf)	1169 (263)
Side Wind Loading Area, m ² (ft ²)	0.307 (3.3)
Wind Load - Side @ Rated Wind, N (lbf)	916 (206)
Shipping Weight, kg (lb)	9.1 (20)
Packing Dimensions, HxWxD, mm (in)	1448 x 406 x 305 (57 x 16 x 12)
Shipping Dimensions of Accessory - HxWxD, m (ft)	Packed w/antenna
Shipping Mode	TBD

Notes

Note: *typ 40 dB 824-894, typ 32 dB 806-824





(6) Proposed



DB846F65ZAXY

Directed Dipole Antenna

Decibel®

Base Station Antennas

- Exceptional azimuth roll off reducing soft hand offs and improving capacity
- Strong null filling for below horizon RF penetration
- Extremely rugged, reliable design yet lightweight for low tower loading
- Air dielectric feed system

ELECTRICAL

Frequency (MHz) :	806 - 896	870 - 960
Polarization :	Vertical	Vertical
Gain (dBd/dBi) :	14.5/16.6	14.8/16.9
Azimuth BW (Deg.):	65	60
Elevation BW (Deg.):	11	10.5
Beam Tilt (Deg.):	0	0
USLS* (dB) :	15	15
Front-To-Back Ratio* (dB) :	40	40
VSWR :	<1.33:1	<1.33:1
PIM3 @ 2 x 20w (dBc) :	-150	-150
Max. Input Power (Watts) :	500	500
Impedance (Ohms) :	50	50
Lightning Protection :	DC Ground	DC Ground



MECHANICAL

Weight :	9.5 kg (21 lb)
Dimensions (LxWxD) :	1,829 x 254 x 216 mm (72 x 10 x 8.5 in)
Max. Wind Area :	0.15 m ² (1.6 ft ²)
Max. Wind Load (@ 100 mph) :	386.9 N (87 lbf)
Max. Wind Speed :	241 km/h (150 mph)
Hardware Material :	Galvanized Steel
Connector Type :	7-16 DIN - Female (1, Back)
Color :	Light Gray
Standard Mounting Hardware :	DB380
Standard Downtilt Mounting Hardware :	DB5083

Andrew Corporation
 2601 Telecom Parkway
 Richardson, Texas U.S.A 75082-3521
 Tel: 214.631.0310

Fax: 214.631.4706
 Toll Free Tel: 1.800.676.5342
 Fax: 1.800.229.4706
 www.andrew.com

* - Indicates Typical
 4/13/2007
 dbtech@andrew.com

Information correct at date of issue but may be subject to change without notice.



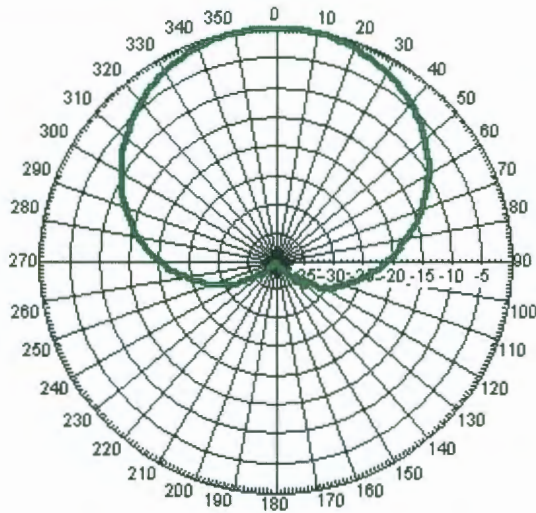
DB846F65ZAXY

Directed Dipole Antenna

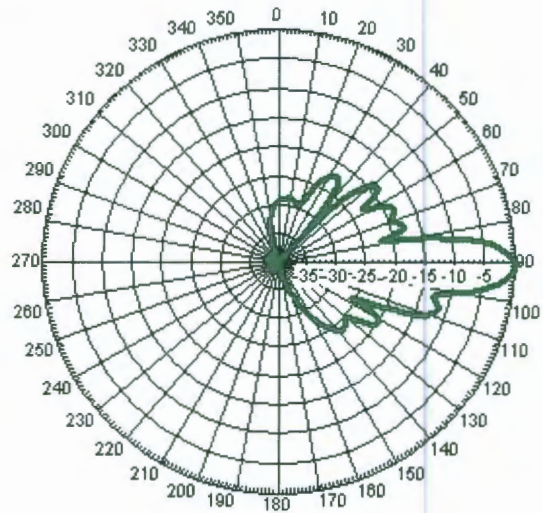
Decibel[®]
Base Station Antennas

AZIMUTH PATTERN

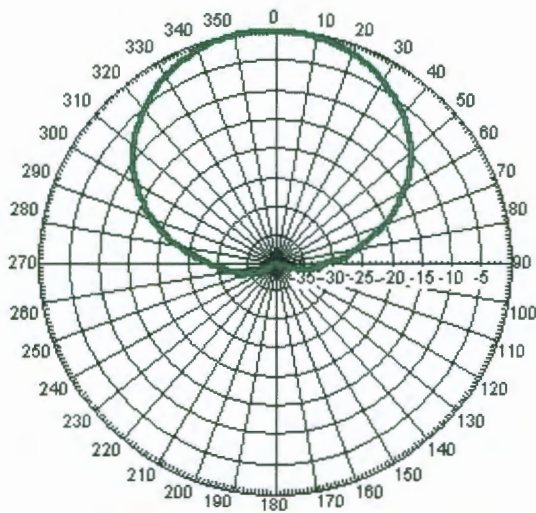
ELEVATION PATTERN



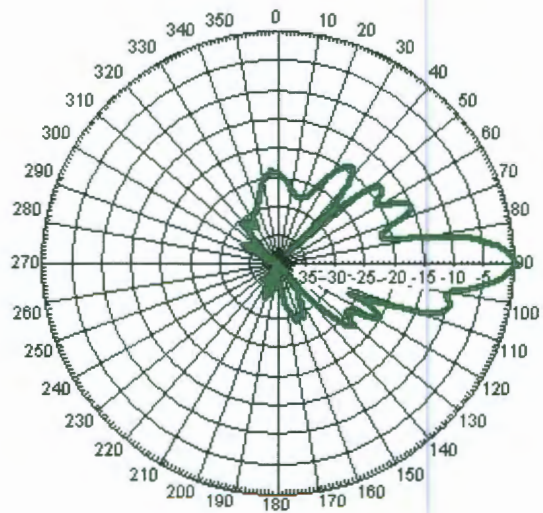
Freq: 850 MHz, Tilt: 0



Freq: 850 MHz, Tilt: 0



Freq: 940 MHz, Tilt: 0



Freq: 940 MHz, Tilt: 0

Andrew Corporation
2601 Telecom Parkway
Richardson, Texas U.S.A 75082-3521
Tel: 214.631.0310

Fax: 214.631.4706
Toll Free Tel: 1.800.676.5342
Fax: 1.800.229.4706
www.andrew.com

* - Indicates Typical
4/13/2007
dbtech@andrew.com

Information correct at date of issue but may be subject to change without notice.

Product Specifications



HBV-6517DS-T2M

Sector Antenna, 1710–2170 MHz, 65° horizontal beamwidth, fixed electrical tilt



- Low profile for ease of zoning approval
- Optimized for maximum gain on the horizon
- Superior front-to-back ratio
- Extremely rugged, reliable design, light weight for low tower loading

CHARACTERISTICS

General Specifications

Antenna Type Sector
 Operating Frequency Band 1710 – 2170 MHz

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2170
Beamwidth, Horizontal, degrees	65	65	65
Gain, dBd	16.9	17.4	17.4
Gain, dBi	19.0	19.5	19.5
Beamwidth, Vertical, degrees	4.8	4.6	4.4
Beam Tilt, degrees	2	2	2
Upper Sidelobe Suppression (USLS), typical, dB	16	17	17
Front-to-Back Ratio at 180°, dB	32	34	34
VSWR	1.45:1	1.45:1	1.45:1
3rd Order IMD at 2 x 20 W, dBc	-150	-150	-150
Input Power, maximum, watts	250	250	250
Polarization	Vertical	Vertical	Vertical
Impedance, ohms	50	50	50
Lightning Protection	dc Ground	dc Ground	dc Ground

Product Specifications

HBV-6517DS-T2M



Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	1
Wind Area, maximum	0.2 m ² 1.9 ft ²
Wind Loading, maximum	471.5 N @ 100 mph 106.0 lbf @ 100 mph
Wind Speed, maximum	241.4 km/h 150.0 mph

Dimensions

Depth	83.8 mm 3.3 in
Length	1960.9 mm 77.2 in
Width	165.1 mm 6.5 in
Net Weight	6.2 kg 13.6 lb

Regulatory Compliance/Certifications

Agency

RoHS 2002/95/EC
China RoHS SJ/T 11364-2006

Classification

Compliant by Exemption
Logo 2



Included Products



602030A

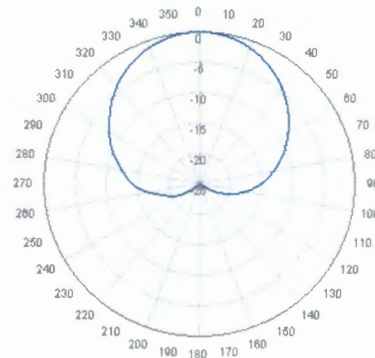
Downtilt Mounting Kit for 4.5 in (114.3 mm) OD round members

Product Specifications

HBV-6517DS-T2M

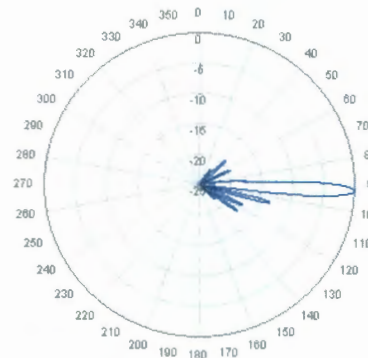


Horizontal Pattern

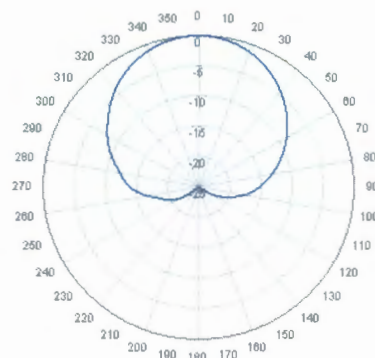


Freq: 1785 MHz, Tilt: 2°

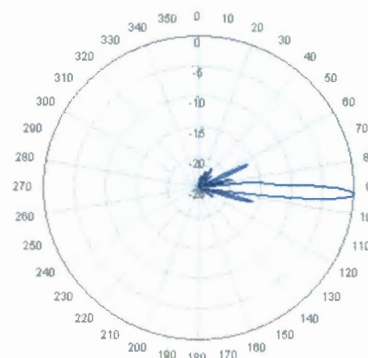
Vertical Pattern



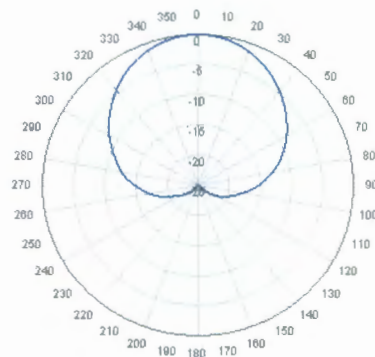
Freq: 1785 MHz, Tilt: 2°



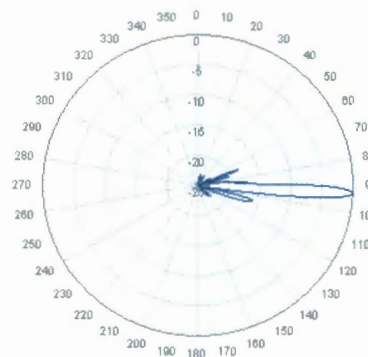
Freq: 1920 MHz, Tilt: 2°



Freq: 1920 MHz, Tilt: 2°



Freq: 2110 MHz, Tilt: 2°



Freq: 2110 MHz, Tilt: 2°

From North America, toll free
Telephone: 1-800-255-1479
Fax: 1-800-349-5444

Outside North America
Telephone: +1-708-873-2307
Fax: +1-779-435-8579

© 2008 CommScope, Inc. All rights reserved.
All specifications are subject to change. Please see www.andrew.com
for the most current information.

page 3 of 3
6/13/2008

Product Specifications



This specification is PRELIMINARY

LNX-6514DS-VTM

DualPol® Antenna, 698-896 MHz, 65° horizontal beamwidth, RET compatible variable electrical tilt

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site co-locations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings

CHARACTERISTICS

General Specifications

Antenna Type DualPol®
 Brand DualPol® | Teletilt®
 Operating Frequency Band 698 – 896 MHz

Electrical Specifications

Frequency Band, MHz	698-806	806-896
Beamwidth, Horizontal, degrees	65	65
Gain, dBd	13.7	14.2
Gain, dBi	15.8	16.3
Beamwidth, Vertical, degrees	12.0	12.0
Beam Tilt, degrees	0-12	0-12
Upper Sidelobe Suppression (USLS), typical, dB	17	17
Front-to-Back Ratio at 180°, dB	30	30
Isolation, dB	30	30
VSWR Return Loss, db	1.4:1 15.6	1.4:1 15.6
Intermodulation Products, 3rd Order, 2 x 20 W, dBc	-150	-150
Input Power, maximum, watts	400	400
Polarization	±45°	±45°
Impedance, ohms	50	50
Lightning Protection	dc Ground	dc Ground

Product Specifications

LNX-6514DS-VTM



Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	2
Wind Loading, maximum	186.0 lb/ft @ 100 mph
Wind Speed, maximum	241.4 km/h 150.0 mph

Dimensions

Depth	180.3 mm 7.1 in
Length	1828.8 mm 72.0 in
Width	302.3 mm 11.9 in
Net Weight	15.0 kg 33.1 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6514DS-R2M
RET System	Teletilt®

Included Products

- **600899A-2**
Downtilt Mounting Kit for 4.5 in (114.3 mm) OD round members



April 27, 2011

Marianne Leech
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6580

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: 2010543773
Carrier Site Name: Falmouth, Maine

Crown Castle Designation: Crown Castle BU Number: 878783
Crown Castle Site Name: Portland North
Crown Castle JDE Job Number: 155629
Crown Castle Work Order Number: 403608

Engineering Firm Designation: B&T Engineering, Inc. Project Number: 82822

Site Data: 527 Persumpscot, Portland, ME, Cumberland County
Latitude 43° 41' 58.53", Longitude -70° 15' 30.64"
178 Foot - Monopole Tower

Dear Marianne Leech

B&T Engineering, Inc. 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 412637, in accordance with application 121496, 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-222-G standard and the International Building Code 2009 based upon a wind speed of 100 mph 3-second gust.

All modifications and 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 Crown Castle USA Inc. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Jerod Dotson
Project Engineer

Chad E. Tuttle, P.E.
President

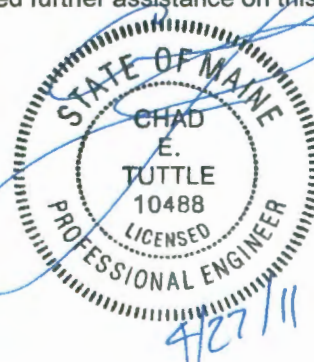


TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 5 - Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

RISA Tower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 178 ft Monopole tower designed by Pittsburg in December of 1996. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. This tower has been modified by PSG in April 2009 and these Modifications were incorporated in this Analysis

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 100 mph with no ice, 40 mph with 1 inch ice thickness and 60 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
149	151	1	Andrew	HBX-6517DS-T2M	6	1 5/8	
		2	Andrew	LNx-6514DS-VTM			
		2	Andrew	DB846F65ZAXY			
	150	2	Andrew	HBX-6517DS-T2M			
		1	Andrew	LNx-6514DS-VTM			
		4	Andrew	DB846F65ZAXY			

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
178	180	9 (MLA)	MLA Antenna	(6'x1'x6" Panel)	9 (MLA)	1 5/8	2
		6	Decibel	DB978H65A-M	6	1 5/8	1
		1	Bird Deterrent	Owl			
	178	1	--	Platform w/ Rails			
168	170	3	Celwave	APX16DWV-16DWV-S-E-A20	12	1 5/8	1
		6	Celwave	APXV18-206517-C			
		3	Ericsson	KRY 112 144/1 TMA			
		6	Ericsson	KRY 112 71 TMA			
	168	1	--	Platform Mount [LP 305-1]			
158	160	3	Allgon	7391.00	12	1 5/8	1
		6	Powerwave	7020.00			
		6	Powerwave	7770.00			
		6	Powerwave	LGP21401			
		6	Powerwave	LGP21903			
	158	1	--	T-Arm Mount [TA 602-3]			
149	151	6	Decibel	DB948P85E-M	12	1 5/8	3
	150	6	Decibel	DB844H80-XY			
	149	1	--	Platform w/ Rails			
134	135	6	Antel	BSA-185065/10CF	6	1 5/8	1
	134	1	--	Platform Mount [LP 403-1]			

- Notes:
 1) Existing Equipment
 2) MLA Equipment Controlling
 3) Equipment to be Removed

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)
180	180	1	--	Platform	--	--
		12	--	4 SQ Feet		
170	170	2	--	6' Dishes	--	--
160	160	1	--	Platform	--	--
		12	--	4 SQ Feet		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Revision # 0	121496	Crown OTG
Tower Manufacturing Drawing	Pittsburg, Project. No. 96088-117	1619399	Crown OTG
Tower Modification Drawing	PSG Engineering -Project no-0801F197-A040180	2415719	Crown OTG
Foundation Drawing	Pittsburg, Project. No. 96088-117	1620582	Crown OTG
Geotechnical Report	Gemini Geotechnical Associates Project no-96211ME	1620506	Crown OTG
Antenna Configuration	Crown CAD Package	Date: 04/20/11	Crown OTG

3.1) Analysis Method

RISA Tower (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-G.

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	178 - 140	Pole	P24x1/2	1	-14.465	1162.780	77.5	Pass
L2	140 - 100	Pole	P36x1/2	2	-28.701	1756.540	104.4	OK Note:2
L3	100 - 60	Pole	P48x5/8	3	-47.125	2930.150	84.8	Pass
L4	60 - 20	Pole	P54x5/8	4	-67.719	3301.250	102.3	OK Note:2
L5	20 - 0	Pole	P60x5/8	5	-78.681	3649.510	99.2	Pass
							Summary	
						Pole (L2)	104.4	OK Note:2
						Rating =	104.4	OK Note:2

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	104.4	OK Note: 2
1	Base Plate	Base	44.0	Pass
1	Flange Connection	140'	98.0	Pass
1	Flange Connection	100'	95.3	Pass
1	Flange Connection	60'	89.0	Pass
1	Flange Connection	20'	101.1	OK Note: 2
1	Base Foundation	Base	101.5	OK Note: 2

Structure Rating (max from all components) =	104.4 %
---	----------------

Notes:

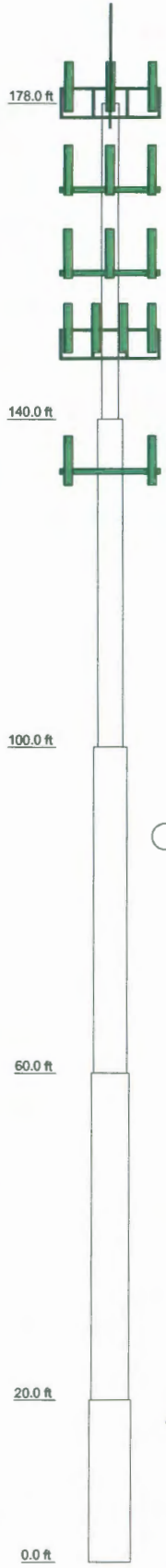
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Capacities up to 105% are considered acceptable based on analysis methods used.

4.1) Recommendations

N/A

APPENDIX A
RISA TOWER OUTPUT

1	P24x1/2	38,000	4.8
2	P36x1/2	40,000	7.6
3	P48x5/8	40,000	12.7
4	P54x5/8	40,000	14.3
5	P60x5/8	20,000	7.9
			47.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod (E)	185	7391.00 w/Mount Pipe (E)	160
(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe (MLA)	180	7391.00 w/Mount Pipe (E)	160
(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe (MLA)	180	7391.00 w/Mount Pipe (E)	160
(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe (MLA)	180	(2) 7020.00 (E)	160
(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe (MLA)	180	(2) 7020.00 (E)	160
6' x 2" Mount Pipe (MLA)	178	(2) LGP21401 (E)	160
6' x 2" Mount Pipe (MLA)	178	(2) LGP21401 (E)	160
6' x 2" Mount Pipe (MLA)	178	(2) LGP21903 (E)	160
Platform Mount [LP 713-1] (E)	178	(2) LGP21903 (E)	160
(2) APXV18-206517-C w/Mount Pipe (E)	170	(2) LGP21903 (E)	160
(2) APXV18-206517-C w/Mount Pipe (E)	170	6' x 2" Mount Pipe (E)	158
(2) APXV18-206517-C w/Mount Pipe (E)	170	6' x 2" Mount Pipe (E)	158
APX16DWW-16DWW-S-E-A20 w/Mount Pipe (E)	170	6' x 2" Mount Pipe (E)	158
APX16DWW-16DWW-S-E-A20 w/Mount Pipe (E)	170	T-Arm Mount [TA 802-3] (E)	158
APX16DWW-16DWW-S-E-A20 w/Mount Pipe (E)	170	LNx-6514DS-VTM w/Mount Pipe (P)	151
(2) KRY 112 71 TMA (E)	170	LNx-6514DS-VTM w/Mount Pipe (P)	151
(2) KRY 112 71 TMA (E)	170	HBX-6517DS-T2M w/Mount Pipe (P)	151
(2) KRY 112 71 TMA (E)	170	(2) DB846F65ZAXY w/Mount Pipe (P)	151
KRY 112 144/1 TMA (E)	170	HBX-6517DS-T2M w/Mount Pipe (P)	150
KRY 112 144/1 TMA (E)	170	HBX-6517DS-T2M w/Mount Pipe (P)	150
KRY 112 144/1 TMA (E)	170	LNx-6514DS-VTM w/Mount Pipe (P)	150
Platform Mount [LP 305-1] (E)	168	(2) DB846F65ZAXY w/Mount Pipe (P)	150
(2) 7770.00 w/Mount Pipe (E)	160	(2) DB846F65ZAXY w/Mount Pipe (P)	150
(2) 7770.00 w/Mount Pipe (E)	160	Platform Mount [LP 713-1] (E)	149
(2) 7770.00 w/Mount Pipe (E)	160	(2) BSA-185065/10CF w/Mount Pipe (E)	135
		(2) BSA-185065/10CF w/Mount Pipe (E)	135
		(2) BSA-185065/10CF w/Mount Pipe (E)	135
		Platform Mount [LP 403-1] (E)	134

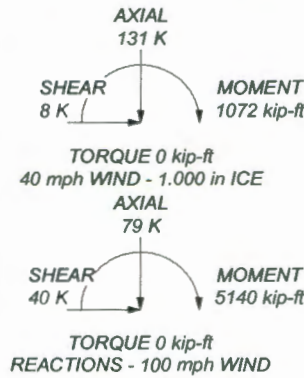
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Cumberland County, Maine.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 100 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 104.4%

ALL REACTIONS ARE FACTORED



 B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job: 82822 - Portland north, ME (BU# 878783)	
	Project: 178' Pittsburg Monopole / App ID: 121496; Rev: 0	
	Client: Crown Castle USA, Inc.	
	Drawn by: jdotsen	
	App'd:	
Code: TIA-222-G	Date: 04/28/11	Scale: N
Path:	Dwg No.	

Vx

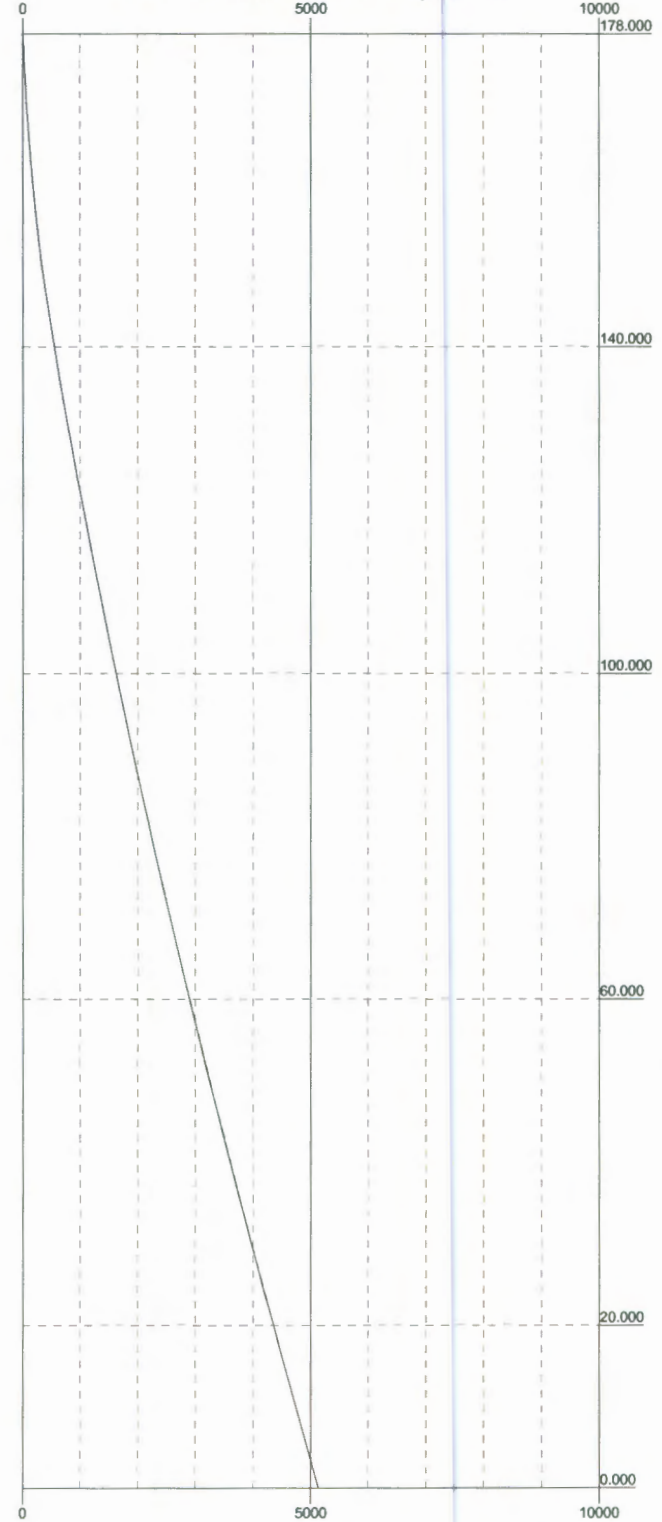
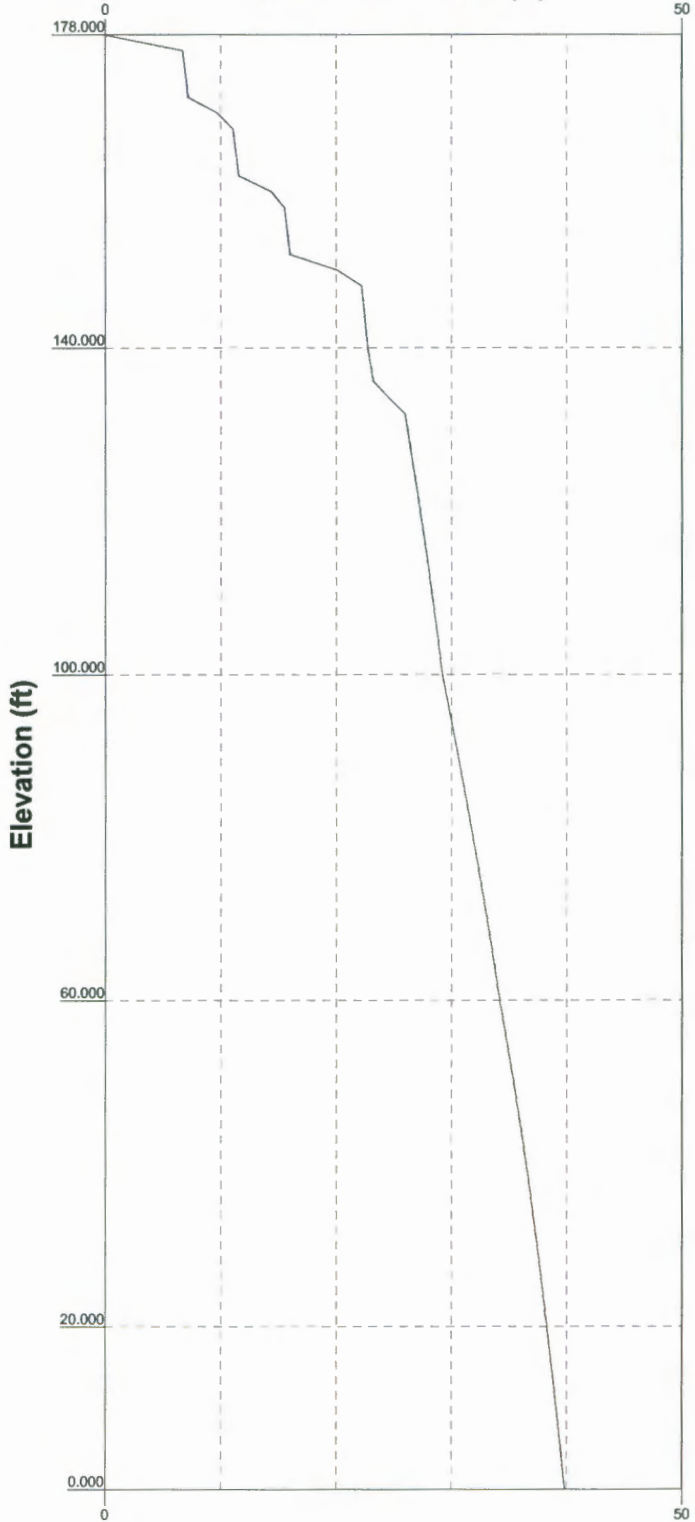
Vz

Mx

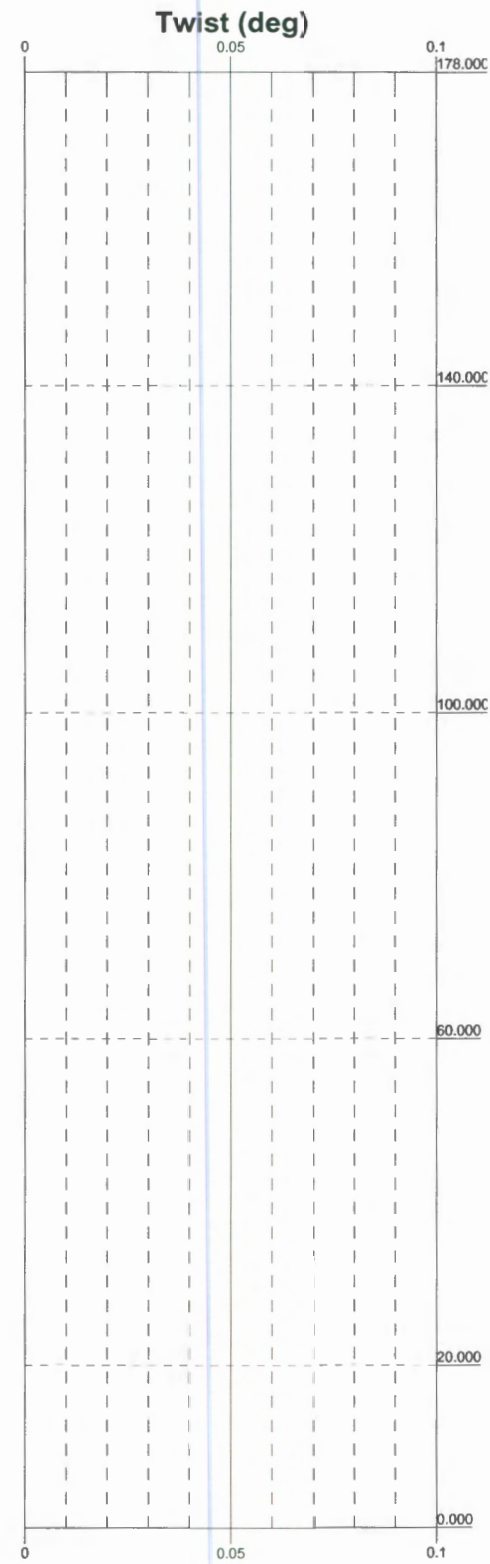
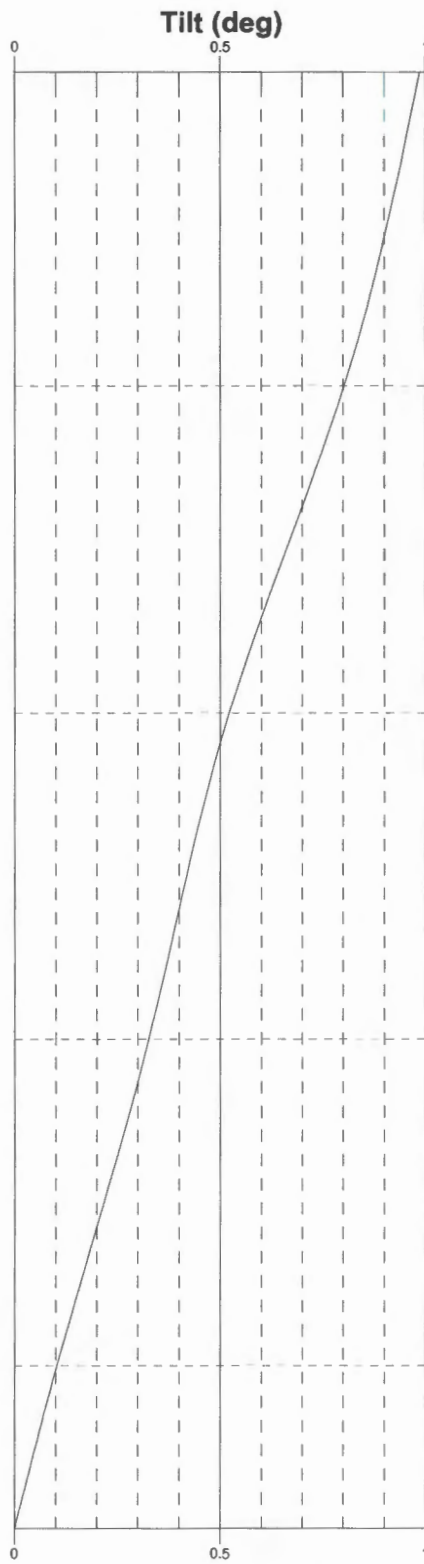
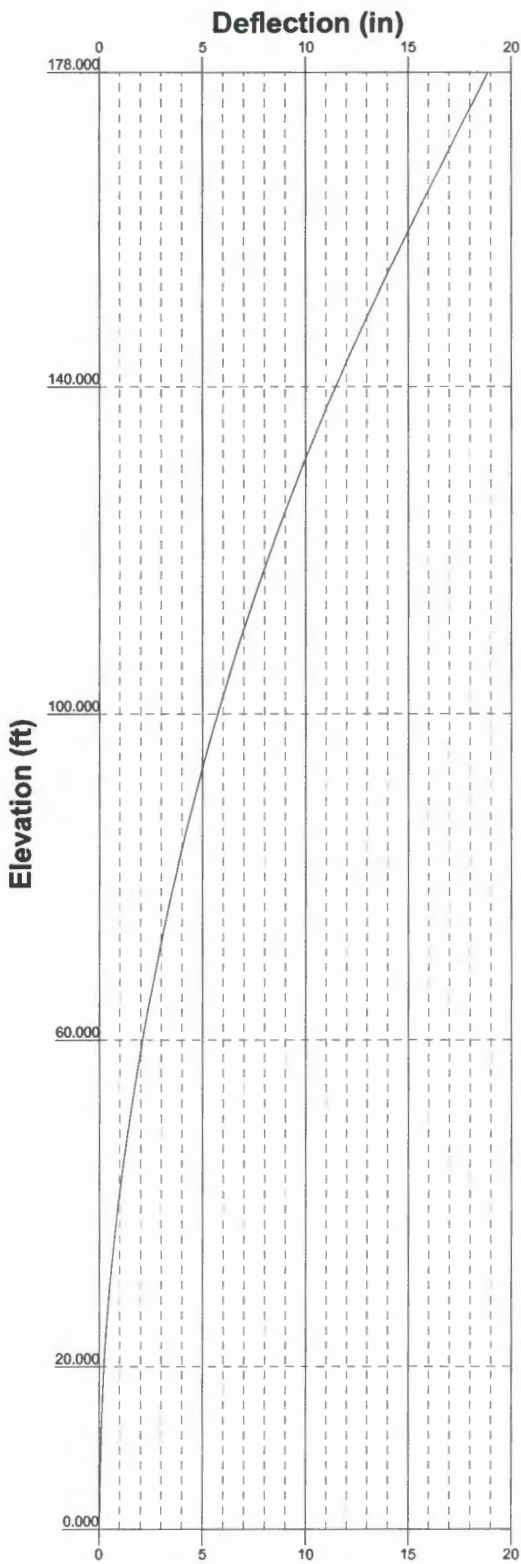
Mz


Global Mast Shear (K)

Global Mast Moment (kip-ft)



 <p>B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	Job: 82822 - Portland north, ME (BU# 878783)		
	Project: 178' Pittsburg Monopole / App ID: 121496; Rev: 0		
	Client: Crown Castle USA, Inc.	Drawn by: jdotson	App'd:
	Code: TIA-222-G	Date: 04/28/11	Scale: N
	Path:		Dwg No.

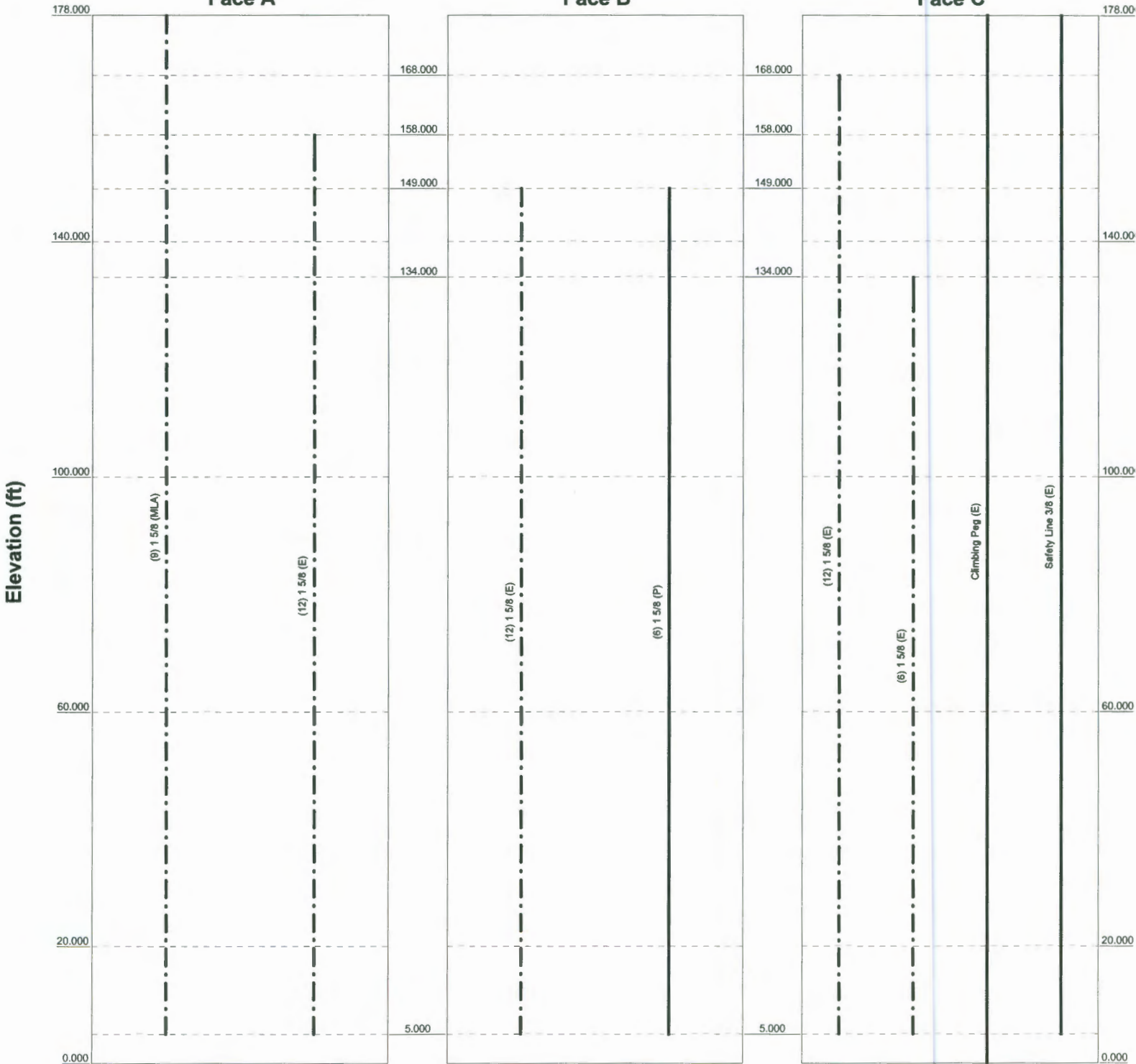


 <p>B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	<p>Job: 82822 - Portland north, ME (BU# 878783)</p>		
	<p>Project: 178' Pittsburg Monopole / App ID: 121496; Rev: 0</p>		
	<p>Client: Crown Castle USA, Inc.</p>	<p>Drawn by: jdotson</p>	<p>App'd:</p>
	<p>Code: TIA-222-G</p>	<p>Date: 04/28/11</p>	<p>Scale: N</p>
	<p>Path:</p>	<p>Dwg No.</p>	

Face A

Face B

Face C



 <p>B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	<p>Job: 82822 - Portland north, ME (BU# 878783)</p>		
	<p>Project: 178' Pittsburg Monopole / App ID: 121496; Rev: 0</p>		
	<p>Client: Crown Castle USA, Inc.</p>	<p>Drawn by: jdotson</p>	<p>App'd:</p>
	<p>Code: TIA-222-G</p>	<p>Date: 04/28/11</p>	<p>Scale: N</p>
	<p>Path:</p>	<p>Dwg No.</p>	

RISATower B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 82822 - Portland north, ME (BU# 878783)	Page 1 of 11
	Project 178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date 09:04:36 04/28/11
	Client Crown Castle USA, Inc.	Designed by jdotson

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:
Tower is located in Cumberland County, Maine.
Basic wind speed of 100 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 <li style="text-align: center;">Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

Pole Section Geometry

Section	Elevation <i>ft</i>	Section Length <i>ft</i>	Pole Size	Pole Grade	Socket Length <i>ft</i>
L1	178.000-140.000	38.000	P24x1/2	A53-B-35 (35 ksi)	
L2	140.000-100.000	40.000	P36x1/2	A53-B-35 (35 ksi)	
L3	100.000-60.000	40.000	P48x5/8	A53-B-35 (35 ksi)	
L4	60.000-20.000	40.000	P54x5/8	A53-B-35 (35 ksi)	
L5	20.000-0.000	20.000	P60x5/8	A53-B-35 (35 ksi)	

RISATower

B&T Engineering
 1717 S. Boulder, Suite 300
 Tulsa, OK 74119
 Phone: (918) 587-4630
 FAX: (918) 295-0265

Job	82822 - Portland north, ME (BU# 878783)	Page	2 of 11
Project	178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date	09:04:36 04/28/11
Client	Crown Castle USA, Inc.	Designed by	jdotson

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 178.000-140.000				1	1	1		
L2 140.000-100.000				1	1	1		
L3 100.000-60.000				1	1	1		
L4 60.000-20.000				1	1	1		
L5 20.000-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
			ft				in	in	klf
1 5/8 (P) ****	B	Surface Ar (CaAa)	149.000 - 5.000	6	6	0.000 0.200	1.980		0.001
Climbing Peg (E)	C	Surface Ar (CaAa)	178.000 - 0.000	1	1	0.000 0.000	0.880		0.000
Safety Line 3/8 (E) ****	C	Surface Af (CaAa)	178.000 - 5.000	1	1	0.100 0.100	0.375	1.180	0.000

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	klf
1 5/8 (MLA) ****	A	No	Inside Pole	178.000 - 5.000	9	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
1 5/8 (E) ****	C	No	Inside Pole	168.000 - 5.000	12	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
1 5/8 (E) ****	A	No	Inside Pole	158.000 - 5.000	12	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
1 5/8 (E) ****	B	No	Inside Pole	149.000 - 5.000	12	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
1 5/8 (E) ****	C	No	Inside Pole	134.000 - 5.000	6	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001

RISATower

B&T Engineering
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job
82822 - Portland north, ME (BU# 878783)

Page
3 of 11

Project
178' Pittsburg Monopole / App ID: 121496; Rev: 0

Date
09:04:36 04/28/11

Client
Crown Castle USA, Inc.

Designed by
jdotson

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	178.000-140.000	A	0.000	0.000	0.000	0.000	0.580
		B	0.000	0.000	10.692	0.000	0.168
		C	0.000	0.000	5.719	0.000	0.373
L2	140.000-100.000	A	0.000	0.000	0.000	0.000	0.874
		B	0.000	0.000	47.520	0.000	0.749
		C	0.000	0.000	6.020	0.000	0.736
L3	100.000-60.000	A	0.000	0.000	0.000	0.000	0.874
		B	0.000	0.000	47.520	0.000	0.749
		C	0.000	0.000	6.020	0.000	0.774
L4	60.000-20.000	A	0.000	0.000	0.000	0.000	0.874
		B	0.000	0.000	47.520	0.000	0.749
		C	0.000	0.000	6.020	0.000	0.774
L5	20.000-0.000	A	0.000	0.000	0.000	0.000	0.328
		B	0.000	0.000	17.820	0.000	0.281
		C	0.000	0.000	2.697	0.000	0.292

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	178.000-140.000	A	2.341	0.000	0.000	0.000	0.000	0.580
		B		0.000	0.000	18.632	0.000	0.457
		C		0.000	0.000	41.298	0.000	1.070
L2	140.000-100.000	A	2.276	0.000	0.000	0.000	0.000	0.874
		B		0.000	0.000	82.159	0.000	1.989
		C		0.000	0.000	42.435	0.000	1.434
L3	100.000-60.000	A	2.186	0.000	0.000	0.000	0.000	0.874
		B		0.000	0.000	81.259	0.000	1.933
		C		0.000	0.000	40.994	0.000	1.423
L4	60.000-20.000	A	2.042	0.000	0.000	0.000	0.000	0.874
		B		0.000	0.000	79.816	0.000	1.844
		C		0.000	0.000	38.685	0.000	1.348
L5	20.000-0.000	A	1.775	0.000	0.000	0.000	0.000	0.328
		B		0.000	0.000	28.931	0.000	0.632
		C		0.000	0.000	15.122	0.000	0.489

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	178.000-140.000	0.326	0.069	0.209	0.659
L2	140.000-100.000	1.210	-0.247	1.140	0.231
L3	100.000-60.000	1.294	-0.263	1.322	0.257
L4	60.000-20.000	1.325	-0.269	1.401	0.243
L5	20.000-0.000	1.066	-0.188	1.211	0.264

RISATower B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 82822 - Portland north, ME (BU# 878783)	Page 4 of 11
	Project 178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date 09:04:36 04/28/11
	Client Crown Castle USA, Inc.	Designed by jdotson

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	9	1 5/8	140.00 - 149.00	1.0000	1.0000
L1	13	Climbing Peg	140.00 - 178.00	1.0000	1.0000
L1	14	Safety Line 3/8	140.00 - 178.00	1.0000	1.0000
L2	9	1 5/8	100.00 - 140.00	1.0000	1.0000
L2	13	Climbing Peg	100.00 - 140.00	1.0000	1.0000
L2	14	Safety Line 3/8	100.00 - 140.00	1.0000	1.0000
L3	9	1 5/8	60.00 - 100.00	1.0000	1.0000
L3	13	Climbing Peg	60.00 - 100.00	1.0000	1.0000
L3	14	Safety Line 3/8	60.00 - 100.00	1.0000	1.0000
L4	9	1 5/8	20.00 - 60.00	1.0000	1.0000
L4	13	Climbing Peg	20.00 - 60.00	1.0000	1.0000
L4	14	Safety Line 3/8	20.00 - 60.00	1.0000	1.0000
L5	9	1 5/8	5.00 - 20.00	1.0000	1.0000
L5	13	Climbing Peg	0.00 - 20.00	1.0000	1.0000
L5	14	Safety Line 3/8	5.00 - 20.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft ²	C _A A ₂ Side ft ²	Weight K	
Lightning Rod (E)	C	None		0.000	185.000	No Ice 1/2" Ice 1" Ice	0.500 0.750 1.000	0.500 0.750 1.000	0.100 0.200 0.300

(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe (MLA)	C	From Face	0.000 0.000 0.000	0.000	180.000	No Ice 1/2" Ice 1" Ice	8.637 9.290 9.910	6.362 7.538 8.427	0.061 0.123 0.198
(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe (MLA)	B	From Face	0.000 0.000 0.000	0.000	180.000	No Ice 1/2" Ice 1" Ice	8.637 9.290 9.910	6.362 7.538 8.427	0.061 0.123 0.198
(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe (MLA)	A	From Face	0.000 0.000 0.000	0.000	180.000	No Ice 1/2" Ice 1" Ice	8.637 9.290 9.910	6.362 7.538 8.427	0.061 0.123 0.198
6' x 2" Mount Pipe (MLA)	C	From Face	0.000 0.000 0.000	0.000	178.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
6' x 2" Mount Pipe (MLA)	B	From Face	0.000 0.000 0.000	0.000	178.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
6' x 2" Mount Pipe (MLA)	A	From Face	0.000 0.000 0.000	0.000	178.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
Platform Mount [LP 713-1] (E)	C	None		0.000	178.000	No Ice 1/2" Ice 1" Ice	31.270 39.680 48.090	31.270 39.680 48.090	1.510 1.929 2.348

(2) APXV18-206517-C w/Mount Pipe (E)	C	From Face	0.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	5.167 5.618 6.077	4.463 5.394 6.203	0.048 0.088 0.139
(2) APXV18-206517-C w/Mount Pipe	B	From Face	0.000 0.000	0.000	170.000	No Ice 1/2" Ice	5.167 5.618	4.463 5.394	0.048 0.088

RISATower B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job	82822 - Portland north, ME (BU# 878783)	Page	5 of 11
	Project	178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date	09:04:36 04/28/11
	Client	Crown Castle USA, Inc.	Designed by	jdotson

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
(E)			0.000			1" Ice	6.077	6.203	0.139
(2) APXV18-206517-C w/Mount Pipe	A	From Face	0.000		0.000	No Ice	5.167	4.463	0.048
(E)			0.000			1/2" Ice	5.618	5.394	0.088
(E)			0.000			1" Ice	6.077	6.203	0.139
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	C	From Face	0.000		0.000	No Ice	7.547	3.575	0.063
(E)			0.000			1/2" Ice	8.111	4.415	0.110
(E)			0.000			1" Ice	8.655	5.131	0.167
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	B	From Face	0.000		0.000	No Ice	7.547	3.575	0.063
(E)			0.000			1/2" Ice	8.111	4.415	0.110
(E)			0.000			1" Ice	8.655	5.131	0.167
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	A	From Face	0.000		0.000	No Ice	7.547	3.575	0.063
(E)			0.000			1/2" Ice	8.111	4.415	0.110
(E)			0.000			1" Ice	8.655	5.131	0.167
(2) KRY 112 71 TMA	C	From Face	0.000		0.000	No Ice	0.000	0.408	0.013
(E)			0.000			1/2" Ice	0.809	0.513	0.018
(E)			0.000			1" Ice	0.938	0.627	0.025
(2) KRY 112 71 TMA	B	From Face	0.000		0.000	No Ice	0.000	0.408	0.013
(E)			0.000			1/2" Ice	0.809	0.513	0.018
(E)			0.000			1" Ice	0.938	0.627	0.025
(2) KRY 112 71 TMA	A	From Face	0.000		0.000	No Ice	0.000	0.408	0.013
(E)			0.000			1/2" Ice	0.809	0.513	0.018
(E)			0.000			1" Ice	0.938	0.627	0.025
KRY 112 144/1 TMA	C	From Face	0.000		0.000	No Ice	0.000	0.189	0.011
(E)			0.000			1/2" Ice	0.500	0.256	0.014
(E)			0.000			1" Ice	0.597	0.332	0.018
KRY 112 144/1 TMA	B	From Face	0.000		0.000	No Ice	0.000	0.189	0.011
(E)			0.000			1/2" Ice	0.500	0.256	0.014
(E)			0.000			1" Ice	0.597	0.332	0.018
KRY 112 144/1 TMA	A	From Face	0.000		0.000	No Ice	0.000	0.189	0.011
(E)			0.000			1/2" Ice	0.500	0.256	0.014
(E)			0.000			1" Ice	0.597	0.332	0.018
Platform Mount [LP 305-1]	C	None			0.000	No Ice	18.010	18.010	1.121
(E)						1/2" Ice	23.330	23.330	1.352
(E)						1" Ice	28.650	28.650	1.584

(2) 7770.00 w/Mount Pipe	C	From Face	0.000		0.000	No Ice	6.218	4.353	0.057
(E)			0.000			1/2" Ice	6.769	5.198	0.103
(E)			0.000			1" Ice	7.296	5.919	0.159
(2) 7770.00 w/Mount Pipe	B	From Face	0.000		0.000	No Ice	6.218	4.353	0.057
(E)			0.000			1/2" Ice	6.769	5.198	0.103
(E)			0.000			1" Ice	7.296	5.919	0.159
(2) 7770.00 w/Mount Pipe	A	From Face	0.000		0.000	No Ice	6.218	4.353	0.057
(E)			0.000			1/2" Ice	6.769	5.198	0.103
(E)			0.000			1" Ice	7.296	5.919	0.159
7391.00 w/Mount Pipe	C	From Face	0.000		0.000	No Ice	6.282	4.417	0.044
(E)			0.000			1/2" Ice	6.969	5.478	0.091
(E)			0.000			1" Ice	7.558	6.252	0.149
7391.00 w/Mount Pipe	B	From Face	0.000		0.000	No Ice	6.282	4.417	0.044
(E)			0.000			1/2" Ice	6.969	5.478	0.091
(E)			0.000			1" Ice	7.558	6.252	0.149
7391.00 w/Mount Pipe	A	From Face	0.000		0.000	No Ice	6.282	4.417	0.044
(E)			0.000			1/2" Ice	6.969	5.478	0.091
(E)			0.000			1" Ice	7.558	6.252	0.149
(2) 7020.00	C	From Face	0.000		0.000	No Ice	0.119	0.204	0.002
(E)			0.000			1/2" Ice	0.171	0.279	0.005
(E)			0.000			1" Ice	0.232	0.363	0.009
(2) 7020.00	B	From Face	0.000		0.000	No Ice	0.119	0.204	0.002

RISATower B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job		82822 - Portland north, ME (BU# 878783)		Page	6 of 11
	Project		178' Pittsburg Monopole / App ID: 121496; Rev: 0		Date	09:04:36 04/28/11
	Client		Crown Castle USA, Inc.		Designed by	jdotson

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
(E)			0.000						0.005
			0.000			1/2" Ice	0.171	0.279	0.009
			0.000			1" Ice	0.232	0.363	0.002
(2) 7020.00	A	From Face	0.000	0.000	160.000	No Ice	0.119	0.204	0.005
(E)			0.000			1/2" Ice	0.171	0.279	0.009
			0.000			1" Ice	0.232	0.363	0.014
(2) LGP21401	C	From Face	0.000	0.000	160.000	No Ice	1.288	0.233	0.021
(E)			0.000			1/2" Ice	1.445	0.313	0.030
			0.000			1" Ice	1.611	0.403	0.014
(2) LGP21401	B	From Face	0.000	0.000	160.000	No Ice	1.288	0.233	0.021
(E)			0.000			1/2" Ice	1.445	0.313	0.030
			0.000			1" Ice	1.611	0.403	0.014
(2) LGP21401	A	From Face	0.000	0.000	160.000	No Ice	1.288	0.233	0.021
(E)			0.000			1/2" Ice	1.445	0.313	0.030
			0.000			1" Ice	1.611	0.403	0.011
(2) LGP21903	C	From Face	0.000	0.000	160.000	No Ice	0.270	0.184	0.013
(E)			0.000			1/2" Ice	0.343	0.248	0.017
			0.000			1" Ice	0.425	0.322	0.011
(2) LGP21903	B	From Face	0.000	0.000	160.000	No Ice	0.270	0.184	0.013
(E)			0.000			1/2" Ice	0.343	0.248	0.017
			0.000			1" Ice	0.425	0.322	0.011
(2) LGP21903	A	From Face	0.000	0.000	160.000	No Ice	0.270	0.184	0.013
(E)			0.000			1/2" Ice	0.343	0.248	0.017
			0.000			1" Ice	0.425	0.322	0.022
6' x 2" Mount Pipe	C	From Face	0.000	0.000	158.000	No Ice	1.425	1.425	0.033
(E)			0.000			1/2" Ice	1.925	1.925	0.048
			0.000			1" Ice	2.294	2.294	0.022
6' x 2" Mount Pipe	B	From Face	0.000	0.000	158.000	No Ice	1.425	1.425	0.033
(E)			0.000			1/2" Ice	1.925	1.925	0.048
			0.000			1" Ice	2.294	2.294	0.022
6' x 2" Mount Pipe	A	From Face	0.000	0.000	158.000	No Ice	1.425	1.425	0.033
(E)			0.000			1/2" Ice	1.925	1.925	0.048
			0.000			1" Ice	2.294	2.294	0.774
T-Arm Mount [TA 602-3]	C	None		0.000	158.000	No Ice	11.590	11.590	0.990
(E)						1/2" Ice	15.440	15.440	1.206
						1" Ice	19.290	19.290	

LNx-6514DS-VTM w/Mount	C	From Face	0.000	0.000	151.000	No Ice	8.330	6.767	0.055
Pipe			0.000			1/2" Ice	8.878	7.720	0.193
(P)			0.000			1" Ice	9.435	8.549	0.055
LNx-6514DS-VTM w/Mount	B	From Face	0.000	0.000	151.000	No Ice	8.330	6.767	0.119
Pipe			0.000			1/2" Ice	8.878	7.720	0.193
(P)			0.000			1" Ice	9.435	8.549	0.055
LNx-6514DS-VTM w/Mount	A	From Face	0.000	0.000	150.000	No Ice	8.330	6.767	0.119
Pipe			0.000			1/2" Ice	8.878	7.720	0.193
(P)			0.000			1" Ice	9.435	8.549	0.034
HBX-6517DS-T2M w/Mount	C	From Face	0.000	0.000	151.000	No Ice	5.243	4.726	0.075
Pipe			0.000			1/2" Ice	5.709	5.675	0.126
(P)			0.000			1" Ice	6.183	6.501	0.034
HBX-6517DS-T2M w/Mount	B	From Face	0.000	0.000	150.000	No Ice	5.243	4.726	0.075
Pipe			0.000			1/2" Ice	5.709	5.675	0.126
(P)			0.000			1" Ice	6.183	6.501	0.034
HBX-6517DS-T2M w/Mount	A	From Face	0.000	0.000	150.000	No Ice	5.243	4.726	0.075
Pipe			0.000			1/2" Ice	5.709	5.675	0.126
(P)			0.000			1" Ice	6.183	6.501	0.047
(2) DB846F65ZAXY	C	From Face	0.000	0.000	151.000	No Ice	7.271	7.821	0.111
w/Mount Pipe			0.000			1/2" Ice	7.877	9.010	0.188
(P)			0.000			1" Ice	8.484	9.912	

RISATower

B&T Engineering
 1717 S. Boulder, Suite 300
 Tulsa, OK 74119
 Phone: (918) 587-4630
 FAX: (918) 295-0265

Job	82822 - Portland north, ME (BU# 878783)	Page	7 of 11
Project	178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date	09:04:36 04/28/11
Client	Crown Castle USA, Inc.	Designed by	jdotson

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
(2) DB846F65ZAXY w/Mount Pipe (P)	B	From Face	0.000	0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	7.271 7.877 8.484	7.821 9.010 9.912	0.047 0.111 0.188
(2) DB846F65ZAXY w/Mount Pipe (P)	A	From Face	0.000	0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	7.271 7.877 8.484	7.821 9.010 9.912	0.047 0.111 0.188
Platform Mount [LP 713-1] (E)	C	None			0.000	149.000	No Ice 1/2" Ice 1" Ice	31.270 39.680 48.090	31.270 39.680 48.090	1.510 1.929 2.348

(2) BSA-185065/10CF w/Mount Pipe (E)	C	From Face	0.000	0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	4.383 4.970 5.482	3.335 4.563 5.363	0.035 0.069 0.114
(2) BSA-185065/10CF w/Mount Pipe (E)	B	From Face	0.000	0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	4.383 4.970 5.482	3.335 4.563 5.363	0.035 0.069 0.114
(2) BSA-185065/10CF w/Mount Pipe (E)	A	From Face	0.000	0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	4.383 4.970 5.482	3.335 4.563 5.363	0.035 0.069 0.114
Platform Mount [LP 403-1] (E)	C	None			0.000	134.000	No Ice 1/2" Ice 1" Ice	18.850 24.300 29.750	18.850 24.300 29.750	1.500 1.797 2.093

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice

RISATower

B&T Engineering
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job	82822 - Portland north, ME (BU# 878783)	Page	8 of 11
Project	178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date	09:04:36 04/28/11
Client	Crown Castle USA, Inc.	Designed by	jdotson

Comb. No.	Description
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	178 - 140	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-41.397	-0.336	-0.653
			Max. Mx	8	-14.466	-551.455	0.029
			Max. My	14	-14.466	-0.041	-551.395
			Max. Vy	8	22.754	-551.455	0.029
			Max. Vx	2	-22.753	-0.107	551.386
			Max. Torque	8			-0.005
L2	140 - 100	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-64.413	-2.590	-1.023
			Max. Mx	8	-28.701	-1628.686	0.138
			Max. My	2	-28.701	-0.575	1628.261
			Max. Vy	8	29.244	-1628.686	0.138
			Max. Vx	2	-29.244	-0.575	1628.261
			Max. Torque	8			-0.005
L3	100 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-89.675	-5.257	-1.398
			Max. Mx	8	-47.125	-2901.943	0.279
			Max. My	2	-47.125	-1.185	2901.050
			Max. Vy	8	34.216	-2901.943	0.279
			Max. Vx	2	-34.215	-1.185	2901.050
			Max. Torque	8			-0.005
L4	60 - 20	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-116.929	-8.083	-1.724
			Max. Mx	8	-67.719	-4358.101	0.434
			Max. My	2	-67.719	-1.860	4356.690
			Max. Vy	8	38.296	-4358.101	0.434
			Max. Vx	2	-38.296	-1.860	4356.690
			Max. Torque	8			-0.005
L5	20 - 0	Pole	Max Tension	1	0.000	0.000	0.000

RISATower B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job	82822 - Portland north, ME (BU# 878783)	Page	9 of 11
	Project	178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date	09:04:36 04/28/11
	Client	Crown Castle USA, Inc.	Designed by	jdotson

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-130.759	-9.135	-1.871
			Max. Mx	8	-78.680	-5139.592	0.492
			Max. My	2	-78.680	-2.135	5137.963
			Max. Vy	8	39.835	-5139.592	0.492
			Max. Vx	2	-39.835	-2.135	5137.963
			Max. Torque	8			-0.005

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	178 - 140	18.874	42	0.986	0.000
L2	140 - 100	11.464	42	0.800	0.000
L3	100 - 60	5.728	42	0.522	0.000
L4	60 - 20	2.096	42	0.326	0.000
L5	20 - 0	0.227	42	0.105	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.000	Lightning Rod	42	18.874	0.986	0.000	55412
180.000	(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe	42	18.874	0.986	0.000	55412
178.000	6' x 2" Mount Pipe	42	18.874	0.986	0.000	55412
170.000	(2) APXV18-206517-C w/Mount Pipe	42	17.234	0.952	0.000	34633
168.000	Platform Mount [LP 305-1]	42	16.827	0.944	0.000	27706
160.000	(2) 7770.00 w/Mount Pipe	42	15.218	0.908	0.000	15392
158.000	6' x 2" Mount Pipe	42	14.823	0.898	0.000	13853
151.000	LNx-6514DS-VTM w/Mount Pipe	42	13.469	0.863	0.000	10261
150.000	LNx-6514DS-VTM w/Mount Pipe	42	13.280	0.858	0.000	9894
149.000	Platform Mount [LP 713-1]	42	13.092	0.853	0.000	9553
135.000	(2) BSA-185065/10CF w/Mount Pipe	42	10.613	0.767	0.000	7475
134.000	Platform Mount [LP 403-1]	42	10.448	0.761	0.000	7513

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	178 - 140	94.191	8	4.926	0.000
L2	140 - 100	57.223	8	3.996	0.000
L3	100 - 60	28.595	8	2.609	0.000
L4	60 - 20	10.463	8	1.628	0.000
L5	20 - 0	1.131	6	0.526	0.000

RISATower B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 82822 - Portland north, ME (BU# 878783)	Page 10 of 11
	Project 178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date 09:04:36 04/28/11
	Client Crown Castle USA, Inc.	Designed by jdotson

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.000	Lightning Rod	8	94.191	4.926	0.000	11245
180.000	(3) MLA Antenna (6'x1'x6" Panel) w/Mount Pipe	8	94.191	4.926	0.000	11245
178.000	6' x 2" Mount Pipe	8	94.191	4.926	0.000	11245
170.000	(2) APXV18-206517-C w/Mount Pipe	8	86.012	4.756	0.000	7027
168.000	Platform Mount [LP 305-1]	8	83.980	4.713	0.000	5622
160.000	(2) 7770.00 w/Mount Pipe	8	75.955	4.533	0.000	3122
158.000	6' x 2" Mount Pipe	8	73.984	4.486	0.000	2809
151.000	LNx-6514DS-VTM w/Mount Pipe	8	67.231	4.311	0.000	2079
150.000	LNx-6514DS-VTM w/Mount Pipe	8	66.287	4.285	0.000	2005
149.000	Platform Mount [LP 713-1]	8	65.350	4.258	0.000	1935
135.000	(2) BSA-185065/10CF w/Mount Pipe	8	52.980	3.833	0.000	1511
134.000	Platform Mount [LP 403-1]	8	52.156	3.799	0.000	1519

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _u K	Ratio P _u φP _u
L1	178 - 140 (1)	P24x1/2	38.000	0.000	0.0	36.914	-14.465	1162.780	0.012
L2	140 - 100 (2)	P36x1/2	40.000	0.000	0.0	55.763	-28.701	1756.540	0.016
L3	100 - 60 (3)	4.8.2 (1.04 CR) - 2 P48x5/8	40.000	0.000	0.0	93.021	-47.125	2930.150	0.016
L4	60 - 20 (4)	P54x5/8	40.000	0.000	0.0	104.802	-67.719	3301.250	0.021
L5	20 - 0 (5)	4.8.2 (1.02 CR) - 4 P60x5/8	20.000	0.000	0.0	116.583	-78.681	3649.510	0.022

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{xx} kip-ft	φM _{xx} kip-ft	Ratio M _{xx} φM _{xx}	M _{yy} kip-ft	φM _{yy} kip-ft	Ratio M _{yy} φM _{yy}
L1	178 - 140 (1)	P24x1/2	551.518	724.938	0.761	0.000	724.938	0.000
L2	140 - 100 (2)	P36x1/2	1628.850	1586.550	1.027	0.000	1586.550	0.000
L3	100 - 60 (3)	P48x5/8	2902.233	3492.392	0.831	0.000	3492.392	0.000
L4	60 - 20 (4)	P54x5/8	4358.525	4349.317	1.002	0.000	4349.317	0.000
L5	20 - 0 (5)	P60x5/8	5140.075	5299.025	0.970	0.000	5299.025	0.000

RISATower B&T Engineering 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 82822 - Portland north, ME (BU# 878783)	Page 11 of 11
	Project 178' Pittsburg Monopole / App ID: 121496; Rev: 0	Date 09:04:36 04/28/11
	Client Crown Castle USA, Inc.	Designed by jdotson

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	178 - 140 (1)	P24x1/2	22.756	581.391	0.039	0.005	1115.342	0.000
L2	140 - 100 (2)	P36x1/2	29.246	878.272	0.033	0.005	2562.642	0.000
L3	100 - 60 (3)	P48x5/8	34.217	1465.070	0.023	0.005	5709.675	0.000
L4	60 - 20 (4)	P54x5/8	38.298	1650.620	0.023	0.005	7257.858	0.000
L5	20 - 0 (5)	P60x5/8	39.838	1824.750	0.022	0.005	8935.667	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	178 - 140 (1)	0.012	0.761	0.000	0.039	0.000	0.775	1.000	4.8.2 ✓
L2	140 - 100 (2)	0.016	1.027	0.000	0.033	0.000	1.044 ✗	1.000	4.8.2 ✗
L3	100 - 60 (3)	0.016	0.831	0.000	0.023	0.000	0.848	1.000	4.8.2 ✓
L4	60 - 20 (4)	0.021	1.002	0.000	0.023	0.000	1.023 ✗	1.000	4.8.2 ✗
L5	20 - 0 (5)	0.022	0.970	0.000	0.022	0.000	0.992	1.000	4.8.2 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	178 - 140	Pole	P24x1/2	1	-14.465	1162.780	77.5	Pass
L2	140 - 100	Pole	P36x1/2	2	-28.701	1756.540	104.4	OK
L3	100 - 60	Pole	P48x5/8	3	-47.125	2930.150	84.8	Pass
L4	60 - 20	Pole	P54x5/8	4	-67.719	3301.250	102.3	OK
L5	20 - 0	Pole	P60x5/8	5	-78.681	3649.510	99.2	Pass
Summary								
Pole (L2)							104.4	OK
RATING =							104.4	OK

APPENDIX B
BASE LEVEL DRAWING

(MLA)
(9) 1-5/8" TO 178 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 178 FT LEVEL

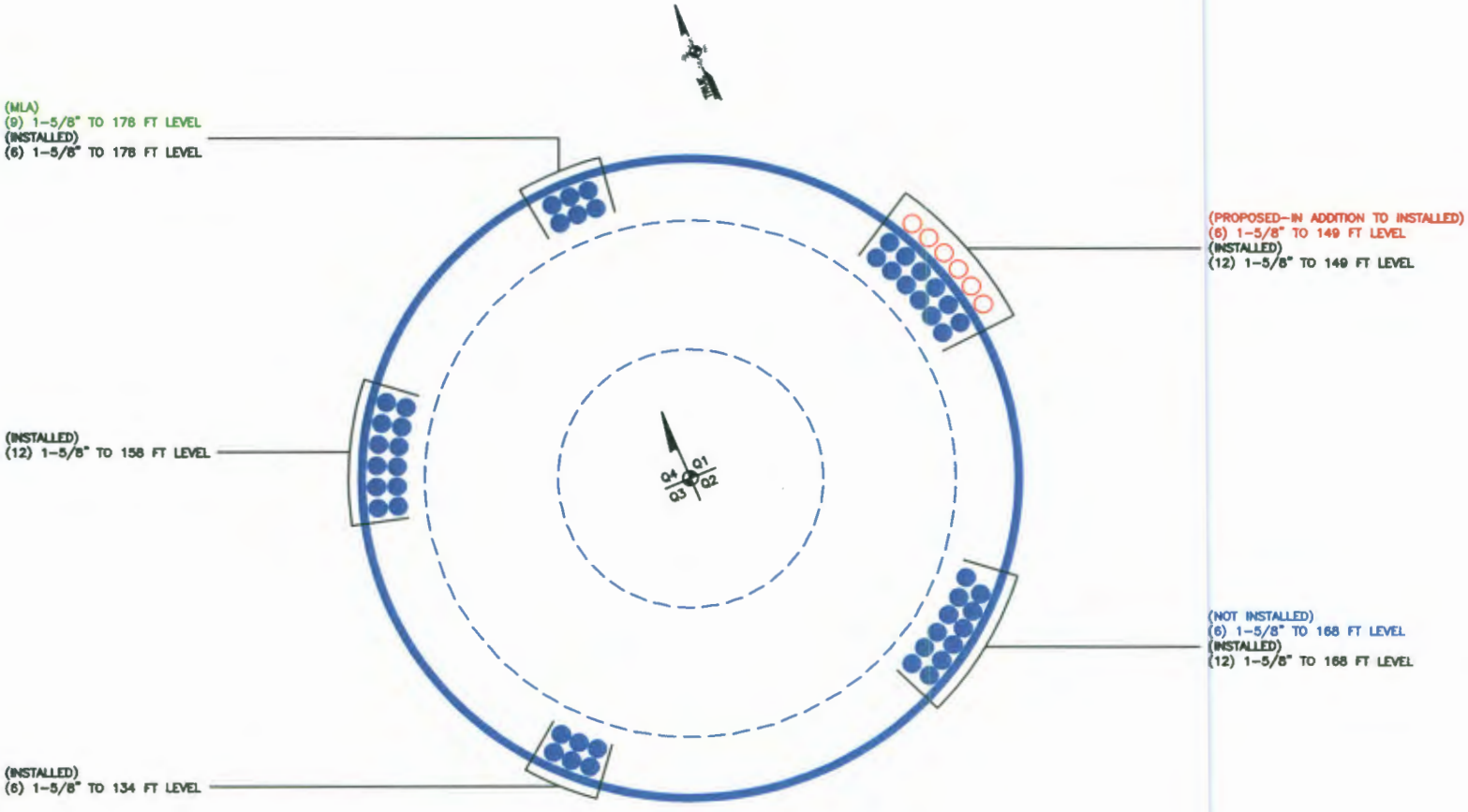
(INSTALLED)
(12) 1-5/8" TO 158 FT LEVEL

(INSTALLED)
(6) 1-5/8" TO 134 FT LEVEL

(PROPOSED—IN ADDITION TO INSTALLED)
(8) 1-5/8" TO 149 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 149 FT LEVEL

(NOT INSTALLED)
(6) 1-5/8" TO 168 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 168 FT LEVEL

BUSINESS UNIT: 878783



APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data	
BU#:	878783
Site Name:	Portland north, ME
App #:	121496; Rev: 0
Pole Manufacturer:	Other

Anchor Rod Data	
Qty:	32
Diam:	2 in
Rod Material:	Other
Strength (Fu):	58 ksi
Yield (Fy):	36 ksi
Bolt Circle:	66 in

Plate Data	
Diam:	72 in
Thick:	3.25 in
Grade:	36 ksi
Single-Rod B-eff:	5.89 in

Stiffener Data (Welding at both sides)	
Config:	0 *
Weld Type:	Fillet
Groove Depth:	0.25 <-- Disregard
Groove Angle:	45 <-- Disregard
Fillet H. Weld:	0.25 in
Fillet V. Weld:	0.3125 in
Width:	5 in
Height:	18 in
Thick:	0.75 in
Notch:	0.5 in
Grade:	36 ksi
Weld str.:	70 ksi

Pole Data	
Diam:	60 in
Thick:	0.625 in
Grade:	35 ksi
# of Sides:	0 "0" IF Round
Fu	63 ksi
Reinf. Fillet Weld	0 "0" if None

Reactions		
Mu:	5140	ft-kips
Axial, Pu:	79	kips
Shear, Vu:	40	kips
Eta Factor, η	0.7	TIA G (Fig. 4-4)

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

Anchor Rod Results	
Max Rod (Cu+ Vu/η):	121.1 Kips
Allowable Axial, Φ*Fu*Anet:	116.0 Kips
Anchor Rod Stress Ratio:	104.4% Pass

Rigid
AISC LRFD
φ*Tn

Base Plate Results		Flexural Check
Base Plate Stress:	14.3 ksi	
Allowable Plate Stress:	32.4 ksi	
Base Plate Stress Ratio:	44.0%	Pass

Rigid
AISC LRFD
φ*Fy
Y.L. Length:
27.50

n/a

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

Pole Results	
Pole Punching Shear Check:	n/a



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

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

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

Site Data

BU#: 878783
 Site Name: Portland north, ME
 App #: 121496; Rev: 0

Reactions		
Mu	4358.101	ft-kips
Axial, Pu:	67.719	kips
Shear, Vu:	38.296	kips
Elevation:	20	feet

Bolt Threads:
X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi^* V_n$ (kips):
43.05

Pole Manufacturer:	Other
--------------------	-------

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

Bolt Data		
Qty:	60	
Diameter (in.):	1.125	Bolt Fu: 105
Bolt Material:	A325	Bolt Fy: 81
N/A:	75	<-- Disregard
N/A:	55	<-- Disregard
Circle (in.):	56.375	

Flange Bolt Results		Rigid
Bolt Tension Capacity, $\phi^* T_n, B1$:	60.09 kips	$\phi^* T_n$
Adjusted $\phi^* T_n$ (due to $V_u = V_u / Q_t$), B:	60.08 kips	$\phi T_n [(1 - (V_u / \phi V_n)^2)^{0.5}]$
Max Bolt directly applied Tu:	60.72 Kips	
Min. PL "tc" for B cap. w/o Pry:	Tu>B N/A in	
Min PL "treq" for actual T w/ Pry:	1.014 in	
Min PL "t1" for actual T w/o Pry:	Tu>B N/A in	
T allowable w/o Prying:	60.09 kips	
Prying Force, q:	0.00 kips	T>B Case
Total Bolt Tension=Tu+q:	60.72 kips	
Non-Prying Bolt Stress Ratio, Tu/B:	101.1% Pass	

Plate Data		
Diam:	58.5	in
Thick, t:	3.125	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.83	in

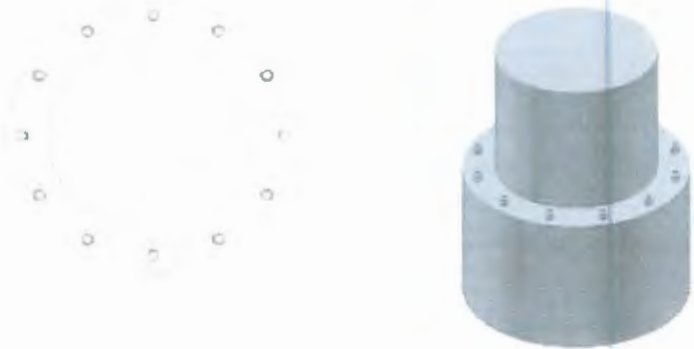
Exterior Flange Plate Results		Flexural Check	Rigid
Compression Side Plate Stress:	7.0 ksi		TIA G
Allowable Plate Stress:	32.4 ksi		$\phi^* F_y$
Compression Plate Stress Ratio:	21.6% Pass		Comp. Y.L. Length:
No Prying Check for Tu>B			16.19
Tension Side Stress Ratio, (treq/t)^2:	10.5% Pass		

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

n/a
Stiffener Results
 Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results
 Pole Punching Shear Check: n/a

Pole Data		
Diam:	54	in
Thick:	0.625	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None



* 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

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

Site Data

BU#: 878783
 Site Name: Portland north, ME
 App #: 121496; Rev: 0

Manufacturer: Other

Bolt Data

Qty:	60	Bolt Fu:	105
Diam:	1.125	Bolt Fy:	81
Bolt Material:	A325		
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	56.375	in	

Plate Data

Plate Outer Diam:	58.75	in
Plate Inner Diam:	54.25	in (Hole @ Ctr)
Thick:	3.125	in
Grade:	36	ksi
Effective Width:	3.08	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
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:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data

Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Reactions

Moment:	4358.101	ft-kips
Axial:	67.719	kips
Shear:	38.296	kips
Exterior Flange Run, T+q:	60.72	kips

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
43.05

Elevation: 20 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu: 60.7 Kips, Ext. Flange Tu+q
 Adjusted ϕ^*T_n (due to $V_u = V_u/Q_t$), l: 60.1 Kips
 Bolt Stress Ratio: 101.1% **Pass**

Interior Flange Plate Results

Controlling Bolt Axial Force: 63.0 Kips, Ext. Cu=Interior Cu
 Plate Stress: 10.0 ksi
 Allowable Plate Stress, ϕ^*F_y : 32.4 ksi
 Plate Stress Ratio: 30.7% **Pass**

n/a

Stiffener Results

Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: n/a
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a



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

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

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

Site Data

BU#: 878783
 Site Name: Portland north, ME
 App #: 121496; Rev: 0

Reactions		
Mu	2901.943	ft-kips
Axial, Pu:	47.125	kips
Shear, Vu:	34.216	kips
Elevation:	60	feet

Bolt Threads:
X-Excluded
$\phi V_n = \phi(0.55 \cdot A_b \cdot F_u)$
$\phi = 0.75, \phi \cdot V_n$ (kips):
38.88

Pole Manufacturer:	Other
--------------------	-------

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

Bolt Data		
Qty:	56	
Diameter (in.):	1	Bolt Fu: 120
Bolt Material:	A325	Bolt Fy: 92
N/A:	75	<-- Disregard
N/A:	55	<-- Disregard
Circle (in.):	50.375	

Flange Bolt Results		Rigid
Bolt Tension Capacity, $\phi \cdot T_n, B1$:	54.54 kips	$\phi \cdot T_n$
Adjusted $\phi \cdot T_n$ (due to $V_u = V_u / Q_t$), B:	54.53 kips	$\phi T_n [(1 - (V_u / \phi V_n)^2)^{0.5}]$
Max Bolt directly applied Tu:	48.54 Kips	
Min. PL "tc" for B cap. w/o Pry:	1.032 in	
Min PL "treq" for actual T w/ Pry:	0.826 in	
Min PL "t1" for actual T w/o Pry:	0.974 in	
T allowable w/o Prying:	54.54 kips	$\alpha' < 0$ case
Prying Force, q:	0.00 kips	
Total Bolt Tension = Tu + q:	48.54 kips	
Non-Prying Bolt Stress Ratio, Tu/B:	89.0% Pass	

Plate Data		
Diam:	52.5	in
Thick, t:	2.75	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.69	in

Exterior Flange Plate Results		Flexural Check	Rigid
Compression Side Plate Stress:	7.5 ksi		TIA G
Allowable Plate Stress:	32.4 ksi		$\phi \cdot F_y$
Compression Plate Stress Ratio:	23.2% Pass		Comp. Y.L. Length:
No Prying			15.29
Tension Side Stress Ratio, $(treq/t)^2$:	9.0% Pass		

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

n/a

Stiffener Results	
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$:	n/a
Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Data		
Diam:	48	in
Thick:	0.625	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu:	63	ksi
Reinf. Fillet Weld:	0	"0" if None

Pole Results	
Pole Punching Shear Check:	n/a



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

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

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

Site Data

BU#: 878783
 Site Name: Portland north, ME
 App #: 121496; Rev: 0

Manufacturer: Other

Bolt Data

Qty:	56	Bolt Fu:	120
Diam:	1	Bolt Fy:	92
Bolt Material:	A325		
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	50.375	in	

Plate Data

Plate Outer Diam:	52.75	in
Plate Inner Diam:	48.25	in (Hole @ Ctr)
Thick:	2.75	in
Grade:	36	ksi
Effective Width:	2.96	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
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:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data

Pole OuterDiam:	54	in
Thick:	0.625	in
Pole Inner Diam:	52.75	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Reactions

Moment:	2901.943	ft-kips
Axial:	47.125	kips
Shear:	34.216	kips
Exterior Flange Run, T+q:	48.54	kips

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
38.88

Elevation: 60 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu: 48.5 Kips, Ext. Flange Tu+q
 Adjusted ϕ^*T_n (due to $V_u = V_u/Q_t$), I: 54.5 Kips
 Bolt Stress Ratio: 89.0% **Pass**

Interior Flange Plate Results

Controlling Bolt Axial Force: 50.2 Kips, Ext. Cu=Interior Cu
 Plate Stress: 10.7 ksi
 Allowable Plate Stress, ϕ^*F_y : 32.4 ksi
 Plate Stress Ratio: 32.9% **Pass**

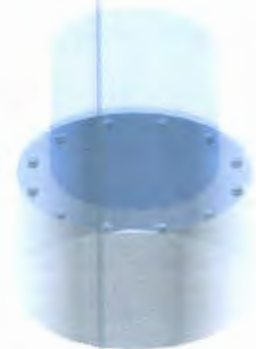
n/a

Stiffener Results

Horizontal Weld: n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: n/a
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a



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

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

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

Site Data

BU#: 878783

Site Name: Portland north, ME

App #: 121496; Rev: 0

Reactions		
Mu	1628.686	ft-kips
Axial, Pu:	28.701	kips
Shear, Vu:	29.244	kips
Elevation:	100	feet

Bolt Threads:
X-Excluded
$\phi V_n = \phi(0.55 \cdot A_b \cdot F_u)$
$\phi = 0.75, \phi \cdot V_n$ (kips):
27.34

Pole Manufacturer:	Other
--------------------	-------

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

Bolt Data		
Qty:	52	
Diameter (in.):	0.75	Bolt Fu: 150
Bolt Material:	Other	Bolt Fy: 113
Strength (Fu):	150	ksi
Yield (Fy):	113	ksi
Circle (in.):	41.375	

Flange Bolt Results		Rigid
Bolt Tension Capacity, $\phi \cdot T_n, B1$:	37.58 kips	$\phi \cdot T_n$
Adjusted $\phi \cdot T_n$ (due to $V_u = V_u / Q_t$), B:	37.57 kips	$\phi T_n [(1 - (V_u / \phi V_n)^2)^{0.5}]$
Max Bolt directly applied Tu:	35.78 Kips	
Min. PL "tc" for B cap. w/o Pry:	1.749 in	
Min PL "treq" for actual T w/ Pry:	1.652 in	
Min PL "t1" for actual T w/o Pry:	1.707 in	
T allowable w/o Prying:	37.58 kips	$\alpha' < 0$ case
Prying Force, q:	0.00 kips	
Total Bolt Tension = Tu + q:	35.78 kips	
Non-Prying Bolt Stress Ratio, Tu/B:	95.3% Pass	

Plate Data		
Diam:	46.5	in
Thick, t:	2.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.17	in

Exterior Flange Plate Results		Flexural Check	Rigid
Compression Side Plate Stress:	17.2 ksi		TIA G
Allowable Plate Stress:	32.4 ksi		$\phi \cdot F_y$
Compression Plate Stress Ratio:	53.1% Pass		Comp. Y.L. Length: 20.39
No Prying			
Tension Side Stress Ratio, $(treq/t)^2$:	43.7% Pass		

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

n/a
Stiffener Results
 Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Data		
Diam:	36	in
Thick:	0.5	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Pole Results
 Pole Punching Shear Check: n/a



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

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

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

Site Data

BU#: 878783
 Site Name: Portland north, ME
 App #: 121496; Rev: 0

Manufacturer: Other

Bolt Data

Qty:	52	Bolt Fu:	150
Diam:	0.75	Bolt Fy:	113
Bolt Material:	Other		
Strength (Fu):	150 ksi		
Yield (Fy):	113 ksi		
Circle:	41.375 in		

Plate Data

Plate Outer Diam:	46.75 in
Plate Inner Diam:	36.25 in (Hole @ Ctr)
Thick:	2.5 in
Grade:	36 ksi
Effective Width:	2.82 in

Stiffener Data (Welding at Both Sides)

Config:	0	*
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:	3 in	
Height:	18 in	
Thick:	0.75 in	
Notch:	0.5 in	
Grade:	36 ksi	
Weld str.:	70 ksi	

Pole Data

Pole OuterDiam:	48 in
Thick:	0.625 in
Pole Inner Diam:	46.75 in
Grade:	35 ksi
# of Sides:	0 "0" IF Round
Fu	63 ksi

Reactions

Moment:	1628.686	ft-kips
Axial:	28.701	kips
Shear:	29.244	kips
Exterior Flange Run, T+q:	35.78	kips

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
27.34

Elevation: 100 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu: 35.8 Kips, Ext. Tu=Interior Tu
 Adjusted ϕ^*T_n (due to $V_u = V_u/Q_t$), l: 37.6 Kips
 Bolt Stress Ratio: 95.3% **Pass**

Interior Flange Plate Results

Controlling Bolt Axial Force: 36.9 Kips, Ext. Cu=Interior Cu
 Plate Stress: 22.5 ksi
 Allowable Plate Stress, ϕ^*F_y : 32.4 ksi
 Plate Stress Ratio: 69.3% **Pass**

Flexural Check

n/a

Stiffener Results

Horizontal Weld: n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: n/a
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a



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

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

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

Site Data

BU#: 878783
 Site Name: *Portland north, ME*
 App #: 121496; Rev: 0

Reactions		
Mu	551.455	ft-kips
Axial, Pu:	14.466	kips
Shear, Vu:	22.754	kips
Elevation:	140	feet

Bolt Threads:
X-Excluded
$\phi V_n = \phi(0.55 \cdot A_b \cdot F_u)$
$\phi = 0.75, \phi \cdot V_n$ (kips):
27.34

Pole Manufacturer:	Other
--------------------	-------

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

Bolt Data		
Qty:	24	
Diameter (in.):	0.75	Bolt Fu: 150
Bolt Material:	Other	Bolt Fy: 113
Strength (Fu):	150	ksi
Yield (Fy):	113	ksi
Circle (in.):	29.5	

Flange Bolt Results
 Bolt Tension Capacity, $\phi \cdot T_n, B1$: 37.58 kips
 Adjusted $\phi \cdot T_n$ (due to $V_u = V_u / Q_t$), B: 37.55 kips
 Max Bolt directly applied Tu: 36.78 Kips
 Min. PL "tc" for B cap. w/o Pry: 1.474 in
 Min PL "treq" for actual T w/ Pry: 1.440 in
 Min PL "t1" for actual T w/o Pry: 1.459 in
 T allowable w/o Prying: 37.58 kips $\alpha' < 0$ case
 Prying Force, q: 0.00 kips
 Total Bolt Tension = Tu + q: 36.78 kips
 Non-Prying Bolt Stress Ratio, Tu/B: 98.0% **Pass**

Rigid
$\phi \cdot T_n$
$\phi T_n [(1 - (V_u / \phi V_n)^2)^{0.5}]$

Plate Data		
Diam:	34.75	in
Thick, t:	1.875	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.14	in

Exterior Flange Plate Results Flexural Check
 Compression Side Plate Stress: 21.3 ksi
 Allowable Plate Stress: 32.4 ksi
 Compression Plate Stress Ratio: 65.6% **Pass**
No Prying
 Tension Side Stress Ratio, $(treq/t)^2$: 59.0% **Pass**

Rigid
TIA G
$\phi \cdot F_y$
Comp. Y.L. Length: 17.15

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

n/a
Stiffener Results
 Horizontal Weld: n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results
 Pole Punching Shear Check: n/a

Pole Data		
Diam:	24	in
Thick:	0.5	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None



* 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

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

Site Data

BU#: 878783
 Site Name: Portland north, ME
 App #: 121496; Rev: 0

Manufacturer: Other

Bolt Data

Qty:	24	Bolt Fu:	150
Diam:	0.75	Bolt Fy:	113
Bolt Material:	Other		
Strength (Fu):	150	ksi	
Yield (Fy):	113	ksi	
Circle:	29.5	in	

Plate Data

Plate Outer Diam:	35	in
Plate Inner Diam:	24.25	in (Hole @ Ctr)
Thick:	1.875	in
Grade:	36	ksi
Effective Width:	4.58	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
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:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data

Pole OuterDiam:	36	in
Thick:	0.5	in
Pole Inner Diam:	35	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Reactions

Moment:	551.455	ft-kips
Axial:	14.466	kips
Shear:	22.754	kips
Exterior Flange Run, T+q:	36.78	kips

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi^* V_n$ (kips):
27.34

Elevation: 140 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu: 36.8 Kips, Ext. Tu=Interior Tu
 Adjusted $\phi^* T_n$ (due to $V_u = V_u / Q_t$), I: 37.6 Kips
 Bolt Stress Ratio: 98.0% **Pass**

Interior Flange Plate Results

Controlling Bolt Axial Force: 38.0 Kips, Ext. Cu=Interior Cu
 Plate Stress: 25.9 ksi
 Allowable Plate Stress, $\phi^* F_y$: 32.4 ksi
 Plate Stress Ratio: 80.1% **Pass**

Flexural Check

n/a

Stiffener Results

Horizontal Weld: n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a



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

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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Any application (MP, SST, GT)

Site Data

BU#: 878783
Site Name: <i>Portland north, ME</i>
App #: 121496; Rev: 0

Loads Already Factored

For P (DL)	1.2	<---Disregard
For P,V, and M (WL)	1.35	<---Disregard

Pad & Pier Data

Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	0	in
Pad Bearing Depth, D:	5	ft
Pad Thickness, T:	5	ft
Pad Width=Length, L:	26.5	ft
Pier Cross Section Shape:	Round	<--Pull Down
Enter Pier Diameter:	5	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	19.63	ft^2
Pier Height:	0.00	ft
Soil (above pad) Height:	0.00	ft

Soil Parameters

Unit Weight, γ :	125.0	pcf
Ultimate Bearing Capacity, q_n :	6.00	ksf
Strength Reduct. factor, ϕ :	0.75	
Angle of Friction, Φ :	30.0	degrees
Undrained Shear Strength, C_u :	0.00	ksf
Allowable Bearing: $\phi * q_n$:	4.50	ksf
Passive Pres. Coeff., K_p :	3.00	

Forces/Moments due to Wind and Lateral Soil

Factored Pad Passive Force:	124.2	kips
Pad Force Location Above D:	1.67	ft
ϕ (Passive Pressure Moment):	155.27	ft-kips
Factored O.T. M(WL), "1.6W":	5340.0	ft-kips
Factored OT (MW-Msoil), M1	5184.73	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:	526.7	kips
Unfactored (Total ftg-soil Wt):	526.69	kips
1.2D. No Soil Wedges.	711.03	kips
0.9D. With Soil Wedges	533.27	kips

Resistance due to Cohesion (Vertical)

$\phi * (1/2 * C_u)$ (Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces

TIA Revision:	G	<--Pull Down
Factored DL Axial, PDu:	79	kips
Factored WL Axial, PWu:	0	kips
Factored WL Shear, Vu:	40	kips
Factored WL Moment, Mu:	5140	ft-kips

Load Factor Shaft Factored Loads

1.00	1.2D+1.6W, Pu:	79	kips
0.90	0.9D+1.6W, Pu:	59.25	kips
1.00	Vu:	40	kips
	Mu:	5140	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	711.03	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	5184.73	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 = 7.29 ft
 Orthogonal qu= 2.25 ksf
 qu/ $\phi * q_n$ Ratio= **50.04%** Pass

Diagonal Direction:

ecc2 = (0.707M1)/P1 = 5.16 ft
 Diagonal qu= 3.84 ksf
 qu/ $\phi * q_n$ Ratio= **85.26%** Pass

<-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(w/ Soil Wedges) [Reaction+Conc+Soil]	533.27	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	5184.73	ft-kips

Orthogonal ecc3 = M2/P2 = 9.72 ft
 Ortho Non Bearing Length,NBL= 7.05 ft
 Orthogonal qu= 2.85 ksf
 Diagonal qu= 4.64 ksf

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

Actual M:	5140.00		
M Orthogonal:	5828.73	88.18%	Pass
M Diagonal:	5066.31	101.45%	Pass

Kristin Champagne

From: Kristin Champagne
Sent: Wednesday, September 07, 2011 2:19 PM
To: 'ldobson@portlandmaine.gov'
Cc: 'buildinginspections@portlandmaine.gov'
Subject: VZW BP 517 Presumpscot St. Portland, ME
Attachments: FALMOUTH ME FINAL LE REV2 08-30-11.pdf; 1 VZW BP app 517 Presumpscot St..pdf; Structural.pdf

Good Afternoon,

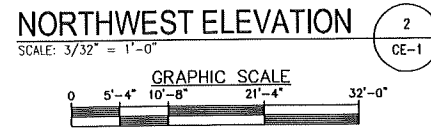
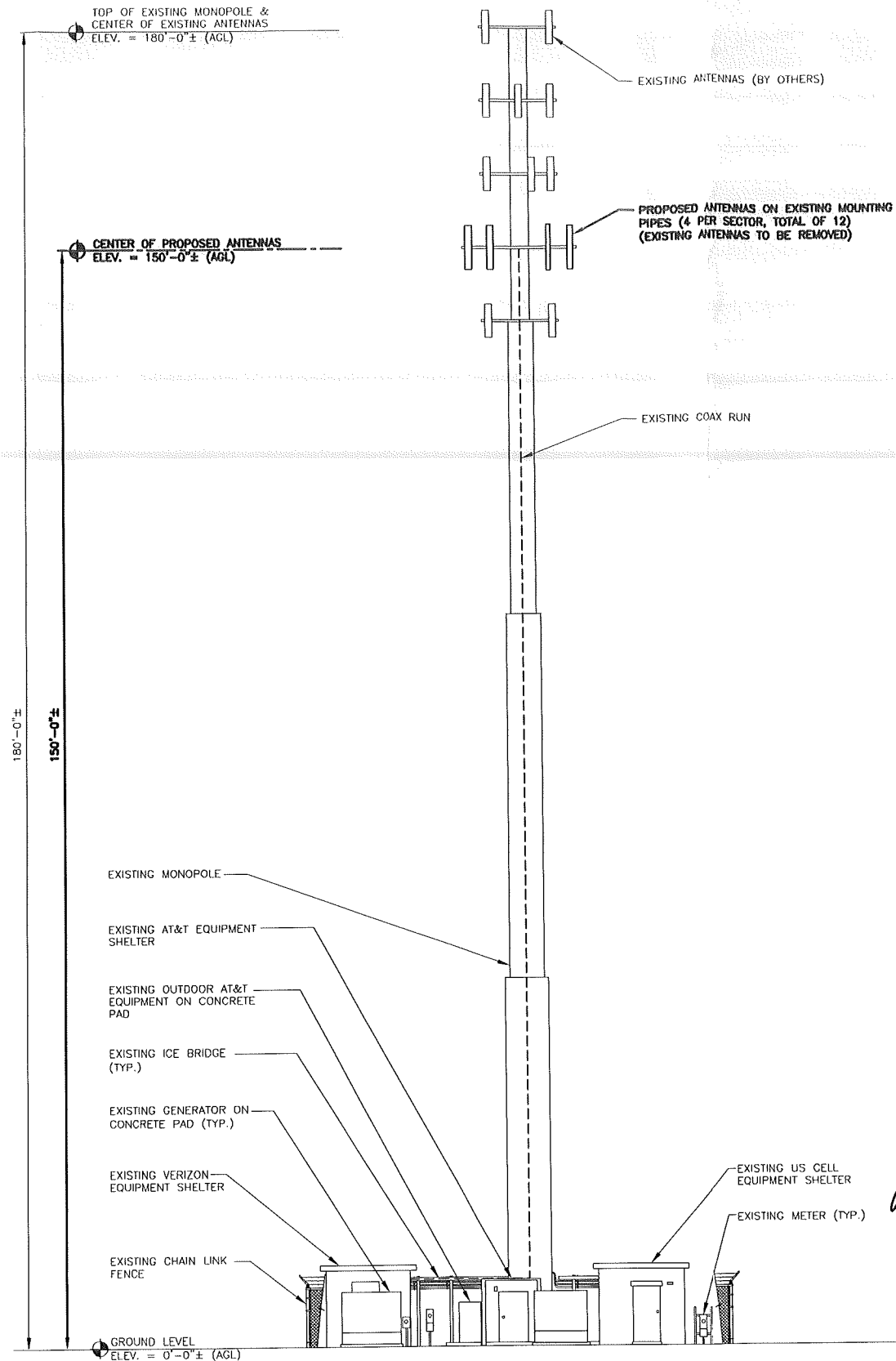
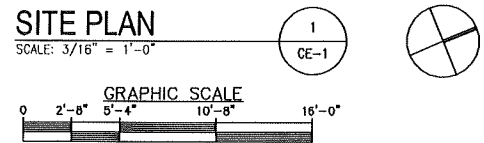
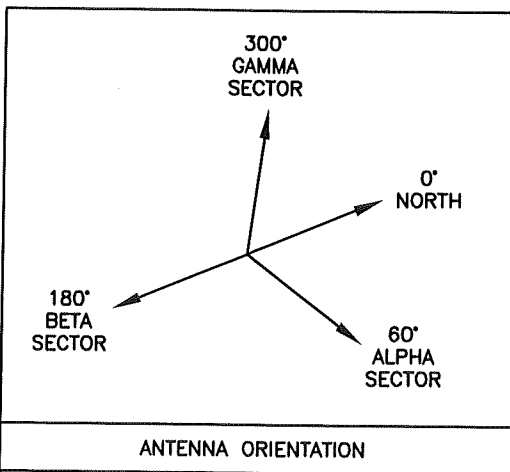
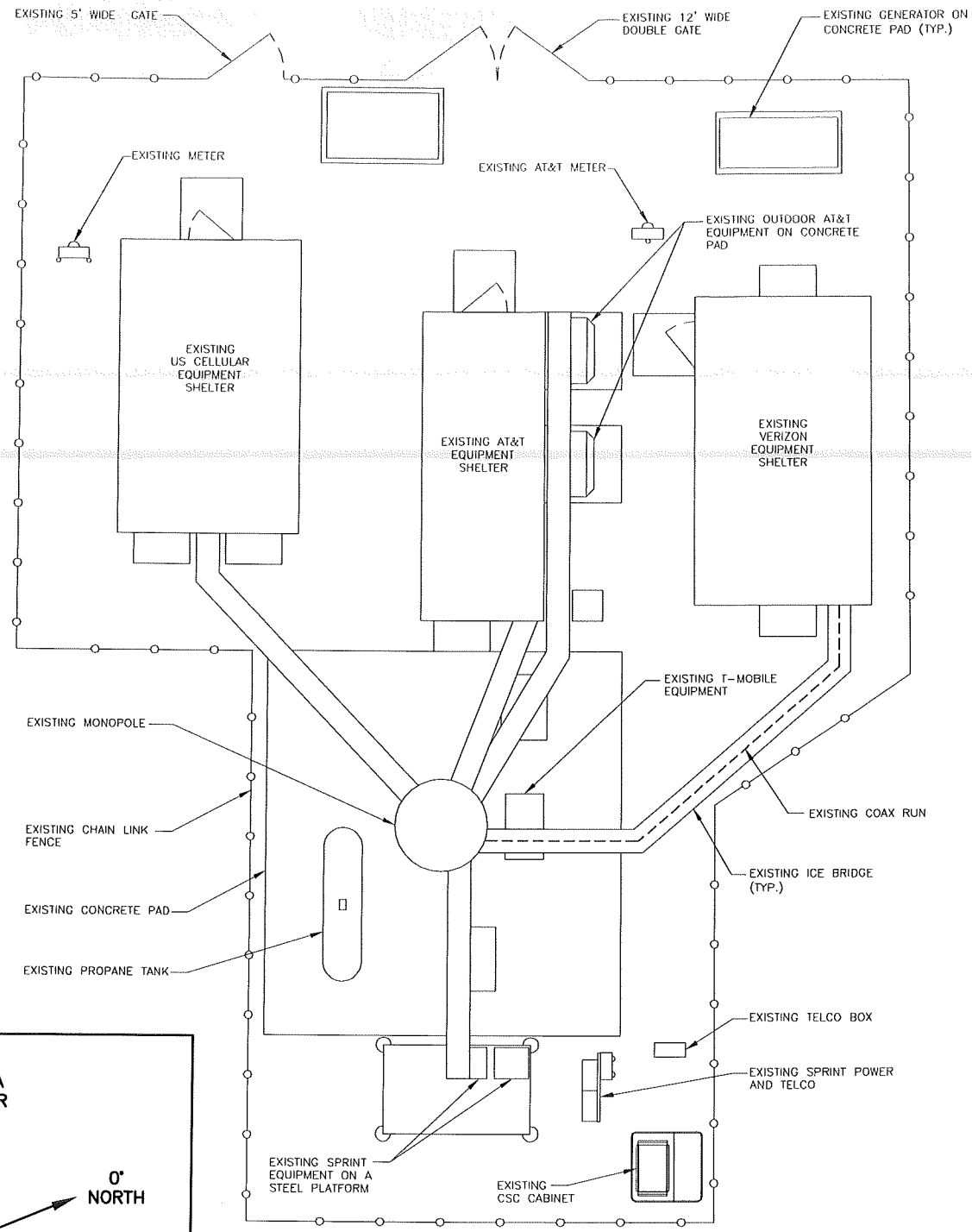
I have another site where Verizon Wireless is currently installed on a cell tower and we are looking to swap existing antennas with new ones. This tower is located off of Presumpscot St. I have attached the drawings, the passing structural, building permit application, CCA, antenna spec sheets (both existing and proposed). The breakdown of antenna is below.

- (12) ALE859012-42T0 existing to be removed and replaced with the following
- (6) DB846F65ZAXY
- (3) HBV-6517DS-T2M
- (3) LNX-6514DS-VTM

I have written out these quantities on the spec sheets. I am just waiting for a check from our billing dept. then this entire package will be FedEx up to you. Thank you in advanced for allowing me to FedEx this to you. Please let me know if any questions come up during your review. I will also include a return envelope (postage included) for the building permit to be mailed back to me once issued.

Thank You
Kristin

Kristin Champagne
Structure Consulting Group
49 Brattle St.
Arlington, MA 02474
M: 781.454.9134
O: 781-791-7724 x32
F: 781.791.7704



Daniel P. Hamm
REGISTERED ENGINEER

PREPARED BY:
Hudson
Design Group, LLC
1400 CSCOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 357-5553
FAX: (978) 356-5586

SITE PLAN & ELEVATION

REV	DATE	DESCRIPTION	BY	CHK	APP'D
1	01/20/11	FOR REVIEW	DB	JX	DPH
2	01/26/11	FOR PERMITTING	DB	JX	DPH
	08/30/11	REVISED PER NEW RF DATA	BR	JX	DPH

IF THE PLANS ARE PRINTED 24x36 THE SCALE IS 1:1
IF THE PLANS ARE PRINTED 11x17 THE SCALE IS 1:2

- SCOPE:**
1. VERIFY EXACT COAX AND ANTENNA INSTALLATION WITH LATEST RF DATA SHEETS PRIOR TO INSTALLATION.
 2. VERIFY EXACT ANTENNA HEIGHT WITH RF DATA SHEET PRIOR TO INSTALLATION.

FALMOUTH ME
503-525
PRESUMPSCOT STREET
PORTLAND, ME 04103

CE-1

VERIZON #2010543773

CONSTRUCTION PLAN EXHIBIT