Robinson+Cole

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Also admitted in Massachusetts

September 14, 2016

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
56 Norfield Road, Weston, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) antennas at the 150-foot level of the existing 190-foot tower at 56 Norfield Road in Weston, Connecticut (the "Property"). The tower is owned by Crown Castle ("Crown"). The Council approved Cellco's use of this tower in 2000. Cellco now intends to modify its facility by replacing six (6) existing antennas with three (3) model SBNHH-1D85C, 700/1900 MHz antennas and three (3) model SBNHH-1D85C, 1200 MHz antennas, all at the same 150-foot level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") and install six (6) new RRHs and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being sent to Nina Daniel, First Selectman for the Town of Weston. The Town of Weston is the owner of the Property. A copy of this notice is also being sent to Crown, the tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing structure. Cellco's new antennas and RRHs will be installed at a centerline height of 150 feet on the existing 190-foot tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

A copy of the Town Assessor's Parcel Map and property owner information is included in Attachment 4.

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Nina Daniel, Weston First Selectman
Crown Castle
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D85C

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 85° horizontal beamwidth, internal RETs.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Three internal RETs for independent tilt on all three bands

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	15.6	15.6	17.0	17.6	17.9	17.8
Beamwidth, Horizontal, degrees	82	83	82	79	79	80
Beamwidth, Vertical, degrees	8.9	8.1	5.6	5.2	4.9	4.6
Beam Tilt, degrees	0–10	0–10	0–8	0–8	0–8	0–8
USLS, dB	16	17	14	14	14	15
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	25	25	25	25
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	300	300	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	15.4	15.4	16.6	17.3	17.7	17.6
Gain by all Beam Tilts Tolerance, dB	±0.2	±0.3	±0.6	±0.2	±0.4	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 15.2	0 ° | 15.1	0 ° | 16.6	0 ° | 17.3	0 ° | 17.6	0 ° | 17.5
	5 ° | 15.5	5 ° | 15.4	4 ° | 16.6	4 ° | 17.4	4 ° | 17.7	4 ° | 17.8
	10 ° | 15.5	10 ° | 15.5	8 ° | 16.4	8 ° | 17.2	8 ° | 17.5	8 ° | 17.3
Beamwidth, Horizontal Tolerance, degrees	±2.3	±1.4	±4.5	±2.4	±3	±2.6
Beamwidth, Vertical Tolerance, degrees	±0.5	±0.5	±0.3	±0.2	±0.3	±0.2
USLS, dB	17	18	15	16	17	17
Front-to-Back Total Power at 180° ± 30°, dB	23	24	27	26	26	27
CPR at Boresight, dB	20	20	21	22	18	25
CPR at Sector, dB	14	16	13	12	11	6

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband
Band	Multiband
Brand	DualPol®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray

Product Specifications

SBNHH-1D85C

Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	875.0 N @ 150 km/h 196.7 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	2438.0 mm | 96.0 in
Width	301.0 mm | 11.9 in
Net Weight	22.5 kg | 49.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

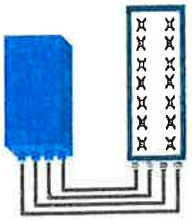
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (In 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal: <200N / Lateral : <150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-1900A-4R FOR BAND 2/25 APPLICATIONS

The Alcatel-Lucent RRH2x60-1900A-4R is a high power, small form factor Remote Radio Head operating in the PCS 1900MHz frequency band for WCDMA and LTE technologies. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.

A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-1900A-4R is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-1900A-4R integrates all the latest technologies. This allows operators to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-1900A-4R is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

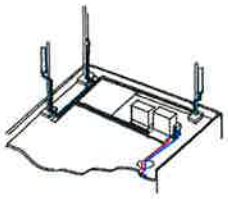
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

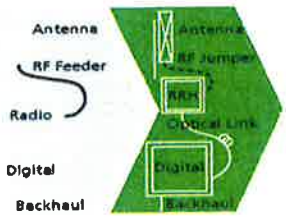
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-1900A-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

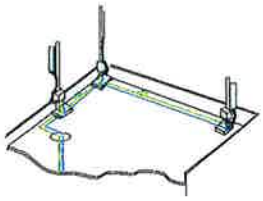
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-190A-4R is compact and weighs about 21 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-1900A-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- RRH2x60-1900A-4R can operate WCDMA only, LTE only or a mix of WCDMA and LTE
- RRH2x60-1900A-4R offers the possibility for WCDMA (non MIMO) to operate the two radio chains independently (2 blocks of 20 MHz anywhere in the band)
- RRH2x60-1900A-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO deployment and/or WCDMA and LTE simultaneous operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 500x285x208 mm (30l with solar shield)
- Weight : 21 kg (46 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption: 460W typ. @2x60W (100%RF)

RF Characteristics

- Supported spectrum: DL 1930-1990 / UL 1850-1910
- Frequency band: 3GPP band 2/25
- Output power: 2x60W at antenna connectors
- Technology supported: W-CDMA and LTE
- Instantaneous bandwidth: 20 MHz (MIMO) or 2x20 MHz (non MIMO)
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -124.8dBm for WCDMA and -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 15km using SM fiber
- TMA/RETA: AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions: ETS300-019-1-4 class4.1E
- Ingress Protection: IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089
- Safety : IEC60950-1, EN 60825-1
- Regulatory: CE Mark-European Directive 2002/95/EC (RoHS), 2002/96/EC (WEEE), 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

B66A RRH 4X45 - PHYSICAL CHARACTERISTICS- TARGET 15.1

B4 RRH4x45-4R (AWS-Extension Band)	
Frequency Band	LR15.1 – B4 / LR16.1 B66 (AWS 1 and 3 only)
RF Output Power	2x90W/4x45W (SW configurable)
Operational range	2110-2180 MHz, DL/ 1710-1780 MHz UL
Instantaneous Bandwidth	70MHz
Configuration (HW readiness)	LTE: 2T2R, 2T4R, 4T4R
Carrier Bandwidths	5, 10, 15 and 20 MHz
Interfaces	2x CPRI Rate 7 Ports Antenna Connectors 4.3-10
AISG Support	AISG 2.0 for RET Internal Smart Bias T
Monitor Ports	NA (Spec An to replace ports)
Environmental	GR487 Compliance / GR3178 Compliance (with exceptions)
Mounting options	Pole/Wall
Connectors location	All bottom
External Alarms	4
Annual Return Rate (Target)	<2%
Operating Temperature	-40 C to +55 C (without solar load)

- Commercial Product Will include B66 support of AWS 1 and 3.
- Lower AWS 3 UL Not in 3GPP Band 66 Definition

Physical Dimensions – Not to Exceed		
	W/O Solar Shield	With Solar Shield
Dimensions HxWxD	H = 26in (H=660mm) W = 11.4in (W=290mm) D = 5.9in (D=150mm)	H = 26.6in (H=675mm) W = 12in (W=304mm) D = 6.8n (D=173mm)
Volume	29l	35.5l
Weight		64lbs / 29kg

Product Data Sheet HB158-1-08U8-S8J18

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

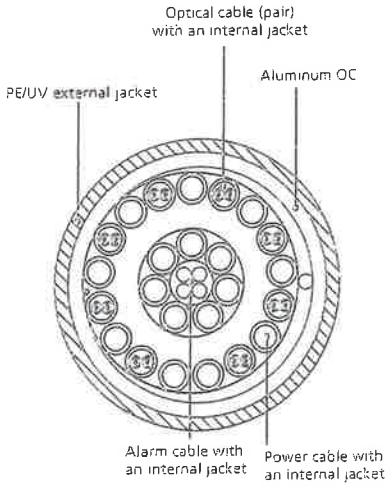


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Weston								
Tower Height: 190Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Weston Police			145	465.2125	0.0007	0.3101	0.02%	
*Weston FD			145	453.85	0.0007	0.3026	0.02%	
*Weston EMS			145	453.5125	0.0007	0.3023	0.02%	
*Weston Public Works			145	460.0375	0.0007	0.3067	0.02%	
*Sprint	2	693	174	1900	0.0177	1.0000	0.18%	
*Sprint	1	390	174	850	0.0050	0.5667	0.09%	
*Sprint	2	693	174	2500	0.0177	1.0000	0.18%	
*AT&T	1	500	152	880	0.0084	0.5867	0.14%	
*AT&T	2	500	152	1900	0.0169	1.0000	0.17%	
*AT&T	2	427	152	1900	0.0144	1.0000	0.14%	
*AT&T	4	296	152	880	0.0200	0.5867	0.34%	
*AT&T	1	500	152	740	0.0084	0.4933	0.17%	
*T-Mobile	2	24	179	2100	0.0006	1.0000	0.01%	
*T-Mobile	2	12	179	1950	0.0003	1.0000	0.00%	
*T-Mobile	2	12	179	2100	0.0003	1.0000	0.00%	
Verizon PCS	**1**	**1837**	**150**	**0.0294**	**1970**	**1.0000**	**2.94%**	
Verizon Cellular	**9**	**384**	**150**	**0.0552**	**869**	**0.5793**	**9.53%**	
Verizon AWS	**1**	**1911**	**150**	**0.0305**	**2145**	**1.0000**	**3.05%**	
Verizon 700	**1**	**619**	**150**	**0.0099**	**746**	**0.4973**	**1.99%**	
								19.02%
* Source: Siting Council								

ATTACHMENT 3

PJF PAUL J. FORD & COMPANY

Date: **February 18, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jwoolley@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Weston, CT
Crown Castle Designation:	**Crown Castle BU Number:**	829046
	Crown Castle Site Name:	Weston/ Rt-57/ Norfield R
	Crown Castle JDE Job Number:	346563
	Crown Castle Work Order Number:	1169328
	Crown Castle Application Number:	310867 Rev. 5
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-0710.001.7805
Site Data:	**56 Norfield Rd. (Town Hall), Weston, Fairfield County, CT**	
	Latitude *41° 12' 8.4"*, Longitude *-73° 22' 46.6"*	
	190 Foot - Monopole Tower	

Dear Sean Dempsey,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 873515, in accordance with application 310867, revision 5.

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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

John J. Woolley, E.I.
Structural Designer

2.19.16

tnxTower Report - version 7.0.5.1

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1) INTRODUCTION

This tower is a 190 ft Monopole tower designed by PIROD MANUFACTURES INC. in January of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	150.0	3	alcatel lucent	RRH2X60-PCS	1	1-5/8	-
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		6	commscope	SBNHH-1D85C w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

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
190.0	190.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
		1	tower mounts	Platform Mount [LP 403-1]			
188.0	188.0	3	alcatel lucent	1900MHz RRH	-	-	1
		3	alcatel lucent	800MHZ RRH			
		1	tower mounts	Side Arm Mount [SO 102-3]			
182.0	182.0	1	tower mounts	Platform Mount [LP 403-1]	-	-	1
170.0	170.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	7	1-5/8	1
		3	ericsson	Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Platform Mount [LP 405-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
162.0	163.0	3	cci antennas	OPA-65R-LCUU-H6 w/Mount Pipe	-	-	2
		3	ericsson	RRUS12/RRUS A2			
		12	powerwave technologies	7020.00	2 12	7/8 1-5/8	1
		3	ericsson	RRUS-11			
		6	powerwave technologies	LGP21401			
		3	powerwave technologies	TT19-08BP111-001			
		1	raycap	DC6-48-60-18-8F			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
	162.0	1	tower mounts	Platform Mount [LP 403-1]			
150.0	150.0	3	antel	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	1	1-5/8	3
		1	powerwave technologies	P65-16-XL-R w/ Mount Pipe			
		2	andrew	LNX-6514DS-T4M w/ Mount Pipe			
		3	antel	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	12	1-5/8	1
		2	antel	LPA-80080/6CF w/ Mount Pipe			
		4	decibel	DB846F65ZAXY w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 403-1]			
125.0	130.0	1	rfs celwave	PD128-1	1 1	1/2 7/8	1
		1	rfs celwave	PD201-1			
	125.0	1	tower mounts	Side Arm Mount [SO 701-3]			
110.0	115.0	2	rfs celwave	PD128-1	2	1/2	1
	110.0	1	tower mounts	Side Arm Mount [SO 701-3]			
95.0	100.0	2	rfs celwave	PD128-1	2	7/8	1
	95.0	1	tower mounts	Side Arm Mount [SO 701-3]			
80.0	85.0	1	decibel	DB222	2	1/2	1
		1	rfs celwave	PD128-1			
	80.0	1	tower mounts	Side Arm Mount [SO 701-3]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Arcnet, A99.506-247B, 10/15/1999	3529916	CCISITES
4-POST-MODIFICATION INSPECTION	Sabre, 61801, 11/19/2012	3774763	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, A-116331, 1/5/2000	3529917	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP, 1/25/2012	3667108	CCISITES
FABRICATION DRAWINGS	Sabre, 61801-MR, 8/2/2012	-	SABRE
4-POST-MODIFICATION INSPECTION	TEP, 48073, 11/10/14	5392198	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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) Monopole has been reinforced in conformance with the referenced modification drawings.
5) The rock anchors have been analyzed assuming reinforced concrete-type action in the interaction between the rock anchors and the rock.
6) The existing anchor brackets have been welded through their chamfer region. This analysis assumes no damage to the weld from the pole shaft to the base plate has occurred and that the weld is complete and effective.
7) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN/PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 100% or less, then the existing flange plates are at a usage capacity of 100% or less and no additional analysis of the flange plate is required.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	190 - 180	Pole	30" x 0.375"	1	-4.901	1166.570	6.7	Pass
L2	180 - 160	Pole	36" x 0.375"	2	-12.990	1325.678	27.3	Pass
L3	160 - 140	Pole	42" x 0.375"	3	-19.336	1484.549	59.7	Pass
L4	140 - 120	Pole	P48x3/8	4	-24.015	1643.282	86.6	Pass
L5	120 - 113.33	Pole	54" x 0.375"	5	-25.676	1801.923	81.6	Pass
L6	113.33 - 103	Pole	RPS 54" x 0.49054"	6	-29.137	2350.759	77.0	Pass
L7	103 - 100	Pole	RPS 54" x 0.49054"	7	-30.087	2350.759	81.2	Pass
L8	100 - 90	Pole	RPS 60" x 0.47803"	8	-33.686	2493.470	81.3	Pass
L9	90 - 85.5	Pole	RPS 60" x 0.55603"	9	-35.432	2896.062	75.1	Pass
L10	85.5 - 84	Pole	RPS 60" x 0.63464"	10	-36.086	3001.849	67.7	Pass
L11	84 - 80	Pole	RPS 60" x 0.52996"	11	-37.582	2761.003	85.2	Pass
L12	80 - 60	Pole	RPS 60" x 0.57817"	12	-45.932	3211.717	94.9	Pass
L13	60 - 58.5	Pole	RPS 60" x 0.70417"	13	-46.659	3764.312	75.3	Pass
L14	58.5 - 47.25	Pole	P60x5/8	14	-51.614	3682.439	95.5	Pass
L15	47.25 - 40	Pole	RPS 60" x 0.76962"	15	-55.458	4113.078	84.3	Pass
L16	40 - 32.25	Pole	RPS 60" x 0.76962"	16	-59.581	4113.078	90.9	Pass
L17	32.25 - 29.75	Pole	RPS 60" x 0.96202"	17	-61.207	5123.199	75.2	Pass
L18	29.75 - 20	Pole	RPS 60" x 0.81453"	18	-66.688	4346.166	96.3	Pass
L19	20 - 4.25	Pole	RPS 60" x 0.94201"	19	-76.802	5311.885	90.1	Pass
L20	4.25 - 0	Pole	RPS 60" x 1.07924"	20	-79.894	6049.207	82.2	Pass
							Summary	
						Pole (L18)	96.3	Pass
						RATING =	**96.3**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	89.9	Pass
1	Base Plate	0	72.9	Pass
1	Base Foundation	0	78.2	Pass
1	Flange Connection	20	78.7	Pass
1	Flange Connection	40	80.3	Pass
1	Flange Connection	60	77.4	Pass
1	Flange Connection	80	75.0	Pass
1	Flange Connection	100	63.9	Pass
1, 2	Flange Connection	120	86.6	Pass
1, 2	Flange Connection	140	59.7	Pass
1, 2	Flange Connection	160	27.3	Pass
1, 2	Flange Connection	180	6.7	Pass

Structure Rating (max from all components) =	96.3%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) See assumption #7.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.750 in.
4) Ice density of 56.000 pcf.
5) A wind speed of 28 mph is used in combination with ice.
6) Temperature drop of 50.000 °F.
7) Deflections calculated using a wind speed of 50 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	**Poles**
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

Pole Section Geometry

Section	*Elevation* ft	*Section Length* ft	*Pole Size*	*Pole Grade*	*Socket Length* ft
L1	190.000-180.000	10.000	30" x 0.375"	A53-B-42 (42 ksi)	
L2	180.000-160.000	20.000	36" x 0.375"	A53-B-42 (42 ksi)	
L3	160.000-140.000	20.000	42" x 0.375"	A53-B-42 (42 ksi)	
L4	140.000-120.000	20.000	P48x3/8	A53-B-42 (42 ksi)	
L5	120.000-113.330	6.670	54" x 0.375"	A53-B-42 (42 ksi)	
L6	113.330-103.000	10.330	RPS 54" x 0.49054"	Reinf 38.43 ksi (38 ksi)	
L7	103.000-100.000	3.000	RPS 54" x 0.49054"	Reinf 38.43 ksi (38 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L8	100.000-90.000	10.000	RPS 60" x 0.47803"	Reinf 39.13 ksi (39 ksi)	
L9	90.000-85.500	4.500	RPS 60" x 0.55603"	Reinf 36.97 ksi (37 ksi)	
L10	85.500-84.000	1.500	RPS 60" x 0.63464"	Reinf 31.71 ksi (32 ksi)	
L11	84.000-80.000	4.000	RPS 60" x 0.52996"	Reinf 37.68 ksi (38 ksi)	
L12	80.000-60.000	20.000	RPS 60" x 0.57817"	Reinf 39.86 ksi (40 ksi)	
L13	60.000-58.500	1.500	RPS 60" x 0.70417"	Reinf 35.88 ksi (36 ksi)	
L14	58.500-47.250	11.250	P60x5/8	A53-B-42 (42 ksi)	
L15	47.250-40.000	7.250	RPS 60" x 0.76962"	Reinf 35.91 ksi (36 ksi)	
L16	40.000-32.250	7.750	RPS 60" x 0.76962"	Reinf 35.91 ksi (36 ksi)	
L17	32.250-29.750	2.500	RPS 60" x 0.96202"	Reinf 35.90 ksi (36 ksi)	
L18	29.750-20.000	9.750	RPS 60" x 0.81453"	Reinf 35.88 ksi (36 ksi)	
L19	20.000-4.250	15.750	RPS 60" x 0.94201"	Reinf 38.00 ksi (38 ksi)	
L20	4.250-0.000	4.250	RPS 60" x 1.07924"	Reinf 37.86 ksi (38 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 190.000-180.000				1	1	1			
L2 180.000-160.000				1	1	1			
L3 160.000-140.000				1	1	1			
L4 140.000-120.000				1	1	1			
L5 120.000-113.330				1	1	1			
L6 113.330-103.000				1	1	1			
L7 103.000-100.000				1	1	1			
L8 100.000-90.000				1	1	1			
L9 90.000-85.500				1	1	1			
L10 85.500-84.000				1	1	1			
L11 84.000-80.000				1	1	1			
L12 80.000-				1	1	1			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
60.000									
L13 60.000-58.500				1	1	1			
L14 58.500-47.250				1	1	1			
L15 47.250-40.000				1	1	1			
L16 40.000-32.250				1	1	1			
L17 32.250-29.750				1	1	1			
L18 29.750-20.000				1	1	1			
L19 20.000-4.250				1	1	1			
L20 4.250-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
AL5-50(7/8")	C	No	Inside Pole	190.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
TYPE I(1-1/4")	C	No	Inside Pole	190.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
*****								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	173.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	173.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
****								
LDF5-50A(7/8")	C	No	CaAa (Out Of Face)	162.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
LDF5-50A(7/8")	C	No	CaAa (Out Of Face)	162.000 - 0.000	1	No Ice	0.109	0.000
						1/2" Ice	0.209	0.001
						1" Ice	0.309	0.003
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	162.000 - 0.000	2	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	162.000 - 0.000	10	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
****								
LDF7-50A(1-5/8")	C	No	Inside Pole	150.000 - 0.000	13	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
****								
LDF5-50A(7/8")	C	No	Inside Pole	125.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
*****								
****								
****								
****								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	15.000 - 0.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	112.500 - 57.500	1	1" Ice	0.431	0.000
						No Ice	0.167	0.000
						1/2" Ice	0.278	0.000
						1" Ice	0.389	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	35.000 - 25.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	45.000 - 35.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	51.000 - 45.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	25.000 - 15.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	45.000 - 35.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	65.000 - 55.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	87.250 - 75.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	190.000-180.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.021
L2	180.000-160.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.584	0.139
L3	160.000-140.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	14.060	0.474
L4	140.000-120.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	14.060	0.583
L5	120.000-113.330	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.689	0.196
L6	113.330-103.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.845	0.303
L7	103.000-100.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	2.609	0.088
L8	100.000-90.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.697	0.294
L9	90.000-85.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.278	0.132
L10	85.500-84.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.617	0.044
L11	84.000-80.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.312	0.118
L12	80.000-60.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	19.477	0.588
L13	60.000-58.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.617	0.044
L14	58.500-47.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	9.586	0.331
L15	47.250-40.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	7.649	0.213
L16	40.000-32.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.104	0.228
L17	32.250-29.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	2.278	0.073
L18	29.750-20.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.885	0.286
L19	20.000-4.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	14.353	0.463
L20	4.250-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.873	0.125

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	190.000-180.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.021
L2	180.000-160.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	6.434	0.442
L3	160.000-140.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	26.060	1.525
L4	140.000-120.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	26.060	1.633
L5	120.000-113.330	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.691	0.546
L6	113.330-103.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	16.627	0.846
L7	103.000-100.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.909	0.246
L8	100.000-90.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	16.363	0.819
L9	90.000-85.500	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.020	0.368
L10	85.500-84.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	3.017	0.123
L11	84.000-80.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.045	0.328
L12	80.000-60.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	36.477	1.638
L13	60.000-58.500	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	3.017	0.123
L14	58.500-47.250	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	17.711	0.921
L15	47.250-40.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	14.041	0.594
L16	40.000-32.250	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	14.880	0.635
L17	32.250-29.750	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.195	0.205
L18	29.750-20.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	16.361	0.798
L19	20.000-4.250	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	26.429	1.290
L20	4.250-0.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	7.132	0.348

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	190.000-180.000	0.000	0.000	0.000	0.000
L2	180.000-160.000	-0.220	0.127	-0.364	0.210
L3	160.000-140.000	-0.760	0.439	-1.202	0.694
L4	140.000-120.000	-0.777	0.448	-1.247	0.720
L5	120.000-113.330	-0.790	0.456	-1.285	0.742
L6	113.330-103.000	-0.935	0.540	-1.509	0.871
L7	103.000-100.000	-0.947	0.547	-1.528	0.882
L8	100.000-90.000	-0.962	0.556	-1.572	0.908
L9	90.000-85.500	-1.038	0.599	-1.676	0.968
L10	85.500-84.000	-1.152	0.665	-1.831	1.057
L11	84.000-80.000	-1.152	0.665	-1.831	1.057
L12	80.000-60.000	-1.059	0.611	-1.705	0.984
L13	60.000-58.500	-1.152	0.665	-1.831	1.057
L14	58.500-47.250	-0.946	0.546	-1.526	0.881
L15	47.250-40.000	-1.132	0.653	-1.781	1.028
L16	40.000-32.250	-1.123	0.649	-1.770	1.022
L17	32.250-29.750	-1.001	0.578	-1.602	0.925
L18	29.750-20.000	-1.001	0.578	-1.602	0.925
L19	20.000-4.250	-1.001	0.578	-1.602	0.925
L20	4.250-0.000	-1.001	0.578	-1.602	0.925

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft	C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PD201-7	C	From Leg	4.000 0.000 3.000	0.000	190.000	No Ice 1/2" Ice 1" Ice	1.015 1.810 2.620	1.015 1.810 2.620	0.004 0.013 0.026
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	50.000	190.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	45.000	190.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	60.000	190.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227
(2) 2.375" OD x 6' Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	190.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
(2) 2.375" OD x 6' Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	190.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
(2) 2.375" OD x 6' Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	190.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
Platform Mount [LP 403-1]	C	None		0.000	190.000	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
****									
800MHZ RRH	A	From Leg	4.000 0.000 0.000	50.000	188.000	No Ice 1/2" Ice 1" Ice	2.490 2.706 2.931	2.068 2.271 2.481	0.053 0.074 0.098
800MHZ RRH	B	From Leg	4.000 0.000 0.000	45.000	188.000	No Ice 1/2" Ice 1" Ice	2.490 2.706 2.931	2.068 2.271 2.481	0.053 0.074 0.098
800MHZ RRH	C	From Leg	4.000 0.000 0.000	60.000	188.000	No Ice 1/2" Ice 1" Ice	2.490 2.706 2.931	2.068 2.271 2.481	0.053 0.074 0.098
1900MHz RRH	A	From Leg	4.000 0.000 0.000	50.000	188.000	No Ice 1/2" Ice 1" Ice	2.907 3.145 3.391	3.801 4.065 4.337	0.044 0.075 0.110
1900MHz RRH	B	From Leg	4.000 0.000 0.000	45.000	188.000	No Ice 1/2" Ice 1" Ice	2.907 3.145 3.391	3.801 4.065 4.337	0.044 0.075 0.110
1900MHz RRH	C	From Leg	4.000 0.000 0.000	60.000	188.000	No Ice 1/2" Ice 1" Ice	2.907 3.145 3.391	3.801 4.065 4.337	0.044 0.075 0.110
Side Arm Mount [SO 102-3]	C	None		0.000	188.000	No Ice 1/2" Ice 1" Ice	3.000 3.480 3.960	3.000 3.480 3.960	0.081 0.111 0.141
****									
Platform Mount [LP 403-1]	C	None		0.000	182.000	No Ice 1/2" Ice	18.850 24.300 29.750	18.850 24.300 29.750	1.500 1.797 2.093

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
(4) 6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	182.000	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
(4) 6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	182.000	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
(4) 6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	182.000	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
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
KRY 112 144/1	A	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	0.408 0.497 0.594	0.204 0.273 0.351	0.011 0.014 0.019
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
KRY 112 144/1	B	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	0.408 0.497 0.594	0.204 0.273 0.351	0.011 0.014 0.019
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	6.825 7.347 7.863	5.642 6.480 7.257	0.112 0.169 0.233
KRY 112 144/1	C	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	0.408 0.497 0.594	0.204 0.273 0.351	0.011 0.014 0.019
Platform Mount [LP 405-1]	C	None		0.000	170.000	No Ice 1/2" Ice 1" Ice	20.800 28.100 35.400	20.800 28.100 35.400	1.800 2.066 2.332
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	11.782 12.502 13.232	11.038 12.564 14.116	0.159 0.254 0.360
RRUS 11 B12	A	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	3.306 3.550 3.802	1.361 1.540 1.728	0.051 0.072 0.095
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	11.782 12.502 13.232	11.038 12.564 14.116	0.159 0.254 0.360
RRUS 11 B12	B	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	3.306 3.550 3.802	1.361 1.540 1.728	0.051 0.072 0.095
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	11.782 12.502 13.232	11.038 12.564 14.116	0.159 0.254 0.360
RRUS 11 B12	C	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice	3.306 3.550 3.802	1.361 1.540 1.728	0.051 0.072 0.095

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***						1" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	6.221 6.714 7.218	4.820 5.508 6.213	0.086 0.143 0.208
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	6.221 6.714 7.218	4.820 5.508 6.213	0.086 0.143 0.208
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	6.221 6.714 7.218	4.820 5.508 6.213	0.086 0.143 0.208
(2) LGP21401	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	1.288 1.445 1.611	0.364 0.479 0.602	0.014 0.021 0.030
(2) LGP21401	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	1.288 1.445 1.611	0.364 0.479 0.602	0.014 0.021 0.030
(2) LGP21401	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	1.288 1.445 1.611	0.364 0.479 0.602	0.014 0.021 0.030
(4) 7020.00	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	0.119 0.171 0.232	0.204 0.279 0.363	0.002 0.005 0.009
(4) 7020.00	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	0.119 0.171 0.232	0.204 0.279 0.363	0.002 0.005 0.009
(4) 7020.00	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	0.119 0.171 0.232	0.204 0.279 0.363	0.002 0.005 0.009
TT19-08BP111-001	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	0.645 0.757 0.877	0.520 0.623 0.735	0.016 0.022 0.029
TT19-08BP111-001	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	0.645 0.757 0.877	0.520 0.623 0.735	0.016 0.022 0.029
TT19-08BP111-001	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	0.645 0.757 0.877	0.520 0.623 0.735	0.016 0.022 0.029
RRUS-11	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	3.249 3.491 3.741	1.373 1.551 1.738	0.048 0.068 0.092
RRUS-11	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	3.249 3.491 3.741	1.373 1.551 1.738	0.048 0.068 0.092
RRUS-11	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	3.249 3.491 3.741	1.373 1.551 1.738	0.048 0.068 0.092
DC6-48-60-18-8F	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice	1.467 1.667 1.878	1.467 1.667 1.878	0.019 0.037 0.057

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1" Ice			
OPA-65R-LCUU-H6 w/Mount Pipe	A	From Leg	4.000	0.000	0.000	162.000	No Ice	10.598	8.113	0.092
			0.000				1/2" Ice	11.268	9.304	0.174
			1.000				1" Ice	11.906	10.209	0.263
OPA-65R-LCUU-H6 w/Mount Pipe	B	From Leg	4.000	0.000	0.000	162.000	No Ice	10.598	8.113	0.092
			0.000				1/2" Ice	11.268	9.304	0.174
			1.000				1" Ice	11.906	10.209	0.263
OPA-65R-LCUU-H6 w/Mount Pipe	C	From Leg	4.000	0.000	0.000	162.000	No Ice	10.598	8.113	0.092
			0.000				1/2" Ice	11.268	9.304	0.174
			1.000				1" Ice	11.906	10.209	0.263
RRUS12/RRUS A2	A	From Leg	4.000	0.000	0.000	162.000	No Ice	3.667	2.141	0.072
			0.000				1/2" Ice	3.924	2.347	0.099
			1.000				1" Ice	4.189	2.563	0.130
RRUS12/RRUS A2	B	From Leg	4.000	0.000	0.000	162.000	No Ice	3.667	2.141	0.072
			0.000				1/2" Ice	3.924	2.347	0.099
			1.000				1" Ice	4.189	2.563	0.130
RRUS12/RRUS A2	C	From Leg	4.000	0.000	0.000	162.000	No Ice	3.667	2.141	0.072
			0.000				1/2" Ice	3.924	2.347	0.099
			1.000				1" Ice	4.189	2.563	0.130
Platform Mount [LP 403-1]	C	None			0.000	162.000	No Ice	18.850	18.850	1.500
							1/2" Ice	24.300	24.300	1.797
							1" Ice	29.750	29.750	2.093
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	0.000	162.000	No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
			1.000				1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	0.000	162.000	No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
			1.000				1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	0.000	162.000	No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
			1.000				1" Ice	2.294	2.294	0.048
***										
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	150.000	No Ice	7.271	7.821	0.047
			0.000				1/2" Ice	7.877	9.010	0.114
			0.000				1" Ice	8.484	9.912	0.189
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	150.000	No Ice	7.271	7.821	0.047
			0.000				1/2" Ice	7.877	9.010	0.114
			0.000				1" Ice	8.484	9.912	0.189
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	150.000	No Ice	5.029	5.289	0.041
			0.000				1/2" Ice	5.583	6.459	0.087
			0.000				1" Ice	6.103	7.348	0.140
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	150.000	No Ice	5.029	5.289	0.041
			0.000				1/2" Ice	5.583	6.459	0.087
			0.000				1" Ice	6.103	7.348	0.140
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	150.000	No Ice	5.029	5.289	0.041
			0.000				1/2" Ice	5.583	6.459	0.087
			0.000				1" Ice	6.103	7.348	0.140
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	150.000	No Ice	4.564	10.728	0.046
			0.000				1/2" Ice	5.105	11.990	0.113
			0.000				1" Ice	5.612	12.968	0.187

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.367 0.451 0.543	0.085 0.136 0.196	0.003 0.005 0.009
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.367 0.451 0.543	0.085 0.136 0.196	0.003 0.005 0.009
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.367 0.451 0.543	0.085 0.136 0.196	0.003 0.005 0.009
DB-T1-6Z-8AB-0Z	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.600 5.915 6.240	2.333 2.558 2.791	0.044 0.080 0.120
Platform Mount [LP 403-1]	C	None		0.000	150.000	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
RRH2x60-700	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.957 4.272 4.596	1.816 2.075 2.360	0.060 0.083 0.109
RRH2X60-PCS	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.567 2.791 3.025	2.011 2.218 2.435	0.055 0.075 0.099
RRH4X45-AWS4 B66	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.103 3.358 3.621	1.759 1.979 2.209	0.064 0.084 0.108
(2) SBNHH-1D85C w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	11.626 12.346 13.074	9.793 11.311 12.854	0.077 0.166 0.266
RRH2x60-700	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.957 4.272 4.596	1.816 2.075 2.360	0.060 0.083 0.109
RRH2X60-PCS	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.567 2.791 3.025	2.011 2.218 2.435	0.055 0.075 0.099
RRH4X45-AWS4 B66	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.103 3.358 3.621	1.759 1.979 2.209	0.064 0.084 0.108
(2) SBNHH-1D85C w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	11.626 12.346 13.074	9.793 11.311 12.854	0.077 0.166 0.266
RRH2x60-700	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.957 4.272 4.596	1.816 2.075 2.360	0.060 0.083 0.109
RRH2X60-PCS	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.567 2.791 3.025	2.011 2.218 2.435	0.055 0.075 0.099
RRH4X45-AWS4 B66	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.103 3.358 3.621	1.759 1.979 2.209	0.064 0.084 0.108

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) SBNHH-1D85C w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	11.626 12.346 13.074	9.793 11.311 12.854	0.077 0.166 0.266
DB-T1-6Z-8AB-0Z	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.600 5.915 6.240	2.333 2.558 2.791	0.044 0.080 0.120
****									
*****									
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD201-1	A	From Leg	4.000 0.000 5.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	0.628 1.539 2.467	0.628 1.539 2.467	0.004 0.011 0.023
Side Arm Mount [SO 701-3]	C	None		0.000	125.000	No Ice 1/2" Ice 1" Ice	2.830 3.920 5.010	2.830 3.920 5.010	0.195 0.237 0.279
***									
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-3]	C	None		0.000	110.000	No Ice 1/2" Ice 1" Ice	2.830 3.920 5.010	2.830 3.920 5.010	0.195 0.237 0.279
***									
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	95.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	95.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-3]	C	None		0.000	95.000	No Ice 1/2" Ice 1" Ice	2.830 3.920 5.010	2.830 3.920 5.010	0.195 0.237 0.279
***									
DB222	A	From Leg	4.000 0.000 5.000	0.000	80.000	No Ice 1/2" Ice 1" Ice	1.600 2.880 4.160	1.600 2.880 4.160	0.016 0.021 0.026
PD128-1	C	From Leg	4.000 0.000 5.000	0.000	80.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-3]	C	None		0.000	80.000	No Ice 1/2" Ice 1" Ice	2.830 3.920 5.010	2.830 3.920 5.010	0.195 0.237 0.279
****									

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 190.000-180.000	185.000	1.636	0.030	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.597	0.030	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	3.584
L3 160.000-140.000	150.000	1.541	0.029	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	14.060
L4 140.000-120.000	130.000	1.48	0.027	80.000	A	0.000	80.000	80.000	100.00	0.000	0.000
					B	0.000	80.000		100.00	0.000	0.000
					C	0.000	80.000		100.00	0.000	14.060
L5 120.000-113.330	116.665	1.434	0.027	30.015	A	0.000	30.015	30.015	100.00	0.000	0.000
					B	0.000	30.015		100.00	0.000	0.000
					C	0.000	30.015		100.00	0.000	4.689
L6 113.330-103.000	108.165	1.404	0.026	46.485	A	0.000	46.485	46.485	100.00	0.000	0.000
					B	0.000	46.485		100.00	0.000	0.000
					C	0.000	46.485		100.00	0.000	8.845
L7 103.000-100.000	101.500	1.379	0.025	13.500	A	0.000	13.500	13.500	100.00	0.000	0.000
					B	0.000	13.500		100.00	0.000	0.000
					C	0.000	13.500		100.00	0.000	2.609
L8 100.000-90.000	95.000	1.353	0.025	50.000	A	0.000	50.000	50.000	100.00	0.000	0.000
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	8.697
L9 90.000-85.500	87.750	1.322	0.024	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	4.278
L10 85.500-84.000	84.750	1.309	0.024	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.617
L11 84.000-80.000	82.000	1.297	0.024	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	4.312
L12 80.000-60.000	70.000	1.24	0.023	100.000	A	0.000	100.000	100.000	100.00	0.000	0.000
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	19.477
L13 60.000-58.500	59.250	1.182	0.022	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.617
L14 58.500-47.250	52.875	1.144	0.021	56.250	A	0.000	56.250	56.250	100.00	0.000	0.000
					B	0.000	56.250		100.00	0.000	0.000
					C	0.000	56.250		100.00	0.000	9.586
L15 47.250-40.000	43.625	1.083	0.020	36.250	A	0.000	36.250	36.250	100.00	0.000	0.000
					B	0.000	36.250		100.00	0.000	0.000
					C	0.000	36.250		100.00	0.000	7.649
L16 40.000-32.250	36.125	1.026	0.019	38.750	A	0.000	38.750	38.750	100.00	0.000	0.000
					B	0.000	38.750		100.00	0.000	0.000
					C	0.000	38.750		100.00	0.000	8.104
L17 32.250-29.750	31.000	1	0.018	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	2.278
L18 29.750-20.000	24.875	1	0.018	48.750	A	0.000	48.750	48.750	100.00	0.000	0.000
					B	0.000	48.750		100.00	0.000	0.000
					C	0.000	48.750		100.00	0.000	8.885
L19 20.000-4.250	12.125	1	0.018	78.750	A	0.000	78.750	78.750	100.00	0.000	0.000
					B	0.000	78.750		100.00	0.000	0.000
					C	0.000	78.750		100.00	0.000	14.353
L20 4.250-0.000	2.125	1	0.018	21.250	A	0.000	21.250	21.250	100.00	0.000	0.000
					B	0.000	21.250		100.00	0.000	0.000
					C	0.000	21.250		100.00	0.000	3.873

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z ksf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 190.000-180.000	185.000	1.636	0.003	0.750	26.250	A	0.000	26.250	26.250	100.00	0.000	0.000
						B	0.000	26.250		100.00	0.000	0.000
						C	0.000	26.250		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.597	0.003	0.750	62.500	A	0.000	62.500	62.500	100.00	0.000	0.000
						B	0.000	62.500		100.00	0.000	0.000
						C	0.000	62.500		100.00	0.000	6.434
L3 160.000-140.000	150.000	1.541	0.003	0.750	72.500	A	0.000	72.500	72.500	100.00	0.000	0.000
						B	0.000	72.500		100.00	0.000	0.000
						C	0.000	72.500		100.00	0.000	26.060
L4 140.000-120.000	130.000	1.48	0.003	0.750	82.500	A	0.000	82.500	82.500	100.00	0.000	0.000
						B	0.000	82.500		100.00	0.000	0.000
						C	0.000	82.500		100.00	0.000	26.060
L5 120.000-113.330	116.665	1.434	0.003	0.750	30.849	A	0.000	30.849	30.849	100.00	0.000	0.000
						B	0.000	30.849		100.00	0.000	0.000
						C	0.000	30.849		100.00	0.000	8.691
L6 113.330-103.000	108.165	1.404	0.003	0.750	47.776	A	0.000	47.776	47.776	100.00	0.000	0.000
						B	0.000	47.776		100.00	0.000	0.000
						C	0.000	47.776		100.00	0.000	16.627
L7 103.000-100.000	101.500	1.379	0.003	0.750	13.875	A	0.000	13.875	13.875	100.00	0.000	0.000
						B	0.000	13.875		100.00	0.000	0.000
						C	0.000	13.875		100.00	0.000	4.909
L8 100.000-90.000	95.000	1.353	0.003	0.750	51.250	A	0.000	51.250	51.250	100.00	0.000	0.000
						B	0.000	51.250		100.00	0.000	0.000
						C	0.000	51.250		100.00	0.000	16.363
L9 90.000-85.500	87.750	1.322	0.003	0.750	23.063	A	0.000	23.063	23.063	100.00	0.000	0.000
						B	0.000	23.063		100.00	0.000	0.000
						C	0.000	23.063		100.00	0.000	8.020
L10 85.500-84.000	84.750	1.309	0.003	0.750	7.688	A	0.000	7.688	7.688	100.00	0.000	0.000
						B	0.000	7.688		100.00	0.000	0.000
						C	0.000	7.688		100.00	0.000	3.017
L11 84.000-80.000	82.000	1.297	0.003	0.750	20.500	A	0.000	20.500	20.500	100.00	0.000	0.000
						B	0.000	20.500		100.00	0.000	0.000
						C	0.000	20.500		100.00	0.000	8.045
L12 80.000-60.000	70.000	1.24	0.003	0.750	102.500	A	0.000	102.500	102.500	100.00	0.000	0.000
						B	0.000	102.500		100.00	0.000	0.000
						C	0.000	102.500		100.00	0.000	36.477
L13 60.000-58.500	59.250	1.182	0.002	0.750	7.688	A	0.000	7.688	7.688	100.00	0.000	0.000
						B	0.000	7.688		100.00	0.000	0.000
						C	0.000	7.688		100.00	0.000	3.017
L14 58.500-47.250	52.875	1.144	0.002	0.750	57.656	A	0.000	57.656	57.656	100.00	0.000	0.000
						B	0.000	57.656		100.00	0.000	0.000
						C	0.000	57.656		100.00	0.000	17.711
L15 47.250-40.000	43.625	1.083	0.002	0.750	37.156	A	0.000	37.156	37.156	100.00	0.000	0.000
						B	0.000	37.156		100.00	0.000	0.000
						C	0.000	37.156		100.00	0.000	14.041
L16 40.000-32.250	36.125	1.026	0.002	0.750	39.719	A	0.000	39.719	39.719	100.00	0.000	0.000
						B	0.000	39.719		100.00	0.000	0.000
						C	0.000	39.719		100.00	0.000	14.880
L17 32.250-29.750	31.000	1	0.002	0.750	12.813	A	0.000	12.813	12.813	100.00	0.000	0.000
						B	0.000	12.813		100.00	0.000	0.000
						C	0.000	12.813		100.00	0.000	4.195
L18 29.750-20.000	24.875	1	0.002	0.750	49.969	A	0.000	49.969	49.969	100.00	0.000	0.000
						B	0.000	49.969		100.00	0.000	0.000
						C	0.000	49.969		100.00	0.000	16.361
L19 20.000-4.250	12.125	1	0.002	0.750	80.719	A	0.000	80.719	80.719	100.00	0.000	0.000
						B	0.000	80.719		100.00	0.000	0.000
						C	0.000	80.719		100.00	0.000	26.429
L20 4.250-0.000	2.125	1	0.002	0.750	21.781	A	0.000	21.781	21.781	100.00	0.000	0.000
						B	0.000	21.781		100.00	0.000	0.000
						C	0.000	21.781		100.00	0.000	7.132

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 190.000-180.000	185.000	1.636	0.010	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.597	0.010	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	3.584
L3 160.000-140.000	150.000	1.541	0.010	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	14.060
L4 140.000-120.000	130.000	1.48	0.009	80.000	A	0.000	80.000	80.000	100.00	0.000	0.000
					B	0.000	80.000		100.00	0.000	0.000
					C	0.000	80.000		100.00	0.000	14.060
L5 120.000-113.330	116.665	1.434	0.009	30.015	A	0.000	30.015	30.015	100.00	0.000	0.000
					B	0.000	30.015		100.00	0.000	0.000
					C	0.000	30.015		100.00	0.000	4.689
L6 113.330-103.000	108.165	1.404	0.009	46.485	A	0.000	46.485	46.485	100.00	0.000	0.000
					B	0.000	46.485		100.00	0.000	0.000
					C	0.000	46.485		100.00	0.000	8.845
L7 103.000-100.000	101.500	1.379	0.009	13.500	A	0.000	13.500	13.500	100.00	0.000	0.000
					B	0.000	13.500		100.00	0.000	0.000
					C	0.000	13.500		100.00	0.000	2.609
L8 100.000-90.000	95.000	1.353	0.009	50.000	A	0.000	50.000	50.000	100.00	0.000	0.000
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	8.697
L9 90.000-85.500	87.750	1.322	0.008	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	4.278
L10 85.500-84.000	84.750	1.309	0.008	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.617
L11 84.000-80.000	82.000	1.297	0.008	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	4.312
L12 80.000-60.000	70.000	1.24	0.008	100.000	A	0.000	100.000	100.000	100.00	0.000	0.000
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	19.477
L13 60.000-58.500	59.250	1.182	0.008	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.617
L14 58.500-47.250	52.875	1.144	0.007	56.250	A	0.000	56.250	56.250	100.00	0.000	0.000
					B	0.000	56.250		100.00	0.000	0.000
					C	0.000	56.250		100.00	0.000	9.586
L15 47.250-40.000	43.625	1.083	0.007	36.250	A	0.000	36.250	36.250	100.00	0.000	0.000
					B	0.000	36.250		100.00	0.000	0.000
					C	0.000	36.250		100.00	0.000	7.649
L16 40.000-32.250	36.125	1.026	0.007	38.750	A	0.000	38.750	38.750	100.00	0.000	0.000
					B	0.000	38.750		100.00	0.000	0.000
					C	0.000	38.750		100.00	0.000	8.104
L17 32.250-29.750	31.000	1	0.006	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	2.278
L18 29.750-20.000	24.875	1	0.006	48.750	A	0.000	48.750	48.750	100.00	0.000	0.000
					B	0.000	48.750		100.00	0.000	0.000
					C	0.000	48.750		100.00	0.000	8.885
L19 20.000-4.250	12.125	1	0.006	78.750	A	0.000	78.750	78.750	100.00	0.000	0.000
					B	0.000	78.750		100.00	0.000	0.000
					C	0.000	78.750		100.00	0.000	14.353
L20 4.250-0.000	2.125	1	0.006	21.250	A	0.000	21.250	21.250	100.00	0.000	0.000
					B	0.000	21.250		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	21.250		100.00	0.000	3.873

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	190 - 180	Pole	Max Tension	11	0.000	-0.000	0.002
			Max. Compression	14	-7.373	0.099	-0.057
			Max. Mx	11	-4.904	43.953	0.117
			Max. My	8	-4.903	-0.117	-44.071
			Max. Vy	11	-6.533	43.953	0.117
			Max. Vx	8	6.545	-0.117	-44.071
			Max. Torque	7			-0.361
L2	180 - 160	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.090	0.882	-0.509
			Max. Mx	11	-12.998	253.567	0.252
			Max. My	8	-12.994	-0.157	-253.871
			Max. Vy	11	-18.411	253.567	0.252

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	8	18.424	-0.157	-253.871
			Max. Torque	7			-0.779
L3	160 - 140	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-31.302	3.035	-2.329
			Max. Mx	11	-19.361	735.898	2.430
			Max. My	8	-19.351	-2.356	-737.711
			Max. Vy	11	-29.765	735.898	2.430
			Max. Vx	8	29.892	-2.356	-737.711
			Max. Torque	7			-2.911
L4	140 - 120	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-37.954	5.516	-3.463
			Max. Mx	11	-24.037	1362.236	7.193
			Max. My	8	-24.028	-6.769	-1366.334
			Max. Vy	11	-32.877	1362.236	7.193
			Max. Vx	8	33.004	-6.769	-1366.334
			Max. Torque	7			-3.069
L5	120 - 113.33	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-40.268	6.444	-3.997
			Max. Mx	11	-25.698	1585.054	8.744
			Max. My	8	-25.689	-8.221	-1589.943
			Max. Vy	11	-33.891	1585.054	8.744
			Max. Vx	8	34.019	-8.221	-1589.943
			Max. Torque	7			-2.931
L6	113.33 - 103	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-44.854	7.880	-4.418
			Max. Mx	11	-29.157	1946.091	11.284
			Max. My	8	-29.149	-10.472	-1952.046
			Max. Vy	11	-35.765	1946.091	11.284
			Max. Vx	8	35.891	-10.472	-1952.046
			Max. Torque	7			-2.974
L7	103 - 100	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-46.092	8.297	-4.658
			Max. Mx	11	-30.107	2054.131	11.983
			Max. My	8	-30.099	-11.126	-2060.444
			Max. Vy	11	-36.224	2054.131	11.983
			Max. Vx	8	36.350	-11.126	-2060.444
			Max. Torque	7			-2.758
L8	100 - 90	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-50.832	9.836	-5.122
			Max. Mx	11	-33.705	2426.524	14.437
			Max. My	8	-33.697	-13.273	-2433.848
			Max. Vy	11	-38.097	2426.524	14.437
			Max. Vx	8	38.222	-13.273	-2433.848
			Max. Torque	7			-2.833
L9	90 - 85.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-53.041	10.527	-5.520
			Max. Mx	11	-35.450	2599.712	15.476
			Max. My	8	-35.443	-14.240	-2607.569
			Max. Vy	11	-38.832	2599.712	15.476
			Max. Vx	8	38.959	-14.240	-2607.569
			Max. Torque	8			-2.856
L10	85.5 - 84	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-53.852	10.756	-5.651
			Max. Mx	11	-36.104	2658.182	15.823
			Max. My	8	-36.097	-14.563	-2666.217
			Max. Vy	5	39.084	-2653.386	-18.401
			Max. Vx	8	39.213	-14.563	-2666.217
			Max. Torque	8			-2.879
L11	84 - 80	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-55.750	11.373	-6.007
			Max. Mx	11	-37.599	2815.917	16.747
			Max. My	8	-37.592	-15.423	-2824.424
			Max. Vy	11	-39.739	2815.917	16.747
			Max. Vx	8	39.864	-15.423	-2824.424
			Max. Torque	8			-2.942
L12	80 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-66.160	14.609	-7.721
			Max. Mx	11	-45.946	3646.416	21.417
			Max. My	8	-45.940	-19.659	-3657.161

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-42.941	3646.416	21.417
			Max. Vx	8	43.067	-19.659	-3657.161
			Max. Torque	8			-3.505
L13	60 - 58.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-67.035	14.828	-7.847
			Max. Mx	11	-46.672	3711.014	21.763
			Max. My	8	-46.667	-19.982	-3721.938
			Max. Vy	5	43.155	-3704.349	-25.289
			Max. Vx	8	43.285	-19.982	-3721.938
			Max. Torque	8			-3.527
L14	58.5 - 47.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-73.046	16.486	-8.804
			Max. Mx	11	-51.624	4204.737	24.351
			Max. My	8	-51.620	-22.396	-4216.993
			Max. Vy	11	-44.570	4204.737	24.351
			Max. Vx	8	44.697	-22.396	-4216.993
			Max. Torque	8			-3.646
L15	47.25 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-77.576	17.554	-9.421
			Max. Mx	11	-55.467	4531.307	26.015
			Max. My	8	-55.464	-23.948	-4544.420
			Max. Vy	11	-45.479	4531.307	26.015
			Max. Vx	8	45.606	-23.948	-4544.420
			Max. Torque	8			-3.739
L16	40 - 32.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-82.419	18.693	-10.079
			Max. Mx	11	-59.589	4887.345	27.790
			Max. My	8	-59.586	-25.605	-4901.373
			Max. Vy	5	46.362	-4878.919	-32.400
			Max. Vx	8	46.490	-25.605	-4901.373
			Max. Torque	8			-3.831
L17	32.25 - 29.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-84.281	19.061	-10.292
			Max. Mx	11	-61.214	5003.632	28.361
			Max. My	8	-61.211	-26.138	-5017.954
			Max. Vy	5	46.633	-4995.039	-33.074
			Max. Vx	8	46.761	-26.138	-5017.954
			Max. Torque	8			-3.856
L18	29.75 - 20	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-90.646	20.494	-11.120
			Max. Mx	11	-66.692	5463.320	30.583
			Max. My	8	-66.690	-28.215	-5478.788
			Max. Vy	5	47.619	-5454.079	-35.697
			Max. Vx	8	47.746	-28.215	-5478.788
			Max. Torque	8			-3.954
L19	20 - 4.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-102.180	22.810	-12.458
			Max. Mx	11	-76.803	6225.714	34.149
			Max. My	8	-76.803	-31.548	-6243.020
			Max. Vy	5	49.135	-6215.432	-39.905
			Max. Vx	8	49.261	-31.548	-6243.020
			Max. Torque	8			-4.113
L20	4.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-105.654	23.435	-12.819
			Max. Mx	11	-79.894	6435.440	35.104
			Max. My	8	-79.894	-32.443	-6453.239
			Max. Vy	5	49.529	-6424.880	-41.033
			Max. Vx	8	49.655	-32.443	-6453.239
			Max. Torque	8			-4.155

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	105.654	-0.001	0.001
	Max. H_x	11	79.903	49.509	0.245
	Max. H_z	2	79.903	0.245	49.639
	Max. M_x	2	6447.317	0.245	49.639
	Max. M_z	5	6424.880	-49.513	-0.245
	Max. Torsion	2	4.152	0.245	49.639
	Min. Vert	11	79.903	49.509	0.245
	Min. H_x	5	79.903	-49.513	-0.245
	Min. H_z	8	79.903	-0.245	-49.639
	Min. M_x	8	-6453.239	-0.245	-49.639
	Min. M_z	11	-6435.440	49.509	0.245
	Min. Torsion	8	-4.155	-0.245	-49.639

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	79.904	-0.000	0.000	2.891	5.500	0.000
Dead+Wind 0 deg - No Ice	79.903	-0.245	-49.639	-6447.317	43.702	-4.152
Dead+Wind 30 deg - No Ice	79.904	24.546	-42.867	-5564.311	-3176.915	-3.285
Dead+Wind 60 deg - No Ice	79.904	42.760	-24.608	-3189.327	-5544.780	-1.539
Dead+Wind 90 deg - No Ice	79.903	49.513	0.245	41.033	-6424.880	0.619
Dead+Wind 120 deg - No Ice	79.904	43.005	25.032	3261.165	-5582.799	2.613
Dead+Wind 150 deg - No Ice	79.904	24.970	43.112	5608.254	-3242.829	3.908
Dead+Wind 180 deg - No Ice	79.903	0.245	49.639	6453.239	-32.443	4.155
Dead+Wind 210 deg - No Ice	79.904	-24.546	42.867	5570.238	3188.175	3.288
Dead+Wind 240 deg - No Ice	79.904	-42.760	24.608	3195.254	5556.044	1.538
Dead+Wind 270 deg - No Ice	79.903	-49.509	-0.245	-35.104	6435.440	-0.623
Dead+Wind 300 deg - No Ice	79.904	-43.005	-25.032	-3255.244	5594.063	-2.616
Dead+Wind 330 deg - No Ice	79.904	-24.970	-43.112	-5602.334	3254.090	-3.907
Dead+Ice+Temp	105.654	0.001	-0.001	12.819	23.435	-0.000
Dead+Wind 0 deg+Ice+Temp	105.654	-0.027	-6.732	-872.268	28.108	-0.726
Dead+Wind 30 deg+Ice+Temp	105.654	3.336	-5.817	-751.544	-414.084	-0.673
Dead+Wind 60 deg+Ice+Temp	105.654	5.805	-3.343	-425.943	-738.923	-0.439
Dead+Wind 90 deg+Ice+Temp	105.654	6.719	0.027	17.289	-859.368	-0.088
Dead+Wind 120 deg+Ice+Temp	105.654	5.832	3.389	459.389	-743.146	0.287
Dead+Wind 150 deg+Ice+Temp	105.654	3.383	5.844	781.897	-421.400	0.585
Dead+Wind 180 deg+Ice+Temp	105.654	0.027	6.732	898.397	19.660	0.726
Dead+Wind 210 deg+Ice+Temp	105.654	-3.336	5.817	777.673	461.852	0.673
Dead+Wind 240 deg+Ice+Temp	105.654	-5.805	3.343	452.073	786.690	0.439
Dead+Wind 270 deg+Ice+Temp	105.654	-6.719	-0.027	8.841	907.136	0.088
Dead+Wind 300 deg+Ice+Temp	105.654	-5.832	-3.389	-433.259	790.915	-0.287
Dead+Wind 330 deg+Ice+Temp	105.654	-3.383	-5.844	-755.767	469.168	-0.585
Dead+Wind 0 deg - Service	79.903	-0.085	-17.174	-2229.521	18.816	-1.440
Dead+Wind 30 deg - Service	79.904	8.493	-14.832	-1924.051	-1095.944	-1.140
Dead+Wind 60 deg - Service	79.904	14.795	-8.514	-1101.990	-1915.537	-0.533
Dead+Wind 90 deg - Service	79.903	17.131	0.085	16.142	-2220.105	0.216
Dead+Wind 120 deg - Service	79.904	14.880	8.661	1130.799	-1928.807	0.907
Dead+Wind 150 deg - Service	79.904	8.640	14.917	1943.158	-1118.769	1.356
Dead+Wind 180 deg -	79.903	0.085	17.174	2235.450	-7.538	1.441

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Service						
Dead+Wind 210 deg - Service	79.904	-8.493	14.833	1930.075	1107.276	1.140
Dead+Wind 240 deg - Service	79.904	-14.795	8.514	1107.920	1926.817	0.533
Dead+Wind 270 deg - Service	79.903	-17.131	-0.085	-10.212	2231.383	-0.216
Dead+Wind 300 deg - Service	79.904	-14.880	-8.661	-1124.815	1939.993	-0.907
Dead+Wind 330 deg - Service	79.904	-8.640	-14.917	-1937.321	1130.102	-1.355

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-79.904	0.000	0.000	79.904	-0.000	0.000%
2	-0.245	-79.904	-49.641	0.245	79.903	49.639	0.002%
3	24.546	-79.904	-42.868	-24.546	79.904	42.867	0.000%
4	42.760	-79.904	-24.608	-42.760	79.904	24.608	0.000%
5	49.517	-79.904	0.245	-49.513	79.903	-0.245	0.004%
6	43.005	-79.904	25.032	-43.005	79.904	-25.032	0.000%
7	24.970	-79.904	43.112	-24.970	79.904	-43.112	0.000%
8	0.245	-79.904	49.641	-0.245	79.903	-49.639	0.002%
9	-24.546	-79.904	42.868	24.546	79.904	-42.867	0.000%
10	-42.760	-79.904	24.608	42.760	79.904	-24.608	0.000%
11	-49.517	-79.904	-0.245	49.509	79.903	0.245	0.009%
12	-43.005	-79.904	-25.032	43.005	79.904	25.032	0.000%
13	-24.970	-79.904	-43.112	24.970	79.904	43.112	0.000%
14	0.000	-105.654	0.000	-0.001	105.654	0.001	0.001%
15	-0.027	-105.654	-6.732	0.027	105.654	6.732	0.000%
16	3.336	-105.654	-5.817	-3.336	105.654	5.817	0.000%
17	5.805	-105.654	-3.343	-5.805	105.654	3.343	0.000%
18	6.719	-105.654	0.027	-6.719	105.654	-0.027	0.000%
19	5.832	-105.654	3.389	-5.832	105.654	-3.389	0.000%
20	3.383	-105.654	5.844	-3.383	105.654	-5.844	0.000%
21	0.027	-105.654	6.732	-0.027	105.654	-6.732	0.000%
22	-3.336	-105.654	5.817	3.336	105.654	-5.817	0.000%
23	-5.805	-105.654	3.343	5.805	105.654	-3.343	0.000%
24	-6.719	-105.654	-0.027	6.719	105.654	0.027	0.000%
25	-5.832	-105.654	-3.389	5.832	105.654	3.389	0.000%
26	-3.383	-105.654	-5.844	3.383	105.654	5.844	0.000%
27	-0.085	-79.904	-17.177	0.085	79.903	17.174	0.003%
28	8.494	-79.904	-14.833	-8.493	79.904	14.832	0.001%
29	14.796	-79.904	-8.515	-14.795	79.904	8.514	0.001%
30	17.134	-79.904	0.085	-17.131	79.903	-0.085	0.003%
31	14.881	-79.904	8.662	-14.880	79.904	-8.661	0.001%
32	8.640	-79.904	14.918	-8.640	79.904	-14.917	0.001%
33	0.085	-79.904	17.177	-0.085	79.903	-17.174	0.003%
34	-8.494	-79.904	14.833	8.493	79.904	-14.833	0.001%
35	-14.796	-79.904	8.515	14.795	79.904	-8.514	0.001%
36	-17.134	-79.904	-0.085	17.131	79.903	0.085	0.003%
37	-14.881	-79.904	-8.662	14.880	79.904	8.661	0.001%
38	-8.640	-79.904	-14.918	8.640	79.904	14.917	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00000001	0.00011583

3	Yes	18	0.00000001	0.00009121
4	Yes	18	0.00000001	0.00009494
5	Yes	14	0.00004874	0.00009908
6	Yes	18	0.00000001	0.00010003
7	Yes	18	0.00000001	0.00009379
8	Yes	15	0.00000001	0.00008161
9	Yes	18	0.00000001	0.00009749
10	Yes	18	0.00000001	0.00009338
11	Yes	13	0.00011259	0.00009050
12	Yes	18	0.00000001	0.00009483
13	Yes	18	0.00000001	0.00010146
14	Yes	8	0.00000001	0.00004109
15	Yes	16	0.00000001	0.00006956
16	Yes	16	0.00000001	0.00006967
17	Yes	16	0.00000001	0.00006930
18	Yes	16	0.00000001	0.00006844
19	Yes	16	0.00000001	0.00007126
20	Yes	16	0.00000001	0.00007233
21	Yes	16	0.00000001	0.00007177
22	Yes	16	0.00000001	0.00007404
23	Yes	16	0.00000001	0.00007420
24	Yes	16	0.00000001	0.00007247
25	Yes	16	0.00000001	0.00007357
26	Yes	16	0.00000001	0.00007270
27	Yes	13	0.00011457	0.00007541
28	Yes	14	0.00000001	0.00012732
29	Yes	14	0.00000001	0.00014209
30	Yes	13	0.00011458	0.00003537
31	Yes	15	0.00000001	0.00007281
32	Yes	14	0.00000001	0.00013079
33	Yes	13	0.00011458	0.00006817
34	Yes	15	0.00000001	0.00007156
35	Yes	14	0.00000001	0.00013571
36	Yes	13	0.00011458	0.00003147
37	Yes	14	0.00000001	0.00013446
38	Yes	15	0.00000001	0.00007579

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 180	25.417	38	1.077	0.002
L2	180 - 160	23.164	38	1.073	0.002
L3	160 - 140	18.731	38	1.035	0.002
L4	140 - 120	14.549	38	0.947	0.001
L5	120 - 113.33	10.825	38	0.817	0.001
L6	113.33 - 103	9.713	38	0.774	0.001
L7	103 - 100	8.101	38	0.713	0.001
L8	100 - 90	7.660	38	0.693	0.001
L9	90 - 85.5	6.265	38	0.637	0.001
L10	85.5 - 84	5.677	38	0.612	0.001
L11	84 - 80	5.485	38	0.605	0.001
L12	80 - 60	4.989	38	0.580	0.001
L13	60 - 58.5	2.829	38	0.446	0.000
L14	58.5 - 47.25	2.690	38	0.436	0.000
L15	47.25 - 40	1.762	38	0.350	0.000
L16	40 - 32.25	1.267	38	0.300	0.000
L17	32.25 - 29.75	0.826	38	0.243	0.000
L18	29.75 - 20	0.703	38	0.227	0.000
L19	20 - 4.25	0.317	38	0.150	0.000
L20	4.25 - 0	0.014	38	0.031	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	PD201-7	38	25.417	1.077	0.002	148082
188.000	800MHZ RRH	38	24.966	1.077	0.002	148082
182.000	Platform Mount [LP 403-1]	38	23.613	1.074	0.002	91772
170.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	38	20.928	1.059	0.002	31126
162.000	(2) 7770.00 w/ Mount Pipe	38	19.166	1.040	0.002	21217
150.000	(2) DB846F65ZAXY w/ Mount Pipe	38	16.595	0.998	0.002	13480
125.000	PD128-1	38	11.703	0.851	0.001	8070
110.000	PD128-1	38	9.179	0.755	0.001	9658
95.000	PD128-1	38	6.948	0.664	0.001	10059
80.000	DB222	38	4.989	0.580	0.001	9457

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 180	73.367	13	3.111	0.006
L2	180 - 160	66.865	13	3.097	0.006
L3	160 - 140	54.073	13	2.988	0.005
L4	140 - 120	42.004	13	2.736	0.004
L5	120 - 113.33	31.258	13	2.360	0.003
L6	113.33 - 103	28.046	13	2.237	0.003
L7	103 - 100	23.394	13	2.060	0.002
L8	100 - 90	22.119	13	2.001	0.002
L9	90 - 85.5	18.093	13	1.839	0.002
L10	85.5 - 84	16.393	13	1.769	0.002
L11	84 - 80	15.841	13	1.747	0.002
L12	80 - 60	14.408	13	1.675	0.002
L13	60 - 58.5	8.169	13	1.287	0.001
L14	58.5 - 47.25	7.769	13	1.260	0.001
L15	47.25 - 40	5.088	13	1.012	0.001
L16	40 - 32.25	3.660	13	0.867	0.001
L17	32.25 - 29.75	2.387	13	0.701	0.001
L18	29.75 - 20	2.032	13	0.655	0.001
L19	20 - 4.25	0.916	13	0.435	0.000
L20	4.25 - 0	0.040	13	0.089	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	PD201-7	13	73.367	3.111	0.006	51629
188.000	800MHZ RRH	13	72.065	3.109	0.006	51629
182.000	Platform Mount [LP 403-1]	13	68.164	3.101	0.006	31995
170.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	13	60.414	3.059	0.006	10847
162.000	(2) 7770.00 w/ Mount Pipe	13	55.329	3.005	0.006	7393
150.000	(2) DB846F65ZAXY w/ Mount Pipe	13	47.910	2.881	0.005	4696
125.000	PD128-1	13	33.791	2.458	0.003	2807
110.000	PD128-1	13	26.504	2.181	0.003	3355
95.000	PD128-1	13	20.063	1.917	0.002	3492
80.000	DB222	13	14.408	1.675	0.002	3281

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	190 - 180 (1)	30" x 0.375"	10.000	0.000	0.0	25.075	34.901	-4.901	875.146	0.006
L2	180 - 160 (2)	36" x 0.375"	20.000	0.000	0.0	23.696	41.970	-12.990	994.507	0.013
L3	160 - 140 (3)	42" x 0.375"	20.000	0.000	0.0	22.711	49.038	-19.336	1113.690	0.017
L4	140 - 120 (4)	P48x3/8	20.000	0.000	0.0	21.972	56.107	-24.015	1232.770	0.019
L5	120 - 113.33 (5)	54" x 0.375"	6.670	0.000	0.0	21.397	63.175	-25.676	1351.780	0.019
L6	113.33 - 103 (6)	RPS 54" x 0.49054"	10.330	0.000	0.0	21.386	82.462	-29.137	1763.510	0.017
L7	103 - 100 (7)	RPS 54" x 0.49054"	3.000	0.000	0.0	21.386	82.462	-30.087	1763.510	0.017
L8	100 - 90 (8)	RPS 60" x 0.47803"	10.000	0.000	0.0	20.926	89.389	-33.686	1870.570	0.018
L9	90 - 85.5 (9)	RPS 60" x 0.55603"	4.500	0.000	0.0	20.923	103.838	-35.432	2172.590	0.016
L10	85.5 - 84 (10)	RPS 60" x 0.63464"	1.500	0.000	0.0	19.026	118.361	-36.086	2251.950	0.016
L11	84 - 80 (11)	RPS 60" x 0.52996"	4.000	0.000	0.0	20.919	99.013	-37.582	2071.270	0.018
L12	80 - 60 (12)	RPS 60" x 0.57817"	20.000	0.000	0.0	22.323	107.932	-45.932	2409.390	0.019
L13	60 - 58.5 (13)	RPS 60" x 0.70417"	1.500	0.000	0.0	21.528	131.175	-46.659	2823.940	0.017
L14	58.5 - 47.25 (14)	P60x5/8	11.250	0.000	0.0	23.696	116.583	-51.614	2762.520	0.019
L15	47.25 - 40 (15)	RPS 60" x 0.76962"	7.250	0.000	0.0	21.546	143.209	-55.458	3085.580	0.018
L16	40 - 32.25 (16)	RPS 60" x 0.76962"	7.750	0.000	0.0	21.546	143.209	-59.581	3085.580	0.019
L17	32.25 - 29.75 (17)	RPS 60" x 0.96202"	2.500	0.000	0.0	21.540	178.429	-61.207	3843.360	0.016
L18	29.75 - 20 (18)	RPS 60" x 0.81453"	9.750	0.000	0.0	21.528	151.451	-66.688	3260.440	0.020
L19	20 - 4.25 (19)	RPS 60" x 0.94201"	15.750	0.000	0.0	22.800	174.777	-76.802	3984.910	0.019
L20	4.25 - 0 (20)	RPS 60" x 1.07924"	4.250	0.000	0.0	22.716	199.773	-79.894	4538.040	0.018

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	190 - 180 (1)	30" x 0.375"	44.139	2.075	25.075	0.083	0.000	0.000	25.075	0.000
L2	180 - 160 (2)	36" x 0.375"	253.984	8.239	23.696	0.348	0.000	0.000	23.696	0.000
L3	160 - 140 (3)	42" x 0.375"	739.463	17.544	22.711	0.772	0.000	0.000	22.711	0.000
L4	140 - 120 (4)	P48x3/8	1371.492	24.829	21.972	1.130	0.000	0.000	21.972	0.000
L5	120 - 113.33 (5)	54" x 0.375"	1596.217	22.773	21.397	1.064	0.000	0.000	21.397	0.000
L6	113.33 - 103 (6)	RPS 54" x 0.49054"	1960.108	21.516	21.386	1.006	0.000	0.000	21.386	0.000
L7	103 - 100 (7)	RPS 54" x 0.49054"	2069.008	22.712	21.386	1.062	0.000	0.000	21.386	0.000
L8	100 - 90 (8)	RPS 60" x 0.47803"	2444.400	22.228	20.926	1.062	0.000	0.000	20.926	0.000
L9	90 - 85.5 (9)	RPS 60" x 0.55603"	2618.867	20.554	20.923	0.982	0.000	0.000	20.923	0.000
L10	85.5 - 84 (10)	RPS 60" x 0.63464"	2677.767	18.486	20.929	0.883	0.000	0.000	20.929	0.000
L11	84 - 80 (11)	RPS 60" x 0.52996"	2836.642	23.328	20.919	1.115	0.000	0.000	20.919	0.000
L12	80 - 60 (12)	RPS 60" x 0.57817"	3672.858	27.753	22.323	1.243	0.000	0.000	22.323	0.000
L13	60 - 58.5 (13)	RPS 60" x 0.70417"	3737.892	23.338	23.681	0.986	0.000	0.000	23.681	0.000
L14	58.5 - 47.25 (14)	P60x5/8	4234.808	29.671	23.696	1.252	0.000	0.000	23.696	0.000
L15	47.25 - 40	RPS 60" x 0.76962"	4563.4	26.155	23.701	1.104	0.000	0.000	23.701	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	(15)		42							
L16	40 - 32.25	RPS 60" x 0.76962"	4921.675	28.208	23.701	1.190	0.000	0.000	23.701	0.000
	(16)									
L17	32.25 - 29.75	RPS 60" x 0.96202"	5038.675	23.327	23.694	0.985	0.000	0.000	23.694	0.000
	(17)									
L18	29.75 - 20	RPS 60" x 0.81453"	5501.108	29.858	23.681	1.261	0.000	0.000	23.681	0.000
	(18)									
L19	20 - 4.25 (19)	RPS 60" x 0.94201"	6267.917	29.605	25.080	1.180	0.000	0.000	25.080	0.000
L20	4.25 - 0 (20)	RPS 60" x 1.07924"	6478.833	26.895	24.988	1.076	0.000	0.000	24.988	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	190 - 180 (1)	30" x 0.375"	6.555	0.376	16.800	0.022	0.335	0.008	15.644	0.001
L2	180 - 160 (2)	36" x 0.375"	18.436	0.879	16.800	0.052	0.779	0.013	11.901	0.001
L3	160 - 140 (3)	42" x 0.375"	30.080	1.227	16.800	0.073	2.911	0.035	9.619	0.004
L4	140 - 120 (4)	P48x3/8	33.192	1.183	16.800	0.070	2.855	0.026	8.021	0.003
L5	120 - 113.33	54" x 0.375"	34.207	1.083	16.800	0.064	2.931	0.021	7.343	0.003
	(5)									
L6	113.33 - 103	RPS 54" x 0.49054"	36.081	0.875	15.372	0.057	2.716	0.015	10.272	0.001
	(6)									
L7	103 - 100 (7)	RPS 54" x 0.49054"	36.539	0.886	15.372	0.058	2.758	0.015	10.272	0.001
L8	100 - 90 (8)	RPS 60" x 0.47803"	38.411	0.859	15.652	0.055	2.548	0.012	9.190	0.001
L9	90 - 85.5 (9)	RPS 60" x 0.55603"	39.148	0.754	14.788	0.051	2.620	0.010	11.101	0.001
L10	85.5 - 84 (10)	RPS 60" x 0.63464"	39.401	0.666	12.684	0.052	2.647	0.009	12.684	0.001
L11	84 - 80 (11)	RPS 60" x 0.52996"	40.053	0.809	15.072	0.054	2.719	0.011	10.454	0.001
L12	80 - 60 (12)	RPS 60" x 0.57817"	43.253	0.801	15.944	0.050	3.156	0.012	11.656	0.001
L13	60 - 58.5 (13)	RPS 60" x 0.70417"	43.472	0.663	14.352	0.046	3.181	0.010	14.352	0.001
L14	58.5 - 47.25	P60x5/8	44.883	0.770	16.800	0.046	3.319	0.012	12.848	0.001
	(14)									
L15	47.25 - 40	RPS 60" x 0.76962"	45.791	0.640	14.364	0.045	3.426	0.010	14.364	0.001
	(15)									
L16	40 - 32.25	RPS 60" x 0.76962"	46.674	0.652	14.364	0.045	3.533	0.010	14.364	0.001
	(16)									
L17	32.25 - 29.75	RPS 60" x 0.96202"	46.946	0.526	14.360	0.037	3.562	0.008	14.360	0.001
	(17)									
L18	29.75 - 20	RPS 60" x 0.81453"	47.930	0.633	14.352	0.044	3.675	0.010	14.352	0.001
	(18)									
L19	20 - 4.25 (19)	RPS 60" x 0.94201"	49.444	0.566	15.200	0.037	3.858	0.009	15.200	0.001
L20	4.25 - 0 (20)	RPS 60" x 1.07924"	49.837	0.499	15.144	0.033	3.907	0.008	15.144	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	190 - 180 (1)	0.006	0.083	0.000	0.022	0.001	0.089 ✔	1.333	H1-3+VT ✔
L2	180 - 160 (2)	0.013	0.348	0.000	0.052	0.001	0.364 ✔	1.333	H1-3+VT ✔
L3	160 - 140 (3)	0.017	0.772	0.000	0.073	0.004	0.796 ✔	1.333	H1-3+VT ✔
L4	140 - 120 (4)	0.019	1.130	0.000	0.070	0.003	1.155 ✔	1.333	H1-3+VT ✔

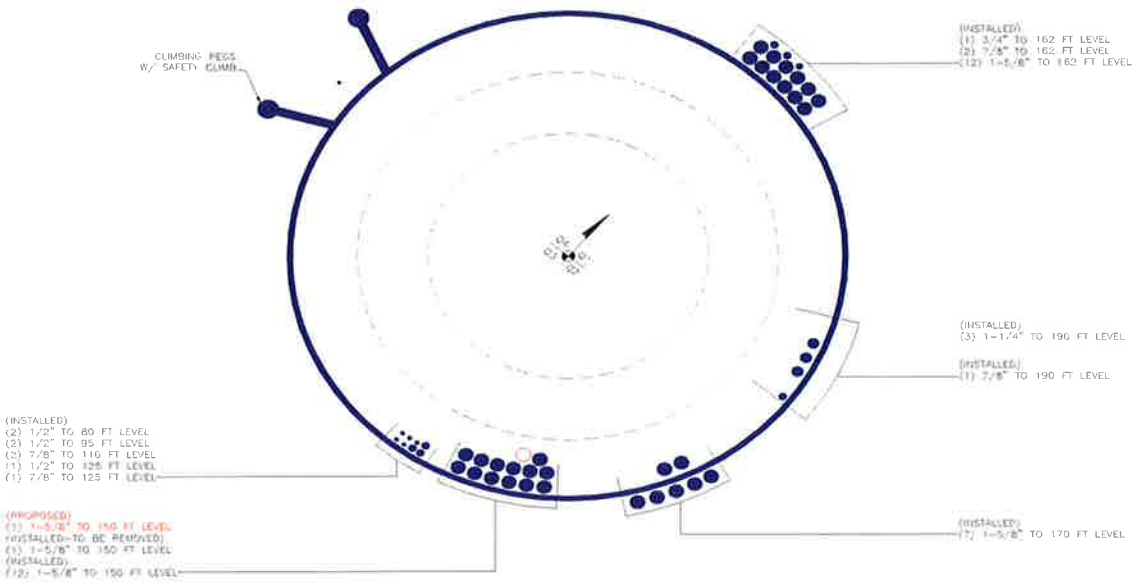
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L5	120 - 113.33 (5)	0.019	1.064	0.000	0.064	0.003	1.088 ✔	1.333	H1-3+VT ✔
L6	113.33 - 103 (6)	0.017	1.006	0.000	0.057	0.001	1.026 ✔	1.333	H1-3+VT ✔
L7	103 - 100 (7)	0.017	1.062	0.000	0.058	0.001	1.083 ✔	1.333	H1-3+VT ✔
L8	100 - 90 (8)	0.018	1.062	0.000	0.055	0.001	1.083 ✔	1.333	H1-3+VT ✔
L9	90 - 85.5 (9)	0.016	0.982	0.000	0.051	0.001	1.001 ✔	1.333	H1-3+VT ✔
L10	85.5 - 84 (10)	0.016	0.883	0.000	0.052	0.001	0.902 ✔	1.333	H1-3+VT ✔
L11	84 - 80 (11)	0.018	1.115	0.000	0.054	0.001	1.136 ✔	1.333	H1-3+VT ✔
L12	80 - 60 (12)	0.019	1.243	0.000	0.050	0.001	1.265 ✔	1.333	H1-3+VT ✔
L13	60 - 58.5 (13)	0.017	0.986	0.000	0.046	0.001	1.004 ✔	1.333	H1-3+VT ✔
L14	58.5 - 47.25 (14)	0.019	1.252	0.000	0.046	0.001	1.273 ✔	1.333	H1-3+VT ✔
L15	47.25 - 40 (15)	0.018	1.104	0.000	0.045	0.001	1.124 ✔	1.333	H1-3+VT ✔
L16	40 - 32.25 (16)	0.019	1.190	0.000	0.045	0.001	1.212 ✔	1.333	H1-3+VT ✔
L17	32.25 - 29.75 (17)	0.016	0.985	0.000	0.037	0.001	1.002 ✔	1.333	H1-3+VT ✔
L18	29.75 - 20 (18)	0.020	1.261	0.000	0.044	0.001	1.283 ✔	1.333	H1-3+VT ✔
L19	20 - 4.25 (19)	0.019	1.180	0.000	0.037	0.001	1.201 ✔	1.333	H1-3+VT ✔
L20	4.25 - 0 (20)	0.018	1.076	0.000	0.033	0.001	1.095 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	190 - 180	Pole	30" x 0.375"	1	-4.901	1166.570	6.7	Pass
L2	180 - 160	Pole	36" x 0.375"	2	-12.990	1325.678	27.3	Pass
L3	160 - 140	Pole	42" x 0.375"	3	-19.336	1484.549	59.7	Pass
L4	140 - 120	Pole	P48x3/8	4	-24.015	1643.282	86.6	Pass
L5	120 - 113.33	Pole	54" x 0.375"	5	-25.676	1801.923	81.6	Pass
L6	113.33 - 103	Pole	RPS 54" x 0.49054"	6	-29.137	2350.759	77.0	Pass
L7	103 - 100	Pole	RPS 54" x 0.49054"	7	-30.087	2350.759	81.2	Pass
L8	100 - 90	Pole	RPS 60" x 0.47803"	8	-33.686	2493.470	81.3	Pass
L9	90 - 85.5	Pole	RPS 60" x 0.55603"	9	-35.432	2896.062	75.1	Pass
L10	85.5 - 84	Pole	RPS 60" x 0.63464"	10	-36.086	3001.849	67.7	Pass
L11	84 - 80	Pole	RPS 60" x 0.52996"	11	-37.582	2761.003	85.2	Pass
L12	80 - 60	Pole	RPS 60" x 0.57817"	12	-45.932	3211.717	94.9	Pass
L13	60 - 58.5	Pole	RPS 60" x 0.70417"	13	-46.659	3764.312	75.3	Pass
L14	58.5 - 47.25	Pole	P60x5/8	14	-51.614	3682.439	95.5	Pass
L15	47.25 - 40	Pole	RPS 60" x 0.76962"	15	-55.458	4113.078	84.3	Pass
L16	40 - 32.25	Pole	RPS 60" x 0.76962"	16	-59.581	4113.078	90.9	Pass
L17	32.25 - 29.75	Pole	RPS 60" x 0.96202"	17	-61.207	5123.199	75.2	Pass
L18	29.75 - 20	Pole	RPS 60" x 0.81453"	18	-66.688	4346.166	96.3	Pass
L19	20 - 4.25	Pole	RPS 60" x 0.94201"	19	-76.802	5311.885	90.1	Pass
L20	4.25 - 0	Pole	RPS 60" x 1.07924"	20	-79.894	6049.207	82.2	Pass
						Summary		
						Pole (L18)	96.3	Pass
						RATING =	**96.3**	**Pass**

APPENDIX B

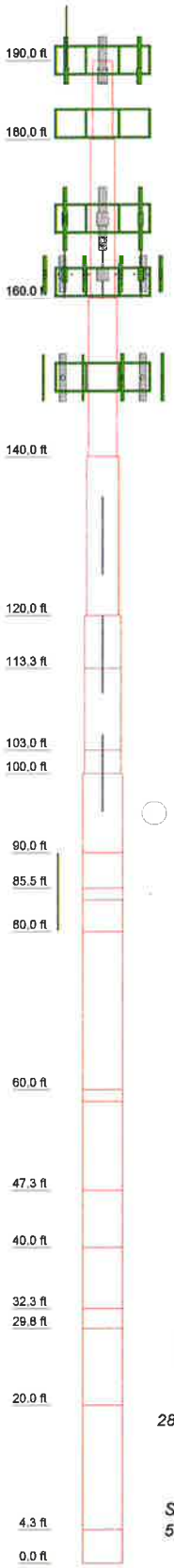
BASE LEVEL DRAWING


CLIMBING PEGS
W/ SAFETY CLIMB
(INSTALLED)
(1) 3/4" TO 162 FT LEVEL
(2) 7/8" TO 162 FT LEVEL
(12) 1-5/8" TO 162 FT LEVEL
(INSTALLED)
(3) 1-1/4" TO 190 FT LEVEL
(INSTALLED)
(1) 7/8" TO 190 FT LEVEL
(INSTALLED)
(2) 1/2" TO 80 FT LEVEL
(2) 1/2" TO 95 FT LEVEL
(2) 7/8" TO 110 FT LEVEL
(1) 1/2" TO 125 FT LEVEL
(1) 7/8" TO 125 FT LEVEL
(PROPOSED)
(1) 1-5/8" TO 150 FT LEVEL
(INSTALLED-TO BE REMOVED)
(1) 1-5/8" TO 150 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 150 FT LEVEL
(INSTALLED)
(7) 1-5/8" TO 170 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Program Version 7.0.5.1 - 2/1/2016 File:G:/TOWER/375_Crown_Castle/2016/37516-0710_829046_WESTON- RT-57- NORFIELD/37516-0710.001.7805_SA_1169328/37516-0710.001.7805.eri



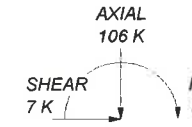
Section	Size	Length (ft)	Grade	Weight (K)
1	30" x 0.375"	10.000	A53-B-42	1.2
2	36" x 0.375"	20.000		2.9
3	42" x 0.375"	20.000		3.3
4	P48x3/8	20.000		3.8
5		6.670		1.4
6		10.330	Reinf 38.43 ksi	2.9
7		3.000		0.8
8		10.000	Reinf 39.13 ksi	3.0
9		4.500		1.6
10				
11		4.000		1.3
12		20.000	Reinf 39.86 ksi	7.3
13		1.500	Reinf 35.88 ksi	0.7
14		11.250	A53-B-42	4.5
15		7.250	Reinf 35.91 ksi	3.5
16		7.750		3.8
17		2.500		1.5
18		9.750	Reinf 35.90 ksi	5.0
19	RPS 60" x 0.9420"	15.750	Reinf 38.00 ksi	9.4
20	RPS 60" x 1.0923"	4.250	Reinf 37.86 ksi	2.9
				61.5

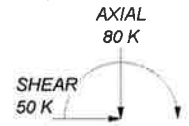
DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD201-7	190	RRUS-11	162
APXVSPP18-C-A20 w/ Mount Pipe	190	DC6-48-60-18-8F	162
APXVSPP18-C-A20 w/ Mount Pipe	190	OPA-65R-LCUU-H6 w/Mount Pipe	162
APXVSPP18-C-A20 w/ Mount Pipe	190	OPA-65R-LCUU-H6 w/Mount Pipe	162
(2) 2.375" OD x 6' Mount Pipe	190	OPA-65R-LCUU-H6 w/Mount Pipe	162
(2) 2.375" OD x 6' Mount Pipe	190	RRUS12/RRUS A2	162
(2) 2.375" OD x 6' Mount Pipe	190	RRUS12/RRUS A2	162
Platform Mount [LP 403-1]	190	RRUS12/RRUS A2	162
800MHZ RRH	188	Platform Mount [LP 403-1]	162
800MHZ RRH	188	6' x 2" Mount Pipe	162
800MHZ RRH	188	6' x 2" Mount Pipe	162
1900MHz RRH	188	6' x 2" Mount Pipe	162
1900MHz RRH	188	(2) DB846F65ZAXY w/ Mount Pipe	150
1900MHz RRH	188	(2) DB846F65ZAXY w/ Mount Pipe	150
Side Arm Mount [SO 102-3]	188	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
Platform Mount [LP 403-1]	182		
(4) 6' x 2" Mount Pipe	182	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
(4) 6' x 2" Mount Pipe	182		
(4) 6' x 2" Mount Pipe	182	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	(2) LPA-80080/6CF w/ Mount Pipe	150
KRY 112 144/1	170	(2) FD9R6004/2C-3L	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	(2) FD9R6004/2C-3L	150
		(2) FD9R6004/2C-3L	150
KRY 112 144/1	170	DB-T1-6Z-8AB-0Z	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	Platform Mount [LP 403-1]	150
		RRH2x60-700	150
KRY 112 144/1	170	RRH2X60-PCS	150
Platform Mount [LP 405-1]	170	RRH4X45-AWS4 B66	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	(2) SBNHH-1D85C w/ Mount Pipe	150
		RRH2x60-700	150
RRUS 11 B12	170	RRH2X60-PCS	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	RRH4X45-AWS4 B66	150
		(2) SBNHH-1D85C w/ Mount Pipe	150
RRUS 11 B12	170	RRH2x60-700	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	RRH2X60-PCS	150
		RRH4X45-AWS4 B66	150
RRUS 11 B12	170	(2) SBNHH-1D85C w/ Mount Pipe	150
(2) 7770.00 w/ Mount Pipe	162	DB-T1-6Z-8AB-0Z	150
(2) 7770.00 w/ Mount Pipe	162	PD128-1	125
(2) 7770.00 w/ Mount Pipe	162	PD201-1	125
(2) LGP21401	162	Side Arm Mount [SO 701-3]	125
(2) LGP21401	162	PD128-1	110
(2) LGP21401	162	PD128-1	110
(4) 7020.00	162	Side Arm Mount [SO 701-3]	110
(4) 7020.00	162	PD128-1	95
(4) 7020.00	162	PD128-1	95
TT19-08BP111-001	162	Side Arm Mount [SO 701-3]	95
TT19-08BP111-001	162	DB222	80
TT19-08BP111-001	162	PD128-1	80
RRUS-11	162	Side Arm Mount [SO 701-3]	80
RRUS-11	162		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	Reinf 39.86 ksi	40 ksi	50 ksi
Reinf 38.43 ksi	38 ksi	49 ksi	Reinf 35.88 ksi	36 ksi	45 ksi
Reinf 39.13 ksi	39 ksi	49 ksi	Reinf 35.91 ksi	36 ksi	45 ksi
Reinf 36.97 ksi	37 ksi	47 ksi	Reinf 35.90 ksi	36 ksi	45 ksi
Reinf 31.71 ksi	32 ksi	40 ksi	Reinf 38.00 ksi	38 ksi	48 ksi
Reinf 37.68 ksi	38 ksi	48 ksi	Reinf 37.86 ksi	38 ksi	48 ksi





TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F standard.
3. Tower is also designed for a 28 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 96.3%

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: 190' Monopole / Weston Rt-57 Norfield R			
Project: PJF 37515-0537 / BU 829046			
Client: CCI	Drawn by: John J. Woolley	App'd:	
Code: TIA/EIA-222-F	Date: 02/18/16	Scale: NTS	
Path:		Dwg No. E-1	

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

Date: 2/18/2016
PJF Project: 37516-0710.001.7805
Client Ref. # 829046
Site Name:
Description:
Owner:
Engineer: JJW

v4.1 - Effective 7-3-12

Asymmetric Anchor Rod Analysis

Moment =	6479	k-ft	TIA Ref.	F	Location =	Base Plate	
Axial =	80.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	50.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	60						

** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. **

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in²	Area, in²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A687	105	125	0.0	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
2	1.250	A687	105	125	6.9	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
3	1.250	A687	105	125	13.8	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
4	1.250	A687	105	125	20.8	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
5	1.250	A687	105	125	27.7	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
6	1.250	A687	105	125	34.6	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
7	1.250	A687	105	125	41.5	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
8	1.250	A687	105	125	48.5	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
9	1.250	A687	105	125	55.4	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
10	1.250	A687	105	125	62.3	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
11	1.250	A687	105	125	69.2	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
12	1.250	A687	105	125	76.2	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
13	1.250	A687	105	125	83.1	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
14	1.250	A687	105	125	90.0	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
15	1.250	A687	105	125	96.9	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
16	1.250	A687	105	125	103.8	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
17	1.250	A687	105	125	110.8	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
18	1.250	A687	105	125	117.7	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
19	1.250	A687	105	125	124.6	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
20	1.250	A687	105	125	131.5	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
21	1.250	A687	105	125	138.5	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
22	1.250	A687	105	125	145.4	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
23	1.250	A687	105	125	152.3	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
24	1.250	A687	105	125	159.2	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
25	1.250	A687	105	125	166.2	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
26	1.250	A687	105	125	173.1	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
27	1.250	A687	105	125	180.0	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
28	1.250	A687	105	125	186.9	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
29	1.250	A687	105	125	193.8	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
30	1.250	A687	105	125	200.8	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
31	1.250	A687	105	125	207.7	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
32	1.250	A687	105	125	214.6	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
33	1.250	A687	105	125	221.5	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
34	1.250	A687	105	125	228.5	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
35	1.250	A687	105	125	235.4	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
36	1.250	A687	105	125	242.3	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
37	1.250	A687	105	125	249.2	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
38	1.250	A687	105	125	256.2	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
39	1.250	A687	105	125	263.1	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
40	1.250	A687	105	125	270.0	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
41	1.250	A687	105	125	276.9	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
42	1.250	A687	105	125	283.8	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
43	1.250	A687	105	125	290.8	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
44	1.250	A687	105	125	297.7	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
45	1.250	A687	105	125	304.6	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
46	1.250	A687	105	125	311.5	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
47	1.250	A687	105	125	318.5	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
48	1.250	A687	105	125	325.4	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
49	1.250	A687	105	125	332.3	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
50	1.250	A687	105	125	339.2	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
51	1.250	A687	105	125	346.2	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
52	1.250	A687	105	125	353.1	67.00	0.00	1.23	55.41	53.36	53.36	0.00	67.50	79.1%
53	2.250	F1554 Gr 105	105	125	3.5	76.00	0.00	3.98	203.20	196.54	196.54	0.00	218.68	89.9%
54	2.250	F1554 Gr 105	105	125	48.5	76.00	0.00	3.98	203.20	196.54	196.54	0.00	218.68	89.9%
55	2.250	F1554 Gr 105	105	125	93.5	76.00	0.00	3.98	203.20	196.54	196.54	0.00	218.68	89.9%
56	2.250	F1554 Gr 105	105	125	138.5	76.00	0.00	3.98	203.20	196.54	196.54	0.00	218.68	89.9%
57	2.250	F1554 Gr 105	105	125	183.5	76.00	0.00	3.98	203.20	196.54	196.54	0.00	218.68	89.9%

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v4.1 - Effective 7-3-12

Date: 2/18/2016
PJF Project: 37516-0710.001.7805
Client Ref. # 829046
Site Name:
Description:
Owner:
Engineer: JJW

Asymmetric Anchor Rod Analysis

Moment =	6479	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	80.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	50.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	60							

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

58	2.250	F1554 Gr 105	105	125	228.5	76.00	0.00	3.98	203.20	196.54	196.54	0.00	218.68	89.9%
59	2.250	F1554 Gr 105	105	125	273.5	76.00	0.00	3.98	203.20	196.54	196.54	0.00	218.68	89.9%
60	2.250	F1554 Gr 105	105	125	318.5	76.00	0.00	3.98	203.20	196.54	196.54	0.00	218.68	89.9%
								95.62						

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

TIA Rev F

Site Data

BU#: *829046*
Site Name:
App #:

Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

Plate Data		
Diam:	70	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	4.5	in
Height:	8	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	60	in
Thick:	0.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	3947.3	ft-kips
Axial:	53.4	kips
Shear:	33.4	kips

Reactions adjusted to account for additional anchors

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

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	53.4 Kips	Service, ASD
Allowable Tension:	67.5 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	79.1% Pass	

Base Plate Results — Shear Check Only

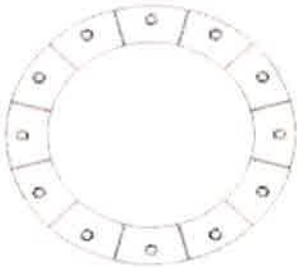
		Stiffened
Base Plate Stress:	4.9 ksi	Service, ASD
Allowable Plate Stress:	19.2 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	25.7% Pass	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	67.1% Pass
Vertical Weld:	43.2% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	30.8% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	50.4% Pass
Plate Comp. (AISC Bracket):	72.9% Pass

Pole Results

Pole Punching Shear Check:	10.5% Pass



* 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

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v4.1 - Effective 7-3-12

Date: 2/18/2016
PJF Project: 37516-0710.001.7805
Client Ref. # 829046
Site Name:
Description: Flange at 20'
Owner:
Engineer: JJW

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	4261	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	66.7	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	47.9	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	70							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	35.66	34.37	34.37	0.00	71.99	47.7%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	31.69	30.41	30.41	0.00	71.99	42.2%

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

Site Data	20' Flange
BU#:	829046
Site Name:	
App #:	

Manufacturer:	Other

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	50	in	

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	10	in
Thick:	0.625	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:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	2210.1	ft-kips
Axial:	66.7	kips
Shear:	47.9	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for flange jumps

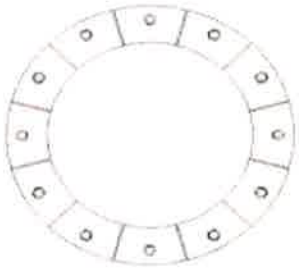
Elevation: 20 feet

PLATE CHECK ONLY

Interior Flange Plate Results	Flexural Check
Controlling Bolt Axial Force:	68.4 Kips, Ext. C= Interior C
Plate Stress:	27.9 ksi
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	77.4% Pass

Stiffener Results	
Horizontal Weld :	43.3% Pass
Vertical Weld:	37.8% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	26.1% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	30.8% Pass
Plate Comp. (AISC Bracket):	62.4% Pass

Pole Results	
Pole Punching Shear Check:	12.2% Pass



* 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

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v4.1 - Effective 7-3-12

Date: 2/18/2016
PJF Project: 37516-0710.001.7805
Client Ref. # 829046
Site Name:
Description: Flange at 40'
Owner:
Engineer: JJW

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	3733	k-ft	TIA Ref.	F	Location =	Flange Plate	
Axial =	55.5	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	45.8	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	70						

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in²	Area, in²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	35.80	34.61	34.61	0.00	71.99	48.1%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%

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v4.1 - Effective 7-3-12

Date: 2/18/2016
PJF Project: 37516-0710.001.7805
Client Ref. # 829046
Site Name:
Description: Flange at 40'
Owner:
Engineer: JJW

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	3733	k-ft	TIA Ref.	F	Location =	Flange Plate	
Axial =	55.5	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	45.8	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	70						

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

58	1.250	A325	81	105	281.3	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
63	1.250	A325	81	105	337.5	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	31.82	30.63	30.63	0.00	71.99	42.5%
65	0.000	Sabre 6 x 1	65	80	0.0	61.00	6.00	6.00	201.03	195.21	201.03	250.40	250.40	80.3%
66	0.000	Sabre 6 x 1	65	80	60.0	61.00	6.00	6.00	201.03	195.21	201.03	250.40	250.40	80.3%
67	0.000	Sabre 6 x 1	65	80	120.0	61.00	6.00	6.00	201.03	195.21	201.03	250.40	250.40	80.3%
68	0.000	Sabre 6 x 1	65	80	180.0	61.00	6.00	6.00	201.03	195.21	201.03	250.40	250.40	80.3%
69	0.000	Sabre 6 x 1	65	80	240.0	61.00	6.00	6.00	201.03	195.21	201.03	250.40	250.40	80.3%
70	0.000	Sabre 6 x 1	65	80	300.0	61.00	6.00	6.00	201.03	195.21	201.03	250.40	250.40	80.3%
								114.54						

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

Site Data	40' Flange
BU#:	829046
Site Name:	
App #:	

Manufacturer:	Other

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	50	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor	
ASIF:	1.333

Reactions		
Moment:	2222.3	ft-kips
Axial:	55.5	kips
Shear:	45.8	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for flange jumps

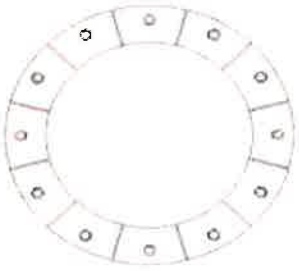
Elevation: 40 feet

PLATE CHECK ONLY

Interior Flange Plate Results	Flexural Check
Controlling Bolt Axial Force:	68.4 Kips, Ext. C= Interior C
Plate Stress:	27.9 ksi
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	77.4% Pass

Stiffener Results	
Horizontal Weld :	48.4% Pass
Vertical Weld:	42.3% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	30.1% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	35.0% Pass
Plate Comp. (AISC Bracket):	69.7% Pass

Pole Results	
Pole Punching Shear Check:	17.1% Pass



* 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

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v4.1 - Effective 7-3-12

Date: 2/18/2016
PJF Project: 37516-0710.001.7805
Client Ref. # 829046
Site Name:
Description: Flange at 60'
Owner:
Engineer: JJW

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	3189	k-ft	TIA Ref.	F	Location =	Flange Plate	
Axial =	45.9	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	43.3	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	67						

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	35.05	33.96	33.96	0.00	71.99	47.2%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	31.15	30.05	30.05	0.00	71.99	41.7%

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

Site Data	60' Flange
BU#:	829046
Site Name:	
App #:	

Reactions		
Moment:	2178	ft-kips
Axial:	45.9	kips
Shear:	43.3	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for flange jumps

Manufacturer:	Other

Elevation: 60 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	50	in	

PLATE CHECK ONLY

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Interior Flange Plate Results — Flexural Check

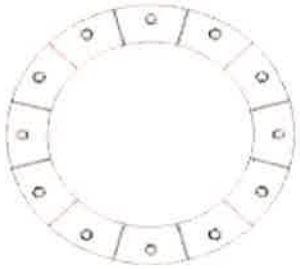
Controlling Bolt Axial Force:	66.8	Kips, Ext. C= Interior C
Plate Stress:	27.2	ksi
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	75.6%	Pass

Stiffener Results

Horizontal Weld :	47.2%	Pass
Vertical Weld:	41.3%	Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	29.1%	Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	34.0%	Pass
Plate Comp. (AISC Bracket):	68.0%	Pass

Pole Results

Pole Punching Shear Check:	16.6%	Pass



* 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

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Date: 2/18/2016
PJF Project: 37516-0710.001.7805
Client Ref. # 829046
Site Name:
Description: Flange at 80'
Owner:
Engineer: JJW

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	2362	k-ft	TIA Ref.	F	Location =	Flange Plate	
Axial =	37.6	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	40.1	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	67						

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in²	Area, in²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	30.32	29.31	29.31	0.00	71.99	40.7%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%

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v4.1 - Effective 7-3-12

Date: 2/18/2016
PJF Project: 37516-0710.001.7805
Client Ref. # 829046
Site Name:
Description: Flange at 80'
Owner:
Engineer: JJW

Asymmetric Bolt Analysis

Moment adjusted to account for load in Reinforcing Flat Plate on Pole Exterior

Moment =	2362	k-ft	TIA Ref.	F	Location =	Flange Plate	
Axial =	37.6	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	40.1	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	67						

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

58	1.250	A325	81	105	281.3	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
63	1.250	A325	81	105	337.5	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	26.94	25.94	25.94	0.00	71.99	36.0%
65	0.000	Sabre 4.5 x 1	65	80	0.0	61.00	4.50	4.50	127.67	123.99	127.67	170.16	170.16	75.0%
66	0.000	Sabre 4.5 x 1	65	80	120.0	61.00	4.50	4.50	127.67	123.99	127.67	170.16	170.16	75.0%
67	0.000	Sabre 4.5 x 1	65	80	240.0	61.00	4.50	4.50	127.67	123.99	127.67	170.16	170.16	75.0%
								92.04						

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

Site Data	80' Flange
BU#:	829046
Site Name:	
App #:	

Manufacturer:	Other

Reactions		
Moment:	1881.8	ft-kips
Axial:	37.6	kips
Shear:	40.1	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for flange jumps

Elevation: 80 feet

Bolt Data				
Qty:	32		Bolt Fu:	105
Diam:	1.25		Bolt Fy:	81
Bolt Material:	A325		Bolt Fty:	
N/A:	100	<-- Disregard		44.00
N/A:	75	<-- Disregard		
Circle:	50	in		

PLATE CHECK ONLY

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.82	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Interior Flange Plate Results — Flexural Check

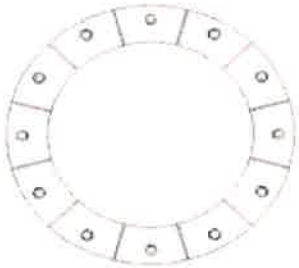
Controlling Bolt Axial Force:	57.6 Kips, Ext. C= Interior C
Plate Stress:	23.5 ksi
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	65.2% Pass

Stiffener Results

Horizontal Weld :	46.2% Pass
Vertical Weld:	40.4% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	28.4% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	33.2% Pass
Plate Comp. (AISC Bracket):	66.6% Pass

Pole Results

Pole Punching Shear Check:	21.7% Pass



* 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 F

Site Data

BU#: *829046*
Site Name:
App #:

Manufacturer:	Other

Reactions		
Moment:	1591.9	ft-kips
Axial:	30.1	kips
Shear:	36.5	kips
Exterior Flange Run, T+Q:	27.3	kips

Reactions adjusted to account for load in flat plate shaft reinforcing

Elevation: 100 feet

Bolt Data				
Qty:	48			
Diam:	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	100	<-- Disregard	Bolt Fty:	
N/A:	75	<-- Disregard	44.00	
Circle:	57	in		

Interior Flange Bolt Results

Maximum Bolt Tension:	27.3	Kips, Ext. T=Interior T
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	59.3%	Pass

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	3.88	in

Interior Flange Plate Results Shear Check Only

Controlling Bolt Axial Force:	28.6	Kips, Ext. C= Interior C
Plate Stress:	4.4	ksi
Allowable Plate Stress:	19.2	ksi
Plate Stress Ratio:	22.7%	Pass

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

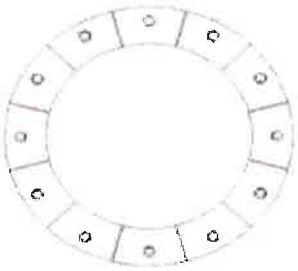
Stiffener Results

Horizontal Weld :	59.2%	Pass
Vertical Weld:	33.2%	Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	21.5%	Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	43.5%	Pass
Plate Comp. (AISC Bracket):	55.2%	Pass

Pole Results

Pole Punching Shear Check:	15.8%	Pass

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi



Stress Increase Factor		
ASIF:	1.333	

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

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

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

Site Data

BU#: *829046*
Site Name:
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	1591.9	ft-kips
Axial:	30.1	kips
Shear:	36.5	kips
Elevation:	100	feet

Reactions adjusted to account for load in flat plate shaft reinforcing.

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

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty: 44.00
N/A:	55	<-- Disregard	
Circle (in.):	57		

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

		Stiffened
Bolt Tension Capacity, B:	46.07 kips	Service, ASD
Max Bolt directly applied T:	27.30 Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	Stiffened in	
Min PL "treq" for actual T w/ Pry:	Stiffened in	
Min PL "t1" for actual T w/o Pry:	Stiffened in	
T allowable	46.07 kips	<-- B, Stiffened
Prying Force, Q:	0.00 kips	Stiffened
Total Bolt Tension=T+Q:	27.30 kips	
Non-Prying Bolt Stress Ratio, T/B:	59.3% Pass	

Exterior Flange Plate Results Shear Check Only

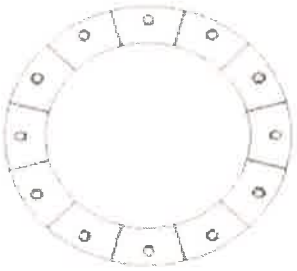
		Stiffened
Compression Side Plate Stress:	3.8 ksi	Service, ASD
Allowable Plate Stress:	19.2 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	19.8% Pass	Comp. Y.L. Length:
Stiffened		N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A	

Stiffener Results

Horizontal Weld :	59.5% Pass
Vertical Weld:	40.3% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	28.2% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	44.3% Pass
Plate Comp. (AISC Bracket):	63.9% Pass

Pole Results

Pole Punching Shear Check:	20.4% Pass



* 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 F

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	1371.49	ft-kips
Axial:	24.02	kips
Shear:	33.19	kips
Elevation:	120	feet

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

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	51		

Plate Data		
Diam:	54	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results

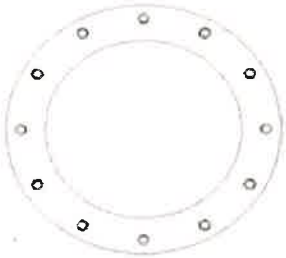
			Rigid
Bolt Tension Capacity, **B**:	46.08	kips	Service, ASD
Max Bolt directly applied T:	35.19	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.354	in	
Min PL "treq" for actual **T w/ Pry**:	0.895	in	
Min PL "t1" for actual **T w/o Pry**:	1.183	in	
T allowable with Prying:	43.81	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	35.19	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	76.4%	Pass	

Exterior Flange Plate Results

		Rigid
Flexural Check		Service ASD
Compression Side Plate Stress:	Rohn/Pirod, OK	0.75*Fy*ASIF
Allowable Plate Stress:	36.0 ksi	Comp. Y.L. Length:
Compression Plate Stress Ratio:	Rohn/Pirod, OK	17.23
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	51.3% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
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, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	1371.49	ft-kips
Axial:	24.02	kips
Shear:	33.19	kips
Exterior Flange Run, T+Q:	35.19	kips

Elevation: 120 feet

Bolt Data			
Qty:	36		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle:	51	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	35.2	Kips, Ext. Flange T+Q
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	76.4%	Pass

Plate Data		
Plate Outer Diam:	53.25	in
Plate Inner Diam:	48	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.65	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	36.5	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

Stiffener Results N/A for Rohn / Pirod

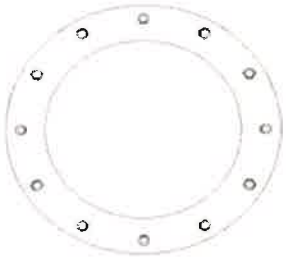
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	54	in
Thick:	0.375	in
Pole Inner Diam:	53.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.3333333	



* 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 F

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	739.46	ft-kips
Axial:	19.34	kips
Shear:	30.08	kips
Elevation:	140	feet

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

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	45		

Plate Data		
Diam:	48	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results

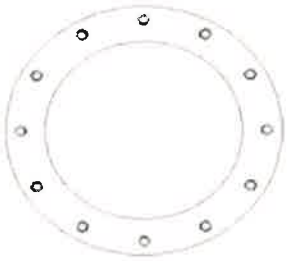
		Rigid
Bolt Tension Capacity, B:	46.08 kips	Service, ASD
Max Bolt directly applied T:	24.04 Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	1.365 in	
Min PL "treq" for actual T w/ Pry:	0.747 in	
Min PL "t1" for actual T w/o Pry:	0.986 in	
T allowable with Prying:	43.60 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	24.04 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	52.2% **Pass**	

Exterior Flange Plate Results

		Rigid
	Flexural Check	Service ASD
Compression Side Plate Stress:	Rohn/Pirod, OK	0.75*Fy*ASIF
Allowable Plate Stress:	36.0 ksi	Comp. Y.L. Length:
Compression Plate Stress Ratio:	Rohn/Pirod, OK	16.16
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	35.7% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
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, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	739.46	ft-kips
Axial:	19.34	kips
Shear:	30.08	kips
Exterior Flange Run, T+Q:	24.04	kips

Elevation: 140 feet

Bolt Data			
Qty:	32		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle:	45	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	24.0 Kips, Ext. T=Interior T
Allowable Tension:	46.1 Kips
Bolt Stress Ratio:	52.2% Pass

Plate Data		
Plate Outer Diam:	47.25	in
Plate Inner Diam:	42	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.64	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	25.3 Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

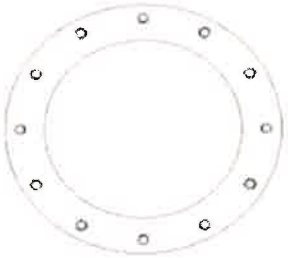
Stiffener Results N/A for Rohn / Pirod

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 Data		
Pole OuterDiam:	48	in
Thick:	0.375	in
Pole Inner Diam:	47.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Pole Results

Pole Punching Shear Check:	N/A



Stress Increase Factor		
ASIF:	1.3333333	

* 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 F

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Pole Manufacturer:	Pirod

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	39		

Plate Data		
Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Reactions		
Moment:	253.98	ft-kips
Axial:	12.99	kips
Shear:	18.44	kips
Elevation:	160	feet

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

Flange Bolt Results

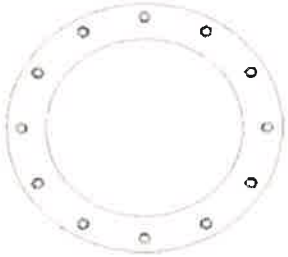
		Rigid
Bolt Tension Capacity, **B**:	46.08 kips	Service, ASD
Max Bolt directly applied T:	10.70 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.379 in	
Min PL "treq" for actual **T w/ Pry**:	0.504 in	
Min PL "t1" for actual **T w/o Pry**:	0.664 in	
T allowable with Prying:	43.34 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	10.70 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	23.2% **Pass**	

Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 15.00
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	16.3% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
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, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	253.98	ft-kips
Axial:	12.99	kips
Shear:	18.44	kips
Exterior Flange Run, T+Q:	10.7	kips

Elevation: 160 feet

Bolt Data			
Qty:	28		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle:	39	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	10.7	Kips, Ext. T=Interior T
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	23.2%	Pass

Plate Data		
Plate Outer Diam:	41.25	in
Plate Inner Diam:	36	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.63	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	11.6	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

Stiffener Results N/A for Rohn / Pirod

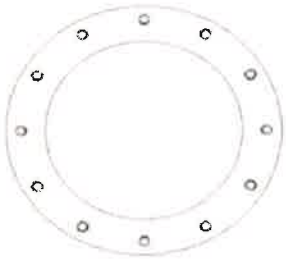
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	42	in
Thick:	0.375	in
Pole Inner Diam:	41.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.3333333	



* 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 F

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Pole Manufacturer:	Pirod

Bolt Data			
Qty:	24		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	33		

Plate Data		
Diam:	36	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.93	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.3333333

Reactions		
Moment:	44.14	ft-kips
Axial:	4.9	kips
Shear:	6.56	kips
Elevation:	180	feet

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

Flange Bolt Results

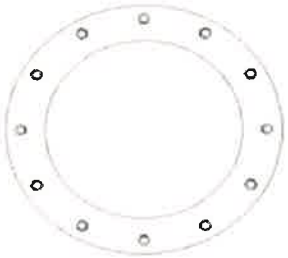
			Rigid
Bolt Tension Capacity, B:	46.08	kips	Service, ASD
Max Bolt directly applied T:	2.47	Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	1.398	in	
Min PL "treq" for actual T w/ Pry:	0.246	in	
Min PL "t1" for actual T w/o Pry:	0.324	in	
T allowable with Prying:	42.99	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	2.47	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	5.4%	Pass	

Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		13.75
Tension Side Stress Ratio, (treq/t)^2:	3.9% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
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, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *829046*
Site Name: *Weston*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	44.14	ft-kips
Axial:	4.9	kips
Shear:	6.56	kips
Exterior Flange Run, T+Q:	2.47	kips

Elevation: 180 feet

Bolt Data			
Qty:	24		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle:	33	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	2.5	Kips, Ext. T=Interior T
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	5.4%	Pass

Plate Data		
Plate Outer Diam:	35.25	in
Plate Inner Diam:	30	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.61	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	2.9	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

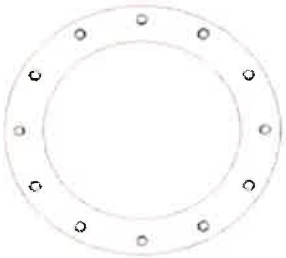
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	36	in
Thick:	0.375	in
Pole Inner Diam:	35.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi



Stress Increase Factor		
ASIF:	1.3333333	

* 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

Moment Capacity of Rock Anchored Foundation - Wind into Corner

PJF job no. 37516-0710.001

Note: For purposes of this check, max allowable rock anchor cap limited to proved rock anchor cap / lock-off load of 172 kips

Determination of effective rock compression area (for moment loads)

Controlling foundation % Capacity = **62.9%** **OK**

Elevation = **0** feet Total pole plus soil & fdn weight = **370.4** kips

Diagonal dimension = **305.40** in 1/2 x diagonal dimension = **152.70** in

Neutral axis location = **108.71** in (Measured from max. compression fiber)

Therefore c= **108.71** inches and a = β_1 x c = **92.40** inches β_1 = **0.85**

Area of fdn-rock contact, Afr = **8538.0** square inches Net area of Afr = **8448.6** square inches

Centroid of Afr located **243.80** inches from maximum tension fiber of cross-section

Check fdn-rock contact area compression capacity versus actual rock compressive stress

Rock f'c = **277** psi Gross area of rock, Ac = **#######** sq. in. ΣT -ΣC = **0.0**

Total rock anchor load, T_L, on annulus area, ΣT = **731.6** kips

Usable rock and rock anchor compression capacity, SC = **1102.0** kips

Rock contribution to Mn = **4326.1** ft-kips

Pole / foundation / soil wt contribution to Mn = **1357.9** ft-kips

Cross-section Moment Cap.		
M_{cap} =	12066.9	ft-kips

M_{actual} = **6854** ft-kips (At bottom of pad)

Mact / Mcap = **56.8%**

Rock anchor steel capacity = **200** kips (SF = 2)

Rock anchor % Cap = **48.8%** **OK**

Max rock strain = **0.0015** (SF=2)

Rock % Cap = **62.9%** **OK**

Additional bar reinforcement information

No. of bars, Nb = 4 Number of bar group locations = 3 No. of bars per group location = 1

Separation angle between bar groups = 90 degrees Area of bar = 2.6 sq. in.

Bar edge distance = 44.5 inches (measured to center of bar group) Modulus of elasticity of bar, E_b = 29000 ksi

Bar strain calculations

Assumed rock strain = 0.001662

Location	No. of bar groups, N_{BG}	Dist. to neutral axis	ε (Tension)	Tension per bar, T_B	$T_L = N_{BG} \times T_B$	Mn Contribution
1	1	152.19	0.0023	172.0	172.0	2180.9
2	2	43.99	0.0006	47.2	94.5	346.3
3	1	-64.21	0.0000	0.0	0.0	0.0
4	0	- - -	- - -	- - -	- - -	- - -
5	0	- - -	- - -	- - -	- - -	- - -
6	0	- - -	- - -	- - -	- - -	- - -
7	0	- - -	- - -	- - -	- - -	- - -
8	0	- - -	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -	- - -

Determination of bar contribution to ultimate moment capacity

Location	No. of bar groups, N_{BG}	ε (C)	Comp. per bar, C_B	$C_L = N_{BG} \times C_B$	Mn Contribution	Area Occupied by Bar
1	1	0.0000	0.0	0.0	0.0	- - -
2	2	0.0000	0.0	0.0	0.0	- - -
3	1	-0.0010	-77.5	0.0	0.0	28.27
4	0	- - -	- - -	- - -	- - -	- - -
5	0	- - -	- - -	- - -	- - -	- - -
6	0	- - -	- - -	- - -	- - -	- - -
7	0	- - -	- - -	- - -	- - -	- - -
8	0	- - -	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -	- - -

$M_n = \Sigma$ (Load in bar groups x bar group distance to N.A.) = **2527.2** ft-kips

$M_u = \phi M_n = 0.75 \times M_n =$ **1895.4** ft-kips

Bar yield strength = **332.000** kips

Additional bar reinforcement information

No. of bar, Nf = 12 Number of bar group locations = 7 No. of bar per group location = 1

Separation angle between bar groups = 30 degrees Area of bar = 2.6 sq. in.

bar edge distance = 72.1 inches (measured to center of bar group) Modulus of elasticity of bar, Ef = 29000 ksi

Bar strain calculations

(Type of bar = B ("B" for bar, "T" for tape or "L" for laminate)

Assumed rock strain = 0.001662

Location	No. of bar groups, NFG	Dist. to neutral axis	ε (Tension)	Tension per bar, TF	$T_L = N_{FG} \times T_F$	Mn Contribution
1	0	124.59	0.0019	143.6	0.0	0.0
2	2	113.79	0.0017	131.2	262.4	2487.9
3	2	84.29	0.0013	97.2	194.3	1365.1
4	0	43.99	0.0007	50.7	0.0	0.0
5	2	3.69	0.0001	4.3	8.5	2.6
6	2	-25.81	0.0000	0.0	0.0	0.0
7	0	-36.61	0.0000	0.0	0.0	0.0
8	0	---	---	---	---	---
9	0	---	---	---	---	---
10	0	---	---	---	---	---

Determination of bar contribution to ultimate moment capacity

Location	No. of bar groups, NFG	ε (Comp)	Comp. per bar, CF	$C_L = N_{FG} \times C_F$	Mn Contribution	Area Occupied by bar
1	0	0.0000	0.0	0.0	0.0	- - -
2	2	0.0000	0.0	0.0	0.0	- - -
3	2	0.0000	0.0	0.0	0.0	- - -
4	0	0.0000	0.0	0.0	0.0	- - -
5	2	0.0000	0.0	0.0	0.0	- - -
6	2	-0.0004	-29.8	0.0	0.0	28.27
7	0	-0.0006	-42.2	0.0	0.0	28.27
8	0	- - -	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -	- - -

Mn = S (Load in bar groups x bar group distance to N.A.) = **3855.7** ft-kips

$M_u = \phi M_n = 0.9 \times M_n =$ **3470.1** ft-kips

bar yield strength = **332.000** kips

Rock Anchored Foundation Structural and Overturning Checks

Beam Shear, Tension Side - Wind into corner

b =	151	in	(Critical section at distance of d away from center of anchor, towards face of pier)
d=	31	in	
f'c=	5000	psi	
Vu=	223.6	kips	(Assumed to be 1.3 times max proven anchor capacity)
ϕ=	0.85		
ϕVc=	562.7	kips	
% Cap=	22.6%	OK	(Vu adjusted for actual rock bolt load)

Beam Shear, Compression Side - Wind into corner

b =	270.8	in	(Critical section at distance of a plus d away from corner of foundation)
d=	43	in	
f'c=	5000	psi	
Vu=	813.7	kips	(1.3 times SC, adjusted for overall foundation % Capacity)
ϕ=	0.85		
ϕVc=	1399.8	kips	
% Cap=	58.1%	OK	

Punching Shear, Tension Side - Wind into corner

b =	94	in	(Critical section at distance of 0.5d away from center of anchor in all applicable directions)
d=	31	in	
f'c=	5000	psi	
Vu=	223.6	kips	(Assumed to be 1.3 times max proven anchor capacity)
ϕ=	0.85		
ϕVc=	700.6	kips	
% Cap=	18.1%	OK	(Adjusted for actual rock bolt load)

Moment Capacity of Rock Anchored Foundation - Wind into Side

PJF job no. 37516-0710.001

Note: For purposes of this check, max allowable rock anchor cap limited to proved rock anchor cap / lock-off load of 172 kips

Determination of effective rock compression area (for moment loads)

Controlling foundation % Capacity = 78.2% OK

Elevation = 0 feet Total pole plus soil & fdn weight = 370.4 kips
Side dimension = 216.00 in 1/2 x diagonal dimension = 108.00 in
Neutral axis location = 68.08 in (Measured from max. compression fiber)
Therefore c= 68.08 inches and a = β_1 x c = 57.87 inches β_1 = 0.85

Area of fdn-rock contact, Afr = 12499.0 square inches Net area of Afr = 12325.2 square inches

Centroid of Afr located 187.07 inches from maximum tension fiber of cross-section

Check fdn-rock contact area compression capacity versus actual rock compressive stress

Rock f'c = 277 psi Gross area of rock, Ac = ###### sq. in. $\Sigma T - \Sigma C$ = 0.0

Total rock anchor load, T_L, on annulus area, ΣT = 918.8 kips

Usable rock and rock anchor compression capacity, SC = 1289.2 kips

Rock contribution to Mn = 4205.6 ft-kips

Pole / foundation / soil wt contribution to Mn = 1232.3 ft-kips

Cross-section Moment Cap.		
M_{cap} =	13159.3	ft-kips

M_{actual} = 6854 ft-kips (At bottom of pad)

Mact / Mcap = 52.1%

Rock anchor steel capacity = 200 kips (SF = 2)
Rock anchor % Cap = 44.8% OK

Max rock strain = 0.0015 (SF=2)
Rock % Cap = 46.3% OK

Additional bar reinforcement information

No. of bars, Nb = 8 Number of bar group locations = 5 No. of bars per group location = 1

Separation angle between bar groups = 45 degrees Area of bar = 2.6 sq. in.

Bar edge distance = -0.187 inches (measured to center of bar group) Modulus of elasticity of bar, E_b = 29000 ksi

Bar strain calculations

Assumed rock strain = 0.0013328

Location	No. of bar groups, N_{BG}	Dist. to neutral axis	ε (Tension)	Tension per bar, T_B	$T_L = N_{BG} \times T_B$	Mn Contribution
1	0	148.11	0.0029	216.2	0.0	0.0
2	2	116.42	0.0022	169.5	338.9	3288.4
3	0	39.92	0.0007	56.5	0.0	0.0
4	2	-36.58	0.0000	0.0	0.0	0.0
5	0	-68.26	0.0000	0.0	0.0	0.0
6	0	---	---	---	---	---
7	0	---	---	---	---	---
8	0	---	---	---	---	---
9	0	---	---	---	---	---
10	0	---	---	---	---	---

Determination of bar contribution to ultimate moment capacity

Location	No. of bar groups, N_{BG}	ε (C)	Comp. per bar, C_B	$C_L = N_{BG} \times C_B$	Mn Contribution	Area Occupied by Bar
1	0	0.0000	0.0	0.0	0.0	- - -
2	2	0.0000	0.0	0.0	0.0	- - -
3	0	0.0000	0.0	0.0	0.0	- - -
4	2	-0.0007	-54.0	0.0	0.0	28.27
5	0	-0.0013	-100.8	0.0	0.0	28.27
6	0	- - -	- - -	- - -	- - -	- - -
7	0	- - -	- - -	- - -	- - -	- - -
8	0	- - -	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -	- - -

$M_n = \Sigma$ (Load in bar groups x bar group distance to N.A.) = **3288.4** ft-kips

$M_u = \phi M_n = 0.75 \times M_n =$ **2466.3** ft-kips

Bar yield strength = **332.000** kips

Additional bar reinforcement information

No. of bar, Nf = 20 Number of bar group locations = 11 No. of bar per group location = 1

Separation angle between bar groups = 18 degrees Area of bar = 2.6 sq. in.

bar edge distance = 27.4 inches (measured to center of bar group) Modulus of elasticity of bar, Ef = 29000 ksi

Bar strain calculations

(Type of bar = B ("B" for bar, "T" for tape or "L" for laminate)

Assumed rock strain = 0.0013328

Location	No. of bar groups, NFG	Dist. to neutral axis	ε (Tension)	Tension per bar, TF	$T_L = N_{FG} \times T_F$	Mn Contribution
1	0	120.52	0.0024	177.9	0.0	0.0
2	2	116.58	0.0023	172.1	344.2	3343.6
3	0	105.13	0.0021	155.2	0.0	0.0
4	0	87.30	0.0017	128.9	0.0	0.0
5	2	64.83	0.0013	95.7	191.4	1034.0
6	0	39.92	0.0008	58.9	0.0	0.0
7	2	15.02	0.0003	22.2	44.3	55.5
8	0	-7.45	0.0000	0.0	0.0	0.0
9	0	-25.28	0.0000	0.0	0.0	0.0
10	2	-36.73	0.0000	0.0	0.0	0.0
11	0	-40.68	0.0000	0.0	0.0	0.0
12	0	- - -	- - -	- - -	- - -	- - -
13	0	- - -	- - -	- - -	- - -	- - -

Determination of bar contribution to ultimate moment capacity

Location	No. of bar groups, NFG	ε (Comp)	Comp. per bar, CF	$C_L = N_{FG} \times C_F$	Mn Contribution	Area Occupied by bar
1	0	0.0000	0.0	0.0	0.0	- - -
2	2	0.0000	0.0	0.0	0.0	- - -
3	0	0.0000	0.0	0.0	0.0	- - -
4	0	0.0000	0.0	0.0	0.0	- - -
5	2	0.0000	0.0	0.0	0.0	- - -
6	0	0.0000	0.0	0.0	0.0	- - -
7	2	0.0000	0.0	0.0	0.0	- - -
8	0	-0.0001	-11.0	0.0	0.0	28.27
9	0	-0.0005	-37.3	0.0	0.0	28.27
10	2	-0.0007	-54.2	0.0	0.0	28.27
11	0	-0.0008	-60.0	0.0	0.0	28.27
12	0	- - -	- - -	- - -	- - -	- - -
13	0	- - -	- - -	- - -	- - -	- - -

Mn = S (Load in bar groups x bar group distance to N.A.) = **4433.1** ft-kips

$M_u = \phi M_n = 0.9 \times M_n =$ **3989.8** ft-kips

bar yield strength = **332.000** kips

Rock Anchored Foundation Structural and Overturning Checks

Beam Shear, Tension Side - Wind into Side

b =	216.00	in	(Equal to width of mat)
d=	31	in	
f'c=	5000	psi	
Vu=	465.8	kips	(1.3 times max proven anchor capacity, adjusted for overall foundation % Capacity)
ϕ=	0.85		
ϕVc=	804.9	kips	
% Cap=	57.9%	OK	

Beam Shear, Compression Side - Wind into Side

b =	216.0	in	(Equal to width of mat)
d=	43	in	
f'c=	5000	psi	
Vu=	873.0	kips	(1.3 times SC, adjusted for overall foundation % Capacity)
ϕ=	0.85		
ϕVc=	1116.5	kips	
% Cap=	78.2%	OK	

Punching Shear, Tension Side - Wind into Side

b =	94	in	(Critical section at distance of 0.5d away from center of anchor in all applicable directions)
d=	31	in	
f'c=	5000	psi	
Vu=	223.6	kips	(Assumed to be 1.3 times max proven anchor capacity)
ϕ=	0.85		
ϕVc=	700.6	kips	
% Cap=	16.6%	OK	(Adjusted for actual rock bolt load)

Centroid of loads on tension and compression sides of foundation less than distance of d away from face of pier. Therefore, load assumed to be transferred through deep beam type action (bending is negligible)

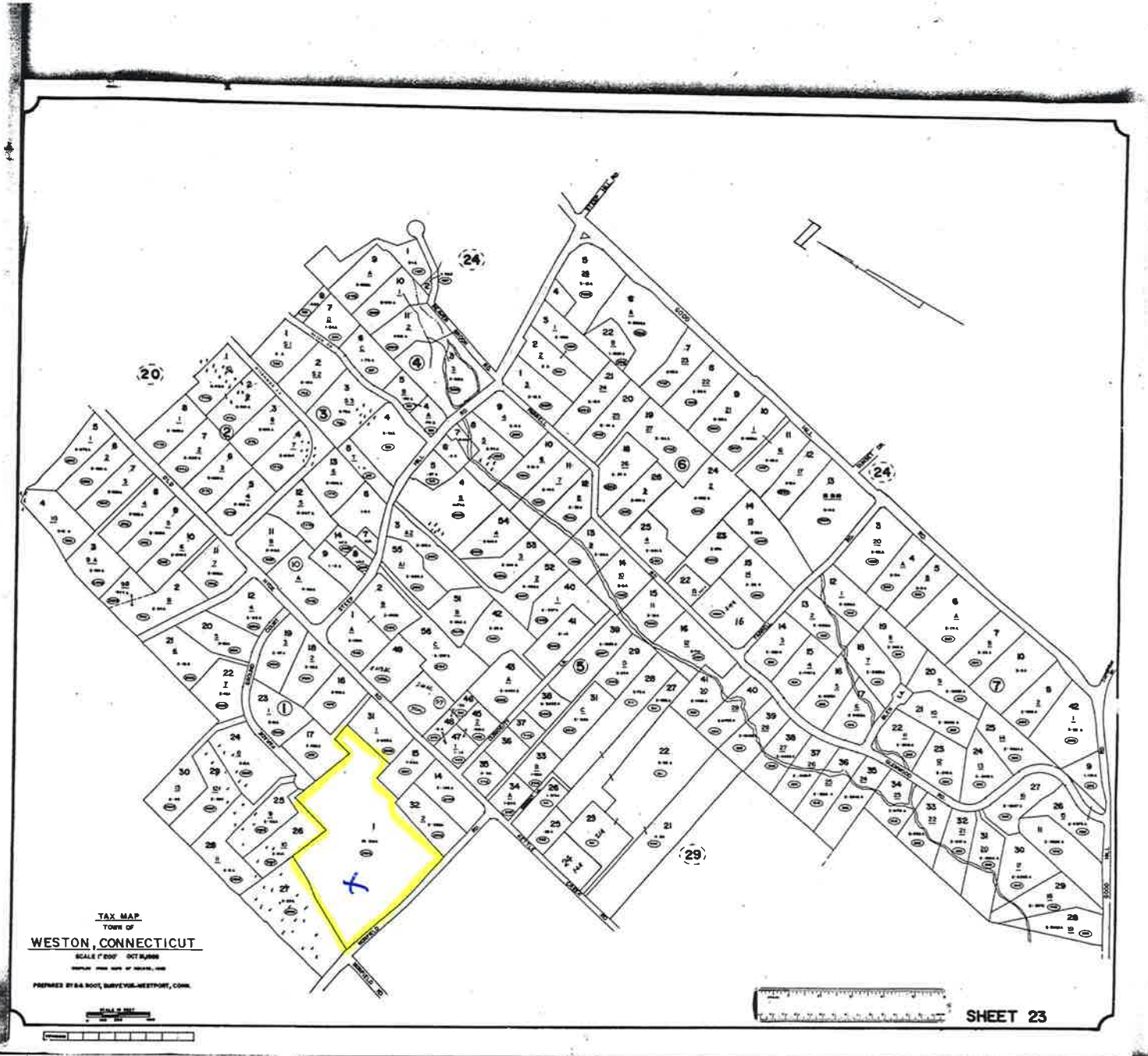
Overturning / Stability - Worst case assumed to be wind into the side

Rock anchor proof load, PL =	259	kips	(Assumed to be ultimate anchor capacity)
# of anchors in Line 1, N1 =	4		
Line 1 distance to rotation pt, d1 =	13.75	feet	
# of anchors in Line 2, N2 =	4		(Combined anchors on either side of foundation centerline)
Line 2 distance to rotation pt, d2 =	9	feet	
Foundation / pole / soil wt, W =	370.4	kips	
Distance to rotation pt, dw =	9	feet	
Foundation actual OTM, Mo =	6854	ft-k	(At bottom of foundation)
Overturning resistance, Mr =	23682	ft-k	(N1 x d1 x PL + N2 x d2 x [d2/d1 x PL] + W x dw)
% Cap = Mo / 0.5Mr =	57.9%	OK	(Min SF=2)

Note - Overturning % Cap conservative due to:

1) Line of anchors closest to point of overturning not included in calculation
2) Ultimate / maximum anchor capacity likely greater than proof load applied to anchor during installation

ATTACHMENT 4


TAX MAP
TOWN OF
WESTON, CONNECTICUT
SCALE 1" 200'
PREPARED BY R.A. ROOT, SURVEYOR-WESTPORT, CONN.
SHEET 23

Town of Weston, CT

Recent Sales in Neighborhood	Previous Parcel	Next Parcel	Field Definitions	Return to Main Search	Weston Home

Owner and Parcel Information

Owner Name	TOWN OF WESTON TOWN HALL & FIRE STATION	**Today's Date**	September 2, 2016
Mailing Address	56 NORFIELD RRD	**Parcel ID**	13093 (Account #: E00116)
	WESTON, CT 06883	**Map/Block/Lot**	22/6/28+31
Location Address	56 NORFIELD ROAD		
Subdivision Map / Lot	/	**Acreage**	0.00
Use Class / Description	901 Municipal	**Subdivision**	

Current Appraised Value Information

Building Value	XF Value	OB Value	Land Value	Special Land Value	Total Appraised Value	Net Appraised Value	Current Assessment
$ 4,449,600	$ 0	$ 175,800	$ 0		$ 4,625,400	$ 4,625,400	$ 3,237,800

Assessment History

Year	Building	OB/Misc	Land	Total Assessment
2015	$ 3,114,700	$ 123,100	0	$ 3,237,800
2014	$ 3,114,700	$ 123,100	0	$ 3,237,800
2013	$ 3,114,700	$ 123,100	0	$ 3,237,800

Land Information

Use	Class	Area	Value
Municipal	E	0 AC	
Municipal	E	0 AC	
Municipal	E	0 AC	

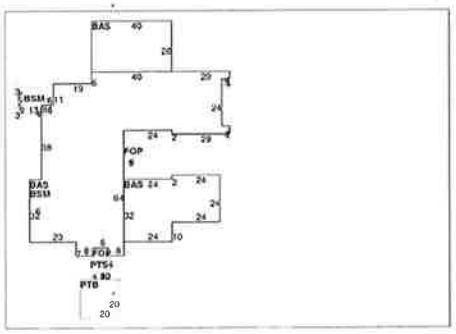
Commercial Building Information

Style	Year Built	Eff Year Built	Gross Area	Stories	Grade	Exterior Wall	Interior Wall	Wall Height	# Units
Town Hall	1956	2000	13,686	1	C	Brick/Masonry	Drywall	10	1
Roof Cover	**Roof Structure**	**Floor Type**	**Heat Type**	**Heat Fuel**	**AC Type**	**Sprinkler**	**Construction**	**Plumbing**	**Comm Walls**
Slate	Gable	Carpet	Gas	Hot Water	Heat/AC Pkg	%	Wood Frame	Average	0%

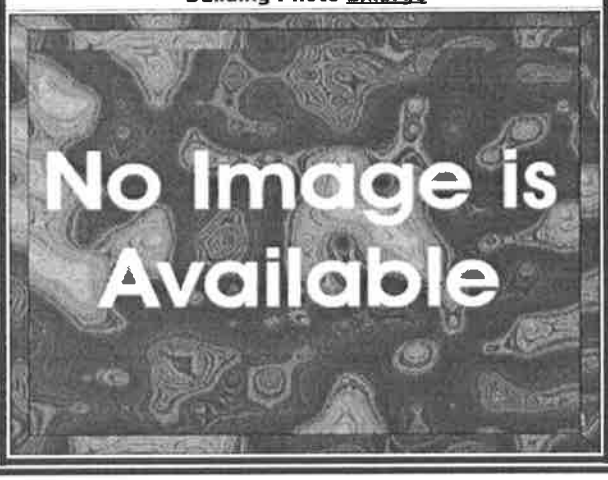
Building Sub Areas

Code	Description	Living Area	Gross Area
BAS	First Floor	7,615	7,615
BSM	Basement Area	0	5,474
FOP	Framed Open Porch	0	77
PTB	Patio - Brick	0	400
PTS	Patio - Stone	0	120
	Totals	**7,615**	**13,686**

Building Sketch Enlarge



Building Photo Enlarge



Commercial Building 2 Information

Style	Year Built	Eff Year Built	Gross Area	Stories	Grade	Exterior Wall	Interior Wall	Wall Height	# Units
Town Hall	1956	1993	5,883	1	C	Brick/Masonry	Drywall	8	1
Roof Cover	**Roof Structure**	**Floor Type**	**Heat Type**	**Heat Fuel**	**AC Type**	**Sprinkler**	**Construction**	**Plumbing**	**Comm Walls**
Slate	Gable	Linoleum	Gas	Forced Air	Heat/AC Pkg	%	Wood Frame	Average	0%

Building Sub Areas

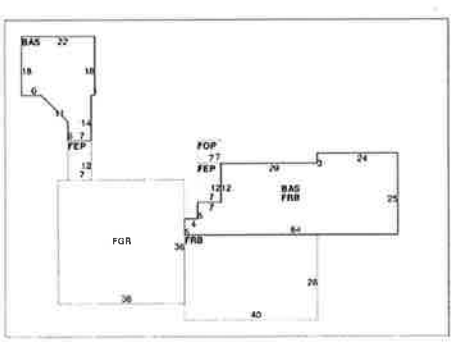
Code	Description	Living Area	Gross Area

Building Sketch Enlarge

Building Photo

NA

BAS	First Floor	1,854	1,854
FEP	Framed Enclosed Porch	0	168
FGR	Garage	0	1,444
FOP	Framed Open Porch	0	49
FRB	Raised Bsmt. Fin	0	2,368
	Totals	**1,854**	**5,883**



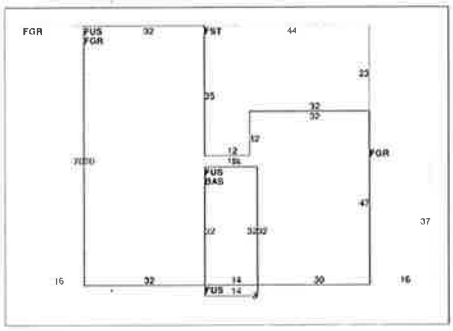
Commercial Building 3 Information

Style	Year Built	Eff Year Built	Gross Area	Stories	Grade	Exterior Wall	Interior Wall	Wall Height	# Units
Fire Station	1956	1986	11,238	2	C	Brick/Masonry	Minimum	8	1
Roof Cover	**Roof Structure**	**Floor Type**	**Heat Type**	**Heat Fuel**	**AC Type**	**Sprinkler**	**Construction**	**Plumbing**	**Comm Walls**
Asphalt Shingl	Hip	Linoleum Carpet	Gas	Hot Water	Heat/AC Split	%	Wood Frame	Average	0%

Building Sub Areas

Code	Description	Living Area	Gross Area
BAS	First Floor	448	448
FGR	Garage	0	5,428
FST	Finished Storage	0	1,156
FUS	Finished Upper Story	4,206	4,206
	Totals	**4,654**	**11,238**

Building Sketch Enlarge



Building Photo Enlarge

Out Buildings / Extra Features

Description	Sub Description	Area	Year Built	Value
Paving Asph.		25,600 S.F.	2008	$ 62,200
Paving Asph.		9,600 S.F.	2008	$ 23,300
Light (1)		7 UNITS	2008	$ 13,800
Work Shop		240 S.F.	2008	$ 4,500
Light (2)		1 UNITS	2008	$ 2,900
Studio/Office		768 S.F.	2008	$ 69,100

Sale Information

Sale Date	Sale Price	Deed Book/Page	Sale Qualification	Reason	Vacant or Improved	Owner
00/00/0000						TOWN OF WESTON TOWN HALL & FIRE STATION

Permit Information

Permit ID	Issue Date	Type	Description	Amount	Inspection Date	% Complete	Date Complete	Comments
7790	07/12/2016					0		INTERIOR RENOVATIONS TO LIBRARY
7702	12/17/2015			$ 20,000		0		AT&T REMOVE AND REPLCE ANTENNAS
7502	01/13/2015			$ 20,000	04/15/2015	100	04/15/2015	SEE PERMIT
7429	08/20/2014			$ 15,000	12/24/2014	100	10/01/2014	ANTENNAS
7346	03/19/2014			$ 10,000	12/24/2014	100	06/01/2014	SEE PERMIT
7291	11/05/2013			$ 25,000	12/24/2014	100	01/15/2014	ELECTRICAL
6512	11/05/2008				08/05/2009	100	01/22/2009	FOOD PANTRY
6490	09/19/2008				04/01/2009	100	04/01/2009	REPLACE ROOF
5362	10/06/2003			$ 80,000		100		CELL TOWER

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