Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts

July 24, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
54 Waterbury Road, Prospect, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 135-foot level on the existing 160-foot guyed-lattice tower at 54 Waterbury Road in Prospect, Connecticut (the "Property"). The tower is owned by Charles E. Bradshaw. The Council approved Cellco's shared use of this tower in 2006. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same 135-foot level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") and two (2) HYBRIFLEX™ antenna cables. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Robert Chatfield, Mayor for the Town of Prospect. A copy of this letter is being sent to Charles E. and Averyll B. Bradshaw, the owners of the Property.

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 tower. The replacement antennas and RRHs will be located at the 135-foot level on the 160-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 Cellco's proposed modifications. (*See* Structural Analysis included in Attachment 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Robert Chatfield, Prospect Mayor
Charles E. and Averyll B. Bradshaw
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW

SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS, dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
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	350	350	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	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

* 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 with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

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Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
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	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 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

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Product Specifications

COMMSCOPE®

POWERED BY ANDREW®

HBXX-6517DS-VTM

Andrew® Quad Port Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	11	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4	0 ° | 18.4	0 ° | 18.7
	3 ° | 18.7	3 ° | 18.7	3 ° | 18.9
	6 ° | 18.4	6 ° | 18.5	6 ° | 18.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9

* 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® quad
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz

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All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: April 14, 2015

Product Specifications

HBXX-6517DS-VTM

Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	166.0 mm | 6.5 in
Length	1903.0 mm | 74.9 in
Width	305.0 mm | 12.0 in
Net Weight	19.5 kg | 43.0 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
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

600899A-2 — 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

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PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version	2 Branch RX – LA6.0.1
	1900A HW version	4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms
Monitor Ports		TX
Environmental		GR487 Compliance
RF Connectors		7/16 DIN (top mounted)

** Not a Verizon Wireless deployed product

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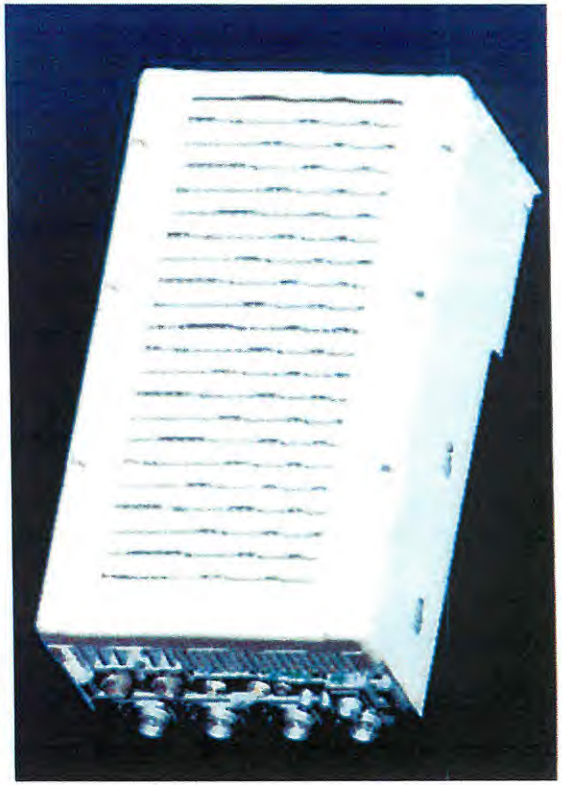
NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w)x 9.4" (d)**
Weight	55lb**



**- Includes solar shield but not mounting brackets (8 lbs.)

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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.

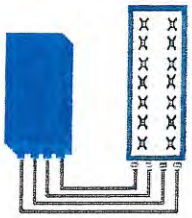
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

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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.

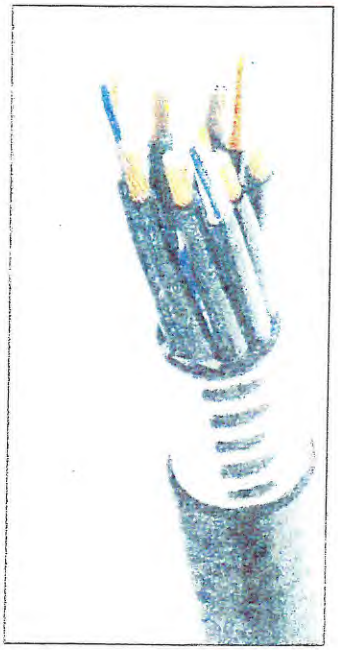


Figure 1: HYBRIFLEX Series

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)

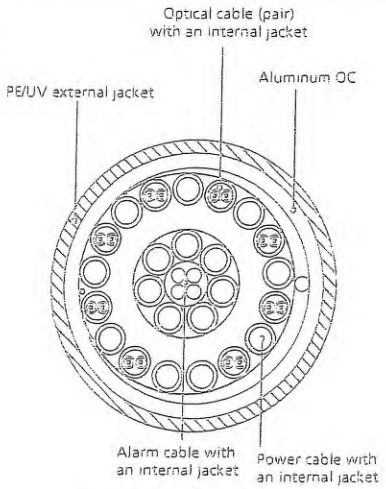


Figure 2: Construction Detail

* This data is provisional and subject to change

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

ATTACHMENT 2

	General	Power	Density					
Site Name: Prospect N								
Tower Height: 160Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*F&S Oil				0.0031	451	0.3007	1.03%	
*New Haven Transit				0.0031	451	0.3007	1.03%	
*US Post Office				0.0031	415	0.2767	1.12%	
*Central Comm.				0.0031	452	0.3013	1.03%	
*CT Motor Club				0.0381	150.92	0.2000	19.05%	
*Sprint-Nextel CDMA/EVDO	1	350	146	0.0059	865	0.5767	0.10%	
*Sprint-Nextel CDMA/EVDO	5	622	146	0.0525	1900	1.0000	0.52%	
*Sprint-Nextel LTE	1	875	146	0.0148	865	0.5767	0.26%	
*Sprint-Nextel LTE	1	3112	146	0.0525	1900	1.0000	0.52%	
*Sprint-Nextel LTE	1	3112	146	0.0525	2500	1.0000	0.52%	
*Clearwire	2	153	146	0.0052	2496	1.0000	0.52%	
*Clearwire	1	211	151	0.0033	23 GHz	1.0000	0.33%	
*AT&T UMTS	2	1077	126	0.0488	880	0.5867	8.32%	
*AT&T UMTS	2	1556	126	0.0705	1900	1.0000	7.05%	
*AT&T GSM	1	538	126	0.0122	880	0.5867	2.08%	
*AT&T GSM	4	934	126	0.0846	1900	1.0000	8.46%	
*AT&T LTE	1	1375	126	0.0311	734	0.4893	6.36%	
Verizon PCS	**7**	**407**	**135**	**0.0562**	**1970**	**1.0000**	**5.62%**	
Verizon Cellular	**9**	**348**	**135**	**0.0618**	**869**	**0.5793**	**10.67%**	
Verizon AWS	**1**	**2306**	**135**	**0.0455**	**2145**	**1.0000**	**4.55%**	
Verizon 700	**1**	**1050**	**135**	**0.0207**	**746**	**0.4973**	**4.17%**	
								83.31%
* Source: Siting Council								

ATTACHMENT 3

ARMOR TOWER ENGINEERING

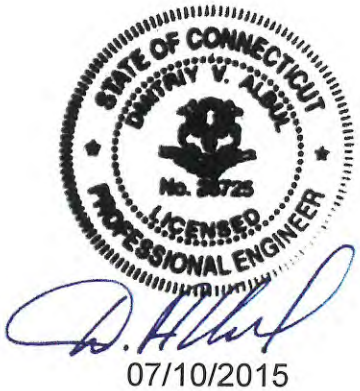
Structural Analysis of a 160 ft Guyed Tower

Site Number: Verizon Wireless - ECP-2-0144

Site Name: Prospect North
County: New Haven
Location: Prospect, CT

Checked By:

David Harrison
Structural Design Engineer II



07/10/2015

McPHEE ELECTRIC Ltd.
ELECTRICAL CONTRACTORS

505 Main Street

Farmington, CT 06032

July 2015

9 North Main Street, 2nd Floor, Cortland, NY 13045
(607)591-5381 Fax: (866)870-0840 www.ArmorTower.com

ARMOR TOWER ENGINEERING

July 9, 2015

Douglas Barker
McPhee ElectricLtd.
505 MAin Street
Farmington, CT 06032

RE: Verizon Wireless – ECP-2-0144 – Prospect North
54 Waterbury Road, Prospect, CT 06712

Douglas:

We have completed the structural analysis of the subject tower and **have found it to be adequate within the scope of this analysis to support the proposed antenna loading**. The tower was analyzed according to the requirements of TIA/EIA 222-F standard for New Haven County for 85 mph (fastest mile) wind speed with no ice and 74 mph wind with ½" ice.

The subject tower is a 160' guyed tower consisting of all-welded sections with pipe legs and pipe bracing. The tower has been previously reinforced. Tower face dimension is 30" the full height above a 80" tapered base. The tower mast is laterally supported by three levels of guying attached to one set of three guy anchors. Foundation details have not been provided for our review and are therefore considered unknown.

The loading used in the analysis consisted of the existing antennas/lines as well as the following for Verizon Wireless at 135' on existing antenna frames:

- (6) Commscope SBNHH-1D65B antennas [2 per sector]
- (2) Swedcom SWCP 2X5514 antennas [1 for Alpha & Beta]
- (1) Commscope LNX-8514DS-VTM antenna [Gamma]
- (3) Commscope HBXX-6517DS-A2M antennas [1 per sector]
- (3 ea) ALU 700 RRH, AWS RRH, and PCS RRH units [1 ea. per sector]
- (2) DB-T1-6Z-8AB-0Z main distribution boxes.
- (18) 1-5/8" coax cables and (2) HB158-1-08U8-S8J18 fiber cables

The proposed feed lines are to be located as shown on drawing E-7.

The results of the analysis showed all tower elements to be loaded within allowable limits with a maximum stress rating of 98.8%. We recommend a post-construction inspection be completed by an engineer to document that tower-mounted equipment has been placed in compliance with the requirements of this analysis. For a detailed listing of tower performance, please see pages 10 and 11 of the calculations.

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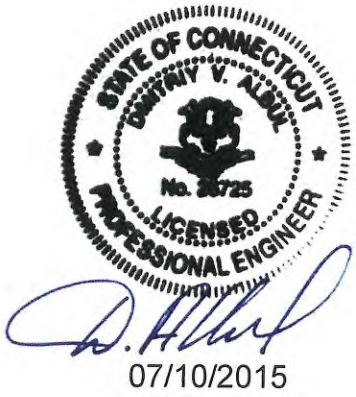
We appreciate the opportunity to provide our services to McPhee Electric, Ltd and Verizon, and if you have any questions concerning this analysis, please contact us.

Sincerely,

ARMOR TOWER, INC.

Patrick Propert
Structural Design Engineer II



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PRIMARY ASSUMPTIONS USED IN THE ANALYSIS

1. Leg A is assumed to be oriented North.
2. Allowable steel stresses are defined by AISC-ASD 9th Edition and all welds conform to AWS D1.1 specifications.
3. Armor Tower has been commissioned to analyze the tower according to the requirements of TIA/EIA 222-F for New Haven County, CT, Per this code, a basic wind speed of 85 mph (fastest mile) without ice and 74 mph with ½" ice is recommended. This site is not within a special wind region according to the ASCE 7 wind map. It is the client's responsibility to check with local authorities or the tower owner if a greater wind or ice loading is required to be considered in the analysis. Note that Section 3108.4 of the International Building Code states that "Towers shall be designed to resist wind loads according to TIA/EIA-222".
4. The acceptability of the analyzed antenna loading is the responsibility of McPhee Electric and its affiliates to confirm with the respective carriers or the tower owner.
5. Any deviation from the analyzed antenna loading will require a re-analysis of the tower for verification of structural integrity. The proposed feed lines are be located as shown on drawing E-7.
6. This analysis assumes all tower members are galvanized adequately to prevent corrosion of the steel and that all tower members are in "like new" condition with no physical deterioration. This analysis also assumes the tower has been maintained properly per TIA/EIA 222-F Annex E recommended inspection and maintenance procedures for tower owners and is in a plumb condition. Armor Tower has not completed a condition assessment of the tower.
7. No accounting for residual stresses due to incorrect tower erection can be made. This analysis assumes all bolts are appropriately tightened providing necessary connection continuity and that the installation of the tower was performed by a qualified tower erector.
8. This certification does not include foundations. Geotechnical or foundation information was not provided to Armor Tower to complete a foundation review. Armor Tower therefore does not accept responsibility for foundation adequacy.
9. No conclusions, expressed or implied, shall indicate that Armor Tower has made an evaluation of the original design, materials, fabrication, or potential installation or erection deficiencies. Any information contrary to that assumed for the purpose of preparing this analysis could alter the findings and conclusions stated herein.
10. Tower member sizes, geometry, are based on a tower reinforcement design completed by Bay State Design in January 2011. Existing antenna loading is based on our previous analysis dated April 2015. It is our assumption that this data is complete and accurately reflects the existing conditions of the tower and equipment. Armor Tower has not been commissioned to field validate this data. Armor Tower reserves the right to add to or modify this report as more information becomes available. Proposed equipment was outlined in an RF design dated June 2015.
11. The investigation of the load carrying capacities of the antenna supporting frames/mounts is outside the scope of this analysis. Antenna mount certification can be completed under separate contract.

12. This tower does not have an industry-approved fall protection system installed. For the safety of workers climbing this tower, we recommend a flexible cable safety climb be installed.

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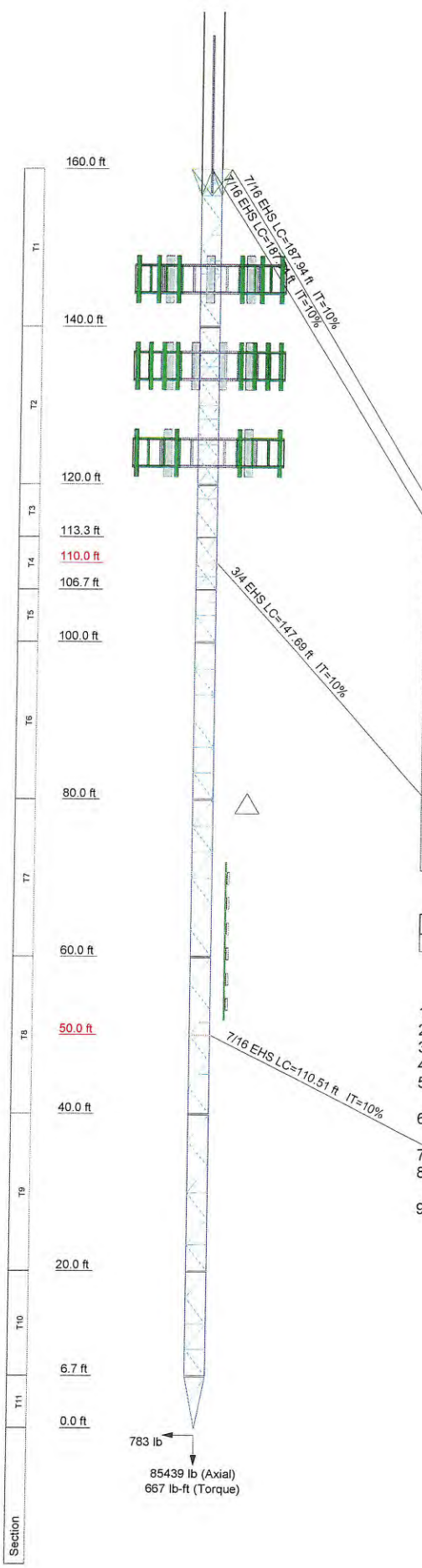
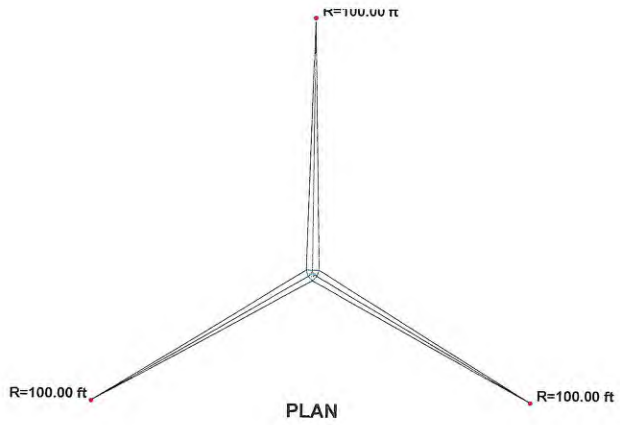




DESIGNED APPURTENANCE LOADING

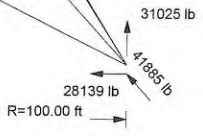
TYPE	ELEVATION	TYPE	ELEVATION
3" Dia 20' Omni	160	HBXX-6517DS-A2M w. Mtg Pipe (P-VZW-Beta)	135
3" Dia 20' Omni	160	HBXX-6517DS-A2M w. Mtg Pipe (P-VZW-Gamma)	135
2" Dia 15' Omni	160	RRH RH-2X60-AWS (P-VZW-Alpha)	135
2" Dia 15' Omni	160	RRH RH-2X60-AWS (P-VZW-Beta)	135
1" x 6' DIPOLE	160	RRH RH-2X60-AWS (P-VZW-Gamma)	135
Valmont 13' Standoff Frame (set of 3)	146	(2) DB-T1-6Z-8AB-0Z (P-VZW)	135
(3) DB844H90E-XY w/Mount Pipe	146	RRH RH-2X60-PCS (P-VZW-Alpha)	135
(3) DB844H90E-XY w/Mount Pipe	146	RRH RH-2X60-PCS (P-VZW-Beta)	135
(3) DB844H90E-XY w/Mount Pipe	146	RRH RH-2X60-PCS (P-VZW-Gamma)	135
12' booms (set of 3) (E-VZW)	135	RRH RH-2X60-700U (P-VZW-Alpha)	135
(2) SBNHH-1D65B w. Mtg. Pipe (P-VZW-Alpha)	135	RRH RH-2X60-700U (P-VZW-Beta)	135
(2) SBNHH-1D65B w. Mtg. Pipe (P-VZW-Beta)	135	RRH RH-2X60-700U (P-VZW-Gamma)	135
(2) SBNHH-1D65B w. Mtg. Pipe (P-VZW-Gamma)	135	8'x1'x6" Panel	124
SWCP 2x5514 w. MtgPipe (E-VZW-Alpha)	135	8'x1'x6" Panel	124
SWCP 2x5514 w. MtgPipe (E-VZW-Beta)	135	(2) TMA	124
LNX-8514DS-VTM w. Mtg. Pipe (E-VZW-Gamma)	135	(2) TMA	124
HBXX-6517DS-A2M w. Mtg Pipe (P-VZW-Alpha)	135	10' Pirod Frame (set of 3)	124
		20' 4-Bay Dipole	72 - 52

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A53-B-35	35 ksi	63 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. Verizon Wireless antennas are indicated as (E)xisting, (P)roposed and (R)eserved. All others are considered existing.
9. TOWER RATING: 98.8%



ARMOR TOWER
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Cortland, NY 13045
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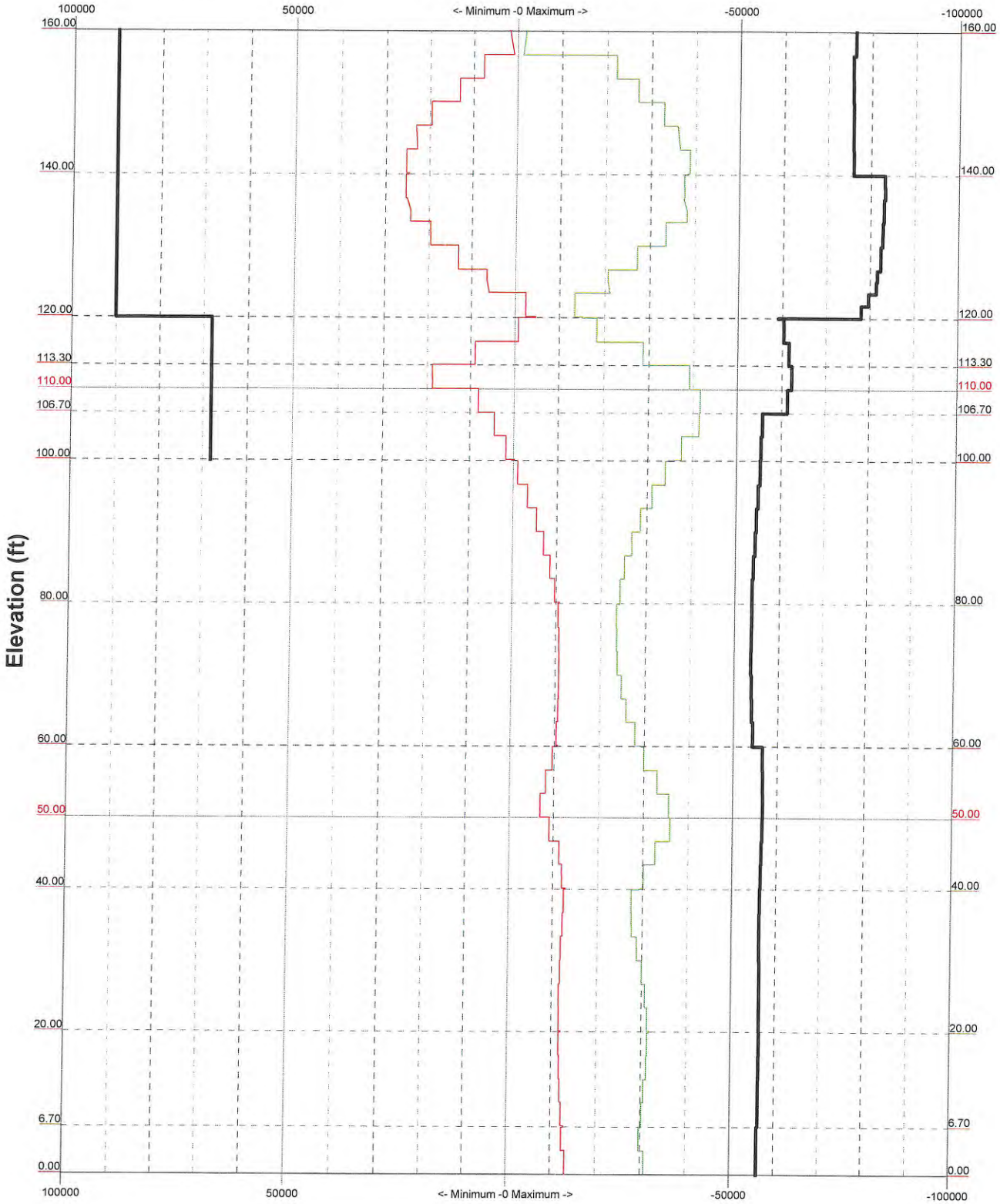
FAX: (866) 870-0840

Job: ***160' Guyed Tower Analysis***			
Project: ***Prospect North, CT***			
Client: Verizon Wireless	Drawn by: PEP	App'd:	
Code: TIA/EIA-222-F	Date: 07/09/15	Scale: N	
Path: Z:\McPhee Electric\ProspectCT\2015-06 Analysis\Tnx\ProspectCT July 2015.eri		Dwg No.	

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Leg Capacity ——— **Leg Compression (lb)**



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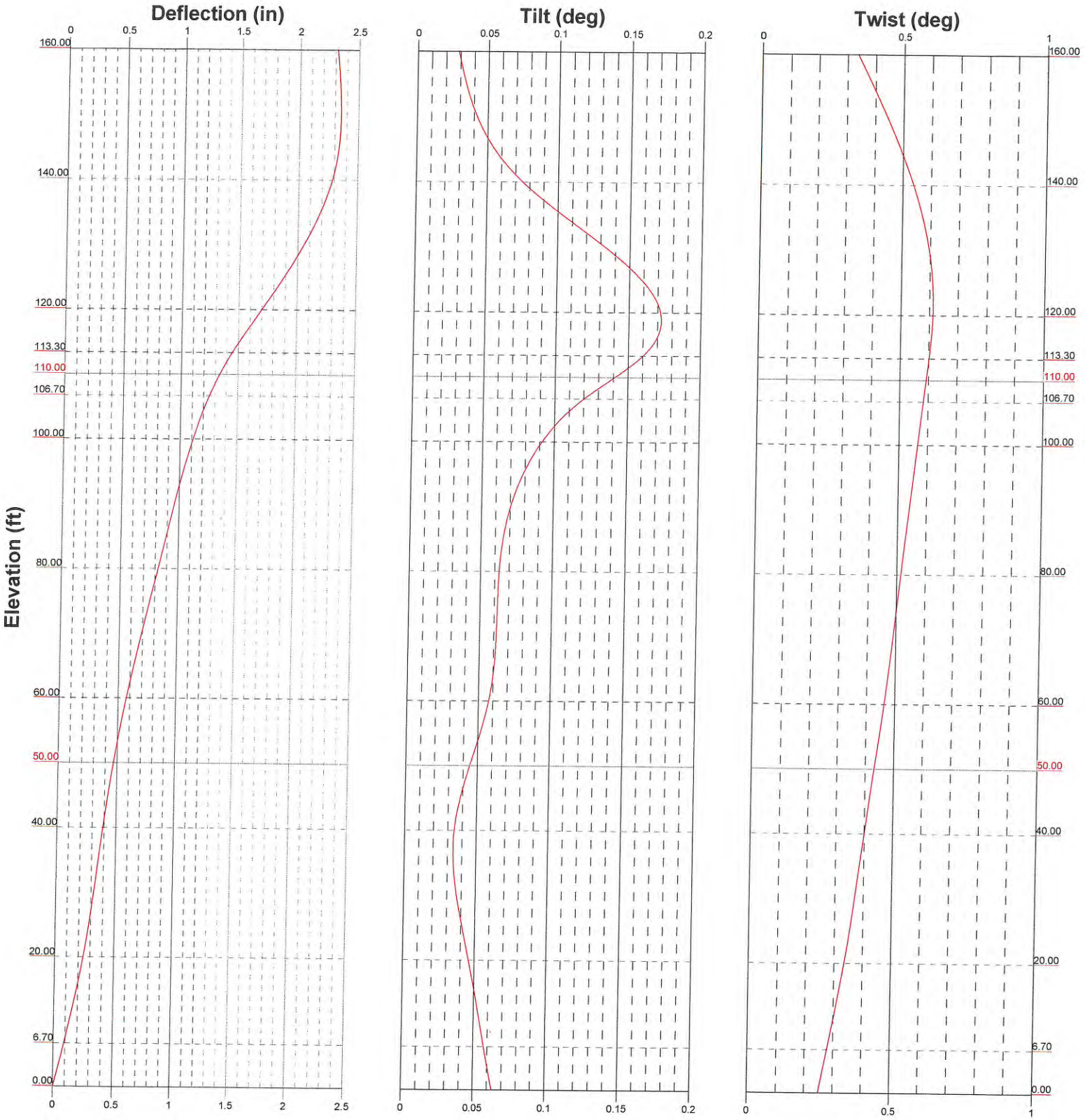
Path: Z:\McPhee Electric\ProspectCT\2015-06 Analysis\Tnx\ProspectCT July 2015.eri		Dwg No.	

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

Maximum Values



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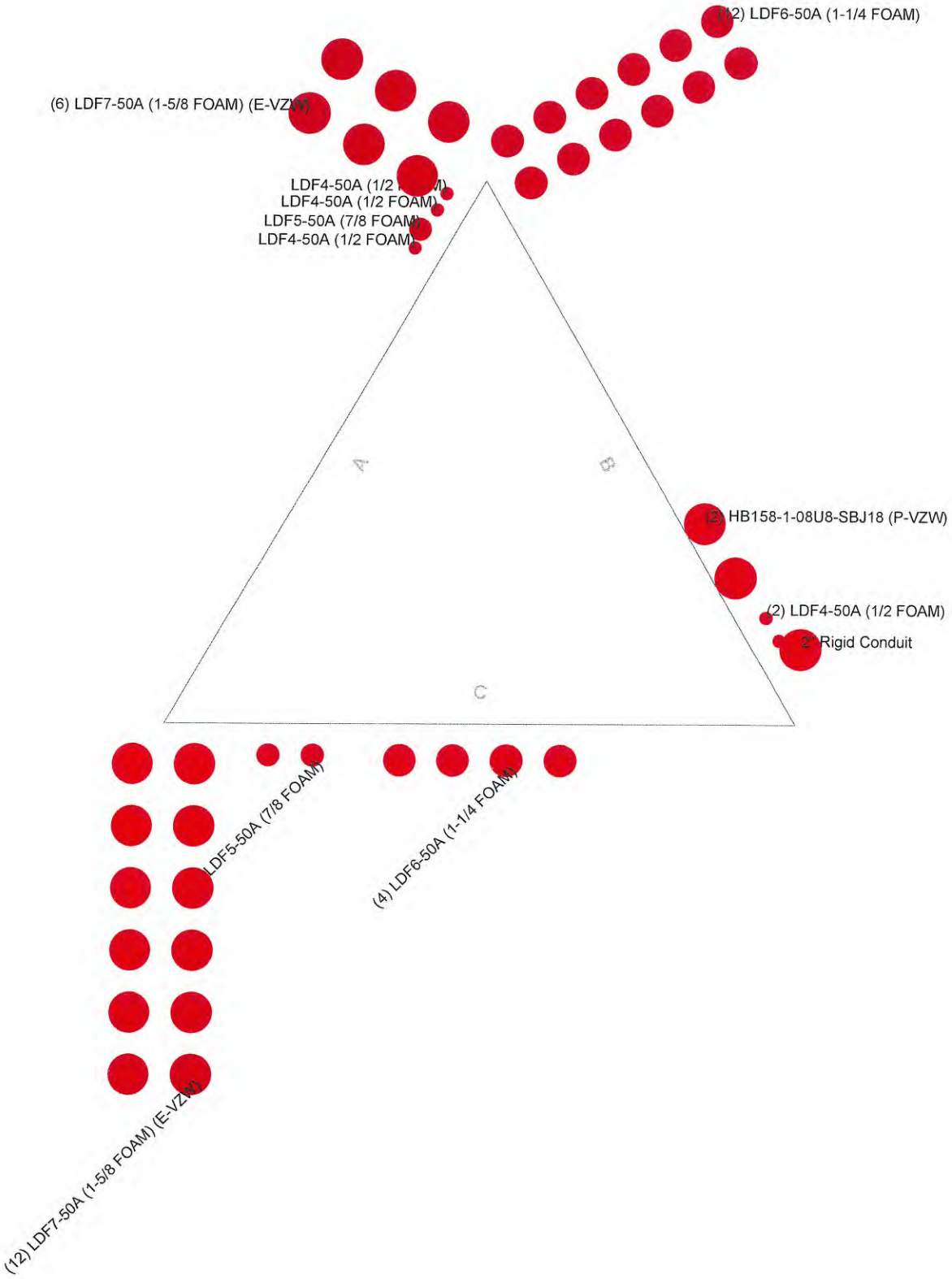
Round Flat App In Face App Out Face



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160' Guyed Tower Analysis	1 of 11
Project	**Date**
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Client	**Designed by**
Verizon Wireless	PEP

Load Combinations

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

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
T1	160 - 140	2.319	33	0.0268	0.3394
T2	140 - 120	2.289	29	0.0764	0.5398
T3	120 - 113.3	1.704	29	0.1718	0.6157
T4	113.3 - 106.7	1.450	29	0.1576	0.6000
T5	106.7 - 100	1.252	29	0.1211	0.5857
T6	100 - 80	1.115	29	0.0945	0.5684
T7	80 - 60	0.825	29	0.0635	0.5179
T8	60 - 40	0.570	27	0.0565	0.4622
T9	40 - 20	0.389	37	0.0337	0.3984
T10	20 - 6.7	0.240	37	0.0466	0.3353
T11	6.7 - 0	0.088	37	0.0588	0.2807

Critical Deflections and Radius of Curvature - Service Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
160.00	Guy	33	2.319	0.0268	0.3394	23352
146.00	Valmont 13' Standoff Frame (set of 3)	29	2.343	0.0487	0.4872	8340
135.00	12' booms (set of 3)	29	2.193	0.1062	0.5751	7280
124.00	10' Pirod Frame (set of 3)	29	1.854	0.1642	0.6161	15980
110.00	Guy	29	1.343	0.1400	0.5926	7626
72.00	20' 4-Bay Dipole	29	0.718	0.0615	0.4969	164818
67.00	20' 4-Bay Dipole	27	0.654	0.0604	0.4830	82017
62.00	20' 4-Bay Dipole	27	0.593	0.0581	0.4683	55087
57.00	20' 4-Bay Dipole	27	0.537	0.0533	0.4528	50658
52.00	20' 4-Bay Dipole	27	0.487	0.0466	0.4367	55666
50.00	Guy	37	0.469	0.0439	0.4302	58079

Maximum Tower Deflections - Design Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
T1	160 - 140	15.618	23	0.3520	1.3035
T2	140 - 120	13.938	23	0.5880	1.7920
T3	120 - 113.3	10.740	23	0.8236	1.9720
T4	113.3 - 106.7	9.554	23	0.7754	1.9140
T5	106.7 - 100	8.584	23	0.6601	1.8686
T6	100 - 80	7.831	23	0.5681	1.8065
T7	80 - 60	5.975	15	0.4345	1.6248
T8	60 - 40	4.177	15	0.4076	1.4283
T9	40 - 20	2.759	15	0.2832	1.2038
T10	20 - 6.7	1.575	15	0.3293	0.9990
T11	6.7 - 0	0.563	15	0.3826	0.8342

Critical Deflections and Radius of Curvature - Design Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
160.00	Guy	23	15.618	0.3520	1.3035	8222
146.00	Valmont 13' Standoff Frame (set of 3)	23	14.574	0.5031	1.6619	2936
135.00	12' booms (set of 3)	23	13.268	0.6710	1.8812	2603
124.00	10' Pirod Frame (set of 3)	23	11.461	0.8144	1.9806	6295
110.00	Guy	23	9.037	0.7201	1.8907	2008
72.00	20' 4-Bay Dipole	15	5.241	0.4320	1.5507	11584
67.00	20' 4-Bay Dipole	15	4.785	0.4281	1.5016	9311
62.00	20' 4-Bay Dipole	15	4.345	0.4160	1.4498	7849
57.00	20' 4-Bay Dipole	15	3.934	0.3907	1.3950	7620
52.00	20' 4-Bay Dipole	15	3.554	0.3552	1.3380	8155
50.00	Guy	15	3.411	0.3403	1.3151	8399

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Project	**Date**
Prospect North, CT	10:04:42 07/09/15
Client	**Designed by**
Verizon Wireless	PEP

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	160	Leg	A325N	6185.29	19437.70	0.318 ✓	1.333	Bolt Tension
T2	140	Leg	A325N	0.00	19426.10	0.000 ✓	1.333	Bolt Tension
T5	106.7	Leg	A325N	0.00	19436.80	0.000 ✓	1.333	Bolt Tension
T6	100	Leg	A325N	0.00	19438.60	0.000 ✓	1.333	Bolt Tension
T7	80	Leg	A325N	0.00	19437.00	0.000 ✓	1.333	Bolt Tension
T8	60	Leg	A325N	0.00	19436.80	0.000 ✓	1.333	Bolt Tension
T9	40	Leg	A325N	0.00	19438.50	0.000 ✓	1.333	Bolt Tension
T10	20	Leg	A325N	0.00	19379.90	0.000 ✓	1.333	Bolt Tension
T11	6.7	Leg	A325N	0.00	19438.10	0.000 ✓	1.333	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T_a lb	Required S.F.	Actual S.F.
T1	160.00 (A) (429)	2080.00	20800.02	8523.95	10400.00	2.000	2.440 ✓
	160.00 (A) (430)	2080.00	20800.02	8314.99	10400.00	2.000	2.502 ✓
	160.00 (B) (423)	2080.00	20800.02	8582.54	10400.00	2.000	2.424 ✓
	160.00 (B) (424)	2080.00	20800.02	8246.31	10400.00	2.000	2.522 ✓
	160.00 (C) (417)	2080.00	20800.02	8146.76	10400.00	2.000	2.553 ✓
	160.00 (C) (418)	2080.00	20800.02	8686.19	10400.00	2.000	2.395 ✓
T4	110.00 (A) (437)	5830.00	58299.91	19977.00	29150.00	2.000	2.918 ✓
	110.00 (B) (436)	5830.00	58299.91	20103.50	29150.00	2.000	2.900 ✓
	110.00 (C) (435)	5830.00	58299.91	20065.00	29150.00	2.000	2.906 ✓
T8	50.00 (A) (440)	2080.00	20800.02	6339.26	10400.00	2.000	3.281 ✓
	50.00 (B) (439)	2080.00	20800.02	6359.31	10400.00	2.000	3.271 ✓
	50.00 (C) (438)	2080.00	20800.02	6357.75	10400.00	2.000	3.272 ✓

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Job	Page
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Project	**Date**
Prospect North, CT	10:04:42 07/09/15
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Verizon Wireless	PEP

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	20.00	3.32	43.1 K=1.00	1.00	25.270	2.2535	-38732.50	56946.70	0.680 ✓
T2	140 - 120	20.00	1.65	21.5 K=1.00	0.98	27.661	2.2535	-38262.60	62334.60	0.614 ✓
T3	120 - 113.3	6.70	1.65	21.0 K=1.00	0.96	27.092	1.7040	-28734.30	46166.70	0.622 ✓
T4	113.3 - 106.7	6.60	1.65	20.9 K=1.00	0.96	26.980	1.7040	-41663.30	45975.30	0.906 ✓
T5	106.7 - 100	6.70	3.31	41.9 K=1.00	0.96	24.541	1.7040	-41411.00	41819.10	0.990 ✓
T6	100 - 80	20.00	3.31	41.9 K=1.00	0.95	24.359	1.7040	-35955.10	41509.00	0.866 ✓
T7	80 - 60	20.00	3.31	41.9 K=1.00	0.94	23.922	1.7040	-29251.30	40764.50	0.718 ✓
T8	60 - 40	20.00	3.31	41.9 K=1.00	0.98	24.959	1.7040	-35937.30	42532.30	0.845 ✓
T9	40 - 20	20.00	3.31	41.9 K=1.00	0.97	24.810	1.7040	-31760.20	42278.00	0.751 ✓
T10	20 - 6.7	13.30	3.28	41.6 K=1.00	0.97	24.825	1.7040	-31761.50	42303.70	0.751 ✓
T11	6.7 - 0	6.85	3.38	42.9 K=1.00	0.97	24.695	1.7040	-30833.40	42082.40	0.733 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	4.16	3.76	94.6 K=0.70	13.429	0.3326	-5883.28	4466.99	1.317 ✓
T2	140 - 120	4.14	1.87	67.4 K=1.00	16.329	0.3326	-4944.99	5431.46	0.910 ✓
T3	120 - 113.3	4.15	1.87	67.4 K=1.00	16.325	0.3326	-5285.28	5430.30	0.973 ✓
T4	113.3 - 106.7	4.14	1.87	67.3 K=1.00	16.336	0.3326	-5619.88	5433.78	1.034 ✓
T5	106.7 - 100	4.15	3.75	94.4 K=0.70	13.453	0.3326	-3562.01	4474.80	0.796 ✓
T6	100 - 80	4.14	3.75	94.3 K=0.70	13.458	0.3326	-3307.48	4476.75	0.739 ✓
T7	80 - 60	4.14	3.75	94.3 K=0.70	13.458	0.3326	-2482.27	4476.75	0.554 ✓
T8	60 - 40	4.14	3.75	94.3 K=0.70	13.458	0.3326	-3400.75	4476.75	0.760 ✓
T9	40 - 20	4.14	3.75	94.3 K=0.70	13.458	0.3326	-2872.81	4476.75	0.642 ✓
T10	20 - 6.7	4.13	3.73	93.9	13.505	0.3326	-2291.72	4492.30	0.510 ✓

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T11	6.7 - 0	3.81	3.32	K=0.70 83.7 K=0.70	14.655	0.3326	-1855.55	4874.67	0.381 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	2.50	2.26	81.3 K=1.00	14.912	0.3326	-1614.97	4960.30	0.326 ✓
T2	140 - 120	2.50	2.26	81.3 K=1.00	14.912	0.3326	-1058.86	4960.30	0.213 ✓
T5	106.7 - 100	2.50	2.26	81.3 K=1.00	14.912	0.3326	-717.26	4960.30	0.145 ✓
T6	100 - 80	2.50	2.26	81.3 K=1.00	14.912	0.3326	-622.76	4960.30	0.126 ✓
T7	80 - 60	2.50	2.26	81.3 K=1.00	14.912	0.3326	-506.65	4960.30	0.102 ✓
T8	60 - 40	2.50	2.26	81.3 K=1.00	14.912	0.3326	-622.45	4960.30	0.125 ✓
T9	40 - 20	2.50	2.26	81.3 K=1.00	14.912	0.3326	-550.10	4960.30	0.111 ✓
T10	20 - 6.7	2.50	2.26	81.3 K=1.00	14.912	0.3326	-550.13	4960.30	0.111 ✓
T11	6.7 - 0	1.23	0.99	35.8 K=1.00	19.013	0.3326	-543.16	6324.27	0.086 ✓

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	1.25	1.13	72.3 K=1.00	20.499	0.4418	-0.02	9056.00	0.000 ✓
T2	140 - 120	2.50	2.26	144.7 K=1.00	7.135	0.4418	-662.73	3152.29	0.210 ✓
T3	120 - 113.3	2.50	2.26	144.7 K=1.00	7.135	0.4418	-497.69	3152.29	0.158 ✓
T4	113.3 - 106.7	2.50	2.26	144.7 K=1.00	7.135	0.4418	-721.63	3152.29	0.229 ✓
T5	106.7 - 100	1.25	1.13	72.3 K=1.00	20.499	0.4418	-0.02	9056.00	0.000 ✓
T8	60 - 40	1.25	1.13	40.7 K=1.00	18.650	0.3326	-0.01	6203.62	0.000 ✓

Top Girt Design Data (Compression)

Section No.	Elevation	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft	ft	ft		ksi	in^2	lb	lb	
T2	140 - 120	2.50	2.26	81.3 K=1.00	14.912	0.3326	-317.05	4960.30	0.064 ✓
T4	113.3 - 106.7	2.50	2.26	81.3 K=1.00	14.912	0.3326	-245.13	4960.30	0.049 ✓
T5	106.7 - 100	2.50	2.26	81.3 K=1.00	14.912	0.3326	-206.74	4960.30	0.042 ✓

Bottom Girt Design Data (Compression)

Section No.	Elevation	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft	ft	ft		ksi	in^2	lb	lb	
T1	160 - 140	2.50	2.26	81.3 K=1.00	14.912	0.3326	-413.40	4960.30	0.083 ✓

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft	ft	ft		ksi	in^2	lb	lb	
T1	160 - 140	2.50	2.26	86.8 K=1.00	17.618	1.2272	-1622.25	21621.00	0.075 ✓

Torque-Arm Bottom Design Data

Section No.	Elevation	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft	ft	ft		ksi	in^2	lb	lb	
T1	160 - 140 (421)	4.16	3.96	80.9 K=1.00	15.257	2.1100	-10823.50	32192.10	0.336 ✓
T1	160 - 140 (422)	4.16	3.96	80.9 K=1.00	15.257	2.1100	-10937.80	32192.10	0.340 ✓
T1	160 - 140 (427)	4.16	3.96	80.9 K=1.00	15.257	2.1100	-11631.30	32192.10	0.361 ✓
T1	160 - 140 (428)	4.16	3.96	80.9 K=1.00	15.257	2.1100	-11613.30	32192.10	0.361 ✓
T1	160 - 140 (433)	4.16	3.96	80.9 K=1.00	15.257	2.1100	-11178.10	32192.10	0.347 ✓
T1	160 - 140 (434)	4.16	3.96	80.9 K=1.00	15.257	2.1100	-11175.50	32192.10	0.347 ✓

ARMOR TOWER ENGINEERING

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Project	**Date**
Prospect North, CT	10:04:42 07/09/15
Client	**Designed by**
Verizon Wireless	PEP

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	20.00	3.32	43.1	30.000	2.2535	25393.30	67606.20	0.376 ✓
T2	140 - 120	20.00	1.65	21.5	30.000	2.2535	25451.70	67606.20	0.376 ✓
T3	120 - 113.3	6.70	1.65	21.0	30.000	1.7040	9064.06	51121.50	0.177 ✓
T4	113.3 - 106.7	6.60	1.65	20.9	30.000	1.7040	18828.30	51121.50	0.368 ✓
T5	106.7 - 100	6.70	3.31	41.9	30.000	1.7040	4517.51	51121.50	0.088 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	4.16	3.76	135.1	21.000	0.3326	5484.44	6985.33	0.785 ✓
T2	140 - 120	4.14	1.87	67.4	21.000	0.3326	3582.67	6985.33	0.513 ✓
T3	120 - 113.3	4.15	1.87	67.4	21.000	0.3326	3452.87	6985.33	0.494 ✓
T4	113.3 - 106.7	4.14	1.87	67.3	21.000	0.3326	3779.80	6985.33	0.541 ✓
T5	106.7 - 100	4.15	3.75	134.8	21.000	0.3326	2533.53	6985.33	0.363 ✓
T6	100 - 80	4.14	3.75	134.8	21.000	0.3326	1915.68	6985.33	0.274 ✓
T7	80 - 60	4.14	3.75	134.8	21.000	0.3326	875.15	6985.33	0.125 ✓
T8	60 - 40	4.14	3.75	134.8	21.000	0.3326	1662.89	6985.33	0.238 ✓
T9	40 - 20	4.14	3.75	134.8	21.000	0.3326	1100.06	6985.33	0.157 ✓
T10	20 - 6.7	4.13	3.73	134.2	21.000	0.3326	501.01	6985.33	0.072 ✓

Horizontal Design Data (Tension)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	2.50	2.26	81.3	21.000	0.3326	1721.49	6985.33	0.246 ✓
T2	140 - 120	2.50	2.26	81.3	21.000	0.3326	2100.24	6985.33	0.301 ✓
T3	120 - 113.3	2.50	2.26	81.3	21.000	0.3326	1660.22	6985.33	0.238 ✓
T5	106.7 - 100	2.50	2.26	81.3	21.000	0.3326	717.26	6985.33	0.103 ✓
T6	100 - 80	2.50	2.26	81.3	21.000	0.3326	624.33	6985.33	0.089 ✓
T7	80 - 60	2.50	2.26	81.3	21.000	0.3326	631.65	6985.33	0.090 ✓
T8	60 - 40	2.50	2.26	81.3	21.000	0.3326	622.45	6985.33	0.089 ✓
T9	40 - 20	2.50	2.26	81.3	21.000	0.3326	660.42	6985.33	0.095 ✓
T10	20 - 6.7	2.50	2.26	81.3	21.000	0.3326	704.97	6985.33	0.101 ✓

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T11	6.7 - 0	1.23	0.99	35.8	21.000	0.3326	611.37	6985.33	0.088 ✓

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	1.25	1.13	72.3	30.000	0.4418	0.01	13253.60	0.000 ✓
T2	140 - 120	2.50	2.26	144.7	30.000	0.4418	662.73	13253.60	0.050 ✓
T3	120 - 113.3	2.50	2.26	144.7	30.000	0.4418	497.69	13253.60	0.038 ✓
T4	113.3 - 106.7	2.50	2.26	144.7	30.000	0.4418	721.63	13253.60	0.054 ✓
T5	106.7 - 100	1.25	1.13	72.3	30.000	0.4418	0.02	13253.60	0.000 ✓
T8	60 - 40	1.25	1.13	40.7	21.000	0.3326	0.01	6985.33	0.000 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	140 - 120	2.50	2.26	81.3	21.000	0.3326	662.95	6985.33	0.095 ✓
T3	120 - 113.3	2.50	2.26	81.3	21.000	0.3326	542.43	6985.33	0.078 ✓
T4	113.3 - 106.7	2.50	2.26	81.3	21.000	0.3326	2227.88	6985.33	0.319 ✓
T5	106.7 - 100	2.50	2.26	81.3	21.000	0.3326	2302.24	6985.33	0.330 ✓
T6	100 - 80	2.50	2.26	81.3	21.000	0.3326	303.15	6985.33	0.043 ✓
T7	80 - 60	2.50	2.26	81.3	21.000	0.3326	282.15	6985.33	0.040 ✓
T8	60 - 40	2.50	2.26	81.3	21.000	0.3326	368.98	6985.33	0.053 ✓
T9	40 - 20	2.50	2.26	81.3	21.000	0.3326	326.00	6985.33	0.047 ✓
T10	20 - 6.7	2.50	2.26	81.3	21.000	0.3326	345.00	6985.33	0.049 ✓
T11	6.7 - 0	2.47	2.23	80.2	21.000	0.3326	2179.26	6985.33	0.312 ✓

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	2.50	2.26	81.3	21.000	0.3326	754.08	6985.33	0.108 ✓
T2	140 - 120	2.50	2.26	81.3	21.000	0.3326	646.48	6985.33	0.093 ✓
T5	106.7 - 100	2.50	2.26	81.3	21.000	0.3326	359.91	6985.33	0.052 ✓
T6	100 - 80	2.50	2.26	81.3	21.000	0.3326	311.20	6985.33	0.045 ✓
T7	80 - 60	2.50	2.26	81.3	21.000	0.3326	278.52	6985.33	0.040 ✓
T8	60 - 40	2.50	2.26	81.3	21.000	0.3326	385.64	6985.33	0.055 ✓

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	40 - 20	2.50	2.26	81.3	21.000	0.3326	339.33	6985.33	0.049 ✓
T10	20 - 6.7	2.50	2.26	81.3	21.000	0.3326	2174.88	6985.33	0.311 ✓

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140	2.50	2.26	86.8	30.000	1.2272	1615.91	36815.50	0.044 ✓
T4	113.3 - 106.7	2.50	2.26	86.8	30.000	1.2272	6736.64	36815.50	0.183 ✓
T8	60 - 40	2.50	2.26	86.8	30.000	1.2272	3724.37	36815.50	0.101 ✓

Torque-Arm Top Design Data

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140 (419)	2.50	2.38	31.3	21.600	2.1100	6369.67	45576.00	0.140 ✓
T1	160 - 140 (420)	2.50	2.38	31.3	21.600	2.1100	6317.73	45576.00	0.139 ✓
T1	160 - 140 (425)	2.50	2.38	31.3	21.600	2.1100	6335.37	45576.00	0.139 ✓
T1	160 - 140 (426)	2.50	2.38	31.3	21.600	2.1100	6282.34	45576.00	0.138 ✓
T1	160 - 140 (431)	2.50	2.38	31.3	21.600	2.1100	6527.41	45576.00	0.143 ✓
T1	160 - 140 (432)	2.50	2.38	31.3	21.600	2.1100	6195.86	45576.00	0.136 ✓

Torque-Arm Bottom Design Data

Section No.	Elevation ft	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	160 - 140 (421)	4.16	3.96	52.0	21.600	2.1100	1587.15	45576.00	0.035 ✓
T1	160 - 140 (422)	4.16	3.96	52.0	21.600	2.1100	1539.91	45576.00	0.034 ✓
T1	160 - 140 (427)	4.16	3.96	52.0	21.600	2.1100	2086.27	45576.00	0.046 ✓
T1	160 - 140 (428)	4.16	3.96	52.0	21.600	2.1100	2115.27	45576.00	0.046 ✓
T1	160 - 140 (433)	4.16	3.96	52.0	21.600	2.1100	1787.17	45576.00	0.039 ✓
T1	160 - 140 (434)	4.16	3.96	52.0	21.600	2.1100	1801.96	45576.00	0.040 ✓

ARMOR TOWER ENGINEERING

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Project	**Date**
Prospect North, CT	10:04:42 07/09/15
Client	**Designed by**
Verizon Wireless	PEP

Section Capacity Table

Section No.	Elevation ft	Component Type	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	160 - 140	Leg	1	-38732.50	75909.95	51.0	Pass
T2	140 - 120	Leg	49	-38262.60	83092.02	46.0	Pass
T3	120 - 113.3	Leg	128	-28734.30	61540.21	46.7	Pass
T4	113.3 - 106.7	Leg	154	-41663.30	61285.07	68.0	Pass
T5	106.7 - 100	Leg	182	-41411.00	55744.86	74.3	Pass
T6	100 - 80	Leg	201	-35955.10	55331.49	65.0	Pass
T7	80 - 60	Leg	243	-29251.30	54339.08	53.8	Pass
T8	60 - 40	Leg	285	-35937.30	56695.55	63.4	Pass
T9	40 - 20	Leg	335	-31760.20	56356.57	56.4	Pass
T10	20 - 6.7	Leg	377	-31761.50	56390.83	56.3	Pass
T11	6.7 - 0	Leg	407	-30833.40	56095.83	55.0	Pass
T1	160 - 140	Diagonal	31	-5883.28	5954.50	98.8	Pass
T2	140 - 120	Diagonal	59	-4944.99	7240.14	68.3	Pass
T3	120 - 113.3	Diagonal	134	-5285.28	7238.59	73.0	Pass
T4	113.3 - 106.7	Diagonal	172	-5619.88	7243.23	77.6	Pass
T5	106.7 - 100	Diagonal	198	-3562.01	5964.91	59.7	Pass
T6	100 - 80	Diagonal	241	-3307.48	5967.51	55.4	Pass
T7	80 - 60	Diagonal	252	-2482.27	5967.51	41.6	Pass
T8	60 - 40	Diagonal	310	-3400.75	5967.51	57.0	Pass
T9	40 - 20	Diagonal	374	-2872.81	5967.51	48.1	Pass
T10	20 - 6.7	Diagonal	384	-2291.72	5988.24	38.3	Pass
T11	6.7 - 0	Diagonal	415	-1855.55	6497.93	28.6	Pass
T1	160 - 140	Horizontal	42	-1614.97	6612.08	24.4	Pass
T2	140 - 120	Horizontal	114	2100.24	9311.44	22.6	Pass
T3	120 - 113.3	Horizontal	139	1660.22	9311.44	17.8	Pass
T5	106.7 - 100	Horizontal	195	-717.26	6612.08	10.8	Pass
T6	100 - 80	Horizontal	215	-622.76	6612.08	9.4	Pass
T7	80 - 60	Horizontal	257	-506.65	6612.08	7.7	Pass
T8	60 - 40	Horizontal	298	-622.45	6612.08	9.4	Pass
T9	40 - 20	Horizontal	347	-550.10	6612.08	8.3	Pass
T10	20 - 6.7	Horizontal	389	-550.13	6612.08	8.3	Pass
T11	6.7 - 0	Horizontal	412	611.37	9311.44	6.6	Pass
T1	160 - 140	Secondary Horizontal	13	-0.02	12071.65	0.0	Pass
T2	140 - 120	Secondary Horizontal	69	-662.73	4202.00	15.8	Pass
T3	120 - 113.3	Secondary Horizontal	142	-497.69	4202.00	11.8	Pass
T4	113.3 - 106.7	Secondary Horizontal	171	-721.63	4202.00	17.2	Pass
T5	106.7 - 100	Secondary Horizontal	193	-0.02	12071.65	0.0	Pass
T8	60 - 40	Secondary Horizontal	297	-0.01	8269.43	0.1	Pass
T2	140 - 120	Top Girt	53	662.95	9311.44	7.1	Pass
T3	120 - 113.3	Top Girt	130	542.43	9311.44	5.8	Pass
T4	113.3 - 106.7	Top Girt	157	2227.88	9311.44	23.9	Pass
T5	106.7 - 100	Top Girt	186	2302.24	9311.44	24.7	Pass
T6	100 - 80	Top Girt	206	303.15	9311.44	3.3	Pass
T7	80 - 60	Top Girt	246	282.15	9311.44	3.0	Pass
T8	60 - 40	Top Girt	288	368.98	9311.44	4.0	Pass
T9	40 - 20	Top Girt	338	326.00	9311.44	3.5	Pass
T10	20 - 6.7	Top Girt	379	345.00	9311.44	3.7	Pass
T11	6.7 - 0	Top Girt	408	2179.26	9311.44	23.4	Pass
T1	160 - 140	Bottom Girt	8	754.08	9311.44	8.1	Pass
T2	140 - 120	Bottom Girt	55	646.48	9311.44	6.9	Pass
T5	106.7 - 100	Bottom Girt	188	359.91	9311.44	3.9	Pass
T6	100 - 80	Bottom Girt	208	311.20	9311.44	3.3	Pass
T7	80 - 60	Bottom Girt	249	278.52	9311.44	3.0	Pass
T8	60 - 40	Bottom Girt	293	385.64	9311.44	4.1	Pass
T9	40 - 20	Bottom Girt	339	339.33	9311.44	3.6	Pass
T10	20 - 6.7	Bottom Girt	381	2174.88	9311.44	23.4	Pass
T1	160 - 140	Guy A@160	429	8523.95	10400.00	82.0	Pass
T4	113.3 - 106.7	Guy A@110	437	19977.00	29150.00	68.5	Pass

ARMOR TOWER ENGINEERING **Armor Tower, Inc.** 9 N Main St Cortland, NY 13045 Phone: (607) 591-5381 FAX: (866) 870-0840	**Job** 160' Guyed Tower Analysis	**Page** 11 of 11
	Project Prospect North, CT	**Date** 10:04:42 07/09/15
	Client Verizon Wireless	**Designed by** PEP

Section No.	Elevation ft	Component Type	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T8	60 - 40	Guy A@50	440	6339.26	10400.00	61.0	Pass
T1	160 - 140	Guy B@160	423	8582.54	10400.00	82.5	Pass
T4	113.3 - 106.7	Guy B@110	436	20103.50	29150.00	69.0	Pass
T8	60 - 40	Guy B@50	439	6359.31	10400.00	61.1	Pass
T1	160 - 140	Guy C@160	418	8686.19	10400.00	83.5	Pass
T4	113.3 - 106.7	Guy C@110	435	20065.00	29150.00	68.8	Pass
T8	60 - 40	Guy C@50	438	6357.75	10400.00	61.1	Pass
T1	160 - 140	Top Guy Pull-Off@160	5	-1622.25	28820.79	5.6	Pass
T4	113.3 - 106.7	Top Guy Pull-Off@110	167	6736.64	49075.06	13.7	Pass
T8	60 - 40	Top Guy Pull-Off@50	313	3724.37	49075.06	7.6	Pass
T1	160 - 140	Torque Arm Top@160	431	6527.41	60752.81	10.7	Pass
T1	160 - 140	Torque Arm Bottom@160	427	-11631.30	42912.07	27.1	Pass
						Summary	
					Leg (T5)	74.3	Pass
					Diagonal (T1)	98.8	Pass
					Horizontal (T1)	24.4	Pass
					Secondary Horizontal (T4)	17.2	Pass
					Top Girt (T5)	24.7	Pass
					Bottom Girt (T10)	23.4	Pass
					Guy A (T1)	82.0	Pass
					Guy B (T1)	82.5	Pass
					Guy C (T1)	83.5	Pass
					Top Guy Pull-Off (T4)	13.7	Pass
					Torque Arm Top (T1)	10.7	Pass
					Torque Arm Bottom (T1)	27.1	Pass
					Bolt Checks	23.9	Pass
					RATING =	**98.8**	**Pass**