

January 9, 2018

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification
50 Rockland Road, Norwalk, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the 128-foot level of an existing 180-foot lattice tower at 50 Rockland Road in Norwalk, Connecticut (the “Property”). The tower and Property are owned by Crown Atlantic Company LLC (“Crown”). Cellco’s use of the tower was approved by the Council in 1987. Cellco now intends to replace six (6) of its existing antennas with three (3) model SBNHH-1D65C, 700/1900 MHz antennas and three (3) model SBNHH-1D65C, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to replace three (3) remote radio heads (“RRHs”) with three (3) newer model RRHs and install six (6) new RRHs, for a total of nine (9) RRHs and install one (1) HYBRIFLEX™ fiber optic 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 letter is being sent to Harry Rilling, Mayor for the City of Norwalk; Steven Kleppin, Norwalk’s Director of Planning and Zoning; and Crown, the tower and Property 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 tower. Cellco’s replacement antennas and RRHs will be installed at the same 128-foot level of the 180-foot tower.

17508791-v1

Robinson+Cole

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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 behind 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 Report included in Attachment 3).

A copy of the parcel map and owner information for the Property is included in Attachment 4. A Certificate of Mailing verifying that this filing was sent to municipal officials is included in Attachment 5.

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Harry Rilling, Norwalk Mayor

Steven Kleppin, Norwalk Director of Planning and Zoning

Crown Atlantic Company LLC (*via electronic mail*)

Tim Parks

ATTACHMENT 1



SBNHH-1D65C

Multiband 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	1920–2200	2300–2360
Gain, dBi	16.2	16.0	17.7	17.9	18.5	18.5
Beamwidth, Horizontal, degrees	66	64	70	65	63	58
Beamwidth, Vertical, degrees	8.9	7.8	5.7	5.2	5.0	4.4
Beam Tilt, degrees	0–11	0–11	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	11	12	15	15	15	14
Front-to-Back Ratio at 180°, dB	29	31	27	27	28	27
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	400	400	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	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	15.8	15.6	17.3	17.8	18.2	18.1
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.5	±0.3	±0.2	±0.5	±0.4
Gain by Beam Tilt, average, dBi	0° 16.0	0° 15.8	0° 17.3	0° 17.7	0° 18.0	0° 17.9
	5° 16.0	5° 15.8	4° 17.4	4° 17.8	4° 18.2	4° 18.2
	11° 15.5	11° 15.2	7° 17.3	7° 17.7	7° 18.1	7° 18.2
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.9	±3.4	±3.8	±4.7	±3.7
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.5	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	13	14	17	16	17	15
Front-to-Back Total Power at 180° ± 30°, dB	26	24	27	25	25	26
CPR at Boresight, dB	29	22	20	21	19	21
CPR at Sector, dB	14	11	13	11	9	5

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

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground

SBNHH-1D65C

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, frontal	879.0 N @ 150 km/h 197.6 lbf @ 150 km/h
Wind Loading, lateral	273.0 N @ 150 km/h 61.4 lbf @ 150 km/h
Wind Loading, rear	1033.0 N @ 150 km/h 232.2 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Depth	180.0 mm 7.1 in
Length	2453.0 mm 96.6 in
Width	301.0 mm 11.9 in
Net Weight, without mounting kit	22.5 kg 49.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal RET	High band (1) Low band (1)
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

Packed Dimensions

Depth	296.0 mm 11.7 in
Length	2628.0 mm 103.5 in
Width	390.0 mm 15.4 in
Shipping Weight	35.2 kg 77.6 lb

Regulatory Compliance/Certifications

Agency

RoHS 2011/65/EU
China RoHS SJ/T 11364-2006
ISO 9001:2008

Classification

Compliant by Exemption
Above Maximum Concentration Value (MCV)
Designed, manufactured and/or distributed under this quality management system



SBNHH-1D65C

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.

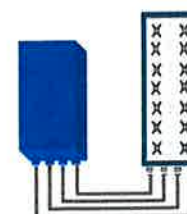


FEATURES

- 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

TECHNICAL SPECIFICATIONS

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
Size (HxWxD) in mm (in.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load (in 2Tx or 4Tx mode)
Environmental conditions	-40°C (-40°F) / +55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	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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ALCATEL-LUCENT B25 RRH4X30

Alcatel-Lucent Band 25 Remote Radio Head 4x30W is the new 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 B25 RRH4x30 allows operators to have a compact radio solution to deploy LTE in the PCS band (1.9 GHz, 3GPP band 25), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B25 RRH4x30 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, LTE carriers from 3 MHz up to 20 MHz and up to 65 MHz instantaneous bandwidth.

The Alcatel-Lucent B25 RRH4x30 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 B25 RRH4x30 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.

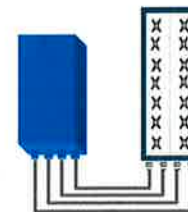


FEATURES

- Supporting LTE in 1.9 GHz band (PCS, 3GPP band 2 & 25)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- Ready for 3, 5, 10, 15 or 20MHz LTE carrier operation with 4Rx Diversity
- Ready to support up to 4 carriers anywhere in 65MHz instantaneous bandwidth
- Convection-cooled (fan-less)
- Supports AISG 2.0 devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in PCS band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Full flexibility for multiple carriers operation over entire PCS spectrum
- Improves downlink spectral efficiency and cell edge throughput through MIMO4
- Increases LTE coverage thanks to 4-way Rx 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

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	3GPP bands 2 & 25 (PCS-G) DL: 1930 - 1995 MHz UL: 1850 - 1915 MHz
Instantaneous bandwidth - #carriers	65MHz – Up to 4 LTE carriers (in 40MHz occupied bandwidth)
LTE carrier bandwidth	3, 5, 10, 15 or 20 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure (3GPP band 2)	2.0 dB typ. (<2.5 dB max)
RX Diversity scheme	2 or 4 way Rx diversity
Sizes (HxWxD)(w/ solar shield) in mm (in.)	538 x 304 x 182 (21.2" x 12.0" x 7.2")
Volume (w/ solar shield) in L	30
Weight (w/ solar shield) in kg (lb)	24 (53)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	580W typical @100% RF load
Environmental conditions	-40°C (-40°F) / +55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	Frontal: <200N / Lateral : <150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5 (> 14dB)
CPRI ports	2 CPRI ports (HW ready for Rate7 / 9.8 Gbps)
AISG interfaces	1 AISG2.0 output (RS485), +24V/2A DC power Integrated Smart Bias Tees (x2)
Misc. Interfaces	1 external alarms connector (4 alarms) 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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B25 RRH4x30

ALCATEL-LUCENT DATA SHEET REV1.1 – JANUARY 2015

ALCATEL-LUCENT B66A RRH4X45

The Alcatel-Lucent B66a Remote Radio Head 4x45 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. Its operational range covers beyond that of B4 (AWS) and B10 (AWS+).

Supporting 2Tx/4Tx MIMO and 2-way/4-way Rx diversity, the Alcatel-Lucent B66a RRH4x45 allows operators to have a compact radio solution to deploy LTE in the 2100 band (3GPP band 4, 10, and 66), providing them with the means to achieve high capacity, high quality, high reliability, large instantaneous bandwidth, and high coverage with minimum site requirements.

The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.



The Alcatel-Lucent B66a RRH4x45 is a compact (near zero-footprint) solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

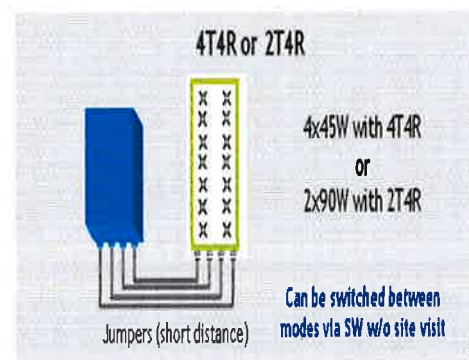
Its compactness and slim design makes the Alcatel-Lucent B66a RRH4x45 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 2110 - 2180 MHz band/DL, 1710-1780MHz/UL (3GPP band 4, 10, and 66a)
- LTE 2Tx or 4Tx MIMO (SW selectable)
- Configuration: 2T2R/2T4R/4T4R
- Output power: Up to 2x90W or 4x45W (SW configurable)
- 70MHz 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 AWS 1-3 band
- Selection of MIMO configuration (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through 4Tx MIMO
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



TECHNICAL SPECIFICATIONS

Features & Performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R selectable by SW)
Frequency band	AWS 1-3, B4/B66a DL: 2110-2180 MHz / UL: 1710-1780 MHz
Instantaneous bandwidth - #carriers	70 MHz – 4 LTE MIMO carriers (in 70 MHz occupied bandwidth)
LTE carrier bandwidth	5, 10, 15, 20 MHz
RF output power	2x90W or 4x45W (selectable by SW)
Noise figure – RX Diversity scheme Receiver Sensivity (FRC A1-3)	2 dB typical (<2.5 dB max) – 2 or 4 way Rx diversity -104.5 dBm maximum
Sizes (HxWxD) in mm (in.)	655x299x182 (25.8x11.8x7.2) (with solar shield) 640x290x160 (25.2x11.4x6.3) (without solar shield)
Volume in Liters	35.5 (with solar shield) 29.7 (without solar shield)
Weight in kg (lb) (w/o mounting HW)	25.8kg (56.8lb) (with solar shield)
DC voltage range	Nominal: -48V, -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	750W typical @100% RF load (in 2Tx or 4Tx mode); Add 58W for 2A*29V for AISG
Environmental conditions	-40°C (-40°F) / +55°C (+131°F) UL50E Type 4 Enclosure
Wind load (@150km/h or 93mph)	250N (56lb) Frontal/150N (34lb) Lateral
Antenna ports	4 ports 4.3-10 female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate 7, 9.8 Gbps) SFP: SMDF (HW supports also SMSF and MMDF)
AISG interfaces	1 AISG 2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-487 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27 / FCC Part 15 / GR-3178-CORE

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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.

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

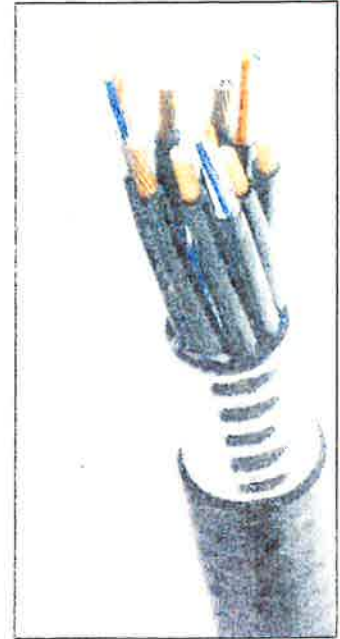


Figure 1: HYBRIFLEX Series

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
Mechanical Properties			
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)
Electrical Properties			
DC-Resistance Outer Conductor Armor		(Ω/km (Ω/1000ft))	0.68 (0.205)
DC-Resistance Power Cable, 8.4mm ² (18AWG)		(Ω/km (Ω/1000ft))	2.1 (0.307)
Optical Properties			
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
DC Power Cable Specifications			
Size (Power)		(mm (AWG))	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		(mm (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, IEC 60332-1-2 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Operating Temperature			
Installation Temperature		(°C (°F))	-40 to +65 (-40 to 149)
Operation Temperature		(°C (°F))	-40 to +65 (-40 to 149)

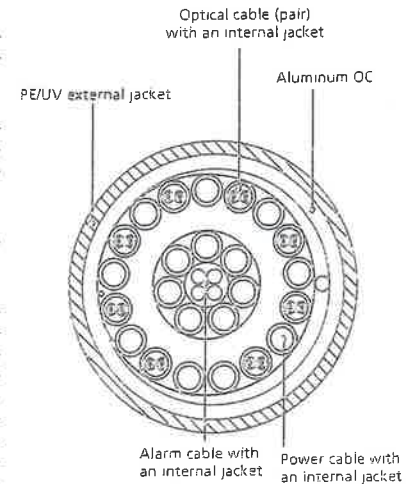


Figure 2: Construction Detail

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

ATTACHMENT 2

Site Name: Norwalk Tower Height: 180'		General		Power		Density					
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total			
*AT&T-UMTS	2	414	103	850	0.0316	0.5667	0.56%				
*AT&T-PCS-UMTS	2	656	103	1900	0.0501	1.0000	0.50%				
*AT&T-GSM	2	409	103	850	0.0313	0.5667	0.55%				
*AT&T-WCS-LTE	2	1833	103	2300	0.1401	1.0000	1.40%				
*AT&T-LTE	2	929	103	700	0.0710	0.4667	1.52%				
*AT&T-PCS-LTE	2	1730	103	1900	0.1322	1.0000	1.32%				
*MetroPCS	7	735	115	2130	0.1557	1.0000	1.56%				
*T-Mobile	4	2334	173	1900/2100	0.1204	1.0000	1.20%				
*T-Mobile	1	865	173	700	0.0112	0.4667	0.24%				
*T-Mobile	6	1167	173	1900/2100	0.0903	1.0000	0.90%				
*Sprint	1	438	148	850	0.0078	0.5667	0.14%				
*Sprint	2	438	148	850	0.0156	0.5667	0.28%				
*Sprint	5	623	148	1900	0.0556	1.0000	0.56%				
*Sprint	2	1556	148	1900	0.0555	1.0000	0.56%				
*Sprint	8	778	148	2500	0.1110	1.0000	1.11%				
Verizon PCS	1	4511	4511	128	0.0990	1.0	9.90%				
Verizon Cellular	3	449	1347	128	0.0296	0.579333	5.10%				
Verizon 850 LTE	1	0	0	128	0.0000	0.586667	0.00%				
Verizon AWS	1	7770	7770	128	0.1705	1.0	17.05%				
Verizon 700	1	3050	3050	128	0.0669	0.497333	13.46%				
* Source: Siting Council											
								57.9%			

ATTACHMENT 3

September 21, 2017

Charles McGuirt
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6607



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Name: Norwalk

Crown Castle Designation: **Crown Castle BU Number:** 807133
Crown Castle Site Name: BRG 134 943057
Crown Castle JDE Job Number: 415246
Crown Castle Work Order Number: 1459311
Crown Castle Application Number: 374095 Rev. 4

Engineering Firm Designation: **B+T Group Project Number:** 82164.003.01

Site Data: **50 Rockland Road Norwalk OFC - MTSO, SO Norwalk,
Fairfield County, CT
Latitude 41° 4' 54.44", Longitude -73° 25' 49.52"
180 Foot - Self Support Tower**

Dear Charles McGuirt,

B+T Group 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 1083194, in accordance with application 374095, revision 4.

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 1 and Table 2 for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

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

We at B+T Group appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Jason Brock, E.I.

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2018

Scott S. Vance, P.E.

tnxTower Report - version 7.0.5.1



9/21/17

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1) INTRODUCTION

This tower is a 180 ft. Self-Support tower designed by Rohn in July of 1987. The tower was originally designed for a wind speed of 85 mph per TIA-222-F. This tower has been modified by Vertical Solutions in November of 2004 and those modifications are incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category C with topographic category 1 and crest height of 0 feet.

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
126.0	128.0	3	Alcatel Lucent	B13 RRH 4X30	1	1-5/8	--
		3	Alcatel Lucent	B25 RRH2x60 PCS			
		3	Alcatel Lucent	B66A RRH4X45			
		6	Commscope	SBNHH-1D65C			
		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
178.0	178.0	2	--	Side Arm Mount [SO 305-1]	--	--	3
176.0	178.0	1	Lcom	HG2409U-PRO	1	1-5/8	2
	176.0	1	--	Side Arm Mount [SO 305-1]			
170.0	173.0	3	Ericsson	AIR -32 B2A/B66AA	13	1-5/8	1
		3	Commscope	LNx-6515DS-VTM			
		3	Ericsson	ERICSSON AIR 21 B2A B4P			
		1	Ericsson	KRY 112 144/1			
		3	Ericsson	RRUS 11 B12			
	172.0	2	Ericsson	KRY 112 144/1			
	170.0	1	--	Sector Mount [SM 702-3]			
157.0	157.0	2	Andrew	VHLP2-18	2	7983A	1
		2	--	Side Arm Mount [SO 203-1]			
148.0	148.0	3	Alcatel Lucent	800 External Notch Filter	4	1-1/4	2
		3	Alcatel Lucent	800MHZ 2X50W RRH			
		6	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
		3	Alcatel Lucent	TD-RRH8x20-25			
		9	Rfs Celwave	ACU-A20-N			
		3	Rfs Celwave	APXVSP18-C-A20			
		3	Rfs Celwave	APXVTM14-ALU-I20			
		1	--	Sector Mount [SM 502-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
143.0	145.0	3	Rfs Celwave	APXVSP18-C-A20	3	1-1/4	4
		3	Alcatel Lucent	TME-800MHZ 2X50W RRH			
	143.0	9	Rfs Celwave	ACU-A20-N			
		3	Alcatel Lucent	800 External Notch Filter			
		1	--	Side Arm Mount [SO 601-3]			
	1	--	Side Arm Mount [SO 701-3]				
142.0	6	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz				
134.0	136.0	1	Andrew	VHLP2-23	6	5/16 1/2	1
	134.0	3	Samsung Telecom.	RRH-2WB			
		3	Argus Tech.	LLPX310R			
		1	--	Sector Mount [SM 504-3]			
126.0	130.0	1	Gps	GPS_A	1	1/2	1
	128.0	3	Alcatel Lucent	RRH2X40-AWS	1	1-5/8	4
		2	Andrew	LNX-6514DS-T4M			
		1	Commscope	HBX-6516DS-VTM			
		1	Powerwave Tech.	P65.16.XL.2			
		2	Rymrsa Wireless	MG D3-800TV			
		1	Rfs Celwave	DB-T1-6Z-8AB-0Z			
	126.0	4	Decibel	DB844G65ZAXY	18	1-5/8	1
2		Decibel	DB844H80-XY				
112.0	112.0	1	--	Sector Mount [SM 411-3]	6	1-5/8	1
		3	Kathrein	800 10504			
102.0	102.0	1	--	Sector Mount [SM 104-3]	2	5/8 3/8	2
		6	Cci Antennas	TPX-070821			
		3	Ericsson	RRUS 32			
		3	Ericsson	RRUS 32 B2			
		3	Quintel Tech.	QS66512-2			
		1	Raycap	DC6-48-60-18-8F			
		3	Ericsson	RRUS 11 B2			
		3	Powerwave Tech.	7770.00			
		6	Powerwave Tech.	LGP2140X			
		3	Powerwave Tech.	P65-16-XLH-RR			
		1	Raycap	DC6-48-60-18-8F			
		1	--	Sector Mount [SM 301-3]			
12.0	12.0	1	Gps	GPS_A	2	1/2	1
		1	--	Side Arm Mount [SO 701-1]			

- Notes:
 1) Existing Equipment
 2) Reserved Equipment
 3) Empty Mount; Considered In This Analysis
 4) Equipment To Be Removed; Not Considered In This Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
217	217	4	Celwave	PD10017	--	--
		4	Generic	3' Side Arm		
207	207	6	Celwave	PD1132	--	--
		3	Generic	6' Side Arm		
180	180	3	Generic	8' Dish	--	--
170	170	1	Generic	8' Dish	--	--
156	156	1	Generic	8' Dish	--	--
150	150	1	Generic	8' Dish	--	--
130	130	1	Celwave	PD1109	--	--
		1	Generic	6' Side Arm		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon wireless Co-Locate, Rev# 4	374095	CCI Sites
Tower Manufacturer Drawings	Rohn, File No. 22678JC	392878	CCI Sites
Tower Modification Drawing	VSI, Date: 11/07/2004	1257479	CCI Sites
Post-Modification Inspection	All Points Technology, Date: 11/07/2004	4065020	CCI Sites
Foundation Drawings	PJF, Project No. 31298-49	821566	CCI Sites
Geotech Report	FDH, Project No. 08-07100E G1	2311843	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 09/15/2017	CCI Sites

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) Mount areas and weights are assumed based on photographs provided.
- 5) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically, and must be replaced if damaged or cracked. Refer to crown document ENG-BUL-10122, Tower Base Plate Grout Inspection and Classification.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-10.249	110.608	9.3	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-15.291	159.906	9.6	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-22.760	159.905	14.2	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-31.078	159.906	19.4	Pass
T5	140 - 120	Leg	ROHN 5 EH	67	-64.815	239.378	27.1	Pass
T6	120 - 100	Leg	ROHN 6 EHS	88	-107.629	274.776	39.2	Pass
T7	100 - 80	Leg	ROHN 6 EH	109	-150.195	303.717	49.5	Pass
T8	80 - 70	Leg	ROHN 8 EHS	124	-172.992	386.395	44.8	Pass
T9	70 - 60	Leg	ROHN 8 EHS	133	-196.458	386.395	50.8	Pass
T10	60 - 40	Leg	ROHN 8 EHS	142	-243.125	386.397	62.9	Pass
T11	40 - 20	Leg	ROHN 8 EH	157	-289.692	505.555	57.3	Pass
T12	20 - 0	Leg	ROHN 8 EH	172	-336.251	505.555	66.5	Pass
T1	180 - 160	Diagonal	L2x2x3/16	13	-2.211	7.596	29.1	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-2.860	14.879	19.2 24.4 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-3.656	13.455	27.2 30.5 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-4.920	12.208	40.3 42.5 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	75	-7.660	9.388	81.6	Pass
T6	120 - 100	Diagonal	L3x3x1/4	96	-9.662	13.205	73.2 77.8 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	116	-11.938	14.200	84.1 85.0 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	131	-12.602	13.254	95.1	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	136	-13.551	52.808	25.7 66.2 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	145	-14.352	15.477	92.7 99.4 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	160	-15.268	16.206	94.2	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	175	-16.497	62.958	26.2 80.3 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.082	3.180	2.6	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	48	-0.192	3.058	6.3 6.6 (b)	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	59	0.272	16.822	1.6 4.8 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.461	2.328	19.8	Pass
							Summary	
							Leg (T12)	66.5 Pass
							Diagonal (T10)	99.4 Pass
							Top Girt (T3)	6.6 Pass
							Mid Girt (T1)	19.8 Pass
							Bolt Checks	99.4 Pass
							Rating =	99.4 Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	61.2	Pass
1	Base Foundation	Base	95.8	Pass
Structure Rating (max from all components) =				99.4%

Notes:

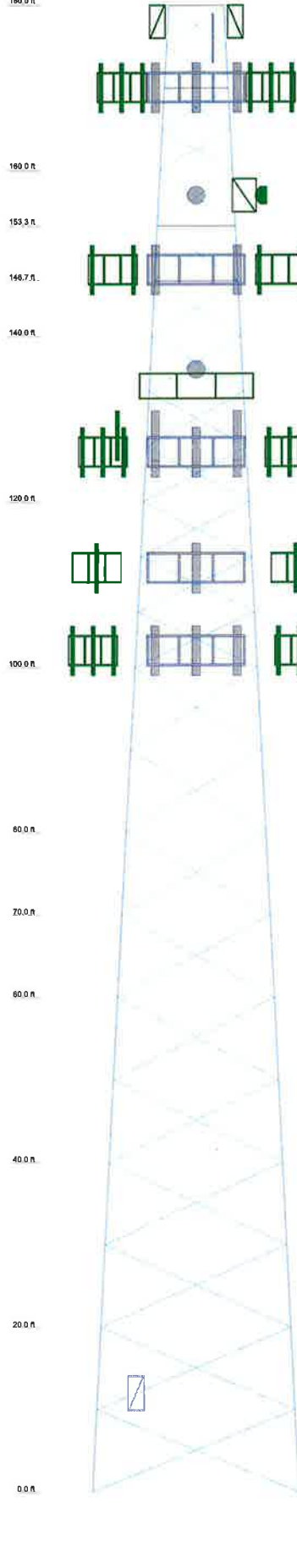
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry Final load configuration. No modifications are required at this time.

APPENDIX A
TNXTOWER OUTPUT

Section	110	100	90	80	70	60	50	40	30	20	10	0
Legs	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH	ROHN 8 EH
Leg Grade	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36
Diagonals	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4	L4x4x1/4
Top Chns	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36
Mid Chns	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Face Width (")	25	21	19	17	16	15	14	13	12	11	10	10 @ 10
# Panels @ (")	4	4	4	4	4	4	4	4	4	4	4	4 @ 5
Weight (K)	31.3	27.8	24.8	22.3	20.0	18.0	16.3	14.9	13.7	12.6	11.6	6.897



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Side Arm Mount (SO 306-1) (E)	178	(2) SBNH-1065C w/ Mount Pipe (P)	126
Side Arm Mount (SO 306-1) (E)	178	B25 RRH260 PCS (P)	126
H2600-9-PRO (R)	178	B25 RRH260 PCS (P)	126
Side Arm Mount (SO 306-1) (R)	178	B25 RRH260 PCS (P)	126
LNK-6516DS-VTM w/ Mount Pipe (E)	170	866A RRH4345 (P)	126
LNK-6516DS-VTM w/ Mount Pipe (E)	170	866A RRH4345 (P)	126
LNK-6516DS-VTM w/ Mount Pipe (E)	170	866A RRH4345 (P)	126
ERICSSON AIR 21 82A B4P w/ Mount Pipe (E)	170	B13 RRH 4X30 (P)	126
ERICSSON AIR 21 82A B4P w/ Mount Pipe (E)	170	B13 RRH 4X30 (P)	126
ERICSSON AIR 21 82A B4P w/ Mount Pipe (E)	170	B13 RRH 4X30 (P)	126
RRUS 11 B12 (E)	170	DB-T1-62-8A8-02 (P)	126
RRUS 11 B12 (E)	170	6" x 2" Mount Pipe (E)	126
RRUS 11 B12 (E)	170	6" x 2" Mount Pipe (E)	126
KRY 112 1441 (E)	170	6" x 2" Pipe Mount (E)	126
KRY 112 1441 (E)	170	Sector Mount (SM 411-3) (E)	126
KRY 112 1441 (E)	170	Pipe Mount (PM 601-3) (E-Mount attach)	126
AIR -32 82A/B66AA w/ Mount Pipe (R)	170	(2) DB844G66ZAXY w/ Mount Pipe (E)	126
AIR -32 82A/B66AA w/ Mount Pipe (R)	170	(2) DB844G66ZAXY w/ Mount Pipe (E)	126
AIR -32 82A/B66AA w/ Mount Pipe (R)	170	DB844H80-XY w/ Mount Pipe (E)	126
6" x 2" Mount Pipe (E-per photo)	170	6" x 2" Mount Pipe (E)	112
6" x 2" Mount Pipe (E-per photo)	170	6" x 2" Mount Pipe (E)	112
6" x 2" Mount Pipe (E-per photo)	170	6" x 2" Mount Pipe (E)	112
Sector Mount (SM 702-3) (E)	170	Sector Mount (SM 104-3) (E)	112
Side Arm Mount (SO 203-1) (E-per photo)	167	800 10504 w/ Mount Pipe (E)	112
Side Arm Mount (SO 203-1) (E-per photo)	167	800 10504 w/ Mount Pipe (E)	112
VHL P2-18 (E-AZ, Per photo)	167	800 10504 w/ Mount Pipe (E)	112
VHL P2-18 (E-AZ, Per photo)	167	P65-16-30-L-R w/ Mount Pipe (E)	102
APXVTM14-ALU-120 w/ Mount Pipe (R)	148	P65-16-30-L-R w/ Mount Pipe (E)	102
APXVBP18-C-A20 w/ Mount Pipe (R)	148	P65-16-30-L-R w/ Mount Pipe (E)	102
APXVBP18-C-A20 w/ Mount Pipe (R)	148	(2) LGP2140X (E)	102
APXVBP18-C-A20 w/ Mount Pipe (R)	148	(2) LGP2140X (E)	102
(2) PCS 1900MHz 4x45W-65MHz (R)	148	(2) LGP2140X (E)	102
(2) PCS 1900MHz 4x45W-65MHz (R)	148	RRUS 11 B2 (E)	102
(2) PCS 1900MHz 4x45W-65MHz (R)	148	RRUS 11 B2 (E)	102
800MHz 2X50W RRH (R)	148	RRUS 11 B2 (E)	102
800MHz 2X50W RRH (R)	148	OC8-48-60-18-8F (R)	102
800MHz 2X50W RRH (R)	148	OS6612-2 w/ Mount Pipe (R)	102
TD-RRH120-28 (R)	148	OS6612-2 w/ Mount Pipe (R)	102
TD-RRH120-28 (R)	148	OS6612-2 w/ Mount Pipe (R)	102
TD-RRH120-28 (R)	148	(2) TPX-070621 (R)	102
(2) R00 EXTERNAL NOTCH FILTER (R)	148	(2) TPX-070621 (R)	102
(8) ACU-A20-N (R)	148	(2) TPX-070621 (R)	102
Sector Mount (SM 502-3) (R)	148	OC8-48-60-18-8F (R)	102
APXVTM14-ALU-120 w/ Mount Pipe (R)	148	RRUS 32 (R)	102
APXVTM14-ALU-120 w/ Mount Pipe (R)	148	RRUS 32 (R)	102
LLPX310R w/ Mount Pipe (E-CL Per photo)	134	RRUS 32 (R)	102
RRH-2WB (E)	134	RRUS 32 (R)	102
RRH-2WB (E)	134	RRUS 32 (R)	102
RRH-2WB (E)	134	RRUS 32 (R)	102
J - Box (E-Per photo)	134	6" x 2" Mount Pipe (E-PER PHOTO)	102
(3) 6" x 2" Mount Pipe (E-PER PHOTO)	134	6" x 2" Mount Pipe (E-PER PHOTO)	102
(3) 6" x 2" Mount Pipe (E-PER PHOTO)	134	6" x 2" Mount Pipe (E-PER PHOTO)	102
(3) 6" x 2" Mount Pipe (E-PER PHOTO)	134	6" x 2" Mount Pipe (E-PER PHOTO)	102
6" x 2" Mount Pipe (E-PER PHOTO)	134	6" x 2" Mount Pipe (E-PER PHOTO)	102
Sector Mount (SM 604-3) (E)	134	6" x 2" Mount Pipe (E-PER PHOTO)	102
LLPX310R w/ Mount Pipe (E-CL Per photo)	134	Sector Mount (SM 301-3) (E)	102
LLPX310R w/ Mount Pipe (E-CL Per photo)	134	7770.00 w/ Mount Pipe (E)	102
LLPX310R w/ Mount Pipe (E-CL Per photo)	134	7770.00 w/ Mount Pipe (E)	102
VHL P2-23 (E-CL Per photo)	134	7770.00 w/ Mount Pipe (E)	102
DB844H80-XY w/ Mount Pipe (E)	126	Side Arm Mount (SO 761-1) (E-Per Photo)	12
GPS_A (E)	126	GPS_A (E-Per Photo)	12
DB-T1-62-8A8-02 (E)	126	7" x 2" Pipe Mount (E-Per Photo)	12
(2) SBNH-1065C w/ Mount Pipe (P)	126	Omni (E-Per Photo)	12
(2) SBNH-1065C w/ Mount Pipe (P)	126		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

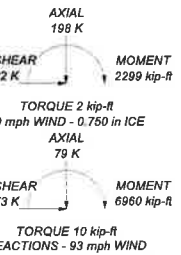
TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0'
8. TOWER RATING: 99.4%

ALL REACTIONS ARE FACTORED

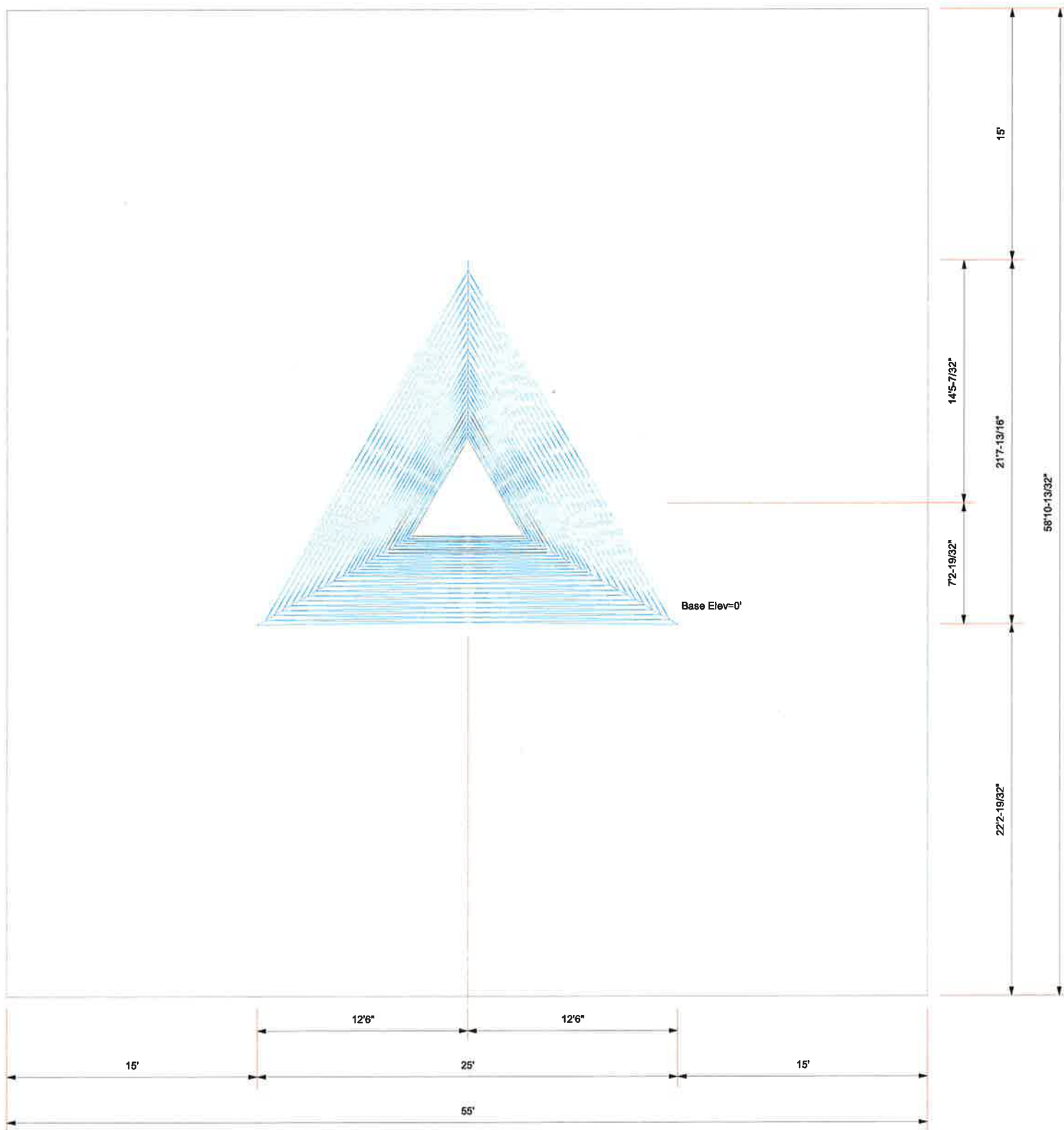
MAX. CORNER REACTIONS AT BASE:
DOWN: 348 K
SHEAR: 45 K

UPLIFT: -287 K
SHEAR: 38 K



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Plot Plan
Total Area - 0.07 Acres



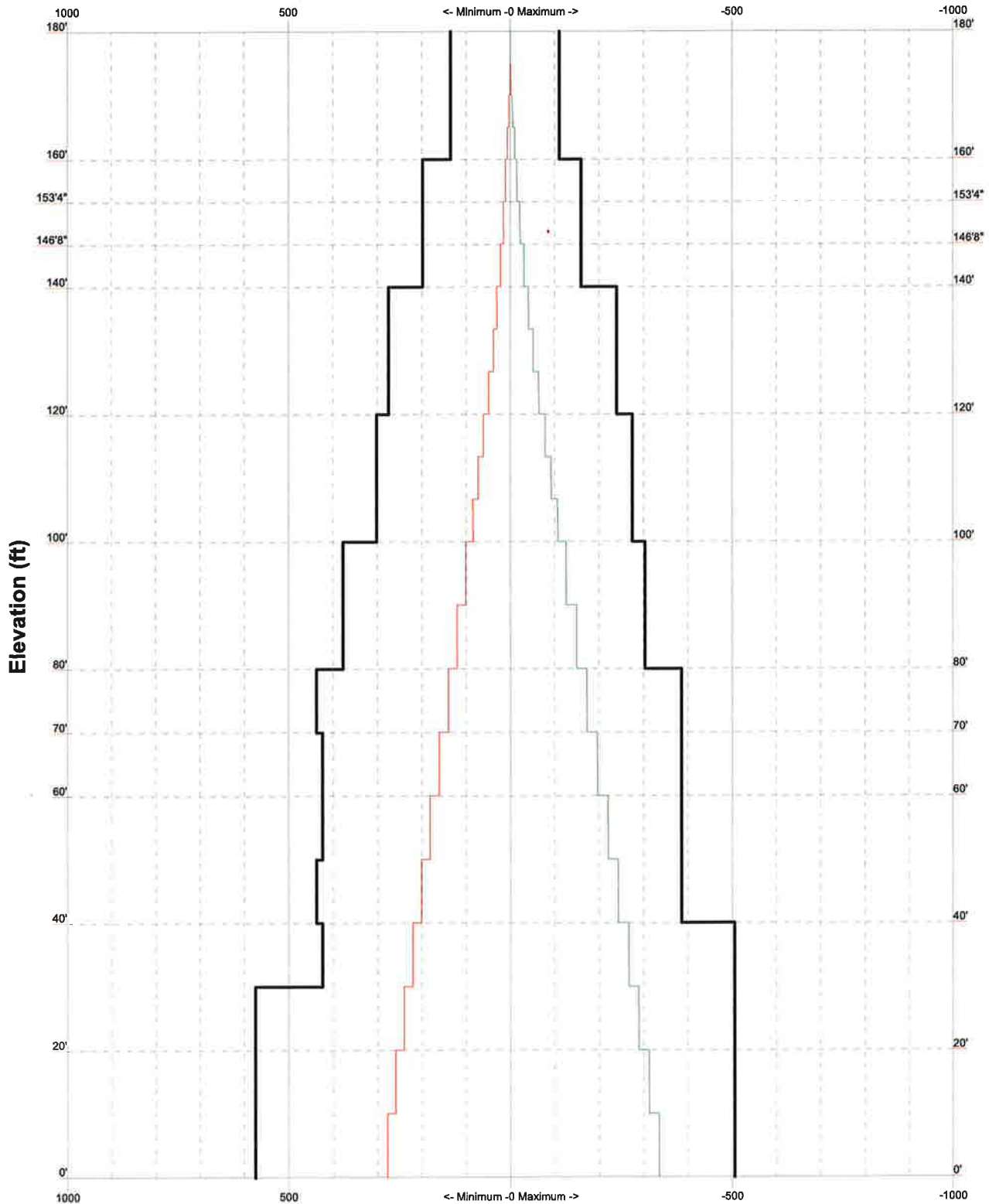
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Job: 82164.003.01 - BRG 134 943057, CT (BU# 807)			
Project:			
Client: Crown Castle	Drawn by: Nithin P Amin	App'd:	
Code: TIA-222-G	Date: 09/20/17	Scale: NTS	
Path:		Dwg No: E-2	

TIA-222-G - 93 mph/50 mph 0.750 in Ice Exposure C

Leg Capacity ———

Leg Compression (K)



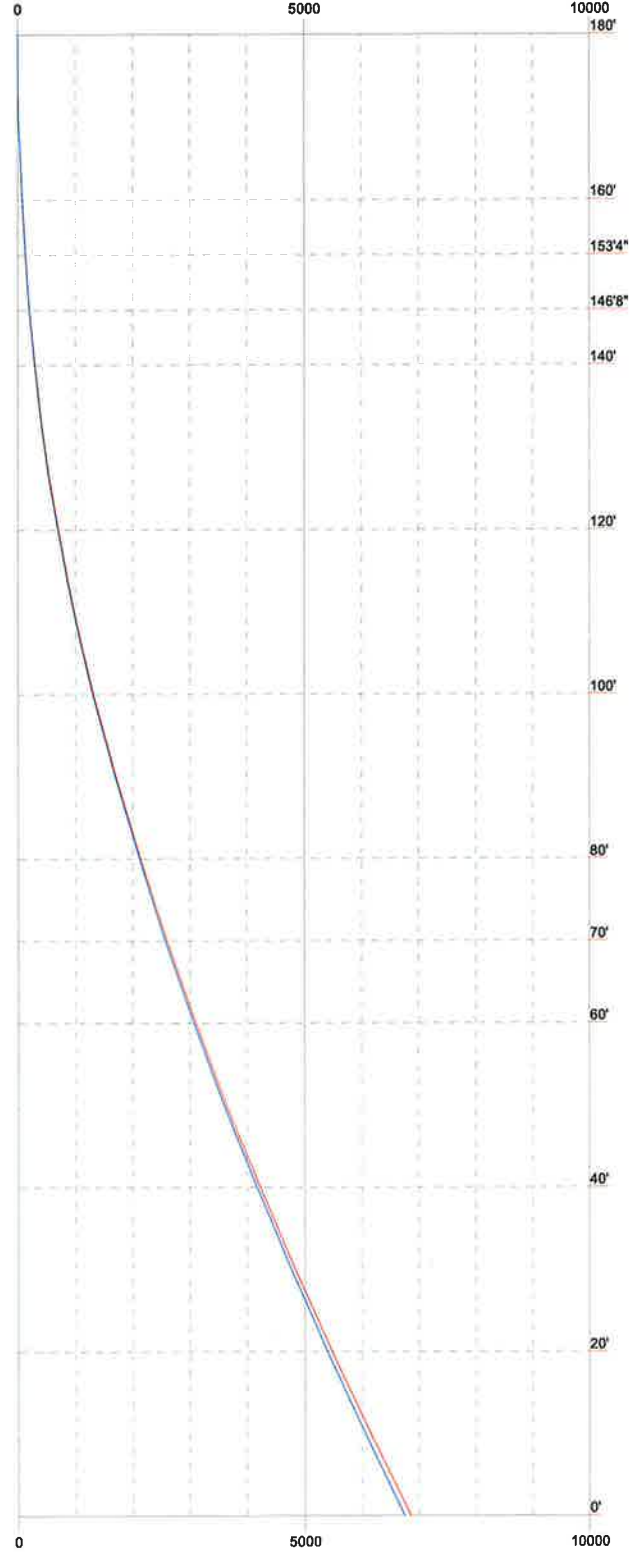
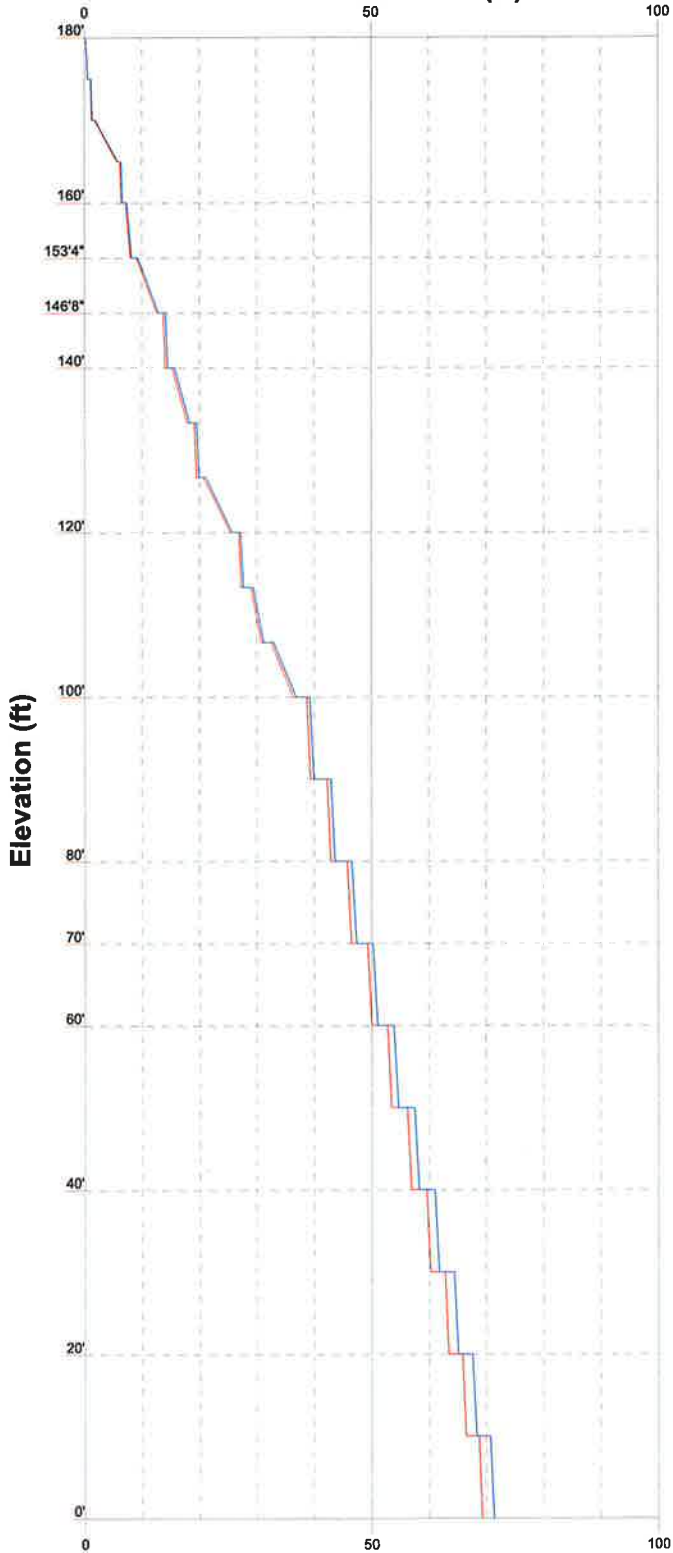
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	<p>Project:</p>		
	<p>Client: Crown Castle</p>	<p>Drawn by: Nithin P Amin</p>	<p>App'd:</p>
	<p>Code: TIA-222-G</p>	<p>Date: 09/20/17</p>	<p>Scale: NTS</p>
	<p>Path:</p>	<p>Dwg No: E-3</p>	

Vx Vz

Mx Mz

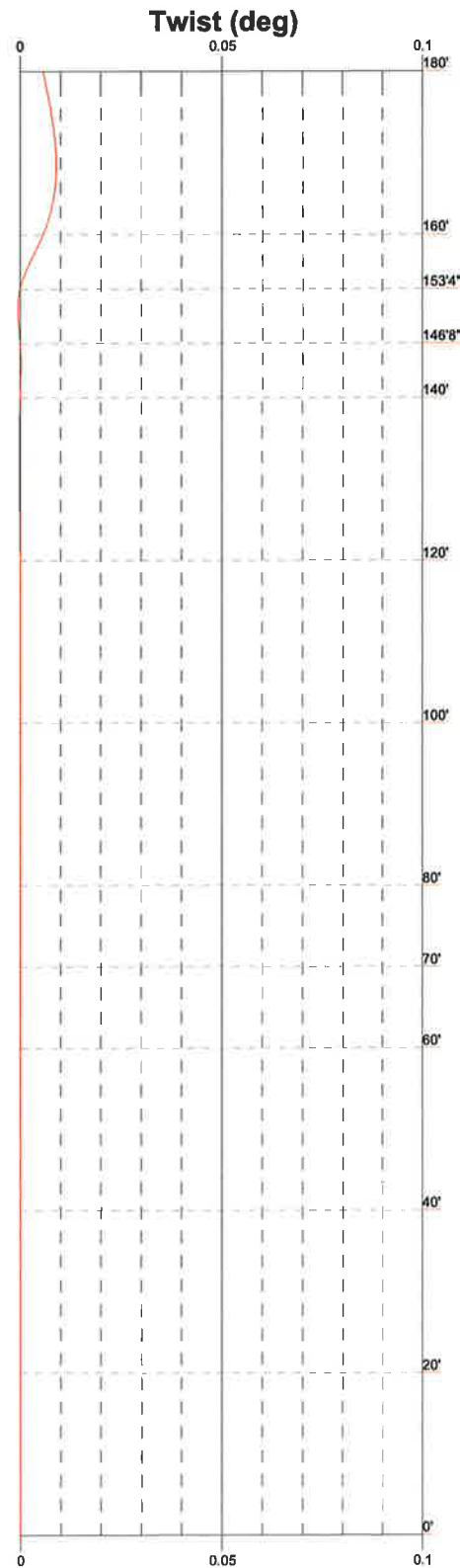
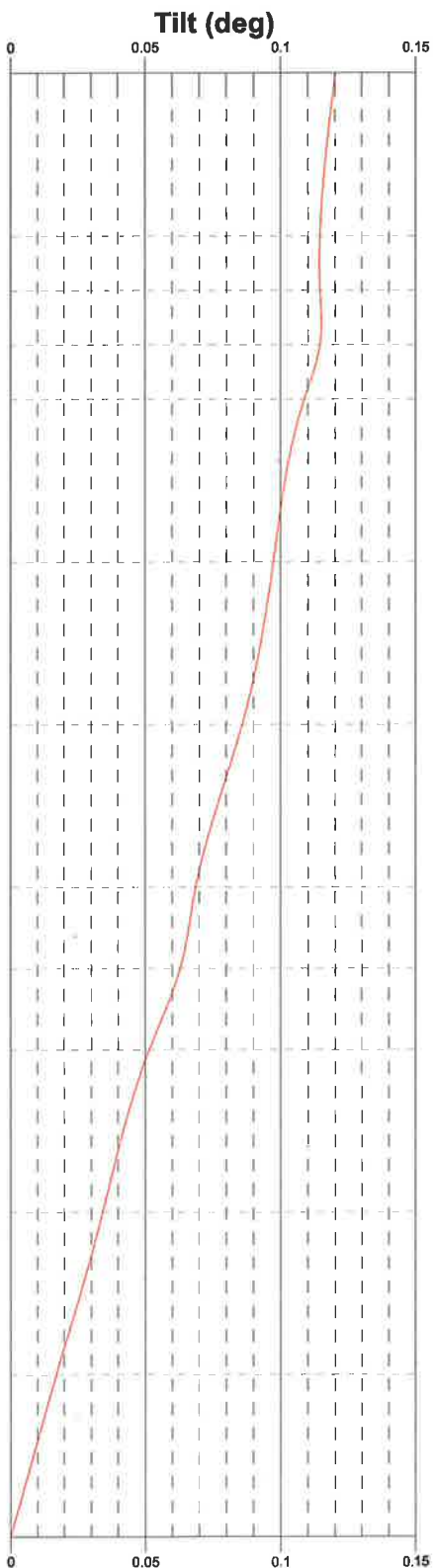
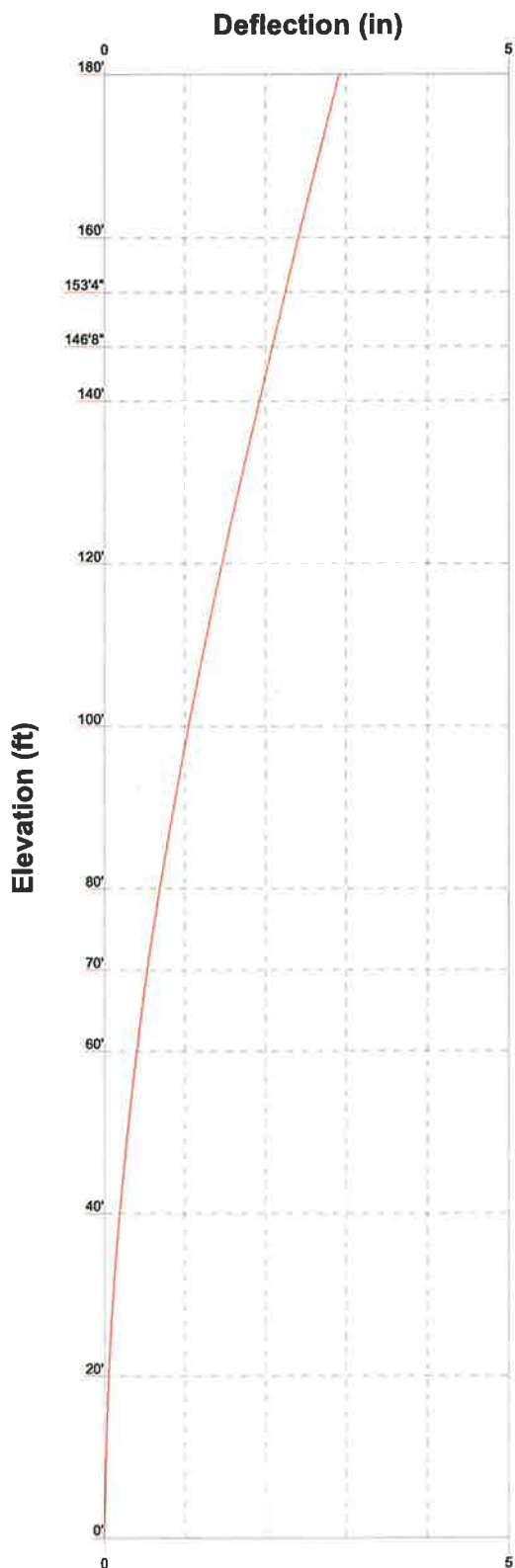
Global Mast Shear (K)

Global Mast Moment (kip-ft)



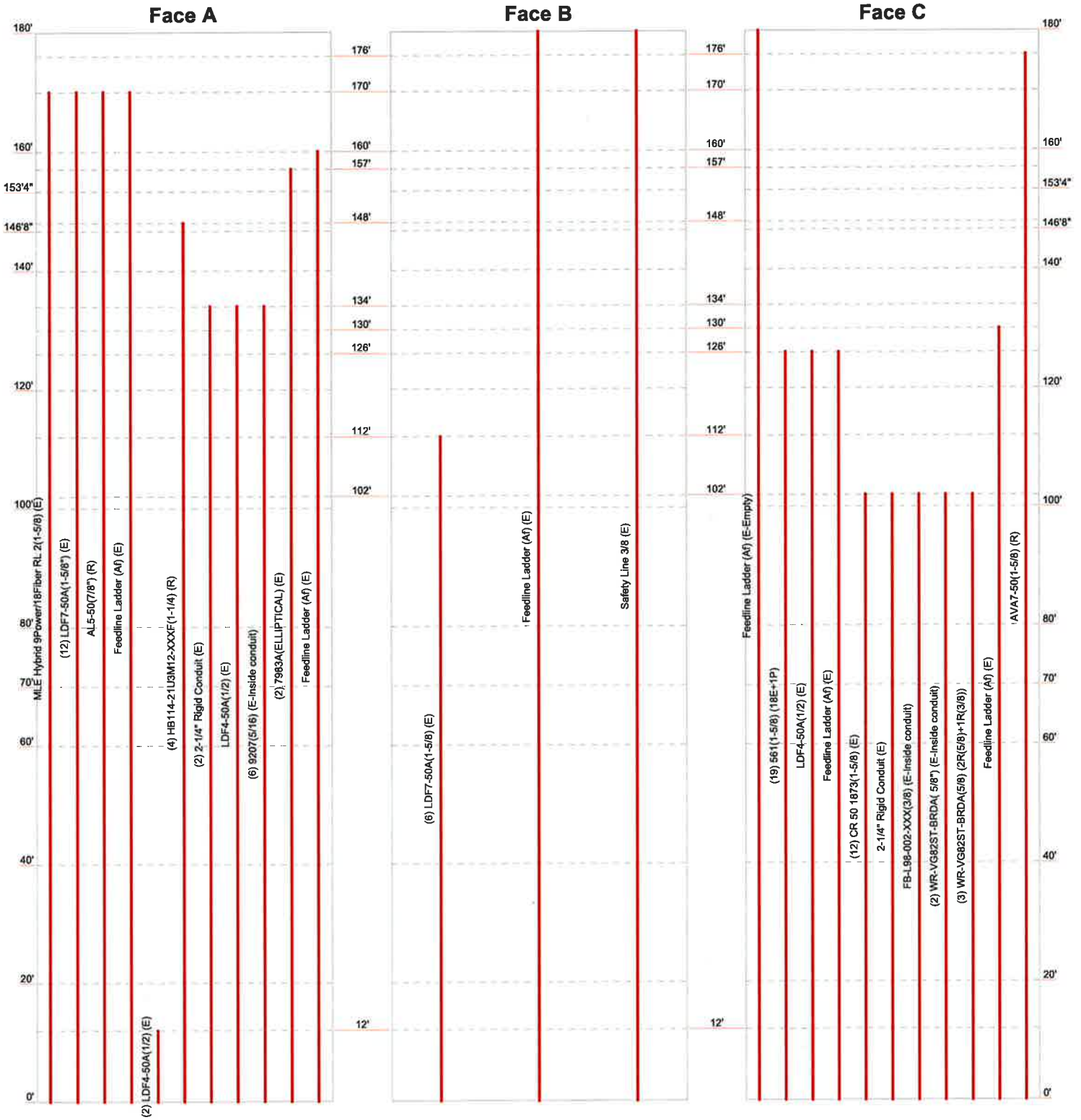
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Job: 82164.003.01 - BRG 134 943057, CT (BU# 807)			
Project:	Client: Crown Castle	Drawn by: Nithin P Amin	App'd:
Code: TIA-222-G	Date: 09/20/17	Scale: NTS	Dwg No: E-4
Path:			



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	Project:		
	Client: Crown Castle	Drawn by: Nithin P Amin	App'd:
	Code: TIA-222-G	Date: 09/20/17	Scale: NTS
	Path:		Dwg No: E-5

Elevation (ft)



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Job: 82164.003.01 - BRG 134 943057, CT (BU# 807)			
Project:			
Client: Crown Castle	Drawn by: Nithin P Amin	App'd:	
Code: TIA-222-G	Date: 09/20/17	Scale: NTS	
Path:		Dwg No. E-7	

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	Client Crown Castle	Designed by Nithin P Amin

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180' above the ground line.

The base of the tower is set at an elevation of 0' above the ground line.

The face width of the tower is 6'8-1/4" at the top and 25' at the base.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 93 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0'.

Nominal ice thickness of 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 60 mph.

Pressures are calculated at each section.

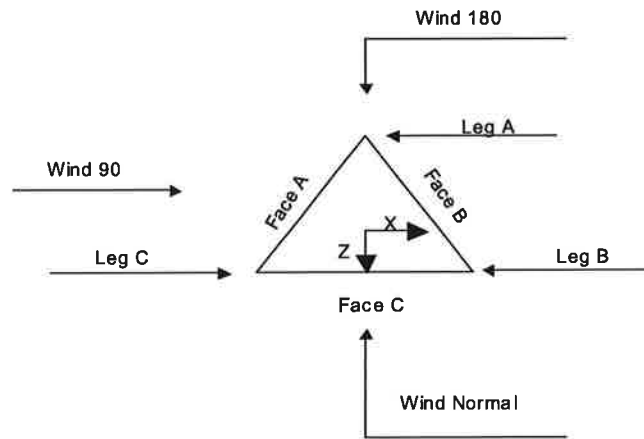
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA √ SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque √ Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <li style="padding-left: 40px;">Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

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Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180'-160'			6'8-1/4"	1	20'
T2	160'-153'4"			8'9-1/8"	1	6'8"
T3	153'4"-146'8"			9'5-13/32"	1	6'8"
T4	146'8"-140'			10'1-23/32"	1	6'8"
T5	140'-120'			10'10"	1	20'
T6	120'-100'			12'11"	1	20'
T7	100'-80'			14'10-1/4"	1	20'
T8	80'-70'			16'11-7/8"	1	10'
T9	70'-60'			17'11-15/16"	1	10'
T10	60'-40'			19'	1	20'
T11	40'-20'			21'	1	20'
T12	20'-0'			23'	1	20'

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180'-160'	5'	X Brace	No	No	0.000	0.000
T2	160'-153'4"	6'8"	X Brace	No	No	0.000	0.000
T3	153'4"-146'8"	6'8"	X Brace	No	No	0.000	0.000

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Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T4	146'8"-140'	6'8"	X Brace	No	No	0.000	0.000
T5	140'-120'	6'8"	X Brace	No	No	0.000	0.000
T6	120'-100'	6'8"	X Brace	No	No	0.000	0.000
T7	100'-80'	10'	X Brace	No	No	0.000	0.000
T8	80'-70'	10'	X Brace	No	No	0.000	0.000
T9	70'-60'	10'	X Brace	No	No	0.000	0.000
T10	60'-40'	10'	X Brace	No	No	0.000	0.000
T11	40'-20'	10'	X Brace	No	No	0.000	0.000
T12	20'-0'	10'	X Brace	No	No	0.000	0.000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180'-160'	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T2 160'-153'4"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 153'4"-146'8"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 146'8"-140'	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 140'-120'	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 120'-100'	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T7 100'-80'	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 80'-70'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 70'-60'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x3/8	A36 (36 ksi)
T10 60'-40'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A572-50 (50 ksi)
T11 40'-20'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T12 20'-0'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Double Equal Angle	2L4x4x5/16x3/8	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180'-160'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 153'4"-146'8"	Equal Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 146'8"-140'	Single Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

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	Client Crown Castle	Designed by Nithin P Amin

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹								
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
			X Y	X Y	X Y	X Y	X Y	X Y	X Y	X Y	
T2 160'-153'4"	Yes	No	1	1	1	1	1	1	1	1	1
T3 153'4"-146'8"	Yes	No	1	1	1	1	1	1	1	1	1
T4 146'8"-140'	Yes	No	1	1	1	1	1	1	1	1	1
T5 140'-120'	Yes	No	1	1	1	1	1	1	1	1	1
T6 120'-100'	Yes	No	1	1	1	1	1	1	1	1	1
T7 100'-80'	Yes	No	1	1	1	1	1	1	1	1	1
T8 80'-70'	Yes	No	1	1	1	1	1	1	1	1	1
T9 70'-60'	Yes	No	1	1	1	1	1	1	1	1	1
T10 60'-40'	Yes	No	1	1	1	1	1	1	1	1	1
T11 40'-20'	Yes	No	1	1	1	1	1	1	1	1	1
T12 20'-0'	Yes	No	1	1	1	1	1	1	1	1	1

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180'-160'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 160'-153'4"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 153'4"-146'8"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 146'8"-140'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 140'-120'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 120'-100'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 100'-80'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 80'-70'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 70'-60'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 60'-40'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 40'-20'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 20'-0'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry (cont'd)

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Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180'-160'	Flange	0.875	4	0.625	1	0.625	1	0.000	0	0.625	1	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325N		A325X		A325N	
T2 160'-153'4"	Flange	0.000	0	0.625	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T3 153'4"-146'8"	Flange	0.000	0	0.625	1	0.625	1	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T4 146'8"-140'	Flange	1.000	4	0.625	1	0.625	1	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T5 140'-120'	Flange	1.000	6	0.625	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T6 120'-100'	Flange	1.000	6	0.625	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T7 100'-80'	Flange	1.000	8	0.750	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T8 80'-70'	Flange	0.000	0	0.750	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T9 70'-60'	Flange	1.000	8	0.750	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T10 60'-40'	Flange	1.000	8	0.750	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T11 40'-20'	Flange	1.000	8	0.750	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A325N		A325N		A325N		A325X		A325X		A325X		A325N	
T12 20'-0'	Flange	1.000	0	0.750	1	0.000	0	0.000	0	0.625	0	0.625	0	0.625	0
		A449		A325N		A325N		A325X		A325X		A325X		A325N	

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
LDF7-50A(1-5/8) (E)	B	No	Ar (CaAa)	112' - 0'	0.000	0.36	6	6	0.750	1.980		0.001
Feedline Ladder (Af) (E) ***	B	No	Af (CaAa)	180' - 0'	0.000	0.38	1	1	3.000	3.000		0.008
MLE Hybrid 9Power/18Fiber RL 2(1-5/8) (E)	A	No	Ar (CaAa)	170' - 0'	5.500	0.2	1	1	0.850 0.750	1.625		0.001
LDF7-50A(1-5/8") (E)	A	No	Ar (CaAa)	170' - 0'	0.000	0.25	12	9	2.000 0.750	1.980		0.001
AL5-50(7/8") (R)	A	No	Ar (CaAa)	170' - 0'	2.000	0.24	1	1	0.850 0.750	1.100		0.000
Feedline Ladder (Af) (E) ***	A	No	Af (CaAa)	170' - 0'	0.000	0.25	1	1	3.000	3.000		0.008
LDF4-50A(1/2) (E)	A	No	Ar (CaAa)	12' - 0'	0.000	0.31	2	2	0.500	0.630		0.000

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*** HB114-21U3 M12-XXXXF(1 -1/4) (R) ***	A	No	Ar (CaAa)	148' - 0'	0.000	-0.36	4	2	0.850 0.750	1.540		0.001
2-1/4" Rigid Conduit (E)	A	No	Ar (CaAa)	134' - 0'	0.000	-0.38	2	2	0.850 0.750	2.250		0.003
LDF4-50A(1/ 2) (E)	A	No	Ar (CaAa)	134' - 0'	0.000	-0.395	1	1	0.850 0.750	0.630		0.000
9207(5/16) (E-Inside conduit)	A	No	Ar (CaAa)	134' - 0'	0.000	-0.38	6	6	0.200 0.250	0.330		0.001
7983A(ELLIP TICAL) (E)	A	No	Ar (CaAa)	157' - 0'	0.000	-0.405	2	1	0.573	0.573		0.000
Feedline Ladder (Af) (E) ***	A	No	Af (CaAa)	160' - 0'	0.000	-0.36	1	1	3.000	3.000		0.008
Feedline Ladder (Af) (E-Empty) ***	C	No	Af (CaAa)	180' - 0'	0.000	-0.4	1	1	3.000	3.000		0.008
561(1-5/8) (18E+1P)	C	No	Ar (CaAa)	126' - 0'	-2.500	-0.4	19	12	0.850 0.750	1.625		0.001
LDF4-50A(1/ 2) (E)	C	No	Ar (CaAa)	126' - 0'	-1.000	-0.455	1	1	0.850 0.750	0.630		0.000
Feedline Ladder (Af) (E) ***	C	No	Af (CaAa)	126' - 0'	-2.000	-0.4	1	1	3.000	3.000		0.008
CR 50 1873(1-5/8) (E)	C	No	Ar (CaAa)	102' - 0'	0.000	0.42	12	8	0.750	1.980		0.001
2-1/4" Rigid Conduit (E)	C	No	Ar (CaAa)	102' - 0'	2.000	0.43	1	1	2.250	2.250		0.003
FB-L98-002- XXX(3/8) (E-Inside conduit)	C	No	Ar (CaAa)	102' - 0'	2.000	0.43	1	1	0.394	0.394		0.000
WR-VG82ST- BRDA(5/8") (E-Inside conduit)	C	No	Ar (CaAa)	102' - 0'	2.000	0.43	2	2	0.500	0.645		0.000
WR-VG82ST- BRDA(5/8) (2R(5/8)+1R(3 /8))	C	No	Ar (CaAa)	102' - 0'	2.000	0.45	3	2	0.750	0.645		0.000
Feedline Ladder (Af) (E) ***	C	No	Af (CaAa)	130' - 0'	0.000	0.4	1	1	3.000	3.000		0.008
AVA7-50(1-5/ 8) (R) ***	C	No	Ar (CaAa)	176' - 0'	0.000	0	1	1	0.850 0.750	2.010		0.001

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
Safety Line 3/8 (E) ***	B	No	Ar (CaAa)	180' - 0'	0.000	0.5	1	1	0.375	0.375		0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA} ft ² /ft	Weight klf

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
T1	180'-160'	A	0.000	0.000	31.485	0.000	0.196
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	13.216	0.000	0.179
T2	160'-153'4"	A	0.000	0.000	24.744	0.000	0.187
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	4.673	0.000	0.061
T3	153'4"-146'8"	A	0.000	0.000	25.909	0.000	0.194
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	4.673	0.000	0.061
T4	146'8"-140'	A	0.000	0.000	29.194	0.000	0.220
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	4.673	0.000	0.061
T5	140'-120'	A	0.000	0.000	97.536	0.000	0.797
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	40.923	0.000	0.471
T6	120'-100'	A	0.000	0.000	101.802	0.000	0.855
		B	0.000	0.000	25.006	0.000	0.231
		C	0.000	0.000	102.956	0.000	1.063
T7	100'-80'	A	0.000	0.000	101.802	0.000	0.855
		B	0.000	0.000	34.510	0.000	0.271
		C	0.000	0.000	156.287	0.000	1.325
T8	80'-70'	A	0.000	0.000	50.901	0.000	0.428
		B	0.000	0.000	17.255	0.000	0.135
		C	0.000	0.000	78.144	0.000	0.663
T9	70'-60'	A	0.000	0.000	50.901	0.000	0.428
		B	0.000	0.000	17.255	0.000	0.135
		C	0.000	0.000	78.144	0.000	0.663
T10	60'-40'	A	0.000	0.000	101.802	0.000	0.855
		B	0.000	0.000	34.510	0.000	0.271
		C	0.000	0.000	156.287	0.000	1.325
T11	40'-20'	A	0.000	0.000	101.802	0.000	0.855
		B	0.000	0.000	34.510	0.000	0.271
		C	0.000	0.000	156.287	0.000	1.325
T12	20'-0'	A	0.000	0.000	103.314	0.000	0.859
		B	0.000	0.000	34.510	0.000	0.271
		C	0.000	0.000	156.287	0.000	1.325

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Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
T1	180'-160'	A	1.767	0.000	0.000	66.145	0.000	1.201
		B		0.000	0.000	24.888	0.000	0.522
		C		0.000	0.000	25.940	0.000	0.567
T2	160'-153'4"	A	1.753	0.000	0.000	52.719	0.000	0.974
		B		0.000	0.000	8.258	0.000	0.173
		C		0.000	0.000	9.348	0.000	0.199
T3	153'4"-146'8"	A	1.745	0.000	0.000	56.868	0.000	1.028
		B		0.000	0.000	8.237	0.000	0.172
		C		0.000	0.000	9.327	0.000	0.198
T4	146'8"-140'	A	1.737	0.000	0.000	63.722	0.000	1.136
		B		0.000	0.000	8.216	0.000	0.171
		C		0.000	0.000	9.306	0.000	0.197
T5	140'-120'	A	1.720	0.000	0.000	227.614	0.000	3.888
		B		0.000	0.000	24.513	0.000	0.508
		C		0.000	0.000	68.584	0.000	1.484
T6	120'-100'	A	1.692	0.000	0.000	241.962	0.000	4.047
		B		0.000	0.000	53.919	0.000	0.920
		C		0.000	0.000	163.674	0.000	3.443
T7	100'-80'	A	1.658	0.000	0.000	240.155	0.000	3.977
		B		0.000	0.000	73.199	0.000	1.179
		C		0.000	0.000	268.798	0.000	4.988
T8	80'-70'	A	1.628	0.000	0.000	119.272	0.000	1.958
		B		0.000	0.000	36.387	0.000	0.580
		C		0.000	0.000	133.585	0.000	2.460
T9	70'-60'	A	1.605	0.000	0.000	118.650	0.000	1.934
		B		0.000	0.000	36.224	0.000	0.573
		C		0.000	0.000	132.956	0.000	2.433
T10	60'-40'	A	1.564	0.000	0.000	235.067	0.000	3.784
		B		0.000	0.000	71.860	0.000	1.121
		C		0.000	0.000	263.652	0.000	4.772
T11	40'-20'	A	1.486	0.000	0.000	230.885	0.000	3.630
		B		0.000	0.000	70.759	0.000	1.074
		C		0.000	0.000	259.421	0.000	4.599
T12	20'-0'	A	1.331	0.000	0.000	230.864	0.000	3.390
		B		0.000	0.000	68.580	0.000	0.984
		C		0.000	0.000	251.030	0.000	4.263

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
T1	180'-160'	1.038	-1.689	2.146	-0.778
T2	160'-153'4"	-1.068	-3.065	-0.643	-2.118
T3	153'4"-146'8"	-1.355	-2.908	-0.932	-1.924
T4	146'8"-140'	-2.182	-2.578	-1.201	-1.831
T5	140'-120'	-1.287	-0.674	-0.923	-0.326
T6	120'-100'	2.056	2.419	1.446	2.107
T7	100'-80'	-0.443	4.650	-0.027	3.601
T8	80'-70'	-0.463	4.967	-0.015	3.887
T9	70'-60'	-0.482	5.240	-0.006	4.099

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Section	Elevation	CP _X	CP _Z	CP _X	CP _Z
	ft	in	in	Ice	Ice
				in	in
T10	60'-40'	-0.503	5.567	0.008	4.377
T11	40'-20'	-0.539	6.079	0.031	4.776
T12	20'-0'	-0.601	6.429	0.048	5.020

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	2	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	160.00 - 170.00	0.6000	0.6000
T1	5	LDF7-50A(1-5/8")	160.00 - 170.00	0.6000	0.6000
T1	6	AL5-50(7/8")	160.00 - 170.00	0.6000	0.6000
T1	7	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T1	21	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	37	AVA7-50(1-5/8)	160.00 - 176.00	0.6000	0.6000
T1	39	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T2	2	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	153.33 - 160.00	0.6000	0.6000
T2	5	LDF7-50A(1-5/8")	153.33 - 160.00	0.6000	0.6000
T2	6	AL5-50(7/8")	153.33 - 160.00	0.6000	0.6000
T2	7	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	18	7983A(ELLIPTICAL)	153.33 - 157.00	0.6000	0.6000
T2	19	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	21	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	37	AVA7-50(1-5/8)	153.33 - 160.00	0.6000	0.6000
T2	39	Safety Line 3/8	153.33 - 160.00	0.6000	0.6000
T3	2	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	146.67 - 153.33	0.6000	0.6000
T3	5	LDF7-50A(1-5/8")	146.67 - 153.33	0.6000	0.6000
T3	6	AL5-50(7/8")	146.67 - 153.33	0.6000	0.6000
T3	7	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	12	HB114-21U3M12-XXXXF(1-1	146.67 -	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
			148.00		
T3	18	7983A(ELLIPTICAL)	146.67 - 153.33	0.6000	0.6000
T3	19	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	21	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	37	AVA7-50(1-5/8)	146.67 - 153.33	0.6000	0.6000
T3	39	Safety Line 3/8	146.67 - 153.33	0.6000	0.6000
T4	2	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	140.00 - 146.67	0.6000	0.6000
T4	5	LDF7-50A(1-5/8")	140.00 - 146.67	0.6000	0.6000
T4	6	AL5-50(7/8")	140.00 - 146.67	0.6000	0.6000
T4	7	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	12	HB114-21U3M12-XXXF(1-1/4)	140.00 - 146.67	0.6000	0.6000
T4	18	7983A(ELLIPTICAL)	140.00 - 146.67	0.6000	0.6000
T4	19	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	21	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	37	AVA7-50(1-5/8)	140.00 - 146.67	0.6000	0.6000
T4	39	Safety Line 3/8	140.00 - 146.67	0.6000	0.6000
T5	2	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	120.00 - 140.00	0.6000	0.6000
T5	5	LDF7-50A(1-5/8")	120.00 - 140.00	0.6000	0.6000
T5	6	AL5-50(7/8")	120.00 - 140.00	0.6000	0.6000
T5	7	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	12	HB114-21U3M12-XXXF(1-1/4)	120.00 - 140.00	0.6000	0.6000
T5	15	2-1/4" Rigid Conduit	120.00 - 134.00	0.6000	0.6000
T5	16	LDF4-50A(1/2)	120.00 - 134.00	0.6000	0.6000
T5	17	9207(5/16)	120.00 - 134.00	0.0000	0.0000
T5	18	7983A(ELLIPTICAL)	120.00 - 140.00	0.6000	0.6000
T5	19	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	21	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	24	561(1-5/8)	120.00 - 126.00	0.6000	0.6000
T5	25	LDF4-50A(1/2)	120.00 - 126.00	0.6000	0.6000
T5	27	Feedline Ladder (Af)	120.00 -	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
			126.00		
T5	35	Feedline Ladder (Af)	120.00 - 130.00	0.6000	0.6000
T5	37	AVA7-50(1-5/8)	120.00 - 140.00	0.6000	0.6000
T5	39	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T6	1	LDF7-50A(1-5/8)	100.00 - 112.00	0.6000	0.6000
T6	2	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	100.00 - 120.00	0.6000	0.6000
T6	5	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.6000
T6	6	AL5-50(7/8")	100.00 - 120.00	0.6000	0.6000
T6	7	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	12	HB114-21U3M12-XXXX(1-1/4)	100.00 - 120.00	0.6000	0.6000
T6	15	2-1/4" Rigid Conduit	100.00 - 120.00	0.6000	0.6000
T6	16	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T6	17	9207(5/16)	100.00 - 120.00	0.0000	0.0000
T6	18	7983A(ELLIPTICAL)	100.00 - 120.00	0.6000	0.6000
T6	19	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	21	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	24	561(1-5/8)	100.00 - 120.00	0.6000	0.6000
T6	25	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T6	27	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	29	CR 50 1873(1-5/8)	100.00 - 102.00	0.6000	0.6000
T6	30	2-1/4" Rigid Conduit	100.00 - 102.00	0.6000	0.6000
T6	31	FB-L98-002-XXX(3/8)	100.00 - 102.00	0.0000	0.0000
T6	32	WR-VG82ST-BRDA(5/8")	100.00 - 102.00	0.0000	0.0000
T6	34	WR-VG82ST-BRDA(5/8)	100.00 - 102.00	0.6000	0.6000
T6	35	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	37	AVA7-50(1-5/8)	100.00 - 120.00	0.6000	0.6000
T6	39	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T7	1	LDF7-50A(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	2	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	5	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.6000
T7	6	AL5-50(7/8")	80.00 - 100.00	0.6000	0.6000
T7	7	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T7	12	HB114-21U3M12-XXXX(1-1/4)	80.00 - 100.00	0.6000	0.6000
T7	15	2-1/4" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T7	16	LDF4-50A(1/2)	80.00 - 100.00	0.6000	0.6000
T7	17	9207(5/16)	80.00 - 100.00	0.0000	0.0000
T7	18	7983A(ELLIPTICAL)	80.00 - 100.00	0.6000	0.6000
T7	19	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	21	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	24	561(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	25	LDF4-50A(1/2)	80.00 - 100.00	0.6000	0.6000
T7	27	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	29	CR 50 1873(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	30	2-1/4" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T7	31	FB-L98-002-XXX(3/8)	80.00 - 100.00	0.0000	0.0000
T7	32	WR-VG82ST-BRDA(5/8")	80.00 - 100.00	0.0000	0.0000
T7	34	WR-VG82ST-BRDA(5/8)	80.00 - 100.00	0.6000	0.6000
T7	35	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	37	AVA7-50(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	39	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T8	1	LDF7-50A(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	2	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	5	LDF7-50A(1-5/8")	70.00 - 80.00	0.6000	0.6000
T8	6	AL5-50(7/8")	70.00 - 80.00	0.6000	0.6000
T8	7	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	12	HB114-21U3M12-XXXX(1-1/4)	70.00 - 80.00	0.6000	0.6000
T8	15	2-1/4" Rigid Conduit	70.00 - 80.00	0.6000	0.6000
T8	16	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	17	9207(5/16)	70.00 - 80.00	0.0000	0.0000
T8	18	7983A(ELLIPTICAL)	70.00 - 80.00	0.6000	0.6000
T8	19	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	21	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	24	561(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	25	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	27	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	29	CR 50 1873(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	30	2-1/4" Rigid Conduit	70.00 - 80.00	0.6000	0.6000
T8	31	FB-L98-002-XXX(3/8)	70.00 - 80.00	0.0000	0.0000
T8	32	WR-VG82ST-BRDA(5/8")	70.00 - 80.00	0.0000	0.0000
T8	34	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	35	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	37	AVA7-50(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	39	Safety Line 3/8	70.00 - 80.00	0.6000	0.6000
T9	1	LDF7-50A(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	2	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	5	LDF7-50A(1-5/8")	60.00 - 70.00	0.6000	0.6000
T9	6	AL5-50(7/8")	60.00 - 70.00	0.6000	0.6000
T9	7	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	12	HB114-21U3M12-XXXX(1-1/4)	60.00 - 70.00	0.6000	0.6000
T9	15	2-1/4" Rigid Conduit	60.00 - 70.00	0.6000	0.6000
T9	16	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	17	9207(5/16)	60.00 - 70.00	0.0000	0.0000
T9	18	7983A(ELLIPTICAL)	60.00 - 70.00	0.6000	0.6000
T9	19	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	21	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	24	561(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	25	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T9	27	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	29	CR 50 1873(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	30	2-1/4" Rigid Conduit	60.00 - 70.00	0.6000	0.6000
T9	31	FB-L98-002-XXX(3/8)	60.00 - 70.00	0.0000	0.0000
T9	32	WR-VG82ST-BRDA(5/8")	60.00 - 70.00	0.0000	0.0000
T9	34	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	35	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	37	AVA7-50(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	39	Safety Line 3/8	60.00 - 70.00	0.6000	0.6000
T10	1	LDF7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	2	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	5	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T10	6	AL5-50(7/8")	40.00 - 60.00	0.6000	0.6000
T10	7	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	12	HB114-21U3M12-XXXF(1-1 /4)	40.00 - 60.00	0.6000	0.6000
T10	15	2-1/4" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T10	16	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	17	9207(5/16)	40.00 - 60.00	0.0000	0.0000
T10	18	7983A(ELLIPTICAL)	40.00 - 60.00	0.6000	0.6000
T10	19	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	21	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	24	561(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	25	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	27	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	29	CR 50 1873(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	30	2-1/4" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T10	31	FB-L98-002-XXX(3/8)	40.00 - 60.00	0.0000	0.0000
T10	32	WR-VG82ST-BRDA(5/8")	40.00 - 60.00	0.0000	0.0000
T10	34	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	35	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	37	AVA7-50(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	39	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T11	1	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	2	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	4	MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	5	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T11	6	AL5-50(7/8")	20.00 - 40.00	0.6000	0.6000
T11	7	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	12	HB114-21U3M12-XXXF(1-1 /4)	20.00 - 40.00	0.6000	0.6000
T11	15	2-1/4" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T11	16	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	17	9207(5/16)	20.00 - 40.00	0.0000	0.0000
T11	18	7983A(ELLIPTICAL)	20.00 - 40.00	0.6000	0.6000
T11	19	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	21	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	24	561(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	25	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	27	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	29	CR 50 1873(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	30	2-1/4" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T11	31	FB-L98-002-XXX(3/8)	20.00 - 40.00	0.0000	0.0000
T11	32	WR-VG82ST-BRDA(5/8")	20.00 - 40.00	0.0000	0.0000
T11	34	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	35	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	37	AVA7-50(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	39	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	1	LDF7-50A(1-5/8)	0.00 - 20.00	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T12	2	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	4	MLE Hybrid 9Power/18Fiber	0.00 - 20.00	0.6000	0.6000
		RL 2(1-5/8)			
T12	5	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T12	6	AL5-50(7/8")	0.00 - 20.00	0.6000	0.6000
T12	7	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	9	LDF4-50A(1/2)	0.00 - 12.00	0.6000	0.6000
T12	12	HB114-21U3M12-XXXF(1-1/4)	0.00 - 20.00	0.6000	0.6000
T12	15	2-1/4" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T12	16	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	17	9207(5/16)	0.00 - 20.00	0.0000	0.0000
T12	18	7983A(ELLIPTICAL)	0.00 - 20.00	0.6000	0.6000
T12	19	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	21	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	24	561(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	25	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	27	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	29	CR 50 1873(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	30	2-1/4" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T12	31	FB-L98-002-XXX(3/8)	0.00 - 20.00	0.0000	0.0000
T12	32	WR-VG82ST-BRDA(5/8")	0.00 - 20.00	0.0000	0.0000
T12	34	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	35	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	37	AVA7-50(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	39	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
Side Arm Mount [SO 305-1] (E)	B	From Leg	1.500	0.000	178'	No Ice	0.940	1.410	0.030
			0'			1/2" Ice	1.480	2.170	0.043
			0'			1" Ice	2.020	2.930	0.057
Side Arm Mount [SO 305-1] (E)	C	From Leg	1.500	0.000	178'	No Ice	0.940	1.410	0.030
			0'			1/2" Ice	1.480	2.170	0.043
			0'			1" Ice	2.020	2.930	0.057

HG2409U-PRO (R)	A	From Leg	3.000	0.000	176'	No Ice	0.377	0.377	0.003
			0'			1/2" Ice	0.543	0.543	0.006
			2'			1" Ice	0.718	0.718	0.012
Side Arm Mount [SO 305-1] (R)	A	From Leg	1.500	0.000	176'	No Ice	0.940	1.410	0.030
			0'			1/2" Ice	1.480	2.170	0.043
			0'			1" Ice	2.020	2.930	0.057

LNX-6515DS-VTM w/ Mount Pipe (E)	A	From Leg	4.000	0.000	170'	No Ice	11.683	9.842	0.083
			0'			1/2" Ice	12.404	11.366	0.173
			3'			1" Ice	13.135	12.914	0.273
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.000	0.000	170'	No Ice	11.683	9.842	0.083
			0'			1/2" Ice	12.404	11.366	0.173

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
(E)				3'			1" Ice	13.135	12.914	0.273
LNx-6515DS-VTM w/ Mount Pipe	C	From Leg	4.000	0'	0.000	170'	No Ice	11.683	9.842	0.083
(E)				3'			1/2" Ice	12.404	11.366	0.173
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000	0'	0.000	170'	No Ice	6.329	5.642	0.112
(E)				3'			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000	0'	0.000	170'	No Ice	6.329	5.642	0.112
(E)				3'			1/2" Ice	6.775	6.426	0.169
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000	0'	0.000	170'	No Ice	6.329	5.642	0.112
(E)				3'			1" Ice	7.214	7.131	0.233
RRUS 11 B12	A	From Leg	4.000	0'	0.000	170'	No Ice	2.833	1.182	0.051
(E)				3'			1/2" Ice	3.043	1.330	0.072
RRUS 11 B12	B	From Leg	4.000	0'	0.000	170'	No Ice	2.833	1.182	0.051
(E)				3'			1/2" Ice	3.043	1.330	0.072
RRUS 11 B12	C	From Leg	4.000	0'	0.000	170'	No Ice	2.833	1.182	0.051
(E)				3'			1" Ice	3.259	1.485	0.095
KRY 112 144/1	A	From Leg	4.000	0'	0.000	170'	No Ice	0.350	0.175	0.011
(E)				2'			1/2" Ice	0.426	0.234	0.014
KRY 112 144/1	B	From Leg	4.000	0'	0.000	170'	No Ice	0.350	0.175	0.011
(E)				3'			1" Ice	0.509	0.301	0.019
KRY 112 144/1	C	From Leg	4.000	0'	0.000	170'	No Ice	0.350	0.175	0.011
(E)				2'			1/2" Ice	0.426	0.234	0.014
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000	0'	0.000	170'	No Ice	6.747	6.070	0.153
(R)				3'			1/2" Ice	7.202	6.867	0.214
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000	0'	0.000	170'	No Ice	6.747	6.070	0.153
(R)				3'			1" Ice	7.648	7.583	0.282
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000	0'	0.000	170'	No Ice	6.747	6.070	0.153
(R)				3'			1/2" Ice	7.202	6.867	0.214
6' x 2" Mount Pipe (E-per photo)	A	From Leg	4.000	0'	0.000	170'	No Ice	1.425	1.425	0.022
(E-per photo)				0'			1/2" Ice	1.925	1.925	0.033
6' x 2" Mount Pipe (E-per photo)	B	From Leg	4.000	0'	0.000	170'	No Ice	1.425	1.425	0.022
(E-per photo)				0'			1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe (E-per photo)	C	From Leg	4.000	0'	0.000	170'	No Ice	1.425	1.425	0.022
(E-per photo)				0'			1/2" Ice	1.925	1.925	0.033
Sector Mount [SM 702-3]		None		0'	0.000	170'	No Ice	2.294	2.294	0.048
(E)	C						1" Ice	2.294	2.294	0.048
***							No Ice	37.400	37.400	1.551
Side Arm Mount [SO 203-1]							1/2" Ice	54.200	54.200	2.352
(E-per photo)							1" Ice	71.000	71.000	3.153
Side Arm Mount [SO 203-1]	A	From Leg	1.500	0'	0.000	157'	No Ice	2.960	3.360	0.125
(E-per photo)				0'			1/2" Ice	4.100	4.680	0.154
Side Arm Mount [SO 203-1]	B	From Leg	1.500	0'	0.000	157'	No Ice	2.960	3.360	0.125
				0'			1" Ice	5.240	6.000	0.182

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
(E-per photo)			0'			1/2" Ice	4.100	4.680	0.154
			0'			1" Ice	5.240	6.000	0.182

APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000	0.000	148'	No Ice	6.580	4.959	0.077
(R)			0'			1/2" Ice	7.031	5.754	0.132
			0'			1" Ice	7.473	6.472	0.193
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000	0.000	148'	No Ice	6.580	4.959	0.077
(R)			0'			1/2" Ice	7.031	5.754	0.132
			0'			1" Ice	7.473	6.472	0.193
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000	0.000	148'	No Ice	6.580	4.959	0.077
(R)			0'			1/2" Ice	7.031	5.754	0.132
			0'			1" Ice	7.473	6.472	0.193
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	148'	No Ice	8.262	6.946	0.083
(R)			0'			1/2" Ice	8.822	8.127	0.151
			0'			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000	0.000	148'	No Ice	8.262	6.946	0.083
(R)			0'			1/2" Ice	8.822	8.127	0.151
			0'			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000	0.000	148'	No Ice	8.262	6.946	0.083
(R)			0'			1/2" Ice	8.822	8.127	0.151
			0'			1" Ice	9.346	9.021	0.227
(2) PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000	0.000	148'	No Ice	2.322	2.238	0.060
(R)			0'			1/2" Ice	2.527	2.441	0.083
			0'			1" Ice	2.739	2.651	0.110
(2) PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000	0.000	148'	No Ice	2.322	2.238	0.060
(R)			0'			1/2" Ice	2.527	2.441	0.083
			0'			1" Ice	2.739	2.651	0.110
(2) PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000	0.000	148'	No Ice	2.322	2.238	0.060
(R)			0'			1/2" Ice	2.527	2.441	0.083
			0'			1" Ice	2.739	2.651	0.110
800MHZ 2X50W RRH	A	From Leg	4.000	0.000	148'	No Ice	2.134	1.773	0.053
(R)			0'			1/2" Ice	2.320	1.946	0.074
			0'			1" Ice	2.512	2.127	0.098
800MHZ 2X50W RRH	B	From Leg	4.000	0.000	148'	No Ice	2.134	1.773	0.053
(R)			0'			1/2" Ice	2.320	1.946	0.074
			0'			1" Ice	2.512	2.127	0.098
800MHZ 2X50W RRH	C	From Leg	4.000	0.000	148'	No Ice	2.134	1.773	0.053
(R)			0'			1/2" Ice	2.320	1.946	0.074
			0'			1" Ice	2.512	2.127	0.098
TD-RRH8x20-25	A	From Leg	4.000	0.000	148'	No Ice	4.045	1.535	0.070
(R)			0'			1/2" Ice	4.298	1.714	0.097
			0'			1" Ice	4.557	1.901	0.128
TD-RRH8x20-25	B	From Leg	4.000	0.000	148'	No Ice	4.045	1.535	0.070
(R)			0'			1/2" Ice	4.298	1.714	0.097
			0'			1" Ice	4.557	1.901	0.128
TD-RRH8x20-25	C	From Leg	4.000	0.000	148'	No Ice	4.045	1.535	0.070
(R)			0'			1/2" Ice	4.298	1.714	0.097
			0'			1" Ice	4.557	1.901	0.128
(3) 800 EXTERNAL NOTCH FILTER	A	From Leg	4.000	0.000	148'	No Ice	0.660	0.321	0.011
(R)			0'			1/2" Ice	0.763	0.398	0.017
			0'			1" Ice	0.873	0.483	0.024
(9) ACU-A20-N	B	From Leg	4.000	0.000	148'	No Ice	0.067	0.117	0.001
(R)			0'			1/2" Ice	0.104	0.162	0.002
			0'			1" Ice	0.148	0.215	0.004
Sector Mount [SM 502-3]	C	None		0.000	148'	No Ice	33.020	33.020	1.673
(R)						1/2" Ice	47.360	47.360	2.224
						1" Ice	61.700	61.700	2.775

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K

LLPX310R w/ Mount Pipe (E-CL Per photo)	A	From Leg	4.000	0.000	0.000	134'	No Ice 4.538	2.985	0.045
			0'				1/2" Ice 4.892	3.528	0.083
			0'				1" Ice 5.254	4.087	0.126
LLPX310R w/ Mount Pipe (E-CL Per photo)	B	From Leg	4.000	0.000	0.000	134'	No Ice 4.538	2.985	0.045
			0'				1/2" Ice 4.892	3.528	0.083
			0'				1" Ice 5.254	4.087	0.126
LLPX310R w/ Mount Pipe (E-CL Per photo)	C	From Leg	4.000	0.000	0.000	134'	No Ice 4.538	2.985	0.045
			0'				1/2" Ice 4.892	3.528	0.083
			0'				1" Ice 5.254	4.087	0.126
RRH-2WB (E)	A	From Leg	4.000	0.000	0.000	134'	No Ice 2.305	0.783	0.044
			0'				1/2" Ice 2.496	0.917	0.059
			0'				1" Ice 2.695	1.058	0.077
RRH-2WB (E)	B	From Leg	4.000	0.000	0.000	134'	No Ice 2.305	0.783	0.044
			0'				1/2" Ice 2.496	0.917	0.059
			0'				1" Ice 2.695	1.058	0.077
RRH-2WB (E)	C	From Leg	4.000	0.000	0.000	134'	No Ice 2.305	0.783	0.044
			0'				1/2" Ice 2.496	0.917	0.059
			0'				1" Ice 2.695	1.058	0.077
J - Box (E-Per photo)	C	From Leg	0.500	0.000	0.000	134'	No Ice 0.667	0.500	0.020
			0'				1/2" Ice 0.770	0.593	0.027
			0'				1" Ice 0.881	0.693	0.036
(3) 6' x 2" Mount Pipe (E-PER PHOTO)	A	From Leg	4.000	0.000	0.000	134'	No Ice 1.425	1.425	0.022
			0'				1/2" Ice 1.925	1.925	0.033
			0'				1" Ice 2.294	2.294	0.048
(3) 6' x 2" Mount Pipe (E-PER PHOTO)	B	From Leg	4.000	0.000	0.000	134'	No Ice 1.425	1.425	0.022
			0'				1/2" Ice 1.925	1.925	0.033
			0'				1" Ice 2.294	2.294	0.048
(3) 6' x 2" Mount Pipe (E-PER PHOTO)	C	From Leg	4.000	0.000	0.000	134'	No Ice 1.425	1.425	0.022
			0'				1/2" Ice 1.925	1.925	0.033
			0'				1" Ice 2.294	2.294	0.048
6' x 3" Mount Pipe (E-PER PHOTO)	A	From Leg	4.000	0.000	0.000	134'	No Ice 1.767	1.767	0.030
			0'				1/2" Ice 2.129	2.129	0.044
			0'				1" Ice 2.501	2.501	0.061
6' x 3" Mount Pipe (E-PER PHOTO)	C	From Leg	4.000	0.000	0.000	134'	No Ice 1.767	1.767	0.030
			0'				1/2" Ice 2.129	2.129	0.044
			0'				1" Ice 2.501	2.501	0.061
Sector Mount [SM 504-3] (E)	C	None		0.000	0.000	134'	No Ice 34.250	34.250	1.708
							1/2" Ice 48.980	48.980	2.286
							1" Ice 63.710	63.710	2.864

(2) DB844G65ZAXY w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	126'	No Ice 4.578	4.802	0.034
			0'				1/2" Ice 4.955	5.416	0.080
			2'				1" Ice 5.340	6.040	0.132
(2) DB844G65ZAXY w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	126'	No Ice 4.578	4.802	0.034
			0'				1/2" Ice 4.955	5.416	0.080
			2'				1" Ice 5.340	6.040	0.132
DB844H80-XY w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	126'	No Ice 3.104	4.984	0.028
			0'				1/2" Ice 3.476	5.600	0.068
			2'				1" Ice 3.848	6.227	0.113
DB844H80-XY w/ Mount Pipe (E)	B	From Leg	4.000	0.000	0.000	126'	No Ice 3.104	4.984	0.028
			0'				1/2" Ice 3.476	5.600	0.068
			2'				1" Ice 3.848	6.227	0.113
GPS_A (E)	B	From Leg	4.000	0.000	0.000	126'	No Ice 0.255	0.255	0.001
			0'				1/2" Ice 0.320	0.320	0.005
			4'				1" Ice 0.393	0.393	0.010

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Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Lateral	Vert			Front	Side	
			ft	ft	ft	°	ft	ft ²	ft ²	K
DB-T1-6Z-8AB-0Z (E)	C	From Leg	4.000	0.000	126'	No Ice	4.800	2.000	0.044	
			0'			1/2" Ice	5.070	2.193	0.080	
			2'			1" Ice	5.348	2.393	0.120	
(2) SBNHH-1D65C w/ Mount Pipe (P)	A	From Leg	4.000	0.000	126'	No Ice	11.626	9.793	0.082	
			0'			1/2" Ice	12.346	11.311	0.172	
			2'			1" Ice	13.074	12.854	0.271	
(2) SBNHH-1D65C w/ Mount Pipe (P)	B	From Leg	4.000	0.000	126'	No Ice	11.626	9.793	0.082	
			0'			1/2" Ice	12.346	11.311	0.172	
			2'			1" Ice	13.074	12.854	0.271	
(2) SBNHH-1D65C w/ Mount Pipe (P)	C	From Leg	4.000	0.000	126'	No Ice	11.626	9.793	0.082	
			0'			1/2" Ice	12.346	11.311	0.172	
			2'			1" Ice	13.074	12.854	0.271	
B25 RRH2x60 PCS (P)	A	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051	
			0'			1/2" Ice	2.329	1.463	0.068	
			2'			1" Ice	2.526	1.626	0.089	
B25 RRH2x60 PCS (P)	B	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051	
			0'			1/2" Ice	2.329	1.463	0.068	
			2'			1" Ice	2.526	1.626	0.089	
B25 RRH2x60 PCS (P)	C	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051	
			0'			1/2" Ice	2.329	1.463	0.068	
			2'			1" Ice	2.526	1.626	0.089	
B66A RRH4X45 (P)	A	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.057	
			0'			1/2" Ice	2.794	1.811	0.077	
			2'			1" Ice	3.015	1.999	0.101	
B66A RRH4X45 (P)	B	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.057	
			0'			1/2" Ice	2.794	1.811	0.077	
			2'			1" Ice	3.015	1.999	0.101	
B66A RRH4X45 (P)	C	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.057	
			0'			1/2" Ice	2.794	1.811	0.077	
			2'			1" Ice	3.015	1.999	0.101	
B13 RRH 4X30 (P)	A	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056	
			0'			1/2" Ice	2.241	1.475	0.073	
			2'			1" Ice	2.433	1.638	0.093	
B13 RRH 4X30 (P)	B	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056	
			0'			1/2" Ice	2.241	1.475	0.073	
			2'			1" Ice	2.433	1.638	0.093	
B13 RRH 4X30 (P)	C	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056	
			0'			1/2" Ice	2.241	1.475	0.073	
			2'			1" Ice	2.433	1.638	0.093	
DB-T1-6Z-8AB-0Z (P)	C	From Leg	4.000	0.000	126'	No Ice	4.800	2.000	0.044	
			0'			1/2" Ice	5.070	2.193	0.080	
			2'			1" Ice	5.348	2.393	0.120	
(2) 6' x 2" Mount Pipe (E)	B	From Leg	4.000	0.000	126'	No Ice	1.425	1.425	0.022	
			0'			1/2" Ice	1.925	1.925	0.033	
			0'			1" Ice	2.294	2.294	0.048	
6' x 2" Mount Pipe (E)	C	From Leg	4.000	0.000	126'	No Ice	1.425	1.425	0.022	
			0'			1/2" Ice	1.925	1.925	0.033	
			0'			1" Ice	2.294	2.294	0.048	
5' x 2" Pipe Mount (E)	B	From Leg	1.000	0.000	126'	No Ice	1.000	1.000	0.029	
			0'			1/2" Ice	1.393	1.393	0.037	
			0'			1" Ice	1.703	1.703	0.048	
Sector Mount [SM 411-3] (E)	C	None		0.000	126'	No Ice	21.880	21.880	1.069	
						1/2" Ice	30.680	30.680	1.485	
						1" Ice	39.480	39.480	1.901	
Pipe Mount [PM 601-3] (E-Mount attach)	C	None		0.000	126'	No Ice	4.390	4.390	0.195	
						1/2" Ice	5.480	5.480	0.237	
						1" Ice	6.570	6.570	0.280	

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Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Lateral	Vert			Front	Side	
			ft	ft	ft	°	ft	ft ²	ft ²	K

800 10504 w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	112'	No Ice	3.589	3.178	0.038
			0'				1/2" Ice	4.007	3.905	0.070
			0'				1" Ice	4.422	4.581	0.109
800 10504 w/ Mount Pipe (E)	B	From Leg	4.000	0.000	0.000	112'	No Ice	3.589	3.178	0.038
			0'				1/2" Ice	4.007	3.905	0.070
			0'				1" Ice	4.422	4.581	0.109
800 10504 w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	112'	No Ice	3.589	3.178	0.038
			0'				1/2" Ice	4.007	3.905	0.070
			0'				1" Ice	4.422	4.581	0.109
6' x 2" Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'				1/2" Ice	1.925	1.925	0.033
			0'				1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe (E)	B	From Leg	4.000	0.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'				1/2" Ice	1.925	1.925	0.033
			0'				1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'				1/2" Ice	1.925	1.925	0.033
			0'				1" Ice	2.294	2.294	0.048
Sector Mount [SM 104-3] (E)	C	None		0.000		112'	No Ice	30.020	30.020	0.953
							1/2" Ice	40.480	40.480	1.405
							1" Ice	50.940	50.940	1.857

7770.00 w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	102'	No Ice	5.746	4.254	0.055
			0'				1/2" Ice	6.179	5.014	0.103
			0'				1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe (E)	B	From Leg	4.000	0.000	0.000	102'	No Ice	5.746	4.254	0.055
			0'				1/2" Ice	6.179	5.014	0.103
			0'				1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	102'	No Ice	5.746	4.254	0.055
			0'				1/2" Ice	6.179	5.014	0.103
			0'				1" Ice	6.607	5.711	0.157
P65-16-XLH-RR w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	102'	No Ice	8.371	6.362	0.079
			0'				1/2" Ice	8.931	7.538	0.144
			0'				1" Ice	9.457	8.427	0.218
P65-16-XLH-RR w/ Mount Pipe (E)	B	From Leg	4.000	0.000	0.000	102'	No Ice	8.371	6.362	0.079
			0'				1/2" Ice	8.931	7.538	0.144
			0'				1" Ice	9.457	8.427	0.218
P65-16-XLH-RR w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	102'	No Ice	8.371	6.362	0.079
			0'				1/2" Ice	8.931	7.538	0.144
			0'				1" Ice	9.457	8.427	0.218
(2) LGP2140X (E)	A	From Leg	4.000	0.000	0.000	102'	No Ice	1.080	0.358	0.014
			0'				1/2" Ice	1.214	0.454	0.021
			0'				1" Ice	1.355	0.556	0.030
(2) LGP2140X (E)	B	From Leg	4.000	0.000	0.000	102'	No Ice	1.080	0.358	0.014
			0'				1/2" Ice	1.214	0.454	0.021
			0'				1" Ice	1.355	0.556	0.030
(2) LGP2140X (E)	C	From Leg	4.000	0.000	0.000	102'	No Ice	1.080	0.358	0.014
			0'				1/2" Ice	1.214	0.454	0.021
			0'				1" Ice	1.355	0.556	0.030
RRUS 11 B2 (E)	A	From Leg	4.000	0.000	0.000	102'	No Ice	2.833	1.182	0.051
			0'				1/2" Ice	3.043	1.330	0.072
			0'				1" Ice	3.259	1.485	0.095
RRUS 11 B2 (E)	B	From Leg	4.000	0.000	0.000	102'	No Ice	2.833	1.182	0.051
			0'				1/2" Ice	3.043	1.330	0.072
			0'				1" Ice	3.259	1.485	0.095
RRUS 11 B2	C	From Leg	4.000	0.000	0.000	102'	No Ice	2.833	1.182	0.051

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Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert	Lateral					
			ft	ft	ft	°	ft	ft ²	ft ²	K
(E)			0'				1/2" Ice	3.043	1.330	0.072
			0'				1" Ice	3.259	1.485	0.095
DC6-48-60-18-8F	C	From Leg	4.000			0.000	No Ice	0.917	0.917	0.019
(E)			0'				1/2" Ice	1.458	1.458	0.037
			0'				1" Ice	1.643	1.643	0.057
QS66512-2 w/ Mount Pipe	A	From Leg	4.000			0.000	No Ice	8.371	8.463	0.137
(R)			0'				1/2" Ice	8.931	9.657	0.212
			0'				1" Ice	9.457	10.548	0.296
QS66512-2 w/ Mount Pipe	B	From Leg	4.000			0.000	No Ice	8.371	8.463	0.137
(R)			0'				1/2" Ice	8.931	9.657	0.212
			0'				1" Ice	9.457	10.548	0.296
QS66512-2 w/ Mount Pipe	C	From Leg	4.000			0.000	No Ice	8.371	8.463	0.137
(R)			0'				1/2" Ice	8.931	9.657	0.212
			0'				1" Ice	9.457	10.548	0.296
(2) TPX-070821	A	From Leg	4.000			0.000	No Ice	0.469	0.101	0.008
(R)			0'				1/2" Ice	0.559	0.147	0.011
			0'				1" Ice	0.656	0.202	0.016
(2) TPX-070821	B	From Leg	4.000			0.000	No Ice	0.469	0.101	0.008
(R)			0'				1/2" Ice	0.559	0.147	0.011
			0'				1" Ice	0.656	0.202	0.016
(2) TPX-070821	C	From Leg	4.000			0.000	No Ice	0.469	0.101	0.008
(R)			0'				1/2" Ice	0.559	0.147	0.011
			0'				1" Ice	0.656	0.202	0.016
DC6-48-60-18-8F	A	From Leg	4.000			0.000	No Ice	0.917	0.917	0.019
(R)			0'				1/2" Ice	1.458	1.458	0.037
			0'				1" Ice	1.643	1.643	0.057
RRUS 32	A	From Leg	4.000			0.000	No Ice	2.857	1.777	0.055
(R)			0'				1/2" Ice	3.083	1.968	0.077
			0'				1" Ice	3.316	2.166	0.103
RRUS 32	B	From Leg	4.000			0.000	No Ice	2.857	1.777	0.055
(R)			0'				1/2" Ice	3.083	1.968	0.077
			0'				1" Ice	3.316	2.166	0.103
RRUS 32	C	From Leg	4.000			0.000	No Ice	2.857	1.777	0.055
(R)			0'				1/2" Ice	3.083	1.968	0.077
			0'				1" Ice	3.316	2.166	0.103
RRUS 32 B2	A	From Leg	4.000			0.000	No Ice	2.731	1.668	0.053
(R)			0'				1/2" Ice	2.953	1.855	0.074
			0'				1" Ice	3.182	2.049	0.098
RRUS 32 B2	B	From Leg	4.000			0.000	No Ice	2.731	1.668	0.053
(R)			0'				1/2" Ice	2.953	1.855	0.074
			0'				1" Ice	3.182	2.049	0.098
RRUS 32 B2	C	From Leg	4.000			0.000	No Ice	2.731	1.668	0.053
(R)			0'				1/2" Ice	2.953	1.855	0.074
			0'				1" Ice	3.182	2.049	0.098
6' x 2" Mount Pipe	A	From Leg	4.000			0.000	No Ice	1.425	1.425	0.022
(E-PER PHOTO)			0'				1/2" Ice	1.925	1.925	0.033
			0'				1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	B	From Leg	4.000			0.000	No Ice	1.425	1.425	0.022
(E-PER PHOTO)			0'				1/2" Ice	1.925	1.925	0.033
			0'				1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	C	From Leg	4.000			0.000	No Ice	1.425	1.425	0.022
(E-PER PHOTO)			0'				1/2" Ice	1.925	1.925	0.033
			0'				1" Ice	2.294	2.294	0.048
3' x 2" Pipe Mount	A	From Leg	4.000			0.000	No Ice	0.583	0.583	0.011
(E-For RRUs)			0'				1/2" Ice	0.770	0.770	0.017
			2'				1" Ice	0.967	0.967	0.024
3' x 2" Pipe Mount	B	From Leg	4.000			0.000	No Ice	0.583	0.583	0.011

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
(E-For RRUs)				0'			1/2" Ice 0.770	0.770	0.017
				2'			1" Ice 0.967	0.967	0.024
3' x 2" Pipe Mount (E-For RRUs)	C	From Leg	4.000	0'	0.000	102'	No Ice 0.583	0.583	0.011
				2'			1/2" Ice 0.770	0.770	0.017
							1" Ice 0.967	0.967	0.024
Sector Mount [SM 301-3] (E)	C	None			0.000	102'	No Ice 29.610	29.610	1.302
							1/2" Ice 39.800	39.800	1.843
							1" Ice 49.990	49.990	2.383

GPS_A (E-Per Photo)	A	From Face	2.000	0'	0.000	12'	No Ice 0.255	0.255	0.001
				0'			1/2" Ice 0.320	0.320	0.005
				0'			1" Ice 0.393	0.393	0.010
3' x 2" Pipe Mount (E-Per Photo)	A	From Face	2.000	0'	0.000	12'	No Ice 0.583	0.583	0.011
				0'			1/2" Ice 0.770	0.770	0.017
				0'			1" Ice 0.967	0.967	0.024
Omni (E-Per Photo)	A	From Face	0.500	0'	0.000	12'	No Ice 1.767	1.767	0.050
				0'			1/2" Ice 2.129	2.129	0.063
				0'			1" Ice 2.501	2.501	0.081
Side Arm Mount [SO 701-1] (E-Per Photo)	A	From Face	1.500	0'	0.000	12'	No Ice 0.850	1.670	0.065
				0'			1/2" Ice 1.140	2.340	0.079
				0'			1" Ice 1.430	3.010	0.093

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				Horz Lateral	Vert						
VHLP2-18 (E-AZ. Per photo)	A	Paraboloid w/Shroud (HP)	From Leg	3.000	0'	-60.000		157'	2.175	No Ice 3.715	0.031
				0'						1/2" Ice 4.006	0.052
				0'						1" Ice 4.296	0.072
VHLP2-18 (E-AZ. Per photo)	B	Paraboloid w/Shroud (HP)	From Leg	3.000	0'	-60.000		157'	2.175	No Ice 3.715	0.031
				0'						1/2" Ice 4.006	0.052
				0'						1" Ice 4.296	0.072
**											
VHLP2-23 (E-CL Per photo)	A	Paraboloid w/Shroud (HP)	From Leg	4.000	0'	50.000		134'	2.175	No Ice 3.715	0.031
				0'						1/2" Ice 4.006	0.052
				2'						1" Ice 4.296	0.072
**											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice

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Comb. No.	Description
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	7	6.646	-0.022	0.001
			Max. Compression	10	-10.249	0.116	0.033
			Max. Mx	18	-9.997	0.123	0.006
			Max. My	15	-5.481	0.049	0.124
			Max. Vy	22	-1.270	0.002	-0.004

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft			
T2	160 - 153.333	Diagonal	Max. Vx	9	1.248	0.002	-0.053			
			Max Tension	24	2.260	0.000	0.000			
			Max. Compression	25	-2.211	0.000	0.000			
			Max. Mx	29	0.652	0.035	0.005			
			Max. My	37	0.656	0.035	-0.005			
			Max. Vy	29	0.035	0.035	0.005			
		Top Girt	Max. Vx	37	0.002	0.000	0.000	0.000		
			Max Tension	3	0.059	0.000	0.000	0.000		
			Max. Compression	14	-0.082	0.000	0.000			
			Max. Mx	26	-0.052	-0.067	0.000	0.000		
			Max. My	26	-0.052	0.000	0.002			
			Max. Vy	26	0.040	0.000	0.000			
		Mid Girt	Max. Vx	26	-0.001	0.000	0.000	0.000		
			Max Tension	19	0.454	0.000	0.000			
			Max. Compression	22	-0.461	0.000	0.000			
			Max. Mx	26	-0.006	-0.089	0.000			
			Max. My	26	-0.011	0.000	0.003			
			Max. Vy	26	0.046	0.000	0.000			
		Leg	160 - 153.333	Diagonal	Max. Vx	26	-0.001	0.000	0.000	
					Max Tension	7	10.954	-0.107	-0.002	
					Max. Compression	10	-15.291	0.377	0.049	
					Max. Mx	22	9.941	-0.418	-0.027	
					Max. My	8	-2.317	-0.030	0.485	
					Max. Vy	22	0.178	-0.418	-0.027	
Leg	153.333 - 146.667			Diagonal	Max. Vx	8	-0.222	-0.030	0.485	
					Max Tension	25	2.757	0.000	0.000	
					Max. Compression	12	-2.860	0.000	0.000	
					Max. Mx	29	0.642	0.056	-0.008	
					Max. My	38	-1.118	0.053	-0.008	
					Max. Vy	29	0.048	0.056	-0.008	
Top Girt	146.667 - 140	Diagonal	Max. Vx	38	0.003	0.000	0.000			
			Max Tension	7	16.417	-0.409	0.002			
			Max. Compression	10	-22.760	0.533	-0.000			
			Max. Mx	14	14.219	0.723	-0.015			
			Max. My	16	-2.557	-0.041	-0.741			
			Max. Vy	14	0.980	-0.570	-0.015			
			Top Girt	146.667 - 140	Diagonal	Max. Vx	20	0.903	-0.021	-0.449
						Max Tension	13	3.444	0.000	0.000
						Max. Compression	12	-3.656	0.000	0.000
						Max. Mx	29	0.673	0.063	-0.009
						Max. My	33	0.654	0.063	0.009
						Max. Vy	29	0.052	0.063	-0.009
			Top Girt	146.667 - 140	Diagonal	Max. Vx	33	-0.003	0.000	0.000
						Max Tension	29	0.376	0.000	0.000
						Max. Compression	11	-0.192	0.000	0.000
						Max. Mx	26	0.275	-0.155	0.000
						Max. My	26	0.267	0.000	0.005
						Max. Vy	26	0.066	0.000	0.000
Leg	146.667 - 140	Top Girt	Max. Vx	26	-0.002	0.000	0.000			
			Max Tension	7	22.793	-0.560	0.011			
			Max. Compression	10	-31.078	0.006	0.013			
			Max. Mx	14	21.385	-0.570	-0.015			
			Max. My	25	-2.869	-0.021	0.463			
			Max. Vy	3	0.141	0.544	0.015			
		Diagonal	146.667 - 140	Leg	Max. Vx	9	0.105	-0.017	0.448	
					Max Tension	13	4.811	0.000	0.000	
					Max. Compression	12	-4.920	0.000	0.000	
					Max. Mx	29	1.163	0.069	0.009	
					Max. My	38	-1.818	0.063	-0.010	
					Max. Vy	29	0.055	0.069	0.009	

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft			
T5	140 - 120	Top Girt	Max. Vx	38	0.003	0.000	0.000			
			Max Tension	29	0.272	0.000	0.000			
			Max. Compression	1	0.000	0.000	0.000			
			Max. Mx	26	0.266	-0.177	0.000			
			Max. My	26	0.241	0.000	0.005			
			Max. Vy	26	-0.070	0.000	0.000			
		Leg	Max. Vx	26	-0.002	0.000	0.000			
			Max Tension	7	49.292	-0.458	0.004			
			Max. Compression	18	-64.815	0.514	-0.017			
			Max. Mx	19	-62.894	0.515	-0.017			
			Max. My	20	-7.502	-0.005	-0.748			
			Max. Vy	6	-1.371	-0.468	0.004			
			Diagonal	Max. Vx	8	1.300	-0.034	0.291		
				Max Tension	16	7.624	0.000	0.000		
Max. Compression	16	-7.660		0.000	0.000					
Max. Mx	37	2.029		0.095	0.012					
T6	120 - 100	Leg	Max. My	35	-2.452	0.088	-0.013			
			Max. Vy	37	0.065	0.095	0.012			
			Max. Vx	35	0.004	0.000	0.000			
			Max Tension	7	84.882	-0.762	-0.006			
			Max. Compression	18	-107.629	1.294	0.008			
			Max. Mx	6	81.111	-1.330	-0.010			
		Diagonal	Max. My	16	-9.584	-0.024	0.980			
			Max. Vy	22	1.011	-1.326	0.017			
			Max. Vx	24	-0.874	-0.041	0.922			
			Max Tension	16	9.646	0.000	0.000			
			Max. Compression	16	-9.662	0.000	0.000			
			Max. Mx	35	2.795	0.139	-0.017			
			Max. My	31	-3.023	0.125	0.017			
			Max. Vy	37	0.085	0.138	-0.017			
T7	100 - 80	Leg	Max. Vx	31	-0.004	0.000	0.000			
			Max Tension	7	121.135	-0.330	-0.035			
			Max. Compression	18	-150.195	0.597	0.022			
			Max. Mx	6	97.690	-1.330	-0.010			
			Max. My	12	-11.625	-0.042	-0.924			
			Max. Vy	22	-0.217	-1.326	0.017			
		Diagonal	Max. Vx	11	-0.143	-0.196	-0.660			
			Max Tension	4	12.013	0.000	0.000			
			Max. Compression	4	-11.939	0.000	0.000			
			Max. Mx	33	3.185	0.219	0.030			
			Max. My	30	3.741	0.216	0.030			
			Max. Vy	33	0.110	0.219	0.030			
			Max. Vx	30	-0.006	0.000	0.000			
			T8	80 - 70	Leg	Max. Tension	15	141.098	-0.628	-0.004
Max. Compression	18	-172.992				2.295	0.020			
Max. Mx	18	-172.992				2.295	0.020			
Max. My	12	-14.655				0.048	-1.970			
Max. Vy	2	-0.302				2.294	0.014			
Max. Vx	12	0.285				0.048	-1.970			
Diagonal	Max Tension	4			12.466	0.000	0.000			
	Max. Compression	4			-12.602	0.000	0.000			
	Max. Mx	33			2.972	0.243	0.030			
	Max. My	32			-4.334	0.221	0.030			
	Max. Vy	33			0.115	0.243	0.030			
	Max. Vx	32			-0.006	0.000	0.000			
	T9	70 - 60			Leg	Max Tension	15	161.259	-2.076	-0.013
						Max. Compression	18	-196.458	0.142	0.017
Max. Mx			18	-195.907		2.295	0.020			
Max. My			12	-15.555	0.048	-1.970				
Max. Vy			2	0.346	2.294	0.014				
Max. Vx			24	0.290	0.049	1.961				

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft		
T10	60 - 40	Diagonal	Max Tension	4	13.384	0.000	0.000		
			Max. Compression	20	-13.551	0.000	0.000		
			Max. Mx	33	3.293	-0.407	-0.049		
			Max. My	36	-3.795	-0.354	-0.054		
			Max. Vy	33	-0.190	-0.407	-0.049		
			Max. Vx	36	0.010	0.000	0.000		
		Leg	Max Tension	15	201.341	-1.254	-0.007		
			Max. Compression	18	-243.125	1.734	0.023		
			Max. Mx	29	18.114	-2.556	-0.016		
			Max. My	12	-18.893	0.058	-1.332		
			Max. Vy	29	0.385	-2.556	-0.016		
			Max. Vx	12	0.222	-0.035	-1.330		
		T11	40 - 20	Diagonal	Max Tension	20	14.055	0.000	0.000
					Max. Compression	20	-14.352	0.000	0.000
Max. Mx	33				3.860	0.328	0.041		
Max. My	36				-4.255	0.291	0.042		
Max. Vy	33				0.144	0.328	0.041		
Max. Vx	36				-0.007	0.000	0.000		
Leg	Max Tension			15	240.673	-0.798	-0.004		
	Max. Compression			18	-289.692	3.001	0.036		
	Max. Mx			29	22.452	-5.940	-0.005		
	Max. My			16	-20.793	-0.210	1.496		
	Max. Vy			29	0.985	-5.940	-0.005		
	Max. Vx			12	-0.164	-0.208	-1.489		
T12	20 - 0			Diagonal	Max Tension	20	14.904	0.000	0.000
					Max. Compression	20	-15.268	0.000	0.000
		Max. Mx	33		2.288	0.427	0.047		
		Max. My	35		5.136	0.361	0.052		
		Max. Vy	33		0.163	0.427	0.047		
		Max. Vx	35		-0.008	0.000	0.000		
		Leg	Max Tension	15	277.958	-1.098	-0.021		
			Max. Compression	18	-336.251	0.000	-0.000		
			Max. Mx	29	29.972	-5.940	-0.005		
			Max. My	12	-25.610	-0.285	-2.957		
			Max. Vy	29	-1.150	-5.940	-0.005		
			Max. Vx	12	-0.403	-0.285	-2.957		
		Diagonal	Max Tension	20	16.246	0.000	0.000		
			Max. Compression	20	-16.498	0.000	0.000		
Max. Mx	33		-0.192	-0.890	0.077				
Max. My	34		7.995	-0.554	-0.102				
Max. Vy	33		-0.286	-0.890	0.077				
Max. Vx	34		0.015	0.000	0.000				

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	347.805	38.789	-22.160
	Max. H _x	18	347.805	38.789	-22.160
	Max. H _z	5	-249.727	-27.698	19.415
	Min. Vert	7	-285.955	-33.347	19.117
	Min. H _x	7	-285.955	-33.347	19.117
Leg B	Min. H _z	18	347.805	38.789	-22.160
	Max. Vert	10	346.505	-38.690	-22.024
	Max. H _x	23	-284.535	33.270	18.975
	Max. H _z	25	-248.016	27.603	19.242

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Min. Vert	23	-284.535	33.270	18.975
	Min. H _x	10	346.505	-38.690	-22.024
	Min. H _z	10	346.505	-38.690	-22.024
	Max. Vert	2	342.832	-0.065	44.440
	Max. H _x	20	23.023	5.832	2.217
	Max. H _z	2	342.832	-0.065	44.440
	Min. Vert	15	-287.256	0.063	-38.372
	Min. H _x	9	18.942	-5.833	1.838
	Min. H _z	15	-287.256	0.063	-38.372

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	65.826	0.000	0.000	40.025	-1.943	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	78.991	0.163	-72.550	-6852.454	-23.094	-2.509
0.9 Dead+1.6 Wind 0 deg - No Ice	59.243	0.163	-72.550	-6864.462	-22.512	-2.509
1.2 Dead+1.6 Wind 30 deg - No Ice	78.991	35.342	-60.939	-5784.178	-3391.012	3.218
0.9 Dead+1.6 Wind 30 deg - No Ice	59.243	35.342	-60.939	-5796.186	-3390.430	3.218
1.2 Dead+1.6 Wind 60 deg - No Ice	78.991	59.989	-34.572	-3261.082	-5753.438	6.275
0.9 Dead+1.6 Wind 60 deg - No Ice	59.243	59.989	-34.572	-3273.090	-5752.855	6.275
1.2 Dead+1.6 Wind 90 deg - No Ice	78.991	70.470	-0.149	29.443	-6753.384	8.685
0.9 Dead+1.6 Wind 90 deg - No Ice	59.243	70.470	-0.149	17.435	-6752.801	8.685
1.2 Dead+1.6 Wind 120 deg - No Ice	78.991	62.937	36.131	3479.688	-5995.375	9.852
0.9 Dead+1.6 Wind 120 deg - No Ice	59.243	62.937	36.131	3467.681	-5994.792	9.852
1.2 Dead+1.6 Wind 150 deg - No Ice	78.991	35.149	60.829	5866.835	-3368.311	7.604
0.9 Dead+1.6 Wind 150 deg - No Ice	59.243	35.149	60.829	5854.828	-3367.728	7.604
1.2 Dead+1.6 Wind 180 deg - No Ice	78.991	-0.186	69.054	6658.824	21.550	2.264
0.9 Dead+1.6 Wind 180 deg - No Ice	59.243	-0.186	69.054	6646.816	22.133	2.264
1.2 Dead+1.6 Wind 210 deg - No Ice	78.991	-35.418	60.974	5885.138	3397.649	-2.963
0.9 Dead+1.6 Wind 210 deg - No Ice	59.243	-35.418	60.974	5873.130	3398.231	-2.963
1.2 Dead+1.6 Wind 240 deg - No Ice	78.991	-63.077	36.399	3513.616	6008.288	-7.174
0.9 Dead+1.6 Wind 240 deg - No Ice	59.243	-63.077	36.399	3501.608	6008.871	-7.174
1.2 Dead+1.6 Wind 270 deg - No Ice	78.991	-70.496	0.182	71.605	6752.270	-8.925
0.9 Dead+1.6 Wind 270 deg - No Ice	59.243	-70.496	0.182	59.597	6752.853	-8.925
1.2 Dead+1.6 Wind 300 deg - No Ice	78.991	-59.884	-34.310	-3227.914	5735.916	-9.457

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Load Combination	Vertical K	Shear _x K	Shear _y K	Overturning Moment, M _x kip-ft	Overturning Moment, M _y kip-ft	Torque kip-ft
No Ice						
0.9 Dead+1.6 Wind 300 deg - No Ice	59.243	-59.884	-34.310	-3239.922	5736.499	-9.457
1.2 Dead+1.6 Wind 330 deg - No Ice	78.991	-35.094	-60.828	-5770.405	3355.032	-7.681
0.9 Dead+1.6 Wind 330 deg - No Ice	59.243	-35.094	-60.828	-5782.413	3355.615	-7.681
1.2 Dead+1.0 Ice+1.0 Temp	198.388	0.000	-0.000	108.936	42.984	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	198.388	0.036	-22.306	-2088.463	38.517	-0.032
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	198.388	10.969	-18.935	-1754.184	-1037.686	1.153
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	198.388	18.885	-10.887	-968.338	-1828.132	1.814
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	198.388	21.890	-0.033	104.969	-2112.836	2.214
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	198.388	19.344	11.121	1203.627	-1864.509	2.141
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	198.388	10.927	18.911	1969.278	-1032.997	1.272
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	198.388	-0.041	21.756	2262.306	48.167	0.000
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	198.388	-10.986	18.943	1973.181	1126.253	-1.094
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	198.388	-19.375	11.180	1210.897	1954.213	-1.956
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	198.388	-21.896	0.040	114.049	2199.619	-2.269
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	198.388	-18.862	-10.829	-961.242	1911.447	-2.141
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	198.388	-10.914	-18.910	-1751.321	1116.983	-1.290
Dead+Wind 0 deg - Service	65.826	0.042	-18.874	-1755.106	-7.344	-0.653
Dead+Wind 30 deg - Service	65.826	9.194	-15.853	-1477.198	-883.493	0.837
Dead+Wind 60 deg - Service	65.826	15.606	-8.994	-820.826	-1498.068	1.632
Dead+Wind 90 deg - Service	65.826	18.332	-0.039	35.190	-1758.200	2.259
Dead+Wind 120 deg - Service	65.826	16.373	9.399	932.756	-1561.007	2.563
Dead+Wind 150 deg - Service	65.826	9.144	15.824	1553.762	-877.588	1.978
Dead+Wind 180 deg - Service	65.826	-0.048	17.964	1759.795	4.270	0.589
Dead+Wind 210 deg - Service	65.826	-9.214	15.862	1558.524	882.547	-0.771
Dead+Wind 240 deg - Service	65.826	-16.409	9.469	941.582	1561.694	-1.866
Dead+Wind 270 deg - Service	65.826	-18.339	0.047	46.158	1755.238	-2.322
Dead+Wind 300 deg - Service	65.826	-15.579	-8.926	-812.197	1490.838	-2.460
Dead+Wind 330 deg - Service	65.826	-9.129	-15.824	-1473.615	871.461	-1.998

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-65.826	0.000	0.000	65.826	0.000	0.000%
2	0.163	-78.991	-72.550	-0.163	78.991	72.550	0.000%
3	0.163	-59.243	-72.550	-0.163	59.243	72.550	0.000%
4	35.342	-78.991	-60.939	-35.342	78.991	60.939	0.000%
5	35.342	-59.243	-60.939	-35.342	59.243	60.939	0.000%
6	59.989	-78.991	-34.572	-59.989	78.991	34.572	0.000%
7	59.989	-59.243	-34.572	-59.989	59.243	34.572	0.000%
8	70.470	-78.991	-0.149	-70.470	78.991	0.149	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
9	70.470	-59.243	-0.149	-70.470	59.243	0.149	0.000%
10	62.937	-78.991	36.131	-62.937	78.991	-36.131	0.000%
11	62.937	-59.243	36.131	-62.937	59.243	-36.131	0.000%
12	35.149	-78.991	60.829	-35.149	78.991	-60.829	0.000%
13	35.149	-59.243	60.829	-35.149	59.243	-60.829	0.000%
14	-0.186	-78.991	69.054	0.186	78.991	-69.054	0.000%
15	-0.186	-59.243	69.054	0.186	59.243	-69.054	0.000%
16	-35.418	-78.991	60.974	35.418	78.991	-60.974	0.000%
17	-35.418	-59.243	60.974	35.418	59.243	-60.974	0.000%
18	-63.077	-78.991	36.399	63.077	78.991	-36.399	0.000%
19	-63.077	-59.243	36.399	63.077	59.243	-36.399	0.000%
20	-70.496	-78.991	0.182	70.496	78.991	-0.182	0.000%
21	-70.496	-59.243	0.182	70.496	59.243	-0.182	0.000%
22	-59.884	-78.991	-34.310	59.884	78.991	34.310	0.000%
23	-59.884	-59.243	-34.310	59.884	59.243	34.310	0.000%
24	-35.094	-78.991	-60.828	35.094	78.991	60.828	0.000%
25	-35.094	-59.243	-60.828	35.094	59.243	60.828	0.000%
26	0.000	-198.388	0.000	0.000	198.388	0.000	0.000%
27	0.036	-198.388	-22.306	-0.036	198.388	22.306	0.000%
28	10.969	-198.388	-18.935	-10.969	198.388	18.935	0.000%
29	18.885	-198.388	-10.887	-18.885	198.388	10.887	0.000%
30	21.890	-198.388	-0.033	-21.890	198.388	0.033	0.000%
31	19.344	-198.388	11.121	-19.344	198.388	-11.121	0.000%
32	10.927	-198.388	18.911	-10.927	198.388	-18.911	0.000%
33	-0.041	-198.388	21.756	0.041	198.388	-21.756	0.000%
34	-10.986	-198.388	18.943	10.986	198.388	-18.943	0.000%
35	-19.375	-198.388	11.180	19.375	198.388	-11.180	0.000%
36	-21.896	-198.388	0.040	21.896	198.388	-0.040	0.000%
37	-18.862	-198.388	-10.829	18.862	198.388	10.829	0.000%
38	-10.914	-198.388	-18.910	10.914	198.388	18.910	0.000%
39	0.042	-65.826	-18.874	-0.042	65.826	18.874	0.000%
40	9.194	-65.826	-15.853	-9.194	65.826	15.853	0.000%
41	15.606	-65.826	-8.994	-15.606	65.826	8.994	0.000%
42	18.332	-65.826	-0.039	-18.332	65.826	0.039	0.000%
43	16.373	-65.826	9.399	-16.373	65.826	-9.399	0.000%
44	9.144	-65.826	15.824	-9.144	65.826	-15.824	0.000%
45	-0.048	-65.826	17.964	0.048	65.826	-17.964	0.000%
46	-9.214	-65.826	15.862	9.214	65.826	-15.862	0.000%
47	-16.409	-65.826	9.469	16.409	65.826	-9.469	0.000%
48	-18.339	-65.826	0.047	18.339	65.826	-0.047	0.000%
49	-15.579	-65.826	-8.926	15.579	65.826	8.926	0.000%
50	-9.129	-65.826	-15.824	9.129	65.826	15.824	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.917	43	0.118	0.003
T2	160 - 153.333	2.416	47	0.116	0.003
T3	153.333 - 146.667	2.252	47	0.115	0.003
T4	146.667 - 140	2.090	47	0.112	0.002
T5	140 - 120	1.929	47	0.109	0.002
T6	120 - 100	1.466	47	0.099	0.001
T7	100 - 80	1.048	47	0.084	0.001
T8	80 - 70	0.693	47	0.068	0.001

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T9	70 - 60	0.540	47	0.061	0.001
T10	60 - 40	0.411	47	0.052	0.001
T11	40 - 20	0.195	47	0.033	0.000
T12	20 - 0	0.055	47	0.017	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Side Arm Mount [SO 305-1]	43	2.866	0.118	0.003	Inf
176'	HG2409U-PRO	43	2.816	0.118	0.003	Inf
170'	LNx-6515DS-VTM w/ Mount Pipe	47	2.665	0.118	0.003	583854
157'	VHLP2-18	47	2.342	0.116	0.003	245058
148'	APXVTM14-ALU-I20 w/ Mount Pipe	47	2.123	0.113	0.002	423203
136'	VHLP2-23	47	1.834	0.107	0.002	146689
134'	LLPX310R w/ Mount Pipe	47	1.787	0.106	0.002	142119
126'	(2) DB844G65ZAXY w/ Mount Pipe	47	1.601	0.102	0.001	126333
112'	800 10504 w/ Mount Pipe	47	1.292	0.093	0.000	88502
102'	7770.00 w/ Mount Pipe	47	1.087	0.086	0.001	68626
12'	GPS A	47	0.026	0.011	0.000	74208

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	11.165	18	0.451	0.012
T2	160 - 153.333	9.247	18	0.444	0.011
T3	153.333 - 146.667	8.618	18	0.438	0.010
T4	146.667 - 140	7.996	18	0.429	0.009
T5	140 - 120	7.380	18	0.417	0.008
T6	120 - 100	5.607	18	0.378	0.004
T7	100 - 80	4.006	18	0.321	0.002
T8	80 - 70	2.651	18	0.261	0.003
T9	70 - 60	2.064	18	0.231	0.003
T10	60 - 40	1.574	18	0.198	0.003
T11	40 - 20	0.748	18	0.126	0.002
T12	20 - 0	0.212	18	0.066	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Side Arm Mount [SO 305-1]	18	10.972	0.451	0.012	321100
176'	HG2409U-PRO	18	10.779	0.451	0.012	321100

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Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
170'	LNX-6515DS-VTM w/ Mount Pipe	18	10.202	0.449	0.012	160550
157'	VHLP2-18	18	8.963	0.442	0.011	66401
148'	APXVTM14-ALU-I20 w/ Mount Pipe	18	8.120	0.431	0.009	117439
136'	VHLP2-23	18	7.015	0.410	0.007	38516
134'	LLPX310R w/ Mount Pipe	18	6.834	0.406	0.007	37251
126'	(2) DB844G65ZAXY w/ Mount Pipe	18	6.124	0.391	0.005	33000
112'	800 10504 w/ Mount Pipe	18	4.941	0.357	0.002	23068
102'	7770.00 w/ Mount Pipe	18	4.155	0.328	0.002	17891
12'	GPS_A	18	0.101	0.040	0.000	19405

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.875	4	1.662	40.589	0.041 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	2.260	8.135	0.278 ✓	1	Member Block Shear
		Top Girt	A325N	0.625	1	0.059	5.423	0.011 ✓	1	Member Block Shear
		Mid Girt	A325N	0.625	1	0.454	5.423	0.084 ✓	1	Member Block Shear
T2	160	Diagonal	A325N	0.625	1	2.757	11.310	0.244 ✓	1	Member Bearing
T3	153.333	Diagonal	A325N	0.625	1	3.444	11.310	0.305 ✓	1	Member Bearing
		Top Girt	A325N	0.625	1	0.376	5.655	0.066 ✓	1	Member Bearing
T4	146.667	Leg	A325N	1.000	4	5.698	53.014	0.107 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	4.811	11.310	0.425 ✓	1	Member Bearing
		Top Girt	A325N	0.625	1	0.272	5.655	0.048 ✓	1	Member Bearing
T5	140	Leg	A325N	1.000	6	8.215	53.014	0.155 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	7.624	11.310	0.674 ✓	1	Member Bearing
T6	120	Leg	A325N	1.000	6	14.147	53.014	0.267 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	9.662	12.425	0.778 ✓	1	Bolt Shear
T7	100	Leg	A325N	1.000	8	15.142	53.014	0.286 ✓	1	Bolt Tension
		Diagonal	A325N	0.750	1	12.013	14.137	0.850 ✓	1	Member Bearing
T8	80	Diagonal	A325N	0.750	1	12.466	14.137	0.882 ✓	1	Member Bearing
T9	70	Leg	A325N	1.000	8	20.157	53.014	0.380 ✓	1	Bolt Tension
		Diagonal	A325N	0.750	1	13.384	20.227	0.662 ✓	1	Gusset Bearing
T10	60	Leg	A325N	1.000	8	25.168	53.014	0.475 ✓	1	Bolt Tension
		Diagonal	A325N	0.750	1	14.055	14.137	0.994 ✓	1	Member Bearing
T11	40	Leg	A325N	1.000	8	30.084	53.014	0.567 ✓	1	Bolt Tension
		Diagonal	A325N	0.750	1	15.268	17.892	0.853 ✓	1	Bolt Shear
T12	20	Diagonal	A325N	0.750	1	16.246	20.227	0.803 ✓	1	Gusset Bearing

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Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16"	5'3/32"	52.9 K=1.00	3.016	-10.249	110.608	0.093 ¹
T2	160 - 153.333	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3 K=1.00	4.407	-15.291	159.906	0.096 ¹
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3 K=1.00	4.407	-22.760	159.905	0.142 ¹
T4	146.667 - 140	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3 K=1.00	4.407	-31.078	159.906	0.194 ¹
T5	140 - 120	ROHN 5 EH	20'7/16"	6'8-5/32'	43.6 K=1.00	6.112	-64.815	239.378	0.271 ¹
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0 K=1.00	6.713	-107.629	274.776	0.392 ¹
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32"	54.8 K=1.00	8.405	-150.195	303.717	0.495 ¹
T8	80 - 70	ROHN 8 EHS	10'7/32"	10'7/32"	41.2 K=1.00	9.719	-172.992	386.395	0.448 ¹
T9	70 - 60	ROHN 8 EHS	10'7/32"	10'7/32"	41.2 K=1.00	9.719	-196.458	386.395	0.508 ¹
T10	60 - 40	ROHN 8 EHS	20'13/32"	10'7/32"	41.2 K=1.00	9.719	-243.125	386.397	0.629 ¹
T11	40 - 20	ROHN 8 EH	20'13/32"	10'7/32"	41.8 K=1.00	12.763	-289.692	505.555	0.573 ¹
T12	20 - 0	ROHN 8 EH	20'13/32"	10'7/32"	41.8 K=1.00	12.763	-336.251	505.555	0.665 ¹

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8"	4'9-15/32"	145.8 K=1.00	0.715	-2.211	7.596	0.291 ¹
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16"	5'6"	134.4 K=1.00	1.190	-2.860	14.879	0.192 ¹
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32"	5'9-13/32"	141.4 K=1.00	1.190	-3.656	13.455	0.272 ¹
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'7/8"	148.4 K=1.00	1.190	-4.920	12.208	0.403 ¹

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4'	6'11-3/3 2"	169.2 K=1.00	1.190	-7.660	9.388	0.816 ¹
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'8-29/3 2"	157.0 K=1.00	1.440	-9.662	13.205	0.732 ¹
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/3 2"	9'5-25/3 2"	164.0 K=1.00	1.690	-11.938	14.200	0.841 ¹
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-25/3 2"	169.7 K=1.00	1.690	-12.602	13.254	0.951 ¹
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8	21'11/32"	10'3-3/3 2"	117.7 K=1.00	3.380	-13.551	52.808	0.257 ¹
T10	60 - 40	2L 'a' > 58.773 in - 136 L4x4x1/4	22'9-23/32"	11'1-25/32"	168.3 K=1.00	1.940	-14.352	15.477	0.927 ¹
T11	40 - 20	L4x4x5/16	24'7-1/2'	12'11/16"	182.9 K=1.00	2.400	-15.268	16.206	0.942 ¹
T12	20 - 0	2L4x4x5/16x3/8	26'5-9/16"	12'11-3/4"	131.1 K=1.00	4.800	-16.497	62.958	0.262 ¹
		2L 'a' > 74.511 in - 175							

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
T1	180 - 160	L2x2x1/8	6'8-1/4"	6'1-3/4"	185.5 K=1.00	0.484	-0.082	3.180	0.026 ¹
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8	9'5-13/3 2"	8'9-29/3 2"	212.2 K=1.00	0.609	-0.192	3.058	0.063 ¹
		KL/R > 200 (C) - 48							

¹ P_u / φP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
T1	180 - 160	L2x2x1/8	7'8-11/16"	7'2-3/16"	216.8 K=1.00	0.484	-0.461	2.328	0.198 ¹
		KL/R > 200 (C) - 9							

¹ P_u / φP_n controls

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Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16"	5'3/32"	52.9	3.016	6.646	135.717	0.049 ¹
T2	160 - 153.333	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3	4.407	10.954	198.335	0.055 ¹
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3	4.407	16.417	198.335	0.083 ¹
T4	146.667 - 140	ROHN 4 EH	6'8-5/32'	6'8-5/32'	54.3	4.407	22.793	198.335	0.115 ¹
T5	140 - 120	ROHN 5 EH	20'7/16"	6'8-5/32'	43.6	6.112	49.292	275.039	0.179 ¹
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0	6.713	84.882	302.097	0.281 ¹
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32"	54.8	8.405	121.135	378.222	0.320 ¹
T8	80 - 70	ROHN 8 EHS	10'7/32"	10'7/32"	41.2	9.719	141.098	437.369	0.323 ¹
T9	70 - 60	ROHN 8 EHS	10'7/32"	10'7/32"	41.2	9.719	161.259	437.369	0.369 ¹
T10	60 - 40	ROHN 8 EHS	20'13/32"	10'7/32"	41.2	9.719	201.341	437.369	0.460 ¹
T11	40 - 20	ROHN 8 EH	20'13/32"	10'7/32"	41.8	12.763	240.673	574.322	0.419 ¹
T12	20 - 0	ROHN 8 EH	20'13/32"	10'7/32"	41.8	12.763	277.958	574.322	0.484 ¹

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8'	4'9-15/32"	95.6	0.431	2.260	18.739	0.121 ¹
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16"	5'6"	87.8	0.752	2.757	32.707	0.084 ¹
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32"	5'9-13/32"	92.2	0.752	3.444	32.707	0.105 ¹
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'7/8"	96.7	0.752	4.811	32.707	0.147 ¹
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4"	6'11-3/32"	110.0	0.752	7.624	32.707	0.233 ¹
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'8-29/32"	101.5	0.939	9.646	45.794	0.211 ¹

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/3 2"	9'5-25/3 2"	105.9	1.103	12.013	53.793	0.223 ¹ ✓
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/ 16"	9'9-25/3 2"	109.6	1.103	12.466	53.793	0.232 ¹ ✓
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8	21'11/32 "	10'3-3/3 2"	114.4	2.207	13.384	95.999	0.139 ¹ ✓
T10	60 - 40	2L 'a' > 58.773 in - 141 L4x4x1/4	22'9-23/ 32"	11'1-25/ 32"	108.3	1.291	14.055	62.933	0.223 ¹ ✓
T11	40 - 20	L4x4x5/16	24'7-1/2' "	12'11/16 "	118.0	1.595	14.904	77.752	0.192 ¹ ✓
T12	20 - 0	2L4x4x5/16x3/8 2L 'a' > 74.511 in - 176	26'5-9/1 6"	12'11-3/ 4"	126.9	3.190	16.246	138.758	0.117 ¹ ✓

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4"	6'1-3/4"	122.6	0.293	0.059	12.744	0.005 ¹ ✓
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8	9'5-13/3 2"	8'9-29/3 2"	138.3	0.387	0.376	16.822	0.022 ¹ ✓
T4	146.667 - 140	L2 1/2x2 1/2x1/8	10'1-23/ 32"	9'6-7/32' "	148.9	0.387	0.272	16.822	0.016 ¹ ✓

¹ P_u / φP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	7'8-11/1 6"	7'2-3/16' "	142.4	0.293	0.454	12.744	0.036 ¹ ✓

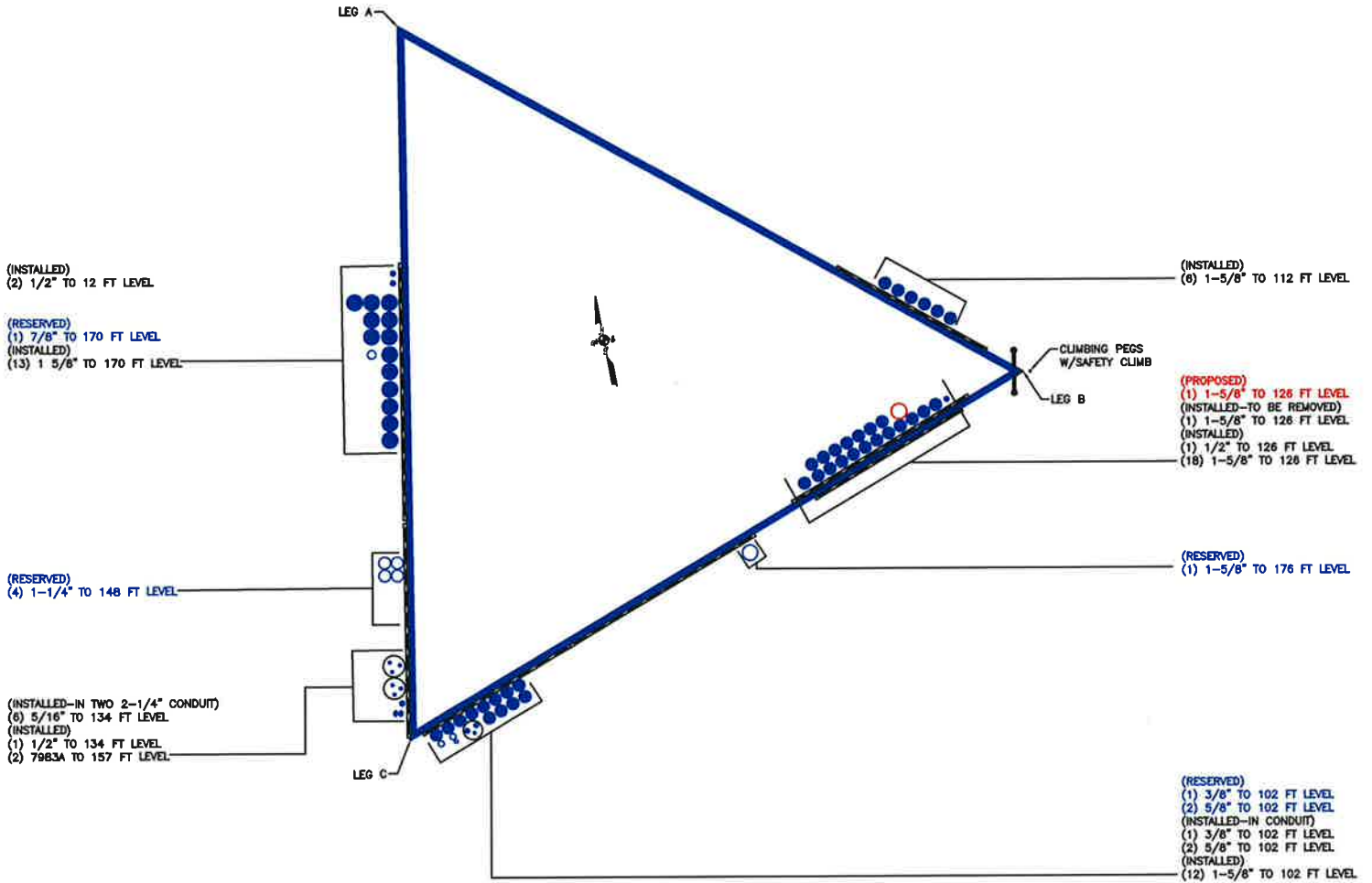
¹ P_u / φP_n controls

Section Capacity Table

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-10.249	110.608	9.3	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-15.291	159.906	9.6	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-22.760	159.905	14.2	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-31.078	159.906	19.4	Pass
T5	140 - 120	Leg	ROHN 5 EH	67	-64.815	239.378	27.1	Pass
T6	120 - 100	Leg	ROHN 6 EHS	88	-107.629	274.776	39.2	Pass
T7	100 - 80	Leg	ROHN 6 EH	109	-150.195	303.717	49.5	Pass
T8	80 - 70	Leg	ROHN 8 EHS	124	-172.992	386.395	44.8	Pass
T9	70 - 60	Leg	ROHN 8 EHS	133	-196.458	386.395	50.8	Pass
T10	60 - 40	Leg	ROHN 8 EHS	142	-243.125	386.397	62.9	Pass
T11	40 - 20	Leg	ROHN 8 EH	157	-289.692	505.555	57.3	Pass
T12	20 - 0	Leg	ROHN 8 EH	172	-336.251	505.555	66.5	Pass
T1	180 - 160	Diagonal	L2x2x3/16	13	-2.211	7.596	29.1	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-2.860	14.879	19.2	Pass
							24.4 (b)	
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-3.656	13.455	27.2	Pass
							30.5 (b)	
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-4.920	12.208	40.3	Pass
							42.5 (b)	
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	75	-7.660	9.388	81.6	Pass
T6	120 - 100	Diagonal	L3x3x1/4	96	-9.662	13.205	73.2	Pass
							77.8 (b)	
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	116	-11.938	14.200	84.1	Pass
							85.0 (b)	
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	131	-12.602	13.254	95.1	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	136	-13.551	52.808	25.7	Pass
							66.2 (b)	
T10	60 - 40	Diagonal	L4x4x1/4	145	-14.352	15.477	92.7	Pass
							99.4 (b)	
T11	40 - 20	Diagonal	L4x4x5/16	160	-15.268	16.206	94.2	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	175	-16.497	62.958	26.2	Pass
							80.3 (b)	
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.082	3.180	2.6	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	48	-0.192	3.058	6.3	Pass
							6.6 (b)	
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	59	0.272	16.822	1.6	Pass
							4.8 (b)	
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.461	2.328	19.8	Pass
							Summary	
						Leg (T12)	66.5	Pass
						Diagonal (T10)	99.4	Pass
						Top Girt (T3)	6.6	Pass
						Mid Girt (T1)	19.8	Pass
						Bolt Checks	99.4	Pass
						RATING =	99.4	Pass

APPENDIX B
BASE LEVEL DRAWING



BUSINESS UNIT:807133

APPENDIX C
ADDITIONAL CALCULATIONS

Anchor Rod Check for Self Supporting Towers

TIA-222-G, Section 4.9.9

Rev. 6.2



Site Data	
BU#:	807133
Site Name:	BRG 134 943057, CT
App #:	374095, Revision # 4

Anchor Rod Data	
Qty:	10
Diam:	1 in
Rod Material:	A449 (1/4 to 1 Incl.)
Strength (Fu):	120 ksi
Yield (Fy):	92 ksi

* Rod Circle:		in
* e:		in
* # of Rods		1 or 2

Mu= Pu x e:		ft-kips
-------------	--	---------

* Only enter rod circle, offset (e) and number of anchor rods at the extreme fiber to consider if eccentric load due to leg reinforcement exist.

Reactions		
Eta Factor, η	0.55	Detail Type
Uplift, Pu:	287	kips
Shear, Vu:	38	kips

l_{ar} :		in
$M_u = 0.65 * l_{ar} * V_u$		ft-kips

Anchor Rod Results:

Max Rod (Cu+ Vu/r):	35.6	Kips
Design Axial, $\phi * F_u * A_{net}$:	58.2	Kips
Anchor Rod Stress Ratio:	61.2%	

If Applicable;

Anchor Rod Results with Bending Considered:

When the clear distance from the top of concrete to the bottom of level nut exceeds 1.0 times the diameter of the anchor rod, the following interaction equation shall also be satisfied (see Figure 4-4 of Rev. G):

$$\left(\frac{V_u}{\phi R_{nv}}\right)^2 + \left[\left(\frac{P_u}{\phi R_{nt}}\right) + \left(\frac{M_u}{\phi R_{nm}}\right)\right]^2 < 1$$

$\phi R_{nv} = \phi * 0.45 * F_{ub} * A_b =$		kips
$\phi R_{nt} = \phi * F_u * A_{net} =$		kips
$\phi R_{nm} = \phi * F_y * Z =$		ft-kips

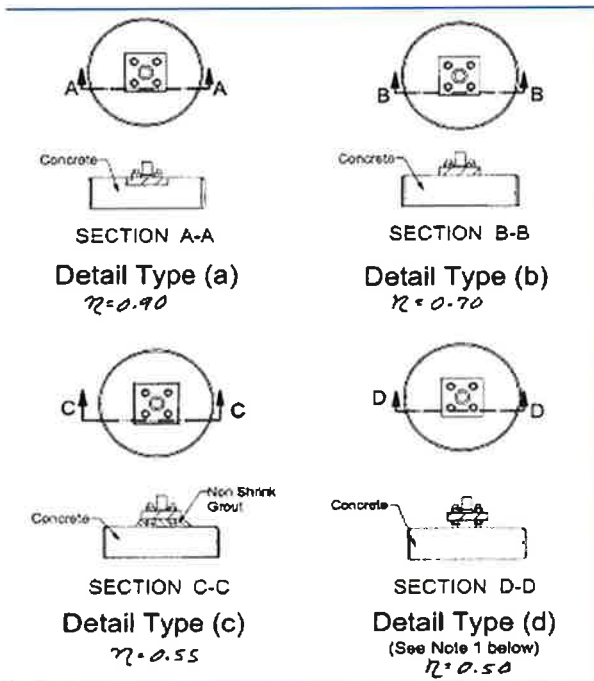


Figure 4-4 of TIA-222-G

Maximum Acceptable Ratio: **105** %

Governing Stress Ratio: **61.2%** **Pass**



8.1 UJ Sdu

a) Steel Anchor Tensile Strength

Anchor
 $F_u = 80 \text{ ksi}$

(UJ Version No. 1.2)
 1/21/83

Anchor - #11 BARS $1.56 \text{ in}^2/\text{BAR}$

$$R_n = 80 \text{ ksi} (1.56 \text{ in}^2) (4) = 499.2 \text{ k}$$

$$\phi R_n = \frac{374.4 \text{ k}}{0.95} > 287 \text{ k} \quad \therefore \text{OK}$$

b) Steel to grout

$R_n = A_s F_s - g$

$$A_s = \pi d^2 = 1.41 \text{ in}^2 (\pi) = 4.43 \text{ in}^2$$

$$\text{Embed length} = 14 - 5.5 = 8.5' (12) = 102 \text{ in}$$

$$A_s = 4.43 \text{ in}^2 (102 \text{ in}) = 451.9 \text{ in}^2$$

$$F_s - g = 4.2 (F_c)^{0.5} = 4.2 (4000 \text{ psi})^{0.5} = 265.6 \text{ psi}$$

(assumed)

$$R_n = 451.9 \text{ in}^2 (265.6 \text{ psi}) = 120 \text{ kips}$$

$$120 (4 \text{ anchors}) = 480 \text{ k}$$

$$\phi R_n = 360 \text{ k} > 287 \text{ k} \quad \therefore \text{OK}$$

$$\phi = 0.95$$

PROJECT	B164.002.01		
SUBJECT	Rock Anchors		
DATE	PAGE	OF	



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 www.btgrp.com

c) Grout to Rock

$$R_n = A_f f_{c-g}$$

$$A_f = 3.25'' (\pi) (8.25'') \left(\frac{12 \text{ in}}{1 \text{ ft}} \right) = 699.8 \text{ in}^2$$

$$f_{c-g} = \text{Rock} - 55 \text{ Psi} (6) = 110 \text{ Psi (ASTM)}$$

$$R_n = 699.8 \text{ in}^2 (110 \text{ Psi}) = 76.98 \text{ kips}$$

$$76.98 \text{ k} (4 \text{ Rods}) = 307.9 \text{ kips}$$

$$\phi R_n = \frac{307.9}{1.9} = 277.1 \text{ kips}$$

Wt of Block -

$$\begin{matrix} 9' & \times & 6.25' & \times & 9' & = & 506.25 \text{ FT}^3 \\ L & & w & & D & & \end{matrix}$$

$$506.25 \text{ FT}^3 (150 \text{ Pcf}) = 75.9 \text{ kips}$$

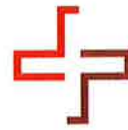
$$\phi (75.9 \text{ k}) = 68.31 \text{ k}$$

$$\text{UPLIFT} - 287 \text{ k} - 68.31 \text{ k} = 218.7 \text{ k}$$

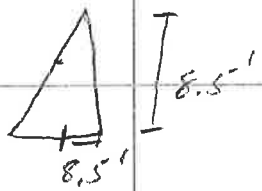
$$\phi R_n = 277.1 \text{ k} > 218.7 \text{ k}$$

∴ OK for
 GR to Rock

PROJECT	82164.005.01		
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DATE	PAGE	3	OF



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D)	Nominal wt of Rock Prism		
	$R_u = W_c$		
	Dims of Rock Core		
	Soil - 135 Pcf		
	Volume - 1879 ft ³		
	$W_c = 1879 \text{ ft}^3 (135 \text{ pcf}) = 253.6 \text{ kips}$		
	$Q_{Ru} = 228.3 \text{ kips}$ (.9)		
	UP Lift - 218.7k		(Pg 2)
	<u>228.3k</u> > 218.7k		OK
	Weight of Rock is UPLIFT Controls.		
	$218.7 / 228.3 = 95.8\%$		



[ASCE 7 Windspeed](#)
 [ASCE 7 Ground Snow Load](#)
 [Related Resources](#)
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 [About ATC](#)
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Search Results

Query Date: Tue Sep 19 2017
Latitude: 41.0818
Longitude: -73.4304

**ASCE 7-10 Windspeeds
 (3-sec peak gust in mph*):**

Risk Category I: 110
Risk Category II: 120
Risk Category III-IV: 130
MRI 10-Year:** 76
MRI 25-Year:** 86
MRI 50-Year:** 92
MRI 100-Year:** 98

ASCE 7-05 Windspeed:
 110 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
 81 (fastest mile in mph)



*Miles per hour
 **Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

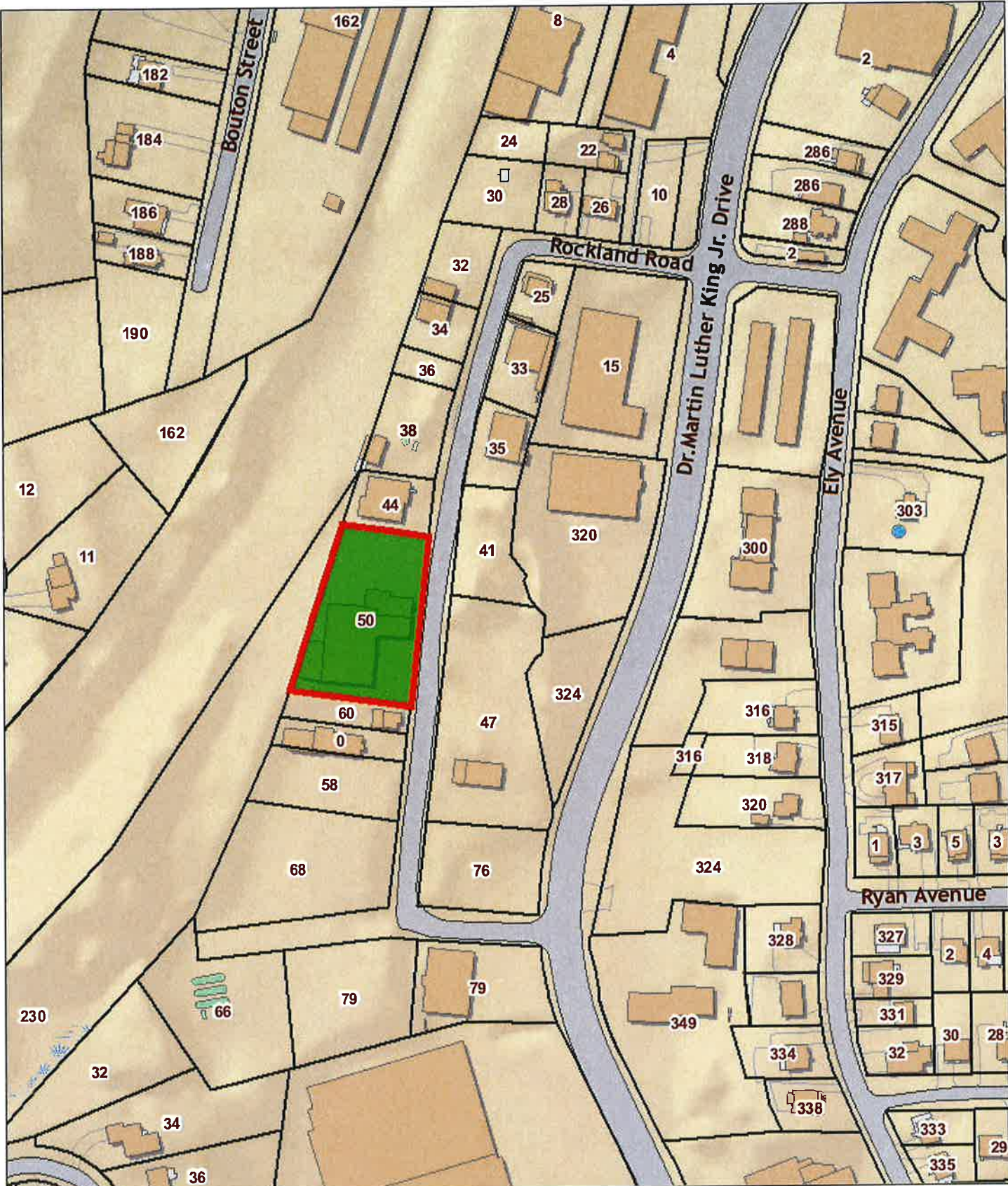


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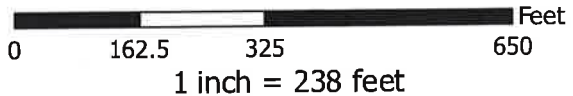
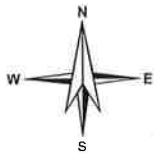
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ATTACHMENT 4



50 rockland road



50 ROCKLAND RD

Location 50 ROCKLAND RD

Mblu 5/ 82/ 58/ 0/

Acct# 25665

Owner CROWN ATLANTIC COMPANY
LLC

Assessment \$1,007,240

Appraisal \$1,438,900

PID 25665

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2015	\$991,370	\$447,530	\$1,438,900
Assessment			
Valuation Year	Improvements	Land	Total
2015	\$693,970	\$313,270	\$1,007,240

Owner of Record

Owner CROWN ATLANTIC COMPANY LLC
Co-Owner
Address PMB 353
 4017 WASHINGTON RD
 McMURRAY, PA 15317-0000

Sale Price \$1,600,000
Certificate
Book & Page 3701/331
Sale Date 04/16/1999

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
CROWN ATLANTIC COMPANY LLC	\$1,600,000		3701/331	04/16/1999
CELLCO PARTNERSHIP, DEVIVO MARIO + WENCHE	\$1,020,000		3489/348	04/03/1998
	\$0		0/0	

Building Information

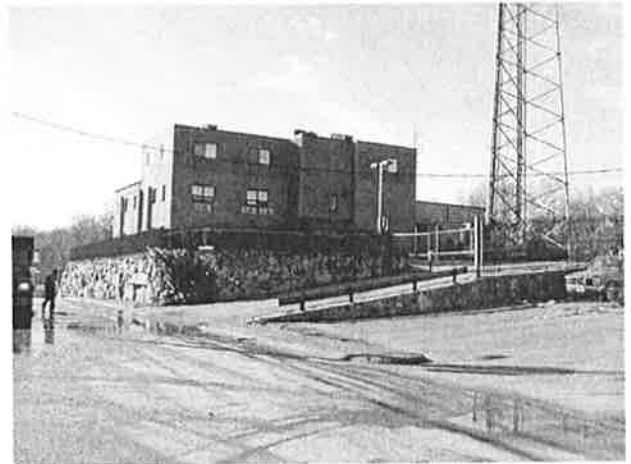
Building 1 : Section 1

Year Built: 1987
Living Area: 21,115
Replacement Cost: \$1,084,957
Building Percent 47
Good:

Replacement Cost
Less Depreciation: \$509,930

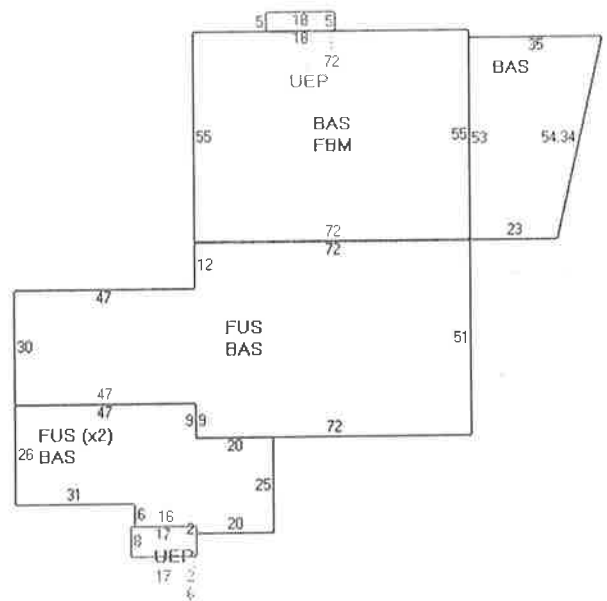
Building Attributes	
Field	Description
STYLE	Light Indust
MODEL	Industrial
Stories:	3.00
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Concrete
Heating Fuel	Gas
Heating Type	Forced Air
AC Percent	60
Heat Percent	100
Bldg Use	Industrial
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	Heat/AC Pkg
Frame	Masonry
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	13.00
% Sprinkler	40.00

Building Photo



(<http://images.vgsi.com/photos/NorwalkCTPhotos//00\00\72\74>)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	12,397	12,397
FUS	Finished Upper Story	8,718	8,718
FBM	Finished Basement	3,960	0
UEP	Utility Enclosed Porch	226	0
		25,301	21,115

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
ELV1	Pass Elevator	1.00 UNITS	\$21,150	1
A/C	Air Conditioning	12669.00 S.F.	\$14,890	1

SPR	Sprinklers	8446.00 S.F.	\$7,940	1
ELVS	Elevator per stop	1.00 UNITS	\$3,760	1

Land

Land Use

Use Code 301
Description Industrial
Zone RI
Neighborhood C530

Land Line Valuation

Size (Acres) 0.82
Frontage
Depth
Assessed Value \$313,270
Appraised Value \$447,530

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving Asph.			16900.00 S.F.	\$17,750	1
FN6	Fence 6'			450.00 L.F.	\$3,150	1
SHD4	Cell Equip	FR	Frame	128.00 S.F.	\$6,400	1
CEL1	Cell Tower			5.00 UNITS	\$400,000	1
SHD4	Cell Equip	FR	Frame	128.00 S.F.	\$6,400	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2015	\$991,370	\$447,530	\$1,438,900
2014	\$991,370	\$447,530	\$1,438,900
2013	\$991,370	\$447,530	\$1,438,900

Assessment			
Valuation Year	Improvements	Land	Total
2015	\$693,970	\$313,270	\$1,007,240
2014	\$693,970	\$313,270	\$1,007,240
2013	\$693,970	\$313,270	\$1,007,240

ATTACHMENT 5



Certificate of Mailing — Firm

Name and Address of Sender
Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

TOTAL NO. of Pieces Listed by Sender
2

TOTAL NO. of Pieces Received at Post Office™
2

Affix Stamp Here
Postmark with Date of Receipt.

Postmaster, per (name of receiving employee)
VP

USPS® Tracking Number
 Firm-specific Identifier

neopostSM
 01/09/2018
US POSTAGE \$002.38
 ZIP 06103
 041112203980



USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Harry Rilling, Mayor City of Norwalk 125 East Avenue Norwalk, CT 06856				
2.	Steven Kleppin, Director of Planning and Zoning City of Norwalk 125 East Avenue Norwalk, CT 06856				
3.					
4.					
5.					
6.					

