App No: 2022061827

Revisions received 8.30.22 - JE
Revisions received 8.23.22 - JE
Revisions received 7.28.22 - JE

Application General Information

Applicant Name	Crown Castle USA Inc	Received	6/9/2022
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	T-Mobile	Will site be used to support government telecommunications facilities or other equipment for government use?	No
Solution Type	Other		
Existing	Existing	Gvt. Use Desc.	

Application Description

TOWER SCOPE OF WORK: REMOVE (6) ANTENNAS, (3) TMAs, (3) RRUs 11 B12, (12) COAX CABLES and (1) 9x18 HCS 60m CABLES.
INSTALL (9) ANTENNAS, (6) RRUs and (3) 6x24 4AWG 60m CABLES.
GROUND SCOPE OF WORK: REMOVE (1) RBS 2106 CABINET, (1) DUW30 and (6) RU22. INSTALL (2) CABINETS, (2) PSU 4813 BOOSTER, (1) BB 6648, (1) IXRe ROUTER, (2) RP 6651 and CAM-LOK GENERATOR CONNECTOR.

Site Information

Site Id	55	Zoning	RE-2C
Structure Type	Monopole	Latitude	38.995137
Street Address	10010 Oaklyn Dr	Longitude	-77.203813
County Site Name	Avenel Golf Course	Ground Elevation	331
Carrier Site Name	7WAN098A	City	Potomac
Site Owner	WSSC	Lease Status	Leased
Structure Owner	Crown Castle USA, Inc	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	130		
Provide the proposed height of the replacement structure without any antenna (New Apps Only)		Distance to Residential Property (New, Colocation Only)	
		Distance to Commercial Property (New, Colocation Only)	

Justification of why this site was selected:

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

NearbySites (New Apps Only):

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Screening considerations(New, Colocation Apps Only):

Thursday, June 9, 2022

4:57:26 PM

App No: 2022061827

6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only): Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater? No

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet? No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet? No

Will the proposed installation require more the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets?YN No

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater? No

Does the structure or current installation have concealment elements/measures? Yes

Will the proposed installation require excavation or expansion outside the current boundaries of the site? No

If yes, describe how the proposed installation does not defeat the existing concealment. swap/add of antennas will not effect the appearance of the monopine

Small Wireless Facility Information

Small Wireless Facility Questions

Small Wireless Facility? No

Is the structure 10% taller than adjacent structures?

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet 17.02

Please list adjacent structure heights

Tribal Lands? No

Cumulative volume of the proposed antenna(s) exclusive of equipment in cubic feet

ROW Information

PROW? No

Pole Number

ROW owner

ROW width

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App No: 2022061827

Antenna Information

Antenna Compliance	Yes
Compliance Desc	
Antenna Location	No
Antenna Loc. Desc.	
Env. Assessment	
Cat. Excluded?	
Routine Env. Evaluation	checked

Antenna Model	APXVAALL24_43-U-NA20						
Frequency	Rx:668-688, Tx:622-642 (600) Tx:728-734, Rx:698-704 (700)						
RAD Center	110	Max ERP	**6459**	Antenna Dimensions	95.9H, 24W, 8.5D	Quantity	3

Antenna Model	AIR6419 B41						
Frequency	Tx:2593-2690, Rx:2496-2592						
RAD Center	110	Max ERP	**54973**	Antenna Dimensions	36.25H, 20.91W, 9.02D	Quantity	3

Antenna Model	VV-65A-R1						
Frequency	Tx:1965-1975, Rx:1885-1895 PCS & Tx:2135-2155, Rx:1735-1755 AWS						
RAD Center	110	Max ERP	**12591**	Antenna Dimensions	54.7H, 12.1W, 4.6D	Quantity	3

Thursday, June 9, 2022

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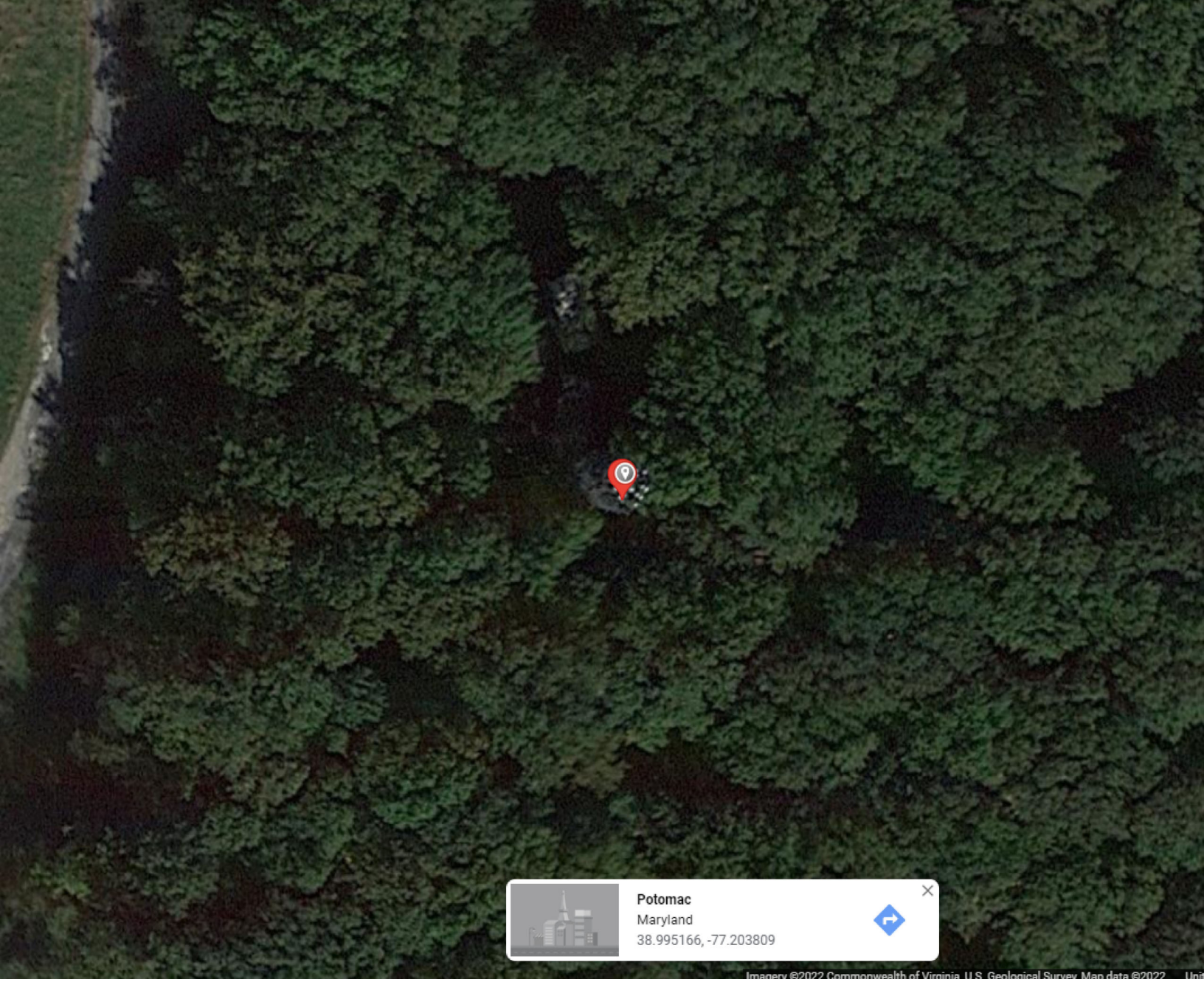
Potomac
Maryland
38.995166, -77.203809
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APXVAALL24_43-U-NA20

Dual Slant Polarized Quad Band (8 Port) Antenna, x2 617-894 / x2 1695-2690MHz, 65deg, 2.4m (8ft), RET, 2-12°

FEATURES / BENEFITS

This antenna provides an 8 Port multi-band platform for flexible use in deployment scenarios encompassing 600, 700, 800, AWS, PCS & BRS applications.

- 24 Inch Width For Easier Zoning
- Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality
- Superior elevation pattern performance across the entire electrical down tilt range
- Includes two ACU-A20-SR AISG RET motors
- Low band arrays driven by a single RET motor
- Mid band arrays driven by a single RET motor

Technical features

RADIO FREQUENCY SYSTEMS

ELECTRICAL SPECIFICATIONS

Electrical Specification Header		Low Band Arrays (617-894 MHz) Ports 1-4		
Frequency Band	MHz	617-698	698-806	806-894
Gain	dBi	15.8	16.0	16.1
Azimuth Beamwidth 3dB	Deg	65 +/-2	64 +/-2	62 +/-5
Elevation Beamwidth 3dB	Deg	9.9 +/-1	8.6 +/-.8	7.5 +/-.5
Cross-Pol at Boresight	dB	17	19	17
F/B at 180 Copolar	dB	30	30	32
Electrical Downtilt	Deg	2 to 12	2 to 12	2 to 12
First Upper Side Lobe	dB	16	16	14
VSWR	-	1.5:1	1.5:1	1.5:1
Return Loss	dB	-14	-14	-14
Cross Polar Isolation	dB	25	25	25
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
Maximum CW Power per Port	Watt	400	400	400
Gain Over All Tilts	dBi	15.2 +/- .6	15.5 +/- .5	15.7 +/- .4
Cross-Pol over Sector	dB	4	4	6
F/B at +/-30 Total Power	dB	17	19	23

ELECTRICAL SPECIFICATIONS

RADIO FREQUENCY SYSTEMS

Electrical Specification Header		Mid Band Arrays (1695-2690 MHz) Ports 5-8			
Frequency Band	MHz	1695-1780	1850-1990	1995-2200	2200-2690
Gain	dBi	18.2	18.7	19.1	18.7
Azimuth Beamwidth 3dB	Deg	67 +/-5	65 +/-4	66 +/-8	61 +/-6
Elevation Beamwidth 3dB	Deg	6.0 +/- .2	5.0 +/-.5	4.5 +/-.3	4.0 +/-.3
Cross-Pol at Boresight	dB	22	18	14	18
F/B at 180 Copolar	dB	31	30	29	27
Electrical Downtilt	Deg	2 to 12	2 to 12	2 to 12	2 to 12
First Upper Side Lobe	dB	15	15	15	14
VSWR	-	1.5:1	1.5:1	1.5:1	1.5:1
Return Loss	dB	-14	-14	-14	-14
Cross Polar Isolation	dB	25	25	25	25
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153	-153
Maximum CW Power per Port	Watt	300	300	300	300
Gain Over All Tilts	dBi	17.5 +/- .6	17.9 +/- .6	18.5 +/- .5	17.8 +/- .6
Cross-Pol over Sector	dB	8	8	8	2
F/B at +/-30 Total Power	dB	25	23	22	19
Upper Side Lobe Peak to +20	dB	14	14	14	13

Impedance	Ohm	50
Polarization	Deg	+/- 45

MECHANICAL SPECIFICATIONS

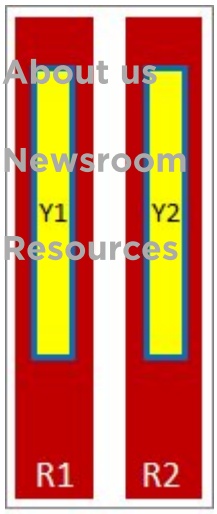
Dimensions - H x W x D	mm (in)	2436 x 609 x 215 (96 x 24 x 8.5)
Weight (Antenna Only)	kg (lb)	56 (123)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	78 (172)
Connector type		8 x 4.3-10 female at bottom
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		Direct Ground
Survival/Rated Wind Velocity	km/h	240 (150)
Wind Load @Rated Wind Front	N	1428
Wind Load @Rated Wind Side	N	434
Wind Load @Rated Wind Rear	N	1476
Survival wind Velocity	km/h	240

Order No.	Configuration	Mounting Hardware	Diameter	Weight
APxVAALL24_43-U-NA20	ACU-A20-SR Field Replace RET included (2)	APM40-5E Beam tilt kit (included)	60-120mm	78 Kg

Port	Array	Frequency	RET	AISG RET UID
1	R1	617-894	R1	RFxxxxxxxxxx-2R1
2		617-894		
3	R2	617-894		
4		617-894		
5	Y1	1695-2690	Y1	RFxxxxxxxxxx-2Y1
6		1695-2690		
7	Y2	1695-2690		
8		1695-2690		



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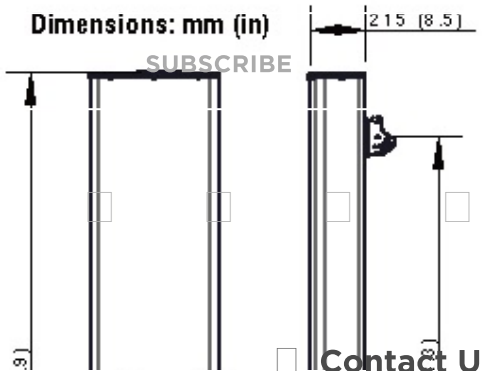
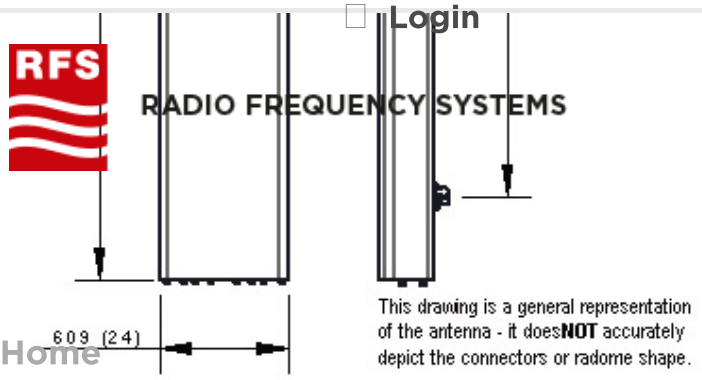
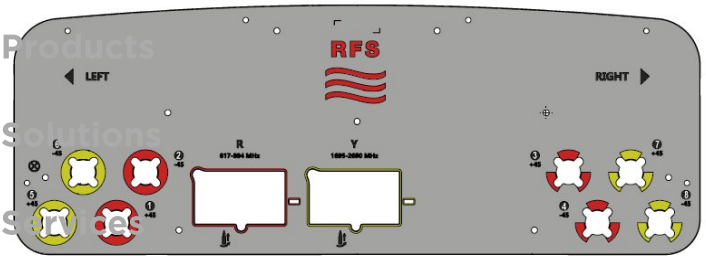






RET Information		
Frequency	617-894	1695-2690
Model	ACU-A20-SR	ACU-A20-SR
Location	Semi-internal	Semi-Internal
Field Replaceable	Yes	Yes
Quantity	1	1
RET ID	R1	Y1

External Document Links

APM40_Series_Installation_Instructions
Global RFS Website

Notes

- All electrical parameters are compliant with BASTA NGMN 11.1 requirements.
- For additional mounting information please click ""External Document Links"".

- **Radiating patterns:** Request pattern files

VV-65A-R1

4-port sector antenna, 4x 1695–2690 MHz, 65° HPBW, 1x RET,The two high band arrays utilize a common tilt.

- The RET interface comprises one pair of AISG input/output ports

General Specifications

Antenna Type	Sector
Band	Single band
Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage
Radome Material	PVC, UV resistant
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, total	4

Remote Electrical Tilt (RET) Information

RET Hardware	CommRET v2
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
Input Voltage	10–30 Vdc
Internal RET	High band (1)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	10 W
Protocol	3GPP/AISG 2.0

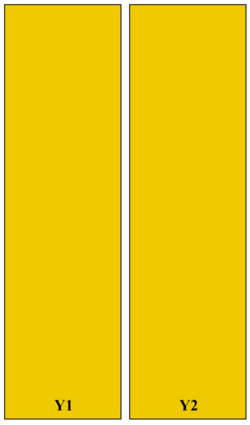
Dimensions

Width	307 mm | 12.087 in
Depth	118 mm | 4.646 in
Length	1390 mm | 54.724 in

VV-65A-R1

Net Weight, without mounting kit	10.8 kg | 23.81 lb

Array Layout



Array ID	Frequency (MHz)	RF Connector	HPBW	RET (SRET)	AISG No.	AISG RET UID
Y1	1695-2690	1 - 2	65°	1	AISG1	CPxxxxxxxxxxxxxxxY1
Y2	1695-2690	3 - 4	65°			

(Sizes of colored boxes are not true depictions of array sizes)

Port Configuration

Electrical Specifications

Impedance	50 ohm
Operating Frequency Band	1695 – 2690 MHz
Polarization	±45°
Total Input Power, maximum	400 W @ 50 °C

Electrical Specifications

Frequency Band, MHz	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2500**	**2490–2690**

Gain, dBi	17.5	17.7	18.2	18.5	18.6
Beamwidth, Horizontal, degrees	66	65	66	63	62
Beamwidth, Vertical, degrees	6.9	6.5	6.1	5.4	5.2
Beam Tilt, degrees	0–12	0–12	0–12	0–12	0–12
USLS (First Lobe), dB	17	18	18	21	21
Front-to-Back Ratio at 180°, dB	30	31	32	29	30
Isolation, Cross Polarization, dB	30	30	30	30	30
Isolation, Inter-band, dB	28	28	28	28	28
VSWR | Return loss, dB	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
Input Power per Port at 50°C, maximum, watts	300	300	300	300	250

Electrical Specifications, BASTA

Frequency Band, MHz	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2500**	**2490–2690**
Gain by all Beam Tilts, average, dBi	17.1	17.5	17.9	18.3	18.2
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.4	±0.4	±0.4	±0.5
Beamwidth, Horizontal Tolerance, degrees	±4.5	±3.5	±2.7	±2.5	±3.2
Beamwidth, Vertical Tolerance, degrees	±0.4	±0.3	±0.5	±0.2	±0.2
USLS, beampeak to 20° above beampeak, dB	16	17	17	18	16
Front-to-Back Total Power at 180° ± 30°, dB	24	26	27	26	26
CPR at Boresight, dB	16	17	17	20	19
CPR at Sector, dB	15	14	13	7	9

Mechanical Specifications

Wind Loading @ Velocity, frontal	494.0 N @ 150 km/h (111.1 lbf @ 150 km/h)
Wind Loading @ Velocity, lateral	102.0 N @ 150 km/h (22.9 lbf @ 150 km/h)
Wind Loading @ Velocity, rear	598.0 N @ 150 km/h (134.4 lbf @ 150 km/h)
Wind Speed, maximum	241 km/h | 149.75 mph

VV-65A-R1

Packaging and Weights

Width, packed	404 mm | 15.906 in
Depth, packed	278 mm | 10.945 in
Length, packed	1527 mm | 60.118 in
Weight, gross	19 kg | 41.888 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant/Exempted

Included Products

600899A-2	–	Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

New Product Introduction (10/27/2021)

Massive MIMO Mid-Band TDD
AIR6419 B41 (2.5GHz)
New Product Introduction Notification

ERICSSON

PURPOSE

Ericsson AIR6419 B41 is a next generation massive MIMO product as a successor to AIR6449 B41. In general, AIR6419 has the same technical capability (e.g., full IBW, 320W RF power), but, thanks to the new HW platform, it has several advantages over the previous AIR6449 model such as:

- Weight: -25% decrease
- Power consumption: -18% decrease

USAGE GUIDELINES

AIR6419 B41 is planned to replace AIR6449 on a go forward basis once available.

- Use existing AIR6449 if construction start is expected to complete before August 1st, 2022.
- Use AIR6419 if construction start is forecasted after August 1st, 2022.

Each site/market has a different entitlement timeline, but please refer to Average EC Duration per market (MLA vs. non-MLA) for site modification project. This will help the markets reverse-calculate what month should be the timing they should start transitioning to the new radio. For example, an average 6-months entitlement market will start using the new product starting from Feb 2022.

TIMELINES

- T-Mobile Lab Entry: Jan 2022
- T-Mobile FOA Entry: March 2022
- T-Mobile GA Forecast: May 15th, 2022
- T-Mobile First National Allocation Date: July 15th, 2022
- T-Mobile First Construction Date: Aug 1st, 2022

RFDS Update:

- New RFDS Templates for Anchor, Retain/NSD, Excalibur programs reflecting AIR6419 have been created already.
- Old AIR6449 RFDS Templates will be archived when its EOD is issued. Tentatively, Nov 15th but it may vary depending on the sites in the design pipe and build pace.

AFFECTED CONFIGURATIONS

Site configurations that are designed with AIR6419 B41 will have a "5D" (5 for 2.5GHz + D for AIR6419) after the low-band indicator and/or before L19 indicator in the naming convention e.g., 67D92DB => 67D5D998E, 92DB => 5D998E, etc.

PRODUCT DESCRIPTION

Frequency Range	LTE TDD B41: 2496 – 2690 MHz
Instantaneous BW	DL 194 MHz
Antenna Ports	64T64R
Technology	NR, LTE and NR+LTE MSMM
Antenna Elements	192 Antenna Elements (8 col x 12 rows x 2 pol)
Output RF Power	320 W (=64 TRX x 5W)
Data Ports	2 x 25Gb/s eCPRI
5G NR Support	YES
DC Feed	-48V DC power connector
Cooling	Passive cooling
Dimensions* (H x W x D)	36.3” x 20.9” x 9.0” (= 921x 531 x 229mm)
Weight*	83.3 lbs (=37.8 kg)
Power Consumption	1300 W
Electrical downtilt	-3 to 11 degrees
Horizontal beamwidth	+/- 65 degrees

*Note: Dimensions and weight are subject to change as the vendor finalizes the product. However, the numbers in the table are not going to exceed the ones of the final product.

WARRANTY: 1 Year

SPARES: 2% of install base. Additional units can be requested as per need.

Baseband Requirements

For a typical 3-sector or 4-sector site, one dedicated Baseband (RP6651) per site will be required.

BOM Items

SKU	Description	Qty
34552	AIR 6419 B41	1 per sector
33768	AIR 6419/5121/5331 Wall/Pole IRMKIT TILT	1 per AIR6419
34110	25G SFP	4 per AIR6419

The AIR6419 requires a voltage booster (i.e., PSU 48 13) depending on the length and gauge of HCS cable. Please refer to Voltage Booster design doc for its exact usage guidance.

SKU	Description	Qty
34513	PSU4813-R4A Voltage Booster Kit	1
34133	PSU installation kit for RBS61xx	Choose 1 per cabinet type
34134	PSU installation kit for PBC6200	
34135	PSU installation kit for E6x60/P6230	

LINKS

- Anchor 2022 Playbook
- Excalibur 2022 Playbook
- NSD 2022 Playbook
- Sprint Retain 2022 Playbook

CONTACTS

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Kyuho Son	Principal Engineer, HQ Cell Site Design	Kyuho.Son@T-Mobile.com
Priyanka Bhardwaj	Principal Engineer, HQ Cell Site Design	Priyanka.Bhardwaj3@T-Mobile.com
Roderick Pahati	Engineer, HQ Cell Site Design	Roderick.Pahati1@T-Mobile.com

Date: **April 27, 2022**

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Site Number:	7WAN098A
	Site Name:	N/A
Crown Castle Designation:	**BU Number:**	806957
	Site Name:	Williamsburg Gardens
	JDE Job Number:	711980
	Work Order Number:	2097400
	Order Number:	611571 Rev. 0
Engineering Firm Designation:	**TEP Project Number:**	241707.688670
Site Data:	**10010 Oaklyn Drive, Potomac, Montgomery County, MD 20854** **Latitude *38° 59' 42.57"*, Longitude *-77° 12' 14.13"*** **130 Foot - Monopine Tower**	

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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: Proposed Equipment Configuration **Sufficient Capacity**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 115 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Gautam Sopal, E.I. / PHX

Respectfully submitted by:

Martin L. Piercey, P.E.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of **Maryland**
License No. **33570**
Expiration Date: **9/12/2022**

This item has been electronically signed and sealed by Martin L. Piercey, P.E. on 4/27/2022 using a Digital Signature.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Digitally signed by Martin L Piercey
Date: 2022.04.27 16:59:46 -04'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 130-ft monopine tower designed by Valmont Microflect. The tower has been modified multiple times in the past to accommodate additional loading. The anchor rod modifications designed by Paul J. Ford and Company in September of 2008 were determined to be ineffective and not considered structurally in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1.0
Ice Thickness:	1.0 in
Wind Speed with Ice:	40 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
110.0	110.0	3	RFS Celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	3	1-5/8
		3	Commscope	VV-65A-R1_TMO w/ Mount Pipe		
		3	Ericsson	AIR 6419 B41_TMO w/ Mount Pipe		
		3	Ericsson	Radio 4460 B2/B25 B66_TMO		
		3	Ericsson	Radio 4480_TMOV2		
		1	Perfect Vision	PV-RP10S-HR-12-96		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
127.0	127.0	6	JMA Wireless	X7CQAP-FRO-860-VR0 w/ Mount Pipe	8 1	1-5/8 1/2
		1	GPS	GPS_A		
		3	Amphenol	HTXCW631619M000 w/ Mount Pipe		
		3	Samsung Telecom.	MT6407-77A w/ Mount Pipe		
		3	Samsung Telecom.	RFV01U-D1A		
		6	Commscope	CDX1923Q-DS-43		
		3	Samsung Telecom.	RFV01U-D2A		
		2	RFS Celwave	DB-B1-6C-12AB-0Z		
		1	Site Pro 1	RMQP-496-HK		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
118.0	118.0	3	Kathrein	800 10121 w/ Mount Pipe	8 2 2 3	7/8 13/16 3/8 5/16
		6	Commscope	NNHH-65C-R4_CCIV2 w/ Mount Pipe		
		3	Nokia	AHFIB_CCIV2		
		3	Nokia	AHLBBA		
		2	Raycap	DC6-48-60-18-8F		
		3	Alcatel Lucent	RRH4X25-WCS		
		3	Nokia	AHCA_CCIV3		
		1	Tower Mounts	Side Arm Mount [SO 101-3]		
		1	Tower Mounts	Miscellaneous [NA 508-3]		
110.0	110.0	3	Commscope	DT465B-2XR w/ Mount Pipe	4	1-1/4
		3	RFS Celwave	APXVSPP18-C w/ Mount Pipe		
		3	Alcatel Lucent	FD-RRH-2X50-800		
		3	Alcatel Lucent	TD-RRH8X20-25		
		9	RFS Celwave	ACU-A20-N		
108.0	108.0	6	Alcatel Lucent	800 External Notch Filter	-	-
		6	Alcatel Lucent	800MHZ RRH		
		6	Alcatel Lucent	1900MHZ RRH (65MHZ)		
98.0	98.0	3	JMA Wireless	MX08FRO665-21 w/ Mount Pipe	1	1-1/2
		3	Fujitsu	TA08025-B605		
		3	Fujitsu	TA08025-B604		
		1	Raycap	RDIDC-9181-PF-48		
		1	Tower Mounts	Commscope MC-K6MHDX-9-96 (3)		
90.0	90.0	6	Ericsson	KRY 112 71/2	-	-
		1	Tower Mounts	Side Arm Mount [SO 101-3]		
		1	Tower Mounts	Miscellaneous [NA 508-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	261743	CCISites
Tower Foundation Drawings	261734	CCISites
Tower Manufacturer Drawings	261735	CCISites
Tower Reinforcement Drawings	2207035	CCISites
Post-Modification Inspection	2331554	CCISites
Tower Reinforcement Drawings	2942459	CCISites
Post-Modification Inspection	3155122	CCISites

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

1) The tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)[1,2]

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP24.687x23.588x0.25	Pole	3.6%	Pass
125 - 120	Pole	TP25.787x24.687x0.25	Pole	10.0%	Pass
120 - 115	Pole	TP26.886x25.787x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP27.985x26.886x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP29.084x27.985x0.25	Pole	41.0%	Pass
105 - 100	Pole	TP30.184x29.084x0.25	Pole	53.7%	Pass
100 - 99.27	Pole	TP30.344x30.184x0.25	Pole	55.6%	Pass
99.27 - 99.02	Pole + Reinf.	TP30.399x30.344x0.475	Reinf. 9 Compression	43.2%	Pass
99.02 - 97.04	Pole + Reinf.	TP30.834x30.399x0.4625	Reinf. 9 Compression	47.3%	Pass
97.04 - 96.79	Pole + Reinf.	TP30.889x30.834x0.675	Reinf. 9 Compression	33.5%	Pass
96.79 - 96.33	Pole + Reinf.	TP30.99x30.889x0.675	Reinf. 9 Compression	34.1%	Pass
96.33 - 96.08	Pole + Reinf.	TP31.045x30.99x0.45	Reinf. 8 Tension Rupture	47.1%	Pass
96.08 - 94.29	Pole + Reinf.	TP31.439x31.045x0.45	Reinf. 8 Tension Rupture	50.5%	Pass
94.29 - 94.04	Pole + Reinf.	TP31.494x31.439x0.45	Reinf. 7 Tension Rupture	51.0%	Pass
94.04 - 91.5	Pole + Reinf.	TP32.052x31.494x0.45	Reinf. 7 Tension Rupture	55.7%	Pass
91.5 - 91.25	Pole + Reinf.	TP32.107x32.052x0.45	Reinf. 6 Tension Rupture	56.2%	Pass
91.25 - 86.25	Pole + Reinf.	TP33.207x32.107x0.4375	Reinf. 6 Tension Rupture	65.7%	Pass
86.25 - 86.08	Pole + Reinf.	TP33.244x33.207x0.4375	Reinf. 6 Tension Rupture	66.0%	Pass
86.08 - 85.83	Pole + Reinf.	TP33.299x33.244x0.4313	Reinf. 2 Tension Rupture	62.8%	Pass
85.83 - 81	Pole + Reinf.	TP35.515x33.299x0.425	Reinf. 2 Tension Rupture	71.2%	Pass
81 - 74.75	Pole + Reinf.	TP35.237x33.861x0.5188	Reinf. 2 Tension Rupture	68.3%	Pass
74.75 - 71	Pole + Reinf.	TP36.063x35.237x0.5063	Reinf. 2 Tension Rupture	72.9%	Pass
71 - 70.75	Pole + Reinf.	TP36.118x36.063x0.6938	Reinf. 5 Tension Rupture	59.1%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
70.75 - 65.75	Pole + Reinf.	TP37.219x36.118x0.6813	Reinf. 5 Tension Rupture	63.9%	Pass
65.75 - 60.75	Pole + Reinf.	TP38.32x37.219x0.6688	Reinf. 5 Tension Rupture	68.4%	Pass
60.75 - 60	Pole + Reinf.	TP38.485x38.32x0.6688	Reinf. 5 Tension Rupture	69.0%	Pass
60 - 59.75	Pole + Reinf.	TP38.54x38.485x0.6313	Reinf. 1 Tension Rupture	65.8%	Pass
59.75 - 54.75	Pole + Reinf.	TP39.641x38.54x0.6313	Reinf. 1 Tension Rupture	69.6%	Pass
54.75 - 50	Pole + Reinf.	TP42.008x39.641x0.6188	Reinf. 1 Tension Rupture	72.9%	Pass
50 - 43	Pole + Reinf.	TP41.539x39.999x0.8313	Reinf. 4 Tension Rupture	65.2%	Pass
43 - 42.85	Pole + Reinf.	TP41.572x41.539x0.8313	Reinf. 4 Tension Rupture	65.3%	Pass
42.85 - 37.85	Pole + Reinf.	TP42.672x41.572x0.8188	Reinf. 4 Tension Rupture	67.8%	Pass
37.85 - 32.85	Pole + Reinf.	TP43.773x42.672x0.8063	Reinf. 4 Tension Rupture	70.2%	Pass
32.85 - 27.85	Pole + Reinf.	TP44.873x43.773x0.7938	Reinf. 4 Tension Rupture	72.5%	Pass
27.85 - 26.25	Pole + Reinf.	TP45.225x44.873x0.7938	Reinf. 4 Tension Rupture	73.1%	Pass
26.25 - 26	Pole + Reinf.	TP45.28x45.225x0.9063	Reinf. 3 Bolt Shear	62.7%	Pass
26 - 21	Pole + Reinf.	TP46.38x45.28x0.8813	Reinf. 3 Compression	62.3%	Pass
21 - 16	Pole + Reinf.	TP47.48x46.38x0.8813	Reinf. 3 Compression	64.0%	Pass
16 - 11	Pole + Reinf.	TP48.58x47.48x0.8563	Reinf. 3 Compression	65.5%	Pass
11 - 6	Pole + Reinf.	TP49.68x48.58x0.8563	Reinf. 3 Compression	67.0%	Pass
6 - 1	Pole + Reinf.	TP50.78x49.68x0.8313	Reinf. 3 Compression	68.3%	Pass
1 - 0	Pole + Reinf.	TP51x50.78x0.8313	Reinf. 3 Compression	68.6%	Pass
				Summary	
			Pole	59.6%	Pass
			Reinforcement	73.1%	Pass
			Overall	**73.1%**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	86.9	Pass
1,2	Base Plate	-	54.4	Pass
1,2	Base Foundation Structural	-	87.2	Pass
1,2	Base Foundation Soil Interaction	-	68.0	Pass

Structure Rating (max from all components) =	**87.2%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5.

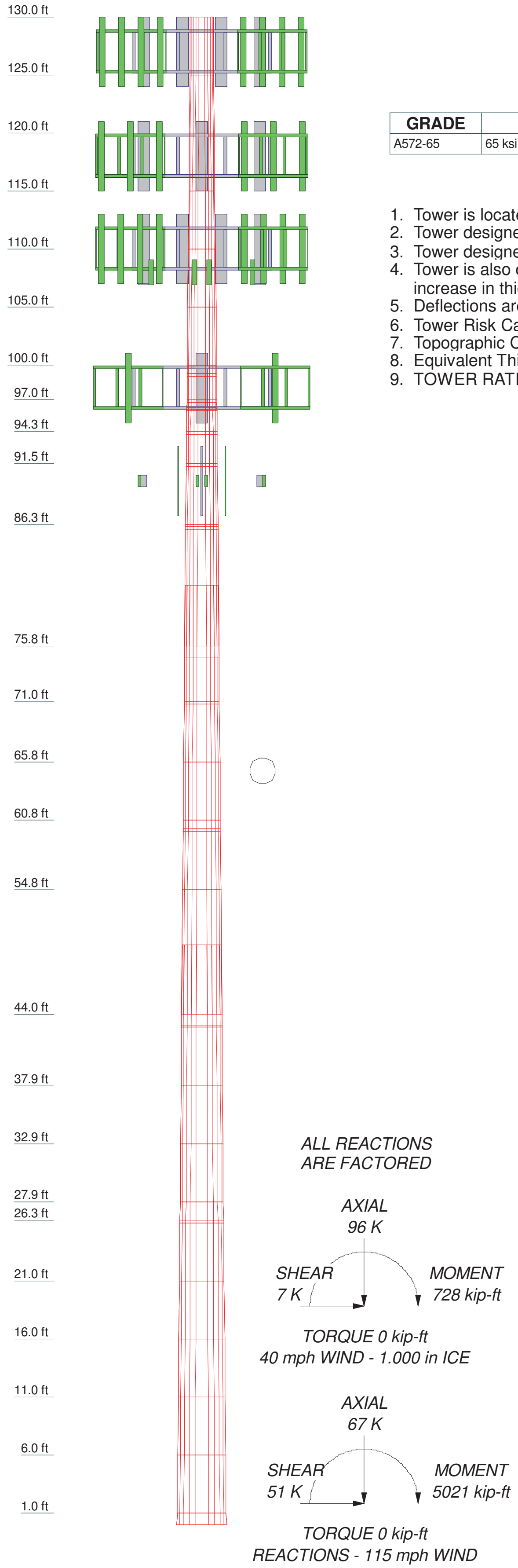
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	12	0.250		23.588	24.687	A572-65	0.3
2	5.00	12	0.250		24.687	25.787		0.3
3	5.00	12	0.250		25.787	26.886		0.4
4	5.00	12	0.250		26.886	27.985		0.4
5	5.00	12	0.250		27.985	29.084		0.4
6	5.00	12	0.250		29.084	30.184		0.4
7–16	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
17	5.00	12	[illegible]		[illegible]	[illegible]		0.7
18–19	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
20	10.08	12	0.425	5.25	33.299	35.515		1.5
21–23	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
24	5.00	12	0.681		[illegible]	[illegible]		1.3
25	5.00	12	0.669		37.219	38.320		1.3
26–27	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
28	5.00	12	0.631		[illegible]	[illegible]		1.2
29	10.75	12	0.619	6.00	39.641	42.008		2.8
30–31	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
32	5.00	12	0.819		[illegible]	[illegible]		1.8
33	5.00	12	0.806		42.672	43.773		1.8
34	5.00	12	0.794		43.773	44.873		1.8
35–36	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
37	5.00	12	0.881		[illegible]	[illegible]		2.1
38	5.00	12	0.881		46.380	47.480		2.1
39	5.00	12	0.856		47.480	48.580		2.1
40	5.00	12	0.856		48.580	49.680		2.1
41	5.00	12	0.831		49.680	50.780		2.2
42	1.00	12	0.831		50.780	51.000		0.4
								34.1



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Montgomery County, Maryland.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Equivalent Thickness Model
9. TOWER RATING: 73.1%

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: **Williamsburg Gardens (BU 806957)**		
Project: **TEP No. 241707.688670**		
Client: Crown Castle	Drawn by: DAR	App'd:
Code: TIA-222-H	Date: 04/27/22	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Montgomery County, Maryland.
Tower base elevation above sea level: 330.00 ft.
Basic wind speed of 115 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Equivalent Thickness Model.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	130.00-125.00	5.00	0.000	12	23.588	24.687	0.250	1.000	A572-65 (65 ksi)
L2	125.00-120.00	5.00	0.000	12	24.687	25.787	0.250	1.000	A572-65 (65 ksi)
L3	120.00-115.00	5.00	0.000	12	25.787	26.886	0.250	1.000	A572-65 (65 ksi)
L4	115.00-110.00	5.00	0.000	12	26.886	27.985	0.250	1.000	A572-65 (65 ksi)
L5	110.00-105.00	5.00	0.000	12	27.985	29.084	0.250	1.000	A572-65 (65 ksi)
L6	105.00-100.00	5.00	0.000	12	29.084	30.184	0.250	1.000	A572-65 (65 ksi)
L7	100.00-99.27	0.73	0.000	12	30.184	30.344	0.250	1.000	A572-65 (65 ksi)
L8	99.27-99.02	0.25	0.000	12	30.344	30.399	0.475	1.900	A572-65 (65 ksi)
L9	99.02-97.04	1.98	0.000	12	30.399	30.834	0.463	1.850	A572-65 (65 ksi)
L10	97.04-96.79	0.25	0.000	12	30.834	30.889	0.675	2.700	A572-65 (65 ksi)
L11	96.79-96.33	0.46	0.000	12	30.889	30.990	0.675	2.700	A572-65 (65 ksi)
L12	96.33-96.08	0.25	0.000	12	30.990	31.045	0.450	1.800	A572-65 (65 ksi)
L13	96.08-94.29	1.79	0.000	12	31.045	31.439	0.450	1.800	A572-65 (65 ksi)
L14	94.29-94.04	0.25	0.000	12	31.439	31.494	0.450	1.800	A572-65 (65 ksi)
L15	94.04-91.50	2.54	0.000	12	31.494	32.052	0.450	1.800	A572-65 (65 ksi)
L16	91.50-91.25	0.25	0.000	12	32.052	32.107	0.450	1.800	A572-65 (65 ksi)
L17	91.25-86.25	5.00	0.000	12	32.107	33.207	0.438	1.750	A572-65 (65 ksi)
L18	86.25-86.08	0.17	0.000	12	33.207	33.244	0.438	1.750	A572-65 (65 ksi)
L19	86.08-85.83	0.25	0.000	12	33.244	33.299	0.431	1.725	A572-65 (65 ksi)
L20	85.83-75.75	10.08	5.250	12	33.299	35.515	0.425	1.700	A572-65 (65 ksi)
L21	75.75-74.75	6.25	0.000	12	33.861	35.237	0.519	2.075	A572-65 (65 ksi)
L22	74.75-71.00	3.75	0.000	12	35.237	36.063	0.506	2.025	A572-65 (65 ksi)
L23	71.00-70.75	0.25	0.000	12	36.063	36.118	0.694	2.775	A572-65 (65 ksi)
L24	70.75-65.75	5.00	0.000	12	36.118	37.219	0.681	2.725	A572-65 (65 ksi)
L25	65.75-60.75	5.00	0.000	12	37.219	38.320	0.669	2.675	A572-65 (65 ksi)
L26	60.75-60.00	0.75	0.000	12	38.320	38.485	0.669	2.675	A572-65 (65 ksi)
L27	60.00-59.75	0.25	0.000	12	38.485	38.540	0.631	2.525	A572-65 (65 ksi)
L28	59.75-54.75	5.00	0.000	12	38.540	39.641	0.631	2.525	A572-65 (65 ksi)
L29	54.75-44.00	10.75	6.000	12	39.641	42.008	0.619	2.475	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L30	44.00-43.00	7.00	0.000	12	39.999	41.539	0.831	3.325	A572-65 (65 ksi)
L31	43.00-42.85	0.15	0.000	12	41.539	41.572	0.831	3.325	A572-65 (65 ksi)
L32	42.85-37.85	5.00	0.000	12	41.572	42.672	0.819	3.275	A572-65 (65 ksi)
L33	37.85-32.85	5.00	0.000	12	42.672	43.773	0.806	3.225	A572-65 (65 ksi)
L34	32.85-27.85	5.00	0.000	12	43.773	44.873	0.794	3.175	A572-65 (65 ksi)
L35	27.85-26.25	1.60	0.000	12	44.873	45.225	0.794	3.175	A572-65 (65 ksi)
L36	26.25-26.00	0.25	0.000	12	45.225	45.280	0.906	3.625	A572-65 (65 ksi)
L37	26.00-21.00	5.00	0.000	12	45.280	46.380	0.881	3.525	A572-65 (65 ksi)
L38	21.00-16.00	5.00	0.000	12	46.380	47.480	0.881	3.525	A572-65 (65 ksi)
L39	16.00-11.00	5.00	0.000	12	47.480	48.580	0.856	3.425	A572-65 (65 ksi)
L40	11.00-6.00	5.00	0.000	12	48.580	49.680	0.856	3.425	A572-65 (65 ksi)
L41	6.00-1.00	5.00	0.000	12	49.680	50.780	0.831	3.325	A572-65 (65 ksi)
L42	1.00-0.00	1.00		12	50.780	51.000	0.831	3.325	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.332	18.787	1306.089	8.355	12.219	106.894	2646.490	9.246	5.652	22.606
	25.470	19.672	1499.476	8.749	12.788	117.256	3038.345	9.682	5.946	23.785
L2	25.470	19.672	1499.476	8.749	12.788	117.256	3038.345	9.682	5.946	23.785
	26.608	20.557	1711.068	9.142	13.357	128.099	3467.087	10.117	6.241	24.963
L3	26.608	20.557	1711.068	9.142	13.357	128.099	3467.087	10.117	6.241	24.963
	27.746	21.442	1941.684	9.536	13.927	139.420	3934.378	10.553	6.535	26.142
L4	27.746	21.442	1941.684	9.536	13.927	139.420	3934.378	10.553	6.535	26.142
	28.884	22.327	2192.142	9.929	14.496	151.221	4441.874	10.989	6.830	27.32
L5	28.884	22.327	2192.142	9.929	14.496	151.221	4441.874	10.989	6.830	27.32
	30.022	23.212	2463.262	10.323	15.066	163.502	4991.237	11.424	7.125	28.498
L6	30.022	23.212	2463.262	10.323	15.066	163.502	4991.237	11.424	7.125	28.498
	31.160	24.097	2755.863	10.716	15.635	176.261	5584.126	11.860	7.419	29.677
L7	31.160	24.097	2755.863	10.716	15.635	176.261	5584.126	11.860	7.419	29.677
	31.326	24.226	2800.429	10.774	15.718	178.164	5674.428	11.923	7.462	29.849
L8	31.247	45.685	5202.361	10.693	15.718	330.976	10541.393	22.485	6.859	14.44
	31.304	45.769	5231.133	10.713	15.747	332.205	10599.693	22.526	6.874	14.471
L9	31.308	44.583	5099.857	10.717	15.747	323.868	10333.693	21.942	6.907	14.935
	31.759	45.231	5325.579	10.873	15.972	333.428	10791.067	22.261	7.024	15.187
L10	31.684	65.551	7610.463	10.797	15.972	476.482	15420.861	32.262	6.455	9.562
	31.741	65.671	7652.147	10.817	16.001	478.240	15505.325	32.321	6.469	9.584
L11	31.741	65.671	7652.147	10.817	16.001	478.240	15505.325	32.321	6.469	9.584
	31.846	65.891	7729.244	10.853	16.053	481.481	15661.543	32.429	6.496	9.624
L12	31.925	44.253	5268.415	10.933	16.053	328.188	10675.237	21.780	7.099	15.777
	31.982	44.333	5296.911	10.953	16.082	329.379	10732.977	21.819	7.114	15.809
L13	31.982	44.333	5296.911	10.953	16.082	329.379	10732.977	21.819	7.114	15.809

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	32.389	44.903	5503.947	11.094	16.285	337.969	11152.489	22.100	7.220	16.044
L14	32.389	44.903	5503.947	11.094	16.285	337.969	11152.489	22.100	7.220	16.044
	32.446	44.983	5533.285	11.114	16.314	339.177	11211.936	22.139	7.234	16.076
L15	32.446	44.983	5533.285	11.114	16.314	339.177	11211.936	22.139	7.234	16.076
	33.024	45.792	5837.291	11.314	16.603	351.578	11827.934	22.537	7.384	16.409
L16	33.024	45.792	5837.291	11.314	16.603	351.578	11827.934	22.537	7.384	16.409
	33.081	45.871	5867.801	11.333	16.632	352.811	11889.755	22.577	7.399	16.442
L17	33.086	44.615	5711.567	11.338	16.632	343.417	11573.183	21.958	7.432	16.988
	34.224	46.163	6327.197	11.731	17.201	367.839	12820.617	22.720	7.727	17.661
L18	34.224	46.163	6327.197	11.731	17.201	367.839	12820.617	22.720	7.727	17.661
	34.262	46.216	6348.871	11.745	17.220	368.684	12864.535	22.746	7.737	17.684
L19	34.265	45.564	6261.751	11.747	17.220	363.625	12688.005	22.425	7.754	17.979
	34.321	45.641	6293.270	11.767	17.249	364.852	12751.871	22.463	7.768	18.014
L20	34.324	44.988	6205.602	11.769	17.249	359.770	12574.232	22.142	7.785	18.318
	36.618	48.021	7547.113	12.562	18.397	410.241	15292.497	23.634	8.379	19.715
L21	36.069	55.694	7902.706	11.936	17.540	450.556	16013.025	27.411	7.684	14.813
	36.297	57.992	8922.226	12.429	18.253	488.815	18078.849	28.542	8.053	15.524
L22	36.301	56.615	8716.641	12.434	18.253	477.552	17662.277	27.864	8.087	15.974
	37.156	57.962	9353.261	12.729	18.680	500.697	18952.242	28.527	8.308	16.411
L23	37.090	79.010	12615.728	12.662	18.680	675.342	25562.885	38.886	7.806	11.251
	37.147	79.133	12674.726	12.682	18.709	677.466	25682.431	38.947	7.820	11.273
L24	37.152	77.734	12459.533	12.686	18.709	665.964	25246.391	38.259	7.854	11.529
	38.291	80.150	13657.302	13.080	19.279	708.391	27673.396	39.447	8.149	11.962
L25	38.296	78.706	13420.474	13.085	19.279	696.107	27193.518	38.737	8.182	12.235
	39.436	81.077	14670.146	13.479	19.850	739.064	29725.693	39.903	8.477	12.677
L26	39.436	81.077	14670.146	13.479	19.850	739.064	29725.693	39.903	8.477	12.677
	39.607	81.432	14864.034	13.538	19.935	745.619	30118.564	40.079	8.522	12.743
L27	39.620	76.942	14072.318	13.552	19.935	705.904	28514.332	37.869	8.622	13.659
	39.677	77.054	14133.802	13.571	19.964	707.976	28638.914	37.924	8.637	13.682
L28	39.677	77.054	14133.802	13.571	19.964	707.976	28638.914	37.924	8.637	13.682
	40.817	79.292	15401.371	13.965	20.534	750.043	31207.354	39.025	8.932	14.15
L29	40.821	77.747	15110.911	13.970	20.534	735.898	30618.802	38.265	8.966	14.49
	43.272	82.463	18030.995	14.817	21.760	828.625	36535.685	40.586	9.600	15.515
L30	42.484	104.838	20529.117	14.022	20.720	990.804	41597.557	51.598	8.492	10.216
	42.712	108.961	23047.206	14.574	21.517	1071.095	46699.889	53.627	8.905	10.713
L31	42.712	108.961	23047.206	14.574	21.517	1071.095	46699.889	53.627	8.905	10.713
	42.746	109.049	23103.305	14.585	21.535	1072.850	46813.559	53.671	8.914	10.723
L32	42.750	107.442	22776.839	14.590	21.535	1057.690	46152.050	52.880	8.947	10.928
	43.889	110.342	24671.525	14.984	22.104	1116.139	49991.199	54.307	9.242	11.288
L33	43.893	108.690	24316.635	14.988	22.104	1100.084	49272.095	53.494	9.275	11.504
	45.032	111.546	26284.256	15.382	22.674	1159.215	53259.028	54.900	9.570	11.87
L34	45.037	109.848	25899.339	15.386	22.674	1142.239	52479.082	54.064	9.604	12.099
	46.176	112.660	27939.401	15.780	23.244	1202.004	56612.801	55.448	9.899	12.471
L35	46.176	112.660	27939.401	15.780	23.244	1202.004	56612.801	55.448	9.899	12.471
	46.540	113.560	28614.148	15.906	23.426	1221.450	57980.021	55.891	9.993	12.59
L36	46.500	129.327	32422.163	15.866	23.426	1384.003	65696.092	63.651	9.691	10.694
	46.557	129.487	32543.030	15.886	23.455	1387.475	65941.001	63.730	9.706	10.71
L37	46.566	125.986	31698.808	15.895	23.455	1351.481	64230.379	62.006	9.773	11.09
	47.705	129.108	34113.892	16.288	24.025	1419.951	69123.994	63.543	10.068	11.425
L38	47.705	129.108	34113.892	16.288	24.025	1419.951	69123.994	63.543	10.068	11.425
	48.844	132.229	36648.630	16.682	24.595	1490.113	74260.060	65.079	10.363	11.759
L39	48.853	128.547	35666.296	16.691	24.595	1450.172	72269.584	63.267	10.430	12.181
	49.992	131.580	38250.935	17.085	25.164	1520.044	77506.765	64.760	10.725	12.525
L40	49.992	131.580	38250.935	17.085	25.164	1520.044	77506.765	64.760	10.725	12.525
	51.130	134.613	40957.520	17.479	25.734	1591.560	82991.040	66.252	11.019	12.869
L41	51.139	130.750	39822.791	17.488	25.734	1547.466	80691.771	64.351	11.086	13.337
	52.278	133.694	42574.250	17.882	26.304	1618.545	86266.972	65.800	11.381	13.692
L42	52.278	133.694	42574.250	17.882	26.304	1618.545	86266.972	65.800	11.381	13.692
	52.506	134.283	43139.323	17.960	26.418	1632.952	87411.963	66.090	11.440	13.763

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.00-125.00				1	1	1			
L2 125.00-120.00				1	1	1			
L3 120.00-115.00				1	1	1			
L4 115.00-110.00				1	1	1			
L5 110.00-105.00				1	1	1			
L6 105.00-100.00				1	1	1			
L7 100.00-99.27				1	1	1			
L8 99.27-99.02				1	1	0.940528			
L9 99.02-97.04				1	1	0.959453			
L10 97.04-96.79				1	1	0.935992			
L11 96.79-96.33				1	1	0.934105			
L12 96.33-96.08				1	1	0.96579			
L13 96.08-94.29				1	1	0.96058			
L14 94.29-94.04				1	1	0.959863			
L15 94.04-91.50				1	1	0.952719			
L16 91.50-91.25				1	1	0.952029			
L17 91.25-86.25				1	1	0.965177			
L18 86.25-86.08				1	1	0.964728			
L19 86.08-85.83				1	1	0.954817			
L20 85.83-75.75				1	1	0.95677			
L21 75.75-74.75				1	1	0.958689			
L22 74.75-71.00				1	1	0.97497			
L23 71.00-70.75				1	1	0.942687			
L24 70.75-65.75				1	1	0.945933			
L25 65.75-60.75				1	1	0.950147			
L26 60.75-60.00				1	1	0.948242			
L27 60.00-59.75				1	1	0.951056			
L28 59.75-54.75				1	1	0.939583			
L29 54.75-44.00				1	1	0.947746			
L30 44.00-43.00				1	1	0.943805			
L31				1	1	0.943437			

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
43.00-42.85									
L32				1	1	0.94542			
42.85-37.85									
L33				1	1	0.948119			
37.85-32.85									
L34				1	1	0.951515			
32.85-27.85									
L35				1	1	0.948031			
27.85-26.25									
L36				1	1	0.939283			
26.25-26.00									
L37				1	1	0.95319			
26.00-21.00									
L38				1	1	0.941571			
21.00-16.00									
L39				1	1	0.957153			
16.00-11.00									
L40 11.00-6.00				1	1	0.946277			
L41 6.00-1.00				1	1	0.963545			
L42 1.00-0.00				1	1	0.961463			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
HB158-1-08U8-S8J18(1-5/8)	B	No	Surface Ar (CaAa)	127.00 - 0.00	2	2	0.500 0.500	1.980		1.300
Mods										
MP3-08 (1.1875in)W	A	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
MP3-08 (1.1875in)W	C	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
MP3-08 (1.1875in)W	B	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
***										
MP3-05 (1.1875in)	A	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
MP3-05 (1.1875in)	C	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
MP3-05 (1.1875in)	B	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
***										
MS-850 (1.1875")W	A	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
MS-850 (1.1875")W	C	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
MS-850 (1.1875")W	B	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
MS-600 (1.1875")	B	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
***										
Sabre PL 5"x1.25"	A	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
Sabre PL 5"x1.25"	C	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
Sabre PL 5"x1.25"	B	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
***										
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Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
127									
AVA7-50(1-5/8)	B	No	No	Inside Pole	127.00 - 0.00	6	No Ice	0.00	0.700
							1/2" Ice	0.00	0.700
							1" Ice	0.00	0.700
LDF4-50A(1/2)	B	No	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	0.150
							1/2" Ice	0.00	0.150
							1" Ice	0.00	0.150
118									
LDF5-50A(7/8)	C	No	No	Inside Pole	118.00 - 0.00	6	No Ice	0.00	0.330
							1/2" Ice	0.00	0.330
							1" Ice	0.00	0.330

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
6-8AWG 3 PAIR(7/8)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.680
							1/2" Ice	0.00	0.680
							1" Ice	0.00	0.680
PWRT-608-S(13/16)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.620
							1/2" Ice	0.00	0.620
							1" Ice	0.00	0.620
12 PAIR(3/8)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.080
							1/2" Ice	0.00	0.080
							1" Ice	0.00	0.080
860-10025(5/16)	C	No	No	Inside Pole	118.00 - 0.00	3	No Ice	0.00	0.000
							1/2" Ice	0.00	0.000
							1" Ice	0.00	0.000
110_TMO HB158-21U6S24-xx M_TMO(1-5/8)	A	No	No	Inside Pole	110.00 - 0.00	3	No Ice	0.00	2.500
							1/2" Ice	0.00	2.500
							1" Ice	0.00	2.500
110_Sprint HB114-13U3M12-X XXF(1-1/4)	A	No	No	Inside Pole	110.00 - 0.00	3	No Ice	0.00	0.992
							1/2" Ice	0.00	0.992
							1" Ice	0.00	0.992
HB114-1-08U4-M5 F(1-1/4)	A	No	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	1.300
							1/2" Ice	0.00	1.300
							1" Ice	0.00	1.300
98 CU12PSM9P6XXX(1-1/2)	B	No	No	Inside Pole	98.00 - 0.00	1	No Ice	0.00	2.350
							1/2" Ice	0.00	2.350
							1" Ice	0.00	2.350
*** ********** *									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-125.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.792	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L2	125.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L3	120.00-115.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.01
L4	115.00-110.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.02
L5	110.00-105.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.02
L6	105.00-100.00	A	0.000	0.000	0.902	0.000	0.06
		B	0.000	0.000	2.882	0.000	0.03
		C	0.000	0.000	0.902	0.000	0.02

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L7	100.00-99.27	A	0.000	0.000	0.519	0.000	0.01
		B	0.000	0.000	0.808	0.000	0.01
		C	0.000	0.000	0.519	0.000	0.00
L8	99.27-99.02	A	0.000	0.000	0.194	0.000	0.00
		B	0.000	0.000	0.293	0.000	0.00
		C	0.000	0.000	0.194	0.000	0.00
L9	99.02-97.04	A	0.000	0.000	3.001	0.000	0.02
		B	0.000	0.000	3.785	0.000	0.02
		C	0.000	0.000	3.001	0.000	0.01
L10	97.04-96.79	A	0.000	0.000	0.379	0.000	0.00
		B	0.000	0.000	0.478	0.000	0.00
		C	0.000	0.000	0.379	0.000	0.00
L11	96.79-96.33	A	0.000	0.000	0.697	0.000	0.01
		B	0.000	0.000	0.879	0.000	0.00
		C	0.000	0.000	0.697	0.000	0.00
L12	96.33-96.08	A	0.000	0.000	0.379	0.000	0.00
		B	0.000	0.000	0.478	0.000	0.00
		C	0.000	0.000	0.379	0.000	0.00
L13	96.08-94.29	A	0.000	0.000	3.683	0.000	0.02
		B	0.000	0.000	4.392	0.000	0.02
		C	0.000	0.000	3.683	0.000	0.01
L14	94.29-94.04	A	0.000	0.000	0.382	0.000	0.00
		B	0.000	0.000	0.481	0.000	0.00
		C	0.000	0.000	0.382	0.000	0.00
L15	94.04-91.50	A	0.000	0.000	4.971	0.000	0.03
		B	0.000	0.000	5.977	0.000	0.02
		C	0.000	0.000	4.971	0.000	0.01
L16	91.50-91.25	A	0.000	0.000	0.274	0.000	0.00
		B	0.000	0.000	0.373	0.000	0.00
		C	0.000	0.000	0.274	0.000	0.00
L17	91.25-86.25	A	0.000	0.000	6.384	0.000	0.06
		B	0.000	0.000	8.364	0.000	0.05
		C	0.000	0.000	6.384	0.000	0.02
L18	86.25-86.08	A	0.000	0.000	0.298	0.000	0.00
		B	0.000	0.000	0.365	0.000	0.00
		C	0.000	0.000	0.298	0.000	0.00
L19	86.08-85.83	A	0.000	0.000	0.438	0.000	0.00
		B	0.000	0.000	0.537	0.000	0.00
		C	0.000	0.000	0.438	0.000	0.00
L20	85.83-75.75	A	0.000	0.000	9.671	0.000	0.12
		B	0.000	0.000	13.662	0.000	0.09
		C	0.000	0.000	9.671	0.000	0.05
L21	75.75-74.75	A	0.000	0.000	0.888	0.000	0.01
		B	0.000	0.000	1.284	0.000	0.01
		C	0.000	0.000	0.888	0.000	0.00
L22	74.75-71.00	A	0.000	0.000	5.331	0.000	0.04
		B	0.000	0.000	6.816	0.000	0.03
		C	0.000	0.000	5.331	0.000	0.02
L23	71.00-70.75	A	0.000	0.000	0.472	0.000	0.00
		B	0.000	0.000	0.571	0.000	0.00
		C	0.000	0.000	0.472	0.000	0.00
L24	70.75-65.75	A	0.000	0.000	9.442	0.000	0.06
		B	0.000	0.000	11.422	0.000	0.05
		C	0.000	0.000	9.442	0.000	0.02
L25	65.75-60.75	A	0.000	0.000	9.442	0.000	0.06
		B	0.000	0.000	11.422	0.000	0.05
		C	0.000	0.000	9.442	0.000	0.02
L26	60.75-60.00	A	0.000	0.000	1.562	0.000	0.01
		B	0.000	0.000	1.859	0.000	0.01
		C	0.000	0.000	1.562	0.000	0.00
L27	60.00-59.75	A	0.000	0.000	0.580	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.679	0.000	0.00
		C	0.000	0.000	0.580	0.000	0.00
L28	59.75-54.75	A	0.000	0.000	8.358	0.000	0.06
		B	0.000	0.000	10.338	0.000	0.05
		C	0.000	0.000	8.358	0.000	0.02
L29	54.75-44.00	A	0.000	0.000	15.308	0.000	0.13
		B	0.000	0.000	19.565	0.000	0.10
		C	0.000	0.000	15.308	0.000	0.05
L30	44.00-43.00	A	0.000	0.000	2.322	0.000	0.01
		B	0.000	0.000	2.718	0.000	0.01
		C	0.000	0.000	2.322	0.000	0.00
L31	43.00-42.85	A	0.000	0.000	0.348	0.000	0.00
		B	0.000	0.000	0.408	0.000	0.00
		C	0.000	0.000	0.348	0.000	0.00
L32	42.85-37.85	A	0.000	0.000	11.608	0.000	0.06
		B	0.000	0.000	13.588	0.000	0.05
		C	0.000	0.000	11.608	0.000	0.02
L33	37.85-32.85	A	0.000	0.000	11.608	0.000	0.06
		B	0.000	0.000	13.588	0.000	0.05
		C	0.000	0.000	11.608	0.000	0.02
L34	32.85-27.85	A	0.000	0.000	12.504	0.000	0.06
		B	0.000	0.000	14.484	0.000	0.05
		C	0.000	0.000	12.504	0.000	0.02
L35	27.85-26.25	A	0.000	0.000	4.381	0.000	0.02
		B	0.000	0.000	5.015	0.000	0.01
		C	0.000	0.000	4.381	0.000	0.01
L36	26.25-26.00	A	0.000	0.000	0.685	0.000	0.00
		B	0.000	0.000	0.784	0.000	0.00
		C	0.000	0.000	0.685	0.000	0.00
L37	26.00-21.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L38	21.00-16.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L39	16.00-11.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L40	11.00-6.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L41	6.00-1.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L42	1.00-0.00	A	0.000	0.000	2.738	0.000	0.01
		B	0.000	0.000	3.134	0.000	0.01
		C	0.000	0.000	2.738	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-125.00	A	0.973	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	1.476	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L2	125.00-120.00	A	0.969	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.686	0.000	0.06

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.00
L3	120.00-115.00	A	0.965	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.681	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.01
L4	115.00-110.00	A	0.961	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.676	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.02
L5	110.00-105.00	A	0.957	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	3.671	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.02
L6	105.00-100.00	A	0.952	0.000	0.000	1.033	0.000	0.07
		B		0.000	0.000	4.698	0.000	0.07
		C		0.000	0.000	1.033	0.000	0.03
L7	100.00-99.27	A	0.949	0.000	0.000	0.594	0.000	0.01
		B		0.000	0.000	1.128	0.000	0.01
		C		0.000	0.000	0.594	0.000	0.01
L8	99.27-99.02	A	0.949	0.000	0.000	0.222	0.000	0.00
		B		0.000	0.000	0.405	0.000	0.00
		C		0.000	0.000	0.222	0.000	0.00
L9	99.02-97.04	A	0.948	0.000	0.000	3.409	0.000	0.05
		B		0.000	0.000	4.858	0.000	0.05
		C		0.000	0.000	3.409	0.000	0.03
L10	97.04-96.79	A	0.947	0.000	0.000	0.430	0.000	0.01
		B		0.000	0.000	0.613	0.000	0.01
		C		0.000	0.000	0.430	0.000	0.00
L11	96.79-96.33	A	0.946	0.000	0.000	0.792	0.000	0.01
		B		0.000	0.000	1.128	0.000	0.01
		C		0.000	0.000	0.792	0.000	0.01
L12	96.33-96.08	A	0.946	0.000	0.000	0.430	0.000	0.01
		B		0.000	0.000	0.613	0.000	0.01
		C		0.000	0.000	0.430	0.000	0.00
L13	96.08-94.29	A	0.945	0.000	0.000	4.189	0.000	0.05
		B		0.000	0.000	5.498	0.000	0.06
		C		0.000	0.000	4.189	0.000	0.04
L14	94.29-94.04	A	0.944	0.000	0.000	0.434	0.000	0.01
		B		0.000	0.000	0.616	0.000	0.01
		C		0.000	0.000	0.434	0.000	0.00
L15	94.04-91.50	A	0.943	0.000	0.000	5.617	0.000	0.07
		B		0.000	0.000	7.472	0.000	0.08
		C		0.000	0.000	5.617	0.000	0.05
L16	91.50-91.25	A	0.941	0.000	0.000	0.307	0.000	0.01
		B		0.000	0.000	0.490	0.000	0.01
		C		0.000	0.000	0.307	0.000	0.00
L17	91.25-86.25	A	0.938	0.000	0.000	7.328	0.000	0.11
		B		0.000	0.000	10.976	0.000	0.12
		C		0.000	0.000	7.328	0.000	0.07
L18	86.25-86.08	A	0.936	0.000	0.000	0.347	0.000	0.00
		B		0.000	0.000	0.471	0.000	0.00
		C		0.000	0.000	0.347	0.000	0.00
L19	86.08-85.83	A	0.935	0.000	0.000	0.510	0.000	0.01
		B		0.000	0.000	0.692	0.000	0.01
		C		0.000	0.000	0.510	0.000	0.00
L20	85.83-75.75	A	0.930	0.000	0.000	11.628	0.000	0.19
		B		0.000	0.000	18.960	0.000	0.22
		C		0.000	0.000	11.628	0.000	0.12
L21	75.75-74.75	A	0.923	0.000	0.000	1.074	0.000	0.02
		B		0.000	0.000	1.802	0.000	0.02
		C		0.000	0.000	1.074	0.000	0.01
L22	74.75-71.00	A	0.920	0.000	0.000	6.368	0.000	0.08
		B		0.000	0.000	9.087	0.000	0.09
		C		0.000	0.000	6.368	0.000	0.05

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L23	71.00-70.75	A	0.918	0.000	0.000	0.561	0.000	0.01
		B		0.000	0.000	0.742	0.000	0.01
		C		0.000	0.000	0.561	0.000	0.00
L24	70.75-65.75	A	0.914	0.000	0.000	11.221	0.000	0.12
		B		0.000	0.000	14.838	0.000	0.13
		C		0.000	0.000	11.221	0.000	0.09
L25	65.75-60.75	A	0.907	0.000	0.000	11.210	0.000	0.12
		B		0.000	0.000	14.819	0.000	0.13
		C		0.000	0.000	11.210	0.000	0.09
L26	60.75-60.00	A	0.903	0.000	0.000	1.812	0.000	0.02
		B		0.000	0.000	2.352	0.000	0.02
		C		0.000	0.000	1.812	0.000	0.01
L27	60.00-59.75	A	0.902	0.000	0.000	0.668	0.000	0.01
		B		0.000	0.000	0.849	0.000	0.01
		C		0.000	0.000	0.668	0.000	0.00
L28	59.75-54.75	A	0.898	0.000	0.000	9.556	0.000	0.11
		B		0.000	0.000	13.154	0.000	0.12
		C		0.000	0.000	9.556	0.000	0.08
L29	54.75-44.00	A	0.885	0.000	0.000	17.399	0.000	0.22
		B		0.000	0.000	25.098	0.000	0.25
		C		0.000	0.000	17.399	0.000	0.15
L30	44.00-43.00	A	0.874	0.000	0.000	2.670	0.000	0.03
		B		0.000	0.000	3.386	0.000	0.03
		C		0.000	0.000	2.670	0.000	0.02
L31	43.00-42.85	A	0.873	0.000	0.000	0.400	0.000	0.00
		B		0.000	0.000	0.507	0.000	0.00
		C		0.000	0.000	0.400	0.000	0.00
L32	42.85-37.85	A	0.867	0.000	0.000	13.317	0.000	0.13
		B		0.000	0.000	16.876	0.000	0.14
		C		0.000	0.000	13.317	0.000	0.09
L33	37.85-32.85	A	0.856	0.000	0.000	13.296	0.000	0.13
		B		0.000	0.000	16.841	0.000	0.14
		C		0.000	0.000	13.296	0.000	0.09
L34	32.85-27.85	A	0.843	0.000	0.000	14.177	0.000	0.13
		B		0.000	0.000	17.706	0.000	0.14
		C		0.000	0.000	14.177	0.000	0.10
L35	27.85-26.25	A	0.833	0.000	0.000	4.915	0.000	0.04
		B		0.000	0.000	6.040	0.000	0.05
		C		0.000	0.000	4.915	0.000	0.03
L36	26.25-26.00	A	0.830	0.000	0.000	0.768	0.000	0.01
		B		0.000	0.000	0.943	0.000	0.01
		C		0.000	0.000	0.768	0.000	0.00
L37	26.00-21.00	A	0.822	0.000	0.000	15.335	0.000	0.13
		B		0.000	0.000	18.837	0.000	0.14
		C		0.000	0.000	15.335	0.000	0.10
L38	21.00-16.00	A	0.802	0.000	0.000	15.296	0.000	0.13
		B		0.000	0.000	18.774	0.000	0.14
		C		0.000	0.000	15.296	0.000	0.10
L39	16.00-11.00	A	0.777	0.000	0.000	15.246	0.000	0.13
		B		0.000	0.000	18.693	0.000	0.14
		C		0.000	0.000	15.246	0.000	0.09
L40	11.00-6.00	A	0.742	0.000	0.000	15.176	0.000	0.13
		B		0.000	0.000	18.578	0.000	0.13
		C		0.000	0.000	15.176	0.000	0.09
L41	6.00-1.00	A	0.679	0.000	0.000	15.050	0.000	0.12
		B		0.000	0.000	18.373	0.000	0.13
		C		0.000	0.000	15.050	0.000	0.08
L42	1.00-0.00	A	0.559	0.000	0.000	2.962	0.000	0.02
		B		0.000	0.000	3.597	0.000	0.02
		C		0.000	0.000	2.962	0.000	0.01

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	130.00-125.00	0.852	0.492	1.065	0.615
L2	125.00-120.00	1.899	1.096	2.159	1.246
L3	120.00-115.00	1.906	1.100	2.183	1.260
L4	115.00-110.00	1.912	1.104	2.205	1.273
L5	110.00-105.00	1.918	1.108	2.226	1.285
L6	105.00-100.00	1.614	0.932	1.972	1.139
L7	100.00-99.27	1.106	0.638	1.467	0.847
L8	99.27-99.02	1.067	0.616	1.426	0.823
L9	99.02-97.04	0.751	0.434	1.062	0.613
L10	97.04-96.79	0.755	0.436	1.068	0.617
L11	96.79-96.33	0.757	0.437	1.070	0.618
L12	96.33-96.08	0.757	0.437	1.071	0.618
L13	96.08-94.29	0.625	0.361	0.904	0.522
L14	94.29-94.04	0.760	0.439	1.075	0.621
L15	94.04-91.50	0.653	0.377	0.944	0.545
L16	91.50-91.25	0.928	0.536	1.283	0.741
L17	91.25-86.25	0.862	0.498	1.194	0.690
L18	86.25-86.08	0.722	0.417	1.016	0.586
L19	86.08-85.83	0.723	0.417	1.017	0.587
L20	85.83-75.75	1.026	0.592	1.364	0.788
L21	75.75-74.75	1.074	0.620	1.420	0.820
L22	74.75-71.00	0.853	0.492	1.163	0.672
L23	71.00-70.75	0.725	0.419	1.009	0.583
L24	70.75-65.75	0.733	0.423	1.019	0.588
L25	65.75-60.75	0.746	0.431	1.036	0.598
L26	60.75-60.00	0.709	0.409	1.002	0.579
L27	60.00-59.75	0.661	0.382	0.946	0.546
L28	59.75-54.75	0.819	0.473	1.150	0.664
L29	54.75-44.00	0.918	0.530	1.274	0.735
L30	44.00-43.00	0.693	0.400	0.988	0.570
L31	43.00-42.85	0.695	0.401	0.987	0.570
L32	42.85-37.85	0.701	0.405	0.994	0.574
L33	37.85-32.85	0.712	0.411	1.008	0.582
L34	32.85-27.85	0.690	0.398	0.983	0.567
L35	27.85-26.25	0.657	0.379	0.944	0.545
L36	26.25-26.00	0.659	0.380	0.946	0.546
L37	26.00-21.00	0.664	0.383	0.952	0.550
L38	21.00-16.00	0.675	0.389	0.962	0.556
L39	16.00-11.00	0.685	0.395	0.971	0.560
L40	11.00-6.00	0.695	0.401	0.976	0.564
L41	6.00-1.00	0.705	0.407	0.975	0.563
L42	1.00-0.00	0.711	0.410	0.952	0.550

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	HB158-1-08U8-S8J18(1-5/8)	125.00 - 127.00	1.0000	1.0000
L2	3	HB158-1-08U8-S8J18(1-5/8)	120.00 - 125.00	1.0000	1.0000
L3	3	HB158-1-08U8-S8J18(1-5/8)	115.00 - 120.00	1.0000	1.0000
L4	3	HB158-1-08U8-S8J18(1-5/8)	110.00 - 115.00	1.0000	1.0000
L5	3	HB158-1-08U8-S8J18(1-5/8)	105.00 - 110.00	1.0000	1.0000
L6	3	HB158-1-08U8-S8J18(1-5/8)	100.00 - 105.00	1.0000	1.0000
L6	51	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L6	52	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L6	53	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L7	3	HB158-1-08U8-S8J18(1-5/8)	99.27 - 100.00	1.0000	1.0000
L7	51	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L7	52	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L7	53	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L8	3	HB158-1-08U8-S8J18(1-5/8)	99.02 - 99.27	1.0000	1.0000
L8	47	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	48	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	49	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	51	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L8	52	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L8	53	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L9	3	HB158-1-08U8-S8J18(1-5/8)	97.04 - 99.02	1.0000	1.0000
L9	47	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	48	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	49	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	51	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L9	52	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L9	53	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L10	3	HB158-1-08U8-S8J18(1-5/8)	96.79 - 97.04	1.0000	1.0000
L10	47	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	48	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	49	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	51	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L10	52	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L10	53	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L11	3	HB158-1-08U8-S8J18(1-5/8)	96.33 - 96.79	1.0000	1.0000
L11	47	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	48	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	49	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	51	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L11	52	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L11	53	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L12	3	HB158-1-08U8-S8J18(1-5/8)	96.08 - 96.33	1.0000	1.0000
L12	47	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	48	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	49	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	51	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L12	52	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L12	53	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L13	3	HB158-1-08U8-S8J18(1-5/8)	94.29 - 96.08	1.0000	1.0000
L13	43	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	44	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	45	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	47	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L13	48	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000
L13	49	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000
L13	51	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L13	52	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L13	53	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L14	3	HB158-1-08U8-S8J18(1-5/8)	94.04 - 94.29	1.0000	1.0000
L14	43	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	44	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	45	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	47	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	48	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	49	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L15	3	HB158-1-08U8-S8J18(1-5/8)	91.50 - 94.04	1.0000	1.0000
L15	39	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	40	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	41	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	43	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	44	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	45	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	47	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L15	48	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L15	49	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L16	3	HB158-1-08U8-S8J18(1-5/8)	91.25 - 91.50	1.0000	1.0000
L16	39	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	40	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	41	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	43	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L16	44	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L16	45	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L17	3	HB158-1-08U8-S8J18(1-5/8)	86.25 - 91.25	1.0000	1.0000
L17	23	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	24	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	25	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	39	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L17	40	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L17	41	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L18	3	HB158-1-08U8-S8J18(1-5/8)	86.08 - 86.25	1.0000	1.0000
L18	23	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	24	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	25	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	39	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L18	40	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L18	41	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L19	3	HB158-1-08U8-S8J18(1-5/8)	85.83 - 86.08	1.0000	1.0000
L19	23	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	24	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	25	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	39	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L19	40	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L19	41	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L20	3	HB158-1-08U8-S8J18(1-5/8)	75.75 - 85.83	1.0000	1.0000
L20	23	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	24	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	25	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	39	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L20	40	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L20	41	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L21	3	HB158-1-08U8-S8J18(1-5/8)	74.75 - 75.75	1.0000	1.0000
L21	23	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L21	24	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L21	25	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L22	3	HB158-1-08U8-S8J18(1-5/8)	71.00 - 74.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	23	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	24	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	25	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	35	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L22	36	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L22	37	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L23	3	HB158-1-08U8-S8J18(1-5/8)	70.75 - 71.00	1.0000	1.0000
L23	23	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	24	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	25	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	35	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L23	36	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L23	37	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L24	3	HB158-1-08U8-S8J18(1-5/8)	65.75 - 70.75	1.0000	1.0000
L24	23	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	24	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	25	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	35	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L24	36	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L24	37	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L25	3	HB158-1-08U8-S8J18(1-5/8)	60.75 - 65.75	1.0000	1.0000
L25	23	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	24	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	25	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	35	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L25	36	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L25	37	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L26	3	HB158-1-08U8-S8J18(1-5/8)	60.00 - 60.75	1.0000	1.0000
L26	19	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	20	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	21	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	23	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	24	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	25	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	35	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L26	36	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L26	37	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L27	3	HB158-1-08U8-S8J18(1-5/8)	59.75 - 60.00	1.0000	1.0000
L27	19	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	20	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	21	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	35	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L27	36	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L27	37	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L28	3	HB158-1-08U8-S8J18(1-5/8)	54.75 - 59.75	1.0000	1.0000
L28	19	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	20	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	21	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	35	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L28	36	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L28	37	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L29	3	HB158-1-08U8-S8J18(1-5/8)	44.00 - 54.75	1.0000	1.0000
L29	19	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	20	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	21	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	31	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L29	32	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L29	33	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L30	3	HB158-1-08U8-S8J18(1-5/8)	43.00 - 44.00	1.0000	1.0000
L30	19	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000
L30	20	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000
L30	21	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L30	31	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L30	32	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L30	33	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L31	3	HB158-1-08U8-S8J18(1-5/8)	42.85 - 43.00	1.0000	1.0000
L31	19	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	20	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	21	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	31	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L31	32	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L31	33	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L32	3	HB158-1-08U8-S8J18(1-5/8)	37.85 - 42.85	1.0000	1.0000
L32	19	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	20	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	21	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	31	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L32	32	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L32	33	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L33	3	HB158-1-08U8-S8J18(1-5/8)	32.85 - 37.85	1.0000	1.0000
L33	19	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	20	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	21	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	31	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L33	32	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L33	33	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L34	3	HB158-1-08U8-S8J18(1-5/8)	27.85 - 32.85	1.0000	1.0000
L34	19	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	20	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	21	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	27	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	28	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	29	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	31	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L34	32	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L34	33	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L35	3	HB158-1-08U8-S8J18(1-5/8)	26.25 - 27.85	1.0000	1.0000
L35	19	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	20	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	21	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	27	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L35	28	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L35	29	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L36	3	HB158-1-08U8-S8J18(1-5/8)	26.00 - 26.25	1.0000	1.0000
L36	19	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	20	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	21	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	27	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L36	28	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L36	29	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L37	3	HB158-1-08U8-S8J18(1-5/8)	21.00 - 26.00	1.0000	1.0000
L37	19	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	20	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	21	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	27	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L37	28	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L37	29	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L38	3	HB158-1-08U8-S8J18(1-5/8)	16.00 - 21.00	1.0000	1.0000
L38	19	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	20	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	21	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	27	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000
L38	28	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000
L38	29	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L39	3	HB158-1-08U8-S8J18(1-5/8)	11.00 - 16.00	1.0000	1.0000
L39	19	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	20	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	21	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	27	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L39	28	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L39	29	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L40	3	HB158-1-08U8-S8J18(1-5/8)	6.00 - 11.00	1.0000	1.0000
L40	19	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	20	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	21	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	27	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L40	28	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L40	29	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L41	3	HB158-1-08U8-S8J18(1-5/8)	1.00 - 6.00	1.0000	1.0000
L41	19	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	20	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	21	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	27	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L41	28	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L41	29	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L42	3	HB158-1-08U8-S8J18(1-5/8)	0.00 - 1.00	1.0000	1.0000
L42	19	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	20	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	21	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	27	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000
L42	28	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000
L42	29	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L6	51	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L6	52	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L6	53	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L7	51	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L7	52	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L7	53	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L8	47	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	48	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	49	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	51	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L8	52	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L8	53	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L9	47	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	48	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	49	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	51	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000
L9	52	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L9	53	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000
L10	47	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	48	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	49	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	51	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L10	52	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L10	53	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L11	47	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	48	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	49	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	51	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L11	52	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L11	53	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L12	47	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	48	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	49	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	51	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L12	52	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L12	53	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L13	43	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	44	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	45	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	47	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	48	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	49	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	51	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L13	52	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L13	53	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L14	43	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	44	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	45	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	47	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	48	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	49	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L15	39	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	40	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	41	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	43	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	44	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	45	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	47	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L15	48	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L15	49	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L16	39	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	40	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	41	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	43	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L16	44	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L16	45	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L17	23	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	24	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	25	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	39	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L17	40	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L17	41	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L18	23	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	24	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	25	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	39	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000
L18	40	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000
L18	41	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L19	23	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	24	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	25	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	39	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L19	40	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L19	41	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L20	23	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	24	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	25	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	39	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L20	40	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L20	41	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L21	23	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L21	24	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L21	25	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L22	23	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	24	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	25	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	35	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L22	36	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L22	37	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L23	23	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	24	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	25	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	35	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L23	36	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L23	37	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L24	23	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	24	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	25	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	35	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L24	36	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L24	37	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L25	23	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	24	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	25	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	35	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L25	36	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L25	37	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L26	19	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	20	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	21	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	23	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	24	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	25	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	35	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L26	36	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L26	37	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L27	19	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	20	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	21	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	35	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L27	36	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L27	37	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L28	19	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	20	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	21	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	35	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L28	36	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L28	37	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L29	19	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L29	20	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000
L29	21	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000
L29	31	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L29	32	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L29	33	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L30	19	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	20	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	21	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	31	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L30	32	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L30	33	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L31	19	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	20	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	21	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	31	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L31	32	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L31	33	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L32	19	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	20	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	21	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	31	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L32	32	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L32	33	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L33	19	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	20	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	21	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	31	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L33	32	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L33	33	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L34	19	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	20	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	21	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	27	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	28	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	29	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	31	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L34	32	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L34	33	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L35	19	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	20	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	21	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	27	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L35	28	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L35	29	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L36	19	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	20	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	21	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	27	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L36	28	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L36	29	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L37	19	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	20	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	21	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	27	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L37	28	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L37	29	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L38	19	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	20	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	21	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	27	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000
L38	28	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L38	29	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000
L39	19	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	20	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	21	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	27	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L39	28	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L39	29	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L40	19	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	20	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	21	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	27	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L40	28	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L40	29	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L41	19	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	20	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	21	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	27	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L41	28	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L41	29	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L42	19	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	20	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	21	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	27	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000
L42	28	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000
L42	29	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
5/8" x 4' Lightning Rod	C	From Leg	0.00 0.000 2.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.00 0.01 0.01
Pine branches									
Tree Pole Branchs.	C	None		0.000	130.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	124.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	118.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	113.50	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	109.30	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Tree Pole Branchs.	C	None		0.000	104.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	100.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	93.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	89.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	85.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	81.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
127									
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
GPS_A	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.11 0.21 0.28	0.11 0.21 0.28	0.00 0.00 0.01
HTXCW631619M000 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
HTXCW631619M000 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
HTXCW631619M000 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
MT6407-77A w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
RFV01U-D1A	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	C	From Centroid-Leg	4.00 0.000	0.000	127.00	No Ice 1/2" Ice	1.88 2.05	1.25 1.39	0.08 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		g	0.000			1" Ice	2.22	1.54	0.12
CDX1923Q-DS-43	A	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
(2) CDX1923Q-DS-43	B	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
(3) CDX1923Q-DS-43	C	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
RFV01U-D2A	A	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
RFV01U-D2A	B	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
RFV01U-D2A	C	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
DB-B1-6C-12AB-0Z	B	From	4.00	0.000	127.00	No Ice	3.36	2.19	0.02
		Centroid-Le	0.000			1/2" Ice	3.60	2.39	0.05
		g	0.000			1" Ice	3.84	2.61	0.08
DB-B1-6C-12AB-0Z	C	From	4.00	0.000	127.00	No Ice	3.36	2.19	0.02
		Centroid-Le	0.000			1/2" Ice	3.60	2.39	0.05
		g	0.000			1" Ice	3.84	2.61	0.08
Site Pro 1 RMQP-496-HK	C	None		0.000	127.00	No Ice	23.14	21.40	1.95
						1/2" Ice	28.17	26.44	2.34
						1" Ice	33.23	31.60	2.85
118									
800 10121 w/ Mount Pipe	A	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	B	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	C	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	A	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	B	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	C	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
AHFIB_CCIV2	A	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHFIB_CCIV2	B	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHFIB_CCIV2	C	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHLBBA	A	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
AHLBBA	B	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
AHLBBA	C	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
DC6-48-60-18-8F	A	From Leg	4.00	0.000	118.00	No Ice	1.21	1.21	0.03
			0.000			1/2" Ice	1.89	1.89	0.05
			0.000			1" Ice	2.11	2.11	0.08
DC6-48-60-18-8F	B	From Leg	4.00	0.000	118.00	No Ice	1.21	1.21	0.03
			0.000			1/2" Ice	1.89	1.89	0.05
			0.000			1" Ice	2.11	2.11	0.08
RRH4X25-WCS	A	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
RRH4X25-WCS	B	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
RRH4X25-WCS	C	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
AHCA_CCIV3	A	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
AHCA_CCIV3	B	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
AHCA_CCIV3	C	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
(2) 1 5/8 x 6' unistrut	A	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
(2) 1 5/8 x 6' unistrut	B	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
(2) 1 5/8 x 6' unistrut	C	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
Miscellaneous [NA 508-3]	C	None		0.000	118.00	No Ice	10.62	10.62	0.56
						1/2" Ice	13.64	13.64	0.72
						1" Ice	16.86	16.86	0.92
Side Arm Mount [SO 101-3]	C	None		0.000	118.00	No Ice	5.81	5.81	0.25
						1/2" Ice	6.95	6.95	0.34
						1" Ice	8.28	8.28	0.46
110_TMO									
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
VV-65A-R1_TMO w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
VV-65A-R1_TMO w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
VV-65A-R1_TMO w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
AIR 6419 B41_TMO w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
Radio 4480_TMOV2	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
110_Sprint									
DT465B-2XR w/ Mount Pipe	A	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	B	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	C	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
APXVSPP18-C w/ Mount Pipe	A	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
APXVSPP18-C w/ Mount Pipe	B	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
APXVSPP18-C w/ Mount Pipe	C	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
FD-RRH-2X50-800	A	From Face	4.00 0.000	0.000	110.00	No Ice 1/2" Ice	2.06 2.24	1.36 1.52	0.05 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	2.43	1.68	0.09
FD-RRH-2X50-800	B	From Face	4.00	0.000	110.00	No Ice	2.06	1.36	0.05
			0.000			1/2" Ice	2.24	1.52	0.07
			0.000			1" Ice	2.43	1.68	0.09
FD-RRH-2X50-800	C	From Face	4.00	0.000	110.00	No Ice	2.06	1.36	0.05
			0.000			1/2" Ice	2.24	1.52	0.07
			0.000			1" Ice	2.43	1.68	0.09
TD-RRH8X20-25	A	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
TD-RRH8X20-25	B	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
TD-RRH8X20-25	C	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
(3) ACU-A20-N	A	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	B	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	C	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
PV-RP10S-HR-12-96	C	None		0.000	110.00	No Ice	25.30	25.30	1.84
						1/2" Ice	32.20	32.20	2.49
						1" Ice	39.10	39.10	3.15
108									
(2) 800 EXTERNAL NOTCH FILTER	A	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800 EXTERNAL NOTCH FILTER	B	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800 EXTERNAL NOTCH FILTER	C	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800MHZ RRH	A	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 800MHZ RRH	B	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 800MHZ RRH	C	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 1900MHZ RRH (65MHZ)	A	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
(2) 1900MHZ RRH (65MHZ)	B	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
(2) 1900MHZ RRH (65MHZ)	C	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
2.4" Dia. x 6' Mount Pipe	A	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
2.4" Dia. x 6' Mount Pipe	B	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
2.4" Dia. x 6' Mount Pipe	C	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
98									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
TA08025-B605	A	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B605	B	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B605	C	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B604	A	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
TA08025-B604	B	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
TA08025-B604	C	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
RDIDC-9181-PF-48	A	From Leg	4.00	0.000	98.00	No Ice	2.01	1.17	0.02
			0.000			1/2" Ice	2.19	1.31	0.04
			0.000			1" Ice	2.37	1.46	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
Commscope MC-K6MHDX-9-96 (3)	C	None		0.000	98.00	No Ice	15.30	15.30	1.19
						1/2" Ice	20.48	20.48	1.71
						1" Ice	25.66	25.66	2.22
90									
(2) KRY 112 71/2	A	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02
			0.000			1" Ice	0.80	0.64	0.03
(2) KRY 112 71/2	B	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	0.80	0.64	0.03
(2) KRY 112 71/2	C	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02
			0.000			1" Ice	0.80	0.64	0.03
(2) 2.4" Dia. x 6' Mount Pipe	A	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
(2) 2.4" Dia. x 6' Mount Pipe	B	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
(2) 2.4" Dia. x 6' Mount Pipe	C	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
Miscellaneous [NA 508-3]	C	None		0.000	90.00	No Ice	10.62	10.62	0.56
						1/2" Ice	13.64	13.64	0.72
						1" Ice	16.86	16.86	0.92
Side Arm Mount [SO 101-3]	C	None		0.000	90.00	No Ice	5.81	5.81	0.25
						1/2" Ice	6.95	6.95	0.34
						1" Ice	8.28	8.28	0.46
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Load Combinations

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

Comb. No.	Description
25	0.9 Dead+1.0 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
L1	130 - 125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.51	0.11	-0.50
			Max. Mx	20	-4.79	22.40	-0.20
			Max. My	14	-4.79	0.07	-22.49
			Max. Vy	8	8.52	-22.24	-0.21
			Max. Vx	14	8.49	0.07	-22.49
			Max. Torque	8			-0.43
L2	125 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.03	0.06	-0.47
			Max. Mx	20	-5.45	72.79	-0.18
			Max. My	14	-5.45	0.04	-72.73
			Max. Vy	8	10.65	-72.66	-0.22
			Max. Vx	14	10.62	0.04	-72.73
			Max. Torque	8			-0.43
L3	120 - 115	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.14	-0.35	-0.23
			Max. Mx	8	-9.46	-144.11	-0.14
			Max. My	14	-9.46	-0.14	-143.74
			Max. Vy	8	16.74	-144.11	-0.14
			Max. Vx	14	16.71	-0.14	-143.74
			Max. Torque	8			-0.43
L4	115 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.73	-0.39	-0.21
			Max. Mx	8	-10.22	-234.73	-0.14
			Max. My	14	-10.23	-0.17	-234.17
			Max. Vy	8	18.86	-234.73	-0.14
			Max. Vx	2	-18.83	-0.07	233.94

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	6			-0.33
L5	110 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.36	-0.44	-0.18
			Max. Mx	8	-16.85	-367.07	-0.15
			Max. My	14	-16.85	-0.20	-366.31
			Max. Vy	8	27.41	-367.07	-0.15
			Max. Vx	2	-27.38	-0.08	366.10
			Max. Torque	6			-0.33
L6	105 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.95	-0.49	-0.15
			Max. Mx	8	-18.07	-512.62	-0.15
			Max. My	14	-18.07	-0.24	-511.68
			Max. Vy	8	31.06	-512.62	-0.15
			Max. Vx	2	-31.03	-0.08	511.49
			Max. Torque	6			-0.33
L7	100 - 99.27	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.09	-0.49	-0.15
			Max. Mx	8	-18.18	-535.32	-0.15
			Max. My	14	-18.18	-0.24	-534.34
			Max. Vy	8	31.13	-535.32	-0.15
			Max. Vx	2	-31.09	-0.08	534.16
			Max. Torque	6			-0.33
L8	99.27 - 99.02	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.15	-0.50	-0.15
			Max. Mx	8	-18.24	-543.10	-0.15
			Max. My	14	-18.25	-0.24	-542.12
			Max. Vy	8	31.15	-543.10	-0.15
			Max. Vx	2	-31.11	-0.09	541.93
			Max. Torque	6			-0.33
L9	99.02 - 97.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.21	-0.51	0.19
			Max. Mx	8	-21.09	-607.04	-0.04
			Max. My	2	-21.09	-0.09	605.95
			Max. Vy	8	33.50	-607.04	-0.04
			Max. Vx	2	-33.50	-0.09	605.95
			Max. Torque	6			-0.33
L10	97.04 - 96.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.30	-0.52	0.19
			Max. Mx	8	-21.18	-615.41	-0.04
			Max. My	2	-21.18	-0.09	614.33
			Max. Vy	8	33.52	-615.41	-0.04
			Max. Vx	2	-33.52	-0.09	614.33
			Max. Torque	18			0.16
L11	96.79 - 96.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.47	-0.52	0.19
			Max. Mx	8	-21.31	-630.85	-0.04
			Max. My	2	-21.31	-0.09	629.76
			Max. Vy	8	33.57	-630.85	-0.04
			Max. Vx	2	-33.57	-0.09	629.76
			Max. Torque	18			0.16
L12	96.33 - 96.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.54	-0.52	0.19
			Max. Mx	8	-21.37	-639.24	-0.04
			Max. My	2	-21.37	-0.09	638.15
			Max. Vy	8	33.60	-639.24	-0.04
			Max. Vx	2	-33.60	-0.09	638.15
			Max. Torque	18			0.16
L13	96.08 - 94.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.08	-0.54	0.20
			Max. Mx	8	-21.74	-699.56	-0.04
			Max. My	2	-21.74	-0.09	698.46

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	33.80	-699.56	-0.04
			Max. Vx	2	-33.79	-0.09	698.46
			Max. Torque	18			0.16
L14	94.29 - 94.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.15	-0.54	0.21
			Max. Mx	8	-21.81	-708.01	-0.04
			Max. My	2	-21.82	-0.09	706.91
			Max. Vy	8	33.82	-708.01	-0.04
			Max. Vx	2	-33.81	-0.09	706.91
			Max. Torque	18			0.16
L15	94.04 - 91.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.77	-0.57	0.22
			Max. Mx	8	-22.64	-797.04	-0.05
			Max. My	2	-22.64	-0.09	795.92
			Max. Vy	8	35.64	-797.04	-0.05
			Max. Vx	2	-35.64	-0.09	795.92
			Max. Torque	18			0.16
L16	91.5 - 91.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.84	-0.57	0.22
			Max. Mx	8	-22.71	-805.95	-0.05
			Max. My	2	-22.71	-0.09	804.83
			Max. Vy	8	35.66	-805.95	-0.05
			Max. Vx	2	-35.65	-0.09	804.83
			Max. Torque	6			-0.16
L17	91.25 - 86.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.13	-0.62	0.25
			Max. Mx	8	-25.26	-994.44	-0.05
			Max. My	2	-25.26	-0.10	993.29
			Max. Vy	8	38.84	-994.44	-0.05
			Max. Vx	2	-38.84	-0.10	993.29
			Max. Torque	18			0.16
L18	86.25 - 86.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.19	-0.63	0.25
			Max. Mx	8	-25.31	-1001.04	-0.05
			Max. My	2	-25.31	-0.10	999.89
			Max. Vy	8	38.85	-1001.04	-0.05
			Max. Vx	2	-38.85	-0.10	999.89
			Max. Torque	6			-0.16
L19	86.08 - 85.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.26	-0.63	0.25
			Max. Mx	8	-25.37	-1010.76	-0.05
			Max. My	2	-25.37	-0.10	1009.61
			Max. Vy	8	38.88	-1010.76	-0.05
			Max. Vx	2	-38.87	-0.10	1009.61
			Max. Torque	6			-0.16
L20	85.83 - 75.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.32	-0.68	0.28
			Max. Mx	8	-27.06	-1206.70	-0.05
			Max. My	2	-27.06	-0.11	1205.51
			Max. Vy	8	42.40	-1206.70	-0.05
			Max. Vx	2	-42.39	-0.11	1205.51
			Max. Torque	6			-0.16
L21	75.75 - 74.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.51	-0.75	0.32
			Max. Mx	8	-29.71	-1474.01	-0.05
			Max. My	2	-29.71	-0.12	1472.79
			Max. Vy	8	43.15	-1474.01	-0.05
			Max. Vx	2	-43.14	-0.12	1472.79
			Max. Torque	6			-0.16
L22	74.75 - 71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.77	-0.79	0.35

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-30.79	-1636.48	-0.06
			Max. My	2	-30.80	-0.13	1635.24
			Max. Vy	8	43.52	-1636.48	-0.06
			Max. Vx	2	-43.52	-0.13	1635.24
			Max. Torque	6			-0.16
L23	71 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.88	-0.79	0.35
			Max. Mx	8	-30.90	-1647.36	-0.06
			Max. My	2	-30.90	-0.13	1646.12
			Max. Vy	8	43.54	-1647.36	-0.06
			Max. Vx	2	-43.53	-0.13	1646.12
			Max. Torque	6			-0.16
L24	70.75 - 65.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.99	-0.85	0.38
			Max. Mx	8	-32.69	-1866.42	-0.06
			Max. My	2	-32.69	-0.14	1865.14
			Max. Vy	8	44.09	-1866.42	-0.06
			Max. Vx	2	-44.08	-0.14	1865.14
			Max. Torque	6			-0.16
L25	65.75 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.12	-0.91	0.41
			Max. Mx	8	-34.53	-2088.17	-0.06
			Max. My	2	-34.53	-0.14	2086.86
			Max. Vy	8	44.63	-2088.17	-0.06
			Max. Vx	2	-44.62	-0.14	2086.86
			Max. Torque	6			-0.16
L26	60.75 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.45	-0.91	0.42
			Max. Mx	8	-34.81	-2121.66	-0.06
			Max. My	2	-34.81	-0.15	2120.35
			Max. Vy	8	44.70	-2121.66	-0.06
			Max. Vx	2	-44.70	-0.15	2120.35
			Max. Torque	6			-0.16
L27	60 - 59.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.56	-0.92	0.42
			Max. Mx	8	-34.91	-2132.84	-0.06
			Max. My	2	-34.91	-0.15	2131.52
			Max. Vy	8	44.72	-2132.84	-0.06
			Max. Vx	2	-44.72	-0.15	2131.52
			Max. Torque	6			-0.16
L28	59.75 - 54.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.62	-0.98	0.46
			Max. Mx	8	-36.70	-2357.74	-0.06
			Max. My	2	-36.70	-0.16	2356.40
			Max. Vy	8	45.25	-2357.74	-0.06
			Max. Vx	2	-45.24	-0.16	2356.40
			Max. Torque	6			-0.16
L29	54.75 - 44	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.59	-1.03	0.49
			Max. Mx	8	-38.44	-2573.76	-0.06
			Max. My	2	-38.44	-0.17	2572.38
			Max. Vy	8	45.73	-2573.76	-0.06
			Max. Vx	2	-45.72	-0.17	2572.38
			Max. Torque	6			-0.16
L30	44 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.42	-1.12	0.54
			Max. Mx	8	-43.53	-2896.89	-0.06
			Max. My	2	-43.53	-0.18	2895.47
			Max. Vy	8	46.60	-2896.89	-0.06
			Max. Vx	2	-46.59	-0.18	2895.47
			Max. Torque	6			-0.16

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L31	43 - 42.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.50	-1.12	0.54
			Max. Mx	8	-43.62	-2903.88	-0.06
			Max. My	2	-43.62	-0.18	2902.46
			Max. Vy	8	46.60	-2903.88	-0.06
			Max. Vx	2	-46.60	-0.18	2902.46
			Max. Torque	6			-0.16
L32	42.85 - 37.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.23	-1.18	0.58
			Max. Mx	8	-45.99	-3138.17	-0.06
			Max. My	2	-45.99	-0.19	3136.72
			Max. Vy	8	47.12	-3138.17	-0.06
			Max. Vx	2	-47.12	-0.19	3136.72
			Max. Torque	6			-0.16
L33	37.85 - 32.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.98	-1.25	0.61
			Max. Mx	8	-48.42	-3374.95	-0.06
			Max. My	2	-48.42	-0.21	3373.47
			Max. Vy	8	47.61	-3374.95	-0.06
			Max. Vx	2	-47.61	-0.21	3373.47
			Max. Torque	6			-0.16
L34	32.85 - 27.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.78	-1.31	0.65
			Max. Mx	8	-50.88	-3614.15	-0.06
			Max. My	2	-50.88	-0.22	3612.63
			Max. Vy	8	48.09	-3614.15	-0.06
			Max. Vx	2	-48.08	-0.22	3612.63
			Max. Torque	6			-0.16
L35	27.85 - 26.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.68	-1.33	0.66
			Max. Mx	8	-51.66	-3691.18	-0.06
			Max. My	2	-51.66	-0.22	3689.66
			Max. Vy	8	48.24	-3691.18	-0.06
			Max. Vx	2	-48.24	-0.22	3689.66
			Max. Torque	6			-0.16
L36	26.25 - 26	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.84	-1.34	0.66
			Max. Mx	8	-51.82	-3703.24	-0.06
			Max. My	2	-51.82	-0.22	3701.72
			Max. Vy	8	48.24	-3703.24	-0.06
			Max. Vx	2	-48.24	-0.22	3701.72
			Max. Torque	6			-0.16
L37	26 - 21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.96	-1.40	0.70
			Max. Mx	8	-54.58	-3945.62	-0.05
			Max. My	2	-54.58	-0.24	3944.06
			Max. Vy	8	48.72	-3945.62	-0.05
			Max. Vx	2	-48.71	-0.24	3944.06
			Max. Torque	6			-0.16
L38	21 - 16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.11	-1.47	0.74
			Max. Mx	8	-57.38	-4190.23	-0.05
			Max. My	2	-57.38	-0.25	4188.64
			Max. Vy	8	49.15	-4190.23	-0.05
			Max. Vx	2	-49.14	-0.25	4188.64
			Max. Torque	6			-0.16
L39	16 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-89.28	-1.53	0.78
			Max. Mx	8	-60.22	-4436.92	-0.05
			Max. My	2	-60.22	-0.27	4435.30
			Max. Vy	8	49.55	-4436.92	-0.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-49.55	-0.27	4435.30
			Max. Torque	6			-0.16
L40	11 - 6	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-92.46	-1.60	0.81
			Max. Mx	8	-63.08	-4685.63	-0.05
			Max. My	2	-63.08	-0.28	4683.98
			Max. Vy	8	49.95	-4685.63	-0.05
			Max. Vx	2	-49.95	-0.28	4683.98
			Max. Torque	6			-0.16
L41	6 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.63	-1.66	0.85
			Max. Mx	8	-65.98	-4936.33	-0.04
			Max. My	2	-65.98	-0.30	4934.65
			Max. Vy	8	50.35	-4936.33	-0.04
			Max. Vx	2	-50.35	-0.30	4934.65
			Max. Torque	6			-0.16
L42	1 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-96.26	-1.67	0.86
			Max. Mx	8	-66.57	-4986.71	-0.04
			Max. My	2	-66.57	-0.30	4985.02
			Max. Vy	8	50.43	-4986.71	-0.04
			Max. Vx	2	-50.43	-0.30	4985.02
			Max. Torque	6			-0.16

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	96.26	0.00	0.00
	Max. H_x	21	49.94	50.41	0.00
	Max. H_z	3	49.94	0.00	50.41
	Max. M_x	2	4985.02	0.00	50.41
	Max. M_z	8	4986.71	-50.41	-0.00
	Max. Torsion	18	0.16	43.66	-25.20
	Min. Vert	25	49.94	25.21	43.66
	Min. H_x	9	49.94	-50.41	-0.00
	Min. H_z	15	49.94	-0.00	-50.41
	Min. M_x	14	-4984.39	-0.00	-50.41
	Min. M_z	20	-4985.39	50.41	0.00
	Min. Torsion	6	-0.16	-43.66	25.20

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	55.49	0.00	0.00	-0.26	-0.53	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	66.58	-0.00	-50.41	-4985.02	-0.30	0.11
0.9 Dead+1.0 Wind 0 deg - No Ice	49.94	-0.00	-50.41	-4952.11	-0.13	0.11
1.2 Dead+1.0 Wind 30 deg - No	66.58	25.59	-44.32	-4347.75	-2511.12	0.16

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
Ice						
0.9 Dead+1.0 Wind 30 deg - No Ice	49.94	25.59	-44.32	-4319.13	-2494.47	0.15
1.2 Dead+1.0 Wind 60 deg - No Ice	66.58	43.66	-25.20	-2492.36	-4318.53	0.16
0.9 Dead+1.0 Wind 60 deg - No Ice	49.94	43.66	-25.20	-2475.87	-4289.92	0.15
1.2 Dead+1.0 Wind 90 deg - No Ice	66.58	50.41	0.00	0.04	-4986.71	0.12
0.9 Dead+1.0 Wind 90 deg - No Ice	49.94	50.41	0.00	0.12	-4953.70	0.11
1.2 Dead+1.0 Wind 120 deg - No Ice	66.58	43.66	25.21	2492.35	-4318.88	0.04
0.9 Dead+1.0 Wind 120 deg - No Ice	49.94	43.66	25.21	2476.01	-4290.27	0.04
1.2 Dead+1.0 Wind 150 deg - No Ice	66.58	25.21	43.66	4316.75	-2493.99	-0.04
0.9 Dead+1.0 Wind 150 deg - No Ice	49.94	25.21	43.66	4288.40	-2477.40	-0.04
1.2 Dead+1.0 Wind 180 deg - No Ice	66.58	0.00	50.41	4984.39	-1.01	-0.11
0.9 Dead+1.0 Wind 180 deg - No Ice	49.94	0.00	50.41	4951.65	-0.84	-0.11
1.2 Dead+1.0 Wind 210 deg - No Ice	66.58	-25.59	44.32	4347.13	2509.81	-0.16
0.9 Dead+1.0 Wind 210 deg - No Ice	49.94	-25.59	44.32	4318.67	2493.49	-0.15
1.2 Dead+1.0 Wind 240 deg - No Ice	66.58	-43.66	25.20	2491.73	4317.21	-0.16
0.9 Dead+1.0 Wind 240 deg - No Ice	49.94	-43.66	25.20	2475.40	4288.94	-0.15
1.2 Dead+1.0 Wind 270 deg - No Ice	66.58	-50.41	-0.00	-0.67	4985.39	-0.12
0.9 Dead+1.0 Wind 270 deg - No Ice	49.94	-50.41	-0.00	-0.59	4952.72	-0.11
1.2 Dead+1.0 Wind 300 deg - No Ice	66.58	-43.66	-25.21	-2492.98	4317.57	-0.04
0.9 Dead+1.0 Wind 300 deg - No Ice	49.94	-43.66	-25.21	-2476.48	4289.29	-0.04
1.2 Dead+1.0 Wind 330 deg - No Ice	66.58	-25.21	-43.66	-4317.37	2492.68	0.04
0.9 Dead+1.0 Wind 330 deg - No Ice	49.94	-25.21	-43.66	-4288.87	2476.42	0.04
1.2 Dead+1.0 Ice+1.0 Temp	96.26	0.00	0.00	-0.86	-1.67	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	96.26	-0.00	-7.29	-727.03	-1.71	0.03
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	96.26	3.65	-6.31	-629.72	-364.86	0.03
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	96.26	6.31	-3.65	-363.92	-630.72	0.02
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	96.26	7.29	0.00	-0.84	-728.05	0.01
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	96.26	6.31	3.65	362.22	-630.77	-0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	96.26	3.65	6.31	627.98	-364.95	-0.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	96.26	0.00	7.29	725.24	-1.82	-0.03
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	96.26	-3.65	6.31	627.93	361.33	-0.03
1.2 Dead+1.0 Wind 240	96.26	-6.31	3.65	362.13	627.19	-0.02

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	96.26	-7.29	-0.00	-0.95	724.51	-0.01
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	96.26	-6.31	-3.65	-364.01	627.24	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	96.26	-3.65	-6.31	-629.77	361.42	0.02
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	55.49	-0.00	-12.93	-1273.84	-0.45	0.03
Dead+Wind 30 deg - Service	55.49	6.56	-11.36	-1111.04	-641.97	0.04
Dead+Wind 60 deg - Service	55.49	11.19	-6.46	-636.97	-1103.75	0.04
Dead+Wind 90 deg - Service	55.49	12.93	0.00	-0.17	-1274.47	0.03
Dead+Wind 120 deg - Service	55.49	11.20	6.46	636.61	-1103.84	0.00
Dead+Wind 150 deg - Service	55.49	6.46	11.19	1102.74	-637.59	-0.02
Dead+Wind 180 deg - Service	55.49	0.00	12.93	1273.32	-0.64	-0.03
Dead+Wind 210 deg - Service	55.49	-6.56	11.36	1110.51	640.88	-0.04
Dead+Wind 240 deg - Service	55.49	-11.19	6.46	636.45	1102.66	-0.04
Dead+Wind 270 deg - Service	55.49	-12.93	-0.00	-0.35	1273.38	-0.03
Dead+Wind 300 deg - Service	55.49	-11.20	-6.46	-637.13	1102.75	-0.00
Dead+Wind 330 deg - Service	55.49	-6.46	-11.19	-1103.26	636.49	0.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-55.49	0.00	0.00	55.49	0.00	0.000%
2	-0.00	-66.58	-50.41	0.00	66.58	50.41	0.000%
3	-0.00	-49.94	-50.41	0.00	49.94	50.41	0.000%
4	25.59	-66.58	-44.32	-25.59	66.58	44.32	0.000%
5	25.59	-49.94	-44.32	-25.59	49.94	44.32	0.000%
6	43.66	-66.58	-25.20	-43.66	66.58	25.20	0.000%
7	43.66	-49.94	-25.20	-43.66	49.94	25.20	0.000%
8	50.41	-66.58	0.00	-50.41	66.58	-0.00	0.000%
9	50.41	-49.94	0.00	-50.41	49.94	-0.00	0.000%
10	43.66	-66.58	25.21	-43.66	66.58	-25.21	0.000%
11	43.66	-49.94	25.21	-43.66	49.94	-25.21	0.000%
12	25.21	-66.58	43.66	-25.21	66.58	-43.66	0.000%
13	25.21	-49.94	43.66	-25.21	49.94	-43.66	0.000%
14	0.00	-66.58	50.41	-0.00	66.58	-50.41	0.000%
15	0.00	-49.94	50.41	-0.00	49.94	-50.41	0.000%
16	-25.59	-66.58	44.32	25.59	66.58	-44.32	0.000%
17	-25.59	-49.94	44.32	25.59	49.94	-44.32	0.000%
18	-43.66	-66.58	25.20	43.66	66.58	-25.20	0.000%
19	-43.66	-49.94	25.20	43.66	49.94	-25.20	0.000%
20	-50.41	-66.58	-0.00	50.41	66.58	0.00	0.000%
21	-50.41	-49.94	-0.00	50.41	49.94	0.00	0.000%
22	-43.66	-66.58	-25.21	43.66	66.58	25.21	0.000%
23	-43.66	-49.94	-25.21	43.66	49.94	25.21	0.000%
24	-25.21	-66.58	-43.66	25.21	66.58	43.66	0.000%
25	-25.21	-49.94	-43.66	25.21	49.94	43.66	0.000%
26	0.00	-96.26	0.00	0.00	96.26	0.00	0.000%
27	-0.00	-96.26	-7.29	0.00	96.26	7.29	0.000%
28	3.65	-96.26	-6.31	-3.65	96.26	6.31	0.000%
29	6.31	-96.26	-3.65	-6.31	96.26	3.65	0.000%
30	7.29	-96.26	0.00	-7.29	96.26	-0.00	0.000%
31	6.31	-96.26	3.65	-6.31	96.26	-3.65	0.000%
32	3.65	-96.26	6.31	-3.65	96.26	-6.31	0.000%
33	0.00	-96.26	7.29	-0.00	96.26	-7.29	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
34	-3.65	-96.26	6.31	3.65	96.26	-6.31	0.000%
35	-6.31	-96.26	3.65	6.31	96.26	-3.65	0.000%
36	-7.29	-96.26	-0.00	7.29	96.26	0.00	0.000%
37	-6.31	-96.26	-3.65	6.31	96.26	3.65	0.000%
38	-3.65	-96.26	-6.31	3.65	96.26	6.31	0.000%
39	-0.00	-55.49	-12.93	0.00	55.49	12.93	0.000%
40	6.56	-55.49	-11.36	-6.56	55.49	11.36	0.000%
41	11.19	-55.49	-6.46	-11.19	55.49	6.46	0.000%
42	12.93	-55.49	0.00	-12.93	55.49	-0.00	0.000%
43	11.20	-55.49	6.46	-11.20	55.49	-6.46	0.000%
44	6.46	-55.49	11.19	-6.46	55.49	-11.19	0.000%
45	0.00	-55.49	12.93	-0.00	55.49	-12.93	0.000%
46	-6.56	-55.49	11.36	6.56	55.49	-11.36	0.000%
47	-11.19	-55.49	6.46	11.19	55.49	-6.46	0.000%
48	-12.93	-55.49	-0.00	12.93	55.49	0.00	0.000%
49	-11.20	-55.49	-6.46	11.20	55.49	6.46	0.000%
50	-6.46	-55.49	-11.19	6.46	55.49	11.19	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00006385
3	Yes	4	0.00000001	0.00092843
4	Yes	6	0.00000001	0.00011169
5	Yes	6	0.00000001	0.00003492
6	Yes	6	0.00000001	0.00011075
7	Yes	6	0.00000001	0.00003467
8	Yes	5	0.00000001	0.00006388
9	Yes	4	0.00000001	0.00093012
10	Yes	6	0.00000001	0.00011112
11	Yes	6	0.00000001	0.00003479
12	Yes	6	0.00000001	0.00011108
13	Yes	6	0.00000001	0.00003478
14	Yes	5	0.00000001	0.00006412
15	Yes	4	0.00000001	0.00093500
16	Yes	6	0.00000001	0.00011109
17	Yes	6	0.00000001	0.00003472
18	Yes	6	0.00000001	0.00011122
19	Yes	6	0.00000001	0.00003484
20	Yes	5	0.00000001	0.00006363
21	Yes	4	0.00000001	0.00092406
22	Yes	6	0.00000001	0.00011092
23	Yes	6	0.00000001	0.00003473
24	Yes	6	0.00000001	0.00011090
25	Yes	6	0.00000001	0.00003473
26	Yes	4	0.00000001	0.00000001
27	Yes	6	0.00000001	0.00006634
28	Yes	6	0.00000001	0.00006910
29	Yes	6	0.00000001	0.00006915
30	Yes	6	0.00000001	0.00006651
31	Yes	6	0.00000001	0.00006906
32	Yes	6	0.00000001	0.00006897
33	Yes	6	0.00000001	0.00006619
34	Yes	6	0.00000001	0.00006868

35	Yes	6	0.00000001	0.00006866
36	Yes	6	0.00000001	0.00006608
37	Yes	6	0.00000001	0.00006877
38	Yes	6	0.00000001	0.00006883
39	Yes	4	0.00000001	0.00054102
40	Yes	5	0.00000001	0.00008344
41	Yes	5	0.00000001	0.00008184
42	Yes	4	0.00000001	0.00054091
43	Yes	5	0.00000001	0.00008232
44	Yes	5	0.00000001	0.00008247
45	Yes	4	0.00000001	0.00054093
46	Yes	5	0.00000001	0.00008222
47	Yes	5	0.00000001	0.00008253
48	Yes	4	0.00000001	0.00054031
49	Yes	5	0.00000001	0.00008212
50	Yes	5	0.00000001	0.00008193

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	16.007	40	1.102	0.001
L2	125 - 120	14.853	40	1.101	0.000
L3	120 - 115	13.705	40	1.090	0.000
L4	115 - 110	12.573	40	1.070	0.000
L5	110 - 105	11.469	40	1.037	0.000
L6	105 - 100	10.406	40	0.991	0.000
L7	100 - 99.27	9.399	40	0.930	0.000
L8	99.27 - 99.02	9.258	40	0.920	0.000
L9	99.02 - 97.04	9.210	40	0.918	0.000
L10	97.04 - 96.79	8.832	40	0.902	0.000
L11	96.79 - 96.33	8.785	40	0.901	0.000
L12	96.33 - 96.08	8.698	40	0.898	0.000
L13	96.08 - 94.29	8.651	40	0.896	0.000
L14	94.29 - 94.04	8.318	40	0.880	0.000
L15	94.04 - 91.5	8.272	40	0.878	0.000
L16	91.5 - 91.25	7.812	40	0.854	0.000
L17	91.25 - 86.25	7.767	40	0.851	0.000
L18	86.25 - 86.08	6.904	40	0.797	0.000
L19	86.08 - 85.83	6.875	40	0.795	0.000
L20	85.83 - 75.75	6.834	40	0.792	0.000
L21	81 - 74.75	6.062	40	0.733	0.000
L22	74.75 - 71	5.128	40	0.688	0.000
L23	71 - 70.75	4.606	40	0.641	0.000
L24	70.75 - 65.75	4.572	40	0.639	0.000
L25	65.75 - 60.75	3.929	40	0.590	0.000
L26	60.75 - 60	3.337	40	0.539	0.000
L27	60 - 59.75	3.253	40	0.531	0.000
L28	59.75 - 54.75	3.226	40	0.529	0.000
L29	54.75 - 44	2.701	40	0.473	0.000
L30	50 - 43	2.257	40	0.419	0.000
L31	43 - 42.85	1.669	40	0.379	0.000
L32	42.85 - 37.85	1.657	40	0.378	0.000
L33	37.85 - 32.85	1.285	40	0.332	0.000
L34	32.85 - 27.85	0.962	40	0.285	0.000
L35	27.85 - 26.25	0.689	40	0.237	0.000
L36	26.25 - 26	0.612	40	0.222	0.000
L37	26 - 21	0.600	40	0.220	0.000
L38	21 - 16	0.392	40	0.178	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L39	16 - 11	0.228	40	0.136	0.000
L40	11 - 6	0.108	40	0.093	0.000
L41	6 - 1	0.032	40	0.051	0.000
L42	1 - 0	0.001	40	0.008	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	5/8" x 4' Lightning Rod	40	16.007	1.102	0.001	49078
127.00	(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	40	15.314	1.102	0.001	49078
124.00	Tree Pole Branchs.	40	14.622	1.099	0.000	38251
118.00	Tree Pole Branchs.	40	13.249	1.084	0.000	14360
113.50	Tree Pole Branchs.	40	12.238	1.061	0.000	9393
110.00	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	40	11.469	1.037	0.000	7246
109.30	Tree Pole Branchs.	40	11.317	1.031	0.000	6907
108.00	(2) 800 EXTERNAL NOTCH FILTER	40	11.038	1.020	0.000	6341
104.30	Tree Pole Branchs.	40	10.261	0.983	0.000	5121
100.30	Tree Pole Branchs.	40	9.458	0.934	0.000	5148
98.00	MX08FRO665-21 w/ Mount Pipe	40	9.014	0.910	0.000	6147
93.30	Tree Pole Branchs.	40	8.137	0.871	0.000	6138
90.00	(2) KRY 112 71/2	40	7.546	0.838	0.000	5460
89.30	Tree Pole Branchs.	40	7.424	0.831	0.000	5328
85.30	Tree Pole Branchs.	40	6.746	0.786	0.000	4964
81.30	Tree Pole Branchs.	40	6.108	0.736	0.000	6230

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	62.637	4	4.320	0.002
L2	125 - 120	58.123	4	4.313	0.002
L3	120 - 115	53.632	4	4.272	0.001
L4	115 - 110	49.203	4	4.191	0.001
L5	110 - 105	44.884	4	4.062	0.001
L6	105 - 100	40.726	4	3.880	0.001
L7	100 - 99.27	36.788	4	3.642	0.000
L8	99.27 - 99.02	36.235	4	3.603	0.000
L9	99.02 - 97.04	36.046	4	3.596	0.000
L10	97.04 - 96.79	34.569	4	3.535	0.000
L11	96.79 - 96.33	34.385	4	3.529	0.000
L12	96.33 - 96.08	34.046	4	3.519	0.000
L13	96.08 - 94.29	33.862	4	3.510	0.000
L14	94.29 - 94.04	32.559	4	3.448	0.000
L15	94.04 - 91.5	32.379	4	3.439	0.000
L16	91.5 - 91.25	30.576	4	3.344	0.000
L17	91.25 - 86.25	30.401	4	3.334	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L18	86.25 - 86.08	27.022	4	3.122	0.000
L19	86.08 - 85.83	26.911	4	3.114	0.000
L20	85.83 - 75.75	26.749	4	3.103	0.000
L21	81 - 74.75	23.728	4	2.869	0.000
L22	74.75 - 71	20.074	4	2.696	0.000
L23	71 - 70.75	18.030	4	2.512	0.000
L24	70.75 - 65.75	17.899	4	2.503	0.000
L25	65.75 - 60.75	15.379	4	2.311	0.000
L26	60.75 - 60	13.064	4	2.111	0.000
L27	60 - 59.75	12.735	4	2.081	0.000
L28	59.75 - 54.75	12.626	4	2.070	0.000
L29	54.75 - 44	10.572	4	1.853	0.000
L30	50 - 43	8.834	4	1.641	0.000
L31	43 - 42.85	6.532	4	1.486	0.000
L32	42.85 - 37.85	6.485	4	1.480	0.000
L33	37.85 - 32.85	5.030	4	1.298	0.000
L34	32.85 - 27.85	3.767	4	1.115	0.000
L35	27.85 - 26.25	2.697	4	0.929	0.000
L36	26.25 - 26	2.396	4	0.871	0.000
L37	26 - 21	2.350	4	0.863	0.000
L38	21 - 16	1.534	4	0.697	0.000
L39	16 - 11	0.891	4	0.532	0.000
L40	11 - 6	0.421	4	0.365	0.000
L41	6 - 1	0.125	4	0.200	0.000
L42	1 - 0	0.003	4	0.033	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	5/8" x 4' Lightning Rod	4	62.637	4.320	0.002	12905
127.00	(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	4	59.927	4.318	0.002	12905
124.00	Tree Pole Branchs.	4	57.222	4.308	0.002	10026
118.00	Tree Pole Branchs.	4	51.850	4.245	0.001	3713
113.50	Tree Pole Branchs.	4	47.894	4.158	0.001	2425
110.00	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	4	44.884	4.062	0.001	1868
109.30	Tree Pole Branchs.	4	44.291	4.040	0.001	1781
108.00	(2) 800 EXTERNAL NOTCH FILTER	4	43.198	3.995	0.001	1634
104.30	Tree Pole Branchs.	4	40.160	3.852	0.001	1318
100.30	Tree Pole Branchs.	4	37.017	3.660	0.000	1324
98.00	MX08FRO665-21 w/ Mount Pipe	4	35.282	3.564	0.000	1581
93.30	Tree Pole Branchs.	4	31.848	3.412	0.000	1577
90.00	(2) KRY 112 71/2	4	29.536	3.284	0.000	1402
89.30	Tree Pole Branchs.	4	29.057	3.255	0.000	1368
85.30	Tree Pole Branchs.	4	26.406	3.078	0.000	1274
81.30	Tree Pole Branchs.	4	23.910	2.881	0.000	1598

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	130 - 125 (1)	TP24.687x23.588x0.25	5.00	0.00	0.0	19.672	-4.79	1150.81	0.004
L2	125 - 120 (2)	TP25.787x24.687x0.25	5.00	0.00	0.0	20.557	-5.45	1202.58	0.005
L3	120 - 115 (3)	TP26.886x25.787x0.25	5.00	0.00	0.0	21.442	-9.46	1254.35	0.008
L4	115 - 110 (4)	TP27.985x26.886x0.25	5.00	0.00	0.0	22.327	-10.22	1306.11	0.008
L5	110 - 105 (5)	TP29.084x27.985x0.25	5.00	0.00	0.0	23.212	-16.85	1357.88	0.012
L6	105 - 100 (6)	TP30.184x29.084x0.25	5.00	0.00	0.0	24.097	-18.07	1409.65	0.013
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	0.73	0.00	0.0	24.226	-18.18	1417.20	0.013
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	0.25	0.00	0.0	45.769	-18.24	2677.48	0.007
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	1.98	0.00	0.0	45.231	-21.09	2646.03	0.008
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	0.25	0.00	0.0	65.671	-21.18	3841.74	0.006
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	0.46	0.00	0.0	65.891	-21.31	3854.60	0.006
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	0.25	0.00	0.0	44.333	-21.37	2593.46	0.008
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	1.79	0.00	0.0	44.903	-21.74	2626.82	0.008
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	0.25	0.00	0.0	44.983	-21.81	2631.48	0.008
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	2.54	0.00	0.0	45.792	-22.64	2678.82	0.008
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	0.25	0.00	0.0	45.871	-22.71	2683.48	0.008
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	5.00	0.00	0.0	46.163	-25.26	2700.56	0.009
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	0.17	0.00	0.0	46.216	-25.31	2703.64	0.009
L19	86.08 - 85.83 (19)	TP33.299x33.244x0.431	0.25	0.00	0.0	45.641	-25.37	2669.99	0.010
L20	85.83 - 75.75 (20)	TP35.515x33.299x0.425	10.08	0.00	0.0	46.441	-27.06	2716.80	0.010
L21	75.75 - 74.75 (21)	TP35.237x33.861x0.519	6.25	0.00	0.0	57.993	-29.70	3392.56	0.009
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	3.75	0.00	0.0	57.961	-30.78	3390.75	0.009
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	0.25	0.00	0.0	79.133	-30.89	4629.27	0.007
L24	70.75 - 65.75 (24)	TP37.219x36.118x0.681	5.00	0.00	0.0	80.150	-32.68	4688.75	0.007
L25	65.75 - 60.75 (25)	TP38.32x37.219x0.669	5.00	0.00	0.0	81.077	-34.51	4742.99	0.007
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	0.75	0.00	0.0	81.432	-34.80	4763.79	0.007
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	0.25	0.00	0.0	77.054	-34.89	4507.67	0.008
L28	59.75 - 54.75 (28)	TP39.641x38.54x0.631	5.00	0.00	0.0	79.292	-36.68	4638.58	0.008
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	10.75	0.00	0.0	79.831	-38.42	4670.09	0.008
L30	44 - 43 (30)	TP41.539x39.999x0.831	7.00	0.00	0.0	108.961	-43.52	6374.19	0.007
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	0.15	0.00	0.0	109.049	-43.60	6379.36	0.007
L32	42.85 - 37.85 (32)	TP42.672x41.572x0.819	5.00	0.00	0.0	110.342	-45.98	6455.02	0.007
L33	37.85 - 32.85 (33)	TP43.773x42.672x0.806	5.00	0.00	0.0	111.546	-48.40	6525.44	0.007
L34	32.85 - 27.85 (34)	TP44.873x43.773x0.794	5.00	0.00	0.0	112.660	-50.86	6590.62	0.008
L35	27.85 - 26.25 (35)	TP45.225x44.873x0.794	1.60	0.00	0.0	113.560	-51.65	6643.25	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	0.25	0.00	0.0	129.487	-51.81	7575.00	0.007
L37	26 - 21 (37)	TP46.38x45.28x0.881	5.00	0.00	0.0	129.108	-54.57	7552.79	0.007
L38	21 - 16 (38)	TP47.48x46.38x0.881	5.00	0.00	0.0	132.229	-57.37	7735.41	0.007
L39	16 - 11 (39)	TP48.58x47.48x0.856	5.00	0.00	0.0	131.580	-60.21	7697.43	0.008
L40	11 - 6 (40)	TP49.68x48.58x0.856	5.00	0.00	0.0	134.613	-63.08	7874.86	0.008
L41	6 - 1 (41)	TP50.78x49.68x0.831	5.00	0.00	0.0	133.694	-65.98	7821.10	0.008
L42	1 - 0 (42)	TP51x50.78x0.831	1.00	0.00	0.0	134.283	-66.57	7855.55	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 125 (1)	TP24.687x23.588x0.25	22.52	679.90	0.033	0.00	679.90	0.000
L2	125 - 120 (2)	TP25.787x24.687x0.25	72.82	730.42	0.100	0.00	730.42	0.000
L3	120 - 115 (3)	TP26.886x25.787x0.25	144.11	781.54	0.184	0.00	781.54	0.000
L4	115 - 110 (4)	TP27.985x26.886x0.25	234.74	833.12	0.282	0.00	833.12	0.000
L5	110 - 105 (5)	TP29.084x27.985x0.25	367.07	885.01	0.415	0.00	885.01	0.000
L6	105 - 100 (6)	TP30.184x29.084x0.25	512.62	937.09	0.547	0.00	937.09	0.000
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	535.32	944.70	0.567	0.00	944.70	0.000
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	543.10	2040.57	0.266	0.00	2040.57	0.000
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	607.03	2048.08	0.296	0.00	2048.08	0.000
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	615.41	2937.58	0.209	0.00	2937.58	0.000
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	630.85	2957.50	0.213	0.00	2957.50	0.000
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	639.24	2023.21	0.316	0.00	2023.21	0.000
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	699.56	2075.97	0.337	0.00	2075.97	0.000
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	708.01	2083.40	0.340	0.00	2083.40	0.000
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	797.04	2159.57	0.369	0.00	2159.57	0.000
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	805.95	2167.14	0.372	0.00	2167.14	0.000
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	994.44	2259.45	0.440	0.00	2259.45	0.000
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	1001.04	2264.64	0.442	0.00	2264.64	0.000
L19	86.08 - 85.83 (19)	TP33.299x33.244x0.431	1010.76	2241.11	0.451	0.00	2241.11	0.000
L20	85.83 - 75.75 (20)	TP35.515x33.299x0.425	1206.70	2355.90	0.512	0.00	2355.90	0.000
L21	75.75 - 74.75 (21)	TP35.237x33.861x0.519	1474.10	3002.55	0.491	0.00	3002.55	0.000
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	1637.01	3075.53	0.532	0.00	3075.53	0.000
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	1647.93	4161.34	0.396	0.00	4161.34	0.000
L24	70.75 - 65.75 (24)	TP37.219x36.118x0.681	1867.81	4351.29	0.429	0.00	4351.29	0.000
L25	65.75 - 60.75 (25)	TP38.32x37.219x0.669	2090.67	4539.70	0.461	0.00	4539.70	0.000
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	2124.35	4579.97	0.464	0.00	4579.97	0.000
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	2135.59	4348.74	0.491	0.00	4348.74	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L28	59.75 - 54.75 (28)	TP39.641x38.54x0.631	2361.94	4607.14	0.513	0.00	4607.14	0.000
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	2579.50	4767.76	0.541	0.00	4767.76	0.000
L30	44 - 43 (30)	TP41.539x39.999x0.831	2905.15	6579.20	0.442	0.00	6579.20	0.000
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	2912.20	6589.98	0.442	0.00	6589.98	0.000
L32	42.85 - 37.85 (32)	TP42.672x41.572x0.819	3148.58	6855.88	0.459	0.00	6855.88	0.000
L33	37.85 - 32.85 (33)	TP43.773x42.672x0.806	3387.75	7120.47	0.476	0.00	7120.47	0.000
L34	32.85 - 27.85 (34)	TP44.873x43.773x0.794	3629.58	7383.31	0.492	0.00	7383.31	0.000
L35	27.85 - 26.25 (35)	TP45.225x44.873x0.794	3707.52	7502.76	0.494	0.00	7502.76	0.000
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	3719.72	8522.58	0.436	0.00	8522.58	0.000
L37	26 - 21 (37)	TP46.38x45.28x0.881	3965.08	8722.08	0.455	0.00	8722.08	0.000
L38	21 - 16 (38)	TP47.48x46.38x0.881	4212.90	9153.00	0.460	0.00	9153.00	0.000
L39	16 - 11 (39)	TP48.58x47.48x0.856	4462.99	9336.83	0.478	0.00	9336.83	0.000
L40	11 - 6 (40)	TP49.68x48.58x0.856	4715.27	9776.17	0.482	0.00	9776.17	0.000
L41	6 - 1 (41)	TP50.78x49.68x0.831	4969.69	9941.92	0.500	0.00	9941.92	0.000
L42	1 - 0 (42)	TP51x50.78x0.831	5020.82	10030.42	0.501	0.00	10030.42	0.000

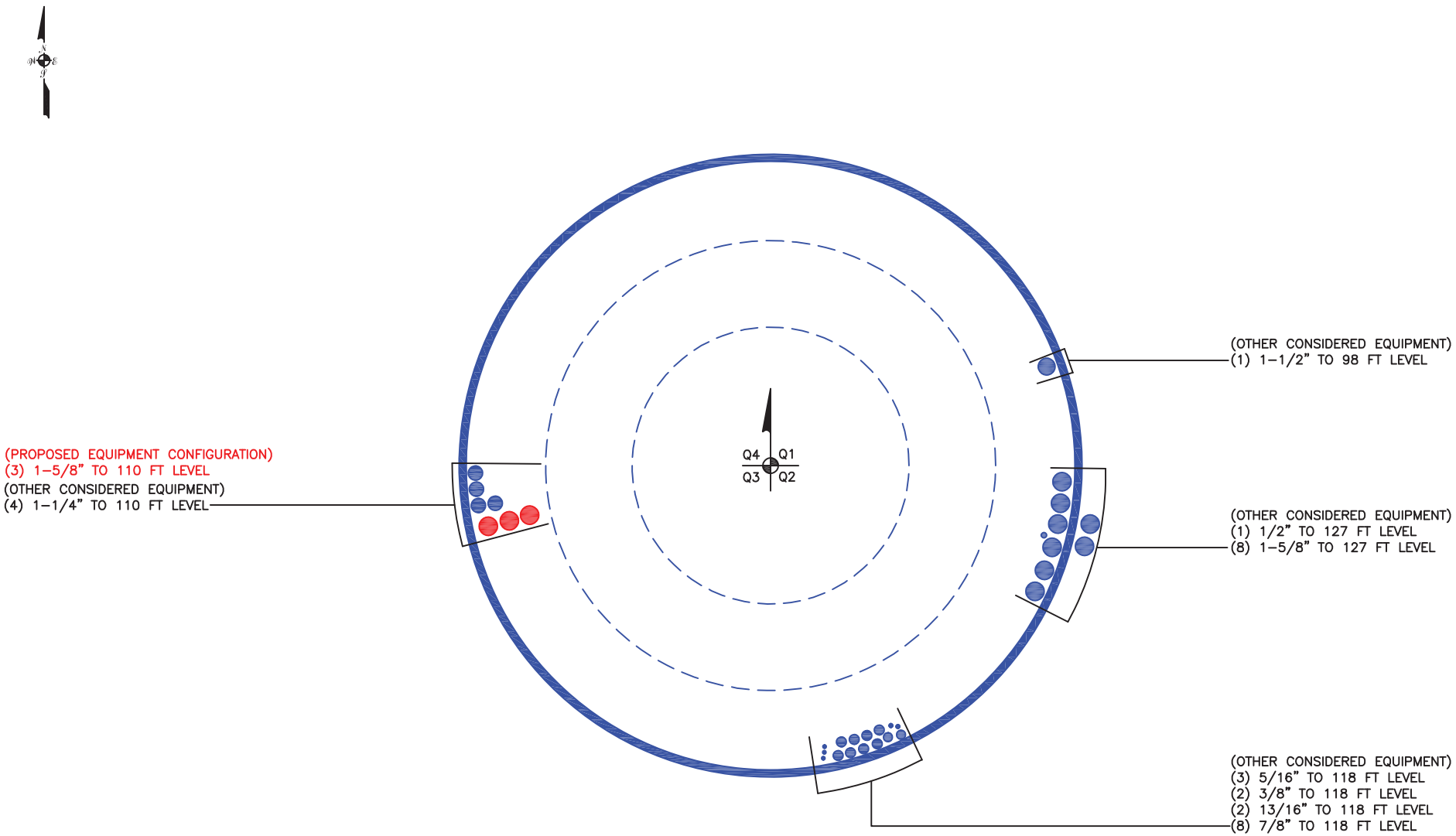
Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 125 (1)	TP24.687x23.588x0.25	8.50	345.24	0.025	0.14	742.13	0.000
L2	125 - 120 (2)	TP25.787x24.687x0.25	10.64	360.77	0.029	0.33	810.39	0.000
L3	120 - 115 (3)	TP26.886x25.787x0.25	16.74	376.30	0.044	0.32	881.67	0.000
L4	115 - 110 (4)	TP27.985x26.886x0.25	18.86	391.83	0.048	0.32	955.94	0.000
L5	110 - 105 (5)	TP29.084x27.985x0.25	27.41	407.36	0.067	0.32	1033.22	0.000
L6	105 - 100 (6)	TP30.184x29.084x0.25	31.06	422.89	0.073	0.32	1113.50	0.000
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	31.13	425.16	0.073	0.32	1125.47	0.000
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	31.15	803.24	0.039	0.32	2114.30	0.000
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	33.50	793.81	0.042	0.32	2120.73	0.000
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	33.52	1152.52	0.029	0.12	3063.10	0.000
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	33.57	1156.38	0.029	0.12	3083.64	0.000
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	33.60	778.04	0.043	0.12	2093.91	0.000
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	33.80	788.05	0.043	0.12	2148.12	0.000
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	33.82	789.45	0.043	0.12	2155.75	0.000
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	35.64	803.65	0.044	0.12	2234.00	0.000
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	35.66	805.04	0.044	0.12	2241.78	0.000
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	38.84	810.17	0.048	0.12	2335.28	0.000
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	38.85	811.09	0.048	0.12	2340.61	0.000
L19	86.08 - 85.83	TP33.299x33.244x0.431	38.88	801.00	0.049	0.12	2315.79	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	(19)							
L20	85.83 - 75.75	TP35.515x33.299x0.425	42.40	815.04	0.052	0.12	2432.97	0.000
	(20)							
L21	75.75 - 74.75	TP35.237x33.861x0.519	43.25	1017.77	0.042	0.16	3108.18	0.000
	(21)							
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	43.66	1017.22	0.043	0.16	3181.53	0.000
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	43.67	1388.78	0.031	0.16	4327.45	0.000
L24	70.75 - 65.75	TP37.219x36.118x0.681	44.29	1406.63	0.031	0.16	4520.82	0.000
	(24)							
L25	65.75 - 60.75	TP38.32x37.219x0.669	44.87	1422.90	0.032	0.16	4712.48	0.000
	(25)							
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	44.96	1429.14	0.031	0.16	4753.91	0.000
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	44.99	1352.30	0.033	0.16	4509.32	0.000
L28	59.75 - 54.75	TP39.641x38.54x0.631	45.56	1391.57	0.033	0.16	4775.06	0.000
	(28)							
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	46.06	1401.03	0.033	0.16	4937.93	0.000
L30	44 - 43 (30)	TP41.539x39.999x0.831	46.98	1912.26	0.025	0.16	6847.43	0.000
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	46.99	1913.81	0.025	0.16	6858.54	0.000
L32	42.85 - 37.85	TP42.672x41.572x0.819	47.57	1936.50	0.025	0.16	7129.40	0.000
	(32)							
L33	37.85 - 32.85	TP43.773x42.672x0.806	48.12	1957.63	0.025	0.16	7398.76	0.000
	(33)							
L34	32.85 - 27.85	TP44.873x43.773x0.794	48.64	1977.18	0.025	0.16	7666.16	0.000
	(34)							
L35	27.85 - 26.25	TP45.225x44.873x0.794	48.81	1992.97	0.024	0.16	7789.09	0.000
	(35)							
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	48.82	2272.50	0.021	0.16	8870.08	0.000
L37	26 - 21 (37)	TP46.38x45.28x0.881	49.34	2265.84	0.022	0.16	9068.33	0.000
L38	21 - 16 (38)	TP47.48x46.38x0.881	49.81	2320.62	0.021	0.16	9512.08	0.000
L39	16 - 11 (39)	TP48.58x47.48x0.856	50.25	2309.23	0.022	0.16	9693.92	0.000
L40	11 - 6 (40)	TP49.68x48.58x0.856	50.68	2362.46	0.021	0.16	10146.00	0.000
L41	6 - 1 (41)	TP50.78x49.68x0.831	51.11	2346.33	0.022	0.16	10308.92	0.000
L42	1 - 0 (42)	TP51x50.78x0.831	51.19	2356.67	0.022	0.16	10399.92	0.000

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED EQUIPMENT CONFIGURATION)
(3) 1–5/8" TO 110 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1–1/4" TO 110 FT LEVEL
Q4
Q1
Q3
Q2
(OTHER CONSIDERED EQUIPMENT)
(1) 1–1/2" TO 98 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 127 FT LEVEL
(8) 1–5/8" TO 127 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 5/16" TO 118 FT LEVEL
(2) 3/8" TO 118 FT LEVEL
(2) 13/16" TO 118 FT LEVEL
(8) 7/8" TO 118 FT LEVEL

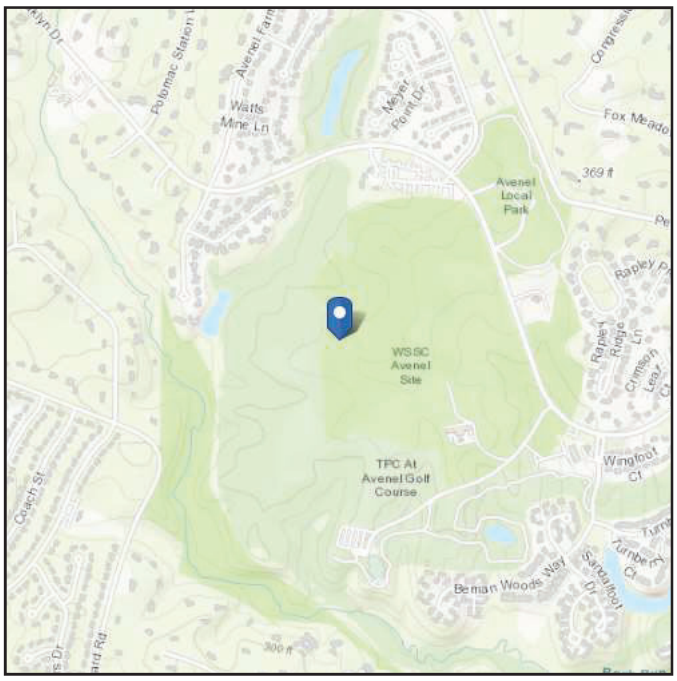
APPENDIX C

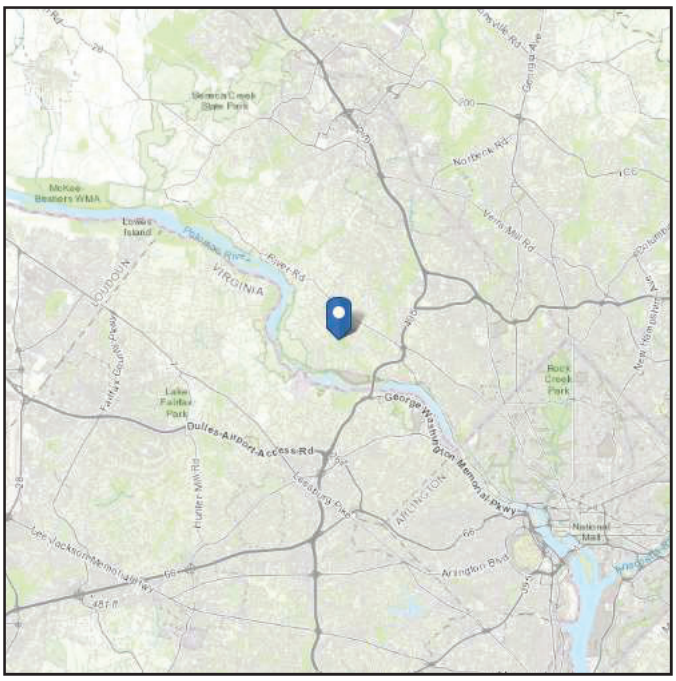
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Elevation:**	330.47 ft (NAVD 88)
Risk Category:	II	**Latitude:**	38.995158
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-77.203925





Wind

Results:

Wind Speed	112 Vmph	115 mph as per jurisdictional requirement
10-year MRI	75 Vmph	
25-year MRI	84 Vmph	
50-year MRI	89 Vmph	
100-year MRI	95 Vmph	

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Tue Apr 19 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

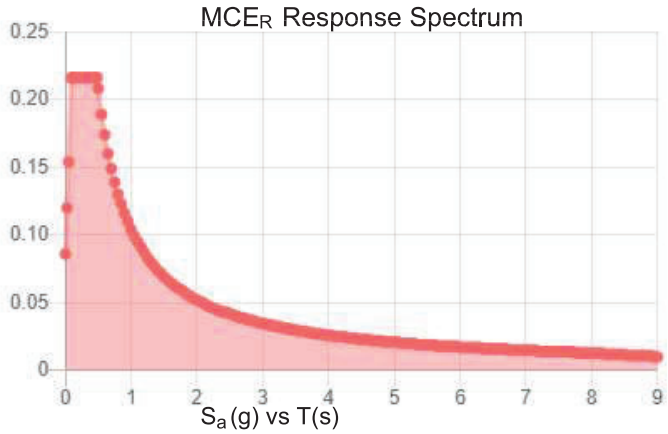
Seismic

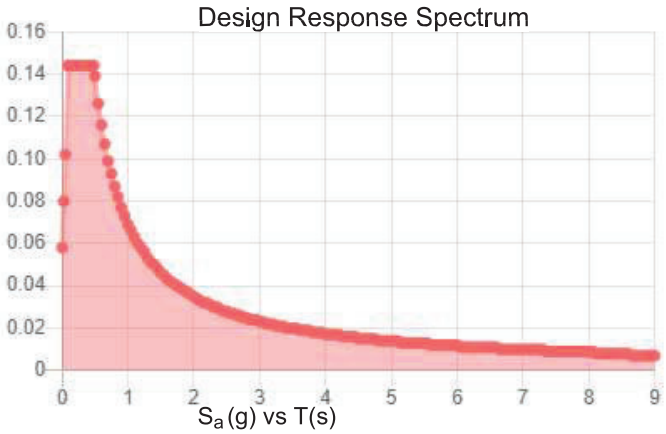
Site Soil Class: D - Default (see Section 11.4.3)

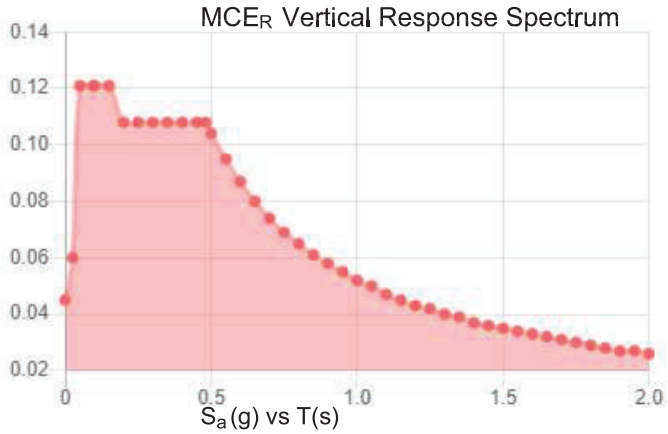
Results:

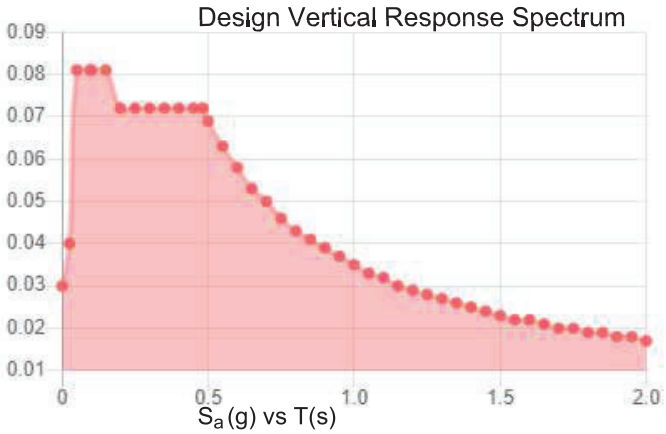
S_S :	0.135	S_{D1} :	0.069
S_1 :	0.043	T_L :	8
F_a :	1.6	PGA :	0.07
F_v :	2.4	PGA_M :	0.112
S_{MS} :	0.216	F_{PGA} :	1.6
S_{M1} :	0.104	I_e :	1
S_{DS} :	0.144	C_v :	0.7

Seismic Design Category B









Data Accessed: **Tue Apr 19 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	40 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Apr 19 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

CCIpole

per TIA-222- H

Site BU: 806957

Work Order: 2097400

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	130	54.25	5.25	12	23.588	35.515	0.25	Auto	A572-65
2	81	37	6	12	33.86	42.008	0.34375	Auto	A572-65
3	50	50	0	12	40.00	51	0.40625	Auto	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	60	channel	MP3-08 (1.1875in)W	3	x				x				x			
2	60	86.08	channel	MP3-05 (1.1875in)	3	x				x				x			
3	0	26.25	plate	MS-850 (1.1875")W	3			x				x				x	
4	26.25	43.1	plate	MS-600 (1.1875")	3			x				x				x	
5	60	71	plate	MS-600 (1.1875")	3			x				x				x	
6	86.08	91.5	plate	MS-600 (1.1875")	3			x				x				x	
7	91.5	94.29	plate	MS-600 (1.1875")	3		x				x				x		
8	94.29	97.04	plate	MS-600 (1.1875")	3				x				x				x
9	96.33	99.27	plate	Sabre PL 5"x1.25"	3			x				x				x	
10																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	7.93	2.8	10.32	0.95	Welded	n/a	PC 8.8 - M20 (100)	47.000	24.000	9.370	1.1875	A572-65
2	5.33	2.09	5.65	0.79	PC 8.8 - M20 (100)	29	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65
3	8.5	1.25	10.625	0.625	Welded	n/a	PC 8.8 - M20 (100)	45.000	17.250	9.063	1.1875	A572-65
4	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
5	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
6	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
7	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
8	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
9	5	1.25	6.25	0.625	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	24.000	4.688	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
MP3-08	Top	16	N	3	2	-	-	-	-	-	-	-	-	-
(1.1875in)W	Bottom	-	-	-	-	70	None	-	-	-	-	60	0.375	-
Sabre PL 5"x1.25"	Top	8	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	8	N	3	3	-	-	-	-	-	-	-	-	-
MS-850	Top	15	N	3	3	-	-	-	-	-	-	-	-	-
(1.1875")W	Bottom	-	-	-	-	80	CJP Groove	8.5	1.25	45	0.25	-	-	-

TNX Geometry Input

Increment (ft): 5 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	130 - 125	5		12	23.588	24.687	0.25	A572-65	1.000
2	125 - 120	5		12	24.687	25.787	0.25	A572-65	1.000
3	120 - 115	5		12	25.787	26.886	0.25	A572-65	1.000
4	115 - 110	5		12	26.886	27.985	0.25	A572-65	1.000
5	110 - 105	5		12	27.985	29.084	0.25	A572-65	1.000
6	105 - 100	5		12	29.084	30.184	0.25	A572-65	1.000
7	100 - 99.27	0.73		12	30.184	30.344	0.25	A572-65	1.000
8	99.27 - 99.02	0.25		12	30.344	30.399	0.475	A572-65	0.941
9	99.02 - 97.04	1.98		12	30.399	30.834	0.4625	A572-65	0.959
10	97.04 - 96.79	0.25		12	30.834	30.889	0.675	A572-65	0.936
11	96.79 - 96.33	0.46		12	30.889	30.990	0.675	A572-65	0.934
12	96.33 - 96.08	0.25		12	30.990	31.045	0.45	A572-65	0.966
13	96.08 - 94.29	1.79		12	31.045	31.439	0.45	A572-65	0.961
14	94.29 - 94.04	0.25		12	31.439	31.494	0.45	A572-65	0.960
15	94.04 - 91.5	2.54		12	31.494	32.052	0.45	A572-65	0.953
16	91.5 - 91.25	0.25		12	32.052	32.107	0.45	A572-65	0.952
17	91.25 - 86.25	5		12	32.107	33.207	0.4375	A572-65	0.965
18	86.25 - 86.08	0.17		12	33.207	33.244	0.4375	A572-65	0.965
19	86.08 - 85.83	0.25		12	33.244	33.299	0.43125	A572-65	0.955
20	85.83 - 81	10.08	5.25	12	33.299	35.515	0.425	A572-65	0.957
21	81 - 74.75	6.25		12	33.861	35.237	0.51875	A572-65	0.959
22	74.75 - 71	3.75		12	35.237	36.063	0.50625	A572-65	0.975
23	71 - 70.75	0.25		12	36.063	36.118	0.69375	A572-65	0.943
24	70.75 - 65.75	5		12	36.118	37.219	0.68125	A572-65	0.946
25	65.75 - 60.75	5		12	37.219	38.320	0.66875	A572-65	0.950
26	60.75 - 60	0.75		12	38.320	38.485	0.66875	A572-65	0.948
27	60 - 59.75	0.25		12	38.485	38.540	0.63125	A572-65	0.951
28	59.75 - 54.75	5		12	38.540	39.641	0.63125	A572-65	0.940
29	54.75 - 50	10.75	6	12	39.641	42.008	0.61875	A572-65	0.948
30	50 - 43	7		12	39.999	41.539	0.83125	A572-65	0.944
31	43 - 42.85	0.15		12	41.539	41.572	0.83125	A572-65	0.943
32	42.85 - 37.85	5		12	41.572	42.672	0.81875	A572-65	0.945
33	37.85 - 32.85	5		12	42.672	43.773	0.80625	A572-65	0.948
34	32.85 - 27.85	5		12	43.773	44.873	0.79375	A572-65	0.952
35	27.85 - 26.25	1.6		12	44.873	45.225	0.79375	A572-65	0.948
36	26.25 - 26	0.25		12	45.225	45.280	0.90625	A572-65	0.939
37	26 - 21	5		12	45.280	46.380	0.88125	A572-65	0.953
38	21 - 16	5		12	46.380	47.480	0.88125	A572-65	0.942
39	16 - 11	5		12	47.480	48.580	0.85625	A572-65	0.957
40	11 - 6	5		12	48.580	49.680	0.85625	A572-65	0.946
41	6 - 1	5		12	49.680	50.780	0.83125	A572-65	0.964
42	1 - 0	1		12	50.780	51.000	0.83125	A572-65	0.961

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	130 - 125	4.79	22.52	8.50
2	125 - 120	5.45	72.82	10.64
3	120 - 115	9.46	144.11	16.74
4	115 - 110	10.22	234.73	18.86
5	110 - 105	16.85	367.07	27.41
6	105 - 100	18.07	512.62	31.06
7	100 - 99.27	18.18	535.32	31.13
8	99.27 - 99.02	18.24	543.10	31.15
9	99.02 - 97.04	21.09	607.04	33.50
10	97.04 - 96.79	21.18	615.41	33.52
11	96.79 - 96.33	21.31	630.85	33.57
12	96.33 - 96.08	21.37	639.24	33.60
13	96.08 - 94.29	21.74	699.56	33.80
14	94.29 - 94.04	21.81	708.01	33.82
15	94.04 - 91.5	22.64	797.04	35.64
16	91.5 - 91.25	22.71	805.95	35.66
17	91.25 - 86.25	25.26	994.44	38.84
18	86.25 - 86.08	25.31	1001.04	38.85
19	86.08 - 85.83	25.37	1010.76	38.88
20	85.83 - 81	27.06	1206.70	42.40
21	81 - 74.75	29.70	1474.10	43.25
22	74.75 - 71	30.78	1637.01	43.66
23	71 - 70.75	30.89	1647.92	43.67
24	70.75 - 65.75	32.68	1867.81	44.29
25	65.75 - 60.75	34.51	2090.67	44.87
26	60.75 - 60	34.80	2124.35	44.96
27	60 - 59.75	34.89	2135.60	44.99
28	59.75 - 54.75	36.68	2361.94	45.56
29	54.75 - 50	38.42	2579.50	46.06
30	50 - 43	43.52	2905.15	46.98
31	43 - 42.85	43.60	2912.20	46.99
32	42.85 - 37.85	45.98	3148.59	47.57
33	37.85 - 32.85	48.40	3387.75	48.12
34	32.85 - 27.85	50.86	3629.58	48.64
35	27.85 - 26.25	51.65	3707.52	48.81
36	26.25 - 26	51.81	3719.72	48.82
37	26 - 21	54.57	3965.08	49.34
38	21 - 16	57.37	4212.90	49.81
39	16 - 11	60.21	4462.99	50.25
40	11 - 6	63.08	4715.27	50.68
41	6 - 1	65.98	4969.69	51.11
42	1 - 0	66.57	5020.83	51.19

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP24.687x23.588x0.25	Pole	3.6%	Pass
125 - 120	Pole	TP25.787x24.687x0.25	Pole	10.0%	Pass
120 - 115	Pole	TP26.886x25.787x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP27.985x26.886x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP29.084x27.985x0.25	Pole	41.0%	Pass
105 - 100	Pole	TP30.184x29.084x0.25	Pole	53.7%	Pass
100 - 99.27	Pole	TP30.344x30.184x0.25	Pole	55.6%	Pass
99.27 - 99.02	Pole + Reinf.	TP30.399x30.344x0.475	Reinf. 9 Compression	43.2%	Pass
99.02 - 97.04	Pole + Reinf.	TP30.834x30.399x0.4625	Reinf. 9 Compression	47.3%	Pass
97.04 - 96.79	Pole + Reinf.	TP30.889x30.834x0.675	Reinf. 9 Compression	33.5%	Pass
96.79 - 96.33	Pole + Reinf.	TP30.99x30.889x0.675	Reinf. 9 Compression	34.1%	Pass
96.33 - 96.08	Pole + Reinf.	TP31.045x30.99x0.45	Reinf. 8 Tension Rupture	47.1%	Pass
96.08 - 94.29	Pole + Reinf.	TP31.439x31.045x0.45	Reinf. 8 Tension Rupture	50.5%	Pass
94.29 - 94.04	Pole + Reinf.	TP31.494x31.439x0.45	Reinf. 7 Tension Rupture	51.0%	Pass
94.04 - 91.5	Pole + Reinf.	TP32.052x31.494x0.45	Reinf. 7 Tension Rupture	55.7%	Pass
91.5 - 91.25	Pole + Reinf.	TP32.107x32.052x0.45	Reinf. 6 Tension Rupture	56.2%	Pass
91.25 - 86.25	Pole + Reinf.	TP33.207x32.107x0.4375	Reinf. 6 Tension Rupture	65.7%	Pass
86.25 - 86.08	Pole + Reinf.	TP33.244x33.207x0.4375	Reinf. 6 Tension Rupture	66.0%	Pass
86.08 - 85.83	Pole + Reinf.	TP33.299x33.244x0.4313	Reinf. 2 Tension Rupture	62.8%	Pass
85.83 - 81	Pole + Reinf.	TP35.515x33.299x0.425	Reinf. 2 Tension Rupture	71.2%	Pass
81 - 74.75	Pole + Reinf.	TP35.237x33.861x0.5188	Reinf. 2 Tension Rupture	68.3%	Pass
74.75 - 71	Pole + Reinf.	TP36.063x35.237x0.5063	Reinf. 2 Tension Rupture	72.9%	Pass
71 - 70.75	Pole + Reinf.	TP36.118x36.063x0.6938	Reinf. 5 Tension Rupture	59.1%	Pass
70.75 - 65.75	Pole + Reinf.	TP37.219x36.118x0.6813	Reinf. 5 Tension Rupture	63.9%	Pass
65.75 - 60.75	Pole + Reinf.	TP38.32x37.219x0.6688	Reinf. 5 Tension Rupture	68.4%	Pass
60.75 - 60	Pole + Reinf.	TP38.485x38.32x0.6688	Reinf. 5 Tension Rupture	69.0%	Pass
60 - 59.75	Pole + Reinf.	TP38.54x38.485x0.6313	Reinf. 1 Tension Rupture	65.8%	Pass
59.75 - 54.75	Pole + Reinf.	TP39.641x38.54x0.6313	Reinf. 1 Tension Rupture	69.6%	Pass
54.75 - 50	Pole + Reinf.	TP42.008x39.641x0.6188	Reinf. 1 Tension Rupture	72.9%	Pass
50 - 43	Pole + Reinf.	TP41.539x39.999x0.8313	Reinf. 4 Tension Rupture	65.2%	Pass
43 - 42.85	Pole + Reinf.	TP41.572x41.539x0.8313	Reinf. 4 Tension Rupture	65.3%	Pass
42.85 - 37.85	Pole + Reinf.	TP42.672x41.572x0.8188	Reinf. 4 Tension Rupture	67.8%	Pass
37.85 - 32.85	Pole + Reinf.	TP43.773x42.672x0.8063	Reinf. 4 Tension Rupture	70.2%	Pass
32.85 - 27.85	Pole + Reinf.	TP44.873x43.773x0.7938	Reinf. 4 Tension Rupture	72.5%	Pass
27.85 - 26.25	Pole + Reinf.	TP45.225x44.873x0.7938	Reinf. 4 Tension Rupture	73.1%	Pass
26.25 - 26	Pole + Reinf.	TP45.28x45.225x0.9063	Reinf. 3 Bolt Shear	62.7%	Pass
26 - 21	Pole + Reinf.	TP46.38x45.28x0.8813	Reinf. 3 Compression	62.3%	Pass
21 - 16	Pole + Reinf.	TP47.48x46.38x0.8813	Reinf. 3 Compression	64.0%	Pass
16 - 11	Pole + Reinf.	TP48.58x47.48x0.8563	Reinf. 3 Compression	65.5%	Pass
11 - 6	Pole + Reinf.	TP49.68x48.58x0.8563	Reinf. 3 Compression	67.0%	Pass
6 - 1	Pole + Reinf.	TP50.78x49.68x0.8313	Reinf. 3 Compression	68.3%	Pass
1 - 0	Pole + Reinf.	TP51x50.78x0.8313	Reinf. 3 Compression	68.6%	Pass
				Summary	
			Pole	59.6%	Pass
			Reinforcement	73.1%	Pass
			Overall	73.1%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity* (100% Max. Allowable)									
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9
130 - 125	1502	n/a	1502	19.64	n/a	19.64	3.6%									
125 - 120	1713	n/a	1713	20.53	n/a	20.53	10.0%									
120 - 115	1944	n/a	1944	21.41	n/a	21.41	18.4%									
115 - 110	2195	n/a	2195	22.29	n/a	22.29	27.7%									
110 - 105	2467	n/a	2467	23.18	n/a	23.18	41.0%									
105 - 100	2760	n/a	2760	24.06	n/a	24.06	53.7%									
100 - 99.27	2804	n/a	2804	24.19	n/a	24.19	55.6%									
99.27 - 99.02	2820	2368	5188	24.24	18.75	42.99	29.5%									43.2%
99.02 - 97.04	2943	2433	5377	24.59	18.75	43.34	32.5%									47.3%
97.04 - 96.79	2959	4758	7717	24.63	36.75	61.38	23.0%								31.3%	33.5%
96.79 - 96.33	2989	4787	7776	24.71	36.75	61.46	23.5%								31.9%	34.1%
96.33 - 96.08	3005	2338	5343	24.75	18.00	42.75	34.7%								47.1%	
96.08 - 94.29	3122	2395	5517	25.07	18.00	43.07	37.5%								50.5%	
94.29 - 94.04	3138	2403	5541	25.12	18.00	43.12	37.8%							51.0%		
94.04 - 91.5	3309	2486	5795	25.56	18.00	43.56	41.8%							55.7%		
91.5 - 91.25	3327	2494	5820	25.61	18.00	43.61	42.2%						56.2%			
91.25 - 86.25	3683	2660	6343	26.49	18.00	44.49	50.2%						65.7%			
86.25 - 86.08	3695	2666	6362	26.52	18.00	44.52	50.5%						66.0%			
86.08 - 85.83	3714	2588	6302	26.57	16.95	43.52	51.6%		62.8%							
85.83 - 81	4084	2748	6831	27.42	16.95	44.37	59.6%		71.2%							
81 - 74.75	6010	2883	8893	38.57	16.95	55.52	49.7%		68.3%							
74.75 - 71	6447	3013	9460	39.48	16.95	56.43	53.5%		72.9%							
71 - 70.75	6477	6149	12626	39.54	34.95	74.49	40.4%		55.1%			59.1%				
70.75 - 65.75	7094	6515	13608	40.76	34.95	75.71	44.3%		59.6%			63.9%				
65.75 - 60.75	7748	6890	14638	41.97	34.95	76.92	48.1%		63.7%			68.4%				
60.75 - 60	7850	6947	14797	42.16	34.95	77.11	48.6%		64.3%			69.0%				
60 - 59.75	7884	6372	14255	42.22	30.96	73.18	50.8%	65.8%								
59.75 - 54.75	8585	6721	15306	43.43	30.96	74.39	54.5%	69.6%								
54.75 - 50	9289	7061	16351	44.59	30.96	75.55	57.8%	72.9%								
50 - 43	11636	11445	23081	53.73	48.96	102.69	44.3%	59.4%			65.2%					
43 - 42.85	11664	11462	23126	53.77	48.96	102.73	44.3%	59.4%			65.3%					
42.85 - 37.85	12624	12050	24675	55.21	48.96	104.17	46.6%	61.7%			67.8%					
37.85 - 32.85	13636	12654	26289	56.65	48.96	105.61	48.8%	63.9%			70.2%					
32.85 - 27.85	14700	13271	27971	58.08	48.96	107.04	50.9%	65.9%			72.5%					
27.85 - 26.25	15052	13472	28524	58.54	48.96	107.50	51.5%	66.5%			73.1%					
26.25 - 26	15107	17381	32489	58.62	62.84	121.45	45.5%	58.6%		62.7%						
26 - 21	16246	18200	34446	60.05	62.84	122.89	47.3%	60.3%		62.3%						
21 - 16	17440	19038	36479	61.49	62.84	124.32	49.2%	61.9%		64.0%						
16 - 11	18692	19896	38587	62.93	62.84	125.76	50.9%	63.4%		65.5%						
11 - 6	20002	20772	40773	64.36	62.84	127.20	52.7%	64.8%		67.0%						
6 - 1	21371	21667	43038	65.80	62.84	128.64	54.4%	66.1%		68.3%						
1 - 0	21652	21848	43501	66.09	62.84	128.92	54.7%	66.3%		68.6%						

Note: Section capacity checked using 5 degree increments.

**Rating per TIA-222-H Section 15.5.*

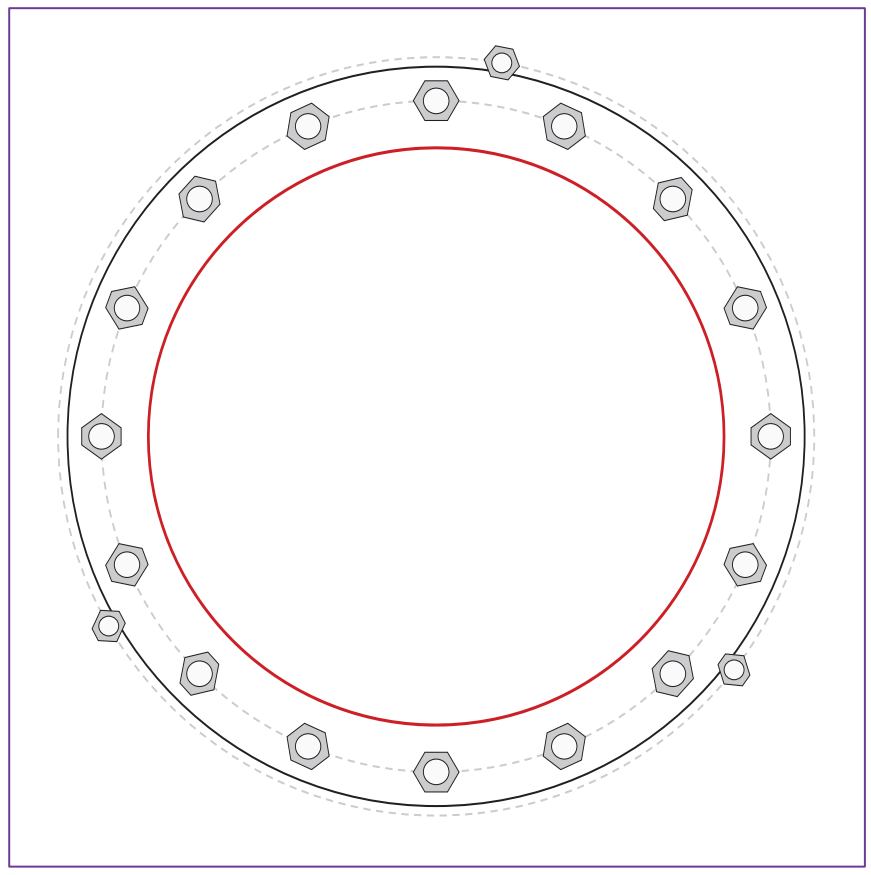
Monopole Base Plate Connection

Site Info	
BU #	806957
Site Name	Williamsburg Gardens
Order #	611571 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	5020.83
Axial Force (kips)	66.57
Shear Force (kips)	51.19

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 59.3" BC

GROUP 2: (3) 1-3/4" ø bolts (F1554-105 N; Fy=105 ksi, Fu=125 ksi) on 67" BC

pos. (deg): 80, 210, 322

Base Plate Data

65.3" OD x 2.75" Plate (S-128; Fy=60 ksi, Fu=80 ksi)

Stiffener Data

N/A

Pole Data

51" x 0.40625" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:

Pu_t = 222.38	ϕPn_t = 243.75	**Stress Rating**
Vu = 3.2	ϕVn = 149.1	**86.9%**
Mu = n/a	ϕMn = n/a	**Pass**

GROUP 2:

Pu_t = 147.93	ϕPn_t = 178.13	**Stress Rating**
Vu = 0	ϕVn = 112.75	**79.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	30.83	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**54.4%**	**Pass**

CCIplate

Elevation (ft)	0	*(Base)*

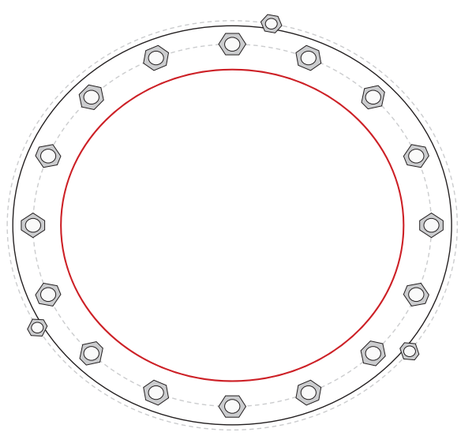
note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	Yes	No	
2	No	No	No	Yes	No	

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η:	l_{ar} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	0	2.25	A615-75	59.3	0.5	0.625	N-Included		No
2	1	22.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
3	1	45	2.25	A615-75	59.3	0.5	0.625	N-Included		No
4	1	67.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
5	1	90	2.25	A615-75	59.3	0.5	0.625	N-Included		No
6	1	112.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
7	1	135	2.25	A615-75	59.3	0.5	0.625	N-Included		No
8	1	157.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
9	1	180	2.25	A615-75	59.3	0.5	0.625	N-Included		No
10	1	202.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
11	1	225	2.25	A615-75	59.3	0.5	0.625	N-Included		No
12	1	247.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
13	1	270	2.25	A615-75	59.3	0.5	0.625	N-Included		No
14	1	292.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
15	1	315	2.25	A615-75	59.3	0.5	0.625	N-Included		No
16	1	337.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
17	2	80	1.75	F1554-105	67	0.5	0.625	N-Included		No
18	2	210	1.75	F1554-105	67	0.5	0.625	N-Included		No
19	2	322	1.75	F1554-105	67	0.5	0.625	N-Included		No

Plot Graphic



Drilled Pier Foundation

BU # :	806957
Site Name:	Williamsburg Gardens
Order Number:	611571 Rev. 0
TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	5020.82	
Axial Force (kips)	66.58	
Shear Force (kips)	51.18	

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	24	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 24' below grade		
Pier Diameter	7	ft
Rebar Quantity	28	
Rebar Size	10	
Clear Cover to Ties	3	in
Tie Size	5	
Tie Spacing	24	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.46	-
Soil Safety Factor	1.86	-
Max Moment (kip-ft)	5362.77	-
Rating*	*68.0%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	549.35	-
End Bearing (kips)	662.99	-
Weight of Concrete (kips)	169.72	-
Total Capacity (kips)	1212.35	-
Axial (kips)	236.30	-
Rating*	*18.6%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.35	-
Critical Moment (kip-ft)	5362.62	-
Critical Moment Capacity	5854.43	-
Rating*	*87.2%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	21.24	-
Critical Shear (kip)	390.19	-
Critical Shear Capacity	851.13	-
Rating*	*43.7%*	-

Tie Spacing Requirements Not Met
Shear-Friction Methodology is Applied

Structural Foundation Rating*	**87.2%**
Soil Interaction Rating*	**68.0%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☑
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

Groundwater Depth	N/A	# of Layers	3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	15	11.5	120	150	0	32	1.209	1.209				22	Cohesionless
3	15	24	9	130	150	0	36	2.156	2.156			20	25	Cohesionless

Radio Frequency Emissions Analysis Report

T-Mobile Wireless Monopole Facility

August 29, 2022

Analysis Format: Theoretical Calculations

Sign Count	
	1
	0
	1
	0
	1

Statement of Compliance

T-Mobile will be compliant with FCC Regulations once the mitigation measures recommended in this report are implemented.

Centerline PN: 950007-204
7WAN098A
CROWN - POTOMAC
10010 OAKLYN DR, POTOMAC, MD 20854

Contents

Overview

Centerline Communications, LLC ("Centerline") has been contracted to provide a Radio Frequency (RF) Analysis for the following T-Mobile wireless monopole facility to determine whether the facility is in compliance with federal standards and regulations regarding RF emissions. This analysis includes theoretical emissions calculations for all existing equipment for T-Mobile .

The facility is located on a Monopole in POTOMAC, Maryland.

Analysis Site Data

Site ID:	7WAN098A
Site Name:	CROWN - POTOMAC
Site Address:	10010 OAKLYN DR, POTOMAC, MD 20854
Site Latitude:	38.994970
Site Longitude:	-77.20390
Facility Type:	Monopole

Compliance Summary

Status:	T-Mobile will be compliant with FCC Regulations Upon Installation of Signage
Site Modeled Composite MPE% (General Public Limit):	0.65 %
T-Mobile Max Modeled MPE% (General Public Limit):	0.29 %
Lock or Control Measures if Present:	Unlocked Gate

In addition to the T-Mobile antennas and radio equipment there are antennas and radio equipment for AT&T, Sprint, Dish & Verizon which have been included in this analysis as part of the overall site compliance determination.

*To be conservative, all sites are considered uncontrolled for modeling purposes unless confirmed otherwise by a site visit.

FCC Guidelines

All power density values used in this report were analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General Population/Uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 600, 700, and 800 MHz Bands is approximately 400 $\mu W/cm^2$, 467 $\mu W/cm^2$, and 567 $\mu W/cm^2$ respectively, and the general population exposure limit for the 1900 MHz PCS, 2100 MHz AWS, 2500 MHz, 3500 MHz CBRS, 5000 MHz LAA, 28GHz, and 39GHz bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density. Reference the Site Antenna Data Table for list of frequencies in operation at this site.

Occupational/Controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure, have been properly trained in RF safety and can exercise control over their exposure. Occupational/Controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure, have been trained in RF safety and can exercise control over his or her exposure by leaving the area or by some other appropriate means. The Occupational/Controlled exposure limits all utilized frequency bands is five (5) times the FCC's General Public / Uncontrolled exposure limit.

Additional details can be found in FCC OET 65.

Calculation Methodology & Data

Centerline has performed theoretical calculations on all transmission equipment located on this facility. All calculations have been performed using the RoofMaster® software from Waterford Consultants LLC. This software performs calculations using a cylindrical model for very conservative power density predictions within the near-field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations the power decreases inversely with the square of the distance. This modeling technique is accurate with low antenna centerlines, such as rooftops, where persons can get close to the antennas and pass through fields in close proximity.

The below calculation in Figure 1 shows the theoretical distribution of power over an imaginary cylinder with equal power distribution in all directions.

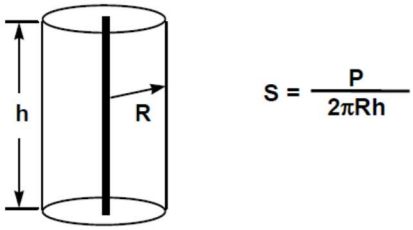


Figure 1: Distribution of power over an imaginary cylinder in all directions

This model can be modified for directional antennas to show directionality of power distribution. This formula will tend to be conservative as it assumes that all power is focused between the 3 dB power roll off points as shown in Figure 2.

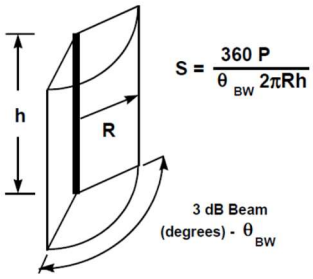


Figure 2: Distribution of power over an imaginary cylinder in all directions inside the half power roll off points (HBW)

The **proposed antenna configuration** for T-Mobile and any other known wireless carriers at this facility are shown below in **Table 1 – Site Antenna Data Table**.

All calculations for this facility were performed assuming that all radios were running at full power and were uncombined in their RF paths with the configuration shown in table 1. FCC OET Bulletin 65 – Edition 97-01 recommends that modeling of this nature should be done as described prior to yield a worst-case scenario. Due to the dynamic nature of many deployed systems the "real world" values will most likely be less than those shown in this report due to worst-case values being shown in all instances.

For all "Other" systems on this facility, exact equipment was used if available. In instances where "Other" system equipment was not available, standard radio configurations for these systems were utilized based upon prior experience with these systems on facilities in this area.

Site Antenna Data Table

Sector	Operator	Frequency Band	TX Power Per Channel	Tx #	ERP	Antenna Make	Antenna Model	Gain (dBd)	Az (°)	Antenna Centerline Height (ft)
A1	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	35	110
A1	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	35	110
A1	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	35	110
A2	T-Mobile	L2500	80	2	25651.9	ERICSSON	AIR6419	22.05	35	110
A2	T-Mobile	N2500	80	2	25651.9	ERICSSON	AIR6419	22.05	35	110
A3	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	35	110
B4	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	115	110
B4	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	115	110
B4	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	115	110
B5	T-Mobile	L2500	80	2	25651.9	ERICSSON	AIR6419	22.05	115	110
B5	T-Mobile	N2500	80	2	25651.9	ERICSSON	AIR6419	22.05	115	110
B6	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	115	110
C7	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	255	110
C7	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	255	110
C7	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	255	110
C8	T-Mobile	L2500	80	2	25651.9	ERICSSON	AIR6419	22.05	255	110
C8	T-Mobile	N2500	80	2	25651.9	ERICSSON	AIR6419	22.05	255	110
C9	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	255	110
10	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	35	118
11	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	35	118
12	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	35	118
12	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	35	118
13	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	115	118
14	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	115	118
15	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	115	118
15	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	115	118
16	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	255	118

17	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	255	118
18	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	255	118
18	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	255	118
19	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860	14.72	35	127
20	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860	14.9	35	127
21	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000	15.4	35	127
22	Verizon	3700	50	4	43154.8	SAMSUNG	SON_MT6407 TB	23.34	35	127
23	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860	14.72	115	127
24	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860	14.9	115	127
25	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000-	15.4	115	127
26	Verizon	3700	50	4	43154.8	SAMSUNG	SON_MT6407 TB	23.34	115	127
27	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860	14.72	255	127
28	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860	14.9	255	127
29	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000-	15.4	255	127
30	Verizon	3700	50	4	43154.8	SAMSUNG	SON_MT6407 TB	23.34	255	127
31	Dish	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	35	98
31	Dish	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	35	98
31	Dish	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	35	98
32	Dish	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	115	98
32	Dish	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	115	98
32	Dish	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	115	98
33	Dish	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	255	98
33	Dish	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	255	98
33	Dish	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	255	98
34	Sprint	850	50	2	2162.72	RFS	APXVSPP18-C-A20	13.35	35	110
34	Sprint	1900	20	8	6153.47	RFS	APXVSPP18-C-A20-	15.85	35	110
35	Sprint	850	50	2	2162.72	RFS	APXVSPP18-C-A20	13.35	35	110
35	Sprint	1900	20	8	6153.47	RFS	APXVSPP18-C-A20-	15.85	35	110
36	Sprint	850	50	2	2162.72	RFS	APXVSPP18-C-A20	13.35	35	110
36	Sprint	1900	20	8	6153.47	RFS	APXVSPP18-C-A20-	15.85	35	110

Table 1: Total Site Antenna data table

Results

All calculations performed based upon the data listed for this facility have produced results that are within allowable limits for General Population for exposure to RF emissions as specified by federal standards.

T-Mobile's RF Exposure: Responsibilities, Procedures & Guidelines document states that microwave dishes are compliant if they are mounted 20 feet or greater above any accessible walking or working surface.

Maximum Predicted MPE Level on Site:	**% of MPE Limit:**
Accessible **General Population** MPE Limits:	**0.65%**
Accessible **Occupational** MPE Limits:	**0.13%**

Ground Level Assessment:	**% of MPE Limit:**
Ground Level **General Population** MPE Limits:	**0.29%**
Ground Level **Occupational** MPE Limits:	**0.06%**

Sector A: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

Sector B: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

Sector C: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

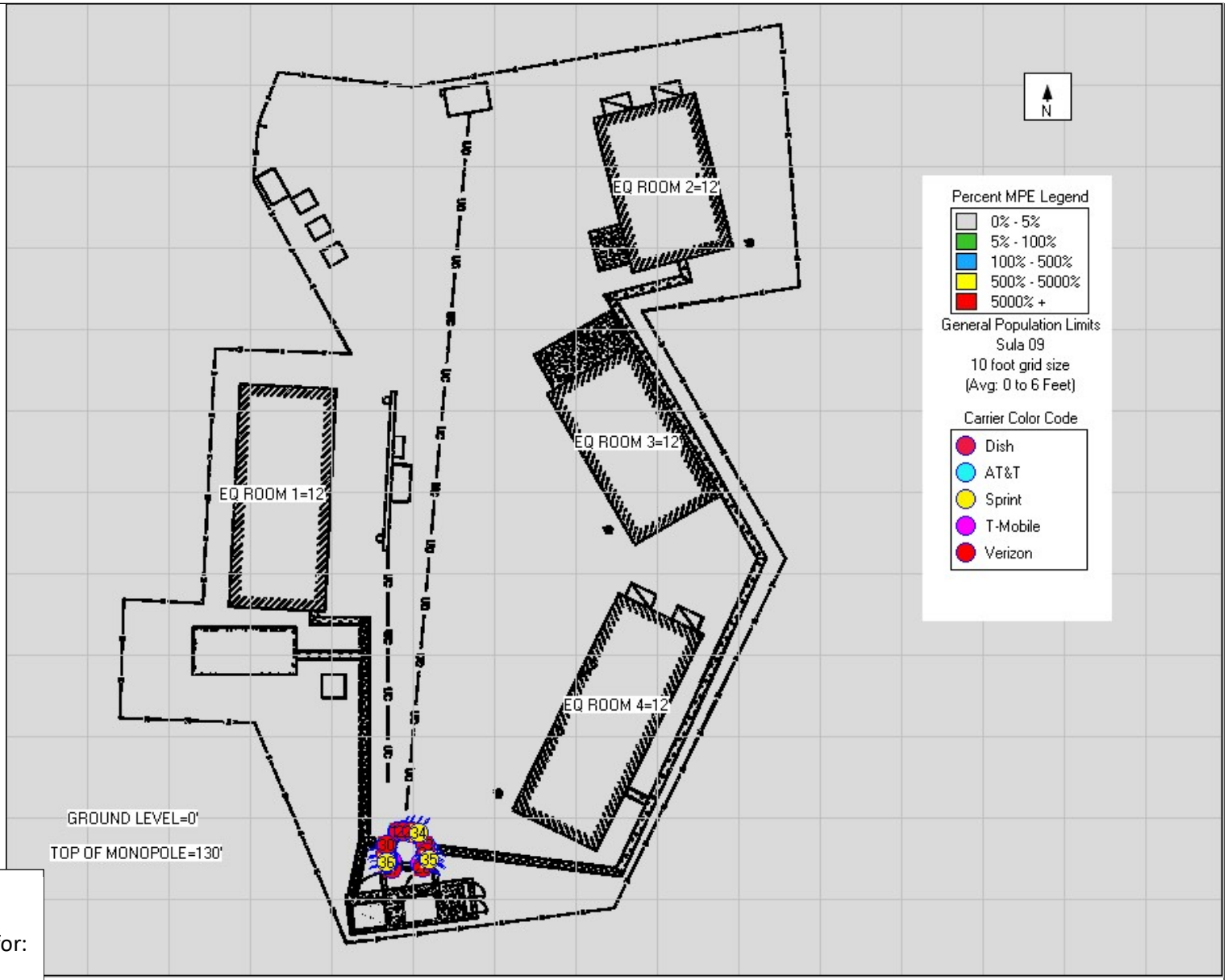
**Distance from Antenna is the distance in feet that the MPE limits are exceeded from the front face of the antenna, outward across an accessible area.*

APPENDIX A: Emissions Thresholds for Walking Surfaces and Signage

Ground (0ft.)

Emissions Thresholds for Walking Surfaces for:

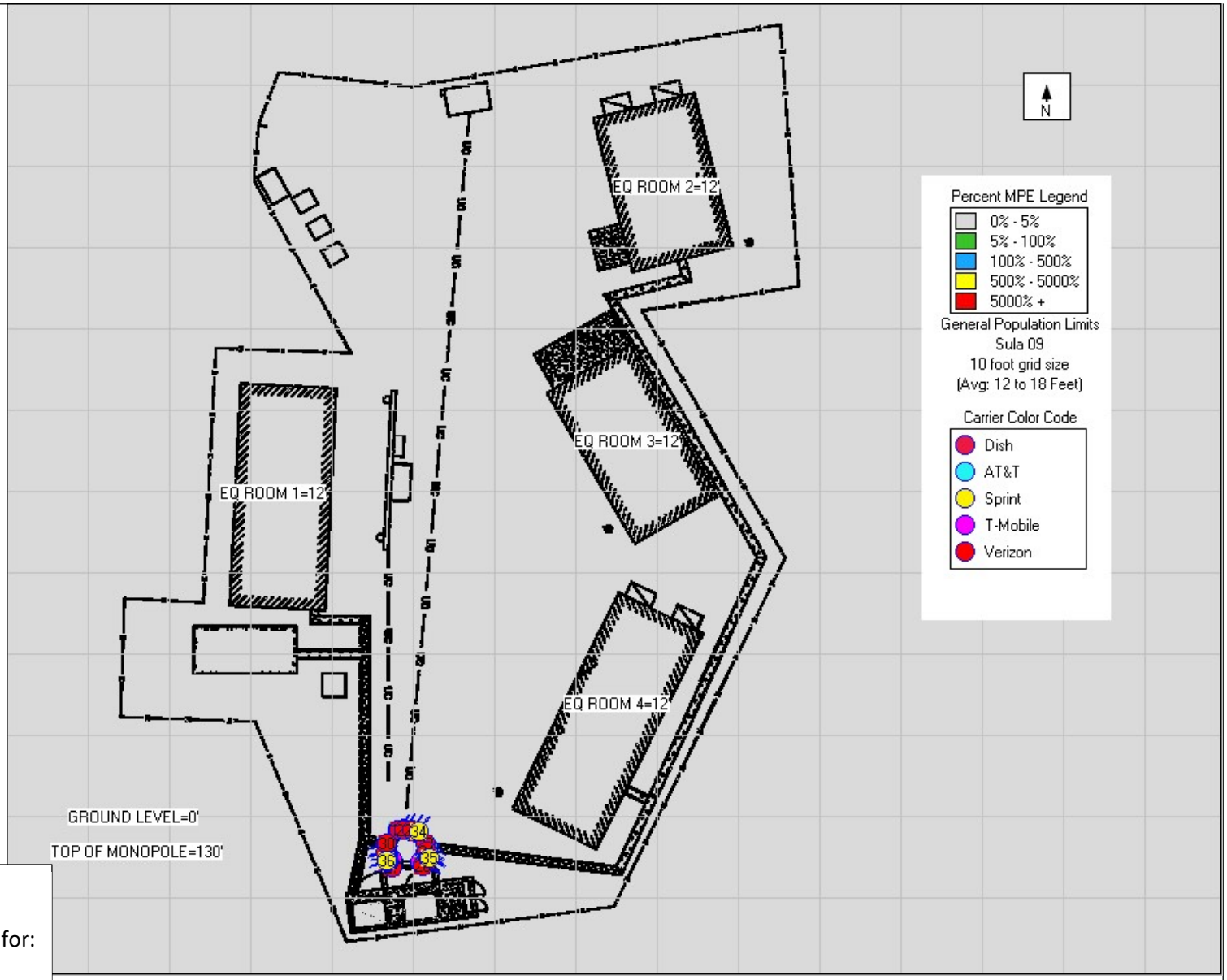
7WAN098A / CROWN - POTOMAC



Monopole Base (0ft.)

Emissions Thresholds for Walking Surfaces for:

7WAN098A / CROWN - POTOMAC



EQ Rooms (12ft.)

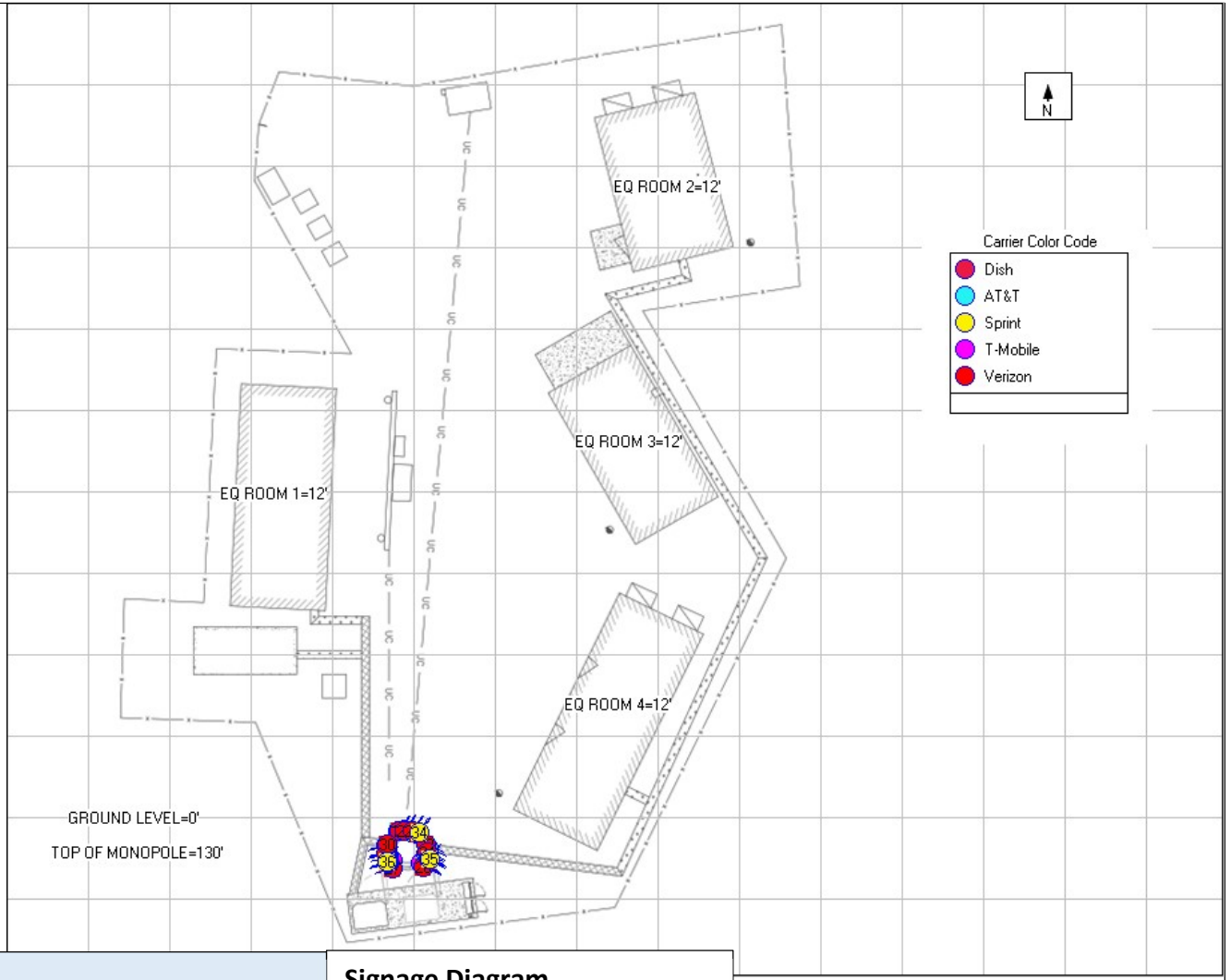
Emissions Thresholds for Walking Surfaces for:

7WAN098A / CROWN - POTOMAC

Access

Existing Item

Proposed Item



Signage Count									
	1		0		1		0		1

Signage Diagram

Signage for:

7WAN098A/ CROWN - POTOMAC

Compliance Actions

Access	• Ensure all access points are locked. • Install (1) Guideline sign on the base of the monopole. • Install (1) Caution sign on the base of the monopole. • Install (1) Emergency sign on the base of the monopole.
Alpha Sector	• No Action Needed.
Beta Sector	• No Action Needed.
Gamma Sector	• No Action Needed.
Notes:	• N/A

APPENDIX B: RF Signage Description Table

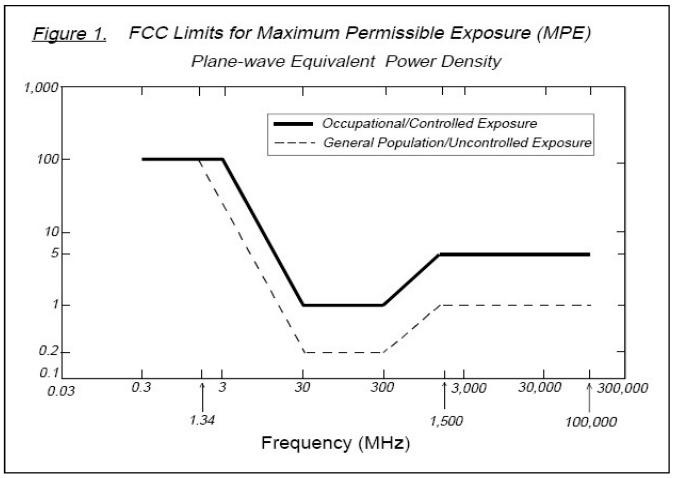
Sign	Description
	**RF Guideline Sign** Gives guidelines on how to proceed in areas that may exceed either the FCC's General Population or Occupational emissions limits.
	**Emergency Sign** Used to inform individuals to call 911 in case of emergency.
 	**Blue Notice Sign** Used to inform individuals that they are entering an area that may exceed the FCC's General Population limits. Must be placed anywhere the public can get within 30 feet vertically or horizontally of an antenna.
 	**Yellow Caution Sign** Used to inform individuals that they are entering an area that may exceed the either the FCC's General Population or Occupational Emissions limits. It must be placed so it is visible from all approachable sides. It must also be just outside of the area predicted to exceed the MPE limits so it can be read without standing within the affected area.
 	**Orange Warning Sign (Previously Red)** Used to inform individuals that they are entering an area that may exceed 5x the FCC's Occupational emissions limit. It must be placed so it is visible from all approachable sides. It must also be just outside of the area predicted to exceed the MPE limits so it can be read without standing within the affected area.

APPENDIX C: FCC Emissions Threshold Limits

Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-I,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-I,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

* Plane-wave equivalent power density



APPENDIX D: Certifications

I, Benjamin Black, preparer of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in T-Mobile's FCC Regulatory Compliance Manual.

Benjamin Black

8/29/2022

I, Yasir Alqadhili, reviewer and approver of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in T-Mobile's FCC Regulatory Compliance Manual.

Yasir Alqadhili

8/29/2022

Montgomery County Planning Department,

1. **JDX COMMENT – The plans do not show any other carrier antennas present at the RAD center of 98', while the structural does show other carrier antennas present at 98'. Please resolve the discrepancy.**

   TEP RESPONSE – Sheets C-2 and S-1 have been updated to show the Dish equipment at 98' RAD center.

2. **JDX COMMENT – The plans depict antennas and equipment belonging to "others" but do not note the names of the other carriers to whom other antennas and equipment belong. Please update the plans to include the names of the carriers for all other antennas and equipment.**

   TEP RESPONSE – Sheets C-1.1, C-2, and S-1 have been updated to callout the equipment by others by their carrier.

Sincerely,

Tower Engineering Professionals, (TEP OPCO)
Geoff McDaniel
Project Manager – Civil Division - Phoenix

TOWER
ENGINEERING
PROFESSIONALS

Montgomery County Planning Department,

1. **JDX COMMENT – The plans do not show any other carrier antennas present at the RAD center of 98', while the structural does show other carrier antennas present at 98'. Please resolve the discrepancy.**

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   TEP RESPONSE – Sheets C-1.0, C-1.1, C-2, and S-1 have been updated to callout the equipment by others by their carrier.

Sincerely,

Tower Engineering Professionals, (TEP OPCO)
Geoff McDaniel
Project Manager – Civil Division - Phoenix

T-Mobile

CALL MARYLAND ONE CALL
(800) 282-8555
CALL 3 WORKING DAYS
BEFORE YOU DIG!
811

T-MOBILE SITE NUMBER: 7WAN098A
T-MOBILE SITE NAME: CROWN - POTOMAC
SITE TYPE: MONOPINE
TOWER HEIGHT: 130'-0"

BUSINESS UNIT #: 806957
SITE ADDRESS: 10010 OAKLYN DRIVE POTOMAC, MD 20854
COUNTY: MONTGOMERY
JURISDICTION: MONTGOMERY COUNTY

T-MOBILE ANCHOR SITE CONFIGURATION: 67E5998E_1XAIR+1OP+1QP

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	WILLIAMSBURG GARDENS
SITE ADDRESS:	10010 OAKLYN DRIVE POTOMAC, MD 20854
COUNTY:	MONTGOMERY
MAP/PARCEL #:	02835024
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	38° 59' 42.57" (38.99500000)
LONGITUDE:	-77° 12' 14.13" (-77.20388900)
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	331 FT
CURRENT ZONING:	RE-2C/TDP
JURISDICTION:	MONTGOMERY COUNTY
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	WASHINGTON SUBURBAN SANITARY COMM. 14501 SWEITZER LANE LAUREL, MD 20707-5902
TOWER OWNER:	CROWN CASTLE USA, INC. 3530 TORINGDON WAY, STE 300 CHARLOTTE, NC 28277
CARRIER/APPLICANT:	T-MOBILE 12050 BALTIMORE AVENUE BELTSVILLE, MD 20705
ELECTRIC PROVIDER:	PEPCO 800-257-7777
TELCO PROVIDER:	VERIZON 1800-837-4966

PROJECT TEAM

A&E FIRM:	TOWER ENGINEERING PROFESSIONALS 326 TRYON ROAD RALEIGH, NC 27603
	JOSEPH T. CRESS - PROJECT MANAGER (919) 661-6351
	SCOTT C. BRANTLEY - CIVIL ENGINEER (919) 661-6351
	SCOTT C. BRANTLEY - ELECTRICAL ENGINEER (919) 661-6351
TOWER OWNER:	CROWN CASTLE USA, INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	9011 ARBORETUM PARKWAY, SUITE 100 RICHMOND, VA 23236
	CHANDLER DAVIS - PROJECT MANAGER CHANDLER.DAVIS@CROWNCASTLE.COM
	BILLY STUBBS - A&E SPECIALIST BILLY.STUBBS@CROWNCASTLE.COM

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.0	OVERALL SITE PLAN
C-1.1	SITE PLAN
C-1.2	EXISTING & FINAL EQUIPMENT PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4.1	EQUIPMENT SPECS
C-4.2	EQUIPMENT SPECS
C-5	EQUIPMENT SPECS
C-6	PLUMBING DIAGRAM & COLOR CODE
S-1	STRUCTURAL
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 22x34. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (3) TMAs
- REMOVE (3) RRUs 11 B12
- REMOVE (12) COAX CABLES
- REMOVE (1) 9x18 HCS 60m CABLES
- INSTALL (9) ANTENNAS
- INSTALL (6) RRUs
- INSTALL (3) 6x24 4AWG 60m CABLES

GROUND SCOPE OF WORK:
- REMOVE (1) RBS 2106 CABINET
- REMOVE (1) DUW30
- REMOVE (6) RU22s
- INSTALL (2) CABINETS
- INSTALL (2) PSU 4813 BOOSTER
- INSTALL (1) BB 6648
- INSTALL (1) IXRe ROUTER
- INSTALL (2) RP 6651s

LOCATION MAP

NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	MARYLAND BUILDING CODES/2018 IBC
MECHANICAL	2018 INTERNATIONAL MECHANICAL CODE
ELECTRICAL	2020 NATIONAL ELECTRICAL CODE

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	TOWER ENGINEERING PROFESSIONALS		
DATED:	4/27/22		
MOUNT ANALYSIS:	TOWER ENGINEERING PROFESSIONALS		
DATED:	5/12/22		
ORDER ID:	611571	RFDS VERSION:	9
REVISION:	0	DATED:	2/21/22

ANALYSIS CRITERIA:

APPLICABLE CODES:	TIA-222-H / ASCE 7-16
WIND SPEED:	112 MPH
EXPOSURE CATEGORY:	C
RISK CATEGORY:	II
TOPOGRAPHIC CATEGORY:	1
SEISMIC Ss:	0.135
SEISMIC S1:	0.043
SERVICE WIND SPEED:	60 MPH

APPROVALS

APPROVAL	SIGNATURE	DATE
RF		
CONST.		
FAA		
OPS		
RE		
SR DEV MGR		
REG DIR		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM
3	08/08/22	KBA	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

08/08/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: T-1

REVISION: 3

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER 40 ksi
   #5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
      #6 BARS AND LARGER 2"
      #5 BARS AND SMALLER 1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
      SLAB AND WALLS 3/4"
      BEAMS AND COLUMNS 1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
LOCP	LOSS OF COMMERCIAL POWER RELAY
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T · · Mobile · · ·
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BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER
ENGINEERING
PROFESSIONALS

326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351

N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

SCOTT C. BRANT
58709

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-2

REVISION: 0

NOTE:
SITE PLAN IS BASED ON GIS AND GOOGLE EARTH DATA. TOWER ENGINEERING PROFESSIONALS HAS NOT COMPLETED A BOUNDARY SURVEY FOR THIS PROPERTY.

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006

1 OVERALL SITE PLAN
SCALE: 200' 100' 0 200' 1" = 200'-0" (FULL SIZE) 1" = 400'-0" (11x17)

N

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EXISTING 130'-0"
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1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM
3	08/08/22	KBA	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

08/08/22

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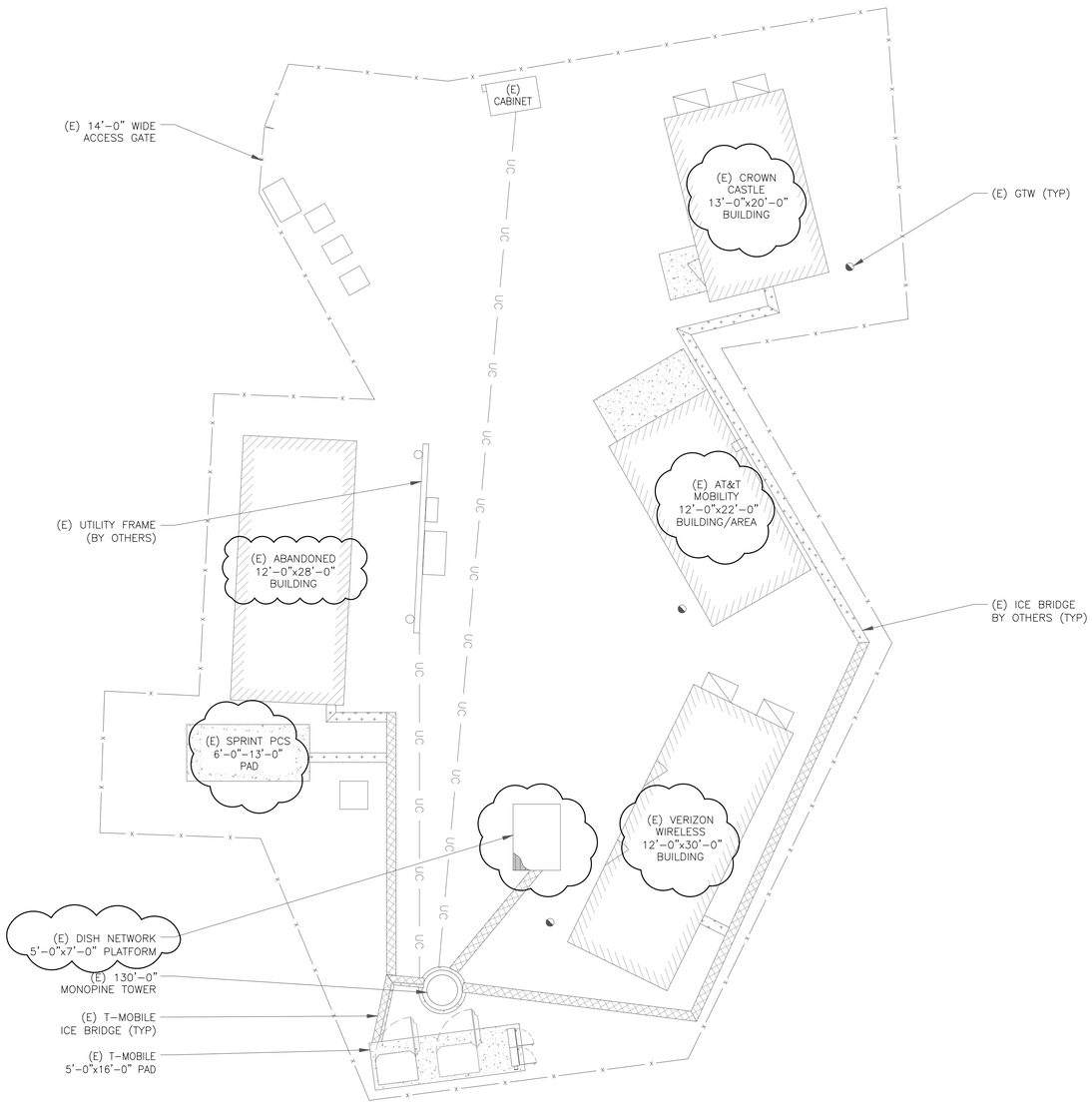
SHEET NUMBER: C-1.0

REVISION: 3

NOTE:
SITE PLAN SHOWN BELOW WAS REPRODUCED FROM INFORMATION PROVIDED BY CROWN CASTLE AND SITE WALK CONDUCTED BY TEP. CONTRACTOR TO VERIFY ALL EXISTING INFORMATION IS AS INDICATED ON SITE PLAN. CONTRACTOR IS TO ESTABLISH THE EXISTENCE AND LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES. IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES.

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006



1 SITE PLAN
SCALE: 8' 6' 4' 2' 0 8' 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

N

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WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

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1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM
3	08/08/22	KBA	CONSTRUCTION	GSM

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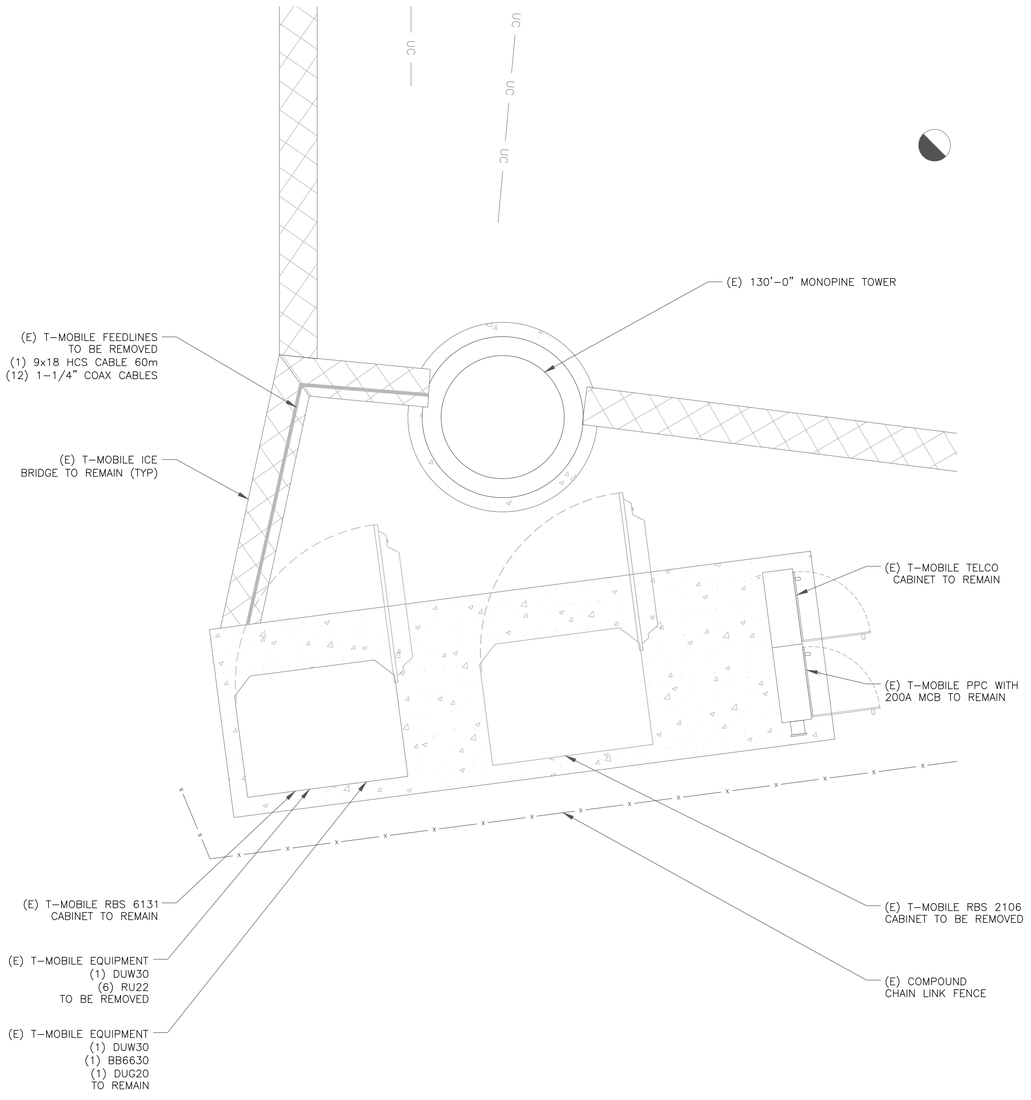
SHEET NUMBER: C-1.1

REVISION: 3

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006



1 EXISTING EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

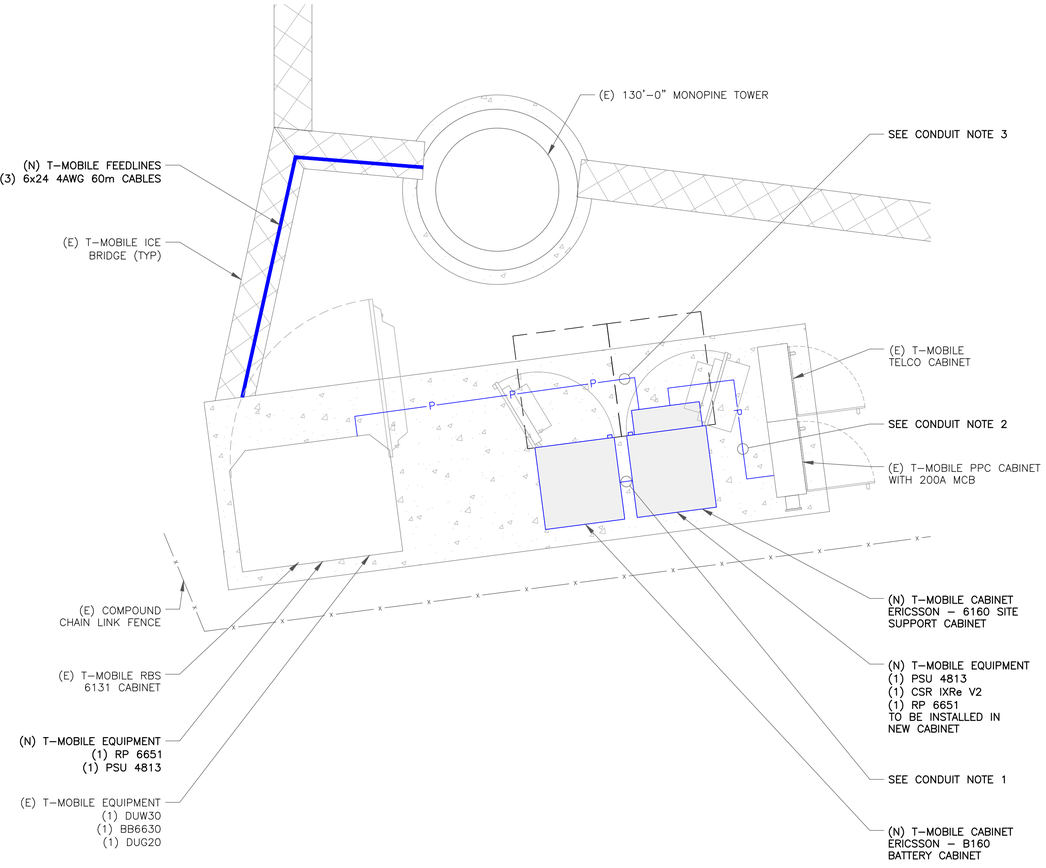
CONDUIT NOTES:

- ALL CONDUIT TO BE SCH40 PVC OR LTFC, AS NOTED. INSTALL WEATHERPROOF FITTINGS.
- ABOVE GRADE CONDUIT RUNS TO BE MARKED WITH HAZARD TAPE TO PREVENT TRIPPING HAZARD.

1. (1) 2" CONDUIT BETWEEN 6160 AND B160 (ABOVE GRADE, LTFC or SCH40 PVC)
2. (1) 2" CONDUIT FROM PPC TO 6160 FOR 125A & 15A BREAKER CONDUCTORS (BELOW GRADE, SCH40 PVC)
3. (1) 1" CONDUIT FROM AAV/WESTELL CABINET TO 6160 CABINET (BELOW GRADE, SCH40 PVC)

NOTE:

ALL RACKS AND EQUIPMENT CABINETS ARE TO HAVE TWO GROUNDING LEADS. ALL EQUIPMENT INSTALLED IN RACKS MUST HAVE A CHASSIS GROUND ATTACHED TO A COMMON BUS BAR ON THE RACK. COMMON BUS BAR MUST BE GROUNDED TO MAIN GROUND BAR. SEE G-1 FOR GROUNDING NOTES.



2 FINAL EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

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T-MOBILE SITE NUMBER:
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WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
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1	06/09/22	JVZ	CONSTRUCTION	GSM

SEAL:

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SCOTT C. BRAY
58709
PROFESSIONAL ENGINEER

06/09/22

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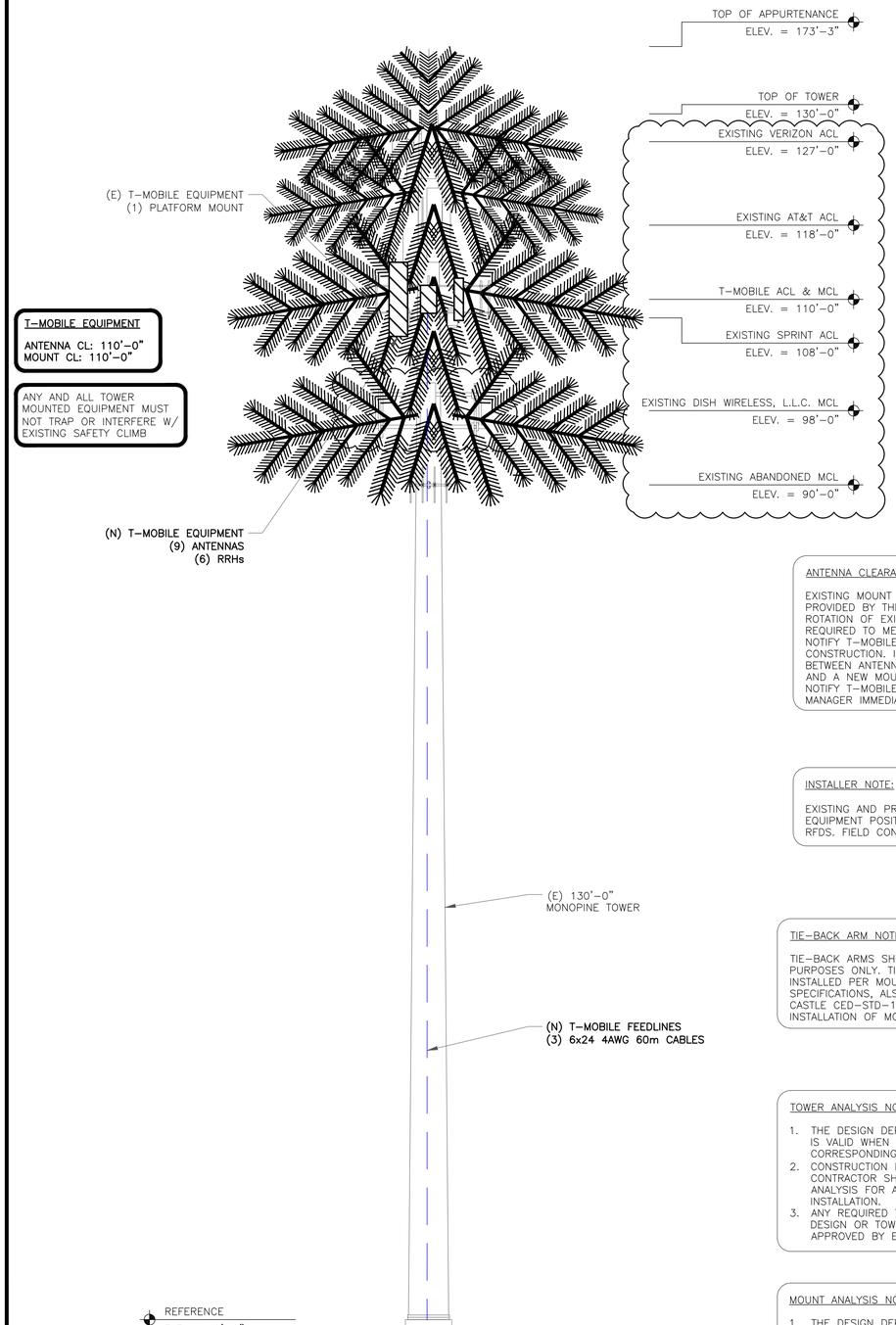
SHEET NUMBER: C-1.2

REVISION: 1



1 FINAL ELEVATION
SCALE: 8" 6" 4" 2" 0 8" 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

ANTENNA CLEARANCE NOTE:

EXISTING MOUNT SIZE AND ORIENTATION PROVIDED BY THE TOWER OWNER. IF ROTATION OF EXISTING MOUNTS IS REQUIRED TO MEET AZIMUTHS, PLEASE NOTIFY T-MOBILE RF PRIOR TO CONSTRUCTION. IF 36" CLEARANCE BETWEEN ANTENNAS CANNOT BE MET AND A NEW MOUNT IS REQUIRED, PLEASE NOTIFY T-MOBILE CONSTRUCTION MANAGER IMMEDIATELY.

INSTALLER NOTE:

EXISTING AND PROPOSED ANTENNA/ EQUIPMENT POSITIONING SHOWN PER RFDS. FIELD CONDITIONS MAY VARY.

TIE-BACK ARM NOTE:

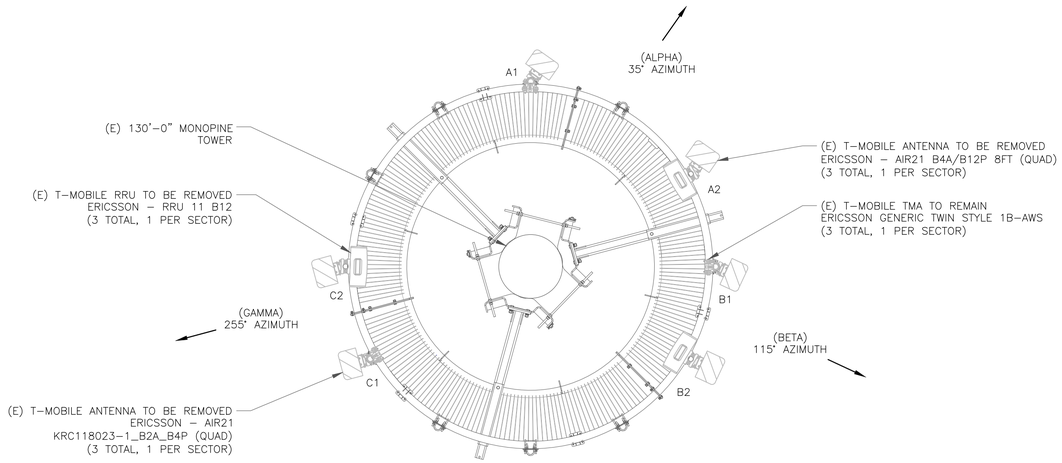
TIE-BACK ARMS SHOWN ARE FOR REFERENCE PURPOSES ONLY. TIE-BACK ARMS TO BE INSTALLED PER MOUNT MANUFACTURERS SPECIFICATIONS, ALSO ADHERING TO CROWN CASTLE CED-STD-10294 STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES.

TOWER ANALYSIS NOTES:

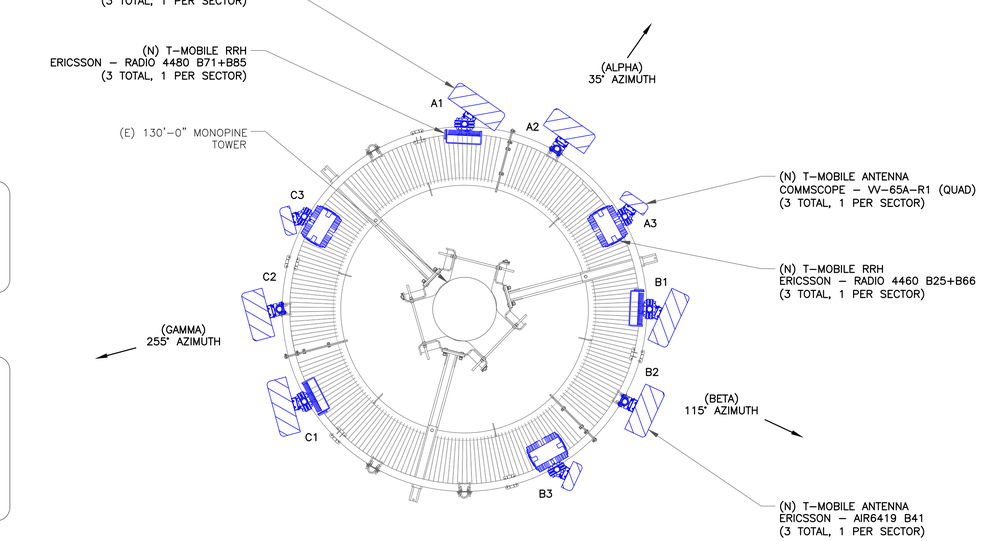
1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.



2 EXISTING ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)



3 FINAL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

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TOWER ENGINEERING PROFESSIONALS
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(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM
3	08/08/22	KBA	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND · SCOTT C. BRAUN · 58709 · PROFESSIONAL ENGINEER

08/08/22

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SHEET NUMBER: C-2

REVISION: 3

EXISTING ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	*U1900, *G1900, *U2100	110'-0"	35°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	4°/4°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
ALPHA	A3	*L2100, *L700	110'-0"	35°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	4°/4°	*(1) ERICSSON - RRU 11 B12	*(1) 9x18 HCS 60m
BETA	B1	*U1900, *G1900, *U2100	110'-0"	115°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	2°/2°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
BETA	B3	*L2100, *L700	110'-0"	115°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	2°/2°	*(1) ERICSSON - RRU 11 B12	HYBRID (SHARED)
GAMMA	C1	*U1900, *G1900, *U2100	110'-0"	255°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	4°/4°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
GAMMA	C3	*L2100, *L700	110'-0"	255°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	4°/4°	*(1) ERICSSON - RRU 11 B12	HYBRID (SHARED)

*EQUIPMENT TO BE REMOVED

EXISTING CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
EXISTING	*COAX	1-1/4"	12
EXISTING	*HCS	6x18 HCS 60m	1
CABLE QUANTITY			13

1 EXISTING ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

FINAL ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L700, L600, N600	110'-0"	35°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	(3) 6x24 4AWG 60m
ALPHA	A2	L2500, N2500	110'-0"	35°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
ALPHA	A3	U1900, L2100 L1900, G1900	110'-0"	35°	COMMSCOPE	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)
BETA	B1	L700, L600, N600	110'-0"	115°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	HYBRID (SHARED)
BETA	B2	L2500, N2500	110'-0"	115°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
BETA	B3	U1900, L2100 L1900, G1900	110'-0"	115°	ERICSSON	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)
GAMMA	C1	L700, L600, N600	110'-0"	255°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	HYBRID (SHARED)
GAMMA	C2	L2500, N2500	110'-0"	255°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
GAMMA	C3	U1900, L2100 L1900, G1900	110'-0"	255°	ERICSSON	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)

FINAL CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
NEW	HCS	4AWG 60m	3
CABLE QUANTITY			3

2 PROPOSED ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

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10010 OAKLYN DRIVE
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SEAL:

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SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

05/27/22

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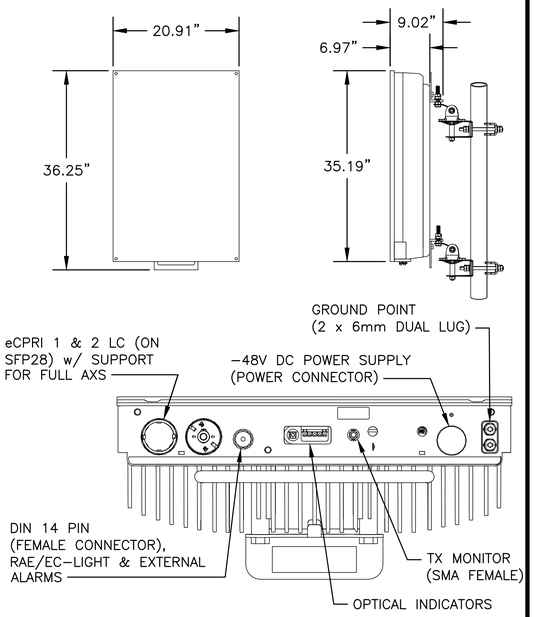
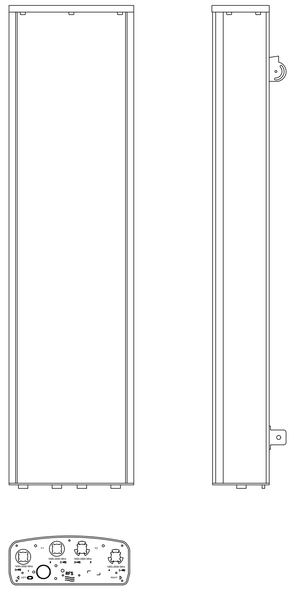
SHEET NUMBER: C-3

REVISION: 0

MANUFACTURER:	ERICSSON
MODEL:	AIR 6419 B41 (2.5GHz M-MIMO)
DIMENSIONS:	36.25" x 20.91" x 9.02" (H x W x D)
WEIGHT:	83 LBS (EXCLUDING MOUNTING KIT)
MOUNT WEIGHT:	13.5 LBS (SXK109 2016/1)



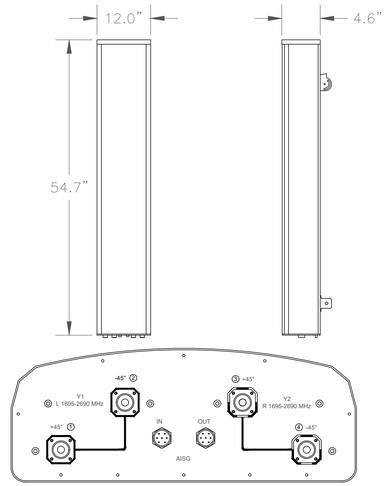
1 ERICSSON – 6419 B41
SCALE: NOT TO SCALE



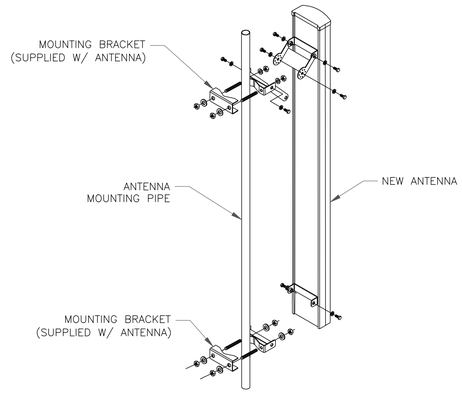
RFS/CELWAVE – APXVAALL24_43-U-NA20
WEIGHT (WITHOUT MOUNTING HARDWARE): 149.90 LBS
SIZE (HxWxD): 95.90x24.00x8.50 IN.

2 RFS/CELWAVE – APXVAALL24_43-U-NA20
SCALE: NOT TO SCALE

MANUFACTURER:	COMMSCOPE
MODEL:	VV-65A-R1
DIMENSIONS:	54.7" x 12.1" x 4.6" (H x W x D)
WEIGHT:	24.7 LB
INTERFACE:	4-PORT 4.3-10 FEMALE
MOUNTING KIT:	600899A-2 (INCLUDED) WEIGHT: 8.6 LB

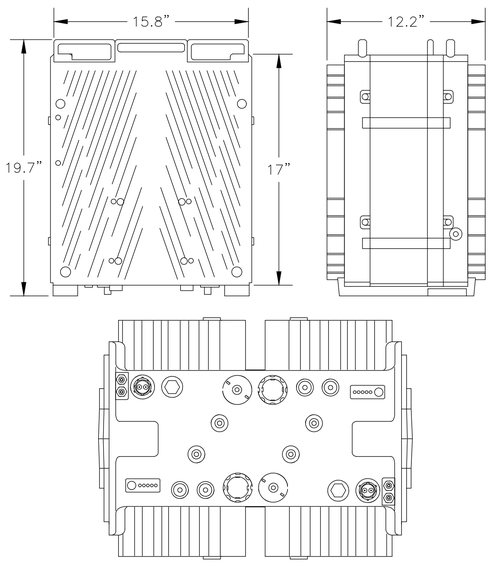


3 COMMSCOPE – VV-65A-R1
SCALE: NOT TO SCALE



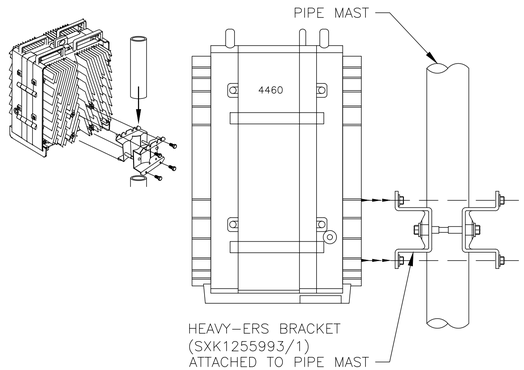
4 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	4460 RADIO B2/25 B66 (KRC 161 912/3)
DIMENSIONS:	19.7" x 15.8" x 12.2" (H" x W" x D")
WEIGHT:	109 LBS
BRACKET WEIGHT:	4.8 LBS (ERS HEAVY #SXK1255993/1)



5 ERICSSON – RADIO 4460 B25+B66
SCALE: NOT TO SCALE

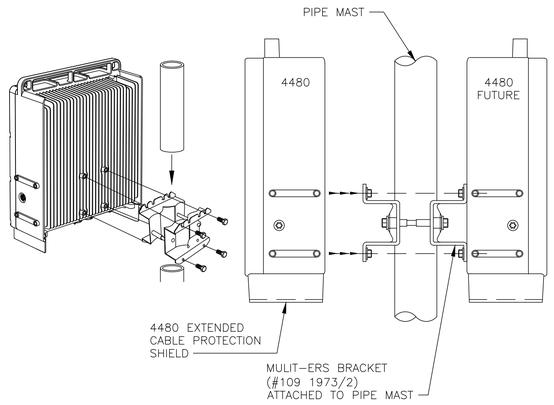
INSTALLATION KIT:	NTB1010029/50	1/RADIO
BRACKET:	ERS HEAVY BRACKET (SXK1255993/1)	1
POWER CONNECTOR:	CIRCULAR CONNECTOR (RNT4437/01)	2
GROUND CABLE:	CABLE -16mm2, GYNE, 2m 1 LUG w/ 2 M6 HOLES, 90° (RPM1192062/2)	1



INSTALLER NOTES:
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

6 ERICSSON – RADIO 4460 MOUNTING DETAIL
SCALE: NOT TO SCALE

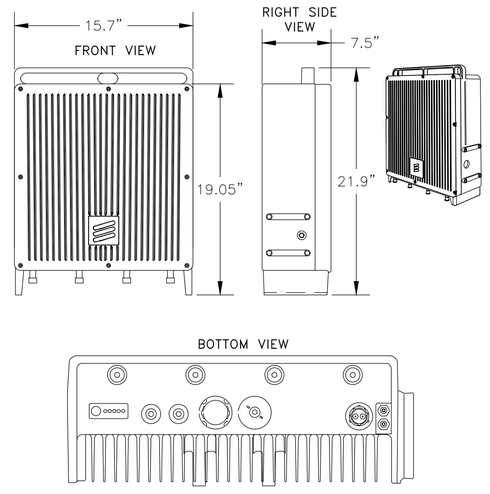
INSTALLATION KIT:	TB1010029/10	1/RADIO
BRACKET:	MULTI ERS BRACKET (#109 1973/2)	1
POWER CONNECTOR:	CIRCULAR CONNECTOR (RNT4437/01)	2
GROUND CABLE:	CABLE -16mm2, GYNE, 2m 1 LUG w/ 2 M6 HOLES, 90° (RPM1192062/2)	1



INSTALLER NOTES:
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

7 ERICSSON – RADIO 4480 MOUNTING DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	4480 RADIO (KRC 161 922/1)
DIMENSIONS:	21.9" x 15.7" x 7.5" (H x W x D)
MODEL BAND:	B71, B85 FOR NR AND LTE
WEIGHT:	81 LBS
BRACKET WEIGHT:	3.75 LBS (MULTI ERS #109 1973/2)



8 ERICSSON – RADIO 4480 B71+B85
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER
ENGINEERING
PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

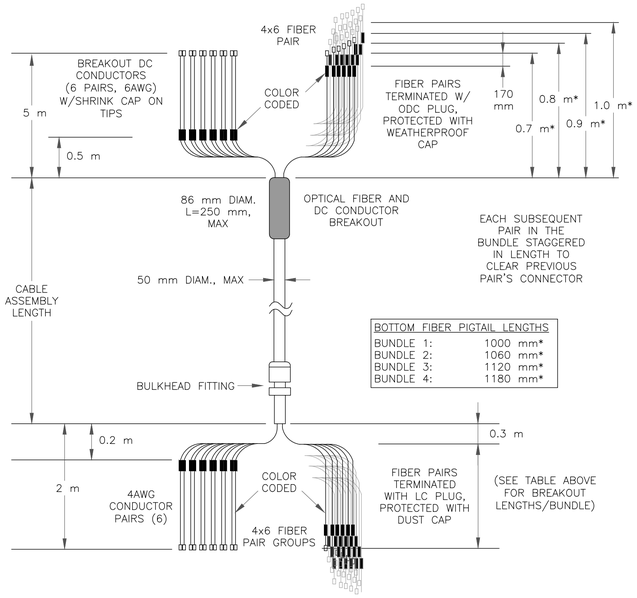
STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

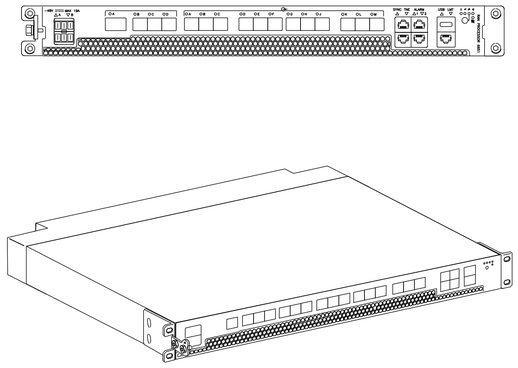
SHEET NUMBER: C-4.1

REVISION: 0



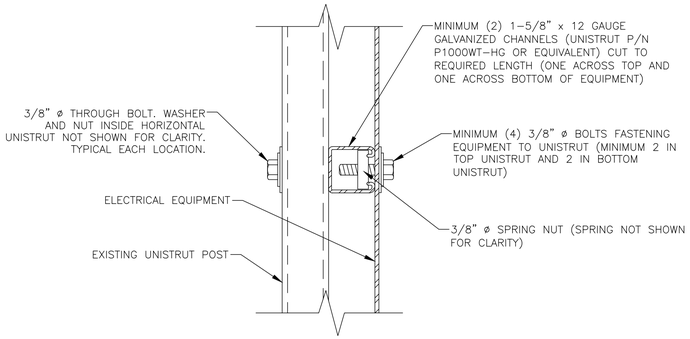
1 HCS DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	6651 RAN PROCESSOR (KDU1370093/11)
WEIGHT:	16.53 LBS
DIMENSIONS:	1.75"x 17.25"x 13.85" (HxWxD)



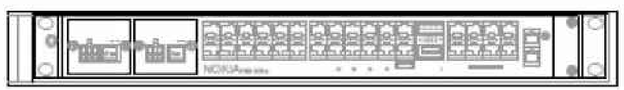
2 BASEBAND RP6651
SCALE: NOT TO SCALE

NOTE: ALL BOLTS TO BE INSTALLED USING LOCK WASHERS AND FLAT WASHERS



3 UNISTRUT ATTACHMENT DETAIL (DESIGNED BY OTHERS)
SCALE: NOT TO SCALE

MANUFACTURER: NOKIA
MODEL: IXR-e
DIMENSIONS: 17.25"x10.0"x1.75"
WEIGHT: TBD



4 CSR IXRE
SCALE: NOT TO SCALE

Attribute	Value
Min Input Voltage	-38 VDC
Output Voltage	3x -58 V DC ports
CB rating	30A/40A/50A
Efficiency	96%
Total output power	6000 Watts (2000 W/port)
Operating Temp	-40°C to +60°C
Alarms	Output fault, DC SPD failure
Mechanical	1 U 19", 13" depth
Certification	IEC 62368-1, UL 62368-1
MTBF	143 Years
Air Flow	Front to Back

5 PSU 4813
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND · SCOTT C. BRANDT · 58709 · PROFESSIONAL ENGINEER

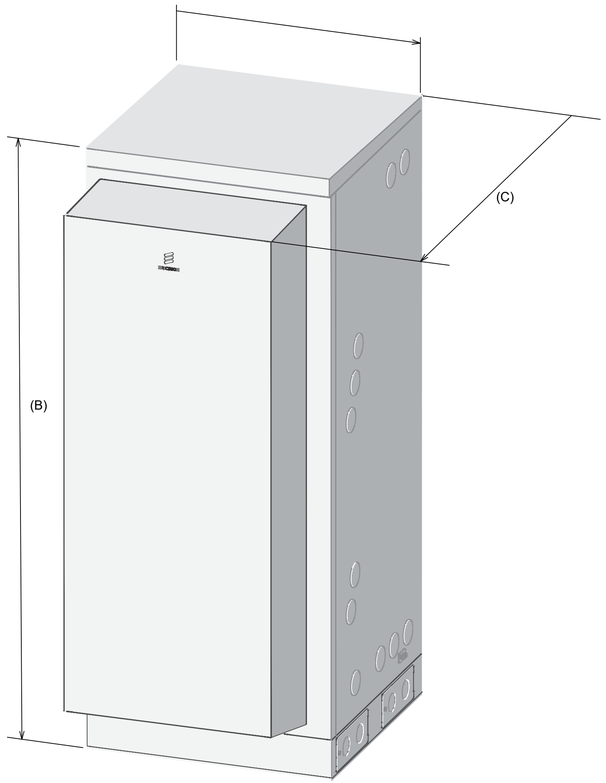
05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: C-4.2
REVISION: 0

INSTALLER NOTES:

1. INFORMATION SHOWN PROVIDED BY T–MOBILE. CONTRACTOR TO REFERENCE CABINET MANUFACTURER'S SPECIFICATIONS FOR FURTHER DETAILS.
2. CONTRACTOR TO FOLLOW THE LATEST VERSION OF T–MOBILE REGIONAL CONSTRUCTION STANDARDS. CONTACT T–MOBILE FOR DETAILS.



Dimensions	
Width (A)	650 mm / 25.5906 in
Height (B)	1450 mm / 57.08661 in (without base frame) 1600 mm / 62.99213 in (with base frame)
Depth (C)	850 mm / 33.4646 in
Weight	
Empty enclosure	176 kg / 388.014 lb

1 ERICSSON 6160 CABINET DETAILS
SCALE: NOT TO SCALE

2 ERICSSON B160 CABINET DETAILS
SCALE: NOT TO SCALE

SITE SIGNAGE NOTE:
WHERE APPLICABLE, CONTRACTOR TO FOLLOW ALL T–MOBILE SIGNAGE REQUIREMENTS. CONFIRM SITE SIGNAGE WITH T–MOBILE CM PRIOR TO CONSTRUCTION

3 T–MOBILE SIGNAGE
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

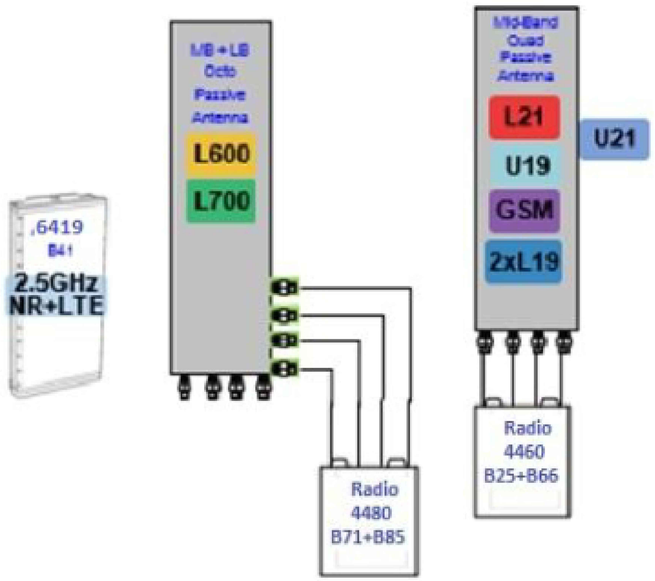
STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: C-5

REVISION: 0



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

TYPICAL T-MOBILE HYBRID PLUMBING

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO (TECHNOLOGY)	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 1	1	RED		1	B	RED		AIR 32 B2a (G19 CPRI 1)	RED 1 + LC Boot Color	ALPHA G19 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		AIR 32 B2a (L19 CPRI 2)	RED 1 + LC Boot Color	ALPHA B2 L19 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		AIR 32 B66a (L21 CPRI 1)	RED 1 + LC Boot Color	ALPHA L21 CPRI 1	ALPHA
				2	A						
	4	YELLOW		1	B	YELLOW		AIR32 B66Aa (L21 CPRI 2)	RED 1 + LC Boot Color	ALPHA L21 CPRI 2	ALPHA
				2	A						
	5	WHITE		1	B	WHITE		AIR 32 B2a (G19 CPRI 1)	YELLOW 1 + LC Boot Color	BETA G19 CPRI 1	BETA
				2	A						
	6	BLACK		1	B	BLACK		AIR 32 B2a (L19 CPRI 2)	YELLOW 1 + LC Boot Color	BETA B2 L19 CPRI 2	BETA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE	AIR 32 B66a (L21 CPRI 1)	YELLOW 1 + LC Boot Color	BETA L21 CPRI 1	BETA
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE	AIR32 B66Aa (L21 CPRI 2)	YELLOW 1 + LC Boot Color	BETA L21 CPRI 2	BETA
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE	AIR 32 B2a (L19 CPRI 1)	BLUE 1 + LC Boot Color	GAMMA G19 CPRI 1	GAMMA
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE	AIR 32 B2a (L19 CPRI 2)	BLUE 1 + LC Boot Color	GAMMA B2 L19 CPRI 2	GAMMA
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE	AIR 32 B66Aa (L21 CPRI 1)	BLUE 1 + LC Boot Color	GAMMA L21 CPRI 1	GAMMA
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE	AIR32 B66Aa (L21 CPRI 2)	BLUE 1 + LC Boot Color	GAMMA L21 CPRI 2	GAMMA
				2	A						

DC Power

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	AIR 32 B66Aa	ALPHA	ALPHA L21
	0V	B	RED				
2	-48	A	BLACK	GREEN	AIR 32 B2a	ALPHA	ALPHA G/L19
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	AIR 32 B66Aa	BETA	BETA L21
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW	AIR 32 B2a	BETA	BETA G/L19
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE	AIR 32 B66Aa	GAMMA	GAMMA L21
	0V	B	WHITE				
6	-48	A	BLACK	BLACK	AIR 32 B2a	GAMMA	GAMMA G/L19
	0V	B	BLACK				

Alpha RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
RED 1	RED 2	RED 3	RED 4	RED 5	RED 6	RED 7	RED 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 2	1	RED		1	B	RED		Radio 4449	RED 2 + LC Boot Color	ALPHA L700/L600 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		Radio 4449	RED 2 + LC Boot Color	ALPHA N600 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		Radio 4449	YELLOW 2 + LC Boot Color	BETA L700/L600 CPRI 1	BETA
				2	A						
	4	YELLOW		1	B	YELLOW		Radio 4449	YELLOW 2 + LC Boot Color	BETA N600 CPRI 2	BETA
				2	A						
	5	WHITE		1	B	WHITE		Radio 4449	BLUE 2 + LC Boot Color	GAMMA L700/L600 CPRI 1	GAMMA
				2	A						
	6	BLACK		1	B	BLACK		Radio 4449	BLUE 2 + LC Boot Color	GAMMA N600 CPRI 2	GAMMA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE				
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE				
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE				
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE				
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE				
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE				
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Radio 4449	ALPHA	ALPHA L600/N600 B71
	0V	B	RED				
2	-48	A	BLACK	GREEN	Radio 4449	ALPHA	Alpha L700 B85
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Radio 4449	BETA	Beta L600/N600 B71
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW	Radio 4449	BETA	Beta L700 B85
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE	Radio 4449	GAMMA	Gamma L600/N600 B71
	0V	B	WHITE				
6	-48	A	BLACK	BLACK	Radio 4449	GAMMA	Gamma L700 B85
	0V	B	BLACK				

Beta RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
BLUE 1	BLUE 2	BLUE 3	BLUE 4	BLUE 5	BLUE 6	BLUE 7	BLUE 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 3	1	RED		1	B	RED		Radion 4415	RED 3 + LC Boot Color	ALPHA B25 L19 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		Radion 4415	RED 3 + LC Boot Color	ALPHA B25 L19 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		Radion 4415	YELLOW 3 + LC Boot Color	BETA B25 L19 CPRI 1	BETA
				2	A						
	4	YELLOW		1	B	YELLOW		Radion 4415	YELLOW 3 + LC Boot Color	BETA B25 L19 CPRI 2	BETA
				2	A						
	5	WHITE		1	B	WHITE		Radion 4415	BLUE 3 + LC Boot Color	GAMMA B25 L19 CPRI 1	GAMMA
				2	A						
	6	BLACK		1	B	BLACK		Radion 4415	BLUE 3 + LC Boot Color	GAMMA B25 L19 CPRI 2	GAMMA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE				
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE				
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE				
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE				
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE				
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE				
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Radio 4415	Alpha	ALPHA B25 L19
	0V	B	RED				
2	-48	A	BLACK	GREEN	Radio 4415	Beta	BETA B25 L19
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Radio 4415	Gamma	GAMMA B25 L19
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW			
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE			
	0V	B	WHITE				
6	-48	A	BLACK	BLACK			
	0V	B	BLACK				

Gamma RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
YELLOW 1	YELLOW 2	YELLOW 3	YELLOW 4	YELLOW 5	YELLOW 6	YELLOW 7	YELLOW 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO (TECHNOLOGY)	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 4	1	RED		1	B	RED		AIR 6449 L41 CPRI 1	RED 4 + LC Boot Color	Alpha L41 CPRI 1	Alpha
				2	A						
	2	GREEN		1	B	GREEN		AIR 6449 L41 CPRI 2	RED 4 + LC Boot Color	Alpha L41 CPRI 2	Alpha
				2	A						
	3	BLUE		1	B	BLUE		AIR 6449 N41 CPRI 3	RED 4 + LC Boot Color	Alpha N41 CPRI 3	Alpha
				2	A						
	4	YELLOW		1	B	YELLOW		AIR 6449 N41 CPRI 4	RED 4 + LC Boot Color	Alpha N41 CPRI 4	Alpha
				2	A						
	5	WHITE		1	B	WHITE		AIR 6449 L41 CPRI 1	YELLOW 4 + LC Boot Color	Beta L41 CPRI 1	Beta
				2	A						
	6	BLACK		1	B	BLACK		AIR 6449 L41 CPRI 2	YELLOW 4 + LC Boot Color	Beta L41 CPRI 2	Beta
				2	A						
	7	RED	WHITE	1	B	RED	WHITE	AIR 6449 N41 CPRI 3	YELLOW 4 + LC Boot Color	Beta N41 CPRI 3	Beta
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE	AIR 6449 N41 CPRI 4	YELLOW 4 + LC Boot Color	Beta N41 CPRI 4	Beta
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE	AIR 6449 L41 CPRI 1	BLUE 4 + LC Boot Color	Gamma L41 CPRI 1	Gamma
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE	AIR 6449 L41 CPRI 2	BLUE 4 + LC Boot Color	Gamma L41 CPRI 2	Gamma
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE	AIR 6449 N41 CPRI 3	BLUE 4 + LC Boot Color	Gamma N41 CPRI 3	Gamma
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE	AIR 6449 N41 CPRI 4	BLUE 4 + LC Boot Color	Gamma N41 CPRI 4	Gamma
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Air 6449	Alpha	Alpha L/N41
	0V	B	RED				
2	-48	A	BLACK	GREEN	Air 6449	Beta	Beta L/N41
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Air 6449	Gamma	Gamma L/N41
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW			
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE			
	0V	B	WHITE				
6	-48	A	BLACK	BLACK			
	0V	B	BLACK				

Delta RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
GREEN 1	GREEN 2	GREEN 3	GREEN 4	GREEN 5	GREEN 6	GREEN 7	GREEN 8

2 COLOR CODE CHART
SCALE: NOT TO SCALE

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BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

05/27/22

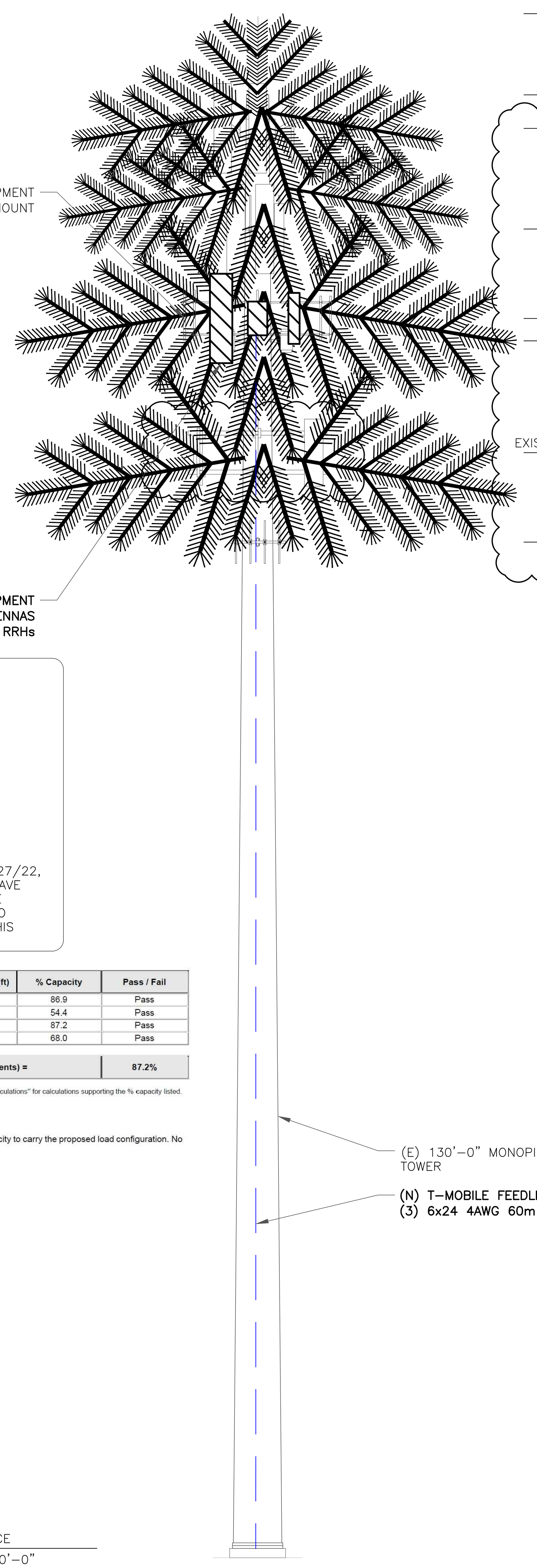
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

SHEET NUMBER: C-6

REVISION: 0

ANTENNA CLEARANCE NOTE:

EXISTING MOUNT SIZE AND ORIENTATION PROVIDED BY THE TOWER OWNER. IF ROTATION OF EXISTING MOUNTS IS REQUIRED TO MEET AZIMUTHS, PLEASE NOTIFY T-MOBILE RF PRIOR TO CONSTRUCTION. IF 36" CLEARANCE BETWEEN ANTENNAS CANNOT BE MET AND A NEW MOUNT IS REQUIRED, PLEASE NOTIFY T-MOBILE CONSTRUCTION MANAGER IMMEDIATELY.



T-MOBILE EQUIPMENT

ANTENNA CL: 110'-0"
MOUNT CL: 110'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

ANALYSIS CRITERIA:

BUILDING CODE: 2018 IBC
TIA-222 REVISION: TIA-222-H
RISK CATEGORY: II
WIND SPEED: 115 mph
EXPOSURE CATEGORY: C
TOPOGRAPHIC FACTOR: 1.0
ICE THICKNESS: 1.0 in
WIND SPEED WITH ICE: 40 mph
SERVICE WIND SPEED: 60 mph

RECOMMENDATIONS:

PER TOWER SA BY TEP DATED 04/27/22, THE TOWER AND ITS FOUNDATION HAVE SUFFICIENT CAPACITY TO CARRY THE PROPOSED LOAD CONFIGURATION. NO MODIFICATIONS ARE REQUIRED AT THIS TIME.

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	86.9	Pass
1,2	Base Plate	-	54.4	Pass
1,2	Base Foundation Structural	-	87.2	Pass
1,2	Base Foundation Soil Interaction	-	68.0	Pass
	Structure Rating (max from all components) =			87.2%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5.

4.1) Recommendations

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

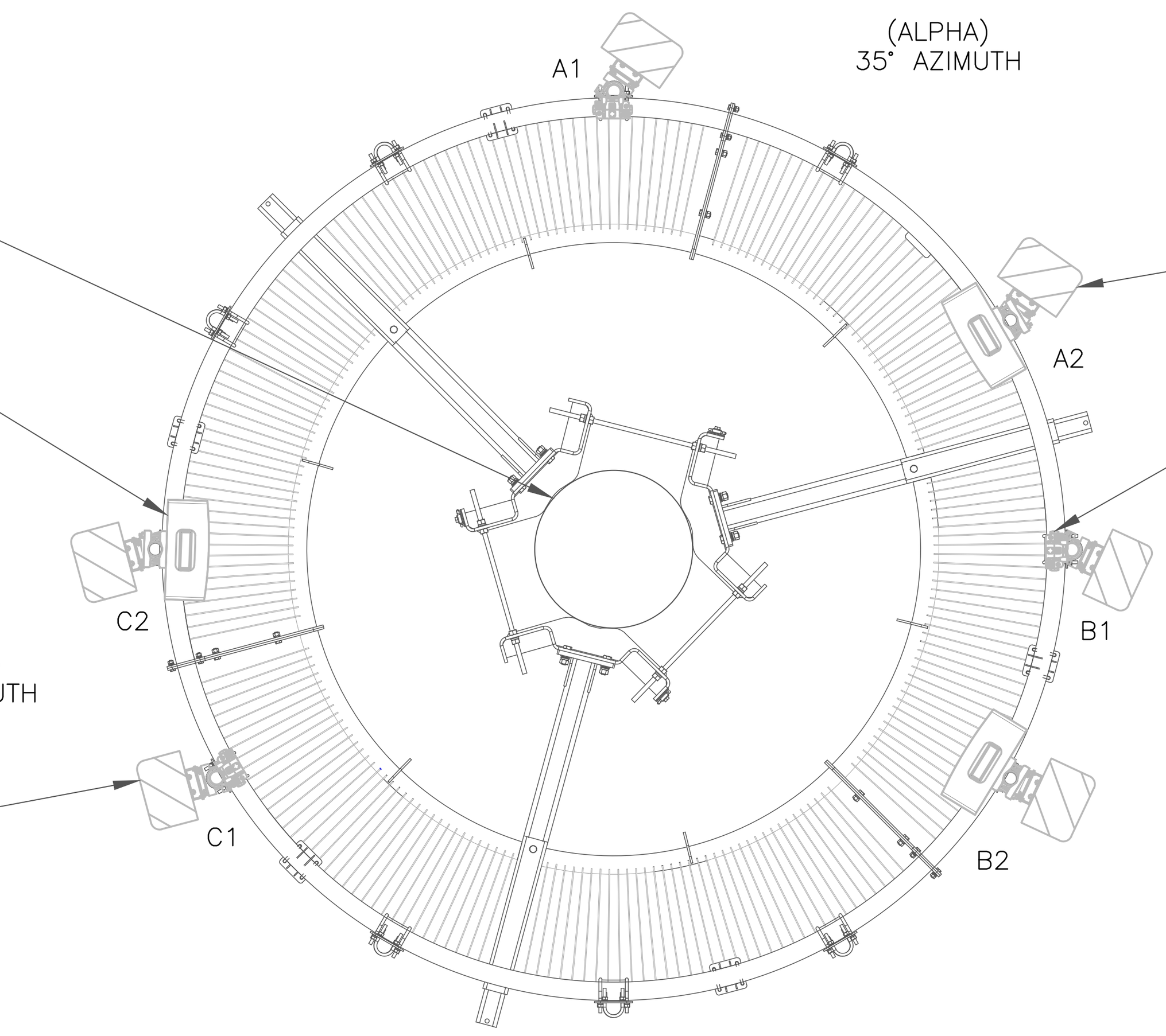
1 FINAL ELEVATION
SCALE: 8' 6' 4' 2' 0 8' — 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

INSTALLER NOTE:

EXISTING AND PROPOSED ANTENNA/ EQUIPMENT POSITIONING SHOWN PER RFDS. FIELD CONDITIONS MAY VARY.

TIE-BACK ARM NOTE:

TIE-BACK ARMS SHOWN ARE FOR REFERENCE PURPOSES ONLY. TIE-BACK ARMS TO BE INSTALLED PER MOUNT MANUFACTURERS SPECIFICATIONS, ALSO ADHERING TO CROWN CASTLE CED-STD-10294 STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES.



2 EXISTING ANTENNA LAYOUT
SCALE: 2' 1' 0 2' — 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

ANALYSIS CRITERIA:

BUILDING CODE: 2018 IBC
TIA-222 REVISION: TIA-222-H
RISK CATEGORY: II
WIND SPEED: 115 mph
EXPOSURE CATEGORY: C
TOPOGRAPHIC FACTOR: 1.0
ICE THICKNESS: 1.0 in
WIND SPEED WITH ICE: 40 mph
SERVICE WIND SPEED: 60 mph

RECOMMENDATIONS:

PER MA BY TEP DATED 05/12/22, THE MOUNT HAS SUFFICIENT CAPACITY TO CARRY THE PROPOSED LOAD CONFIGURATION. NO MODIFICATIONS ARE REQUIRED AT THIS TIME.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform w/ Support Rail Mount)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontals	M304	110.0	25.6	Pass
1	Support Arms	SA-2	110.0	37.4	Pass
1	Internals	M526	110.0	32.6	Pass
1	Support Rails	M563	110.0	9.4	Pass
1	Mount Pipes	MP-1	110.0	31.5	Pass
2	Connection Bolts	-	110.0	23.7	Pass
2	Connection Plate	-	110.0	44.0	Pass
	Structure Rating (max from all components) =				44.0%

Notes:
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity listed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

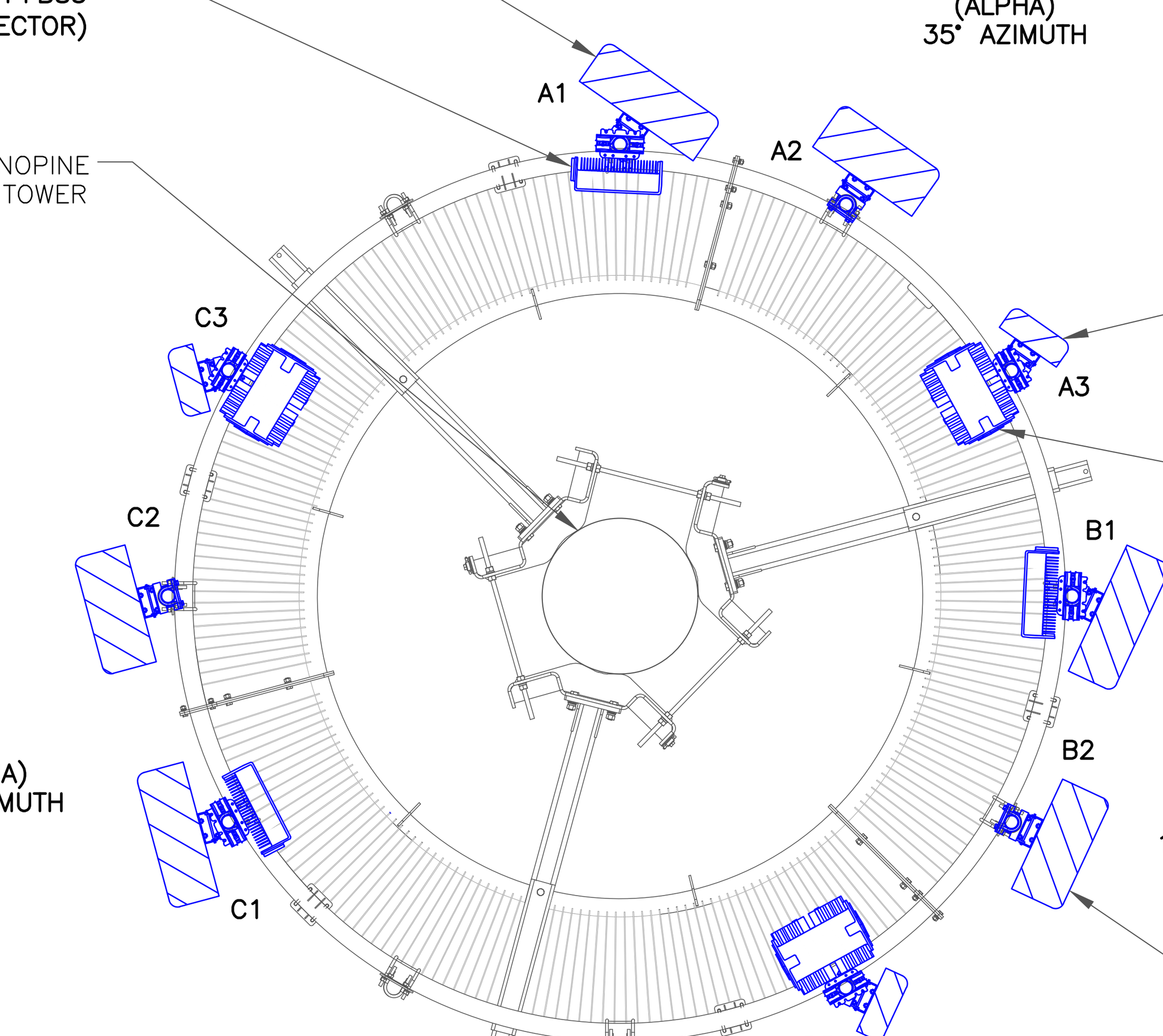
1) If the load differs from that described in Table 1 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The mount and its connection have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

TOWER ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.



3 FINAL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' — 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

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EXISTING 130'-0"
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ISSUED FOR:

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0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM

SEAL:

06/23/22

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License No. 51609
Expiration Date: 10/01/2023

SHEET NUMBER: S-1

REVISION: 2

NOTE:
LOAD CALCULATIONS TAKEN FROM INFORMATION PROVIDED BY CROWN CASTLE & BASED ON THE RFDS DATED 2/21/22, 9. CONTRACTOR TO VERIFY LOADS WITH MANUFACTURER'S SPECIFICATIONS PRIOR TO CONSTRUCTION

EXISTING 200A M.C.B, 240/120 VAC, 1ø, 3W PPC PANEL SCHEDULE

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
BTS	0		40	1	A	2	60	3274		PPC
		0		3	B	4			3274	
LIGHT /OFF	0		20	5	A	6	15	180		GFCI
FAN		360	20	7	B	8	80		0	NODE B
SPARE	–	–	–	9	A	10		0		
SPARE	–	–	–	11	B	12	–		–	SPARE
VOLT AMPS	0	360						3454	3274	VOLT AMPS

L1 VOLT AMPERES	3454	L2 VOLT AMPERES
	3634	MAX VOLT AMPERES
	30.3	MAX AMPS
	37.9	MAX AMPS x 125%

PROPOSED 200A M.C.B, 240/120 VAC, 1ø, 3W PPC PANEL SCHEDULE

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
BTS	0		40	1	A	2	60	5740		PPC
		0		3	B	4			5740	
LIGHT /OFF	0		20	5	A	6	15	180		GFCI
FAN		360	20	7	B	8	80		0	NODE B
6160 ENCLOSURE	**2770**	–	**150**	9	A	10		0		
	–	**2770**		11	B	12	**20**		**180**	INTERNAL 6160 GFCI
VOLT AMPS	2770	3130						5920	5920	VOLT AMPS

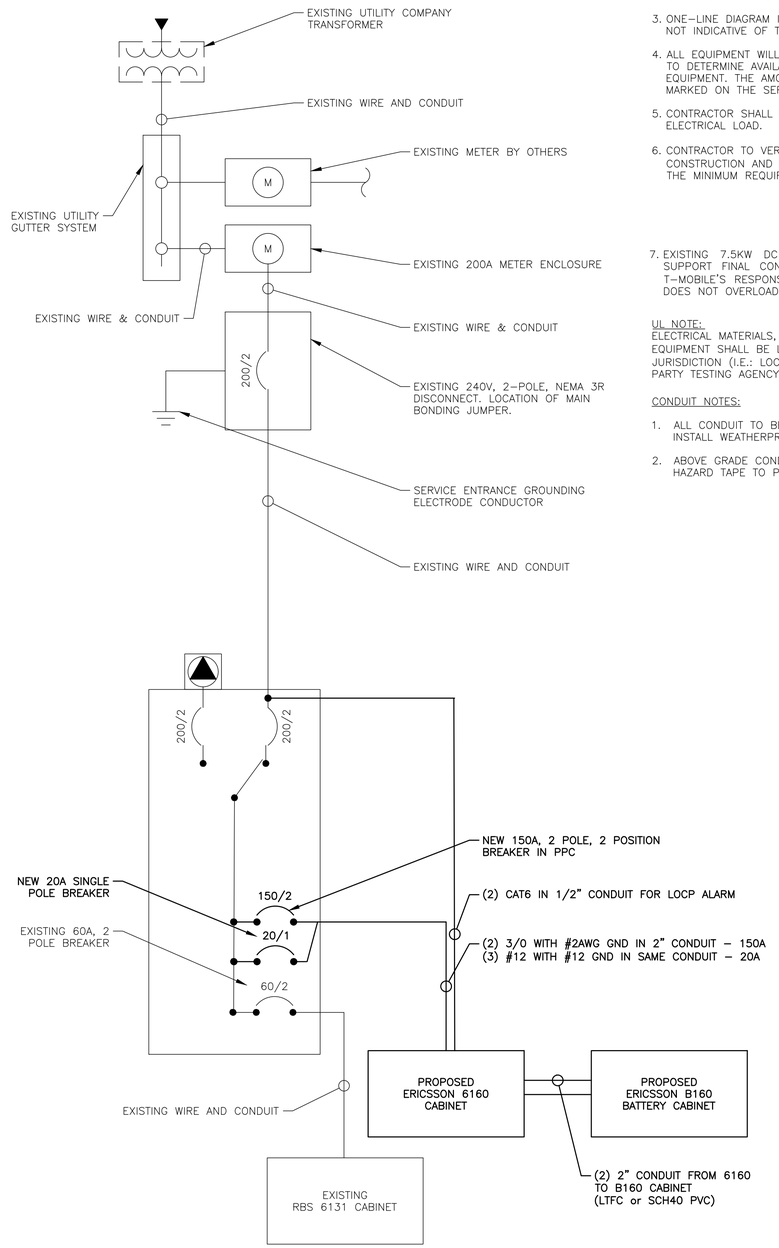
L1 VOLT AMPERES	8690	L2 VOLT AMPERES
	9050	MAX VOLT AMPERES
	75.4	MAX AMPS
	94.3	MAX AMPS x 125%

PROPOSED BREAKER & LOADING IN BOLD

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE

GENERAL NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.



2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

ONE-LINE DIAGRAM NOTES:
1. ELECTRICAL SERVICE SHALL BE 200A, 120/240V, 1ø, 3W.
2. FOR COMPLETE INTERNAL WIRING AND ARRANGEMENT, REFER TO VENDOR PRINTS PROVIDED BY EQUIPMENT MANUFACTURER.

UTILITY NOTES:
1. CONTRACTOR SHALL VERIFY AVAILABLE FAULT CURRENT WITH POWER COMPANY AND ENSURE ALL ELECTRICAL EQUIPMENT IS SUITABLE FOR AVAILABLE FAULT CURRENT.
2. CONTRACTOR SHALL COORDINATE UTILITY SERVICES WITH LOCAL UTILITY COMPANIES. VERIFY ALL REQUIREMENTS WITH UTILITY COMPANY STANDARDS.
3. ONE-LINE DIAGRAM IS FOR SCHEMATIC PURPOSES ONLY AND IS NOT INDICATIVE OF THE ACTUAL EQUIPMENT LAYOUT.
4. ALL EQUIPMENT WILL HAVE A MINIMUM AIC OF 10 KA. CONTRACTOR TO DETERMINE AVAILABLE FAULT CURRENT BEFORE ENERGIZING EQUIPMENT. THE AMOUNT OF AVAILABLE FAULT CURRENT SHALL BE MARKED ON THE SERVICE EQUIPMENT PER NEC 110.24.
5. CONTRACTOR SHALL NOTIFY UTILITY COMPANY OF CHANGES IN ELECTRICAL LOAD.
6. CONTRACTOR TO VERIFY EXISTING CONDUIT(S) SIZE(S) PRIOR TO CONSTRUCTION AND MAY REUSE EXISTING CONDUIT(S) IF THEY MEET THE MINIMUM REQUIREMENTS PER NEC CODE.
7. EXISTING 7.5KW DC GENERATOR ASSUMED TO HAVE CAPACITY TO SUPPORT FINAL CONFIGURATION OF T-MOBILE 6201 CABINET. IT IS T-MOBILE'S RESPONSIBILITY TO VERIFY THE LOAD ON THE DC PLANT DOES NOT OVERLOAD THE CAPACITY OF THE DC GENERATOR.

UL NOTE:
ELECTRICAL MATERIALS, DEVICES, CONDUCTORS, APPLIANCES AND EQUIPMENT SHALL BE LABELED/LISTED BY UL OR ACCEPTED BY JURISDICTION (I.E.: LOCAL COUNTY OR STATE) APPROVED THIRD PARTY TESTING AGENCY

CONDUIT NOTES:
1. ALL CONDUIT TO BE SCH40 PVC OR LTFC, AS NOTED. INSTALL WEATHERPROOF FITTINGS.
2. ABOVE GRADE CONDUIT RUNS TO BE MARKED WITH HAZARD TAPE TO PREVENT TRIPPING HAZARD.

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BU #: **806957**
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ISSUED FOR:

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0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

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Expiration Date: 01/10/2024

SHEET NUMBER: E-1
REVISION: 0

T-MOBILE GROUNDING NOTES:

ALL GROUNDS MUST ROUTE DOWNHILL FOR ENTIRE DURATION OF ROUTE

1. PROVIDE LABOR, MATERIALS, INSPECTION, AND TESTING TO PROVIDE CODE COMPLIANCE FOR ELECTRIC, TELEPHONE, AND GROUNDING/LIGHTNING SYSTEMS.

ICE BRIDGE/ EQUIPMENT POST:

#2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED TO GROUND RING (BOTH ENDS), FINAL WELD COLD GALVANIZED, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, ANCHORED TO PAD/PLATFORM TO AVOID TRIP HAZARD USING HAMMER SET ANCHORS.

PEDESTALS, PLINTHS, SSC CABINET, FCOA CABINETS:

1. #2 SOLID COPPER TINNED, 2 HOLE LUG WITH FLAT AND LOCK WASHER AT EQUIPMENT; EXOTHERMICALLY WELDED TO GROUND RING, FINAL WELD COLD GALVANIZED, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, ANCHORED TO PAD TO AVOID TRIP HAZARD USING HAMMER SET ANCHORS. EACH PART REQUIRES A SEPARATE DOWNLEAD, NO DAISY CHAINS.

2. ALL COMPONENTS INSIDE FCOA CABINETS REQUIRE A DEDICATED GROUND.

COVP's:

#6 THHN STRANDED (GREEN JACKET), CONNECTED AT EQUIPMENT SIDE USING OVP TERMINAL BLOCK CONNECTION; MECHANICALLY CONNECTED TO GROUND REFERENCE AT MASTER BUSS BAR USING 2 HOLE LUG WITH FLAT AND LOCK WASHER, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, AND ANCHORED TO PAD/PLATFORM TO AVOID TRIP HAZARD.

ANTENNA/ COVP/ RRU MAST PIPES:

1. ALL VERTICAL MAST PIPES: #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED TO TOP OF PIPE (PIPE, DOWN MOLD), FINAL WELD COLD GALVANIZED, BONDED TO TOP BUSS BAR WITH 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER.

2. EXISTING/REUSED PIPES: #2 SOLID COPPER TINNED, BONDED WITH COLD WATER CLAMP TO TOP OF PIPE, BONDED TO TOP BUSS WITH 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER

AIR TERMINALS:

TO BE INSTALLED, ONLY IF REQUIRED

TMA's, DIPLEXERS AND TRIPLEXERS:

1. #6 THHN, WITH PROPER COPPER COMPRESSION LUG, FLATS AND LOCK WASHERS

2. ALL GROUND LUGS ON TMA MUST BE GROUNDED WITH SEPARATE DOWNLEAD TO BUSS BAR (NO DAISY CHAINS)

ELEVATED STEEL PLATFORMS WITH LUNAR FEET:

#2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (FLAT PLATE MOLD) TO OUTSIDE PERIMETER BEAMS IN FOUR (4) PLACES, FINAL WELD COLD GALVANIZED, BONDED DIRECTLY TO SUBGRADE GROUND RING.

STEEL CANOPY (STEEL PLATFORM OR CONCRETE PAD):

1. #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (PIPE, DOWN MOLD) TO BOTTOM OF ALL VERTICAL SUPPORT POSTS, TYPICALLY FOUR (4) PIPES, FINAL WELD COLD GALVANIZED, BONDED DIRECTLY TO SUBGRADE GROUND RING.

2. #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (PIPE, UP MOLD) TO TOP OF ALL VERTICAL SUPPORT POSTS, TYPICALLY FOUR (4) PIPES, FINAL WELD COLD GALVANIZED, BONDED UP TO CANOPY GRIP-STRUT USING 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER.

RRU:

#6 THHN, WITH PROPER COPPER COMPRESSION LUG, ANTI-OXIDANT TO SECTOR BUSS BAR

FSBE ALARM BOX:

#6 THHN WITH ONE HOLE LUG BONDED TO PREVIOUSLY GROUNDED FCOA, PLINTH OR BUSS BAR.

SURGE SUPPRESSORS:

#6 THHN TO PREVIOUSLY GROUNDED BUSS BAR USING PROPER LUGS

FYGA/FYGB BRACKET:

1. #6 THHN TO PREVIOUSLY GROUNDED BUSS BAR USING PROPER LUGS

2. THROUGH BOLTS WITH FLAT, LOCK ON BRACKET

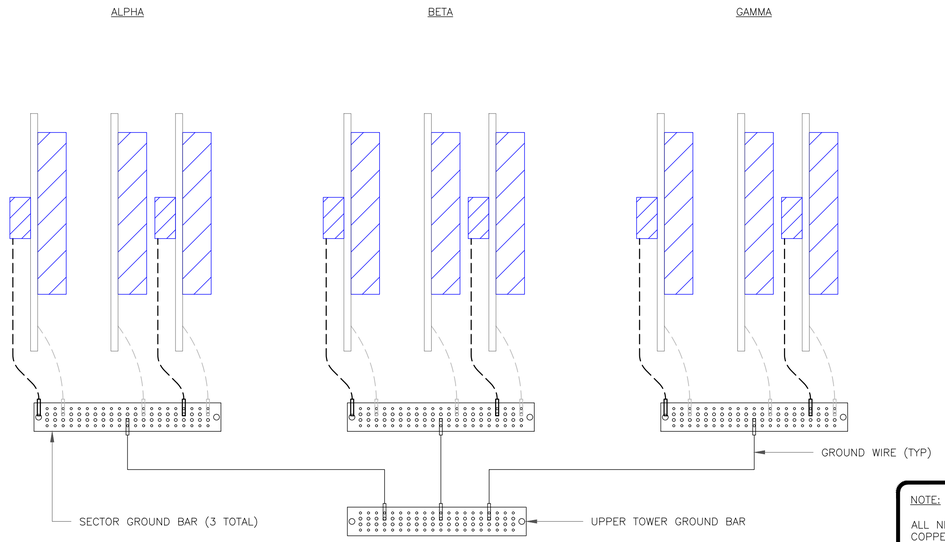
BUSS BARS:

1. PLATFORM / PAD BUSS BAR SHOULD BE MINIMUM 12" TINNED COPPER WITH INSULATORS, AND SHOULD HAVE TWO (2) EXOTHERMICALLY WELDED DOWN LEADS DIRECTLY TO GROUND RING USING #2 SOLID COPPER TINNED WIRE.

2. SECTOR BUSS BAR SHOULD BE PROPERLY SIZED TO ACCOMMODATE NECESSARY GROUNDING FOR EQUIPMENT ON EACH MOUNT, AND MAY BE SOLID COPPER (TINNED NOT REQUIRED). DO NOT USE INSULATORS ON SECTOR BUSS BARS ATTACH DIRECTLY TO TOWER MOUNT STEEL.

GENERAL:

- NO GROUND KITS ON HYBRID TRUNKS (TOP OR BOTTOM)
- NO GROUND KITS ON MICROWAVE IF CABLES (TOP OR BOTTOM)
- MICROWAVE SURGE SUPPRESSORS ARE NOT TO BE INSTALLED UPSTAIRS ON TOWER, DOWNSTAIRS ONLY (BULKHEAD PREFERRED)
- MICROWAVE ODU MUST BE GROUNDED TO TOWER TOP SECTOR OR COLLECTOR BUSS BAR
- ALL TMA'S AND DIPLEXERS MUST BE GROUNDED TO BUSS BAR. NO DAISY CHAIN ON TWIN/DUAL TMA
- ALL LUGS SHOULD BE PROPERLY SIZED FOR CONDUCTOR, BURNDY TINNED COPPER COMPRESSION STYLE
  1. INDOOR (OR INSIDE CABINET) SHOULD HAVE WINDOW
  2. OUTDOOR SHOULD NOT HAVE WINDOW
- CONTRACTOR TO VERIFY EXISTENCE AND LOCATION OF EXISTING SITE GROUND SYSTEM.
- CONTRACTOR SHALL VERIFY THAT GROUNDING ELECTRODES SHALL BE CONNECTED IN A RING USING #2 AWG BARE TINNED COPPER WIRE. THE TOP OF THE GROUND RODS AND THE RING CONDUCTOR SHALL BE 30" BELOW FINISHED GRADE, OR TO FROST DEPTH, WHICHEVER IS GREATER. GROUNDING ELECTRODES SHALL BE DRIVEN ON 10'-0" CENTERS (PROVIDE AND INSTALL AS REQUIRED. REQUIRED PER PLAN BELOW).
- GROUNDING CONDUCTORS SHALL BE OF EQUAL LENGTH, MATERIAL, AND BONDING TECHNIQUE.
- CONTRACTOR SHALL ENSURE GROUND RING IS WITHIN 12 TO 36 INCHES OF THE EQUIPMENT PAD. PROVIDE AND INSTALL GROUNDING CONNECTIONS SHOWN BELOW AS NEEDED PER EXISTING SITE GROUNDING SYSTEM. CONTRACTOR SHALL VERIFY ALL EXISTING SITE GROUNDING CONDITIONS BEFORE STARTING WORK OR PURCHASING EQUIPMENT.
- ALL DOWN CONDUCTORS MUST GO DOWN.



NOTE:

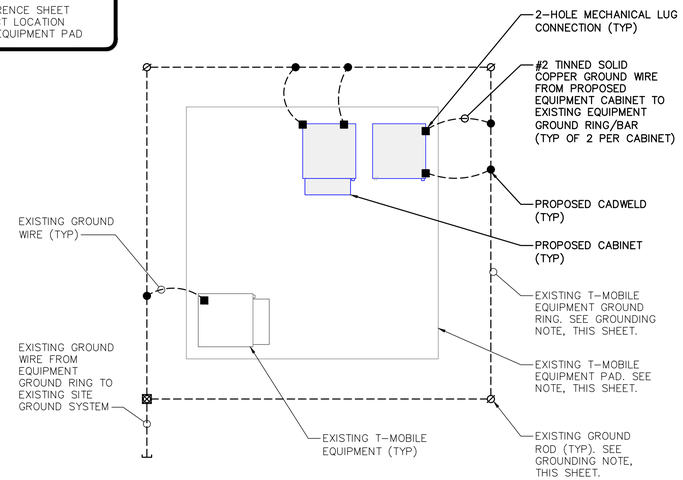
ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

GROUNDING SHOWN TYPICAL PER SECTOR.

1 TYPICAL ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

NOTE:

CONTRACTOR TO REFERENCE SHEET C-1.1 & 1.2 FOR EXACT LOCATION AND ORIENTATION OF EQUIPMENT PAD



2 TYPICAL CABINET GROUNDING DIAGRAM
SCALE: NOT TO SCALE

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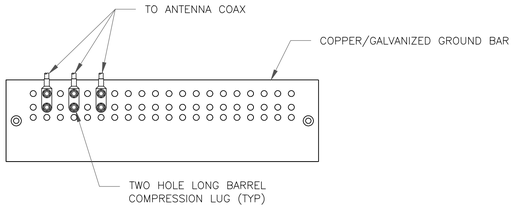
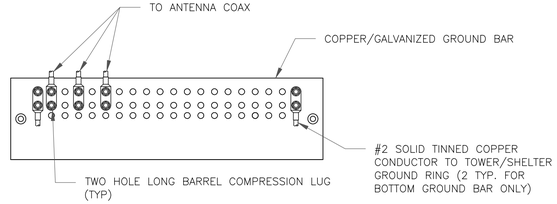


NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

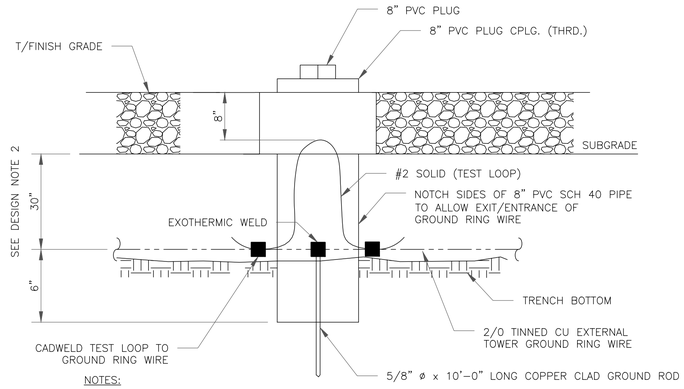
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

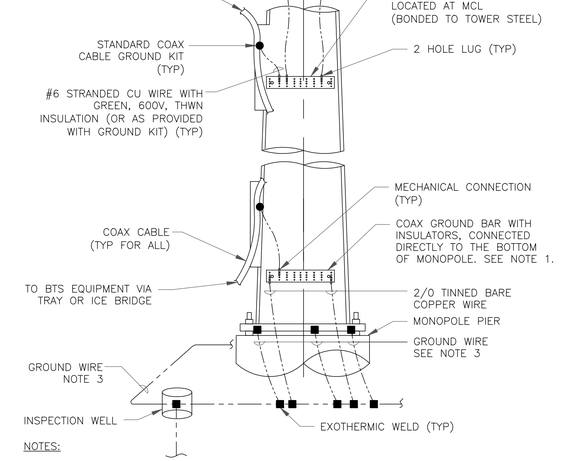
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

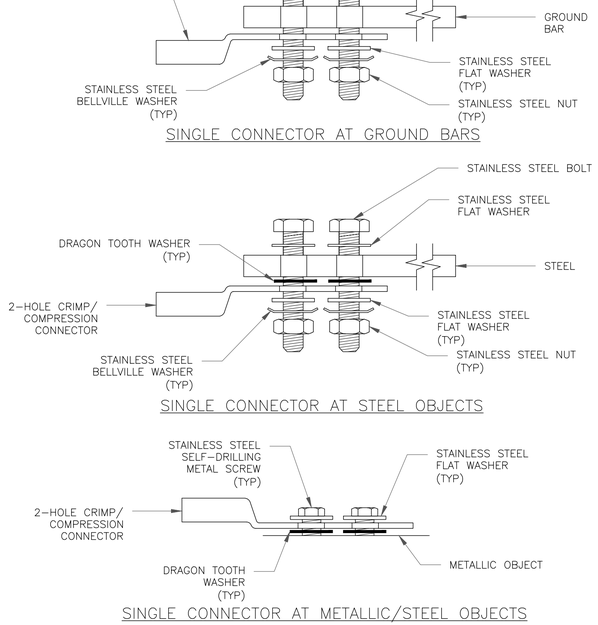
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



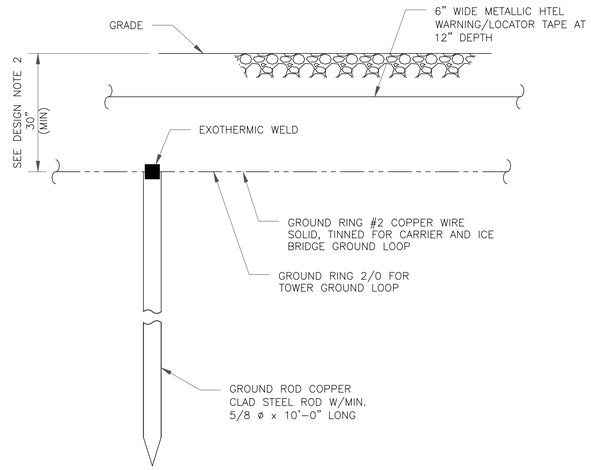
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

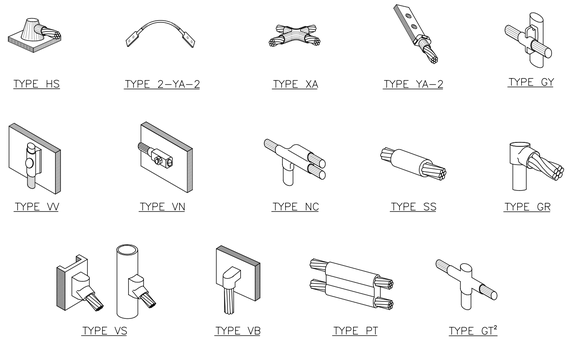
STATE OF MARYLAND
SCOTT C. BRANT
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: G-2

REVISION: 0

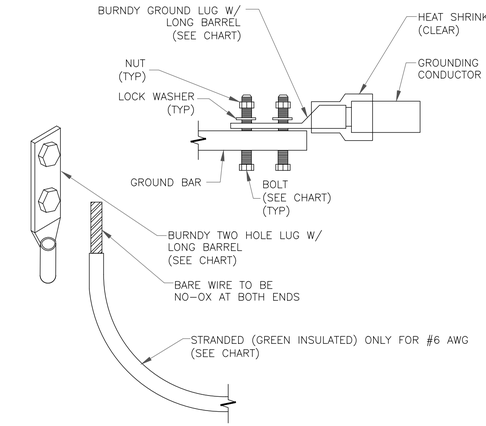


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

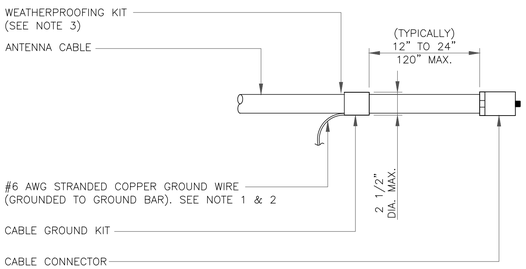
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

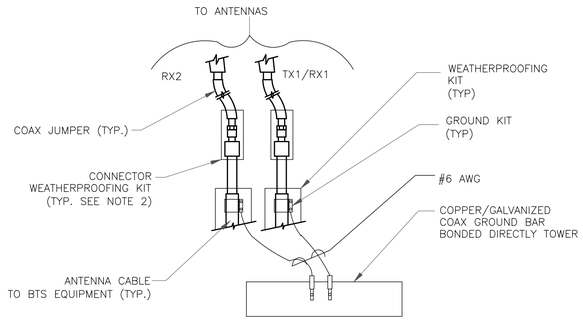
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

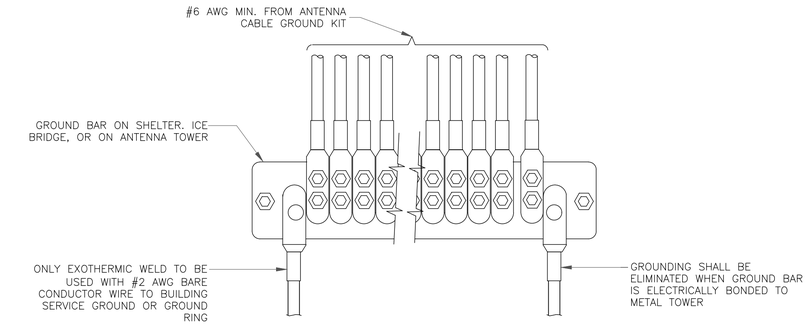
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



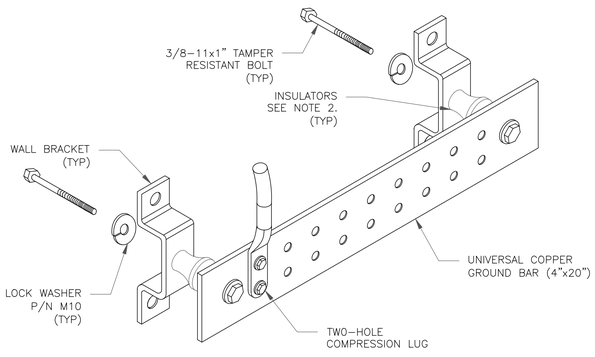
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



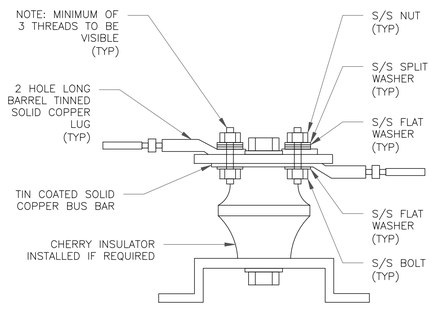
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



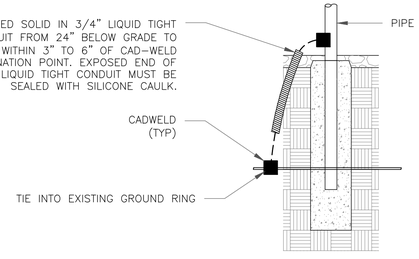
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: G-3

REVISION: 0

App No: 2022061827

Revisions received 8.23.22 - JE
Revisions received 7.28.22 - JE

Application General Information

Applicant Name	Crown Castle USA Inc	Received	6/9/2022
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	T-Mobile	Will site be used to support government telecommunications facilities or other equipment for government use?	No
Solution Type	Other		
Existing	Existing	Gvt. Use Desc.	

Application Description

TOWER SCOPE OF WORK: REMOVE (6) ANTENNAS, (3) TMAs, (3) RRUs 11 B12, (12) COAX CABLES and (1) 9x18 HCS 60m CABLES.
INSTALL (9) ANTENNAS, (6) RRUs and (3) 6x24 4AWG 60m CABLES.
GROUND SCOPE OF WORK: REMOVE (1) RBS 2106 CABINET, (1) DUW30 and (6) RU22. INSTALL (2) CABINETS, (2) PSU 4813 BOOSTER, (1) BB 6648, (1) IXRe ROUTER, (2) RP 6651 and CAM-LOK GENERATOR CONNECTOR.

Site Information

Site Id	55	Zoning	RE-2C
Structure Type	Monopole	Latitude	38.995137
Street Address	10010 Oaklyn Dr	Longitude	-77.203813
County Site Name	Avenel Golf Course	Ground Elevation	331
Carrier Site Name	7WAN098A	City	Potomac
Site Owner	WSSC	Lease Status	Leased
Structure Owner	Crown Castle USA, Inc	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	130	Distance to Residential Property (New, Colocation Only)	
Provide the proposed height of the replacement structure without any antenna (New Apps Only)		Distance to Commercial Property (New, Colocation Only)	

Justification of why this site was selected:

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

NearbySites (New Apps Only):

Thursday, June 9, 2022
4:57:26 PM

App No: 2022061827

Screening considerations(New, Colocation Apps Only):

Thursday, June 9, 2022

4:57:26 PM

App No: 2022061827

6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only): Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater? No

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet? No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet? No

Will the proposed installation require more the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets?YN No

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater? No

Does the structure or current installation have concealment elements/measures? Yes

Will the proposed installation require excavation or expansion outside the current boundaries of the site? No

If yes, describe how the proposed installation does not defeat the existing concealment. swap/add of antennas will not effect the appearance of the monopine

Small Wireless Facility Information

Small Wireless Facility Questions

Small Wireless Facility? No

Is the structure 10% taller than adjacent structures?

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet 17.02

Please list adjacent structure heights

Tribal Lands? No

Cumulative volume of the proposed antenna(s) exclusive of equipment in cubic feet

ROW Information

PROW? No

Pole Number

ROW owner

ROW width

Thursday, June 9, 2022

4:57:26 PM

App No: 2022061827

Antenna Information

Antenna Compliance	Yes
Compliance Desc	
Antenna Location	No
Antenna Loc. Desc.	
Env. Assessment	
Cat. Excluded?	
Routine Env. Evaluation	checked

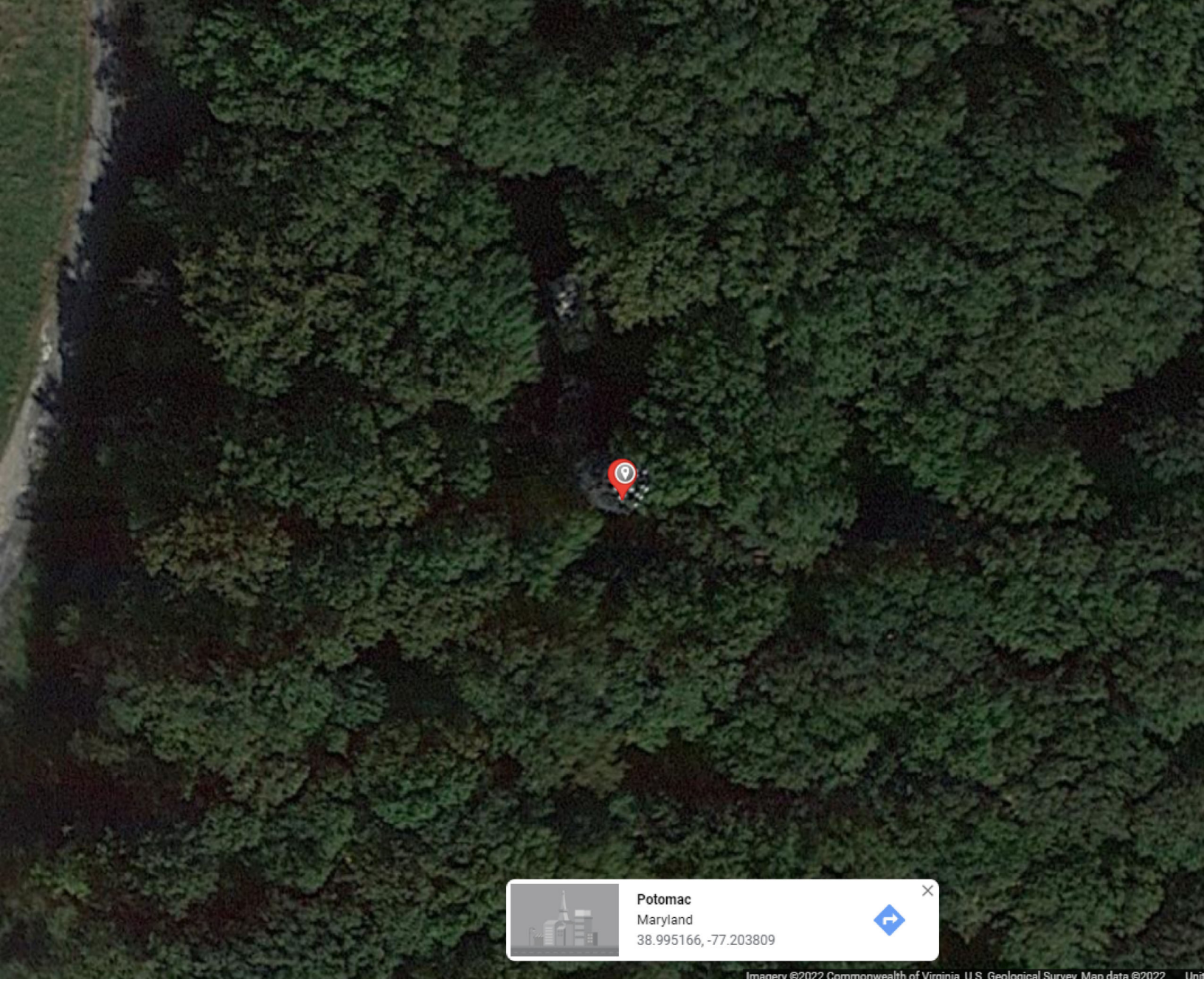
Antenna Model	APXVAALL24_43-U-NA20						
Frequency	Rx:668-688, Tx:622-642 (600) Tx:728-734, Rx:698-704 (700)						
RAD Center	110	Max ERP	**6459**	Antenna Dimensions	95.9H, 24W, 8.5D	Quantity	3

Antenna Model	AIR6419 B41						
Frequency	Tx:2593-2690, Rx:2496-2592						
RAD Center	110	Max ERP	**54973**	Antenna Dimensions	36.25H, 20.91W, 9.02D	Quantity	3

Antenna Model	VV-65A-R1						
Frequency	Tx:1965-1975, Rx:1885-1895 PCS & Tx:2135-2155, Rx:1735-1755 AWS						
RAD Center	110	Max ERP	**12591**	Antenna Dimensions	54.7H, 12.1W, 4.6D	Quantity	3

Thursday, June 9, 2022

4:57:26 PM


Potomac
Maryland
38.995166, -77.203809
Imagery ©2022 Commonwealth of Virginia, U.S. Geological Survey, Map data ©2022

APXVAALL24_43-U-NA20

Dual Slant Polarized Quad Band (8 Port) Antenna, x2 617-894 / x2 1695-2690MHz, 65deg, 2.4m (8ft), RET, 2-12°

FEATURES / BENEFITS

This antenna provides an 8 Port multi-band platform for flexible use in deployment scenarios encompassing 600, 700, 800, AWS, PCS & BRS applications.

- 24 Inch Width For Easier Zoning
- Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality
- Superior elevation pattern performance across the entire electrical down tilt range
- Includes two ACU-A20-SR AISG RET motors
- Low band arrays driven by a single RET motor
- Mid band arrays driven by a single RET motor

Technical features

RADIO FREQUENCY SYSTEMS

ELECTRICAL SPECIFICATIONS

Electrical Specification Header		Low Band Arrays (617-894 MHz) Ports 1-4		
Frequency Band	MHz	617-698	698-806	806-894
Gain	dBi	15.8	16.0	16.1
Azimuth Beamwidth 3dB	Deg	65 +/-2	64 +/-2	62 +/-5
Elevation Beamwidth 3dB	Deg	9.9 +/-1	8.6 +/-.8	7.5 +/-.5
Cross-Pol at Boresight	dB	17	19	17
F/B at 180 Copolar	dB	30	30	32
Electrical Downtilt	Deg	2 to 12	2 to 12	2 to 12
First Upper Side Lobe	dB	16	16	14
VSWR	-	1.5:1	1.5:1	1.5:1
Return Loss	dB	-14	-14	-14
Cross Polar Isolation	dB	25	25	25
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
Maximum CW Power per Port	Watt	400	400	400
Gain Over All Tilts	dBi	15.2 +/- .6	15.5 +/- .5	15.7 +/- .4
Cross-Pol over Sector	dB	4	4	6
F/B at +/-30 Total Power	dB	17	19	23

ELECTRICAL SPECIFICATIONS

RADIO FREQUENCY SYSTEMS

Electrical Specification Header		Mid Band Arrays (1695-2690 MHz) Ports 5-8			
Frequency Band	MHz	1695-1780	1850-1990	1995-2200	2200-2690
Gain	dBi	18.2	18.7	19.1	18.7
Azimuth Beamwidth 3dB	Deg	67 +/-5	65 +/-4	66 +/-8	61 +/-6
Elevation Beamwidth 3dB	Deg	6.0 +/- .2	5.0 +/-.5	4.5 +/-.3	4.0 +/-.3
Cross-Pol at Boresight	dB	22	18	14	18
F/B at 180 Copolar	dB	31	30	29	27
Electrical Downtilt	Deg	2 to 12	2 to 12	2 to 12	2 to 12
First Upper Side Lobe	dB	15	15	15	14
VSWR	-	1.5:1	1.5:1	1.5:1	1.5:1
Return Loss	dB	-14	-14	-14	-14
Cross Polar Isolation	dB	25	25	25	25
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153	-153
Maximum CW Power per Port	Watt	300	300	300	300
Gain Over All Tilts	dBi	17.5 +/- .6	17.9 +/- .6	18.5 +/- .5	17.8 +/- .6
Cross-Pol over Sector	dB	8	8	8	2
F/B at +/-30 Total Power	dB	25	23	22	19
Upper Side Lobe Peak to +20	dB	14	14	14	13

Impedance	Ohm	50
Polarization	Deg	+/- 45

MECHANICAL SPECIFICATIONS

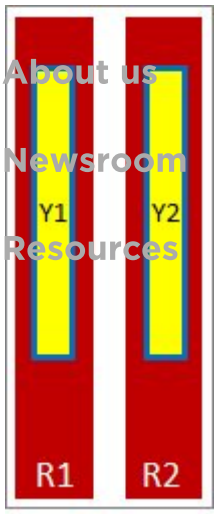
Dimensions - H x W x D	mm (in)	2436 x 609 x 215 (96 x 24 x 8.5)
Weight (Antenna Only)	kg (lb)	56 (123)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	78 (172)
Connector type		8 x 4.3-10 female at bottom
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		Direct Ground
Survival/Rated Wind Velocity	km/h	240 (150)
Wind Load @Rated Wind Front	N	1428
Wind Load @Rated Wind Side	N	434
Wind Load @Rated Wind Rear	N	1476
Survival wind Velocity	km/h	240

Order No.	Configuration	Mounting Hardware	Diameter	Weight
APxVAALL24_43-U-NA20	ACU-A20-SR Field Replace RET included (2)	APM40-5E Beam tilt kit (included)	60-120mm	78 Kg

Port	Array	Frequency	RET	AISG RET UID
1	R1	617-894	R1	RFxxxxxxxxxx-2R1
2		617-894		
3	R2	617-894		
4		617-894		
5	Y1	1695-2690	Y1	RFxxxxxxxxxx-2Y1
6		1695-2690		
7	Y2	1695-2690		
8		1695-2690		



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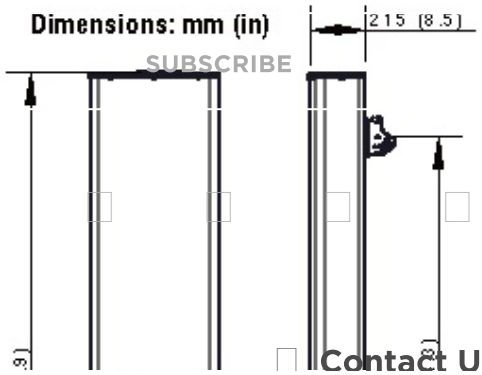
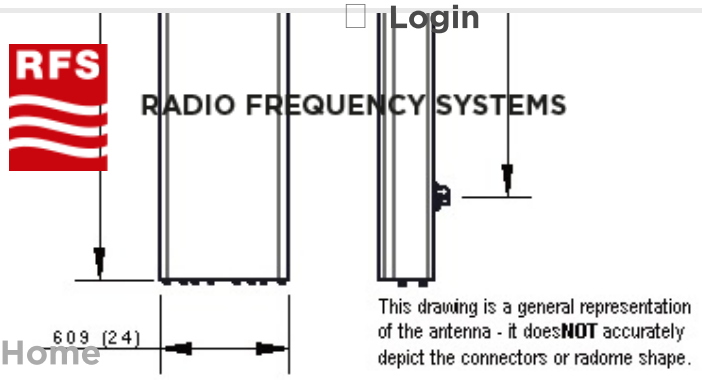
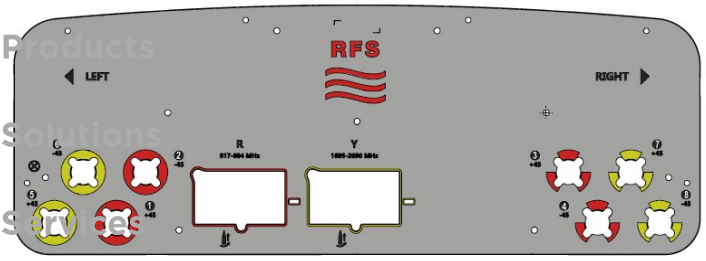






RET Information		
Frequency	617-894	1695-2690
Model	ACU-A20-SR	ACU-A20-SR
Location	Semi-internal	Semi-Internal
Field Replaceable	Yes	Yes
Quantity	1	1
RET ID	R1	Y1

External Document Links

APM40_Series_Installation_Instructions
Global RFS Website

Notes

- All electrical parameters are compliant with BASTA NGMN 11.1 requirements.
- For additional mounting information please click ""External Document Links"".

- **Radiating patterns:** Request pattern files

VV-65A-R1

4-port sector antenna, 4x 1695–2690 MHz, 65° HPBW, 1x RET,The two high band arrays utilize a common tilt.

- The RET interface comprises one pair of AISG input/output ports

General Specifications

Antenna Type	Sector
Band	Single band
Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage
Radome Material	PVC, UV resistant
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, total	4

Remote Electrical Tilt (RET) Information

RET Hardware	CommRET v2
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
Input Voltage	10–30 Vdc
Internal RET	High band (1)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	10 W
Protocol	3GPP/AISG 2.0

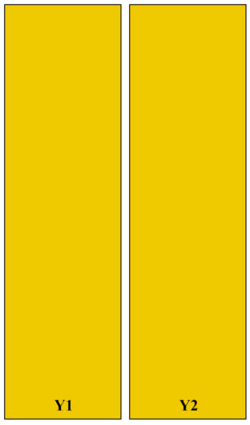
Dimensions

Width	307 mm | 12.087 in
Depth	118 mm | 4.646 in
Length	1390 mm | 54.724 in

VV-65A-R1

Net Weight, without mounting kit	10.8 kg | 23.81 lb

Array Layout



Array ID	Frequency (MHz)	RF Connector	HPBW	RET (SRET)	AISG No.	AISG RET UID
Y1	1695-2690	1 - 2	65°	1	AISG1	CPxxxxxxxxxxxxxxxY1
Y2	1695-2690	3 - 4	65°			

(Sizes of colored boxes are not true depictions of array sizes)

Port Configuration

Electrical Specifications

Impedance	50 ohm
Operating Frequency Band	1695 – 2690 MHz
Polarization	±45°
Total Input Power, maximum	400 W @ 50 °C

Electrical Specifications

Frequency Band, MHz	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2500**	**2490–2690**

Gain, dBi	17.5	17.7	18.2	18.5	18.6
Beamwidth, Horizontal, degrees	66	65	66	63	62
Beamwidth, Vertical, degrees	6.9	6.5	6.1	5.4	5.2
Beam Tilt, degrees	0–12	0–12	0–12	0–12	0–12
USLS (First Lobe), dB	17	18	18	21	21
Front-to-Back Ratio at 180°, dB	30	31	32	29	30
Isolation, Cross Polarization, dB	30	30	30	30	30
Isolation, Inter-band, dB	28	28	28	28	28
VSWR | Return loss, dB	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
Input Power per Port at 50°C, maximum, watts	300	300	300	300	250

Electrical Specifications, BASTA

Frequency Band, MHz	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2500**	**2490–2690**
Gain by all Beam Tilts, average, dBi	17.1	17.5	17.9	18.3	18.2
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.4	±0.4	±0.4	±0.5
Beamwidth, Horizontal Tolerance, degrees	±4.5	±3.5	±2.7	±2.5	±3.2
Beamwidth, Vertical Tolerance, degrees	±0.4	±0.3	±0.5	±0.2	±0.2
USLS, beampeak to 20° above beampeak, dB	16	17	17	18	16
Front-to-Back Total Power at 180° ± 30°, dB	24	26	27	26	26
CPR at Boresight, dB	16	17	17	20	19
CPR at Sector, dB	15	14	13	7	9

Mechanical Specifications

Wind Loading @ Velocity, frontal	494.0 N @ 150 km/h (111.1 lbf @ 150 km/h)
Wind Loading @ Velocity, lateral	102.0 N @ 150 km/h (22.9 lbf @ 150 km/h)
Wind Loading @ Velocity, rear	598.0 N @ 150 km/h (134.4 lbf @ 150 km/h)
Wind Speed, maximum	241 km/h | 149.75 mph

VV-65A-R1

Packaging and Weights

Width, packed	404 mm | 15.906 in
Depth, packed	278 mm | 10.945 in
Length, packed	1527 mm | 60.118 in
Weight, gross	19 kg | 41.888 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant/Exempted

Included Products

600899A-2	–	Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

New Product Introduction (10/27/2021)

Massive MIMO Mid-Band TDD
AIR6419 B41 (2.5GHz)
New Product Introduction Notification

ERICSSON

PURPOSE

Ericsson AIR6419 B41 is a next generation massive MIMO product as a successor to AIR6449 B41. In general, AIR6419 has the same technical capability (e.g., full IBW, 320W RF power), but, thanks to the new HW platform, it has several advantages over the previous AIR6449 model such as:

- Weight: -25% decrease
- Power consumption: -18% decrease

USAGE GUIDELINES

AIR6419 B41 is planned to replace AIR6449 on a go forward basis once available.

- Use existing AIR6449 if construction start is expected to complete before August 1st, 2022.
- Use AIR6419 if construction start is forecasted after August 1st, 2022.

Each site/market has a different entitlement timeline, but please refer to Average EC Duration per market (MLA vs. non-MLA) for site modification project. This will help the markets reverse-calculate what month should be the timing they should start transitioning to the new radio. For example, an average 6-months entitlement market will start using the new product starting from Feb 2022.

TIMELINES

- T-Mobile Lab Entry: Jan 2022
- T-Mobile FOA Entry: March 2022
- T-Mobile GA Forecast: May 15th, 2022
- T-Mobile First National Allocation Date: July 15th, 2022
- T-Mobile First Construction Date: Aug 1st, 2022

RFDS Update:

- New RFDS Templates for Anchor, Retain/NSD, Excalibur programs reflecting AIR6419 have been created already.
- Old AIR6449 RFDS Templates will be archived when its EOD is issued. Tentatively, Nov 15th but it may vary depending on the sites in the design pipe and build pace.

AFFECTED CONFIGURATIONS

Site configurations that are designed with AIR6419 B41 will have a "5D" (5 for 2.5GHz + D for AIR6419) after the low-band indicator and/or before L19 indicator in the naming convention e.g., 67D92DB => 67D5D998E, 92DB => 5D998E, etc.

PRODUCT DESCRIPTION

Frequency Range	LTE TDD B41: 2496 – 2690 MHz
Instantaneous BW	DL 194 MHz
Antenna Ports	64T64R
Technology	NR, LTE and NR+LTE MSMM
Antenna Elements	192 Antenna Elements (8 col x 12 rows x 2 pol)
Output RF Power	320 W (=64 TRX x 5W)
Data Ports	2 x 25Gb/s eCPRI
5G NR Support	YES
DC Feed	-48V DC power connector
Cooling	Passive cooling
Dimensions* (H x W x D)	36.3” x 20.9” x 9.0” (= 921x 531 x 229mm)
Weight*	83.3 lbs (=37.8 kg)
Power Consumption	1300 W
Electrical downtilt	-3 to 11 degrees
Horizontal beamwidth	+/- 65 degrees

*Note: Dimensions and weight are subject to change as the vendor finalizes the product. However, the numbers in the table are not going to exceed the ones of the final product.

WARRANTY: 1 Year

SPARES: 2% of install base. Additional units can be requested as per need.

Baseband Requirements

For a typical 3-sector or 4-sector site, one dedicated Baseband (RP6651) per site will be required.

BOM Items

SKU	Description	Qty
34552	AIR 6419 B41	1 per sector
33768	AIR 6419/5121/5331 Wall/Pole IRMKIT TILT	1 per AIR6419
34110	25G SFP	4 per AIR6419

The AIR6419 requires a voltage booster (i.e., PSU 48 13) depending on the length and gauge of HCS cable. Please refer to Voltage Booster design doc for its exact usage guidance.

SKU	Description	Qty
34513	PSU4813-R4A Voltage Booster Kit	1
34133	PSU installation kit for RBS61xx	Choose 1 per cabinet type
34134	PSU installation kit for PBC6200	
34135	PSU installation kit for E6x60/P6230	

LINKS

- Anchor 2022 Playbook
- Excalibur 2022 Playbook
- NSD 2022 Playbook
- Sprint Retain 2022 Playbook

CONTACTS

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Date: **April 27, 2022**

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Site Number:	7WAN098A
	Site Name:	N/A
Crown Castle Designation:	**BU Number:**	806957
	Site Name:	Williamsburg Gardens
	JDE Job Number:	711980
	Work Order Number:	2097400
	Order Number:	611571 Rev. 0
Engineering Firm Designation:	**TEP Project Number:**	241707.688670
Site Data:	**10010 Oaklyn Drive, Potomac, Montgomery County, MD 20854** **Latitude *38° 59' 42.57"*, Longitude *-77° 12' 14.13"*** **130 Foot - Monopine Tower**	

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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: Proposed Equipment Configuration **Sufficient Capacity**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 115 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Gautam Sopal, E.I. / PHX

Respectfully submitted by:

Martin L. Piercey, P.E.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of **Maryland**
License No. **33570**
Expiration Date: **9/12/2022**

This item has been electronically signed and sealed by Martin L. Piercey, P.E. on 4/27/2022 using a Digital Signature.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Digitally signed by Martin L Piercey
Date: 2022.04.27 16:59:46 -04'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 130-ft monopine tower designed by Valmont Microflect. The tower has been modified multiple times in the past to accommodate additional loading. The anchor rod modifications designed by Paul J. Ford and Company in September of 2008 were determined to be ineffective and not considered structurally in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1.0
Ice Thickness:	1.0 in
Wind Speed with Ice:	40 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
110.0	110.0	3	RFS Celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	3	1-5/8
		3	Commscope	VV-65A-R1_TMO w/ Mount Pipe		
		3	Ericsson	AIR 6419 B41_TMO w/ Mount Pipe		
		3	Ericsson	Radio 4460 B2/B25 B66_TMO		
		3	Ericsson	Radio 4480_TMOV2		
		1	Perfect Vision	PV-RP10S-HR-12-96		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
127.0	127.0	6	JMA Wireless	X7CQAP-FRO-860-VR0 w/ Mount Pipe	8 1	1-5/8 1/2
		1	GPS	GPS_A		
		3	Amphenol	HTXCW631619M000 w/ Mount Pipe		
		3	Samsung Telecom.	MT6407-77A w/ Mount Pipe		
		3	Samsung Telecom.	RFV01U-D1A		
		6	Commscope	CDX1923Q-DS-43		
		3	Samsung Telecom.	RFV01U-D2A		
		2	RFS Celwave	DB-B1-6C-12AB-0Z		
		1	Site Pro 1	RMQP-496-HK		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
118.0	118.0	3	Kathrein	800 10121 w/ Mount Pipe	8 2 2 3	7/8 13/16 3/8 5/16
		6	Commscope	NNHH-65C-R4_CCIV2 w/ Mount Pipe		
		3	Nokia	AHFIB_CCIV2		
		3	Nokia	AHLBBA		
		2	Raycap	DC6-48-60-18-8F		
		3	Alcatel Lucent	RRH4X25-WCS		
		3	Nokia	AHCA_CCIV3		
		1	Tower Mounts	Side Arm Mount [SO 101-3]		
		1	Tower Mounts	Miscellaneous [NA 508-3]		
110.0	110.0	3	Commscope	DT465B-2XR w/ Mount Pipe	4	1-1/4
		3	RFS Celwave	APXVSPP18-C w/ Mount Pipe		
		3	Alcatel Lucent	FD-RRH-2X50-800		
		3	Alcatel Lucent	TD-RRH8X20-25		
		9	RFS Celwave	ACU-A20-N		
108.0	108.0	6	Alcatel Lucent	800 External Notch Filter	-	-
		6	Alcatel Lucent	800MHZ RRH		
		6	Alcatel Lucent	1900MHZ RRH (65MHZ)		
98.0	98.0	3	JMA Wireless	MX08FRO665-21 w/ Mount Pipe	1	1-1/2
		3	Fujitsu	TA08025-B605		
		3	Fujitsu	TA08025-B604		
		1	Raycap	RDIDC-9181-PF-48		
		1	Tower Mounts	Commscope MC-K6MHDX-9-96 (3)		
90.0	90.0	6	Ericsson	KRY 112 71/2	-	-
		1	Tower Mounts	Side Arm Mount [SO 101-3]		
		1	Tower Mounts	Miscellaneous [NA 508-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	261743	CCISites
Tower Foundation Drawings	261734	CCISites
Tower Manufacturer Drawings	261735	CCISites
Tower Reinforcement Drawings	2207035	CCISites
Post-Modification Inspection	2331554	CCISites
Tower Reinforcement Drawings	2942459	CCISites
Post-Modification Inspection	3155122	CCISites

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

1) The tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)[1,2]

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP24.687x23.588x0.25	Pole	3.6%	Pass
125 - 120	Pole	TP25.787x24.687x0.25	Pole	10.0%	Pass
120 - 115	Pole	TP26.886x25.787x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP27.985x26.886x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP29.084x27.985x0.25	Pole	41.0%	Pass
105 - 100	Pole	TP30.184x29.084x0.25	Pole	53.7%	Pass
100 - 99.27	Pole	TP30.344x30.184x0.25	Pole	55.6%	Pass
99.27 - 99.02	Pole + Reinf.	TP30.399x30.344x0.475	Reinf. 9 Compression	43.2%	Pass
99.02 - 97.04	Pole + Reinf.	TP30.834x30.399x0.4625	Reinf. 9 Compression	47.3%	Pass
97.04 - 96.79	Pole + Reinf.	TP30.889x30.834x0.675	Reinf. 9 Compression	33.5%	Pass
96.79 - 96.33	Pole + Reinf.	TP30.99x30.889x0.675	Reinf. 9 Compression	34.1%	Pass
96.33 - 96.08	Pole + Reinf.	TP31.045x30.99x0.45	Reinf. 8 Tension Rupture	47.1%	Pass
96.08 - 94.29	Pole + Reinf.	TP31.439x31.045x0.45	Reinf. 8 Tension Rupture	50.5%	Pass
94.29 - 94.04	Pole + Reinf.	TP31.494x31.439x0.45	Reinf. 7 Tension Rupture	51.0%	Pass
94.04 - 91.5	Pole + Reinf.	TP32.052x31.494x0.45	Reinf. 7 Tension Rupture	55.7%	Pass
91.5 - 91.25	Pole + Reinf.	TP32.107x32.052x0.45	Reinf. 6 Tension Rupture	56.2%	Pass
91.25 - 86.25	Pole + Reinf.	TP33.207x32.107x0.4375	Reinf. 6 Tension Rupture	65.7%	Pass
86.25 - 86.08	Pole + Reinf.	TP33.244x33.207x0.4375	Reinf. 6 Tension Rupture	66.0%	Pass
86.08 - 85.83	Pole + Reinf.	TP33.299x33.244x0.4313	Reinf. 2 Tension Rupture	62.8%	Pass
85.83 - 81	Pole + Reinf.	TP35.515x33.299x0.425	Reinf. 2 Tension Rupture	71.2%	Pass
81 - 74.75	Pole + Reinf.	TP35.237x33.861x0.5188	Reinf. 2 Tension Rupture	68.3%	Pass
74.75 - 71	Pole + Reinf.	TP36.063x35.237x0.5063	Reinf. 2 Tension Rupture	72.9%	Pass
71 - 70.75	Pole + Reinf.	TP36.118x36.063x0.6938	Reinf. 5 Tension Rupture	59.1%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
70.75 - 65.75	Pole + Reinf.	TP37.219x36.118x0.6813	Reinf. 5 Tension Rupture	63.9%	Pass
65.75 - 60.75	Pole + Reinf.	TP38.32x37.219x0.6688	Reinf. 5 Tension Rupture	68.4%	Pass
60.75 - 60	Pole + Reinf.	TP38.485x38.32x0.6688	Reinf. 5 Tension Rupture	69.0%	Pass
60 - 59.75	Pole + Reinf.	TP38.54x38.485x0.6313	Reinf. 1 Tension Rupture	65.8%	Pass
59.75 - 54.75	Pole + Reinf.	TP39.641x38.54x0.6313	Reinf. 1 Tension Rupture	69.6%	Pass
54.75 - 50	Pole + Reinf.	TP42.008x39.641x0.6188	Reinf. 1 Tension Rupture	72.9%	Pass
50 - 43	Pole + Reinf.	TP41.539x39.999x0.8313	Reinf. 4 Tension Rupture	65.2%	Pass
43 - 42.85	Pole + Reinf.	TP41.572x41.539x0.8313	Reinf. 4 Tension Rupture	65.3%	Pass
42.85 - 37.85	Pole + Reinf.	TP42.672x41.572x0.8188	Reinf. 4 Tension Rupture	67.8%	Pass
37.85 - 32.85	Pole + Reinf.	TP43.773x42.672x0.8063	Reinf. 4 Tension Rupture	70.2%	Pass
32.85 - 27.85	Pole + Reinf.	TP44.873x43.773x0.7938	Reinf. 4 Tension Rupture	72.5%	Pass
27.85 - 26.25	Pole + Reinf.	TP45.225x44.873x0.7938	Reinf. 4 Tension Rupture	73.1%	Pass
26.25 - 26	Pole + Reinf.	TP45.28x45.225x0.9063	Reinf. 3 Bolt Shear	62.7%	Pass
26 - 21	Pole + Reinf.	TP46.38x45.28x0.8813	Reinf. 3 Compression	62.3%	Pass
21 - 16	Pole + Reinf.	TP47.48x46.38x0.8813	Reinf. 3 Compression	64.0%	Pass
16 - 11	Pole + Reinf.	TP48.58x47.48x0.8563	Reinf. 3 Compression	65.5%	Pass
11 - 6	Pole + Reinf.	TP49.68x48.58x0.8563	Reinf. 3 Compression	67.0%	Pass
6 - 1	Pole + Reinf.	TP50.78x49.68x0.8313	Reinf. 3 Compression	68.3%	Pass
1 - 0	Pole + Reinf.	TP51x50.78x0.8313	Reinf. 3 Compression	68.6%	Pass
				Summary	
			Pole	59.6%	Pass
			Reinforcement	73.1%	Pass
			Overall	**73.1%**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	86.9	Pass
1,2	Base Plate	-	54.4	Pass
1,2	Base Foundation Structural	-	87.2	Pass
1,2	Base Foundation Soil Interaction	-	68.0	Pass

Structure Rating (max from all components) =	**87.2%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5.

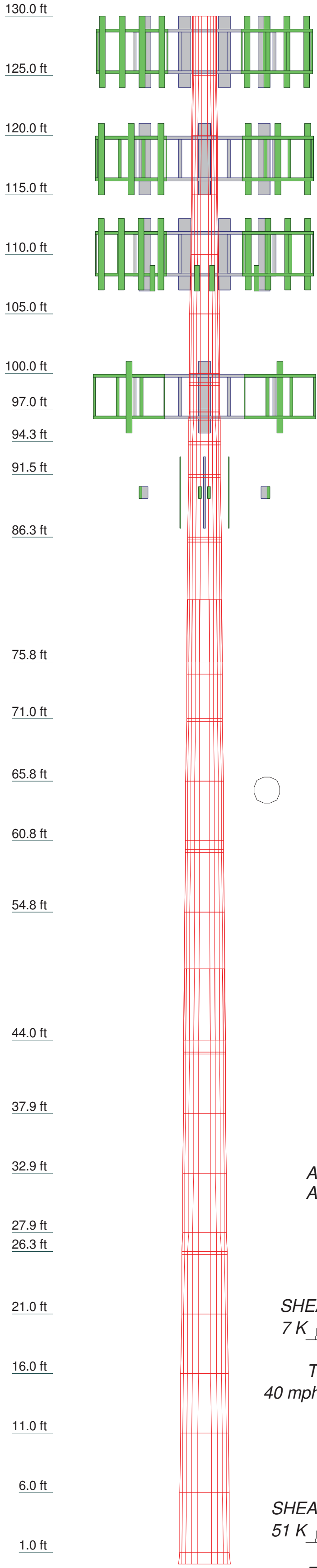
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	12	0.250		23.588	24.687	A572-65	0.3
2	5.00	12	0.250		24.687	25.787		0.3
3	5.00	12	0.250		25.787	26.886		0.4
4	5.00	12	0.250		26.886	27.985		0.4
5	5.00	12	0.250		27.985	29.084		0.4
6	5.00	12	0.250		29.084	30.184		0.4
7–16	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
17	5.00	12	[illegible]		32.103	33.203		0.7
18–19	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
20	10.08	12	0.425	5.25	33.299	35.515		1.5
21	[illegible]	12	0.519		[illegible]	[illegible]		1.2
22	3.75	12	[illegible]		[illegible]	[illegible]		0.7
23	[illegible]	12	[illegible]		[illegible]	[illegible]		0.1
24	5.00	12	0.681		36.118	37.219		1.3
25	5.00	12	0.669		37.219	38.320		1.3
26–27	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
28	5.00	12	0.631		38.540	39.641		1.2
29	10.75	12	0.619	6.00	39.641	42.008		2.8
30–31	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
32	5.00	12	0.819		41.572	42.672		1.8
33	5.00	12	0.806		42.672	43.773		1.8
34	5.00	12	0.794		43.773	44.873		1.8
35–36	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
37	5.00	12	0.881		45.280	46.380		2.1
38	5.00	12	0.881		46.380	47.480		2.1
39	5.00	12	0.856		47.480	48.580		2.1
40	5.00	12	0.856		48.580	49.680		2.1
41	5.00	12	0.831		49.680	50.780		2.2
42	1.00	12	0.831		50.780	51.000		0.4
								34.1



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Montgomery County, Maryland.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Equivalent Thickness Model
9. TOWER RATING: 73.1%

ALL REACTIONS ARE FACTORED

AXIAL 96 K
SHEAR 7 K
MOMENT 728 kip-ft
TORQUE 0 kip-ft
40 mph WIND - 1.000 in ICE

AXIAL 67 K
SHEAR 51 K
MOMENT 5021 kip-ft
TORQUE 0 kip-ft
REACTIONS - 115 mph WIND

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Tower Engineering Professionals

Job: **Williamsburg Gardens (BU 806957)**	
Project: **TEP No. 241707.688670**	
Client: Crown Castle	Drawn by: DAR / App'd:
Code: TIA-222-H	Date: 04/27/22 / Scale: NTS
Path:	Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Montgomery County, Maryland.
Tower base elevation above sea level: 330.00 ft.
Basic wind speed of 115 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Equivalent Thickness Model.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	130.00-125.00	5.00	0.000	12	23.588	24.687	0.250	1.000	A572-65 (65 ksi)
L2	125.00-120.00	5.00	0.000	12	24.687	25.787	0.250	1.000	A572-65 (65 ksi)
L3	120.00-115.00	5.00	0.000	12	25.787	26.886	0.250	1.000	A572-65 (65 ksi)
L4	115.00-110.00	5.00	0.000	12	26.886	27.985	0.250	1.000	A572-65 (65 ksi)
L5	110.00-105.00	5.00	0.000	12	27.985	29.084	0.250	1.000	A572-65 (65 ksi)
L6	105.00-100.00	5.00	0.000	12	29.084	30.184	0.250	1.000	A572-65 (65 ksi)
L7	100.00-99.27	0.73	0.000	12	30.184	30.344	0.250	1.000	A572-65 (65 ksi)
L8	99.27-99.02	0.25	0.000	12	30.344	30.399	0.475	1.900	A572-65 (65 ksi)
L9	99.02-97.04	1.98	0.000	12	30.399	30.834	0.463	1.850	A572-65 (65 ksi)
L10	97.04-96.79	0.25	0.000	12	30.834	30.889	0.675	2.700	A572-65 (65 ksi)
L11	96.79-96.33	0.46	0.000	12	30.889	30.990	0.675	2.700	A572-65 (65 ksi)
L12	96.33-96.08	0.25	0.000	12	30.990	31.045	0.450	1.800	A572-65 (65 ksi)
L13	96.08-94.29	1.79	0.000	12	31.045	31.439	0.450	1.800	A572-65 (65 ksi)
L14	94.29-94.04	0.25	0.000	12	31.439	31.494	0.450	1.800	A572-65 (65 ksi)
L15	94.04-91.50	2.54	0.000	12	31.494	32.052	0.450	1.800	A572-65 (65 ksi)
L16	91.50-91.25	0.25	0.000	12	32.052	32.107	0.450	1.800	A572-65 (65 ksi)
L17	91.25-86.25	5.00	0.000	12	32.107	33.207	0.438	1.750	A572-65 (65 ksi)
L18	86.25-86.08	0.17	0.000	12	33.207	33.244	0.438	1.750	A572-65 (65 ksi)
L19	86.08-85.83	0.25	0.000	12	33.244	33.299	0.431	1.725	A572-65 (65 ksi)
L20	85.83-75.75	10.08	5.250	12	33.299	35.515	0.425	1.700	A572-65 (65 ksi)
L21	75.75-74.75	6.25	0.000	12	33.861	35.237	0.519	2.075	A572-65 (65 ksi)
L22	74.75-71.00	3.75	0.000	12	35.237	36.063	0.506	2.025	A572-65 (65 ksi)
L23	71.00-70.75	0.25	0.000	12	36.063	36.118	0.694	2.775	A572-65 (65 ksi)
L24	70.75-65.75	5.00	0.000	12	36.118	37.219	0.681	2.725	A572-65 (65 ksi)
L25	65.75-60.75	5.00	0.000	12	37.219	38.320	0.669	2.675	A572-65 (65 ksi)
L26	60.75-60.00	0.75	0.000	12	38.320	38.485	0.669	2.675	A572-65 (65 ksi)
L27	60.00-59.75	0.25	0.000	12	38.485	38.540	0.631	2.525	A572-65 (65 ksi)
L28	59.75-54.75	5.00	0.000	12	38.540	39.641	0.631	2.525	A572-65 (65 ksi)
L29	54.75-44.00	10.75	6.000	12	39.641	42.008	0.619	2.475	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L30	44.00-43.00	7.00	0.000	12	39.999	41.539	0.831	3.325	A572-65 (65 ksi)
L31	43.00-42.85	0.15	0.000	12	41.539	41.572	0.831	3.325	A572-65 (65 ksi)
L32	42.85-37.85	5.00	0.000	12	41.572	42.672	0.819	3.275	A572-65 (65 ksi)
L33	37.85-32.85	5.00	0.000	12	42.672	43.773	0.806	3.225	A572-65 (65 ksi)
L34	32.85-27.85	5.00	0.000	12	43.773	44.873	0.794	3.175	A572-65 (65 ksi)
L35	27.85-26.25	1.60	0.000	12	44.873	45.225	0.794	3.175	A572-65 (65 ksi)
L36	26.25-26.00	0.25	0.000	12	45.225	45.280	0.906	3.625	A572-65 (65 ksi)
L37	26.00-21.00	5.00	0.000	12	45.280	46.380	0.881	3.525	A572-65 (65 ksi)
L38	21.00-16.00	5.00	0.000	12	46.380	47.480	0.881	3.525	A572-65 (65 ksi)
L39	16.00-11.00	5.00	0.000	12	47.480	48.580	0.856	3.425	A572-65 (65 ksi)
L40	11.00-6.00	5.00	0.000	12	48.580	49.680	0.856	3.425	A572-65 (65 ksi)
L41	6.00-1.00	5.00	0.000	12	49.680	50.780	0.831	3.325	A572-65 (65 ksi)
L42	1.00-0.00	1.00		12	50.780	51.000	0.831	3.325	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.332	18.787	1306.089	8.355	12.219	106.894	2646.490	9.246	5.652	22.606
	25.470	19.672	1499.476	8.749	12.788	117.256	3038.345	9.682	5.946	23.785
L2	25.470	19.672	1499.476	8.749	12.788	117.256	3038.345	9.682	5.946	23.785
	26.608	20.557	1711.068	9.142	13.357	128.099	3467.087	10.117	6.241	24.963
L3	26.608	20.557	1711.068	9.142	13.357	128.099	3467.087	10.117	6.241	24.963
	27.746	21.442	1941.684	9.536	13.927	139.420	3934.378	10.553	6.535	26.142
L4	27.746	21.442	1941.684	9.536	13.927	139.420	3934.378	10.553	6.535	26.142
	28.884	22.327	2192.142	9.929	14.496	151.221	4441.874	10.989	6.830	27.32
L5	28.884	22.327	2192.142	9.929	14.496	151.221	4441.874	10.989	6.830	27.32
	30.022	23.212	2463.262	10.323	15.066	163.502	4991.237	11.424	7.125	28.498
L6	30.022	23.212	2463.262	10.323	15.066	163.502	4991.237	11.424	7.125	28.498
	31.160	24.097	2755.863	10.716	15.635	176.261	5584.126	11.860	7.419	29.677
L7	31.160	24.097	2755.863	10.716	15.635	176.261	5584.126	11.860	7.419	29.677
	31.326	24.226	2800.429	10.774	15.718	178.164	5674.428	11.923	7.462	29.849
L8	31.247	45.685	5202.361	10.693	15.718	330.976	10541.393	22.485	6.859	14.44
	31.304	45.769	5231.133	10.713	15.747	332.205	10599.693	22.526	6.874	14.471
L9	31.308	44.583	5099.857	10.717	15.747	323.868	10333.693	21.942	6.907	14.935
	31.759	45.231	5325.579	10.873	15.972	333.428	10791.067	22.261	7.024	15.187
L10	31.684	65.551	7610.463	10.797	15.972	476.482	15420.861	32.262	6.455	9.562
	31.741	65.671	7652.147	10.817	16.001	478.240	15505.325	32.321	6.469	9.584
L11	31.741	65.671	7652.147	10.817	16.001	478.240	15505.325	32.321	6.469	9.584
	31.846	65.891	7729.244	10.853	16.053	481.481	15661.543	32.429	6.496	9.624
L12	31.925	44.253	5268.415	10.933	16.053	328.188	10675.237	21.780	7.099	15.777
	31.982	44.333	5296.911	10.953	16.082	329.379	10732.977	21.819	7.114	15.809
L13	31.982	44.333	5296.911	10.953	16.082	329.379	10732.977	21.819	7.114	15.809

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	32.389	44.903	5503.947	11.094	16.285	337.969	11152.489	22.100	7.220	16.044
L14	32.389	44.903	5503.947	11.094	16.285	337.969	11152.489	22.100	7.220	16.044
	32.446	44.983	5533.285	11.114	16.314	339.177	11211.936	22.139	7.234	16.076
L15	32.446	44.983	5533.285	11.114	16.314	339.177	11211.936	22.139	7.234	16.076
	33.024	45.792	5837.291	11.314	16.603	351.578	11827.934	22.537	7.384	16.409
L16	33.024	45.792	5837.291	11.314	16.603	351.578	11827.934	22.537	7.384	16.409
	33.081	45.871	5867.801	11.333	16.632	352.811	11889.755	22.577	7.399	16.442
L17	33.086	44.615	5711.567	11.338	16.632	343.417	11573.183	21.958	7.432	16.988
	34.224	46.163	6327.197	11.731	17.201	367.839	12820.617	22.720	7.727	17.661
L18	34.224	46.163	6327.197	11.731	17.201	367.839	12820.617	22.720	7.727	17.661
	34.262	46.216	6348.871	11.745	17.220	368.684	12864.535	22.746	7.737	17.684
L19	34.265	45.564	6261.751	11.747	17.220	363.625	12688.005	22.425	7.754	17.979
	34.321	45.641	6293.270	11.767	17.249	364.852	12751.871	22.463	7.768	18.014
L20	34.324	44.988	6205.602	11.769	17.249	359.770	12574.232	22.142	7.785	18.318
	36.618	48.021	7547.113	12.562	18.397	410.241	15292.497	23.634	8.379	19.715
L21	36.069	55.694	7902.706	11.936	17.540	450.556	16013.025	27.411	7.684	14.813
	36.297	57.992	8922.226	12.429	18.253	488.815	18078.849	28.542	8.053	15.524
L22	36.301	56.615	8716.641	12.434	18.253	477.552	17662.277	27.864	8.087	15.974
	37.156	57.962	9353.261	12.729	18.680	500.697	18952.242	28.527	8.308	16.411
L23	37.090	79.010	12615.728	12.662	18.680	675.342	25562.885	38.886	7.806	11.251
	37.147	79.133	12674.726	12.682	18.709	677.466	25682.431	38.947	7.820	11.273
L24	37.152	77.734	12459.533	12.686	18.709	665.964	25246.391	38.259	7.854	11.529
	38.291	80.150	13657.302	13.080	19.279	708.391	27673.396	39.447	8.149	11.962
L25	38.296	78.706	13420.474	13.085	19.279	696.107	27193.518	38.737	8.182	12.235
	39.436	81.077	14670.146	13.479	19.850	739.064	29725.693	39.903	8.477	12.677
L26	39.436	81.077	14670.146	13.479	19.850	739.064	29725.693	39.903	8.477	12.677
	39.607	81.432	14864.034	13.538	19.935	745.619	30118.564	40.079	8.522	12.743
L27	39.620	76.942	14072.318	13.552	19.935	705.904	28514.332	37.869	8.622	13.659
	39.677	77.054	14133.802	13.571	19.964	707.976	28638.914	37.924	8.637	13.682
L28	39.677	77.054	14133.802	13.571	19.964	707.976	28638.914	37.924	8.637	13.682
	40.817	79.292	15401.371	13.965	20.534	750.043	31207.354	39.025	8.932	14.15
L29	40.821	77.747	15110.911	13.970	20.534	735.898	30618.802	38.265	8.966	14.49
	43.272	82.463	18030.995	14.817	21.760	828.625	36535.685	40.586	9.600	15.515
L30	42.484	104.838	20529.117	14.022	20.720	990.804	41597.557	51.598	8.492	10.216
	42.712	108.961	23047.206	14.574	21.517	1071.095	46699.889	53.627	8.905	10.713
L31	42.712	108.961	23047.206	14.574	21.517	1071.095	46699.889	53.627	8.905	10.713
	42.746	109.049	23103.305	14.585	21.535	1072.850	46813.559	53.671	8.914	10.723
L32	42.750	107.442	22776.839	14.590	21.535	1057.690	46152.050	52.880	8.947	10.928
	43.889	110.342	24671.525	14.984	22.104	1116.139	49991.199	54.307	9.242	11.288
L33	43.893	108.690	24316.635	14.988	22.104	1100.084	49272.095	53.494	9.275	11.504
	45.032	111.546	26284.256	15.382	22.674	1159.215	53259.028	54.900	9.570	11.87
L34	45.037	109.848	25899.339	15.386	22.674	1142.239	52479.082	54.064	9.604	12.099
	46.176	112.660	27939.401	15.780	23.244	1202.004	56612.801	55.448	9.899	12.471
L35	46.176	112.660	27939.401	15.780	23.244	1202.004	56612.801	55.448	9.899	12.471
	46.540	113.560	28614.148	15.906	23.426	1221.450	57980.021	55.891	9.993	12.59
L36	46.500	129.327	32422.163	15.866	23.426	1384.003	65696.092	63.651	9.691	10.694
	46.557	129.487	32543.030	15.886	23.455	1387.475	65941.001	63.730	9.706	10.71
L37	46.566	125.986	31698.808	15.895	23.455	1351.481	64230.379	62.006	9.773	11.09
	47.705	129.108	34113.892	16.288	24.025	1419.951	69123.994	63.543	10.068	11.425
L38	47.705	129.108	34113.892	16.288	24.025	1419.951	69123.994	63.543	10.068	11.425
	48.844	132.229	36648.630	16.682	24.595	1490.113	74260.060	65.079	10.363	11.759
L39	48.853	128.547	35666.296	16.691	24.595	1450.172	72269.584	63.267	10.430	12.181
	49.992	131.580	38250.935	17.085	25.164	1520.044	77506.765	64.760	10.725	12.525
L40	49.992	131.580	38250.935	17.085	25.164	1520.044	77506.765	64.760	10.725	12.525
	51.130	134.613	40957.520	17.479	25.734	1591.560	82991.040	66.252	11.019	12.869
L41	51.139	130.750	39822.791	17.488	25.734	1547.466	80691.771	64.351	11.086	13.337
	52.278	133.694	42574.250	17.882	26.304	1618.545	86266.972	65.800	11.381	13.692
L42	52.278	133.694	42574.250	17.882	26.304	1618.545	86266.972	65.800	11.381	13.692
	52.506	134.283	43139.323	17.960	26.418	1632.952	87411.963	66.090	11.440	13.763

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.00-125.00				1	1	1			
L2 125.00-120.00				1	1	1			
L3 120.00-115.00				1	1	1			
L4 115.00-110.00				1	1	1			
L5 110.00-105.00				1	1	1			
L6 105.00-100.00				1	1	1			
L7 100.00-99.27				1	1	1			
L8 99.27-99.02				1	1	0.940528			
L9 99.02-97.04				1	1	0.959453			
L10 97.04-96.79				1	1	0.935992			
L11 96.79-96.33				1	1	0.934105			
L12 96.33-96.08				1	1	0.96579			
L13 96.08-94.29				1	1	0.96058			
L14 94.29-94.04				1	1	0.959863			
L15 94.04-91.50				1	1	0.952719			
L16 91.50-91.25				1	1	0.952029			
L17 91.25-86.25				1	1	0.965177			
L18 86.25-86.08				1	1	0.964728			
L19 86.08-85.83				1	1	0.954817			
L20 85.83-75.75				1	1	0.95677			
L21 75.75-74.75				1	1	0.958689			
L22 74.75-71.00				1	1	0.97497			
L23 71.00-70.75				1	1	0.942687			
L24 70.75-65.75				1	1	0.945933			
L25 65.75-60.75				1	1	0.950147			
L26 60.75-60.00				1	1	0.948242			
L27 60.00-59.75				1	1	0.951056			
L28 59.75-54.75				1	1	0.939583			
L29 54.75-44.00				1	1	0.947746			
L30 44.00-43.00				1	1	0.943805			
L31				1	1	0.943437			

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
43.00-42.85									
L32				1	1	0.94542			
42.85-37.85									
L33				1	1	0.948119			
37.85-32.85									
L34				1	1	0.951515			
32.85-27.85									
L35				1	1	0.948031			
27.85-26.25									
L36				1	1	0.939283			
26.25-26.00									
L37				1	1	0.95319			
26.00-21.00									
L38				1	1	0.941571			
21.00-16.00									
L39				1	1	0.957153			
16.00-11.00									
L40 11.00-6.00				1	1	0.946277			
L41 6.00-1.00				1	1	0.963545			
L42 1.00-0.00				1	1	0.961463			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
HB158-1-08U8-S8J18(1-5/8)	B	No	Surface Ar (CaAa)	127.00 - 0.00	2	2	0.500 0.500	1.980		1.300
Mods										
MP3-08 (1.1875in)W	A	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
MP3-08 (1.1875in)W	C	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
MP3-08 (1.1875in)W	B	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
***										
MP3-05 (1.1875in)	A	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
MP3-05 (1.1875in)	C	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
MP3-05 (1.1875in)	B	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
***										
MS-850 (1.1875")W	A	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
MS-850 (1.1875")W	C	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
MS-850 (1.1875")W	B	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
MS-600 (1.1875")	B	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
***										
Sabre PL 5"x1.25"	A	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
Sabre PL 5"x1.25"	C	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
Sabre PL 5"x1.25"	B	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
***										
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Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
127									
AVA7-50(1-5/8)	B	No	No	Inside Pole	127.00 - 0.00	6	No Ice	0.00	0.700
							1/2" Ice	0.00	0.700
							1" Ice	0.00	0.700
LDF4-50A(1/2)	B	No	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	0.150
							1/2" Ice	0.00	0.150
							1" Ice	0.00	0.150
118									
LDF5-50A(7/8)	C	No	No	Inside Pole	118.00 - 0.00	6	No Ice	0.00	0.330
							1/2" Ice	0.00	0.330
							1" Ice	0.00	0.330

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
6-8AWG 3 PAIR(7/8)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.680
							1/2" Ice	0.00	0.680
							1" Ice	0.00	0.680
PWRT-608-S(13/16)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.620
							1/2" Ice	0.00	0.620
							1" Ice	0.00	0.620
12 PAIR(3/8)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.080
							1/2" Ice	0.00	0.080
							1" Ice	0.00	0.080
860-10025(5/16)	C	No	No	Inside Pole	118.00 - 0.00	3	No Ice	0.00	0.000
							1/2" Ice	0.00	0.000
							1" Ice	0.00	0.000
110_TMO HB158-21U6S24-xx M_TMO(1-5/8)	A	No	No	Inside Pole	110.00 - 0.00	3	No Ice	0.00	2.500
							1/2" Ice	0.00	2.500
							1" Ice	0.00	2.500
110_Sprint HB114-13U3M12-X XXF(1-1/4)	A	No	No	Inside Pole	110.00 - 0.00	3	No Ice	0.00	0.992
							1/2" Ice	0.00	0.992
							1" Ice	0.00	0.992
HB114-1-08U4-M5 F(1-1/4)	A	No	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	1.300
							1/2" Ice	0.00	1.300
							1" Ice	0.00	1.300
98 CU12PSM9P6XXX(1-1/2)	B	No	No	Inside Pole	98.00 - 0.00	1	No Ice	0.00	2.350
							1/2" Ice	0.00	2.350
							1" Ice	0.00	2.350
*** ********** *									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-125.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.792	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L2	125.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L3	120.00-115.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.01
L4	115.00-110.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.02
L5	110.00-105.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.02
L6	105.00-100.00	A	0.000	0.000	0.902	0.000	0.06
		B	0.000	0.000	2.882	0.000	0.03
		C	0.000	0.000	0.902	0.000	0.02

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L7	100.00-99.27	A	0.000	0.000	0.519	0.000	0.01
		B	0.000	0.000	0.808	0.000	0.01
		C	0.000	0.000	0.519	0.000	0.00
L8	99.27-99.02	A	0.000	0.000	0.194	0.000	0.00
		B	0.000	0.000	0.293	0.000	0.00
		C	0.000	0.000	0.194	0.000	0.00
L9	99.02-97.04	A	0.000	0.000	3.001	0.000	0.02
		B	0.000	0.000	3.785	0.000	0.02
		C	0.000	0.000	3.001	0.000	0.01
L10	97.04-96.79	A	0.000	0.000	0.379	0.000	0.00
		B	0.000	0.000	0.478	0.000	0.00
		C	0.000	0.000	0.379	0.000	0.00
L11	96.79-96.33	A	0.000	0.000	0.697	0.000	0.01
		B	0.000	0.000	0.879	0.000	0.00
		C	0.000	0.000	0.697	0.000	0.00
L12	96.33-96.08	A	0.000	0.000	0.379	0.000	0.00
		B	0.000	0.000	0.478	0.000	0.00
		C	0.000	0.000	0.379	0.000	0.00
L13	96.08-94.29	A	0.000	0.000	3.683	0.000	0.02
		B	0.000	0.000	4.392	0.000	0.02
		C	0.000	0.000	3.683	0.000	0.01
L14	94.29-94.04	A	0.000	0.000	0.382	0.000	0.00
		B	0.000	0.000	0.481	0.000	0.00
		C	0.000	0.000	0.382	0.000	0.00
L15	94.04-91.50	A	0.000	0.000	4.971	0.000	0.03
		B	0.000	0.000	5.977	0.000	0.02
		C	0.000	0.000	4.971	0.000	0.01
L16	91.50-91.25	A	0.000	0.000	0.274	0.000	0.00
		B	0.000	0.000	0.373	0.000	0.00
		C	0.000	0.000	0.274	0.000	0.00
L17	91.25-86.25	A	0.000	0.000	6.384	0.000	0.06
		B	0.000	0.000	8.364	0.000	0.05
		C	0.000	0.000	6.384	0.000	0.02
L18	86.25-86.08	A	0.000	0.000	0.298	0.000	0.00
		B	0.000	0.000	0.365	0.000	0.00
		C	0.000	0.000	0.298	0.000	0.00
L19	86.08-85.83	A	0.000	0.000	0.438	0.000	0.00
		B	0.000	0.000	0.537	0.000	0.00
		C	0.000	0.000	0.438	0.000	0.00
L20	85.83-75.75	A	0.000	0.000	9.671	0.000	0.12
		B	0.000	0.000	13.662	0.000	0.09
		C	0.000	0.000	9.671	0.000	0.05
L21	75.75-74.75	A	0.000	0.000	0.888	0.000	0.01
		B	0.000	0.000	1.284	0.000	0.01
		C	0.000	0.000	0.888	0.000	0.00
L22	74.75-71.00	A	0.000	0.000	5.331	0.000	0.04
		B	0.000	0.000	6.816	0.000	0.03
		C	0.000	0.000	5.331	0.000	0.02
L23	71.00-70.75	A	0.000	0.000	0.472	0.000	0.00
		B	0.000	0.000	0.571	0.000	0.00
		C	0.000	0.000	0.472	0.000	0.00
L24	70.75-65.75	A	0.000	0.000	9.442	0.000	0.06
		B	0.000	0.000	11.422	0.000	0.05
		C	0.000	0.000	9.442	0.000	0.02
L25	65.75-60.75	A	0.000	0.000	9.442	0.000	0.06
		B	0.000	0.000	11.422	0.000	0.05
		C	0.000	0.000	9.442	0.000	0.02
L26	60.75-60.00	A	0.000	0.000	1.562	0.000	0.01
		B	0.000	0.000	1.859	0.000	0.01
		C	0.000	0.000	1.562	0.000	0.00
L27	60.00-59.75	A	0.000	0.000	0.580	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.679	0.000	0.00
		C	0.000	0.000	0.580	0.000	0.00
L28	59.75-54.75	A	0.000	0.000	8.358	0.000	0.06
		B	0.000	0.000	10.338	0.000	0.05
		C	0.000	0.000	8.358	0.000	0.02
L29	54.75-44.00	A	0.000	0.000	15.308	0.000	0.13
		B	0.000	0.000	19.565	0.000	0.10
		C	0.000	0.000	15.308	0.000	0.05
L30	44.00-43.00	A	0.000	0.000	2.322	0.000	0.01
		B	0.000	0.000	2.718	0.000	0.01
		C	0.000	0.000	2.322	0.000	0.00
L31	43.00-42.85	A	0.000	0.000	0.348	0.000	0.00
		B	0.000	0.000	0.408	0.000	0.00
		C	0.000	0.000	0.348	0.000	0.00
L32	42.85-37.85	A	0.000	0.000	11.608	0.000	0.06
		B	0.000	0.000	13.588	0.000	0.05
		C	0.000	0.000	11.608	0.000	0.02
L33	37.85-32.85	A	0.000	0.000	11.608	0.000	0.06
		B	0.000	0.000	13.588	0.000	0.05
		C	0.000	0.000	11.608	0.000	0.02
L34	32.85-27.85	A	0.000	0.000	12.504	0.000	0.06
		B	0.000	0.000	14.484	0.000	0.05
		C	0.000	0.000	12.504	0.000	0.02
L35	27.85-26.25	A	0.000	0.000	4.381	0.000	0.02
		B	0.000	0.000	5.015	0.000	0.01
		C	0.000	0.000	4.381	0.000	0.01
L36	26.25-26.00	A	0.000	0.000	0.685	0.000	0.00
		B	0.000	0.000	0.784	0.000	0.00
		C	0.000	0.000	0.685	0.000	0.00
L37	26.00-21.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L38	21.00-16.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L39	16.00-11.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L40	11.00-6.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L41	6.00-1.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L42	1.00-0.00	A	0.000	0.000	2.738	0.000	0.01
		B	0.000	0.000	3.134	0.000	0.01
		C	0.000	0.000	2.738	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-125.00	A	0.973	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	1.476	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L2	125.00-120.00	A	0.969	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.686	0.000	0.06

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.00
L3	120.00-115.00	A	0.965	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.681	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.01
L4	115.00-110.00	A	0.961	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.676	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.02
L5	110.00-105.00	A	0.957	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	3.671	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.02
L6	105.00-100.00	A	0.952	0.000	0.000	1.033	0.000	0.07
		B		0.000	0.000	4.698	0.000	0.07
		C		0.000	0.000	1.033	0.000	0.03
L7	100.00-99.27	A	0.949	0.000	0.000	0.594	0.000	0.01
		B		0.000	0.000	1.128	0.000	0.01
		C		0.000	0.000	0.594	0.000	0.01
L8	99.27-99.02	A	0.949	0.000	0.000	0.222	0.000	0.00
		B		0.000	0.000	0.405	0.000	0.00
		C		0.000	0.000	0.222	0.000	0.00
L9	99.02-97.04	A	0.948	0.000	0.000	3.409	0.000	0.05
		B		0.000	0.000	4.858	0.000	0.05
		C		0.000	0.000	3.409	0.000	0.03
L10	97.04-96.79	A	0.947	0.000	0.000	0.430	0.000	0.01
		B		0.000	0.000	0.613	0.000	0.01
		C		0.000	0.000	0.430	0.000	0.00
L11	96.79-96.33	A	0.946	0.000	0.000	0.792	0.000	0.01
		B		0.000	0.000	1.128	0.000	0.01
		C		0.000	0.000	0.792	0.000	0.01
L12	96.33-96.08	A	0.946	0.000	0.000	0.430	0.000	0.01
		B		0.000	0.000	0.613	0.000	0.01
		C		0.000	0.000	0.430	0.000	0.00
L13	96.08-94.29	A	0.945	0.000	0.000	4.189	0.000	0.05
		B		0.000	0.000	5.498	0.000	0.06
		C		0.000	0.000	4.189	0.000	0.04
L14	94.29-94.04	A	0.944	0.000	0.000	0.434	0.000	0.01
		B		0.000	0.000	0.616	0.000	0.01
		C		0.000	0.000	0.434	0.000	0.00
L15	94.04-91.50	A	0.943	0.000	0.000	5.617	0.000	0.07
		B		0.000	0.000	7.472	0.000	0.08
		C		0.000	0.000	5.617	0.000	0.05
L16	91.50-91.25	A	0.941	0.000	0.000	0.307	0.000	0.01
		B		0.000	0.000	0.490	0.000	0.01
		C		0.000	0.000	0.307	0.000	0.00
L17	91.25-86.25	A	0.938	0.000	0.000	7.328	0.000	0.11
		B		0.000	0.000	10.976	0.000	0.12
		C		0.000	0.000	7.328	0.000	0.07
L18	86.25-86.08	A	0.936	0.000	0.000	0.347	0.000	0.00
		B		0.000	0.000	0.471	0.000	0.00
		C		0.000	0.000	0.347	0.000	0.00
L19	86.08-85.83	A	0.935	0.000	0.000	0.510	0.000	0.01
		B		0.000	0.000	0.692	0.000	0.01
		C		0.000	0.000	0.510	0.000	0.00
L20	85.83-75.75	A	0.930	0.000	0.000	11.628	0.000	0.19
		B		0.000	0.000	18.960	0.000	0.22
		C		0.000	0.000	11.628	0.000	0.12
L21	75.75-74.75	A	0.923	0.000	0.000	1.074	0.000	0.02
		B		0.000	0.000	1.802	0.000	0.02
		C		0.000	0.000	1.074	0.000	0.01
L22	74.75-71.00	A	0.920	0.000	0.000	6.368	0.000	0.08
		B		0.000	0.000	9.087	0.000	0.09
		C		0.000	0.000	6.368	0.000	0.05

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L23	71.00-70.75	A	0.918	0.000	0.000	0.561	0.000	0.01
		B		0.000	0.000	0.742	0.000	0.01
		C		0.000	0.000	0.561	0.000	0.00
L24	70.75-65.75	A	0.914	0.000	0.000	11.221	0.000	0.12
		B		0.000	0.000	14.838	0.000	0.13
		C		0.000	0.000	11.221	0.000	0.09
L25	65.75-60.75	A	0.907	0.000	0.000	11.210	0.000	0.12
		B		0.000	0.000	14.819	0.000	0.13
		C		0.000	0.000	11.210	0.000	0.09
L26	60.75-60.00	A	0.903	0.000	0.000	1.812	0.000	0.02
		B		0.000	0.000	2.352	0.000	0.02
		C		0.000	0.000	1.812	0.000	0.01
L27	60.00-59.75	A	0.902	0.000	0.000	0.668	0.000	0.01
		B		0.000	0.000	0.849	0.000	0.01
		C		0.000	0.000	0.668	0.000	0.00
L28	59.75-54.75	A	0.898	0.000	0.000	9.556	0.000	0.11
		B		0.000	0.000	13.154	0.000	0.12
		C		0.000	0.000	9.556	0.000	0.08
L29	54.75-44.00	A	0.885	0.000	0.000	17.399	0.000	0.22
		B		0.000	0.000	25.098	0.000	0.25
		C		0.000	0.000	17.399	0.000	0.15
L30	44.00-43.00	A	0.874	0.000	0.000	2.670	0.000	0.03
		B		0.000	0.000	3.386	0.000	0.03
		C		0.000	0.000	2.670	0.000	0.02
L31	43.00-42.85	A	0.873	0.000	0.000	0.400	0.000	0.00
		B		0.000	0.000	0.507	0.000	0.00
		C		0.000	0.000	0.400	0.000	0.00
L32	42.85-37.85	A	0.867	0.000	0.000	13.317	0.000	0.13
		B		0.000	0.000	16.876	0.000	0.14
		C		0.000	0.000	13.317	0.000	0.09
L33	37.85-32.85	A	0.856	0.000	0.000	13.296	0.000	0.13
		B		0.000	0.000	16.841	0.000	0.14
		C		0.000	0.000	13.296	0.000	0.09
L34	32.85-27.85	A	0.843	0.000	0.000	14.177	0.000	0.13
		B		0.000	0.000	17.706	0.000	0.14
		C		0.000	0.000	14.177	0.000	0.10
L35	27.85-26.25	A	0.833	0.000	0.000	4.915	0.000	0.04
		B		0.000	0.000	6.040	0.000	0.05
		C		0.000	0.000	4.915	0.000	0.03
L36	26.25-26.00	A	0.830	0.000	0.000	0.768	0.000	0.01
		B		0.000	0.000	0.943	0.000	0.01
		C		0.000	0.000	0.768	0.000	0.00
L37	26.00-21.00	A	0.822	0.000	0.000	15.335	0.000	0.13
		B		0.000	0.000	18.837	0.000	0.14
		C		0.000	0.000	15.335	0.000	0.10
L38	21.00-16.00	A	0.802	0.000	0.000	15.296	0.000	0.13
		B		0.000	0.000	18.774	0.000	0.14
		C		0.000	0.000	15.296	0.000	0.10
L39	16.00-11.00	A	0.777	0.000	0.000	15.246	0.000	0.13
		B		0.000	0.000	18.693	0.000	0.14
		C		0.000	0.000	15.246	0.000	0.09
L40	11.00-6.00	A	0.742	0.000	0.000	15.176	0.000	0.13
		B		0.000	0.000	18.578	0.000	0.13
		C		0.000	0.000	15.176	0.000	0.09
L41	6.00-1.00	A	0.679	0.000	0.000	15.050	0.000	0.12
		B		0.000	0.000	18.373	0.000	0.13
		C		0.000	0.000	15.050	0.000	0.08
L42	1.00-0.00	A	0.559	0.000	0.000	2.962	0.000	0.02
		B		0.000	0.000	3.597	0.000	0.02
		C		0.000	0.000	2.962	0.000	0.01

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	130.00-125.00	0.852	0.492	1.065	0.615
L2	125.00-120.00	1.899	1.096	2.159	1.246
L3	120.00-115.00	1.906	1.100	2.183	1.260
L4	115.00-110.00	1.912	1.104	2.205	1.273
L5	110.00-105.00	1.918	1.108	2.226	1.285
L6	105.00-100.00	1.614	0.932	1.972	1.139
L7	100.00-99.27	1.106	0.638	1.467	0.847
L8	99.27-99.02	1.067	0.616	1.426	0.823
L9	99.02-97.04	0.751	0.434	1.062	0.613
L10	97.04-96.79	0.755	0.436	1.068	0.617
L11	96.79-96.33	0.757	0.437	1.070	0.618
L12	96.33-96.08	0.757	0.437	1.071	0.618
L13	96.08-94.29	0.625	0.361	0.904	0.522
L14	94.29-94.04	0.760	0.439	1.075	0.621
L15	94.04-91.50	0.653	0.377	0.944	0.545
L16	91.50-91.25	0.928	0.536	1.283	0.741
L17	91.25-86.25	0.862	0.498	1.194	0.690
L18	86.25-86.08	0.722	0.417	1.016	0.586
L19	86.08-85.83	0.723	0.417	1.017	0.587
L20	85.83-75.75	1.026	0.592	1.364	0.788
L21	75.75-74.75	1.074	0.620	1.420	0.820
L22	74.75-71.00	0.853	0.492	1.163	0.672
L23	71.00-70.75	0.725	0.419	1.009	0.583
L24	70.75-65.75	0.733	0.423	1.019	0.588
L25	65.75-60.75	0.746	0.431	1.036	0.598
L26	60.75-60.00	0.709	0.409	1.002	0.579
L27	60.00-59.75	0.661	0.382	0.946	0.546
L28	59.75-54.75	0.819	0.473	1.150	0.664
L29	54.75-44.00	0.918	0.530	1.274	0.735
L30	44.00-43.00	0.693	0.400	0.988	0.570
L31	43.00-42.85	0.695	0.401	0.987	0.570
L32	42.85-37.85	0.701	0.405	0.994	0.574
L33	37.85-32.85	0.712	0.411	1.008	0.582
L34	32.85-27.85	0.690	0.398	0.983	0.567
L35	27.85-26.25	0.657	0.379	0.944	0.545
L36	26.25-26.00	0.659	0.380	0.946	0.546
L37	26.00-21.00	0.664	0.383	0.952	0.550
L38	21.00-16.00	0.675	0.389	0.962	0.556
L39	16.00-11.00	0.685	0.395	0.971	0.560
L40	11.00-6.00	0.695	0.401	0.976	0.564
L41	6.00-1.00	0.705	0.407	0.975	0.563
L42	1.00-0.00	0.711	0.410	0.952	0.550

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	HB158-1-08U8-S8J18(1-5/8)	125.00 - 127.00	1.0000	1.0000
L2	3	HB158-1-08U8-S8J18(1-5/8)	120.00 - 125.00	1.0000	1.0000
L3	3	HB158-1-08U8-S8J18(1-5/8)	115.00 - 120.00	1.0000	1.0000
L4	3	HB158-1-08U8-S8J18(1-5/8)	110.00 - 115.00	1.0000	1.0000
L5	3	HB158-1-08U8-S8J18(1-5/8)	105.00 - 110.00	1.0000	1.0000
L6	3	HB158-1-08U8-S8J18(1-5/8)	100.00 - 105.00	1.0000	1.0000
L6	51	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L6	52	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L6	53	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L7	3	HB158-1-08U8-S8J18(1-5/8)	99.27 - 100.00	1.0000	1.0000
L7	51	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L7	52	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L7	53	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L8	3	HB158-1-08U8-S8J18(1-5/8)	99.02 - 99.27	1.0000	1.0000
L8	47	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	48	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	49	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	51	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L8	52	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L8	53	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L9	3	HB158-1-08U8-S8J18(1-5/8)	97.04 - 99.02	1.0000	1.0000
L9	47	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	48	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	49	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	51	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L9	52	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L9	53	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L10	3	HB158-1-08U8-S8J18(1-5/8)	96.79 - 97.04	1.0000	1.0000
L10	47	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	48	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	49	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	51	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L10	52	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L10	53	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L11	3	HB158-1-08U8-S8J18(1-5/8)	96.33 - 96.79	1.0000	1.0000
L11	47	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	48	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	49	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	51	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L11	52	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L11	53	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L12	3	HB158-1-08U8-S8J18(1-5/8)	96.08 - 96.33	1.0000	1.0000
L12	47	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	48	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	49	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	51	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L12	52	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L12	53	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L13	3	HB158-1-08U8-S8J18(1-5/8)	94.29 - 96.08	1.0000	1.0000
L13	43	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	44	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	45	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	47	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L13	48	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000
L13	49	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000
L13	51	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L13	52	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L13	53	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L14	3	HB158-1-08U8-S8J18(1-5/8)	94.04 - 94.29	1.0000	1.0000
L14	43	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	44	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	45	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	47	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	48	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	49	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L15	3	HB158-1-08U8-S8J18(1-5/8)	91.50 - 94.04	1.0000	1.0000
L15	39	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	40	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	41	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	43	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	44	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	45	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	47	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L15	48	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L15	49	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L16	3	HB158-1-08U8-S8J18(1-5/8)	91.25 - 91.50	1.0000	1.0000
L16	39	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	40	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	41	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	43	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L16	44	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L16	45	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L17	3	HB158-1-08U8-S8J18(1-5/8)	86.25 - 91.25	1.0000	1.0000
L17	23	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	24	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	25	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	39	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L17	40	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L17	41	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L18	3	HB158-1-08U8-S8J18(1-5/8)	86.08 - 86.25	1.0000	1.0000
L18	23	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	24	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	25	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	39	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L18	40	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L18	41	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L19	3	HB158-1-08U8-S8J18(1-5/8)	85.83 - 86.08	1.0000	1.0000
L19	23	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	24	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	25	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	39	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L19	40	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L19	41	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L20	3	HB158-1-08U8-S8J18(1-5/8)	75.75 - 85.83	1.0000	1.0000
L20	23	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	24	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	25	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	39	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L20	40	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L20	41	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L21	3	HB158-1-08U8-S8J18(1-5/8)	74.75 - 75.75	1.0000	1.0000
L21	23	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L21	24	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L21	25	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L22	3	HB158-1-08U8-S8J18(1-5/8)	71.00 - 74.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	23	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	24	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	25	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	35	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L22	36	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L22	37	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L23	3	HB158-1-08U8-S8J18(1-5/8)	70.75 - 71.00	1.0000	1.0000
L23	23	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	24	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	25	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	35	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L23	36	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L23	37	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L24	3	HB158-1-08U8-S8J18(1-5/8)	65.75 - 70.75	1.0000	1.0000
L24	23	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	24	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	25	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	35	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L24	36	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L24	37	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L25	3	HB158-1-08U8-S8J18(1-5/8)	60.75 - 65.75	1.0000	1.0000
L25	23	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	24	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	25	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	35	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L25	36	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L25	37	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L26	3	HB158-1-08U8-S8J18(1-5/8)	60.00 - 60.75	1.0000	1.0000
L26	19	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	20	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	21	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	23	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	24	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	25	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	35	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L26	36	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L26	37	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L27	3	HB158-1-08U8-S8J18(1-5/8)	59.75 - 60.00	1.0000	1.0000
L27	19	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	20	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	21	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	35	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L27	36	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L27	37	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L28	3	HB158-1-08U8-S8J18(1-5/8)	54.75 - 59.75	1.0000	1.0000
L28	19	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	20	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	21	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	35	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L28	36	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L28	37	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L29	3	HB158-1-08U8-S8J18(1-5/8)	44.00 - 54.75	1.0000	1.0000
L29	19	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	20	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	21	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	31	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L29	32	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L29	33	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L30	3	HB158-1-08U8-S8J18(1-5/8)	43.00 - 44.00	1.0000	1.0000
L30	19	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000
L30	20	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000
L30	21	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L30	31	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L30	32	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L30	33	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L31	3	HB158-1-08U8-S8J18(1-5/8)	42.85 - 43.00	1.0000	1.0000
L31	19	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	20	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	21	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	31	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L31	32	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L31	33	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L32	3	HB158-1-08U8-S8J18(1-5/8)	37.85 - 42.85	1.0000	1.0000
L32	19	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	20	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	21	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	31	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L32	32	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L32	33	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L33	3	HB158-1-08U8-S8J18(1-5/8)	32.85 - 37.85	1.0000	1.0000
L33	19	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	20	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	21	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	31	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L33	32	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L33	33	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L34	3	HB158-1-08U8-S8J18(1-5/8)	27.85 - 32.85	1.0000	1.0000
L34	19	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	20	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	21	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	27	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	28	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	29	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	31	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L34	32	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L34	33	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L35	3	HB158-1-08U8-S8J18(1-5/8)	26.25 - 27.85	1.0000	1.0000
L35	19	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	20	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	21	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	27	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L35	28	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L35	29	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L36	3	HB158-1-08U8-S8J18(1-5/8)	26.00 - 26.25	1.0000	1.0000
L36	19	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	20	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	21	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	27	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L36	28	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L36	29	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L37	3	HB158-1-08U8-S8J18(1-5/8)	21.00 - 26.00	1.0000	1.0000
L37	19	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	20	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	21	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	27	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L37	28	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L37	29	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L38	3	HB158-1-08U8-S8J18(1-5/8)	16.00 - 21.00	1.0000	1.0000
L38	19	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	20	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	21	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	27	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000
L38	28	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000
L38	29	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L39	3	HB158-1-08U8-S8J18(1-5/8)	11.00 - 16.00	1.0000	1.0000
L39	19	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	20	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	21	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	27	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L39	28	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L39	29	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L40	3	HB158-1-08U8-S8J18(1-5/8)	6.00 - 11.00	1.0000	1.0000
L40	19	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	20	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	21	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	27	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L40	28	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L40	29	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L41	3	HB158-1-08U8-S8J18(1-5/8)	1.00 - 6.00	1.0000	1.0000
L41	19	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	20	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	21	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	27	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L41	28	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L41	29	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L42	3	HB158-1-08U8-S8J18(1-5/8)	0.00 - 1.00	1.0000	1.0000
L42	19	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	20	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	21	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	27	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000
L42	28	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000
L42	29	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L6	51	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L6	52	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L6	53	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L7	51	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L7	52	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L7	53	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L8	47	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	48	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	49	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	51	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L8	52	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L8	53	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L9	47	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	48	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	49	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	51	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000
L9	52	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L9	53	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000
L10	47	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	48	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	49	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	51	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L10	52	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L10	53	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L11	47	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	48	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	49	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	51	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L11	52	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L11	53	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L12	47	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	48	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	49	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	51	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L12	52	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L12	53	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L13	43	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	44	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	45	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	47	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	48	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	49	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	51	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L13	52	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L13	53	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L14	43	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	44	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	45	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	47	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	48	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	49	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L15	39	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	40	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	41	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	43	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	44	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	45	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	47	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L15	48	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L15	49	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L16	39	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	40	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	41	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	43	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L16	44	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L16	45	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L17	23	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	24	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	25	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	39	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L17	40	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L17	41	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L18	23	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	24	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	25	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	39	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000
L18	40	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000
L18	41	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L19	23	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	24	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	25	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	39	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L19	40	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L19	41	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L20	23	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	24	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	25	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	39	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L20	40	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L20	41	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L21	23	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L21	24	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L21	25	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L22	23	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	24	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	25	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	35	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L22	36	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L22	37	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L23	23	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	24	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	25	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	35	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L23	36	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L23	37	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L24	23	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	24	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	25	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	35	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L24	36	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L24	37	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L25	23	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	24	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	25	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	35	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L25	36	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L25	37	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L26	19	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	20	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	21	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	23	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	24	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	25	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	35	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L26	36	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L26	37	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L27	19	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	20	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	21	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	35	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L27	36	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L27	37	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L28	19	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	20	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	21	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	35	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L28	36	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L28	37	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L29	19	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L29	20	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000
L29	21	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000
L29	31	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L29	32	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L29	33	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L30	19	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	20	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	21	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	31	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L30	32	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L30	33	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L31	19	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	20	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	21	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	31	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L31	32	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L31	33	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L32	19	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	20	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	21	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	31	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L32	32	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L32	33	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L33	19	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	20	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	21	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	31	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L33	32	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L33	33	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L34	19	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	20	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	21	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	27	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	28	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	29	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	31	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L34	32	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L34	33	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L35	19	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	20	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	21	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	27	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L35	28	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L35	29	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L36	19	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	20	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	21	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	27	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L36	28	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L36	29	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L37	19	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	20	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	21	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	27	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L37	28	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L37	29	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L38	19	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	20	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	21	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	27	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000
L38	28	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L38	29	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000
L39	19	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	20	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	21	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	27	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L39	28	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L39	29	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L40	19	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	20	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	21	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	27	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L40	28	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L40	29	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L41	19	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	20	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	21	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	27	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L41	28	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L41	29	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L42	19	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	20	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	21	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	27	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000
L42	28	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000
L42	29	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
5/8" x 4' Lightning Rod	C	From Leg	0.00 0.000 2.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.00 0.01 0.01
Pine branches									
Tree Pole Branchs.	C	None		0.000	130.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	124.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	118.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	113.50	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	109.30	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Tree Pole Branchs.	C	None		0.000	104.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	100.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	93.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	89.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	85.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	81.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
127									
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
GPS_A	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.11 0.21 0.28	0.11 0.21 0.28	0.00 0.00 0.01
HTXCW631619M000 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
HTXCW631619M000 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
HTXCW631619M000 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
MT6407-77A w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
RFV01U-D1A	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	C	From Centroid-Leg	4.00 0.000	0.000	127.00	No Ice 1/2" Ice	1.88 2.05	1.25 1.39	0.08 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		g	0.000			1" Ice	2.22	1.54	0.12
CDX1923Q-DS-43	A	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
(2) CDX1923Q-DS-43	B	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
(3) CDX1923Q-DS-43	C	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
RFV01U-D2A	A	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
RFV01U-D2A	B	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
RFV01U-D2A	C	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
DB-B1-6C-12AB-0Z	B	From	4.00	0.000	127.00	No Ice	3.36	2.19	0.02
		Centroid-Le	0.000			1/2" Ice	3.60	2.39	0.05
		g	0.000			1" Ice	3.84	2.61	0.08
DB-B1-6C-12AB-0Z	C	From	4.00	0.000	127.00	No Ice	3.36	2.19	0.02
		Centroid-Le	0.000			1/2" Ice	3.60	2.39	0.05
		g	0.000			1" Ice	3.84	2.61	0.08
Site Pro 1 RMQP-496-HK	C	None		0.000	127.00	No Ice	23.14	21.40	1.95
						1/2" Ice	28.17	26.44	2.34
						1" Ice	33.23	31.60	2.85
118									
800 10121 w/ Mount Pipe	A	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	B	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	C	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	A	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	B	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	C	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
AHFIB_CCIV2	A	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHFIB_CCIV2	B	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHFIB_CCIV2	C	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHLBBA	A	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
AHLBBA	B	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
AHLBBA	C	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
DC6-48-60-18-8F	A	From Leg	4.00	0.000	118.00	No Ice	1.21	1.21	0.03
			0.000			1/2" Ice	1.89	1.89	0.05
			0.000			1" Ice	2.11	2.11	0.08
DC6-48-60-18-8F	B	From Leg	4.00	0.000	118.00	No Ice	1.21	1.21	0.03
			0.000			1/2" Ice	1.89	1.89	0.05
			0.000			1" Ice	2.11	2.11	0.08
RRH4X25-WCS	A	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
RRH4X25-WCS	B	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
RRH4X25-WCS	C	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
AHCA_CCIV3	A	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
AHCA_CCIV3	B	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
AHCA_CCIV3	C	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
(2) 1 5/8 x 6' unistrut	A	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
(2) 1 5/8 x 6' unistrut	B	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
(2) 1 5/8 x 6' unistrut	C	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
Miscellaneous [NA 508-3]	C	None		0.000	118.00	No Ice	10.62	10.62	0.56
						1/2" Ice	13.64	13.64	0.72
						1" Ice	16.86	16.86	0.92
Side Arm Mount [SO 101-3]	C	None		0.000	118.00	No Ice	5.81	5.81	0.25
						1/2" Ice	6.95	6.95	0.34
						1" Ice	8.28	8.28	0.46
110_TMO									
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
VV-65A-R1_TMO w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
VV-65A-R1_TMO w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
VV-65A-R1_TMO w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
AIR 6419 B41_TMO w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
Radio 4480_TMOV2	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
110_Sprint									
DT465B-2XR w/ Mount Pipe	A	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	B	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	C	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
APXVSPP18-C w/ Mount Pipe	A	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
APXVSPP18-C w/ Mount Pipe	B	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
APXVSPP18-C w/ Mount Pipe	C	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
FD-RRH-2X50-800	A	From Face	4.00 0.000	0.000	110.00	No Ice 1/2" Ice	2.06 2.24	1.36 1.52	0.05 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	2.43	1.68	0.09
FD-RRH-2X50-800	B	From Face	4.00	0.000	110.00	No Ice	2.06	1.36	0.05
			0.000			1/2" Ice	2.24	1.52	0.07
			0.000			1" Ice	2.43	1.68	0.09
FD-RRH-2X50-800	C	From Face	4.00	0.000	110.00	No Ice	2.06	1.36	0.05
			0.000			1/2" Ice	2.24	1.52	0.07
			0.000			1" Ice	2.43	1.68	0.09
TD-RRH8X20-25	A	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
TD-RRH8X20-25	B	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
TD-RRH8X20-25	C	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
(3) ACU-A20-N	A	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	B	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	C	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
PV-RP10S-HR-12-96	C	None		0.000	110.00	No Ice	25.30	25.30	1.84
						1/2" Ice	32.20	32.20	2.49
						1" Ice	39.10	39.10	3.15
108									
(2) 800 EXTERNAL NOTCH FILTER	A	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800 EXTERNAL NOTCH FILTER	B	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800 EXTERNAL NOTCH FILTER	C	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800MHZ RRH	A	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 800MHZ RRH	B	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 800MHZ RRH	C	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 1900MHZ RRH (65MHZ)	A	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
(2) 1900MHZ RRH (65MHZ)	B	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
(2) 1900MHZ RRH (65MHZ)	C	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
2.4" Dia. x 6' Mount Pipe	A	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
2.4" Dia. x 6' Mount Pipe	B	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
2.4" Dia. x 6' Mount Pipe	C	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
98									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
TA08025-B605	A	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B605	B	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B605	C	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B604	A	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
TA08025-B604	B	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
TA08025-B604	C	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
RDIDC-9181-PF-48	A	From Leg	4.00	0.000	98.00	No Ice	2.01	1.17	0.02
			0.000			1/2" Ice	2.19	1.31	0.04
			0.000			1" Ice	2.37	1.46	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
Commscope MC-K6MHDX-9-96 (3)	C	None		0.000	98.00	No Ice	15.30	15.30	1.19
						1/2" Ice	20.48	20.48	1.71
						1" Ice	25.66	25.66	2.22
90									
(2) KRY 112 71/2	A	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02
			0.000			1" Ice	0.80	0.64	0.03
(2) KRY 112 71/2	B	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	0.80	0.64	0.03
(2) KRY 112 71/2	C	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02
			0.000			1" Ice	0.80	0.64	0.03
(2) 2.4" Dia. x 6' Mount Pipe	A	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
(2) 2.4" Dia. x 6' Mount Pipe	B	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
(2) 2.4" Dia. x 6' Mount Pipe	C	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
Miscellaneous [NA 508-3]	C	None		0.000	90.00	No Ice	10.62	10.62	0.56
						1/2" Ice	13.64	13.64	0.72
						1" Ice	16.86	16.86	0.92
Side Arm Mount [SO 101-3]	C	None		0.000	90.00	No Ice	5.81	5.81	0.25
						1/2" Ice	6.95	6.95	0.34
						1" Ice	8.28	8.28	0.46
****** *** **********									

Load Combinations

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

Comb. No.	Description
25	0.9 Dead+1.0 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
L1	130 - 125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.51	0.11	-0.50
			Max. Mx	20	-4.79	22.40	-0.20
			Max. My	14	-4.79	0.07	-22.49
			Max. Vy	8	8.52	-22.24	-0.21
			Max. Vx	14	8.49	0.07	-22.49
			Max. Torque	8			-0.43
L2	125 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.03	0.06	-0.47
			Max. Mx	20	-5.45	72.79	-0.18
			Max. My	14	-5.45	0.04	-72.73
			Max. Vy	8	10.65	-72.66	-0.22
			Max. Vx	14	10.62	0.04	-72.73
			Max. Torque	8			-0.43
L3	120 - 115	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.14	-0.35	-0.23
			Max. Mx	8	-9.46	-144.11	-0.14
			Max. My	14	-9.46	-0.14	-143.74
			Max. Vy	8	16.74	-144.11	-0.14
			Max. Vx	14	16.71	-0.14	-143.74
			Max. Torque	8			-0.43
L4	115 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.73	-0.39	-0.21
			Max. Mx	8	-10.22	-234.73	-0.14
			Max. My	14	-10.23	-0.17	-234.17
			Max. Vy	8	18.86	-234.73	-0.14
			Max. Vx	2	-18.83	-0.07	233.94

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	6			-0.33
L5	110 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.36	-0.44	-0.18
			Max. Mx	8	-16.85	-367.07	-0.15
			Max. My	14	-16.85	-0.20	-366.31
			Max. Vy	8	27.41	-367.07	-0.15
			Max. Vx	2	-27.38	-0.08	366.10
			Max. Torque	6			-0.33
L6	105 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.95	-0.49	-0.15
			Max. Mx	8	-18.07	-512.62	-0.15
			Max. My	14	-18.07	-0.24	-511.68
			Max. Vy	8	31.06	-512.62	-0.15
			Max. Vx	2	-31.03	-0.08	511.49
			Max. Torque	6			-0.33
L7	100 - 99.27	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.09	-0.49	-0.15
			Max. Mx	8	-18.18	-535.32	-0.15
			Max. My	14	-18.18	-0.24	-534.34
			Max. Vy	8	31.13	-535.32	-0.15
			Max. Vx	2	-31.09	-0.08	534.16
			Max. Torque	6			-0.33
L8	99.27 - 99.02	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.15	-0.50	-0.15
			Max. Mx	8	-18.24	-543.10	-0.15
			Max. My	14	-18.25	-0.24	-542.12
			Max. Vy	8	31.15	-543.10	-0.15
			Max. Vx	2	-31.11	-0.09	541.93
			Max. Torque	6			-0.33
L9	99.02 - 97.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.21	-0.51	0.19
			Max. Mx	8	-21.09	-607.04	-0.04
			Max. My	2	-21.09	-0.09	605.95
			Max. Vy	8	33.50	-607.04	-0.04
			Max. Vx	2	-33.50	-0.09	605.95
			Max. Torque	6			-0.33
L10	97.04 - 96.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.30	-0.52	0.19
			Max. Mx	8	-21.18	-615.41	-0.04
			Max. My	2	-21.18	-0.09	614.33
			Max. Vy	8	33.52	-615.41	-0.04
			Max. Vx	2	-33.52	-0.09	614.33
			Max. Torque	18			0.16
L11	96.79 - 96.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.47	-0.52	0.19
			Max. Mx	8	-21.31	-630.85	-0.04
			Max. My	2	-21.31	-0.09	629.76
			Max. Vy	8	33.57	-630.85	-0.04
			Max. Vx	2	-33.57	-0.09	629.76
			Max. Torque	18			0.16
L12	96.33 - 96.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.54	-0.52	0.19
			Max. Mx	8	-21.37	-639.24	-0.04
			Max. My	2	-21.37	-0.09	638.15
			Max. Vy	8	33.60	-639.24	-0.04
			Max. Vx	2	-33.60	-0.09	638.15
			Max. Torque	18			0.16
L13	96.08 - 94.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.08	-0.54	0.20
			Max. Mx	8	-21.74	-699.56	-0.04
			Max. My	2	-21.74	-0.09	698.46

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	33.80	-699.56	-0.04
			Max. Vx	2	-33.79	-0.09	698.46
			Max. Torque	18			0.16
L14	94.29 - 94.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.15	-0.54	0.21
			Max. Mx	8	-21.81	-708.01	-0.04
			Max. My	2	-21.82	-0.09	706.91
			Max. Vy	8	33.82	-708.01	-0.04
			Max. Vx	2	-33.81	-0.09	706.91
			Max. Torque	18			0.16
L15	94.04 - 91.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.77	-0.57	0.22
			Max. Mx	8	-22.64	-797.04	-0.05
			Max. My	2	-22.64	-0.09	795.92
			Max. Vy	8	35.64	-797.04	-0.05
			Max. Vx	2	-35.64	-0.09	795.92
			Max. Torque	18			0.16
L16	91.5 - 91.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.84	-0.57	0.22
			Max. Mx	8	-22.71	-805.95	-0.05
			Max. My	2	-22.71	-0.09	804.83
			Max. Vy	8	35.66	-805.95	-0.05
			Max. Vx	2	-35.65	-0.09	804.83
			Max. Torque	6			-0.16
L17	91.25 - 86.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.13	-0.62	0.25
			Max. Mx	8	-25.26	-994.44	-0.05
			Max. My	2	-25.26	-0.10	993.29
			Max. Vy	8	38.84	-994.44	-0.05
			Max. Vx	2	-38.84	-0.10	993.29
			Max. Torque	18			0.16
L18	86.25 - 86.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.19	-0.63	0.25
			Max. Mx	8	-25.31	-1001.04	-0.05
			Max. My	2	-25.31	-0.10	999.89
			Max. Vy	8	38.85	-1001.04	-0.05
			Max. Vx	2	-38.85	-0.10	999.89
			Max. Torque	6			-0.16
L19	86.08 - 85.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.26	-0.63	0.25
			Max. Mx	8	-25.37	-1010.76	-0.05
			Max. My	2	-25.37	-0.10	1009.61
			Max. Vy	8	38.88	-1010.76	-0.05
			Max. Vx	2	-38.87	-0.10	1009.61
			Max. Torque	6			-0.16
L20	85.83 - 75.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.32	-0.68	0.28
			Max. Mx	8	-27.06	-1206.70	-0.05
			Max. My	2	-27.06	-0.11	1205.51
			Max. Vy	8	42.40	-1206.70	-0.05
			Max. Vx	2	-42.39	-0.11	1205.51
			Max. Torque	6			-0.16
L21	75.75 - 74.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.51	-0.75	0.32
			Max. Mx	8	-29.71	-1474.01	-0.05
			Max. My	2	-29.71	-0.12	1472.79
			Max. Vy	8	43.15	-1474.01	-0.05
			Max. Vx	2	-43.14	-0.12	1472.79
			Max. Torque	6			-0.16
L22	74.75 - 71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.77	-0.79	0.35

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-30.79	-1636.48	-0.06
			Max. My	2	-30.80	-0.13	1635.24
			Max. Vy	8	43.52	-1636.48	-0.06
			Max. Vx	2	-43.52	-0.13	1635.24
			Max. Torque	6			-0.16
L23	71 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.88	-0.79	0.35
			Max. Mx	8	-30.90	-1647.36	-0.06
			Max. My	2	-30.90	-0.13	1646.12
			Max. Vy	8	43.54	-1647.36	-0.06
			Max. Vx	2	-43.53	-0.13	1646.12
			Max. Torque	6			-0.16
L24	70.75 - 65.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.99	-0.85	0.38
			Max. Mx	8	-32.69	-1866.42	-0.06
			Max. My	2	-32.69	-0.14	1865.14
			Max. Vy	8	44.09	-1866.42	-0.06
			Max. Vx	2	-44.08	-0.14	1865.14
			Max. Torque	6			-0.16
L25	65.75 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.12	-0.91	0.41
			Max. Mx	8	-34.53	-2088.17	-0.06
			Max. My	2	-34.53	-0.14	2086.86
			Max. Vy	8	44.63	-2088.17	-0.06
			Max. Vx	2	-44.62	-0.14	2086.86
			Max. Torque	6			-0.16
L26	60.75 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.45	-0.91	0.42
			Max. Mx	8	-34.81	-2121.66	-0.06
			Max. My	2	-34.81	-0.15	2120.35
			Max. Vy	8	44.70	-2121.66	-0.06
			Max. Vx	2	-44.70	-0.15	2120.35
			Max. Torque	6			-0.16
L27	60 - 59.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.56	-0.92	0.42
			Max. Mx	8	-34.91	-2132.84	-0.06
			Max. My	2	-34.91	-0.15	2131.52
			Max. Vy	8	44.72	-2132.84	-0.06
			Max. Vx	2	-44.72	-0.15	2131.52
			Max. Torque	6			-0.16
L28	59.75 - 54.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.62	-0.98	0.46
			Max. Mx	8	-36.70	-2357.74	-0.06
			Max. My	2	-36.70	-0.16	2356.40
			Max. Vy	8	45.25	-2357.74	-0.06
			Max. Vx	2	-45.24	-0.16	2356.40
			Max. Torque	6			-0.16
L29	54.75 - 44	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.59	-1.03	0.49
			Max. Mx	8	-38.44	-2573.76	-0.06
			Max. My	2	-38.44	-0.17	2572.38
			Max. Vy	8	45.73	-2573.76	-0.06
			Max. Vx	2	-45.72	-0.17	2572.38
			Max. Torque	6			-0.16
L30	44 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.42	-1.12	0.54
			Max. Mx	8	-43.53	-2896.89	-0.06
			Max. My	2	-43.53	-0.18	2895.47
			Max. Vy	8	46.60	-2896.89	-0.06
			Max. Vx	2	-46.59	-0.18	2895.47
			Max. Torque	6			-0.16

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L31	43 - 42.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.50	-1.12	0.54
			Max. Mx	8	-43.62	-2903.88	-0.06
			Max. My	2	-43.62	-0.18	2902.46
			Max. Vy	8	46.60	-2903.88	-0.06
			Max. Vx	2	-46.60	-0.18	2902.46
			Max. Torque	6			-0.16
L32	42.85 - 37.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.23	-1.18	0.58
			Max. Mx	8	-45.99	-3138.17	-0.06
			Max. My	2	-45.99	-0.19	3136.72
			Max. Vy	8	47.12	-3138.17	-0.06
			Max. Vx	2	-47.12	-0.19	3136.72
			Max. Torque	6			-0.16
L33	37.85 - 32.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.98	-1.25	0.61
			Max. Mx	8	-48.42	-3374.95	-0.06
			Max. My	2	-48.42	-0.21	3373.47
			Max. Vy	8	47.61	-3374.95	-0.06
			Max. Vx	2	-47.61	-0.21	3373.47
			Max. Torque	6			-0.16
L34	32.85 - 27.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.78	-1.31	0.65
			Max. Mx	8	-50.88	-3614.15	-0.06
			Max. My	2	-50.88	-0.22	3612.63
			Max. Vy	8	48.09	-3614.15	-0.06
			Max. Vx	2	-48.08	-0.22	3612.63
			Max. Torque	6			-0.16
L35	27.85 - 26.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.68	-1.33	0.66
			Max. Mx	8	-51.66	-3691.18	-0.06
			Max. My	2	-51.66	-0.22	3689.66
			Max. Vy	8	48.24	-3691.18	-0.06
			Max. Vx	2	-48.24	-0.22	3689.66
			Max. Torque	6			-0.16
L36	26.25 - 26	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.84	-1.34	0.66
			Max. Mx	8	-51.82	-3703.24	-0.06
			Max. My	2	-51.82	-0.22	3701.72
			Max. Vy	8	48.24	-3703.24	-0.06
			Max. Vx	2	-48.24	-0.22	3701.72
			Max. Torque	6			-0.16
L37	26 - 21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.96	-1.40	0.70
			Max. Mx	8	-54.58	-3945.62	-0.05
			Max. My	2	-54.58	-0.24	3944.06
			Max. Vy	8	48.72	-3945.62	-0.05
			Max. Vx	2	-48.71	-0.24	3944.06
			Max. Torque	6			-0.16
L38	21 - 16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.11	-1.47	0.74
			Max. Mx	8	-57.38	-4190.23	-0.05
			Max. My	2	-57.38	-0.25	4188.64
			Max. Vy	8	49.15	-4190.23	-0.05
			Max. Vx	2	-49.14	-0.25	4188.64
			Max. Torque	6			-0.16
L39	16 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-89.28	-1.53	0.78
			Max. Mx	8	-60.22	-4436.92	-0.05
			Max. My	2	-60.22	-0.27	4435.30
			Max. Vy	8	49.55	-4436.92	-0.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-49.55	-0.27	4435.30
			Max. Torque	6			-0.16
L40	11 - 6	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-92.46	-1.60	0.81
			Max. Mx	8	-63.08	-4685.63	-0.05
			Max. My	2	-63.08	-0.28	4683.98
			Max. Vy	8	49.95	-4685.63	-0.05
			Max. Vx	2	-49.95	-0.28	4683.98
			Max. Torque	6			-0.16
L41	6 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.63	-1.66	0.85
			Max. Mx	8	-65.98	-4936.33	-0.04
			Max. My	2	-65.98	-0.30	4934.65
			Max. Vy	8	50.35	-4936.33	-0.04
			Max. Vx	2	-50.35	-0.30	4934.65
			Max. Torque	6			-0.16
L42	1 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-96.26	-1.67	0.86
			Max. Mx	8	-66.57	-4986.71	-0.04
			Max. My	2	-66.57	-0.30	4985.02
			Max. Vy	8	50.43	-4986.71	-0.04
			Max. Vx	2	-50.43	-0.30	4985.02
			Max. Torque	6			-0.16

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	96.26	0.00	0.00
	Max. H_x	21	49.94	50.41	0.00
	Max. H_z	3	49.94	0.00	50.41
	Max. M_x	2	4985.02	0.00	50.41
	Max. M_z	8	4986.71	-50.41	-0.00
	Max. Torsion	18	0.16	43.66	-25.20
	Min. Vert	25	49.94	25.21	43.66
	Min. H_x	9	49.94	-50.41	-0.00
	Min. H_z	15	49.94	-0.00	-50.41
	Min. M_x	14	-4984.39	-0.00	-50.41
	Min. M_z	20	-4985.39	50.41	0.00
	Min. Torsion	6	-0.16	-43.66	25.20

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	55.49	0.00	0.00	-0.26	-0.53	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	66.58	-0.00	-50.41	-4985.02	-0.30	0.11
0.9 Dead+1.0 Wind 0 deg - No Ice	49.94	-0.00	-50.41	-4952.11	-0.13	0.11
1.2 Dead+1.0 Wind 30 deg - No	66.58	25.59	-44.32	-4347.75	-2511.12	0.16

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
Ice						
0.9 Dead+1.0 Wind 30 deg - No Ice	49.94	25.59	-44.32	-4319.13	-2494.47	0.15
1.2 Dead+1.0 Wind 60 deg - No Ice	66.58	43.66	-25.20	-2492.36	-4318.53	0.16
0.9 Dead+1.0 Wind 60 deg - No Ice	49.94	43.66	-25.20	-2475.87	-4289.92	0.15
1.2 Dead+1.0 Wind 90 deg - No Ice	66.58	50.41	0.00	0.04	-4986.71	0.12
0.9 Dead+1.0 Wind 90 deg - No Ice	49.94	50.41	0.00	0.12	-4953.70	0.11
1.2 Dead+1.0 Wind 120 deg - No Ice	66.58	43.66	25.21	2492.35	-4318.88	0.04
0.9 Dead+1.0 Wind 120 deg - No Ice	49.94	43.66	25.21	2476.01	-4290.27	0.04
1.2 Dead+1.0 Wind 150 deg - No Ice	66.58	25.21	43.66	4316.75	-2493.99	-0.04
0.9 Dead+1.0 Wind 150 deg - No Ice	49.94	25.21	43.66	4288.40	-2477.40	-0.04
1.2 Dead+1.0 Wind 180 deg - No Ice	66.58	0.00	50.41	4984.39	-1.01	-0.11
0.9 Dead+1.0 Wind 180 deg - No Ice	49.94	0.00	50.41	4951.65	-0.84	-0.11
1.2 Dead+1.0 Wind 210 deg - No Ice	66.58	-25.59	44.32	4347.13	2509.81	-0.16
0.9 Dead+1.0 Wind 210 deg - No Ice	49.94	-25.59	44.32	4318.67	2493.49	-0.15
1.2 Dead+1.0 Wind 240 deg - No Ice	66.58	-43.66	25.20	2491.73	4317.21	-0.16
0.9 Dead+1.0 Wind 240 deg - No Ice	49.94	-43.66	25.20	2475.40	4288.94	-0.15
1.2 Dead+1.0 Wind 270 deg - No Ice	66.58	-50.41	-0.00	-0.67	4985.39	-0.12
0.9 Dead+1.0 Wind 270 deg - No Ice	49.94	-50.41	-0.00	-0.59	4952.72	-0.11
1.2 Dead+1.0 Wind 300 deg - No Ice	66.58	-43.66	-25.21	-2492.98	4317.57	-0.04
0.9 Dead+1.0 Wind 300 deg - No Ice	49.94	-43.66	-25.21	-2476.48	4289.29	-0.04
1.2 Dead+1.0 Wind 330 deg - No Ice	66.58	-25.21	-43.66	-4317.37	2492.68	0.04
0.9 Dead+1.0 Wind 330 deg - No Ice	49.94	-25.21	-43.66	-4288.87	2476.42	0.04
1.2 Dead+1.0 Ice+1.0 Temp	96.26	0.00	0.00	-0.86	-1.67	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	96.26	-0.00	-7.29	-727.03	-1.71	0.03
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	96.26	3.65	-6.31	-629.72	-364.86	0.03
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	96.26	6.31	-3.65	-363.92	-630.72	0.02
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	96.26	7.29	0.00	-0.84	-728.05	0.01
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	96.26	6.31	3.65	362.22	-630.77	-0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	96.26	3.65	6.31	627.98	-364.95	-0.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	96.26	0.00	7.29	725.24	-1.82	-0.03
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	96.26	-3.65	6.31	627.93	361.33	-0.03
1.2 Dead+1.0 Wind 240	96.26	-6.31	3.65	362.13	627.19	-0.02

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	96.26	-7.29	-0.00	-0.95	724.51	-0.01
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	96.26	-6.31	-3.65	-364.01	627.24	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	96.26	-3.65	-6.31	-629.77	361.42	0.02
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	55.49	-0.00	-12.93	-1273.84	-0.45	0.03
Dead+Wind 30 deg - Service	55.49	6.56	-11.36	-1111.04	-641.97	0.04
Dead+Wind 60 deg - Service	55.49	11.19	-6.46	-636.97	-1103.75	0.04
Dead+Wind 90 deg - Service	55.49	12.93	0.00	-0.17	-1274.47	0.03
Dead+Wind 120 deg - Service	55.49	11.20	6.46	636.61	-1103.84	0.00
Dead+Wind 150 deg - Service	55.49	6.46	11.19	1102.74	-637.59	-0.02
Dead+Wind 180 deg - Service	55.49	0.00	12.93	1273.32	-0.64	-0.03
Dead+Wind 210 deg - Service	55.49	-6.56	11.36	1110.51	640.88	-0.04
Dead+Wind 240 deg - Service	55.49	-11.19	6.46	636.45	1102.66	-0.04
Dead+Wind 270 deg - Service	55.49	-12.93	-0.00	-0.35	1273.38	-0.03
Dead+Wind 300 deg - Service	55.49	-11.20	-6.46	-637.13	1102.75	-0.00
Dead+Wind 330 deg - Service	55.49	-6.46	-11.19	-1103.26	636.49	0.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-55.49	0.00	0.00	55.49	0.00	0.000%
2	-0.00	-66.58	-50.41	0.00	66.58	50.41	0.000%
3	-0.00	-49.94	-50.41	0.00	49.94	50.41	0.000%
4	25.59	-66.58	-44.32	-25.59	66.58	44.32	0.000%
5	25.59	-49.94	-44.32	-25.59	49.94	44.32	0.000%
6	43.66	-66.58	-25.20	-43.66	66.58	25.20	0.000%
7	43.66	-49.94	-25.20	-43.66	49.94	25.20	0.000%
8	50.41	-66.58	0.00	-50.41	66.58	-0.00	0.000%
9	50.41	-49.94	0.00	-50.41	49.94	-0.00	0.000%
10	43.66	-66.58	25.21	-43.66	66.58	-25.21	0.000%
11	43.66	-49.94	25.21	-43.66	49.94	-25.21	0.000%
12	25.21	-66.58	43.66	-25.21	66.58	-43.66	0.000%
13	25.21	-49.94	43.66	-25.21	49.94	-43.66	0.000%
14	0.00	-66.58	50.41	-0.00	66.58	-50.41	0.000%
15	0.00	-49.94	50.41	-0.00	49.94	-50.41	0.000%
16	-25.59	-66.58	44.32	25.59	66.58	-44.32	0.000%
17	-25.59	-49.94	44.32	25.59	49.94	-44.32	0.000%
18	-43.66	-66.58	25.20	43.66	66.58	-25.20	0.000%
19	-43.66	-49.94	25.20	43.66	49.94	-25.20	0.000%
20	-50.41	-66.58	-0.00	50.41	66.58	0.00	0.000%
21	-50.41	-49.94	-0.00	50.41	49.94	0.00	0.000%
22	-43.66	-66.58	-25.21	43.66	66.58	25.21	0.000%
23	-43.66	-49.94	-25.21	43.66	49.94	25.21	0.000%
24	-25.21	-66.58	-43.66	25.21	66.58	43.66	0.000%
25	-25.21	-49.94	-43.66	25.21	49.94	43.66	0.000%
26	0.00	-96.26	0.00	0.00	96.26	0.00	0.000%
27	-0.00	-96.26	-7.29	0.00	96.26	7.29	0.000%
28	3.65	-96.26	-6.31	-3.65	96.26	6.31	0.000%
29	6.31	-96.26	-3.65	-6.31	96.26	3.65	0.000%
30	7.29	-96.26	0.00	-7.29	96.26	-0.00	0.000%
31	6.31	-96.26	3.65	-6.31	96.26	-3.65	0.000%
32	3.65	-96.26	6.31	-3.65	96.26	-6.31	0.000%
33	0.00	-96.26	7.29	-0.00	96.26	-7.29	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
34	-3.65	-96.26	6.31	3.65	96.26	-6.31	0.000%
35	-6.31	-96.26	3.65	6.31	96.26	-3.65	0.000%
36	-7.29	-96.26	-0.00	7.29	96.26	0.00	0.000%
37	-6.31	-96.26	-3.65	6.31	96.26	3.65	0.000%
38	-3.65	-96.26	-6.31	3.65	96.26	6.31	0.000%
39	-0.00	-55.49	-12.93	0.00	55.49	12.93	0.000%
40	6.56	-55.49	-11.36	-6.56	55.49	11.36	0.000%
41	11.19	-55.49	-6.46	-11.19	55.49	6.46	0.000%
42	12.93	-55.49	0.00	-12.93	55.49	-0.00	0.000%
43	11.20	-55.49	6.46	-11.20	55.49	-6.46	0.000%
44	6.46	-55.49	11.19	-6.46	55.49	-11.19	0.000%
45	0.00	-55.49	12.93	-0.00	55.49	-12.93	0.000%
46	-6.56	-55.49	11.36	6.56	55.49	-11.36	0.000%
47	-11.19	-55.49	6.46	11.19	55.49	-6.46	0.000%
48	-12.93	-55.49	-0.00	12.93	55.49	0.00	0.000%
49	-11.20	-55.49	-6.46	11.20	55.49	6.46	0.000%
50	-6.46	-55.49	-11.19	6.46	55.49	11.19	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00006385
3	Yes	4	0.00000001	0.00092843
4	Yes	6	0.00000001	0.00011169
5	Yes	6	0.00000001	0.00003492
6	Yes	6	0.00000001	0.00011075
7	Yes	6	0.00000001	0.00003467
8	Yes	5	0.00000001	0.00006388
9	Yes	4	0.00000001	0.00093012
10	Yes	6	0.00000001	0.00011112
11	Yes	6	0.00000001	0.00003479
12	Yes	6	0.00000001	0.00011108
13	Yes	6	0.00000001	0.00003478
14	Yes	5	0.00000001	0.00006412
15	Yes	4	0.00000001	0.00093500
16	Yes	6	0.00000001	0.00011109
17	Yes	6	0.00000001	0.00003472
18	Yes	6	0.00000001	0.00011122
19	Yes	6	0.00000001	0.00003484
20	Yes	5	0.00000001	0.00006363
21	Yes	4	0.00000001	0.00092406
22	Yes	6	0.00000001	0.00011092
23	Yes	6	0.00000001	0.00003473
24	Yes	6	0.00000001	0.00011090
25	Yes	6	0.00000001	0.00003473
26	Yes	4	0.00000001	0.00000001
27	Yes	6	0.00000001	0.00006634
28	Yes	6	0.00000001	0.00006910
29	Yes	6	0.00000001	0.00006915
30	Yes	6	0.00000001	0.00006651
31	Yes	6	0.00000001	0.00006906
32	Yes	6	0.00000001	0.00006897
33	Yes	6	0.00000001	0.00006619
34	Yes	6	0.00000001	0.00006868

35	Yes	6	0.00000001	0.00006866
36	Yes	6	0.00000001	0.00006608
37	Yes	6	0.00000001	0.00006877
38	Yes	6	0.00000001	0.00006883
39	Yes	4	0.00000001	0.00054102
40	Yes	5	0.00000001	0.00008344
41	Yes	5	0.00000001	0.00008184
42	Yes	4	0.00000001	0.00054091
43	Yes	5	0.00000001	0.00008232
44	Yes	5	0.00000001	0.00008247
45	Yes	4	0.00000001	0.00054093
46	Yes	5	0.00000001	0.00008222
47	Yes	5	0.00000001	0.00008253
48	Yes	4	0.00000001	0.00054031
49	Yes	5	0.00000001	0.00008212
50	Yes	5	0.00000001	0.00008193

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	16.007	40	1.102	0.001
L2	125 - 120	14.853	40	1.101	0.000
L3	120 - 115	13.705	40	1.090	0.000
L4	115 - 110	12.573	40	1.070	0.000
L5	110 - 105	11.469	40	1.037	0.000
L6	105 - 100	10.406	40	0.991	0.000
L7	100 - 99.27	9.399	40	0.930	0.000
L8	99.27 - 99.02	9.258	40	0.920	0.000
L9	99.02 - 97.04	9.210	40	0.918	0.000
L10	97.04 - 96.79	8.832	40	0.902	0.000
L11	96.79 - 96.33	8.785	40	0.901	0.000
L12	96.33 - 96.08	8.698	40	0.898	0.000
L13	96.08 - 94.29	8.651	40	0.896	0.000
L14	94.29 - 94.04	8.318	40	0.880	0.000
L15	94.04 - 91.5	8.272	40	0.878	0.000
L16	91.5 - 91.25	7.812	40	0.854	0.000
L17	91.25 - 86.25	7.767	40	0.851	0.000
L18	86.25 - 86.08	6.904	40	0.797	0.000
L19	86.08 - 85.83	6.875	40	0.795	0.000
L20	85.83 - 75.75	6.834	40	0.792	0.000
L21	81 - 74.75	6.062	40	0.733	0.000
L22	74.75 - 71	5.128	40	0.688	0.000
L23	71 - 70.75	4.606	40	0.641	0.000
L24	70.75 - 65.75	4.572	40	0.639	0.000
L25	65.75 - 60.75	3.929	40	0.590	0.000
L26	60.75 - 60	3.337	40	0.539	0.000
L27	60 - 59.75	3.253	40	0.531	0.000
L28	59.75 - 54.75	3.226	40	0.529	0.000
L29	54.75 - 44	2.701	40	0.473	0.000
L30	50 - 43	2.257	40	0.419	0.000
L31	43 - 42.85	1.669	40	0.379	0.000
L32	42.85 - 37.85	1.657	40	0.378	0.000
L33	37.85 - 32.85	1.285	40	0.332	0.000
L34	32.85 - 27.85	0.962	40	0.285	0.000
L35	27.85 - 26.25	0.689	40	0.237	0.000
L36	26.25 - 26	0.612	40	0.222	0.000
L37	26 - 21	0.600	40	0.220	0.000
L38	21 - 16	0.392	40	0.178	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L39	16 - 11	0.228	40	0.136	0.000
L40	11 - 6	0.108	40	0.093	0.000
L41	6 - 1	0.032	40	0.051	0.000
L42	1 - 0	0.001	40	0.008	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	5/8" x 4' Lightning Rod	40	16.007	1.102	0.001	49078
127.00	(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	40	15.314	1.102	0.001	49078
124.00	Tree Pole Branchs.	40	14.622	1.099	0.000	38251
118.00	Tree Pole Branchs.	40	13.249	1.084	0.000	14360
113.50	Tree Pole Branchs.	40	12.238	1.061	0.000	9393
110.00	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	40	11.469	1.037	0.000	7246
109.30	Tree Pole Branchs.	40	11.317	1.031	0.000	6907
108.00	(2) 800 EXTERNAL NOTCH FILTER	40	11.038	1.020	0.000	6341
104.30	Tree Pole Branchs.	40	10.261	0.983	0.000	5121
100.30	Tree Pole Branchs.	40	9.458	0.934	0.000	5148
98.00	MX08FRO665-21 w/ Mount Pipe	40	9.014	0.910	0.000	6147
93.30	Tree Pole Branchs.	40	8.137	0.871	0.000	6138
90.00	(2) KRY 112 71/2	40	7.546	0.838	0.000	5460
89.30	Tree Pole Branchs.	40	7.424	0.831	0.000	5328
85.30	Tree Pole Branchs.	40	6.746	0.786	0.000	4964
81.30	Tree Pole Branchs.	40	6.108	0.736	0.000	6230

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	62.637	4	4.320	0.002
L2	125 - 120	58.123	4	4.313	0.002
L3	120 - 115	53.632	4	4.272	0.001
L4	115 - 110	49.203	4	4.191	0.001
L5	110 - 105	44.884	4	4.062	0.001
L6	105 - 100	40.726	4	3.880	0.001
L7	100 - 99.27	36.788	4	3.642	0.000
L8	99.27 - 99.02	36.235	4	3.603	0.000
L9	99.02 - 97.04	36.046	4	3.596	0.000
L10	97.04 - 96.79	34.569	4	3.535	0.000
L11	96.79 - 96.33	34.385	4	3.529	0.000
L12	96.33 - 96.08	34.046	4	3.519	0.000
L13	96.08 - 94.29	33.862	4	3.510	0.000
L14	94.29 - 94.04	32.559	4	3.448	0.000
L15	94.04 - 91.5	32.379	4	3.439	0.000
L16	91.5 - 91.25	30.576	4	3.344	0.000
L17	91.25 - 86.25	30.401	4	3.334	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L18	86.25 - 86.08	27.022	4	3.122	0.000
L19	86.08 - 85.83	26.911	4	3.114	0.000
L20	85.83 - 75.75	26.749	4	3.103	0.000
L21	81 - 74.75	23.728	4	2.869	0.000
L22	74.75 - 71	20.074	4	2.696	0.000
L23	71 - 70.75	18.030	4	2.512	0.000
L24	70.75 - 65.75	17.899	4	2.503	0.000
L25	65.75 - 60.75	15.379	4	2.311	0.000
L26	60.75 - 60	13.064	4	2.111	0.000
L27	60 - 59.75	12.735	4	2.081	0.000
L28	59.75 - 54.75	12.626	4	2.070	0.000
L29	54.75 - 44	10.572	4	1.853	0.000
L30	50 - 43	8.834	4	1.641	0.000
L31	43 - 42.85	6.532	4	1.486	0.000
L32	42.85 - 37.85	6.485	4	1.480	0.000
L33	37.85 - 32.85	5.030	4	1.298	0.000
L34	32.85 - 27.85	3.767	4	1.115	0.000
L35	27.85 - 26.25	2.697	4	0.929	0.000
L36	26.25 - 26	2.396	4	0.871	0.000
L37	26 - 21	2.350	4	0.863	0.000
L38	21 - 16	1.534	4	0.697	0.000
L39	16 - 11	0.891	4	0.532	0.000
L40	11 - 6	0.421	4	0.365	0.000
L41	6 - 1	0.125	4	0.200	0.000
L42	1 - 0	0.003	4	0.033	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	5/8" x 4' Lightning Rod	4	62.637	4.320	0.002	12905
127.00	(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	4	59.927	4.318	0.002	12905
124.00	Tree Pole Branchs.	4	57.222	4.308	0.002	10026
118.00	Tree Pole Branchs.	4	51.850	4.245	0.001	3713
113.50	Tree Pole Branchs.	4	47.894	4.158	0.001	2425
110.00	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	4	44.884	4.062	0.001	1868
109.30	Tree Pole Branchs.	4	44.291	4.040	0.001	1781
108.00	(2) 800 EXTERNAL NOTCH FILTER	4	43.198	3.995	0.001	1634
104.30	Tree Pole Branchs.	4	40.160	3.852	0.001	1318
100.30	Tree Pole Branchs.	4	37.017	3.660	0.000	1324
98.00	MX08FRO665-21 w/ Mount Pipe	4	35.282	3.564	0.000	1581
93.30	Tree Pole Branchs.	4	31.848	3.412	0.000	1577
90.00	(2) KRY 112 71/2	4	29.536	3.284	0.000	1402
89.30	Tree Pole Branchs.	4	29.057	3.255	0.000	1368
85.30	Tree Pole Branchs.	4	26.406	3.078	0.000	1274
81.30	Tree Pole Branchs.	4	23.910	2.881	0.000	1598

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	130 - 125 (1)	TP24.687x23.588x0.25	5.00	0.00	0.0	19.672	-4.79	1150.81	0.004
L2	125 - 120 (2)	TP25.787x24.687x0.25	5.00	0.00	0.0	20.557	-5.45	1202.58	0.005
L3	120 - 115 (3)	TP26.886x25.787x0.25	5.00	0.00	0.0	21.442	-9.46	1254.35	0.008
L4	115 - 110 (4)	TP27.985x26.886x0.25	5.00	0.00	0.0	22.327	-10.22	1306.11	0.008
L5	110 - 105 (5)	TP29.084x27.985x0.25	5.00	0.00	0.0	23.212	-16.85	1357.88	0.012
L6	105 - 100 (6)	TP30.184x29.084x0.25	5.00	0.00	0.0	24.097	-18.07	1409.65	0.013
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	0.73	0.00	0.0	24.226	-18.18	1417.20	0.013
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	0.25	0.00	0.0	45.769	-18.24	2677.48	0.007
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	1.98	0.00	0.0	45.231	-21.09	2646.03	0.008
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	0.25	0.00	0.0	65.671	-21.18	3841.74	0.006
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	0.46	0.00	0.0	65.891	-21.31	3854.60	0.006
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	0.25	0.00	0.0	44.333	-21.37	2593.46	0.008
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	1.79	0.00	0.0	44.903	-21.74	2626.82	0.008
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	0.25	0.00	0.0	44.983	-21.81	2631.48	0.008
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	2.54	0.00	0.0	45.792	-22.64	2678.82	0.008
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	0.25	0.00	0.0	45.871	-22.71	2683.48	0.008
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	5.00	0.00	0.0	46.163	-25.26	2700.56	0.009
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	0.17	0.00	0.0	46.216	-25.31	2703.64	0.009
L19	86.08 - 85.83 (19)	TP33.299x33.244x0.431	0.25	0.00	0.0	45.641	-25.37	2669.99	0.010
L20	85.83 - 75.75 (20)	TP35.515x33.299x0.425	10.08	0.00	0.0	46.441	-27.06	2716.80	0.010
L21	75.75 - 74.75 (21)	TP35.237x33.861x0.519	6.25	0.00	0.0	57.993	-29.70	3392.56	0.009
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	3.75	0.00	0.0	57.961	-30.78	3390.75	0.009
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	0.25	0.00	0.0	79.133	-30.89	4629.27	0.007
L24	70.75 - 65.75 (24)	TP37.219x36.118x0.681	5.00	0.00	0.0	80.150	-32.68	4688.75	0.007
L25	65.75 - 60.75 (25)	TP38.32x37.219x0.669	5.00	0.00	0.0	81.077	-34.51	4742.99	0.007
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	0.75	0.00	0.0	81.432	-34.80	4763.79	0.007
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	0.25	0.00	0.0	77.054	-34.89	4507.67	0.008
L28	59.75 - 54.75 (28)	TP39.641x38.54x0.631	5.00	0.00	0.0	79.292	-36.68	4638.58	0.008
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	10.75	0.00	0.0	79.831	-38.42	4670.09	0.008
L30	44 - 43 (30)	TP41.539x39.999x0.831	7.00	0.00	0.0	108.961	-43.52	6374.19	0.007
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	0.15	0.00	0.0	109.049	-43.60	6379.36	0.007
L32	42.85 - 37.85 (32)	TP42.672x41.572x0.819	5.00	0.00	0.0	110.342	-45.98	6455.02	0.007
L33	37.85 - 32.85 (33)	TP43.773x42.672x0.806	5.00	0.00	0.0	111.546	-48.40	6525.44	0.007
L34	32.85 - 27.85 (34)	TP44.873x43.773x0.794	5.00	0.00	0.0	112.660	-50.86	6590.62	0.008
L35	27.85 - 26.25 (35)	TP45.225x44.873x0.794	1.60	0.00	0.0	113.560	-51.65	6643.25	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	0.25	0.00	0.0	129.487	-51.81	7575.00	0.007
L37	26 - 21 (37)	TP46.38x45.28x0.881	5.00	0.00	0.0	129.108	-54.57	7552.79	0.007
L38	21 - 16 (38)	TP47.48x46.38x0.881	5.00	0.00	0.0	132.229	-57.37	7735.41	0.007
L39	16 - 11 (39)	TP48.58x47.48x0.856	5.00	0.00	0.0	131.580	-60.21	7697.43	0.008
L40	11 - 6 (40)	TP49.68x48.58x0.856	5.00	0.00	0.0	134.613	-63.08	7874.86	0.008
L41	6 - 1 (41)	TP50.78x49.68x0.831	5.00	0.00	0.0	133.694	-65.98	7821.10	0.008
L42	1 - 0 (42)	TP51x50.78x0.831	1.00	0.00	0.0	134.283	-66.57	7855.55	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 125 (1)	TP24.687x23.588x0.25	22.52	679.90	0.033	0.00	679.90	0.000
L2	125 - 120 (2)	TP25.787x24.687x0.25	72.82	730.42	0.100	0.00	730.42	0.000
L3	120 - 115 (3)	TP26.886x25.787x0.25	144.11	781.54	0.184	0.00	781.54	0.000
L4	115 - 110 (4)	TP27.985x26.886x0.25	234.74	833.12	0.282	0.00	833.12	0.000
L5	110 - 105 (5)	TP29.084x27.985x0.25	367.07	885.01	0.415	0.00	885.01	0.000
L6	105 - 100 (6)	TP30.184x29.084x0.25	512.62	937.09	0.547	0.00	937.09	0.000
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	535.32	944.70	0.567	0.00	944.70	0.000
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	543.10	2040.57	0.266	0.00	2040.57	0.000
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	607.03	2048.08	0.296	0.00	2048.08	0.000
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	615.41	2937.58	0.209	0.00	2937.58	0.000
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	630.85	2957.50	0.213	0.00	2957.50	0.000
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	639.24	2023.21	0.316	0.00	2023.21	0.000
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	699.56	2075.97	0.337	0.00	2075.97	0.000
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	708.01	2083.40	0.340	0.00	2083.40	0.000
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	797.04	2159.57	0.369	0.00	2159.57	0.000
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	805.95	2167.14	0.372	0.00	2167.14	0.000
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	994.44	2259.45	0.440	0.00	2259.45	0.000
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	1001.04	2264.64	0.442	0.00	2264.64	0.000
L19	86.08 - 85.83 (19)	TP33.299x33.244x0.431	1010.76	2241.11	0.451	0.00	2241.11	0.000
L20	85.83 - 75.75 (20)	TP35.515x33.299x0.425	1206.70	2355.90	0.512	0.00	2355.90	0.000
L21	75.75 - 74.75 (21)	TP35.237x33.861x0.519	1474.10	3002.55	0.491	0.00	3002.55	0.000
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	1637.01	3075.53	0.532	0.00	3075.53	0.000
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	1647.93	4161.34	0.396	0.00	4161.34	0.000
L24	70.75 - 65.75 (24)	TP37.219x36.118x0.681	1867.81	4351.29	0.429	0.00	4351.29	0.000
L25	65.75 - 60.75 (25)	TP38.32x37.219x0.669	2090.67	4539.70	0.461	0.00	4539.70	0.000
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	2124.35	4579.97	0.464	0.00	4579.97	0.000
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	2135.59	4348.74	0.491	0.00	4348.74	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L28	59.75 - 54.75 (28)	TP39.641x38.54x0.631	2361.94	4607.14	0.513	0.00	4607.14	0.000
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	2579.50	4767.76	0.541	0.00	4767.76	0.000
L30	44 - 43 (30)	TP41.539x39.999x0.831	2905.15	6579.20	0.442	0.00	6579.20	0.000
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	2912.20	6589.98	0.442	0.00	6589.98	0.000
L32	42.85 - 37.85 (32)	TP42.672x41.572x0.819	3148.58	6855.88	0.459	0.00	6855.88	0.000
L33	37.85 - 32.85 (33)	TP43.773x42.672x0.806	3387.75	7120.47	0.476	0.00	7120.47	0.000
L34	32.85 - 27.85 (34)	TP44.873x43.773x0.794	3629.58	7383.31	0.492	0.00	7383.31	0.000
L35	27.85 - 26.25 (35)	TP45.225x44.873x0.794	3707.52	7502.76	0.494	0.00	7502.76	0.000
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	3719.72	8522.58	0.436	0.00	8522.58	0.000
L37	26 - 21 (37)	TP46.38x45.28x0.881	3965.08	8722.08	0.455	0.00	8722.08	0.000
L38	21 - 16 (38)	TP47.48x46.38x0.881	4212.90	9153.00	0.460	0.00	9153.00	0.000
L39	16 - 11 (39)	TP48.58x47.48x0.856	4462.99	9336.83	0.478	0.00	9336.83	0.000
L40	11 - 6 (40)	TP49.68x48.58x0.856	4715.27	9776.17	0.482	0.00	9776.17	0.000
L41	6 - 1 (41)	TP50.78x49.68x0.831	4969.69	9941.92	0.500	0.00	9941.92	0.000
L42	1 - 0 (42)	TP51x50.78x0.831	5020.82	10030.42	0.501	0.00	10030.42	0.000

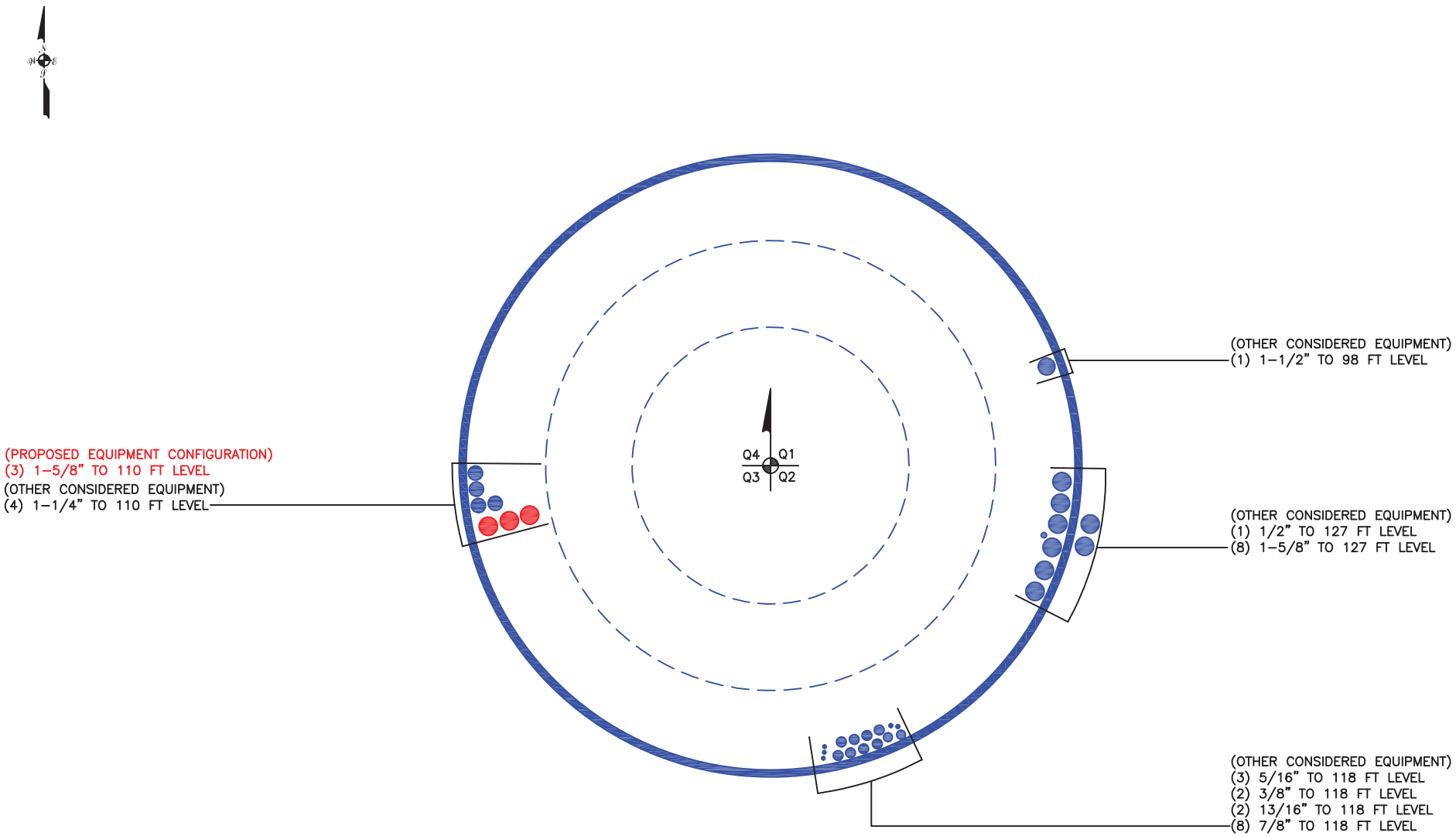
Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 125 (1)	TP24.687x23.588x0.25	8.50	345.24	0.025	0.14	742.13	0.000
L2	125 - 120 (2)	TP25.787x24.687x0.25	10.64	360.77	0.029	0.33	810.39	0.000
L3	120 - 115 (3)	TP26.886x25.787x0.25	16.74	376.30	0.044	0.32	881.67	0.000
L4	115 - 110 (4)	TP27.985x26.886x0.25	18.86	391.83	0.048	0.32	955.94	0.000
L5	110 - 105 (5)	TP29.084x27.985x0.25	27.41	407.36	0.067	0.32	1033.22	0.000
L6	105 - 100 (6)	TP30.184x29.084x0.25	31.06	422.89	0.073	0.32	1113.50	0.000
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	31.13	425.16	0.073	0.32	1125.47	0.000
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	31.15	803.24	0.039	0.32	2114.30	0.000
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	33.50	793.81	0.042	0.32	2120.73	0.000
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	33.52	1152.52	0.029	0.12	3063.10	0.000
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	33.57	1156.38	0.029	0.12	3083.64	0.000
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	33.60	778.04	0.043	0.12	2093.91	0.000
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	33.80	788.05	0.043	0.12	2148.12	0.000
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	33.82	789.45	0.043	0.12	2155.75	0.000
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	35.64	803.65	0.044	0.12	2234.00	0.000
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	35.66	805.04	0.044	0.12	2241.78	0.000
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	38.84	810.17	0.048	0.12	2335.28	0.000
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	38.85	811.09	0.048	0.12	2340.61	0.000
L19	86.08 - 85.83	TP33.299x33.244x0.431	38.88	801.00	0.049	0.12	2315.79	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	(19)							
L20	85.83 - 75.75	TP35.515x33.299x0.425	42.40	815.04	0.052	0.12	2432.97	0.000
	(20)							
L21	75.75 - 74.75	TP35.237x33.861x0.519	43.25	1017.77	0.042	0.16	3108.18	0.000
	(21)							
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	43.66	1017.22	0.043	0.16	3181.53	0.000
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	43.67	1388.78	0.031	0.16	4327.45	0.000
L24	70.75 - 65.75	TP37.219x36.118x0.681	44.29	1406.63	0.031	0.16	4520.82	0.000
	(24)							
L25	65.75 - 60.75	TP38.32x37.219x0.669	44.87	1422.90	0.032	0.16	4712.48	0.000
	(25)							
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	44.96	1429.14	0.031	0.16	4753.91	0.000
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	44.99	1352.30	0.033	0.16	4509.32	0.000
L28	59.75 - 54.75	TP39.641x38.54x0.631	45.56	1391.57	0.033	0.16	4775.06	0.000
	(28)							
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	46.06	1401.03	0.033	0.16	4937.93	0.000
L30	44 - 43 (30)	TP41.539x39.999x0.831	46.98	1912.26	0.025	0.16	6847.43	0.000
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	46.99	1913.81	0.025	0.16	6858.54	0.000
L32	42.85 - 37.85	TP42.672x41.572x0.819	47.57	1936.50	0.025	0.16	7129.40	0.000
	(32)							
L33	37.85 - 32.85	TP43.773x42.672x0.806	48.12	1957.63	0.025	0.16	7398.76	0.000
	(33)							
L34	32.85 - 27.85	TP44.873x43.773x0.794	48.64	1977.18	0.025	0.16	7666.16	0.000
	(34)							
L35	27.85 - 26.25	TP45.225x44.873x0.794	48.81	1992.97	0.024	0.16	7789.09	0.000
	(35)							
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	48.82	2272.50	0.021	0.16	8870.08	0.000
L37	26 - 21 (37)	TP46.38x45.28x0.881	49.34	2265.84	0.022	0.16	9068.33	0.000
L38	21 - 16 (38)	TP47.48x46.38x0.881	49.81	2320.62	0.021	0.16	9512.08	0.000
L39	16 - 11 (39)	TP48.58x47.48x0.856	50.25	2309.23	0.022	0.16	9693.92	0.000
L40	11 - 6 (40)	TP49.68x48.58x0.856	50.68	2362.46	0.021	0.16	10146.00	0.000
L41	6 - 1 (41)	TP50.78x49.68x0.831	51.11	2346.33	0.022	0.16	10308.92	0.000
L42	1 - 0 (42)	TP51x50.78x0.831	51.19	2356.67	0.022	0.16	10399.92	0.000

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED EQUIPMENT CONFIGURATION)
(3) 1–5/8" TO 110 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1–1/4" TO 110 FT LEVEL
Q4
Q1
Q3
Q2
(OTHER CONSIDERED EQUIPMENT)
(1) 1–1/2" TO 98 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 127 FT LEVEL
(8) 1–5/8" TO 127 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 5/16" TO 118 FT LEVEL
(2) 3/8" TO 118 FT LEVEL
(2) 13/16" TO 118 FT LEVEL
(8) 7/8" TO 118 FT LEVEL

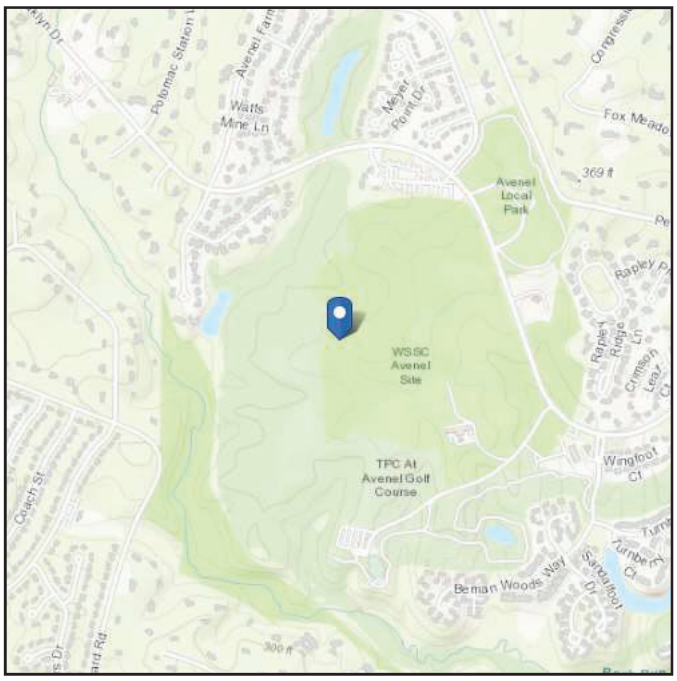
APPENDIX C

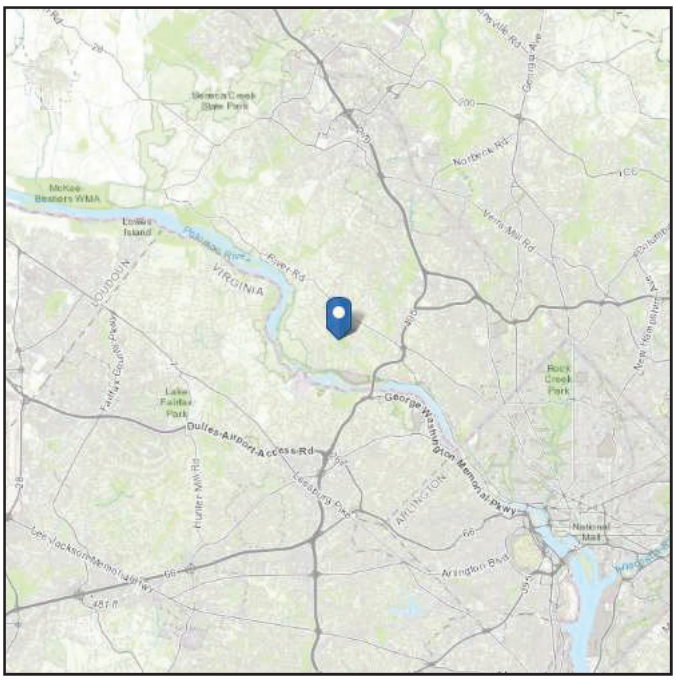
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Elevation:**	330.47 ft (NAVD 88)
Risk Category:	II	**Latitude:**	38.995158
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-77.203925





Wind

Results:

Wind Speed	112 Vmph	115 mph as per jurisdictional requirement
10-year MRI	75 Vmph	
25-year MRI	84 Vmph	
50-year MRI	89 Vmph	
100-year MRI	95 Vmph	

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Tue Apr 19 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

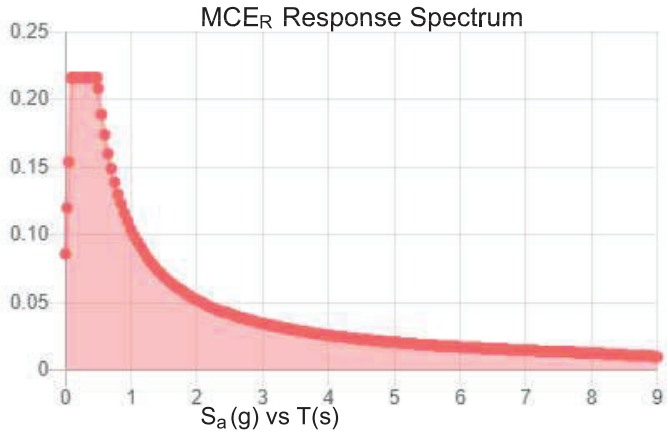
Seismic

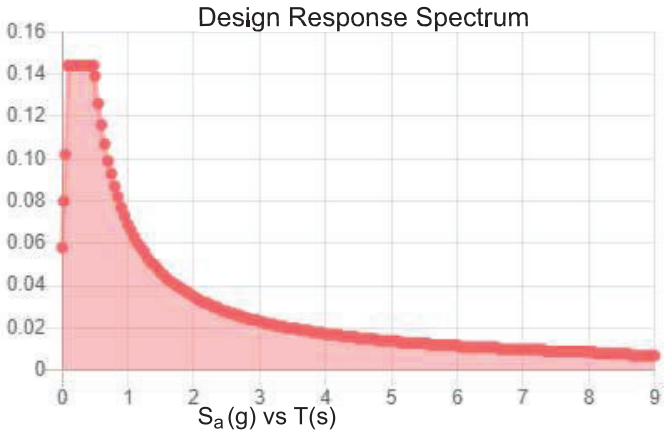
Site Soil Class: D - Default (see Section 11.4.3)

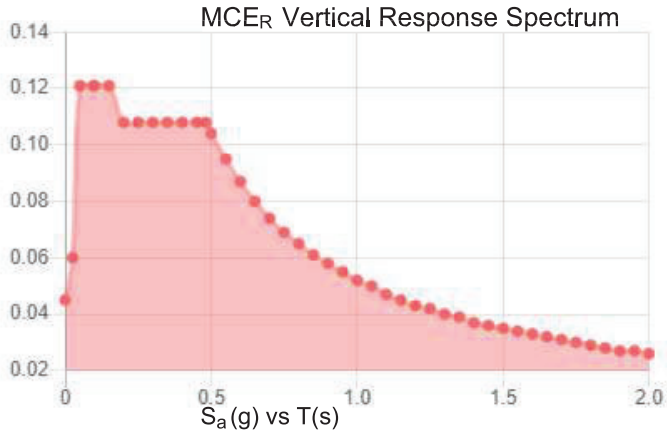
Results:

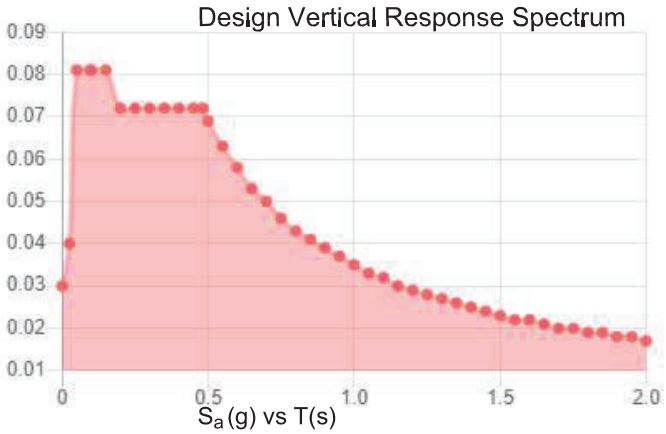
S_S :	0.135	S_{D1} :	0.069
S_1 :	0.043	T_L :	8
F_a :	1.6	PGA :	0.07
F_v :	2.4	PGA_M :	0.112
S_{MS} :	0.216	F_{PGA} :	1.6
S_{M1} :	0.104	I_e :	1
S_{DS} :	0.144	C_v :	0.7

Seismic Design Category B









Data Accessed: **Tue Apr 19 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	40 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Apr 19 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

CCIpole

per TIA-222- H

Site BU: 806957

Work Order: 2097400

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	130	54.25	5.25	12	23.588	35.515	0.25	Auto	A572-65
2	81	37	6	12	33.86	42.008	0.34375	Auto	A572-65
3	50	50	0	12	40.00	51	0.40625	Auto	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	60	channel	MP3-08 (1.1875in)W	3	x				x				x			
2	60	86.08	channel	MP3-05 (1.1875in)	3	x				x				x			
3	0	26.25	plate	MS-850 (1.1875")W	3			x				x				x	
4	26.25	43.1	plate	MS-600 (1.1875")	3			x				x				x	
5	60	71	plate	MS-600 (1.1875")	3			x				x				x	
6	86.08	91.5	plate	MS-600 (1.1875")	3			x				x				x	
7	91.5	94.29	plate	MS-600 (1.1875")	3		x				x				x		
8	94.29	97.04	plate	MS-600 (1.1875")	3				x				x				x
9	96.33	99.27	plate	Sabre PL 5"x1.25"	3			x				x				x	
10																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	7.93	2.8	10.32	0.95	Welded	n/a	PC 8.8 - M20 (100)	47.000	24.000	9.370	1.1875	A572-65
2	5.33	2.09	5.65	0.79	PC 8.8 - M20 (100)	29	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65
3	8.5	1.25	10.625	0.625	Welded	n/a	PC 8.8 - M20 (100)	45.000	17.250	9.063	1.1875	A572-65
4	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
5	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
6	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
7	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
8	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
9	5	1.25	6.25	0.625	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	24.000	4.688	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
MP3-08	Top	16	N	3	2	-	-	-	-	-	-	-	-	-
(1.1875in)W	Bottom	-	-	-	-	70	None	-	-	-	-	60	0.375	-
Sabre PL 5"x1.25"	Top	8	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	8	N	3	3	-	-	-	-	-	-	-	-	-
MS-850	Top	15	N	3	3	-	-	-	-	-	-	-	-	-
(1.1875")W	Bottom	-	-	-	-	80	CJP Groove	8.5	1.25	45	0.25	-	-	-

TNX Geometry Input

Increment (ft): 5 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	130 - 125	5		12	23.588	24.687	0.25	A572-65	1.000
2	125 - 120	5		12	24.687	25.787	0.25	A572-65	1.000
3	120 - 115	5		12	25.787	26.886	0.25	A572-65	1.000
4	115 - 110	5		12	26.886	27.985	0.25	A572-65	1.000
5	110 - 105	5		12	27.985	29.084	0.25	A572-65	1.000
6	105 - 100	5		12	29.084	30.184	0.25	A572-65	1.000
7	100 - 99.27	0.73		12	30.184	30.344	0.25	A572-65	1.000
8	99.27 - 99.02	0.25		12	30.344	30.399	0.475	A572-65	0.941
9	99.02 - 97.04	1.98		12	30.399	30.834	0.4625	A572-65	0.959
10	97.04 - 96.79	0.25		12	30.834	30.889	0.675	A572-65	0.936
11	96.79 - 96.33	0.46		12	30.889	30.990	0.675	A572-65	0.934
12	96.33 - 96.08	0.25		12	30.990	31.045	0.45	A572-65	0.966
13	96.08 - 94.29	1.79		12	31.045	31.439	0.45	A572-65	0.961
14	94.29 - 94.04	0.25		12	31.439	31.494	0.45	A572-65	0.960
15	94.04 - 91.5	2.54		12	31.494	32.052	0.45	A572-65	0.953
16	91.5 - 91.25	0.25		12	32.052	32.107	0.45	A572-65	0.952
17	91.25 - 86.25	5		12	32.107	33.207	0.4375	A572-65	0.965
18	86.25 - 86.08	0.17		12	33.207	33.244	0.4375	A572-65	0.965
19	86.08 - 85.83	0.25		12	33.244	33.299	0.43125	A572-65	0.955
20	85.83 - 81	10.08	5.25	12	33.299	35.515	0.425	A572-65	0.957
21	81 - 74.75	6.25		12	33.861	35.237	0.51875	A572-65	0.959
22	74.75 - 71	3.75		12	35.237	36.063	0.50625	A572-65	0.975
23	71 - 70.75	0.25		12	36.063	36.118	0.69375	A572-65	0.943
24	70.75 - 65.75	5		12	36.118	37.219	0.68125	A572-65	0.946
25	65.75 - 60.75	5		12	37.219	38.320	0.66875	A572-65	0.950
26	60.75 - 60	0.75		12	38.320	38.485	0.66875	A572-65	0.948
27	60 - 59.75	0.25		12	38.485	38.540	0.63125	A572-65	0.951
28	59.75 - 54.75	5		12	38.540	39.641	0.63125	A572-65	0.940
29	54.75 - 50	10.75	6	12	39.641	42.008	0.61875	A572-65	0.948
30	50 - 43	7		12	39.999	41.539	0.83125	A572-65	0.944
31	43 - 42.85	0.15		12	41.539	41.572	0.83125	A572-65	0.943
32	42.85 - 37.85	5		12	41.572	42.672	0.81875	A572-65	0.945
33	37.85 - 32.85	5		12	42.672	43.773	0.80625	A572-65	0.948
34	32.85 - 27.85	5		12	43.773	44.873	0.79375	A572-65	0.952
35	27.85 - 26.25	1.6		12	44.873	45.225	0.79375	A572-65	0.948
36	26.25 - 26	0.25		12	45.225	45.280	0.90625	A572-65	0.939
37	26 - 21	5		12	45.280	46.380	0.88125	A572-65	0.953
38	21 - 16	5		12	46.380	47.480	0.88125	A572-65	0.942
39	16 - 11	5		12	47.480	48.580	0.85625	A572-65	0.957
40	11 - 6	5		12	48.580	49.680	0.85625	A572-65	0.946
41	6 - 1	5		12	49.680	50.780	0.83125	A572-65	0.964
42	1 - 0	1		12	50.780	51.000	0.83125	A572-65	0.961

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	130 - 125	4.79	22.52	8.50
2	125 - 120	5.45	72.82	10.64
3	120 - 115	9.46	144.11	16.74
4	115 - 110	10.22	234.73	18.86
5	110 - 105	16.85	367.07	27.41
6	105 - 100	18.07	512.62	31.06
7	100 - 99.27	18.18	535.32	31.13
8	99.27 - 99.02	18.24	543.10	31.15
9	99.02 - 97.04	21.09	607.04	33.50
10	97.04 - 96.79	21.18	615.41	33.52
11	96.79 - 96.33	21.31	630.85	33.57
12	96.33 - 96.08	21.37	639.24	33.60
13	96.08 - 94.29	21.74	699.56	33.80
14	94.29 - 94.04	21.81	708.01	33.82
15	94.04 - 91.5	22.64	797.04	35.64
16	91.5 - 91.25	22.71	805.95	35.66
17	91.25 - 86.25	25.26	994.44	38.84
18	86.25 - 86.08	25.31	1001.04	38.85
19	86.08 - 85.83	25.37	1010.76	38.88
20	85.83 - 81	27.06	1206.70	42.40
21	81 - 74.75	29.70	1474.10	43.25
22	74.75 - 71	30.78	1637.01	43.66
23	71 - 70.75	30.89	1647.92	43.67
24	70.75 - 65.75	32.68	1867.81	44.29
25	65.75 - 60.75	34.51	2090.67	44.87
26	60.75 - 60	34.80	2124.35	44.96
27	60 - 59.75	34.89	2135.60	44.99
28	59.75 - 54.75	36.68	2361.94	45.56
29	54.75 - 50	38.42	2579.50	46.06
30	50 - 43	43.52	2905.15	46.98
31	43 - 42.85	43.60	2912.20	46.99
32	42.85 - 37.85	45.98	3148.59	47.57
33	37.85 - 32.85	48.40	3387.75	48.12
34	32.85 - 27.85	50.86	3629.58	48.64
35	27.85 - 26.25	51.65	3707.52	48.81
36	26.25 - 26	51.81	3719.72	48.82
37	26 - 21	54.57	3965.08	49.34
38	21 - 16	57.37	4212.90	49.81
39	16 - 11	60.21	4462.99	50.25
40	11 - 6	63.08	4715.27	50.68
41	6 - 1	65.98	4969.69	51.11
42	1 - 0	66.57	5020.83	51.19

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP24.687x23.588x0.25	Pole	3.6%	Pass
125 - 120	Pole	TP25.787x24.687x0.25	Pole	10.0%	Pass
120 - 115	Pole	TP26.886x25.787x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP27.985x26.886x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP29.084x27.985x0.25	Pole	41.0%	Pass
105 - 100	Pole	TP30.184x29.084x0.25	Pole	53.7%	Pass
100 - 99.27	Pole	TP30.344x30.184x0.25	Pole	55.6%	Pass
99.27 - 99.02	Pole + Reinf.	TP30.399x30.344x0.475	Reinf. 9 Compression	43.2%	Pass
99.02 - 97.04	Pole + Reinf.	TP30.834x30.399x0.4625	Reinf. 9 Compression	47.3%	Pass
97.04 - 96.79	Pole + Reinf.	TP30.889x30.834x0.675	Reinf. 9 Compression	33.5%	Pass
96.79 - 96.33	Pole + Reinf.	TP30.99x30.889x0.675	Reinf. 9 Compression	34.1%	Pass
96.33 - 96.08	Pole + Reinf.	TP31.045x30.99x0.45	Reinf. 8 Tension Rupture	47.1%	Pass
96.08 - 94.29	Pole + Reinf.	TP31.439x31.045x0.45	Reinf. 8 Tension Rupture	50.5%	Pass
94.29 - 94.04	Pole + Reinf.	TP31.494x31.439x0.45	Reinf. 7 Tension Rupture	51.0%	Pass
94.04 - 91.5	Pole + Reinf.	TP32.052x31.494x0.45	Reinf. 7 Tension Rupture	55.7%	Pass
91.5 - 91.25	Pole + Reinf.	TP32.107x32.052x0.45	Reinf. 6 Tension Rupture	56.2%	Pass
91.25 - 86.25	Pole + Reinf.	TP33.207x32.107x0.4375	Reinf. 6 Tension Rupture	65.7%	Pass
86.25 - 86.08	Pole + Reinf.	TP33.244x33.207x0.4375	Reinf. 6 Tension Rupture	66.0%	Pass
86.08 - 85.83	Pole + Reinf.	TP33.299x33.244x0.4313	Reinf. 2 Tension Rupture	62.8%	Pass
85.83 - 81	Pole + Reinf.	TP35.515x33.299x0.425	Reinf. 2 Tension Rupture	71.2%	Pass
81 - 74.75	Pole + Reinf.	TP35.237x33.861x0.5188	Reinf. 2 Tension Rupture	68.3%	Pass
74.75 - 71	Pole + Reinf.	TP36.063x35.237x0.5063	Reinf. 2 Tension Rupture	72.9%	Pass
71 - 70.75	Pole + Reinf.	TP36.118x36.063x0.6938	Reinf. 5 Tension Rupture	59.1%	Pass
70.75 - 65.75	Pole + Reinf.	TP37.219x36.118x0.6813	Reinf. 5 Tension Rupture	63.9%	Pass
65.75 - 60.75	Pole + Reinf.	TP38.32x37.219x0.6688	Reinf. 5 Tension Rupture	68.4%	Pass
60.75 - 60	Pole + Reinf.	TP38.485x38.32x0.6688	Reinf. 5 Tension Rupture	69.0%	Pass
60 - 59.75	Pole + Reinf.	TP38.54x38.485x0.6313	Reinf. 1 Tension Rupture	65.8%	Pass
59.75 - 54.75	Pole + Reinf.	TP39.641x38.54x0.6313	Reinf. 1 Tension Rupture	69.6%	Pass
54.75 - 50	Pole + Reinf.	TP42.008x39.641x0.6188	Reinf. 1 Tension Rupture	72.9%	Pass
50 - 43	Pole + Reinf.	TP41.539x39.999x0.8313	Reinf. 4 Tension Rupture	65.2%	Pass
43 - 42.85	Pole + Reinf.	TP41.572x41.539x0.8313	Reinf. 4 Tension Rupture	65.3%	Pass
42.85 - 37.85	Pole + Reinf.	TP42.672x41.572x0.8188	Reinf. 4 Tension Rupture	67.8%	Pass
37.85 - 32.85	Pole + Reinf.	TP43.773x42.672x0.8063	Reinf. 4 Tension Rupture	70.2%	Pass
32.85 - 27.85	Pole + Reinf.	TP44.873x43.773x0.7938	Reinf. 4 Tension Rupture	72.5%	Pass
27.85 - 26.25	Pole + Reinf.	TP45.225x44.873x0.7938	Reinf. 4 Tension Rupture	73.1%	Pass
26.25 - 26	Pole + Reinf.	TP45.28x45.225x0.9063	Reinf. 3 Bolt Shear	62.7%	Pass
26 - 21	Pole + Reinf.	TP46.38x45.28x0.8813	Reinf. 3 Compression	62.3%	Pass
21 - 16	Pole + Reinf.	TP47.48x46.38x0.8813	Reinf. 3 Compression	64.0%	Pass
16 - 11	Pole + Reinf.	TP48.58x47.48x0.8563	Reinf. 3 Compression	65.5%	Pass
11 - 6	Pole + Reinf.	TP49.68x48.58x0.8563	Reinf. 3 Compression	67.0%	Pass
6 - 1	Pole + Reinf.	TP50.78x49.68x0.8313	Reinf. 3 Compression	68.3%	Pass
1 - 0	Pole + Reinf.	TP51x50.78x0.8313	Reinf. 3 Compression	68.6%	Pass
				Summary	
			Pole	59.6%	Pass
			Reinforcement	73.1%	Pass
			Overall	73.1%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity* (100% Max. Allowable)									
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9
130 - 125	1502	n/a	1502	19.64	n/a	19.64	3.6%									
125 - 120	1713	n/a	1713	20.53	n/a	20.53	10.0%									
120 - 115	1944	n/a	1944	21.41	n/a	21.41	18.4%									
115 - 110	2195	n/a	2195	22.29	n/a	22.29	27.7%									
110 - 105	2467	n/a	2467	23.18	n/a	23.18	41.0%									
105 - 100	2760	n/a	2760	24.06	n/a	24.06	53.7%									
100 - 99.27	2804	n/a	2804	24.19	n/a	24.19	55.6%									
99.27 - 99.02	2820	2368	5188	24.24	18.75	42.99	29.5%									43.2%
99.02 - 97.04	2943	2433	5377	24.59	18.75	43.34	32.5%									47.3%
97.04 - 96.79	2959	4758	7717	24.63	36.75	61.38	23.0%								31.3%	33.5%
96.79 - 96.33	2989	4787	7776	24.71	36.75	61.46	23.5%								31.9%	34.1%
96.33 - 96.08	3005	2338	5343	24.75	18.00	42.75	34.7%								47.1%	
96.08 - 94.29	3122	2395	5517	25.07	18.00	43.07	37.5%								50.5%	
94.29 - 94.04	3138	2403	5541	25.12	18.00	43.12	37.8%							51.0%		
94.04 - 91.5	3309	2486	5795	25.56	18.00	43.56	41.8%							55.7%		
91.5 - 91.25	3327	2494	5820	25.61	18.00	43.61	42.2%						56.2%			
91.25 - 86.25	3683	2660	6343	26.49	18.00	44.49	50.2%						65.7%			
86.25 - 86.08	3695	2666	6362	26.52	18.00	44.52	50.5%						66.0%			
86.08 - 85.83	3714	2588	6302	26.57	16.95	43.52	51.6%		62.8%							
85.83 - 81	4084	2748	6831	27.42	16.95	44.37	59.6%		71.2%							
81 - 74.75	6010	2883	8893	38.57	16.95	55.52	49.7%		68.3%							
74.75 - 71	6447	3013	9460	39.48	16.95	56.43	53.5%		72.9%							
71 - 70.75	6477	6149	12626	39.54	34.95	74.49	40.4%		55.1%			59.1%				
70.75 - 65.75	7094	6515	13608	40.76	34.95	75.71	44.3%		59.6%			63.9%				
65.75 - 60.75	7748	6890	14638	41.97	34.95	76.92	48.1%		63.7%			68.4%				
60.75 - 60	7850	6947	14797	42.16	34.95	77.11	48.6%		64.3%			69.0%				
60 - 59.75	7884	6372	14255	42.22	30.96	73.18	50.8%	65.8%								
59.75 - 54.75	8585	6721	15306	43.43	30.96	74.39	54.5%	69.6%								
54.75 - 50	9289	7061	16351	44.59	30.96	75.55	57.8%	72.9%								
50 - 43	11636	11445	23081	53.73	48.96	102.69	44.3%	59.4%			65.2%					
43 - 42.85	11664	11462	23126	53.77	48.96	102.73	44.3%	59.4%			65.3%					
42.85 - 37.85	12624	12050	24675	55.21	48.96	104.17	46.6%	61.7%			67.8%					
37.85 - 32.85	13636	12654	26289	56.65	48.96	105.61	48.8%	63.9%			70.2%					
32.85 - 27.85	14700	13271	27971	58.08	48.96	107.04	50.9%	65.9%			72.5%					
27.85 - 26.25	15052	13472	28524	58.54	48.96	107.50	51.5%	66.5%			73.1%					
26.25 - 26	15107	17381	32489	58.62	62.84	121.45	45.5%	58.6%		62.7%						
26 - 21	16246	18200	34446	60.05	62.84	122.89	47.3%	60.3%		62.3%						
21 - 16	17440	19038	36479	61.49	62.84	124.32	49.2%	61.9%		64.0%						
16 - 11	18692	19896	38587	62.93	62.84	125.76	50.9%	63.4%		65.5%						
11 - 6	20002	20772	40773	64.36	62.84	127.20	52.7%	64.8%		67.0%						
6 - 1	21371	21667	43038	65.80	62.84	128.64	54.4%	66.1%		68.3%						
1 - 0	21652	21848	43501	66.09	62.84	128.92	54.7%	66.3%		68.6%						

Note: Section capacity checked using 5 degree increments.

**Rating per TIA-222-H Section 15.5.*

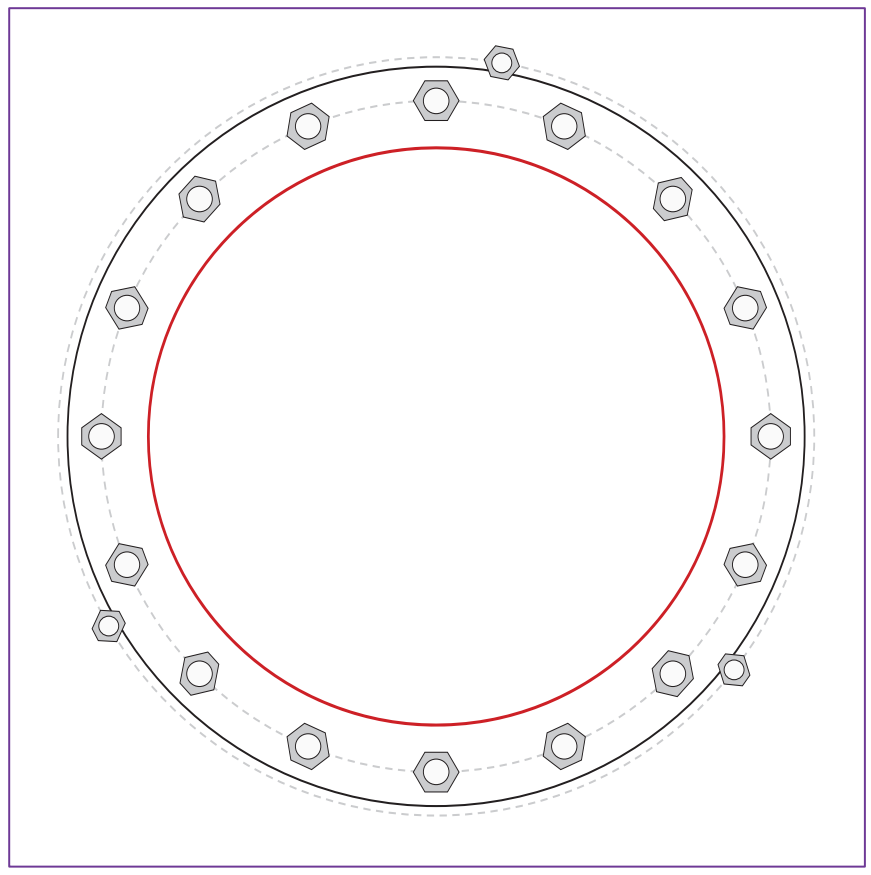
Monopole Base Plate Connection

Site Info	
BU #	806957
Site Name	Williamsburg Gardens
Order #	611571 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	5020.83
Axial Force (kips)	66.57
Shear Force (kips)	51.19

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 59.3" BC

GROUP 2: (3) 1-3/4" ø bolts (F1554-105 N; Fy=105 ksi, Fu=125 ksi) on 67" BC

pos. (deg): 80, 210, 322

Base Plate Data

65.3" OD x 2.75" Plate (S-128; Fy=60 ksi, Fu=80 ksi)

Stiffener Data

N/A

Pole Data

51" x 0.40625" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:

Pu_t = 222.38	ϕPn_t = 243.75	**Stress Rating**
Vu = 3.2	ϕVn = 149.1	**86.9%**
Mu = n/a	ϕMn = n/a	**Pass**

GROUP 2:

Pu_t = 147.93	ϕPn_t = 178.13	**Stress Rating**
Vu = 0	ϕVn = 112.75	**79.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	30.83	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**54.4%**	**Pass**

CCIplate

Elevation (ft)	0	*(Base)*

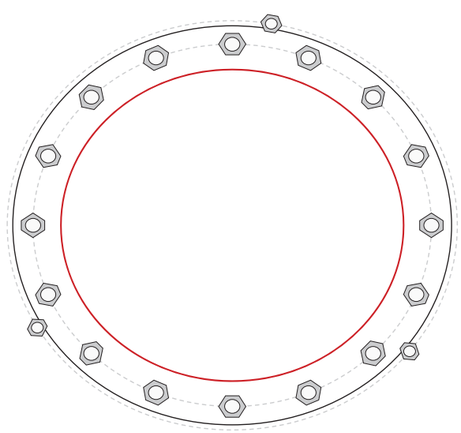
note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	Yes	No	
2	No	No	No	Yes	No	

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η:	l_{ar} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	0	2.25	A615-75	59.3	0.5	0.625	N-Included		No
2	1	22.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
3	1	45	2.25	A615-75	59.3	0.5	0.625	N-Included		No
4	1	67.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
5	1	90	2.25	A615-75	59.3	0.5	0.625	N-Included		No
6	1	112.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
7	1	135	2.25	A615-75	59.3	0.5	0.625	N-Included		No
8	1	157.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
9	1	180	2.25	A615-75	59.3	0.5	0.625	N-Included		No
10	1	202.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
11	1	225	2.25	A615-75	59.3	0.5	0.625	N-Included		No
12	1	247.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
13	1	270	2.25	A615-75	59.3	0.5	0.625	N-Included		No
14	1	292.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
15	1	315	2.25	A615-75	59.3	0.5	0.625	N-Included		No
16	1	337.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
17	2	80	1.75	F1554-105	67	0.5	0.625	N-Included		No
18	2	210	1.75	F1554-105	67	0.5	0.625	N-Included		No
19	2	322	1.75	F1554-105	67	0.5	0.625	N-Included		No

Plot Graphic



Drilled Pier Foundation

BU # :	806957
Site Name:	Williamsburg Gardens
Order Number:	611571 Rev. 0
TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	5020.82	
Axial Force (kips)	66.58	
Shear Force (kips)	51.18	

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	24	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 24' below grade		
Pier Diameter	7	ft
Rebar Quantity	28	
Rebar Size	10	
Clear Cover to Ties	3	in
Tie Size	5	
Tie Spacing	24	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.46	-
Soil Safety Factor	1.86	-
Max Moment (kip-ft)	5362.77	-
Rating*	*68.0%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	549.35	-
End Bearing (kips)	662.99	-
Weight of Concrete (kips)	169.72	-
Total Capacity (kips)	1212.35	-
Axial (kips)	236.30	-
Rating*	*18.6%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.35	-
Critical Moment (kip-ft)	5362.62	-
Critical Moment Capacity	5854.43	-
Rating*	*87.2%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	21.24	-
Critical Shear (kip)	390.19	-
Critical Shear Capacity	851.13	-
Rating*	*43.7%*	-

Tie Spacing Requirements Not Met
Shear-Friction Methodology is Applied

Structural Foundation Rating*	**87.2%**
Soil Interaction Rating*	**68.0%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☑
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

Groundwater Depth	N/A	# of Layers	3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	15	11.5	120	150	0	32	1.209	1.209				22	Cohesionless
3	15	24	9	130	150	0	36	2.156	2.156			20	25	Cohesionless

Radio Frequency Emissions Analysis Report

T-Mobile Wireless Monopole Facility

August 12, 2022

Analysis Format: Theoretical Calculations

Sign Count	
	1
	0
	1
	0
	1

Statement of Compliance

T-Mobile will be compliant with FCC Regulations once the mitigation measures recommended in this report are implemented.

Centerline PN: 950007-204
7WAN098A
CROWN - POTOMAC
10010 OAKLYN DR, POTOMAC, MD 20854

Contents

Overview

Centerline Communications, LLC ("Centerline") has been contracted to provide a Radio Frequency (RF) Analysis for the following T-Mobile wireless monopole facility to determine whether the facility is in compliance with federal standards and regulations regarding RF emissions. This analysis includes theoretical emissions calculations for all existing equipment for T-Mobile .

The facility is located on a Monopole in POTOMAC, Maryland.

Analysis Site Data

Site ID:	7WAN098A
Site Name:	CROWN - POTOMAC
Site Address:	10010 OAKLYN DR, POTOMAC, MD 20854
Site Latitude:	38.994970
Site Longitude:	-77.20390
Facility Type:	Monopole

Compliance Summary

Status:	T-Mobile will be compliant with FCC Regulations Upon Installation of Signage
Site Modeled Composite MPE% (General Public Limit):	0.65 %
T-Mobile Max Modeled MPE% (General Public Limit):	0.29 %
Lock or Control Measures if Present:	Unlocked Gate

In addition to the T-Mobile antennas and radio equipment there are antennas and radio equipment for AT&T, Sprint, Dish & Verizon which have been included in this analysis as part of the overall site compliance determination.

*To be conservative, all sites are considered uncontrolled for modeling purposes unless confirmed otherwise by a site visit.

FCC Guidelines

All power density values used in this report were analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General Population/Uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 600, 700, and 800 MHz Bands is approximately 400 $\mu W/cm^2$, 467 $\mu W/cm^2$, and 567 $\mu W/cm^2$ respectively, and the general population exposure limit for the 1900 MHz PCS, 2100 MHz AWS, 2500 MHz, 3500 MHz CBRS, 5000 MHz LAA, 28GHz, and 39GHz bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density. Reference the Site Antenna Data Table for list of frequencies in operation at this site.

Occupational/Controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure, have been properly trained in RF safety and can exercise control over their exposure. Occupational/Controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure, have been trained in RF safety and can exercise control over his or her exposure by leaving the area or by some other appropriate means. The Occupational/Controlled exposure limits all utilized frequency bands is five (5) times the FCC's General Public / Uncontrolled exposure limit.

Additional details can be found in FCC OET 65.

Calculation Methodology & Data

Centerline has performed theoretical calculations on all transmission equipment located on this facility. All calculations have been performed using the RoofMaster® software from Waterford Consultants LLC. This software performs calculations using a cylindrical model for very conservative power density predictions within the near-field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations the power decreases inversely with the square of the distance. This modeling technique is accurate with low antenna centerlines, such as rooftops, where persons can get close to the antennas and pass through fields in close proximity.

The below calculation in Figure 1 shows the theoretical distribution of power over an imaginary cylinder with equal power distribution in all directions.

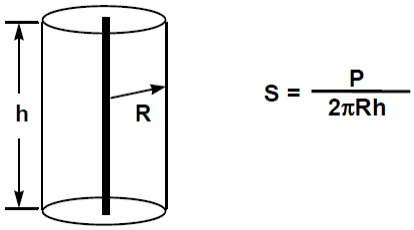


Figure 1: Distribution of power over an imaginary cylinder in all directions

This model can be modified for directional antennas to show directionality of power distribution. This formula will tend to be conservative as it assumes that all power is focused between the 3 dB power roll off points as shown in Figure 2.

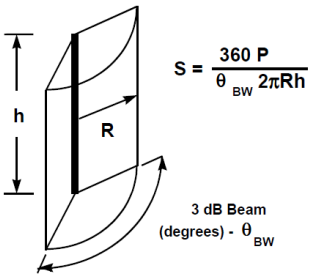


Figure 2: Distribution of power over an imaginary cylinder in all directions inside the half power roll off points (HBW)

The **proposed antenna configuration** for T-Mobile and any other known wireless carriers at this facility are shown below in **Table 1 – Site Antenna Data Table**.

All calculations for this facility were performed assuming that all radios were running at full power and were uncombined in their RF paths with the configuration shown in table 1. FCC OET Bulletin 65 – Edition 97-01 recommends that modeling of this nature should be done as described prior to yield a worst-case scenario. Due to the dynamic nature of many deployed systems the "real world" values will most likely be less than those shown in this report due to worst-case values being shown in all instances.

For all "Other" systems on this facility, exact equipment was used if available. In instances where "Other" system equipment was not available, standard radio configurations for these systems were utilized based upon prior experience with these systems on facilities in this area.

Site Antenna Data Table

Sector	Operator	Frequency Band	TX Power Per Channel	Tx #	ERP	Antenna Make	Antenna Model	Gain (dBd)	Az (°)	Antenna Centerline Height (ft)
A1	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	35	110
A1	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	35	110
A1	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	35	110
A2	T-Mobile	L2500	80	1	13743.2	ERICSSON	AIR6449	22.35	35	110
A2	T-Mobile	N2500	80	1	13743.2	ERICSSON	AIR6449	22.35	35	110
A3	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	35	110
B4	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	115	110
B4	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	115	110
B4	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	115	110
B5	T-Mobile	L2500	80	1	13743.2	ERICSSON	AIR6449	22.35	115	110
B5	T-Mobile	N2500	80	1	13743.2	ERICSSON	AIR6449	22.35	115	110
B6	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	115	110
C7	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	255	110
C7	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	255	110
C7	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	255	110
C8	T-Mobile	L2500	80	1	13743.2	ERICSSON	AIR6449	22.35	255	110
C8	T-Mobile	N2500	80	1	13743.2	ERICSSON	AIR6449	22.35	255	110
C9	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	255	110
10	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	35	118
11	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	35	118
12	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	35	118
12	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	35	118
13	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	115	118
14	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	115	118
15	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	115	118
15	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	115	118
16	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	255	118

17	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	255	118
18	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	255	118
18	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	255	118
19	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860	14.72	35	127
20	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860	14.9	35	127
21	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000-	15.4	35	127
22	Verizon	3700	50	4	43154.8	SAMSUNG	SON_MT6407 TB 03.24.21 3700 VZW	23.34	35	127
23	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860	14.72	115	127
24	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860	14.9	115	127
25	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000	15.4	115	127
26	Verizon	3700	50	4	43154.8	SAMSUNG	SON_MT6407 TB	23.34	115	127
27	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860	14.72	255	127
28	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860	14.9	255	127
29	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000-	15.4	255	127
30	Verizon	3700	50	4	43154.8	SAMSUNG	SON_MT6407 TB	23.34	255	127
31	Dish	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	35	98
31	Dish	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	35	98
31	Dish	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	35	98
32	Dish	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	115	98
32	Dish	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	115	98
32	Dish	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	115	98
33	Dish	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	255	98
33	Dish	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	255	98
33	Dish	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	255	98
34	Sprint	850	50	2	2162.72	RFS	APXVSPP18-C-A20	13.35	35	110
34	Sprint	1900	20	8	6153.47	RFS	APXVSPP18-C-A20-	15.85	35	110
35	Sprint	850	50	2	2162.72	RFS	APXVSPP18-C-A20	13.35	35	110
35	Sprint	1900	20	8	6153.47	RFS	APXVSPP18-C-A20-	15.85	35	110
36	Sprint	850	50	2	2162.72	RFS	APXVSPP18-C-A20	13.35	35	110
36	Sprint	1900	20	8	6153.47	RFS	APXVSPP18-C-A20-	15.85	35	110

Table 1: Total Site Antenna data table

Results

All calculations performed based upon the data listed for this facility have produced results that are within allowable limits for General Population for exposure to RF emissions as specified by federal standards.

T-Mobile's RF Exposure: Responsibilities, Procedures & Guidelines document states that microwave dishes are compliant if they are mounted 20 feet or greater above any accessible walking or working surface.

Maximum Predicted MPE Level on Site:	**% of MPE Limit:**
Accessible **General Population** MPE Limits:	**0.65%**
Accessible **Occupational** MPE Limits:	**0.13%**

Ground Level Assessment:	**% of MPE Limit:**
Ground Level **General Population** MPE Limits:	**0.29%**
Ground Level **Occupational** MPE Limits:	**0.06%**

Sector A: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

Sector B: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

Sector C: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

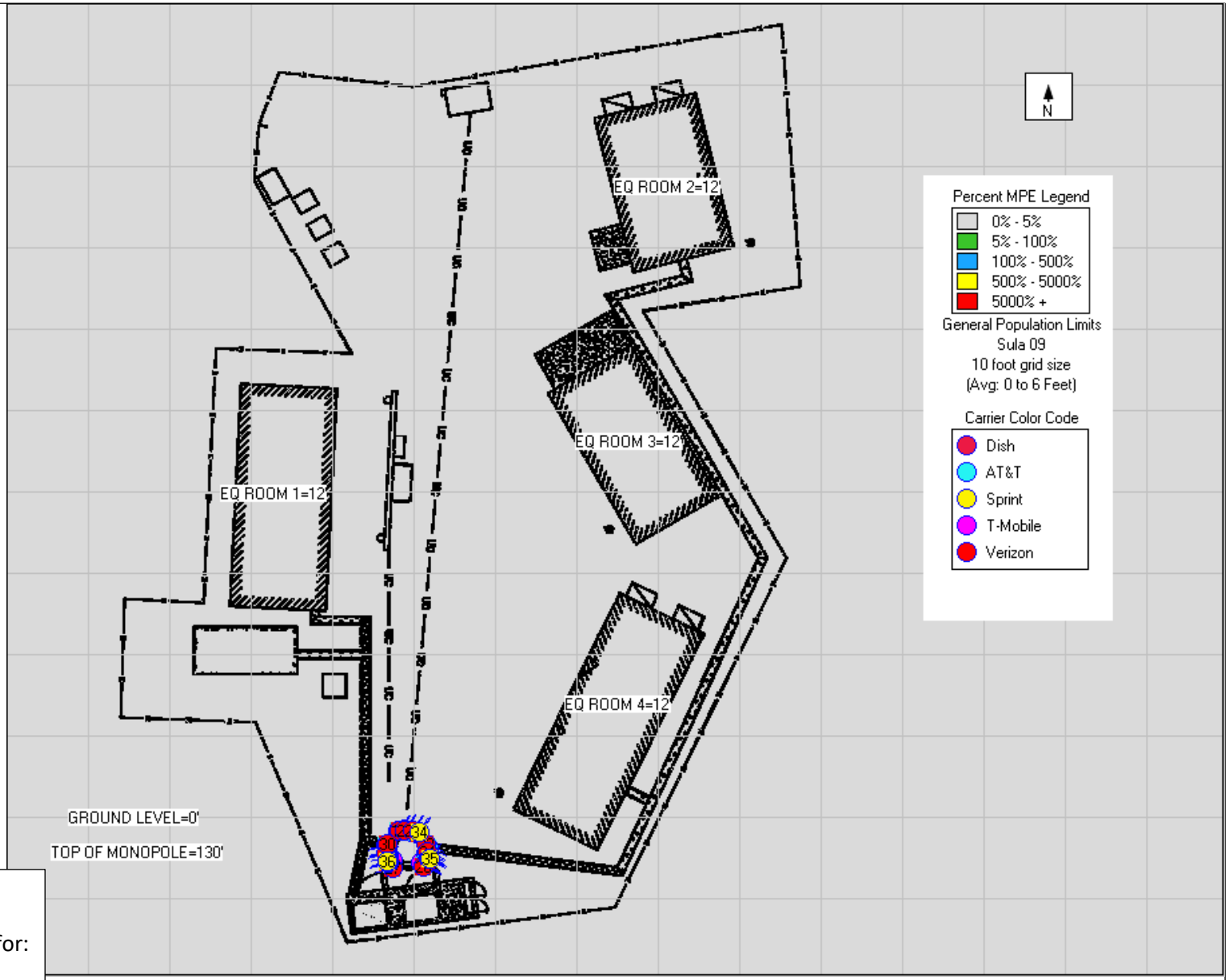
**Distance from Antenna is the distance in feet that the MPE limits are exceeded from the front face of the antenna, outward across an accessible area.*

APPENDIX A: Emissions Thresholds for Walking Surfaces and Signage

Ground (0ft.)

Emissions Thresholds for Walking Surfaces for:

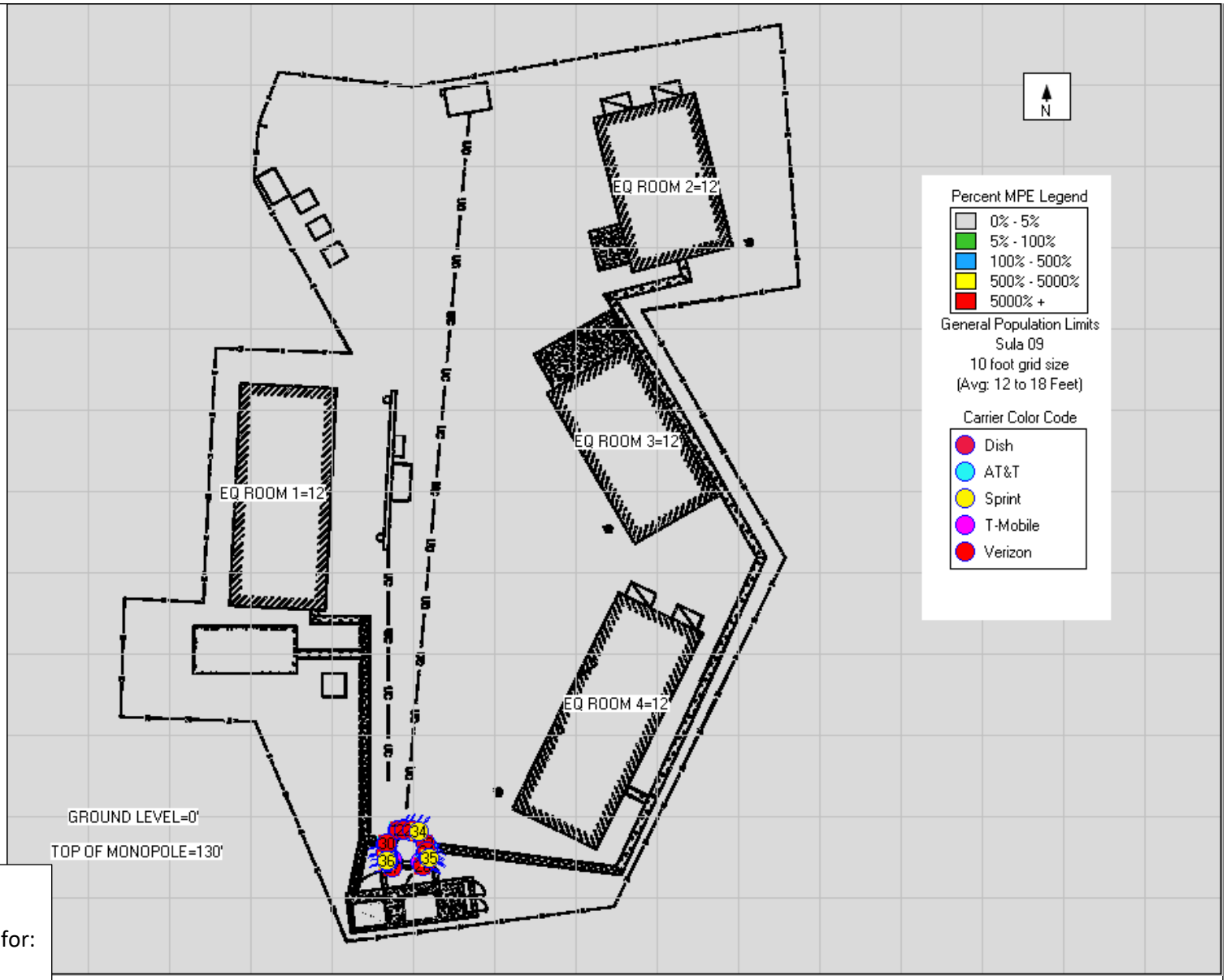
7WAN098A / CROWN - POTOMAC



Monopole Base (0ft.)

Emissions Thresholds for Walking Surfaces for:

7WAN098A / CROWN - POTOMAC



EQ Rooms (12ft.)

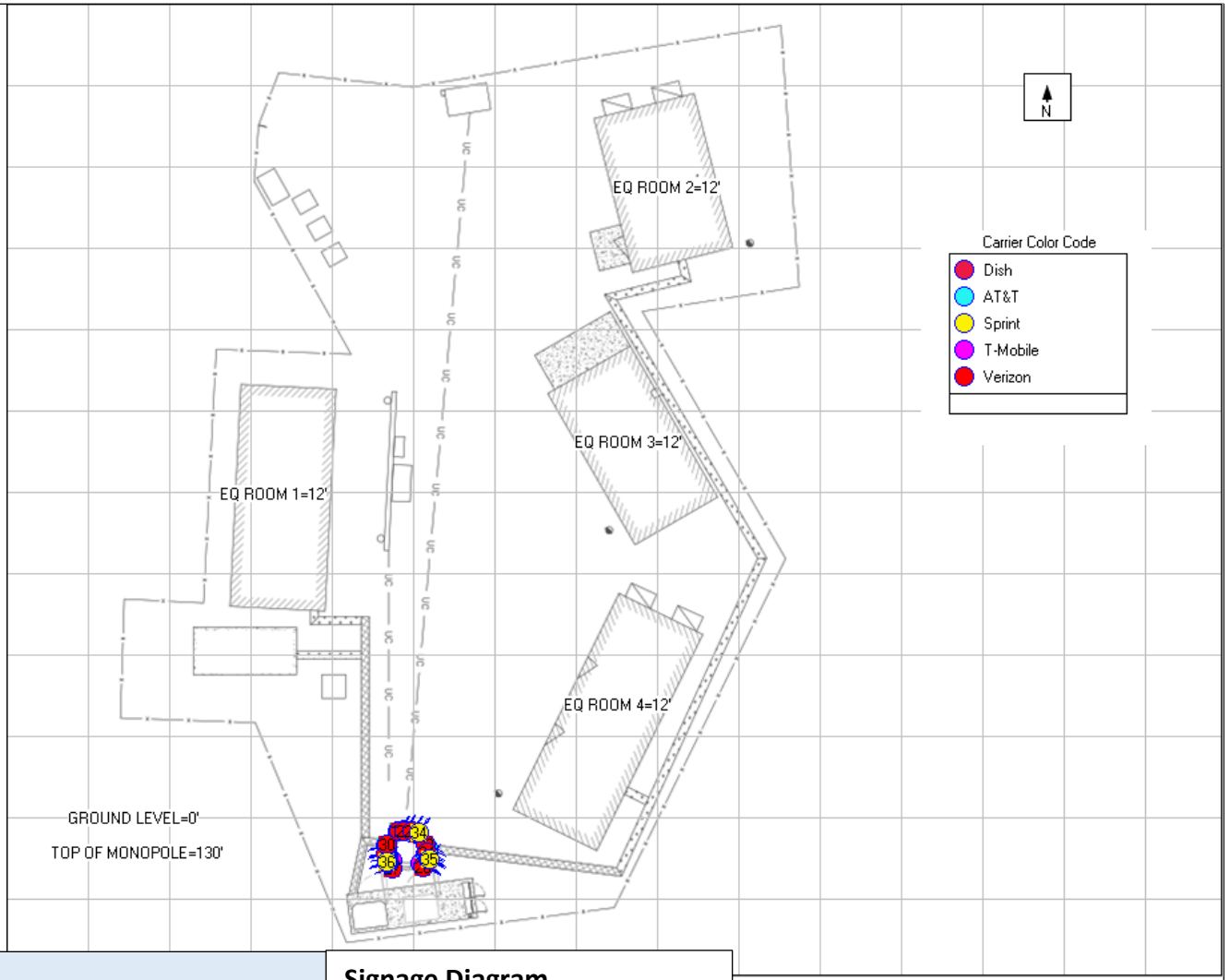
Emissions Thresholds for Walking Surfaces for:

7WAN098A / CROWN - POTOMAC

Access

Existing Item

Proposed Item



Signage Count									
	1		0		1		0		1

Signage Diagram

Signage for:

7WAN098A/ CROWN - POTOMAC

Compliance Actions

Access	• Ensure all access points are locked. • Install (1) Guideline sign on the base of the monopole. • Install (1) Caution sign on the base of the monopole. • Install (1) Emergency sign on the base of the monopole.
Alpha Sector	• No Action Needed.
Beta Sector	• No Action Needed.
Gamma Sector	• No Action Needed.
Notes:	• N/A

APPENDIX B: RF Signage Description Table

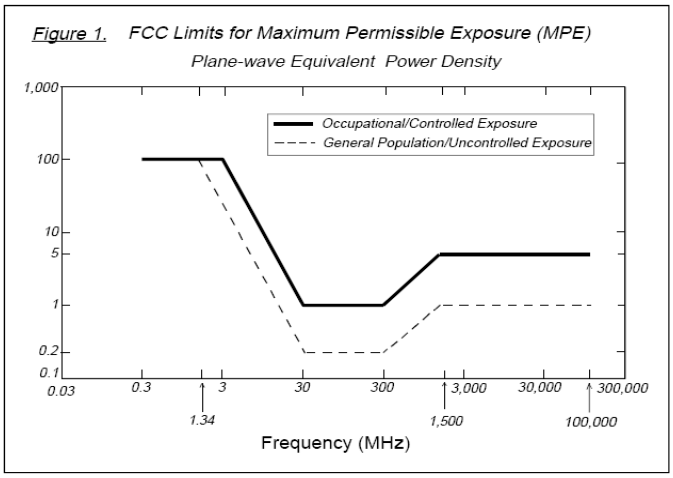
Sign	Description
	**RF Guideline Sign** Gives guidelines on how to proceed in areas that may exceed either the FCC's General Population or Occupational emissions limits.
	**Emergency Sign** Used to inform individuals to call 911 in case of emergency.
 	**Blue Notice Sign** Used to inform individuals that they are entering an area that may exceed the FCC's General Population limits. Must be placed anywhere the public can get within 30 feet vertically or horizontally of an antenna.
 	**Yellow Caution Sign** Used to inform individuals that they are entering an area that may exceed the either the FCC's General Population or Occupational Emissions limits. It must be placed so it is visible from all approachable sides. It must also be just outside of the area predicted to exceed the MPE limits so it can be read without standing within the affected area.
 	**Orange Warning Sign (Previously Red)** Used to inform individuals that they are entering an area that may exceed 5x the FCC's Occupational emissions limit. It must be placed so it is visible from all approachable sides. It must also be just outside of the area predicted to exceed the MPE limits so it can be read without standing within the affected area.

APPENDIX C: FCC Emissions Threshold Limits

Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-I,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-I,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

* Plane-wave equivalent power density



APPENDIX D: Certifications

I, Benjamin Black, preparer of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in T-Mobile's FCC Regulatory Compliance Manual.

Benjamin Black

8/12/2022

I, Yasir Alqadhili, reviewer and approver of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in T-Mobile's FCC Regulatory Compliance Manual.

Yasir Alqadhili

8/12/2022

Montgomery County Planning Department,

1. **JDX COMMENT – The plans do not show any other carrier antennas present at the RAD center of 98', while the structural does show other carrier antennas present at 98'. Please resolve the discrepancy.**

   TEP RESPONSE – Sheets C-2 and S-1 have been updated to show the Dish equipment at 98' RAD center.

2. **JDX COMMENT – The plans depict antennas and equipment belonging to "others" but do not note the names of the other carriers to whom other antennas and equipment belong. Please update the plans to include the names of the carriers for all other antennas and equipment.**

   TEP RESPONSE – Sheets C-1.1, C-2, and S-1 have been updated to callout the equipment by others by their carrier.

Sincerely,

Tower Engineering Professionals, (TEP OPCO)
Geoff McDaniel
Project Manager – Civil Division - Phoenix

TOWER
ENGINEERING
PROFESSIONALS

Montgomery County Planning Department,

1. **JDX COMMENT – The plans do not show any other carrier antennas present at the RAD center of 98', while the structural does show other carrier antennas present at 98'. Please resolve the discrepancy.**

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Sincerely,

Tower Engineering Professionals, (TEP OPCO)
Geoff McDaniel
Project Manager – Civil Division - Phoenix

T-Mobile

CALL MARYLAND ONE CALL
(800) 282-8555
CALL 3 WORKING DAYS
BEFORE YOU DIG!
811

T-MOBILE SITE NUMBER: 7WAN098A
T-MOBILE SITE NAME: CROWN - POTOMAC
SITE TYPE: MONOPINE
TOWER HEIGHT: 130'-0"

BUSINESS UNIT #: 806957
SITE ADDRESS: 10010 OAKLYN DRIVE POTOMAC, MD 20854
COUNTY: MONTGOMERY
JURISDICTION: MONTGOMERY COUNTY

T-MOBILE ANCHOR SITE CONFIGURATION: 67E5998E_1XAIR+1OP+1QP

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	WILLIAMSBURG GARDENS
SITE ADDRESS:	10010 OAKLYN DRIVE POTOMAC, MD 20854
COUNTY:	MONTGOMERY
MAP/PARCEL #:	02835024
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	38° 59' 42.57" (38.99500000)
LONGITUDE:	-77° 12' 14.13" (-77.20388900)
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	331 FT
CURRENT ZONING:	RE-2C/TDP
JURISDICTION:	MONTGOMERY COUNTY
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	WASHINGTON SUBURBAN SANITARY COMM. 14501 SWEITZER LANE LAUREL, MD 20707-5902
TOWER OWNER:	CROWN CASTLE USA, INC. 3530 TORINGDON WAY, STE 300 CHARLOTTE, NC 28277
CARRIER/APPLICANT:	T-MOBILE 12050 BALTIMORE AVENUE BELTSVILLE, MD 20705
ELECTRIC PROVIDER:	PEPCO 800-257-7777
TELCO PROVIDER:	VERIZON 1800-837-4966

PROJECT TEAM

A&E FIRM:	TOWER ENGINEERING PROFESSIONALS 326 TRYON ROAD RALEIGH, NC 27603
	JOSEPH T. CRESS - PROJECT MANAGER (919) 661-6351
	SCOTT C. BRANTLEY - CIVIL ENGINEER (919) 661-6351
	SCOTT C. BRANTLEY - ELECTRICAL ENGINEER (919) 661-6351
TOWER OWNER:	CROWN CASTLE USA, INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	9011 ARBORETUM PARKWAY, SUITE 100 RICHMOND, VA 23236
	CHANDLER DAVIS - PROJECT MANAGER CHANDLER.DAVIS@CROWNCASTLE.COM
	BILLY STUBBS - A&E SPECIALIST BILLY.STUBBS@CROWNCASTLE.COM

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.0	OVERALL SITE PLAN
C-1.1	SITE PLAN
C-1.2	EXISTING & FINAL EQUIPMENT PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4.1	EQUIPMENT SPECS
C-4.2	EQUIPMENT SPECS
C-5	EQUIPMENT SPECS
C-6	PLUMBING DIAGRAM & COLOR CODE
S-1	STRUCTURAL
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 22x34. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (3) TMAs
- REMOVE (3) RRUs 11 B12
- REMOVE (12) COAX CABLES
- REMOVE (1) 9x18 HCS 60m CABLES
- INSTALL (9) ANTENNAS
- INSTALL (6) RRUs
- INSTALL (3) 6x24 4AWG 60m CABLES

GROUND SCOPE OF WORK:
- REMOVE (1) RBS 2106 CABINET
- REMOVE (1) DUW30
- REMOVE (6) RU22s
- INSTALL (2) CABINETS
- INSTALL (2) PSU 4813 BOOSTER
- INSTALL (1) BB 6648
- INSTALL (1) IXRe ROUTER
- INSTALL (2) RP 6651s

LOCATION MAP

NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	MARYLAND BUILDING CODES/2018 IBC
MECHANICAL	2018 INTERNATIONAL MECHANICAL CODE
ELECTRICAL	2020 NATIONAL ELECTRICAL CODE

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	TOWER ENGINEERING PROFESSIONALS		
DATED:	4/27/22		
MOUNT ANALYSIS:	TOWER ENGINEERING PROFESSIONALS		
DATED:	5/12/22		
ORDER ID:	611571	RFDS VERSION:	9
REVISION:	0	DATED:	2/21/22

ANALYSIS CRITERIA:

APPLICABLE CODES:	TIA-222-H / ASCE 7-16
WIND SPEED:	112 MPH
EXPOSURE CATEGORY:	C
RISK CATEGORY:	II
TOPOGRAPHIC CATEGORY:	1
SEISMIC Ss:	0.135
SEISMIC S1:	0.043
SERVICE WIND SPEED:	60 MPH

APPROVALS

APPROVAL	SIGNATURE	DATE
RF		
CONST.		
FAA		
OPS		
RE		
SR DEV MGR		
REG DIR		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM
3	08/08/22	KBA	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

08/08/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: T-1

REVISION: 3

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER 40 ksi
   #5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
      #6 BARS AND LARGER 2"
      #5 BARS AND SMALLER 1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
      SLAB AND WALLS 3/4"
      BEAMS AND COLUMNS 1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   - 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   - 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
LOCP	LOSS OF COMMERCIAL POWER RELAY
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T-Mobile

12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE

3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER
ENGINEERING
PROFESSIONALS

326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351

N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

SCOTT C. BRANTLEY
58709

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-2

REVISION: 0

NOTE:
SITE PLAN IS BASED ON GIS AND GOOGLE EARTH DATA. TOWER ENGINEERING PROFESSIONALS HAS NOT COMPLETED A BOUNDARY SURVEY FOR THIS PROPERTY.

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006

1 OVERALL SITE PLAN
SCALE: 200' 100' 0 200' 1" = 200'-0" (FULL SIZE) 1" = 400'-0" (11x17)

N

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM
3	08/08/22	KBA	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

08/08/22

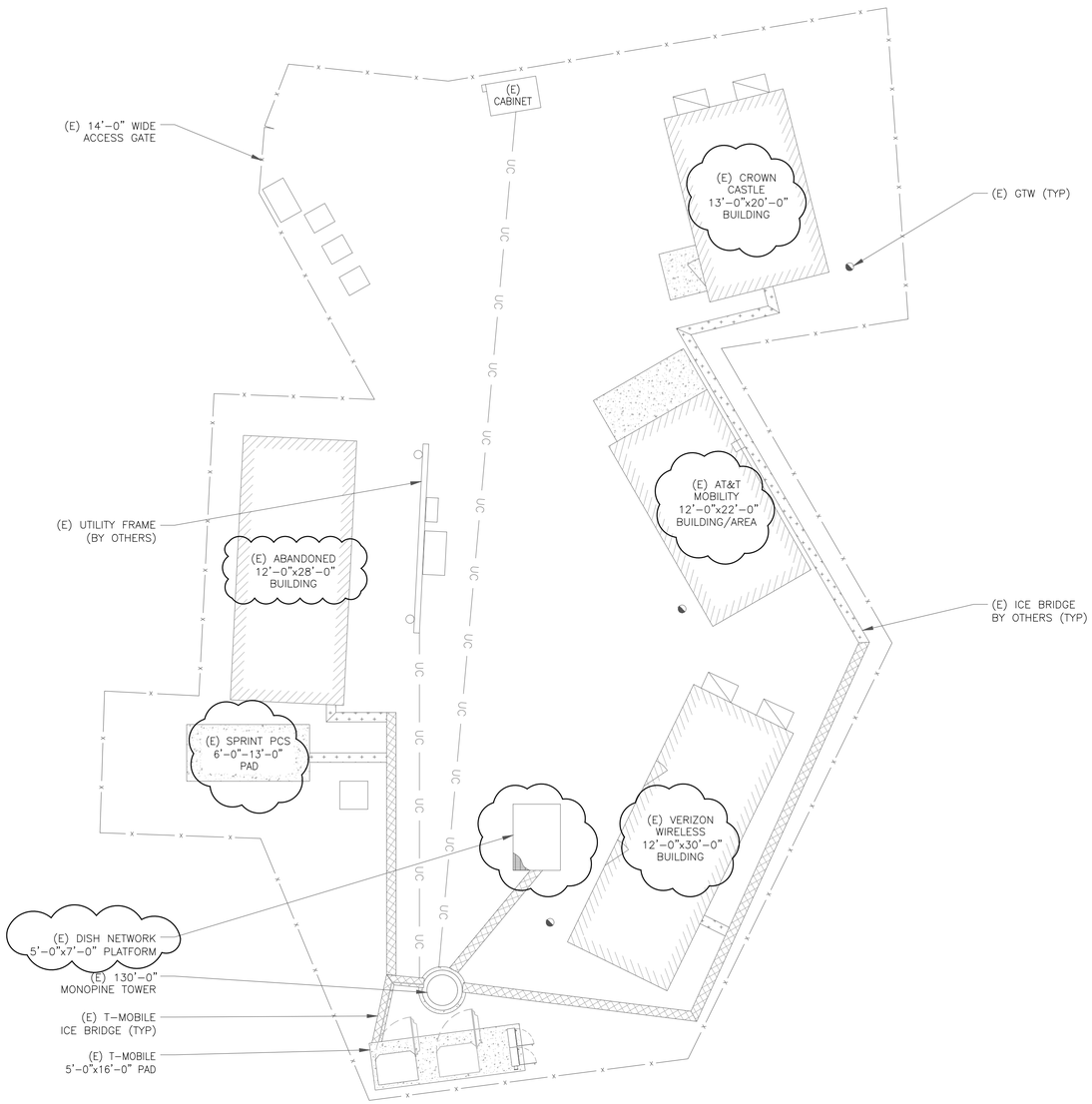
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

SHEET NUMBER: C-1.0

REVISION: 3

NOTE:
SITE PLAN SHOWN BELOW WAS REPRODUCED FROM INFORMATION PROVIDED BY CROWN CASTLE AND SITE WALK CONDUCTED BY TEP. CONTRACTOR TO VERIFY ALL EXISTING INFORMATION IS AS INDICATED ON SITE PLAN. CONTRACTOR IS TO ESTABLISH THE EXISTENCE AND LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES. IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES.

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006



1 SITE PLAN
SCALE: 8' 6' 4' 2' 0 8' 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

N

T-Mobile
12050 BALTIMORE AVENUE
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TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM
3	08/08/22	KBA	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND
SCOTT C. BRANDON
58709
PROFESSIONAL ENGINEER

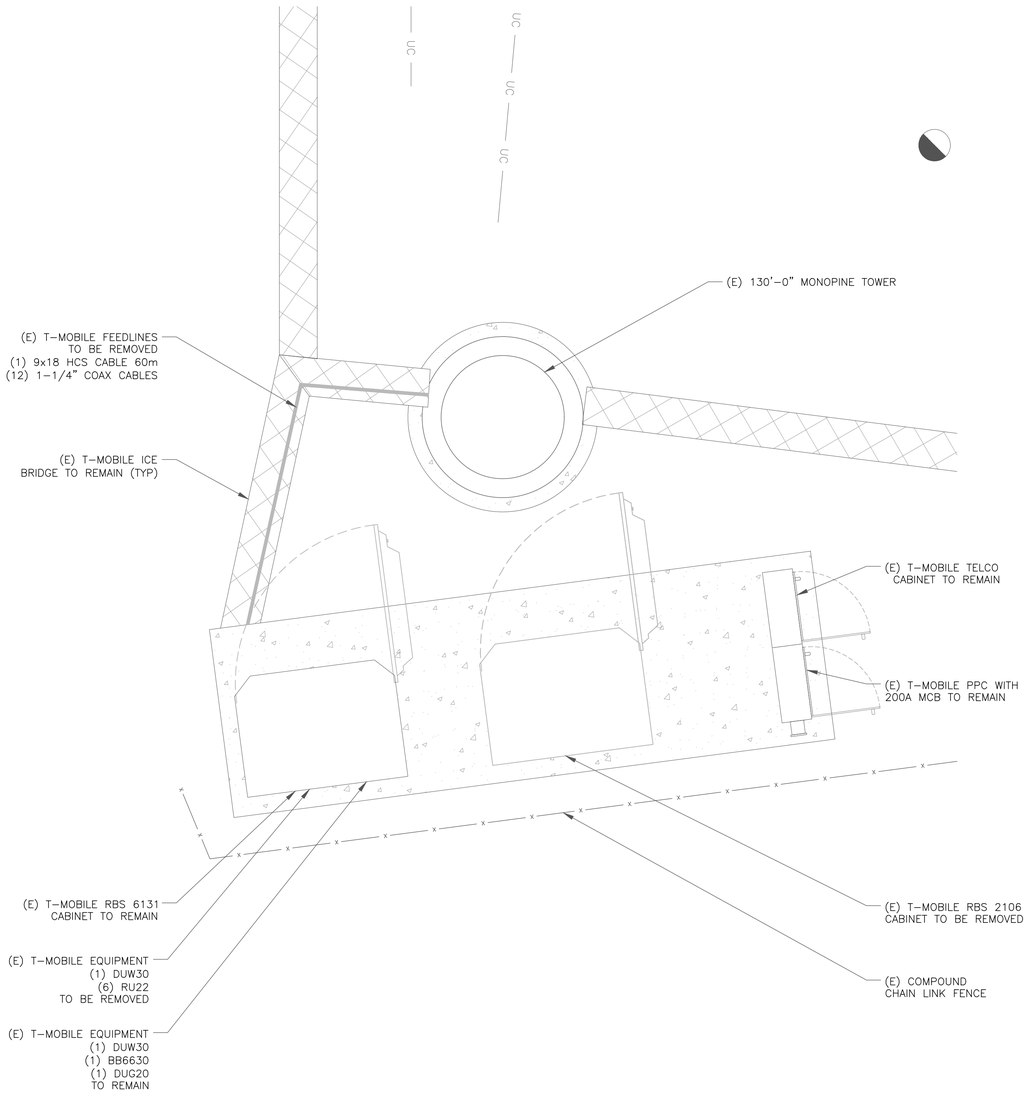
08/08/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

SHEET NUMBER: C-1.1

REVISION: 3

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006



1 EXISTING EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

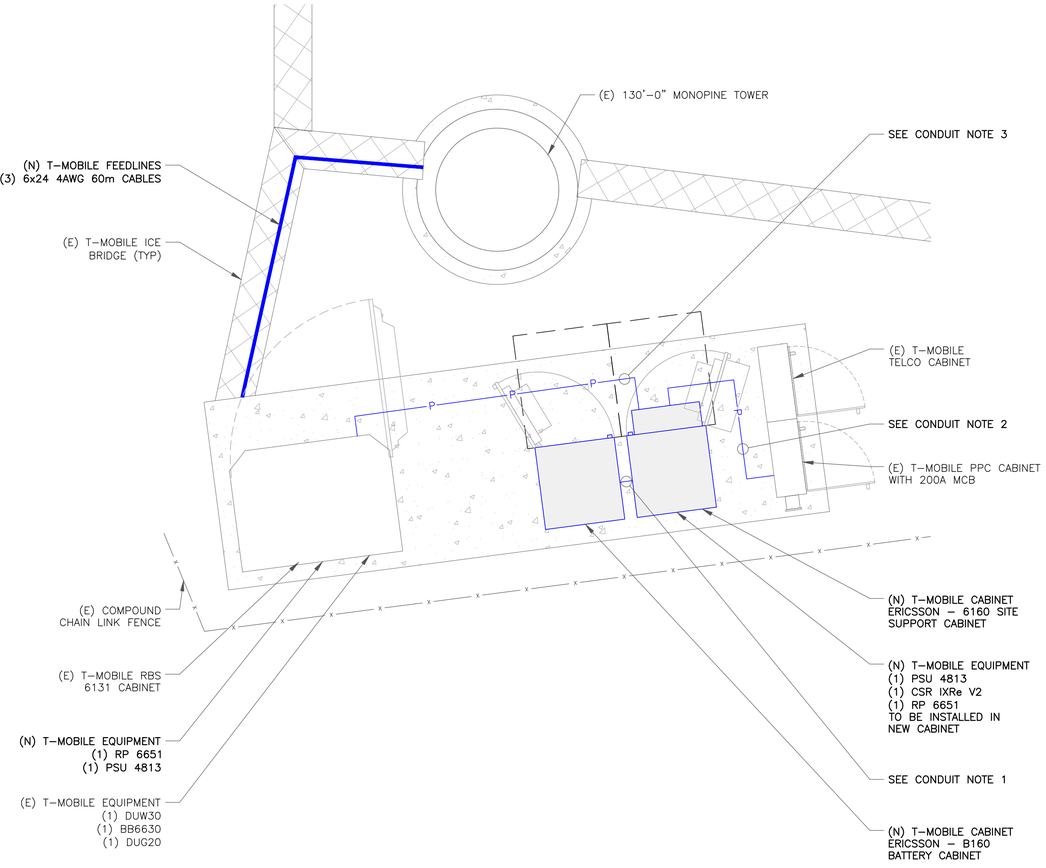
CONDUIT NOTES:

- ALL CONDUIT TO BE SCH40 PVC OR LTFC, AS NOTED. INSTALL WEATHERPROOF FITTINGS.
- ABOVE GRADE CONDUIT RUNS TO BE MARKED WITH HAZARD TAPE TO PREVENT TRIPPING HAZARD.

1. (1) 2" CONDUIT BETWEEN 6160 AND B160 (ABOVE GRADE, LTFC or SCH40 PVC)
2. (1) 2" CONDUIT FROM PPC TO 6160 FOR 125A & 15A BREAKER CONDUCTORS (BELOW GRADE, SCH40 PVC)
3. (1) 1" CONDUIT FROM AAV/WESTELL CABINET TO 6160 CABINET (BELOW GRADE, SCH40 PVC)

NOTE:

ALL RACKS AND EQUIPMENT CABINETS ARE TO HAVE TWO GROUNDING LEADS. ALL EQUIPMENT INSTALLED IN RACKS MUST HAVE A CHASSIS GROUND ATTACHED TO A COMMON BUS BAR ON THE RACK. COMMON BUS BAR MUST BE GROUNDED TO MAIN GROUND BAR. SEE G-1 FOR GROUNDING NOTES.



2 FINAL EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM

SEAL:

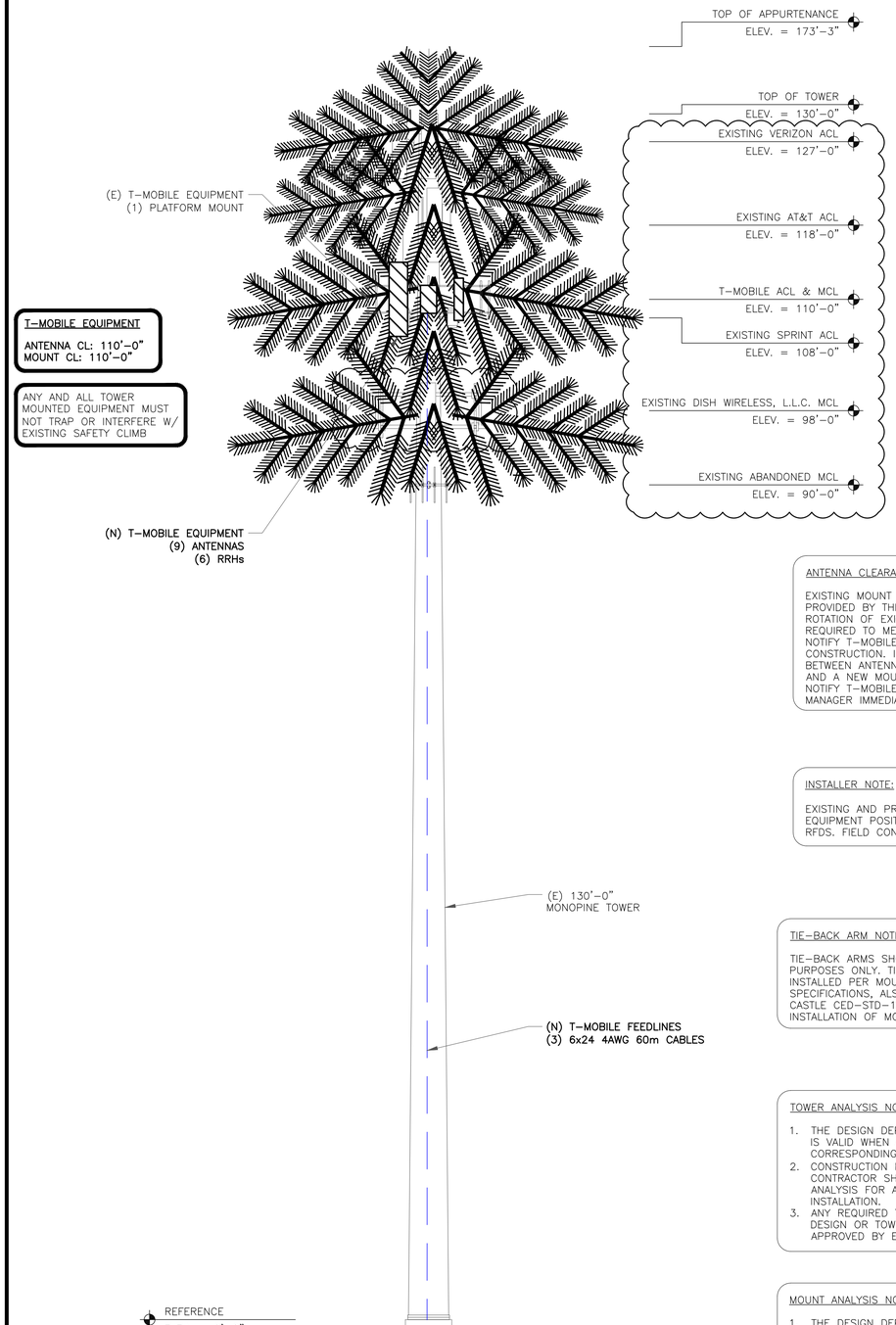
STATE OF MARYLAND
SCOTT C. BRAY
58709
PROFESSIONAL ENGINEER

06/09/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: C-1.2

REVISION: 1



1 FINAL ELEVATION
SCALE: 8" 6" 4" 2" 0 8" 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

ANTENNA CLEARANCE NOTE:

EXISTING MOUNT SIZE AND ORIENTATION PROVIDED BY THE TOWER OWNER. IF ROTATION OF EXISTING MOUNTS IS REQUIRED TO MEET AZIMUTHS, PLEASE NOTIFY T-MOBILE RF PRIOR TO CONSTRUCTION. IF 36" CLEARANCE BETWEEN ANTENNAS CANNOT BE MET AND A NEW MOUNT IS REQUIRED, PLEASE NOTIFY T-MOBILE CONSTRUCTION MANAGER IMMEDIATELY.

INSTALLER NOTE:

EXISTING AND PROPOSED ANTENNA/ EQUIPMENT POSITIONING SHOWN PER RFDS. FIELD CONDITIONS MAY VARY.

TIE-BACK ARM NOTE:

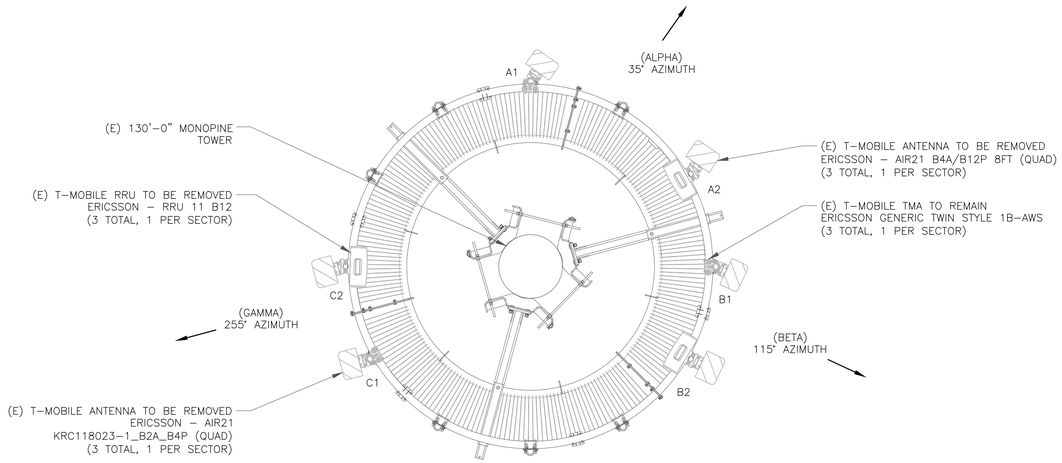
TIE-BACK ARMS SHOWN ARE FOR REFERENCE PURPOSES ONLY. TIE-BACK ARMS TO BE INSTALLED PER MOUNT MANUFACTURERS SPECIFICATIONS, ALSO ADHERING TO CROWN CASTLE CED-STD-10294 STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES.

TOWER ANALYSIS NOTES:

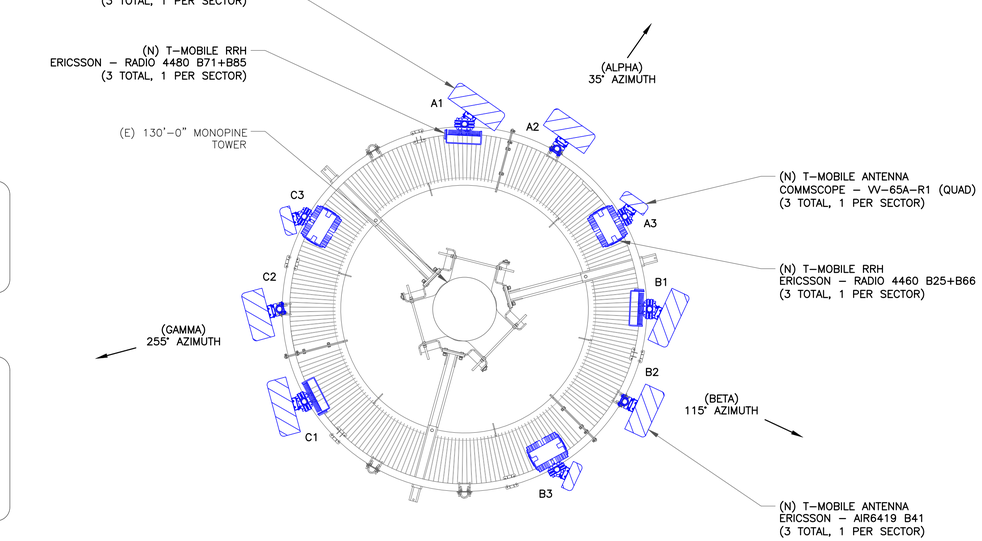
1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.



2 EXISTING ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)



3 FINAL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

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(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM
3	08/08/22	KBA	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND · SCOTT C. BRAUN · 58709 · PROFESSIONAL ENGINEER

08/08/22

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SHEET NUMBER: C-2

REVISION: 3

EXISTING ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	*U1900, *G1900, *U2100	110'-0"	35°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	4°/4°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
ALPHA	A3	*L2100, *L700	110'-0"	35°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	4°/4°	*(1) ERICSSON - RRU 11 B12	*(1) 9x18 HCS 60m
BETA	B1	*U1900, *G1900, *U2100	110'-0"	115°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	2°/2°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
BETA	B3	*L2100, *L700	110'-0"	115°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	2°/2°	*(1) ERICSSON - RRU 11 B12	HYBRID (SHARED)
GAMMA	C1	*U1900, *G1900, *U2100	110'-0"	255°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	4°/4°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
GAMMA	C3	*L2100, *L700	110'-0"	255°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	4°/4°	*(1) ERICSSON - RRU 11 B12	HYBRID (SHARED)

*EQUIPMENT TO BE REMOVED

EXISTING CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
EXISTING	*COAX	1-1/4"	12
EXISTING	*HCS	6x18 HCS 60m	1
CABLE QUANTITY			13

1 EXISTING ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

FINAL ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L700, L600, N600	110'-0"	35°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	(3) 6x24 4AWG 60m
ALPHA	A2	L2500, N2500	110'-0"	35°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
ALPHA	A3	U1900, L2100 L1900, G1900	110'-0"	35°	COMMSCOPE	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)
BETA	B1	L700, L600, N600	110'-0"	115°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	HYBRID (SHARED)
BETA	B2	L2500, N2500	110'-0"	115°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
BETA	B3	U1900, L2100 L1900, G1900	110'-0"	115°	ERICSSON	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)
GAMMA	C1	L700, L600, N600	110'-0"	255°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	HYBRID (SHARED)
GAMMA	C2	L2500, N2500	110'-0"	255°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
GAMMA	C3	U1900, L2100 L1900, G1900	110'-0"	255°	ERICSSON	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)

FINAL CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
NEW	HCS	4AWG 60m	3
CABLE QUANTITY			3

2 PROPOSED ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
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CHARLOTTE, NC 28277

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N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

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REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

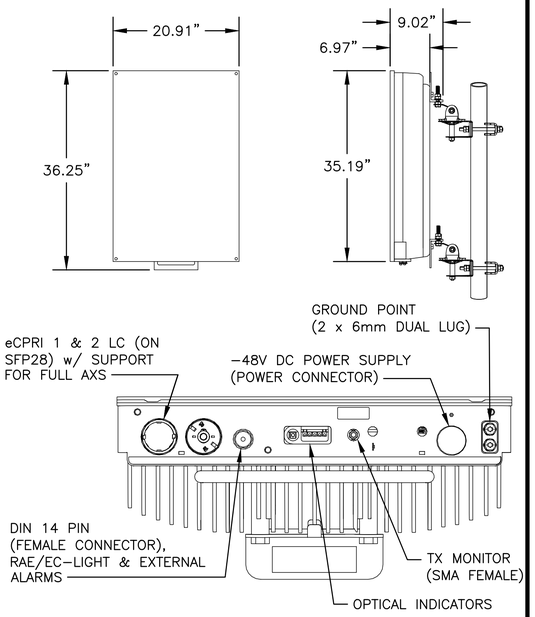
05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

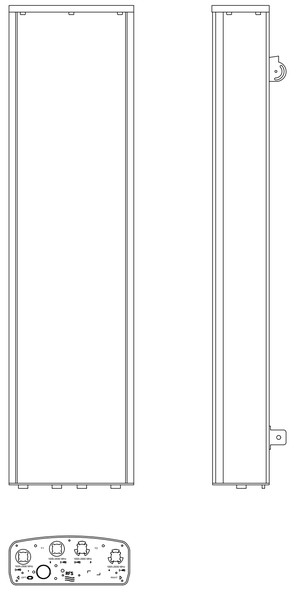
SHEET NUMBER: C-3

REVISION: 0

MANUFACTURER:	ERICSSON
MODEL:	AIR 6419 B41 (2.5GHz M-MIMO)
DIMENSIONS:	36.25" x 20.91" x 9.02" (H x W x D)
WEIGHT:	83 LBS (EXCLUDING MOUNTING KIT)
MOUNT WEIGHT:	13.5 LBS (SXK109 2016/1)



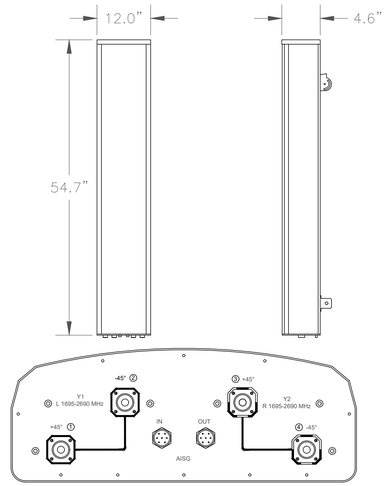
1 ERICSSON – 6419 B41
SCALE: NOT TO SCALE



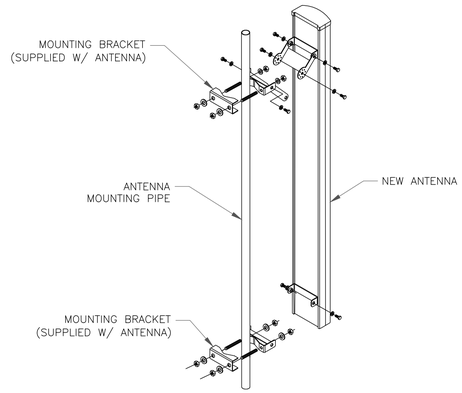
RFS/CELWAVE – APXVAALL24_43-U-NA20
WEIGHT (WITHOUT MOUNTING HARDWARE): 149.90 LBS
SIZE (HxWxD): 95.90x24.00x8.50 IN.

2 RFS/CELWAVE – APXVAALL24_43-U-NA20
SCALE: NOT TO SCALE

MANUFACTURER:	COMMSCOPE
MODEL:	VV-65A-R1
DIMENSIONS:	54.7" x 12.1" x 4.6" (H x W x D)
WEIGHT:	24.7 LB
INTERFACE:	4-PORT 4.3-10 FEMALE
MOUNTING KIT:	600899A-2 (INCLUDED) WEIGHT: 8.6 LB

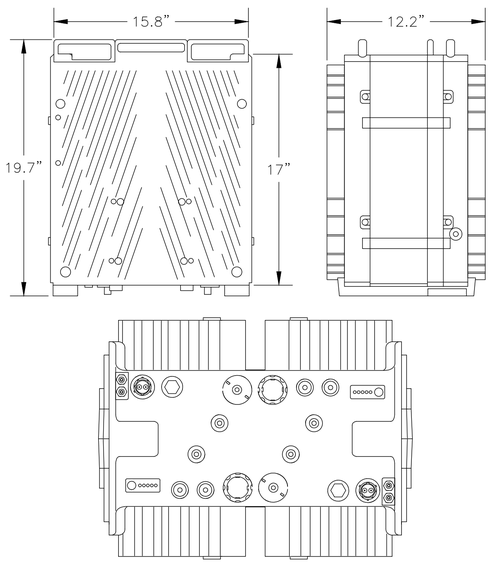


3 COMMSCOPE – VV-65A-R1
SCALE: NOT TO SCALE



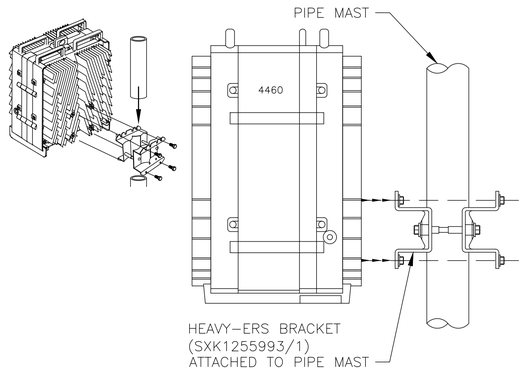
4 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	4460 RADIO B2/25 B66 (KRC 161 912/3)
DIMENSIONS:	19.7" x 15.8" x 12.2" (H" x W" x D")
WEIGHT:	109 LBS
BRACKET WEIGHT:	4.8 LBS (ERS HEAVY #SXK1255993/1)



5 ERICSSON – RADIO 4460 B25+B66
SCALE: NOT TO SCALE

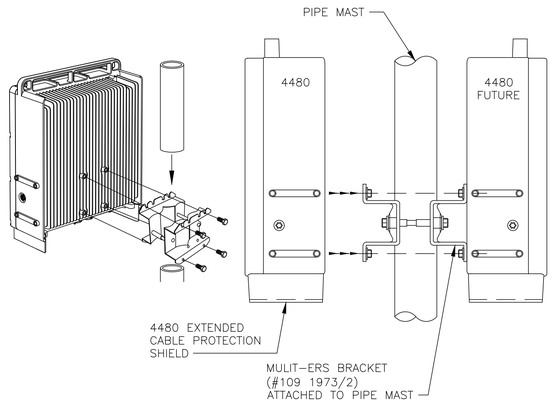
INSTALLATION KIT:	NTB1010029/50	1/RADIO
BRACKET:	ERS HEAVY BRACKET (SXK1255993/1)	1
POWER CONNECTOR:	CIRCULAR CONNECTOR (RNT4437/01)	2
GROUND CABLE:	CABLE -16mm2, GYNE, 2m 1 LUG w/ 2 M6 HOLES, 90° (RPM1192062/2)	1



INSTALLER NOTES:
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

6 ERICSSON – RADIO 4460 MOUNTING DETAIL
SCALE: NOT TO SCALE

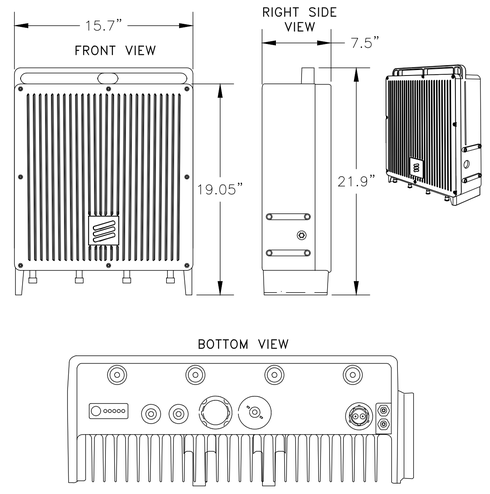
INSTALLATION KIT:	TB1010029/10	1/RADIO
BRACKET:	MULTI ERS BRACKET (#109 1973/2)	1
POWER CONNECTOR:	CIRCULAR CONNECTOR (RNT4437/01)	2
GROUND CABLE:	CABLE -16mm2, GYNE, 2m 1 LUG w/ 2 M6 HOLES, 90° (RPM1192062/2)	1



INSTALLER NOTES:
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

7 ERICSSON – RADIO 4480 MOUNTING DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	4480 RADIO (KRC 161 922/1)
DIMENSIONS:	21.9" x 15.7" x 7.5" (H x W x D)
MODEL BAND:	B71, B85 FOR NR AND LTE
WEIGHT:	81 LBS
BRACKET WEIGHT:	3.75 LBS (MULTI ERS #109 1973/2)



8 ERICSSON – RADIO 4480 B71+B85
SCALE: NOT TO SCALE

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SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

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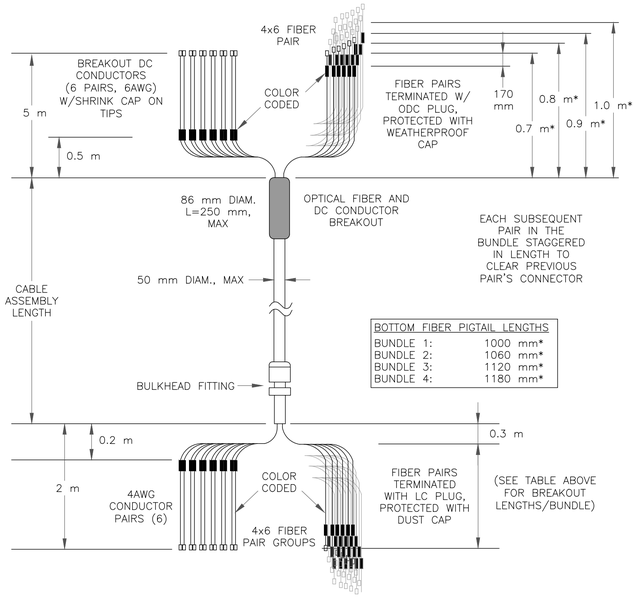
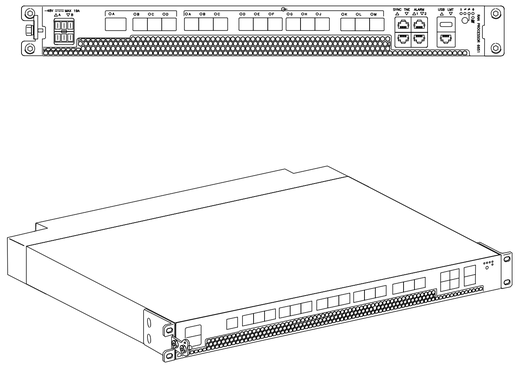
SHEET NUMBER: C-4.1

REVISION: 0



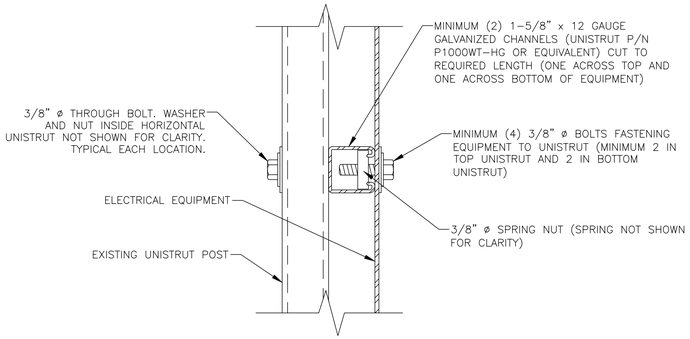
1 HCS DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	6651 RAN PROCESSOR (KDU1370093/11)
WEIGHT:	16.53 LBS
DIMENSIONS:	1.75"x 17.25"x 13.85" (HxWxD)



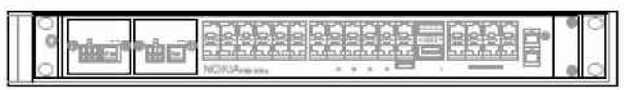
2 BASEBAND RP6651
SCALE: NOT TO SCALE

NOTE: ALL BOLTS TO BE INSTALLED USING LOCK WASHERS AND FLAT WASHERS



3 UNISTRUT ATTACHMENT DETAIL (DESIGNED BY OTHERS)
SCALE: NOT TO SCALE

MANUFACTURER: NOKIA
MODEL: IXR-e
DIMENSIONS: 17.25"x10.0"x1.75"
WEIGHT: TBD



4 CSR IXRE
SCALE: NOT TO SCALE

Attribute	Value
Min Input Voltage	-38 VDC
Output Voltage	3x -58 V DC ports
CB rating	30A/40A/50A
Efficiency	96%
Total output power	6000 Watts (2000 W/port)
Operating Temp	-40°C to +60°C
Alarms	Output fault, DC SPD failure
Mechanical	1 U 19", 13" depth
Certification	IEC 62368-1, UL 62368-1
MTBF	143 Years
Air Flow	Front to Back

5 PSU 4813
SCALE: NOT TO SCALE

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POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND · SCOTT C. BRANDT · 58709 · PROFESSIONAL ENGINEER

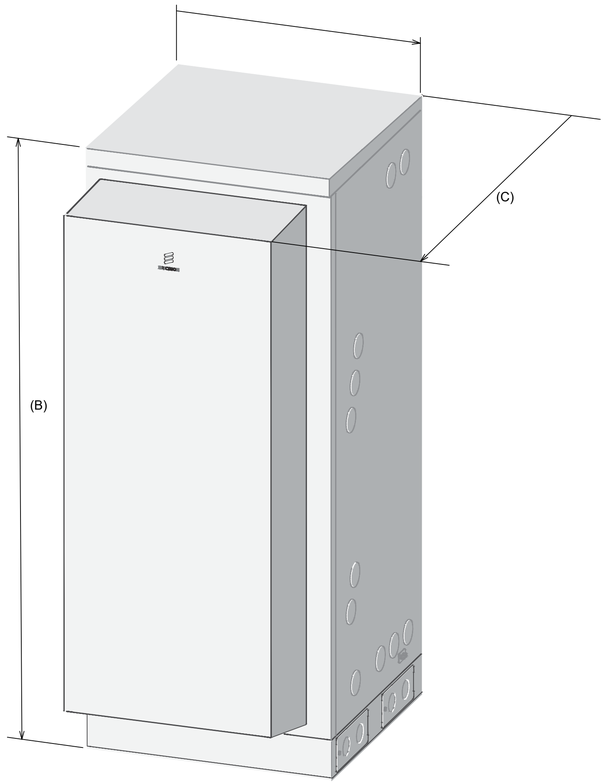
05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: C-4.2
REVISION: 0

INSTALLER NOTES:

1. INFORMATION SHOWN PROVIDED BY T–MOBILE. CONTRACTOR TO REFERENCE CABINET MANUFACTURER'S SPECIFICATIONS FOR FURTHER DETAILS.
2. CONTRACTOR TO FOLLOW THE LATEST VERSION OF T–MOBILE REGIONAL CONSTRUCTION STANDARDS. CONTACT T–MOBILE FOR DETAILS.



Dimensions	
Width (A)	650 mm / 25.5906 in
Height (B)	1450 mm / 57.08661 in (without base frame) 1600 mm / 62.99213 in (with base frame)
Depth (C)	850 mm / 33.4646 in
Weight	
Empty enclosure	176 kg / 388.014 lb

1 ERICSSON 6160 CABINET DETAILS
SCALE: NOT TO SCALE

2 ERICSSON B160 CABINET DETAILS
SCALE: NOT TO SCALE

SITE SIGNAGE NOTE:
WHERE APPLICABLE, CONTRACTOR TO FOLLOW ALL T–MOBILE SIGNAGE REQUIREMENTS. CONFIRM SITE SIGNAGE WITH T–MOBILE CM PRIOR TO CONSTRUCTION

3 T–MOBILE SIGNAGE
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

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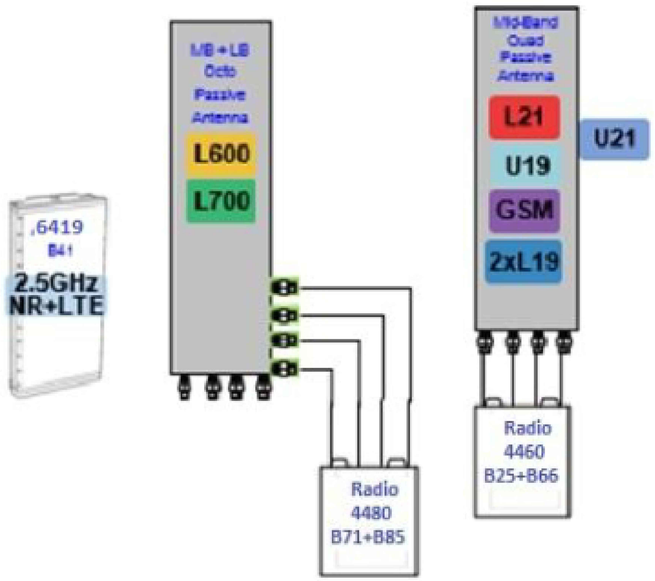
SHEET NUMBER: C-5

REVISION: 0



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

TYPICAL T-MOBILE HYBRID PLUMBING

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO (TECHNOLOGY)	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 1	1	RED		1	B	RED		AIR 32 B2a (G19 CPRI 1)	RED 1 + LC Boot Color	ALPHA G19 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		AIR 32 B2a (L19 CPRI 2)	RED 1 + LC Boot Color	ALPHA B2 L19 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		AIR 32 B66a (L21 CPRI 1)	RED 1 + LC Boot Color	ALPHA L21 CPRI 1	ALPHA
				2	A						
	4	YELLOW		1	B	YELLOW		AIR32 B66Aa (L21 CPRI 2)	RED 1 + LC Boot Color	ALPHA L21 CPRI 2	ALPHA
				2	A						
	5	WHITE		1	B	WHITE		AIR 32 B2a (G19 CPRI 1)	YELLOW 1 + LC Boot Color	BETA G19 CPRI 1	BETA
				2	A						
	6	BLACK		1	B	BLACK		AIR 32 B2a (L19 CPRI 2)	YELLOW 1 + LC Boot Color	BETA B2 L19 CPRI 2	BETA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE	AIR 32 B66a (L21 CPRI 1)	YELLOW 1 + LC Boot Color	BETA L21 CPRI 1	BETA
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE	AIR32 B66Aa (L21 CPRI 2)	YELLOW 1 + LC Boot Color	BETA L21 CPRI 2	BETA
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE	AIR 32 B2a (L19 CPRI 1)	BLUE 1 + LC Boot Color	GAMMA G19 CPRI 1	GAMMA
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE	AIR 32 B2a (L19 CPRI 2)	BLUE 1 + LC Boot Color	GAMMA B2 L19 CPRI 2	GAMMA
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE	AIR 32 B66Aa (L21 CPRI 1)	BLUE 1 + LC Boot Color	GAMMA L21 CPRI 1	GAMMA
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE	AIR32 B66Aa (L21 CPRI 2)	BLUE 1 + LC Boot Color	GAMMA L21 CPRI 2	GAMMA
				2	A						

DC Power

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	AIR 32 B66Aa	ALPHA	ALPHA L21
	0V	B	RED				
2	-48	A	BLACK	GREEN	AIR 32 B2a	ALPHA	ALPHA G/L19
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	AIR 32 B66Aa	BETA	BETA L21
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW	AIR 32 B2a	BETA	BETA G/L19
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE	AIR 32 B66Aa	GAMMA	GAMMA L21
	0V	B	WHITE				
6	-48	A	BLACK	BLACK	AIR 32 B2a	GAMMA	GAMMA G/L19
	0V	B	BLACK				

Alpha RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
RED 1	RED 2	RED 3	RED 4	RED 5	RED 6	RED 7	RED 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 2	1	RED		1	B	RED		Radio 4449	RED 2 + LC Boot Color	ALPHA L700/L600 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		Radio 4449	RED 2 + LC Boot Color	ALPHA N600 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		Radio 4449	YELLOW 2 + LC Boot Color	BETA L700/L600 CPRI 1	BETA
				2	A						
	4	YELLOW		1	B	YELLOW		Radio 4449	YELLOW 2 + LC Boot Color	BETA N600 CPRI 2	BETA
				2	A						
	5	WHITE		1	B	WHITE		Radio 4449	BLUE 2 + LC Boot Color	GAMMA L700/L600 CPRI 1	GAMMA
				2	A						
	6	BLACK		1	B	BLACK		Radio 4449	BLUE 2 + LC Boot Color	GAMMA N600 CPRI 2	GAMMA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE				
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE				
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE				
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE				
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE				
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE				
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Radio 4449	ALPHA	ALPHA L600/N600 B71
	0V	B	RED				
2	-48	A	BLACK	GREEN	Radio 4449	ALPHA	Alpha L700 B85
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Radio 4449	BETA	Beta L600/N600 B71
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW	Radio 4449	BETA	Beta L700 B85
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE	Radio 4449	GAMMA	Gamma L600/N600 B71
	0V	B	WHITE				
6	-48	A	BLACK	BLACK	Radio 4449	GAMMA	Gamma L700 B85
	0V	B	BLACK				

Beta RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
BLUE 1	BLUE 2	BLUE 3	BLUE 4	BLUE 5	BLUE 6	BLUE 7	BLUE 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 3	1	RED		1	B	RED		Radion 4415	RED 3 + LC Boot Color	ALPHA B25 L19 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		Radion 4415	RED 3 + LC Boot Color	ALPHA B25 L19 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		Radion 4415	YELLOW 3 + LC Boot Color	BETA B25 L19 CPRI 1	BETA
				2	A						
	4	YELLOW		1	B	YELLOW		Radion 4415	YELLOW 3 + LC Boot Color	BETA B25 L19 CPRI 2	BETA
				2	A						
	5	WHITE		1	B	WHITE		Radion 4415	BLUE 3 + LC Boot Color	GAMMA B25 L19 CPRI 1	GAMMA
				2	A						
	6	BLACK		1	B	BLACK		Radion 4415	BLUE 3 + LC Boot Color	GAMMA B25 L19 CPRI 2	GAMMA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE				
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE				
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE				
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE				
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE				
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE				
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Radio 4415	Alpha	ALPHA B25 L19
	0V	B	RED				
2	-48	A	BLACK	GREEN	Radio 4415	Beta	BETA B25 L19
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Radio 4415	Gamma	GAMMA B25 L19
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW			
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE			
	0V	B	WHITE				
6	-48	A	BLACK	BLACK			
	0V	B	BLACK				

Gamma RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
YELLOW 1	YELLOW 2	YELLOW 3	YELLOW 4	YELLOW 5	YELLOW 6	YELLOW 7	YELLOW 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO (TECHNOLOGY)	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 4	1	RED		1	B	RED		AIR 6449 L41 CPRI 1	RED 4 + LC Boot Color	Alpha L41 CPRI 1	Alpha
				2	A						
	2	GREEN		1	B	GREEN		AIR 6449 L41 CPRI 2	RED 4 + LC Boot Color	Alpha L41 CPRI 2	Alpha
				2	A						
	3	BLUE		1	B	BLUE		AIR 6449 N41 CPRI 3	RED 4 + LC Boot Color	Alpha N41 CPRI 3	Alpha
				2	A						
	4	YELLOW		1	B	YELLOW		AIR 6449 N41 CPRI 4	RED 4 + LC Boot Color	Alpha N41 CPRI 4	Alpha
				2	A						
	5	WHITE		1	B	WHITE		AIR 6449 L41 CPRI 1	YELLOW 4 + LC Boot Color	Beta L41 CPRI 1	Beta
				2	A						
	6	BLACK		1	B	BLACK		AIR 6449 L41 CPRI 2	YELLOW 4 + LC Boot Color	Beta L41 CPRI 2	Beta
				2	A						
	7	RED	WHITE	1	B	RED	WHITE	AIR 6449 N41 CPRI 3	YELLOW 4 + LC Boot Color	Beta N41 CPRI 3	Beta
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE	AIR 6449 N41 CPRI 4	YELLOW 4 + LC Boot Color	Beta N41 CPRI 4	Beta
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE	AIR 6449 L41 CPRI 1	BLUE 4 + LC Boot Color	Gamma L41 CPRI 1	Gamma
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE	AIR 6449 L41 CPRI 2	BLUE 4 + LC Boot Color	Gamma L41 CPRI 2	Gamma
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE	AIR 6449 N41 CPRI 3	BLUE 4 + LC Boot Color	Gamma N41 CPRI 3	Gamma
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE	AIR 6449 N41 CPRI 4	BLUE 4 + LC Boot Color	Gamma N41 CPRI 4	Gamma
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Air 6449	Alpha	Alpha L/N41
	0V	B	RED				
2	-48	A	BLACK	GREEN	Air 6449	Beta	Beta L/N41
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Air 6449	Gamma	Gamma L/N41
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW			
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE			
	0V	B	WHITE				
6	-48	A	BLACK	BLACK			
	0V	B	BLACK				

Delta RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
GREEN 1	GREEN 2	GREEN 3	GREEN 4	GREEN 5	GREEN 6	GREEN 7	GREEN 8

2 COLOR CODE CHART
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
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(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
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STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

05/27/22

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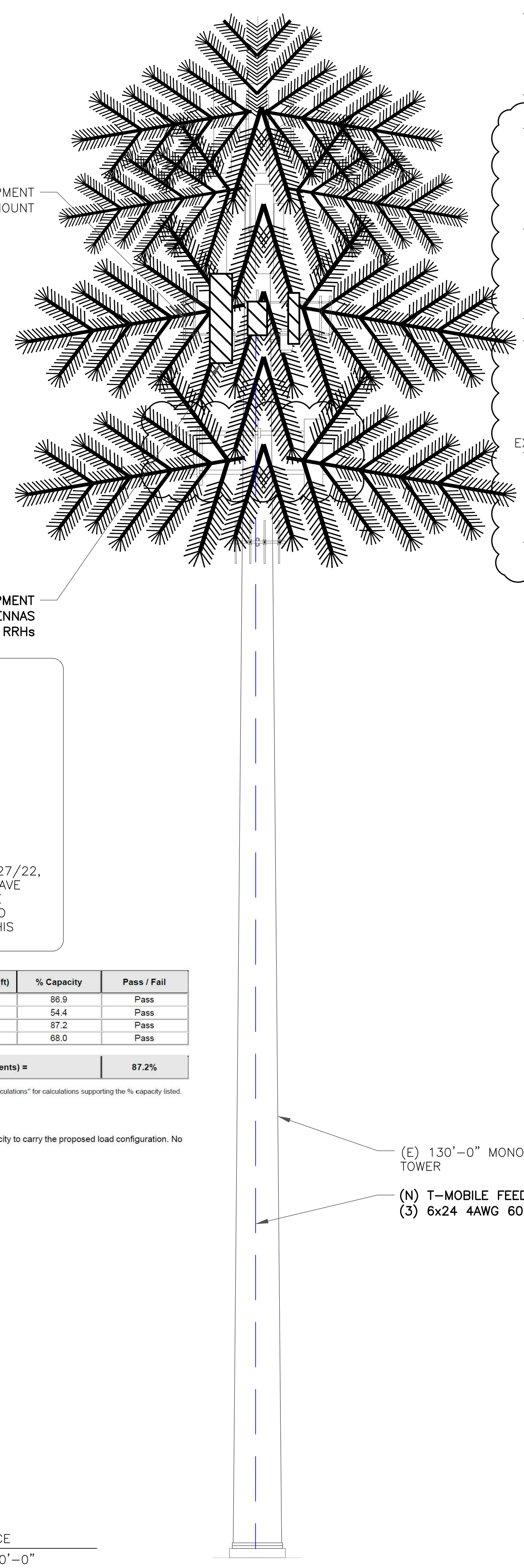
Expiration Date: 01/10/2024

SHEET NUMBER: C-6

REVISION: 0



T-MOBILE EQUIPMENT

ANTENNA CL: 110'-0"
MOUNT CL: 110'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

ANALYSIS CRITERIA:

BUILDING CODE: 2018 IBC
TIA-222 REVISION: TIA-222-H
RISK CATEGORY: II
WIND SPEED: 115 mph
EXPOSURE CATEGORY: C
TOPOGRAPHIC FACTOR: 1.0
ICE THICKNESS: 1.0 in
WIND SPEED WITH ICE: 40 mph
SERVICE WIND SPEED: 60 mph

RECOMMENDATIONS:

PER TOWER SA BY TEP DATED 04/27/22, THE TOWER AND ITS FOUNDATION HAVE SUFFICIENT CAPACITY TO CARRY THE PROPOSED LOAD CONFIGURATION. NO MODIFICATIONS ARE REQUIRED AT THIS TIME.

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	86.9	Pass
1,2	Base Plate	-	54.4	Pass
1,2	Base Foundation Structural	-	87.2	Pass
1,2	Base Foundation Soil Interaction	-	68.0	Pass
Structure Rating (max from all components) =				87.2%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5.

4.1) Recommendations

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

1 FINAL ELEVATION
SCALE: 8' 6' 4' 2' 0 8' 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

ANTENNA CLEARANCE NOTE:

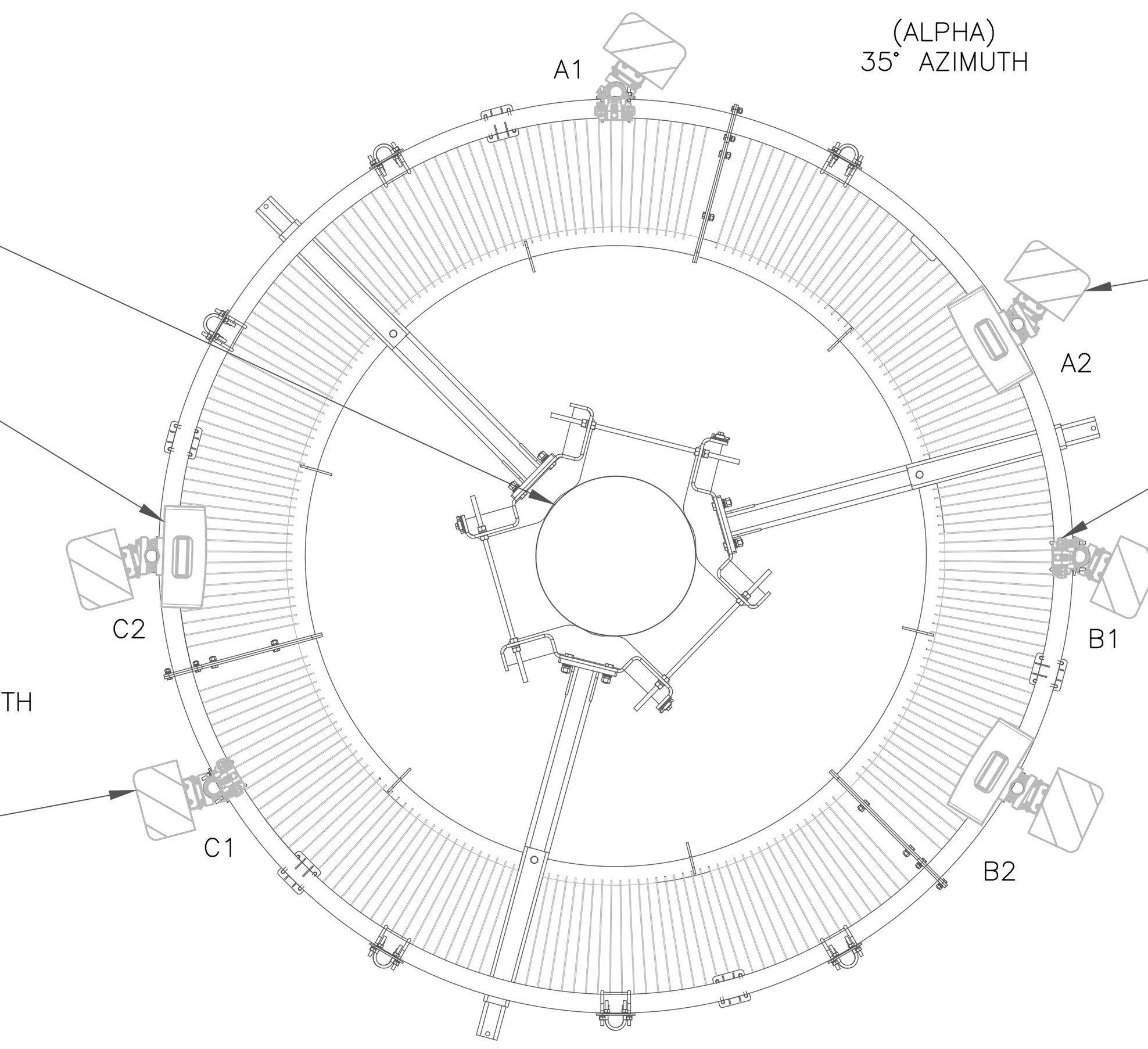
EXISTING MOUNT SIZE AND ORIENTATION PROVIDED BY THE TOWER OWNER. IF ROTATION OF EXISTING MOUNTS IS REQUIRED TO MEET AZIMUTHS, PLEASE NOTIFY T-MOBILE RF PRIOR TO CONSTRUCTION. IF 36" CLEARANCE BETWEEN ANTENNAS CANNOT BE MET AND A NEW MOUNT IS REQUIRED, PLEASE NOTIFY T-MOBILE CONSTRUCTION MANAGER IMMEDIATELY.

INSTALLER NOTE:

EXISTING AND PROPOSED ANTENNA/ EQUIPMENT POSITIONING SHOWN PER RFDS. FIELD CONDITIONS MAY VARY.

TIE-BACK ARM NOTE:

TIE-BACK ARMS SHOWN ARE FOR REFERENCE PURPOSES ONLY. TIE-BACK ARMS TO BE INSTALLED PER MOUNT MANUFACTURERS SPECIFICATIONS, ALSO ADHERING TO CROWN CASTLE CED-STD-10294 STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES.



2 EXISTING ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

N

ANALYSIS CRITERIA:

BUILDING CODE: 2018 IBC
TIA-222 REVISION: TIA-222-H
RISK CATEGORY: II
WIND SPEED: 115 mph
EXPOSURE CATEGORY: C
TOPOGRAPHIC FACTOR: 1.0
ICE THICKNESS: 1.0 in
WIND SPEED WITH ICE: 40 mph
SERVICE WIND SPEED: 60 mph

RECOMMENDATIONS:

PER MA BY TEP DATED 05/12/22, THE MOUNT HAS SUFFICIENT CAPACITY TO CARRY THE PROPOSED LOAD CONFIGURATION. NO MODIFICATIONS ARE REQUIRED AT THIS TIME.

4) ANALYSIS RESULTS

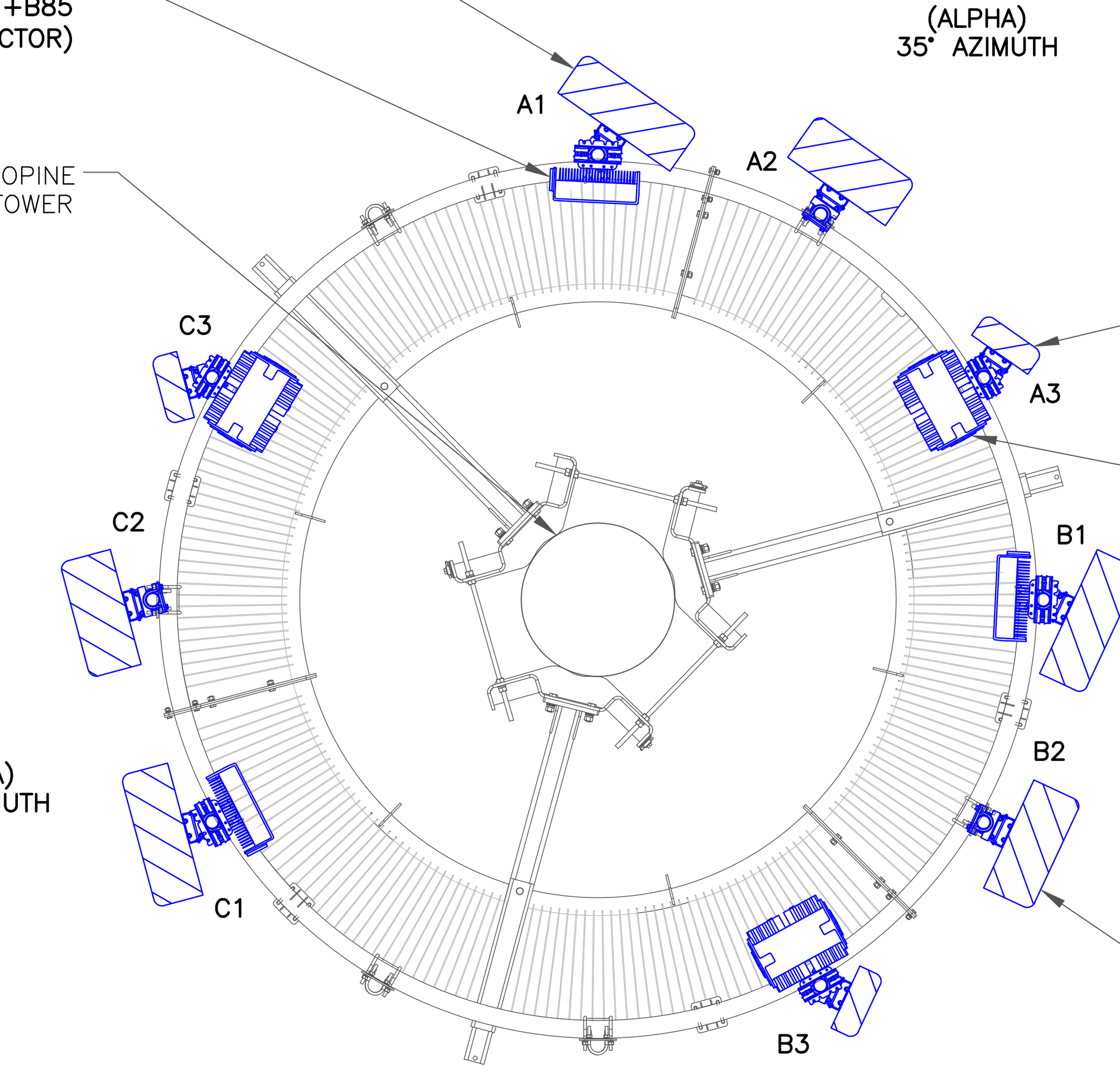
Table 3 - Mount Component Stresses vs. Capacity (Platform w/ Support Rail Mount)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontals	M304	110.0	25.6	Pass
1	Support Arms	SA-2	110.0	37.4	Pass
1	Internals	M526	110.0	32.6	Pass
1	Support Rails	M563	110.0	9.4	Pass
1	Mount Pipes	MP-1	110.0	31.5	Pass
2	Connection Bolts	-	110.0	23.7	Pass
2	Connection Plate	-	110.0	44.0	Pass
Structure Rating (max from all components) =					44.0%

Notes:
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity listed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

1) If the load differs from that described in Table 1 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The mount and its connection have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.



TOWER ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.

3 FINAL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

N

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T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

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0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM

SEAL:

06/23/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am duly licensed professional engineer under the laws of the State of Maryland
License No. 51609
Expiration Date: 10/01/2023

SHEET NUMBER: S-1
REVISION: 2

NOTE:
LOAD CALCULATIONS TAKEN FROM INFORMATION PROVIDED BY CROWN CASTLE & BASED ON THE RFDS DATED 2/21/22, 9. CONTRACTOR TO VERIFY LOADS WITH MANUFACTURER'S SPECIFICATIONS PRIOR TO CONSTRUCTION

EXISTING 200A M.C.B, 240/120 VAC, 1ø, 3W PPC PANEL SCHEDULE

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
BTS	0		40	1	A	2	60	3274		PPC
		0		3	B	4			3274	
LIGHT /OFF	0		20	5	A	6	15	180		GFCI
FAN		360	20	7	B	8	80		0	NODE B
SPARE	–	–	–	9	A	10		0		
SPARE	–	–	–	11	B	12	–		–	SPARE
VOLT AMPS	0	360						3454	3274	VOLT AMPS

L1 VOLT AMPERES	3454	L2 VOLT AMPERES
	3634	MAX VOLT AMPERES
	30.3	MAX AMPS
	37.9	MAX AMPS x 125%

PROPOSED 200A M.C.B, 240/120 VAC, 1ø, 3W PPC PANEL SCHEDULE

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
BTS	0		40	1	A	2	60	5740		PPC
		0		3	B	4			5740	
LIGHT /OFF	0		20	5	A	6	15	180		GFCI
FAN		360	20	7	B	8	80		0	NODE B
6160 ENCLOSURE	**2770**	–	**150**	9	A	10		0		
	–	**2770**		11	B	12	**20**		**180**	INTERNAL 6160 GFCI
VOLT AMPS	2770	3130						5920	5920	VOLT AMPS

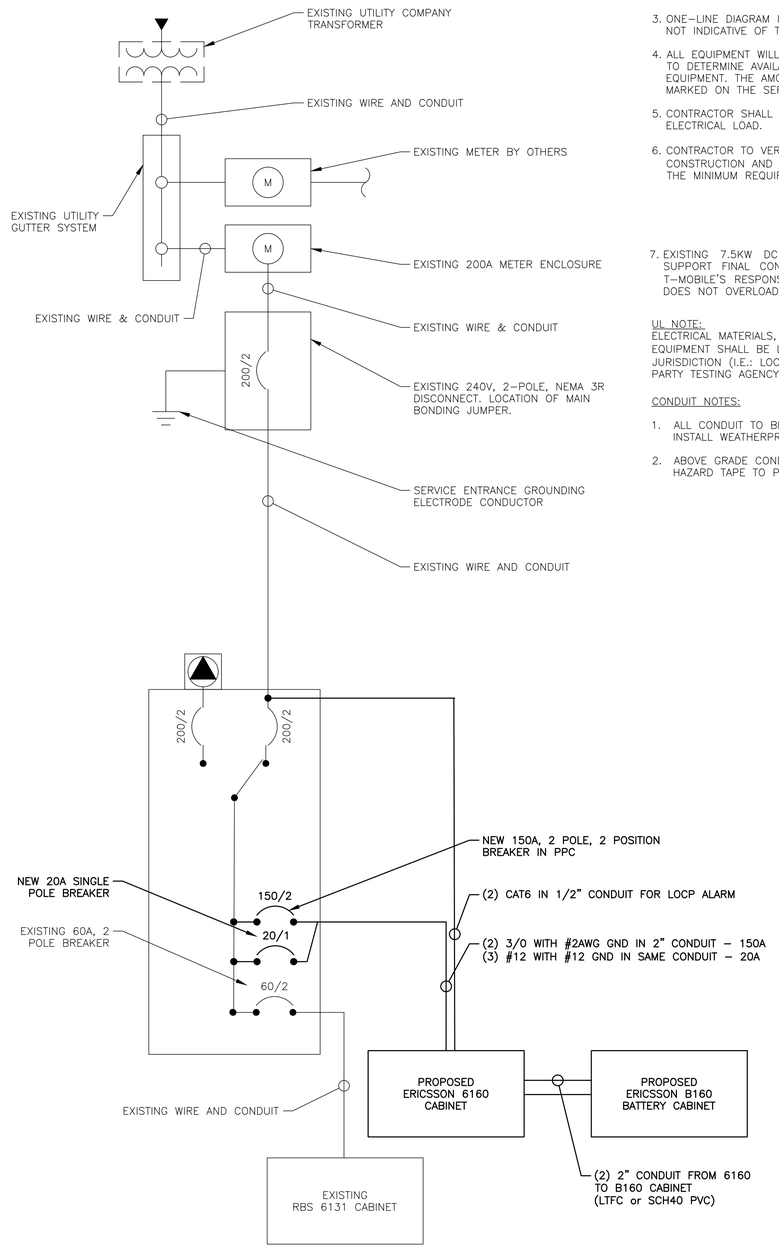
L1 VOLT AMPERES	8690	L2 VOLT AMPERES
	9050	MAX VOLT AMPERES
	75.4	MAX AMPS
	94.3	MAX AMPS x 125%

PROPOSED BREAKER & LOADING IN BOLD

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE

GENERAL NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.



2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

ONE-LINE DIAGRAM NOTES:
1. ELECTRICAL SERVICE SHALL BE 200A, 120/240V, 1ø, 3W.
2. FOR COMPLETE INTERNAL WIRING AND ARRANGEMENT, REFER TO VENDOR PRINTS PROVIDED BY EQUIPMENT MANUFACTURER.

UTILITY NOTES:
1. CONTRACTOR SHALL VERIFY AVAILABLE FAULT CURRENT WITH POWER COMPANY AND ENSURE ALL ELECTRICAL EQUIPMENT IS SUITABLE FOR AVAILABLE FAULT CURRENT.
2. CONTRACTOR SHALL COORDINATE UTILITY SERVICES WITH LOCAL UTILITY COMPANIES. VERIFY ALL REQUIREMENTS WITH UTILITY COMPANY STANDARDS.
3. ONE-LINE DIAGRAM IS FOR SCHEMATIC PURPOSES ONLY AND IS NOT INDICATIVE OF THE ACTUAL EQUIPMENT LAYOUT.
4. ALL EQUIPMENT WILL HAVE A MINIMUM AIC OF 10 KA. CONTRACTOR TO DETERMINE AVAILABLE FAULT CURRENT BEFORE ENERGIZING EQUIPMENT. THE AMOUNT OF AVAILABLE FAULT CURRENT SHALL BE MARKED ON THE SERVICE EQUIPMENT PER NEC 110.24.
5. CONTRACTOR SHALL NOTIFY UTILITY COMPANY OF CHANGES IN ELECTRICAL LOAD.
6. CONTRACTOR TO VERIFY EXISTING CONDUIT(S) SIZE(S) PRIOR TO CONSTRUCTION AND MAY REUSE EXISTING CONDUIT(S) IF THEY MEET THE MINIMUM REQUIREMENTS PER NEC CODE.
7. EXISTING 7.5KW DC GENERATOR ASSUMED TO HAVE CAPACITY TO SUPPORT FINAL CONFIGURATION OF T-MOBILE 6201 CABINET. IT IS T-MOBILE'S RESPONSIBILITY TO VERIFY THE LOAD ON THE DC PLANT DOES NOT OVERLOAD THE CAPACITY OF THE DC GENERATOR.

UL NOTE:
ELECTRICAL MATERIALS, DEVICES, CONDUCTORS, APPLIANCES AND EQUIPMENT SHALL BE LABELED/LISTED BY UL OR ACCEPTED BY JURISDICTION (I.E.: LOCAL COUNTY OR STATE) APPROVED THIRD PARTY TESTING AGENCY

CONDUIT NOTES:
1. ALL CONDUIT TO BE SCH40 PVC OR LTFC, AS NOTED. INSTALL WEATHERPROOF FITTINGS.
2. ABOVE GRADE CONDUIT RUNS TO BE MARKED WITH HAZARD TAPE TO PREVENT TRIPPING HAZARD.

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RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

SHEET NUMBER: E-1
REVISION: 0

T-MOBILE GROUNDING NOTES:

ALL GROUNDS MUST ROUTE DOWNHILL FOR ENTIRE DURATION OF ROUTE

1. PROVIDE LABOR, MATERIALS, INSPECTION, AND TESTING TO PROVIDE CODE COMPLIANCE FOR ELECTRIC, TELEPHONE, AND GROUNDING/LIGHTNING SYSTEMS.

ICE BRIDGE/ EQUIPMENT POST:

#2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED TO GROUND RING (BOTH ENDS), FINAL WELD COLD GALVANIZED, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, ANCHORED TO PAD/PLATFORM TO AVOID TRIP HAZARD USING HAMMER SET ANCHORS.

PEDESTALS, PLINTHS, SSC CABINET, FCOA CABINETS:

1. #2 SOLID COPPER TINNED, 2 HOLE LUG WITH FLAT AND LOCK WASHER AT EQUIPMENT; EXOTHERMICALLY WELDED TO GROUND RING, FINAL WELD COLD GALVANIZED, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, ANCHORED TO PAD TO AVOID TRIP HAZARD USING HAMMER SET ANCHORS. EACH PART REQUIRES A SEPARATE DOWNLEAD, NO DAISY CHAINS.

2. ALL COMPONENTS INSIDE FCOA CABINETS REQUIRE A DEDICATED GROUND.

COVP's:

#6 THHN STRANDED (GREEN JACKET), CONNECTED AT EQUIPMENT SIDE USING OVP TERMINAL BLOCK CONNECTION; MECHANICALLY CONNECTED TO GROUND REFERENCE AT MASTER BUSS BAR USING 2 HOLE LUG WITH FLAT AND LOCK WASHER, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, AND ANCHORED TO PAD/PLATFORM TO AVOID TRIP HAZARD.

ANTENNA/ COVP/ RRU MAST PIPES:

1. ALL VERTICAL MAST PIPES: #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED TO TOP OF PIPE (PIPE, DOWN MOLD), FINAL WELD COLD GALVANIZED, BONDED TO TOP BUSS BAR WITH 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER.

2. EXISTING/REUSED PIPES: #2 SOLID COPPER TINNED, BONDED WITH COLD WATER CLAMP TO TOP OF PIPE, BONDED TO TOP BUSS WITH 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER

AIR TERMINALS:

TO BE INSTALLED, ONLY IF REQUIRED

TMA's, DIPLEXERS AND TRIPLEXERS:

1. #6 THHN, WITH PROPER COPPER COMPRESSION LUG, FLATS AND LOCK WASHERS

2. ALL GROUND LUGS ON TMA MUST BE GROUNDED WITH SEPARATE DOWNLEAD TO BUSS BAR (NO DAISY CHAINS)

ELEVATED STEEL PLATFORMS WITH LUNAR FEET:

#2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (FLAT PLATE MOLD) TO OUTSIDE PERIMETER BEAMS IN FOUR (4) PLACES, FINAL WELD COLD GALVANIZED, BONDED DIRECTLY TO SUBGRADE GROUND RING.

STEEL CANOPY (STEEL PLATFORM OR CONCRETE PAD):

1. #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (PIPE, DOWN MOLD) TO BOTTOM OF ALL VERTICAL SUPPORT POSTS, TYPICALLY FOUR (4) PIPES, FINAL WELD COLD GALVANIZED, BONDED DIRECTLY TO SUBGRADE GROUND RING.

2. #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (PIPE, UP MOLD) TO TOP OF ALL VERTICAL SUPPORT POSTS, TYPICALLY FOUR (4) PIPES, FINAL WELD COLD GALVANIZED, BONDED UP TO CANOPY GRIP-STRUT USING 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER.

RRU:

#6 THHN, WITH PROPER COPPER COMPRESSION LUG, ANTI-OXIDANT TO SECTOR BUSS BAR

FSBE ALARM BOX:

#6 THHN WITH ONE HOLE LUG BONDED TO PREVIOUSLY GROUNDED FCOA, PLINTH OR BUSS BAR.

SURGE SUPPRESSORS:

#6 THHN TO PREVIOUSLY GROUNDED BUSS BAR USING PROPER LUGS

FYGA/FYGB BRACKET:

1. #6 THHN TO PREVIOUSLY GROUNDED BUSS BAR USING PROPER LUGS

2. THROUGH BOLTS WITH FLAT, LOCK ON BRACKET

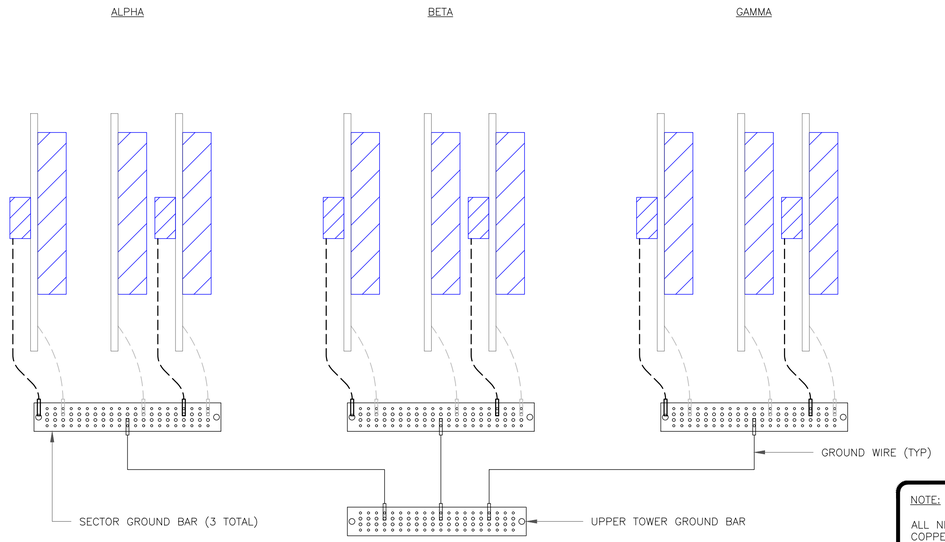
BUSS BARS:

1. PLATFORM / PAD BUSS BAR SHOULD BE MINIMUM 12" TINNED COPPER WITH INSULATORS, AND SHOULD HAVE TWO (2) EXOTHERMICALLY WELDED DOWN LEADS DIRECTLY TO GROUND RING USING #2 SOLID COPPER TINNED WIRE.

2. SECTOR BUSS BAR SHOULD BE PROPERLY SIZED TO ACCOMMODATE NECESSARY GROUNDING FOR EQUIPMENT ON EACH MOUNT, AND MAY BE SOLID COPPER (TINNED NOT REQUIRED). DO NOT USE INSULATORS ON SECTOR BUSS BARS ATTACH DIRECTLY TO TOWER MOUNT STEEL.

GENERAL:

- NO GROUND KITS ON HYBRID TRUNKS (TOP OR BOTTOM)
- NO GROUND KITS ON MICROWAVE IF CABLES (TOP OR BOTTOM)
- MICROWAVE SURGE SUPPRESSORS ARE NOT TO BE INSTALLED UPSTAIRS ON TOWER, DOWNSTAIRS ONLY (BULKHEAD PREFERRED)
- MICROWAVE ODU MUST BE GROUNDED TO TOWER TOP SECTOR OR COLLECTOR BUSS BAR
- ALL TMA'S AND DIPLEXERS MUST BE GROUNDED TO BUSS BAR. NO DAISY CHAIN ON TWIN/DUAL TMA
- ALL LUGS SHOULD BE PROPERLY SIZED FOR CONDUCTOR, BURNDY TINNED COPPER COMPRESSION STYLE
  1. INDOOR (OR INSIDE CABINET) SHOULD HAVE WINDOW
  2. OUTDOOR SHOULD NOT HAVE WINDOW
- CONTRACTOR TO VERIFY EXISTENCE AND LOCATION OF EXISTING SITE GROUND SYSTEM.
- CONTRACTOR SHALL VERIFY THAT GROUNDING ELECTRODES SHALL BE CONNECTED IN A RING USING #2 AWG BARE TINNED COPPER WIRE. THE TOP OF THE GROUND RODS AND THE RING CONDUCTOR SHALL BE 30" BELOW FINISHED GRADE, OR TO FROST DEPTH, WHICHEVER IS GREATER. GROUNDING ELECTRODES SHALL BE DRIVEN ON 10'-0" CENTERS (PROVIDE AND INSTALL AS REQUIRED. REQUIRED PER PLAN BELOW).
- GROUNDING CONDUCTORS SHALL BE OF EQUAL LENGTH, MATERIAL, AND BONDING TECHNIQUE.
- CONTRACTOR SHALL ENSURE GROUND RING IS WITHIN 12 TO 36 INCHES OF THE EQUIPMENT PAD. PROVIDE AND INSTALL GROUNDING CONNECTIONS SHOWN BELOW AS NEEDED PER EXISTING SITE GROUNDING SYSTEM. CONTRACTOR SHALL VERIFY ALL EXISTING SITE GROUNDING CONDITIONS BEFORE STARTING WORK OR PURCHASING EQUIPMENT.
- ALL DOWN CONDUCTORS MUST GO DOWN.



NOTE:

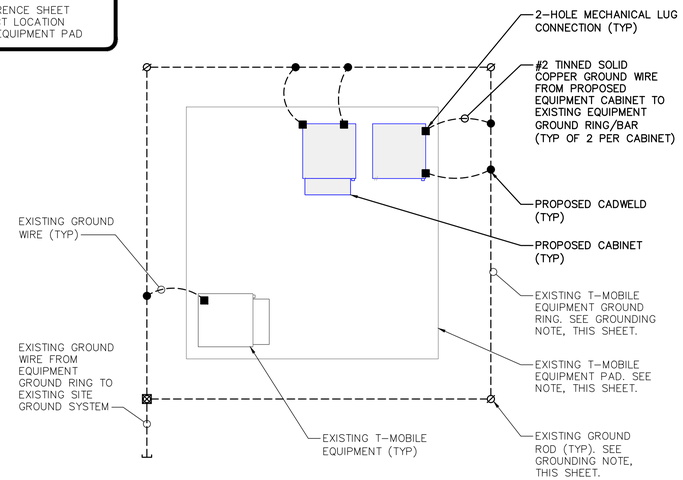
ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

GROUNDING SHOWN TYPICAL PER SECTOR.

1 TYPICAL ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

NOTE:

CONTRACTOR TO REFERENCE SHEET C-1.1 & 1.2 FOR EXACT LOCATION AND ORIENTATION OF EQUIPMENT PAD



2 TYPICAL CABINET GROUNDING DIAGRAM
SCALE: NOT TO SCALE

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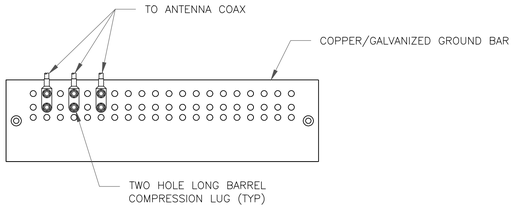
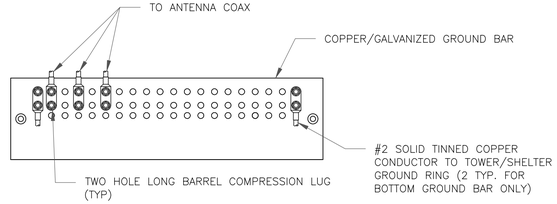


NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

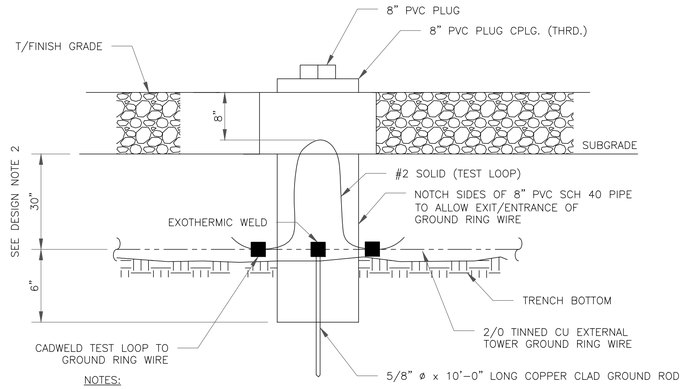
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

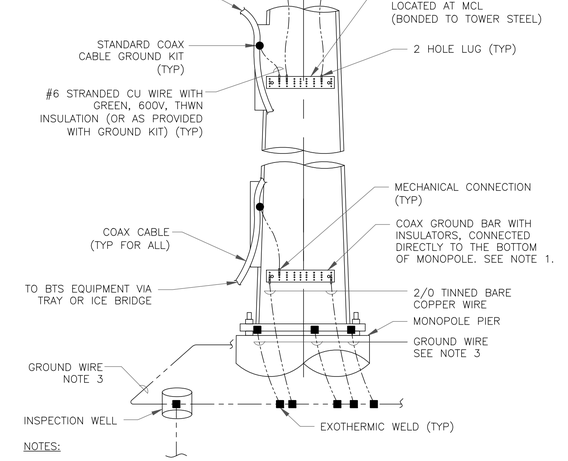
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

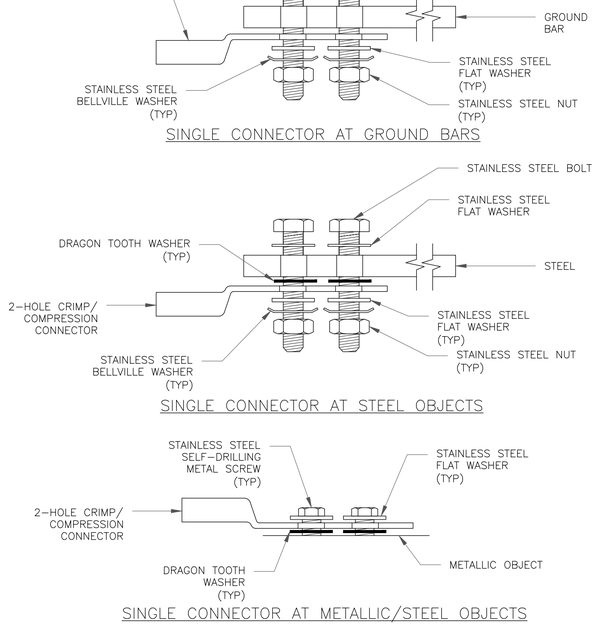
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



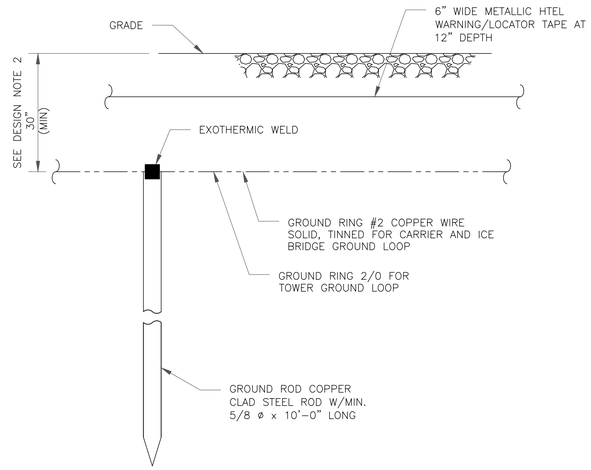
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

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SEAL:

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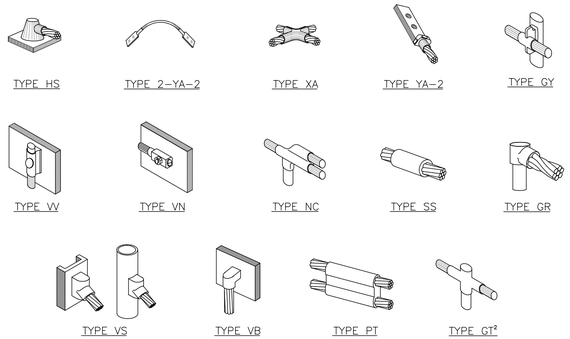
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: G-2

REVISION: 0

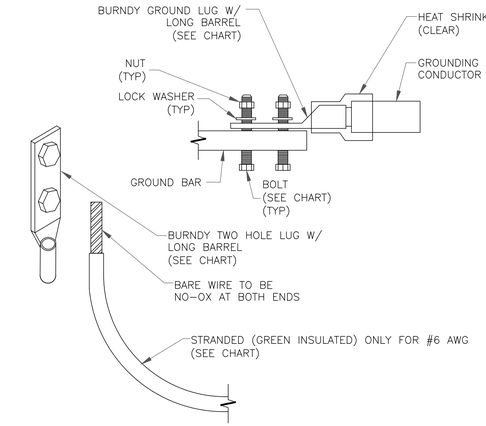


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

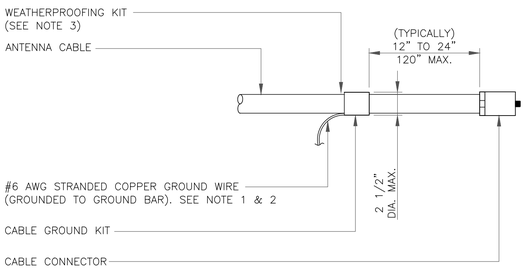
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

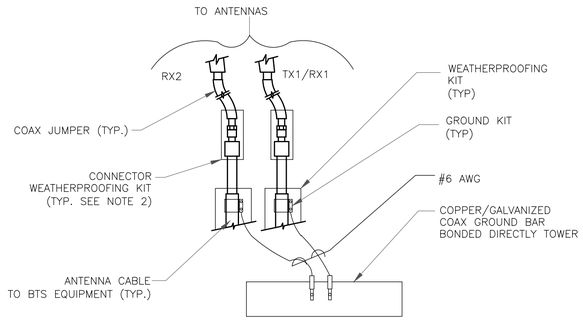
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

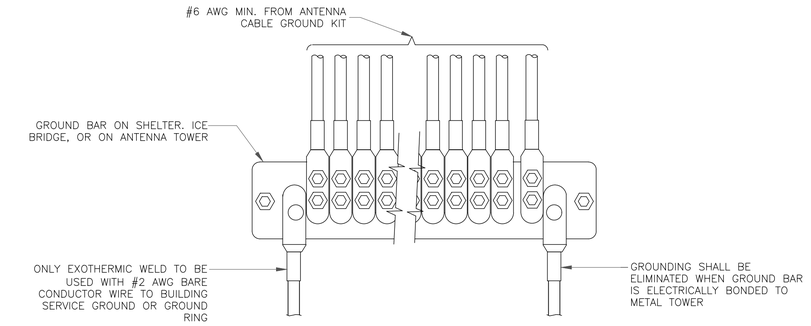
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



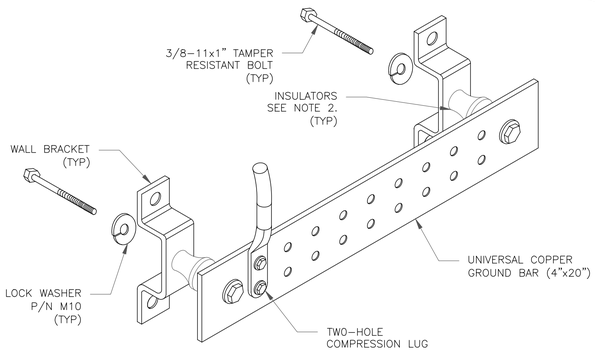
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



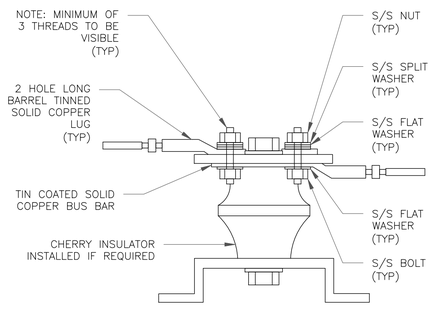
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



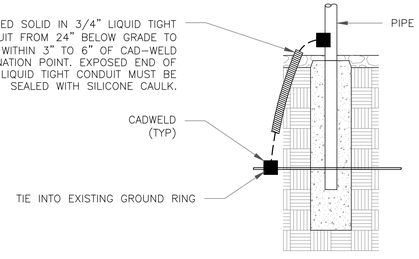
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
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BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: G-3

REVISION: 0

App No: 2022061827

Revisions received 7.28.22 - JE

Application General Information

Applicant Name	Crown Castle USA Inc	Received	6/9/2022
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	T-Mobile	Will site be used to support government telecommunications facilities or other equipment for government use?	No
Solution Type	Other		
Existing	Existing	Gvt. Use Desc.	

Application Description

TOWER SCOPE OF WORK: REMOVE (6) ANTENNAS, (3) TMAs, (3) RRUs 11 B12, (12) COAX CABLES and (1) 9x18 HCS 60m CABLES.
INSTALL (9) ANTENNAS, (6) RRUs and (3) 6x24 4AWG 60m CABLES.
GROUND SCOPE OF WORK: REMOVE (1) RBS 2106 CABINET, (1) DUW30 and (6) RU22. INSTALL (2) CABINETS, (2) PSU 4813 BOOSTER, (1) BB 6648, (1) IXRe ROUTER, (2) RP 6651 and CAM-LOK GENERATOR CONNECTOR.

Site Information

Site Id	55	Zoning	RE-2C
Structure Type	Monopole	Latitude	38.995137
Street Address	10010 Oaklyn Dr	Longitude	-77.203813
County Site Name	Avenel Golf Course	Ground Elevation	331
Carrier Site Name	7WAN098A	City	Potomac
Site Owner	WSSC	Lease Status	Leased
Structure Owner	Crown Castle USA, Inc	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	130		
Provide the proposed height of the replacement structure without any antenna (New Apps Only)		Distance to Residential Property (New, Colocation Only)	
		Distance to Commercial Property (New, Colocation Only)	

Justification of why this site was selected:

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

NearbySites (New Apps Only):

Thursday, June 9, 2022
4:57:26 PM

App No: 2022061827

Screening considerations(New, Colocation Apps Only):

Thursday, June 9, 2022

4:57:26 PM

App No: 2022061827

6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only): Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater? No

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet? No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet? No

Will the proposed installation require more the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets?YN No

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater? No

Does the structure or current installation have concealment elements/measures? Yes

Will the proposed installation require excavation or expansion outside the current boundaries of the site? No

If yes, describe how the proposed installation does not defeat the existing concealment. swap/add of antennas will not effect the appearance of the monopine

Small Wireless Facility Information

Small Wireless Facility Questions

Small Wireless Facility? No

Is the structure 10% taller than adjacent structures?

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet 17.02

Please list adjacent structure heights

Tribal Lands? No

Cumulative volume of the proposed antenna(s) exclusive of equipment in cubic feet

ROW Information

PROW? No

Pole Number

ROW owner

ROW width

Thursday, June 9, 2022

4:57:26 PM

App No: 2022061827

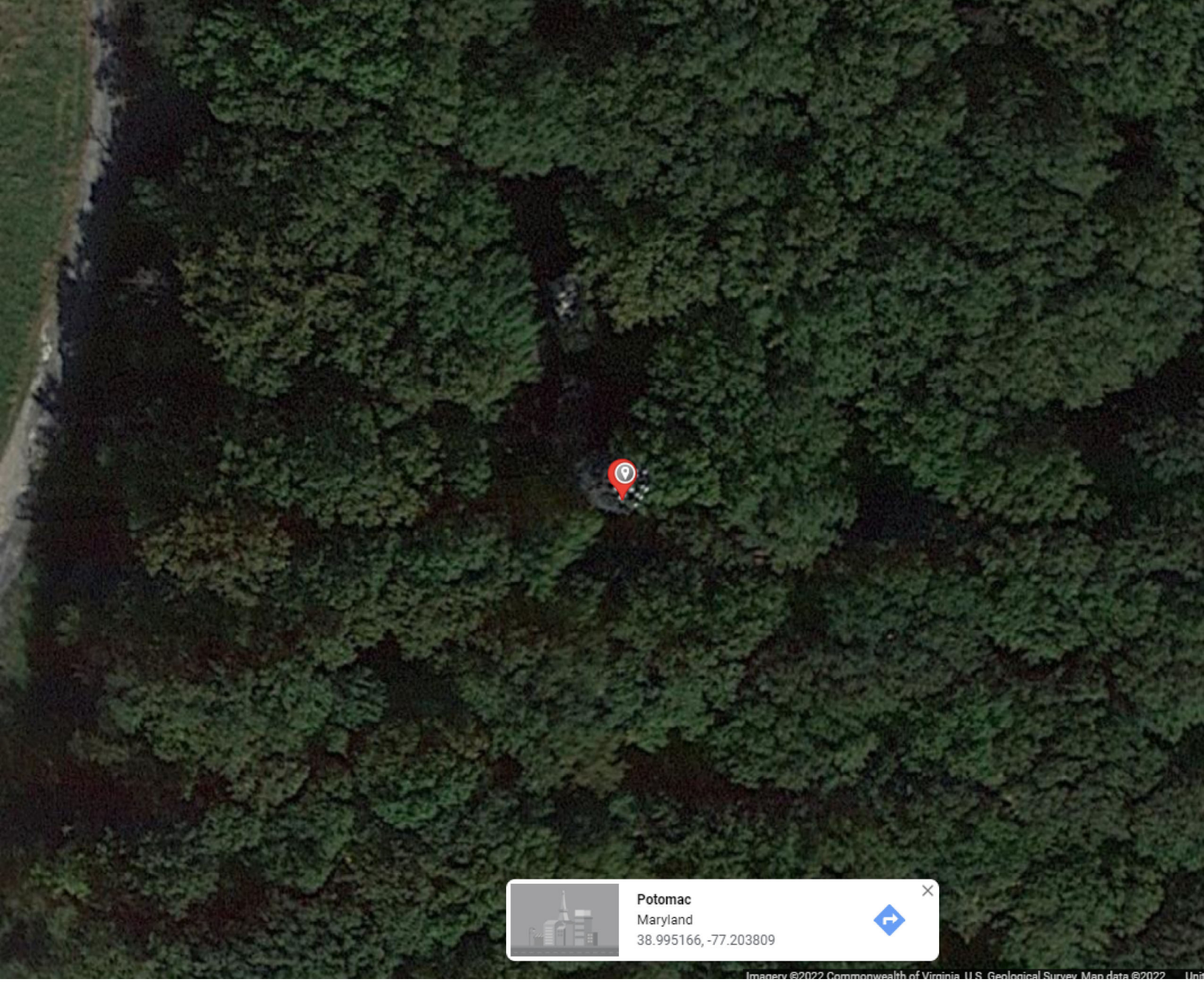
Antenna Information

Antenna Compliance	Yes
Compliance Desc	
Antenna Location	No
Antenna Loc. Desc.	
Env. Assessment	
Cat. Excluded?	
Routine Env. Evaluation	checked

Antenna Model	APXVAALL24_43-U-NA20						
Frequency	Rx:668-688, Tx:622-642 (600) Tx:728-734, Rx:698-704 (700)						
RAD Center	110	Max ERP	3390	Antenna Dimensions	95.9H, 24W, 8.5D	Quantity	3

Antenna Model	AIR6419 B41						
Frequency	Tx:2593-2690, Rx:2496-2592						
RAD Center	110	Max ERP	32886	Antenna Dimensions	36.25H, 20.91W, 9.02D	Quantity	3

Antenna Model	VV-65A-R1						
Frequency	Tx:1965-1975, Rx:1885-1895 PCS & Tx:2135-2155, Rx:1735-1755 AWS						
RAD Center	110	Max ERP	12166	Antenna Dimensions	54.7H, 12.1W, 4.6D	Quantity	3


Potomac
Maryland
38.995166, -77.203809
Imagery ©2022 Commonwealth of Virginia, U.S. Geological Survey, Map data ©2022

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

HIGH BAND LEFT ARRAY (1695-2200 MHZ) [B1]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain	dBi	17.3	17.8	18.5
Horizontal Beamwidth @3dB	Deg	66	59	59
Vertical Beamwidth @3dB	Deg	5.3	4.7	4.3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	25	25
Cross Polar Discrimination (XPD) @ Boresight	dB	19	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	4
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

HIGH BAND RIGHT ARRAY (1695-2200 MHZ) [B2]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain	dBi	17.1	17.8	18.5
Horizontal Beamwidth @3dB	Deg	66	59	59
Vertical Beamwidth @3dB	Deg	5.2	4.7	4.3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	24	25
Cross Polar Discrimination (XPD) @ Boresight	dB	20	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	5
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

APXVAALL24_43-U-NA20

Dual Slant Polarized Quad Band (8 Port) Antenna, x2 617-894 / x2 1695-2690MHz, 65deg, 2.4m (8ft), RET, 2-12°

FEATURES / BENEFITS

This antenna provides an 8 Port multi-band platform for flexible use in deployment scenarios encompassing 600, 700, 800, AWS, PCS & BRS applications.

- 24 Inch Width For Easier Zoning
- Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality
- Superior elevation pattern performance across the entire electrical down tilt range
- Includes two ACU-A20-SR AISG RET motors
- Low band arrays driven by a single RET motor
- Mid band arrays driven by a single RET motor

Technical features

RADIO FREQUENCY SYSTEMS

ELECTRICAL SPECIFICATIONS

Electrical Specification Header		Low Band Arrays (617-894 MHz) Ports 1-4		
Frequency Band	MHz	617-698	698-806	806-894
Gain	dBi	15.8	16.0	16.1
Azimuth Beamwidth 3dB	Deg	65 +/-2	64 +/-2	62 +/-5
Elevation Beamwidth 3dB	Deg	9.9 +/-1	8.6 +/-.8	7.5 +/-.5
Cross-Pol at Boresight	dB	17	19	17
F/B at 180 Copolar	dB	30	30	32
Electrical Downtilt	Deg	2 to 12	2 to 12	2 to 12
First Upper Side Lobe	dB	16	16	14
VSWR	-	1.5:1	1.5:1	1.5:1
Return Loss	dB	-14	-14	-14
Cross Polar Isolation	dB	25	25	25
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
Maximum CW Power per Port	Watt	400	400	400
Gain Over All Tilts	dBi	15.2 +/- .6	15.5 +/- .5	15.7 +/- .4
Cross-Pol over Sector	dB	4	4	6
F/B at +/-30 Total Power	dB	17	19	23

ELECTRICAL SPECIFICATIONS

RADIO FREQUENCY SYSTEMS

Electrical Specification Header		Mid Band Arrays (1695-2690 MHz) Ports 5-8			
Frequency Band	MHz	1695-1780	1850-1990	1995-2200	2200-2690
Gain	dBi	18.2	18.7	19.1	18.7
Azimuth Beamwidth 3dB	Deg	67 +/-5	65 +/-4	66 +/-8	61 +/-6
Elevation Beamwidth 3dB	Deg	6.0 +/- .2	5.0 +/-.5	4.5 +/-.3	4.0 +/-.3
Cross-Pol at Boresight	dB	22	18	14	18
F/B at 180 Copolar	dB	31	30	29	27
Electrical Downtilt	Deg	2 to 12	2 to 12	2 to 12	2 to 12
First Upper Side Lobe	dB	15	15	15	14
VSWR	-	1.5:1	1.5:1	1.5:1	1.5:1
Return Loss	dB	-14	-14	-14	-14
Cross Polar Isolation	dB	25	25	25	25
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153	-153
Maximum CW Power per Port	Watt	300	300	300	300
Gain Over All Tilts	dBi	17.5 +/- .6	17.9 +/- .6	18.5 +/- .5	17.8 +/- .6
Cross-Pol over Sector	dB	8	8	8	2
F/B at +/-30 Total Power	dB	25	23	22	19
Upper Side Lobe Peak to +20	dB	14	14	14	13

Impedance	Ohm	50
Polarization	Deg	+/- 45

MECHANICAL SPECIFICATIONS

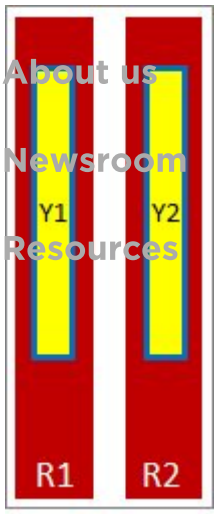
Dimensions - H x W x D	mm (in)	2436 x 609 x 215 (96 x 24 x 8.5)
Weight (Antenna Only)	kg (lb)	56 (123)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	78 (172)
Connector type		8 x 4.3-10 female at bottom
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		Direct Ground
Survival/Rated Wind Velocity	km/h	240 (150)
Wind Load @Rated Wind Front	N	1428
Wind Load @Rated Wind Side	N	434
Wind Load @Rated Wind Rear	N	1476
Survival wind Velocity	km/h	240

Order No.	Configuration	Mounting Hardware	Diameter	Weight
APxVAALL24_43-U-NA20	ACU-A20-SR Field Replace RET included (2)	APM40-5E Beam tilt kit (included)	60-120mm	78 Kg

Port	Array	Frequency	RET	AISG RET UID
1	R1	617-894	R1	RFxxxxxxxxxx-2R1
2		617-894		
3	R2	617-894		
4		617-894		
5	Y1	1695-2690	Y1	RFxxxxxxxxxx-2Y1
6		1695-2690		
7	Y2	1695-2690		
8		1695-2690		



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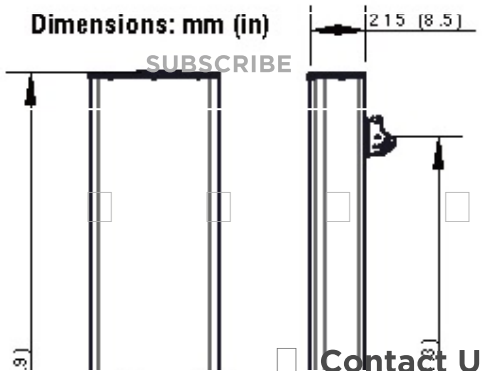
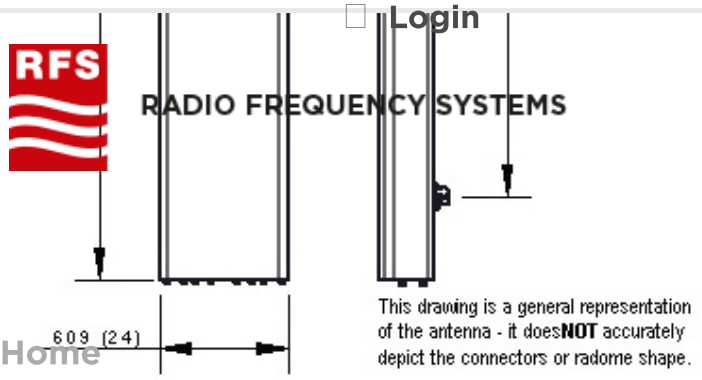
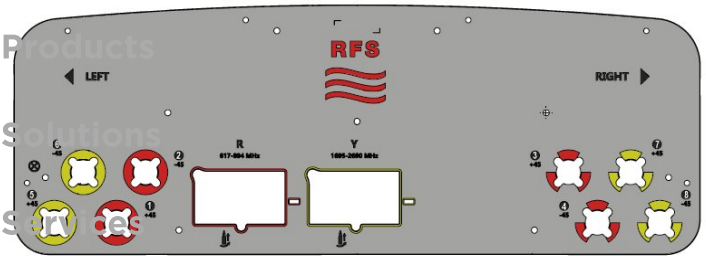






RET Information		
Frequency	617-894	1695-2690
Model	ACU-A20-SR	ACU-A20-SR
Location	Semi-internal	Semi-Internal
Field Replaceable	Yes	Yes
Quantity	1	1
RET ID	R1	Y1

External Document Links

APM40_Series_Installation_Instructions
Global RFS Website

Notes

- All electrical parameters are compliant with BASTA NGMN 11.1 requirements.
- For additional mounting information please click ""External Document Links"".

- **Radiating patterns:** Request pattern files

VV-65A-R1

4-port sector antenna, 4x 1695–2690 MHz, 65° HPBW, 1x RET,The two high band arrays utilize a common tilt.

- The RET interface comprises one pair of AISG input/output ports

General Specifications

Antenna Type	Sector
Band	Single band
Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage
Radome Material	PVC, UV resistant
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, total	4

Remote Electrical Tilt (RET) Information

RET Hardware	CommRET v2
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
Input Voltage	10–30 Vdc
Internal RET	High band (1)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	10 W
Protocol	3GPP/AISG 2.0

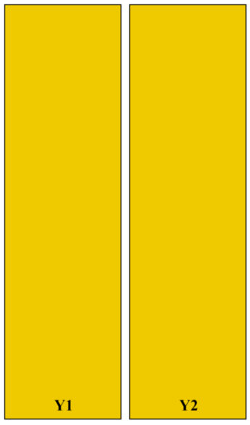
Dimensions

Width	307 mm | 12.087 in
Depth	118 mm | 4.646 in
Length	1390 mm | 54.724 in

VV-65A-R1

Net Weight, without mounting kit	10.8 kg | 23.81 lb

Array Layout



Array ID	Frequency (MHz)	RF Connector	HPBW	RET (SRET)	AISG No.	AISG RET UID
Y1	1695-2690	1 - 2	65°	1	AISG1	CPxxxxxxxxxxxxxxxY1
Y2	1695-2690	3 - 4	65°			

(Sizes of colored boxes are not true depictions of array sizes)

Port Configuration

Electrical Specifications

Impedance	50 ohm
Operating Frequency Band	1695 – 2690 MHz
Polarization	±45°
Total Input Power, maximum	400 W @ 50 °C

Electrical Specifications

Frequency Band, MHz	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2500**	**2490–2690**

Gain, dBi	17.5	17.7	18.2	18.5	18.6
Beamwidth, Horizontal, degrees	66	65	66	63	62
Beamwidth, Vertical, degrees	6.9	6.5	6.1	5.4	5.2
Beam Tilt, degrees	0–12	0–12	0–12	0–12	0–12
USLS (First Lobe), dB	17	18	18	21	21
Front-to-Back Ratio at 180°, dB	30	31	32	29	30
Isolation, Cross Polarization, dB	30	30	30	30	30
Isolation, Inter-band, dB	28	28	28	28	28
VSWR | Return loss, dB	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
Input Power per Port at 50°C, maximum, watts	300	300	300	300	250

Electrical Specifications, BASTA

Frequency Band, MHz	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2500**	**2490–2690**
Gain by all Beam Tilts, average, dBi	17.1	17.5	17.9	18.3	18.2
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.4	±0.4	±0.4	±0.5
Beamwidth, Horizontal Tolerance, degrees	±4.5	±3.5	±2.7	±2.5	±3.2
Beamwidth, Vertical Tolerance, degrees	±0.4	±0.3	±0.5	±0.2	±0.2
USLS, beampeak to 20° above beampeak, dB	16	17	17	18	16
Front-to-Back Total Power at 180° ± 30°, dB	24	26	27	26	26
CPR at Boresight, dB	16	17	17	20	19
CPR at Sector, dB	15	14	13	7	9

Mechanical Specifications

Wind Loading @ Velocity, frontal	494.0 N @ 150 km/h (111.1 lbf @ 150 km/h)
Wind Loading @ Velocity, lateral	102.0 N @ 150 km/h (22.9 lbf @ 150 km/h)
Wind Loading @ Velocity, rear	598.0 N @ 150 km/h (134.4 lbf @ 150 km/h)
Wind Speed, maximum	241 km/h | 149.75 mph

VV-65A-R1

Packaging and Weights

Width, packed	404 mm | 15.906 in
Depth, packed	278 mm | 10.945 in
Length, packed	1527 mm | 60.118 in
Weight, gross	19 kg | 41.888 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant/Exempted

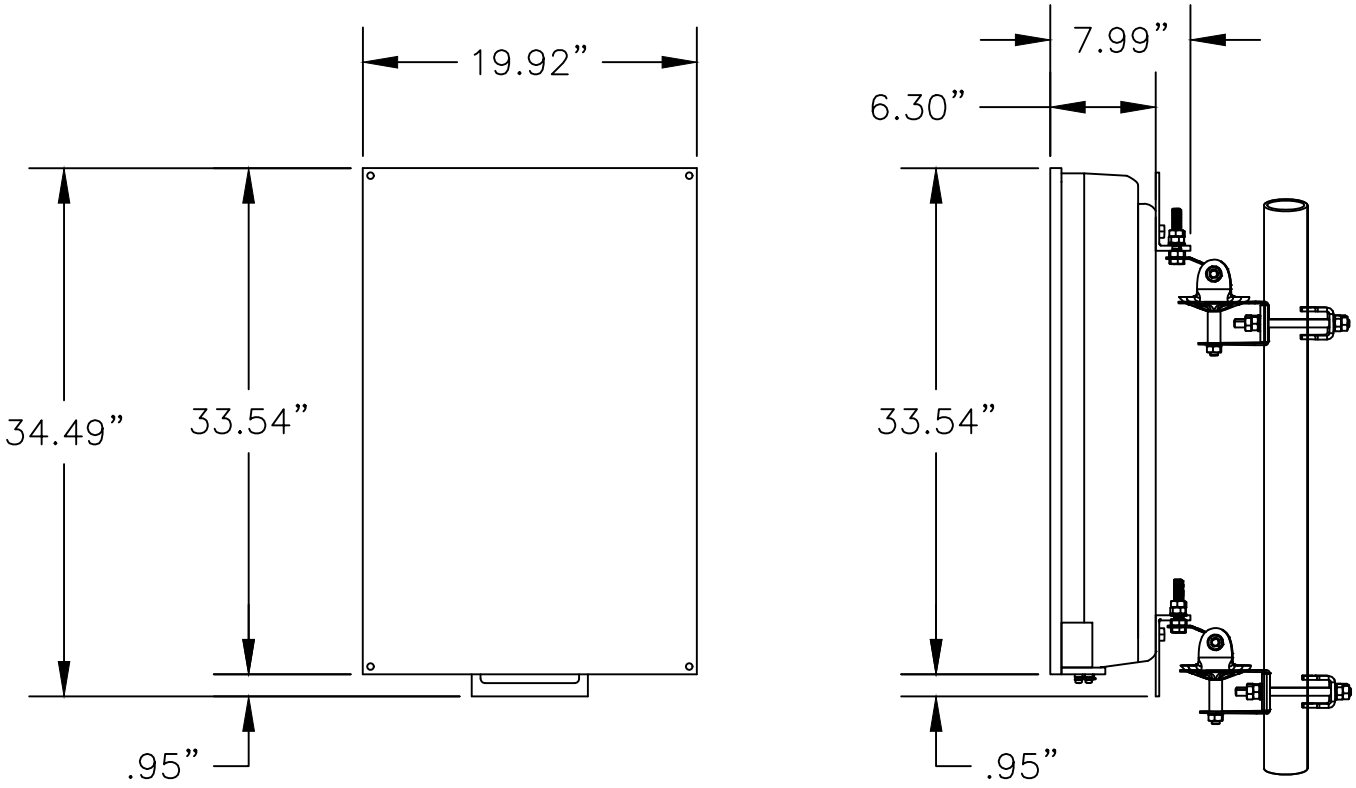
Included Products

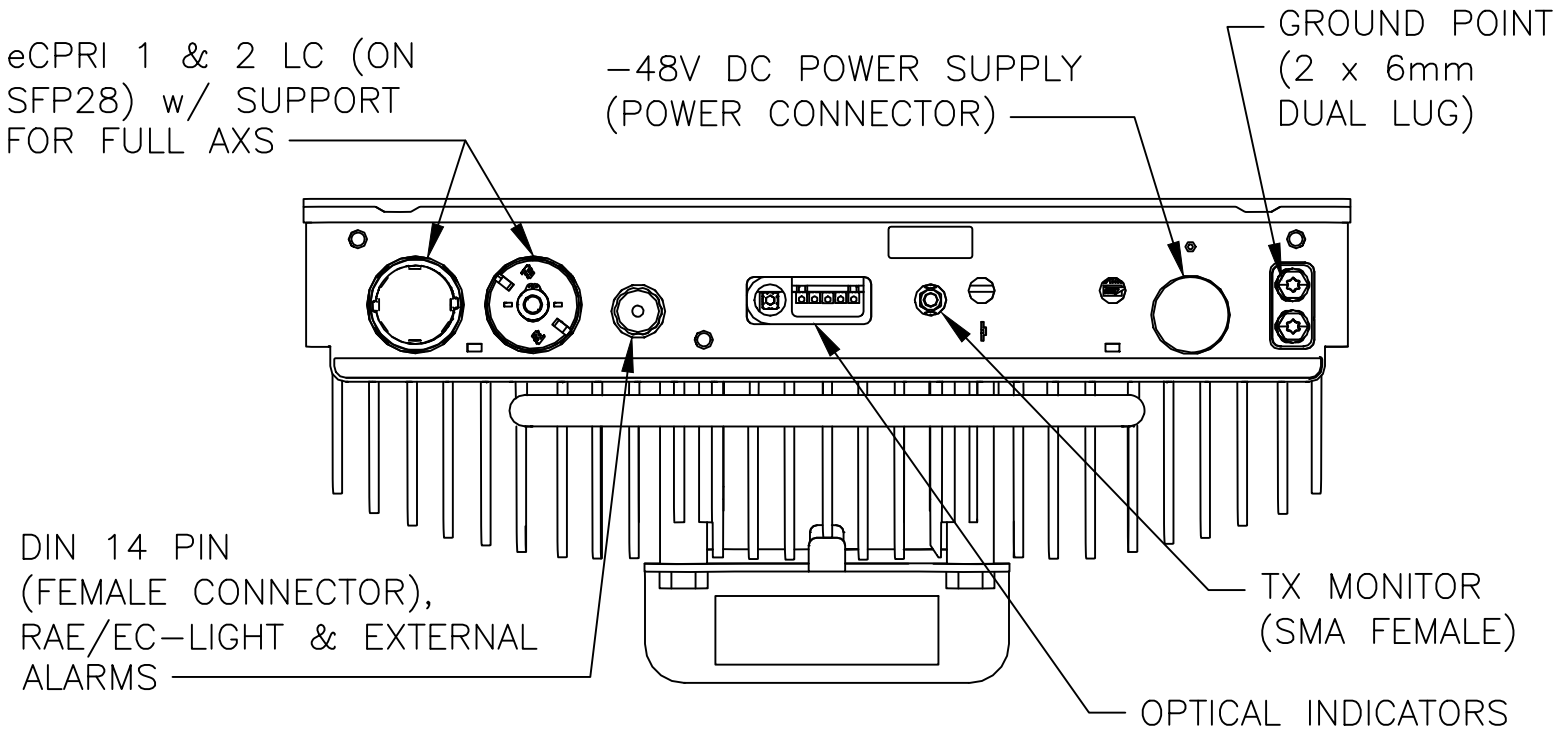
600899A-2	–	Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

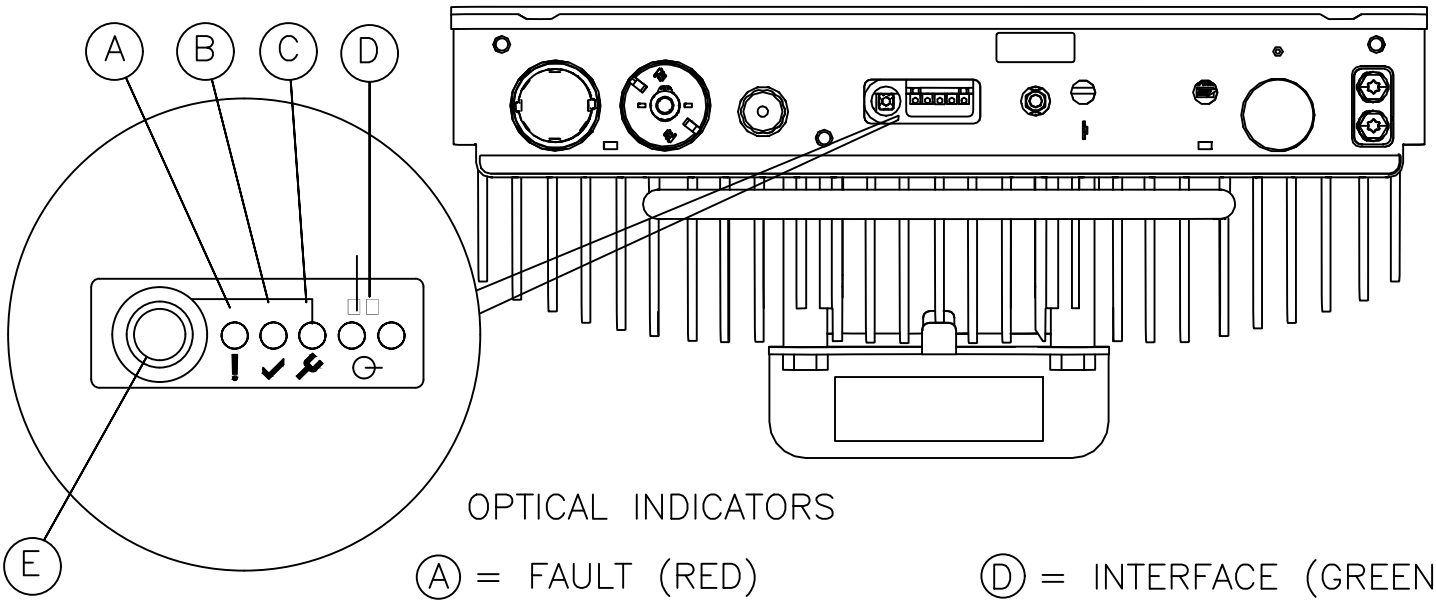
Performance Note	Severe environmental conditions may degrade optimum performance

MANUFACTURER:	ERICSSON
MODEL / PN:	AIR 6419 B41 / KRD 901 212/11
DIMENSIONS:	34.49" x 19.92" x 7.99" (H x W x D)
WEIGHT:	68.34 LBS (EXCLUDING MOUNTING KIT)
MOUNT WEIGHT:	13.5 LBS (SXK109 2016/1)





10/29/21	REV 0	(NOT TO EXCEED)	SKU# 34552 - ERICSSON AIR 6419 BAND 41 (2.5GHz M-MIMO)	
05/31/22	REV 1	FINAL		
			8.5" x 11" SCALE N.T.S.	11" x 17" SCALE N.T.S.



OPTICAL INDICATORS

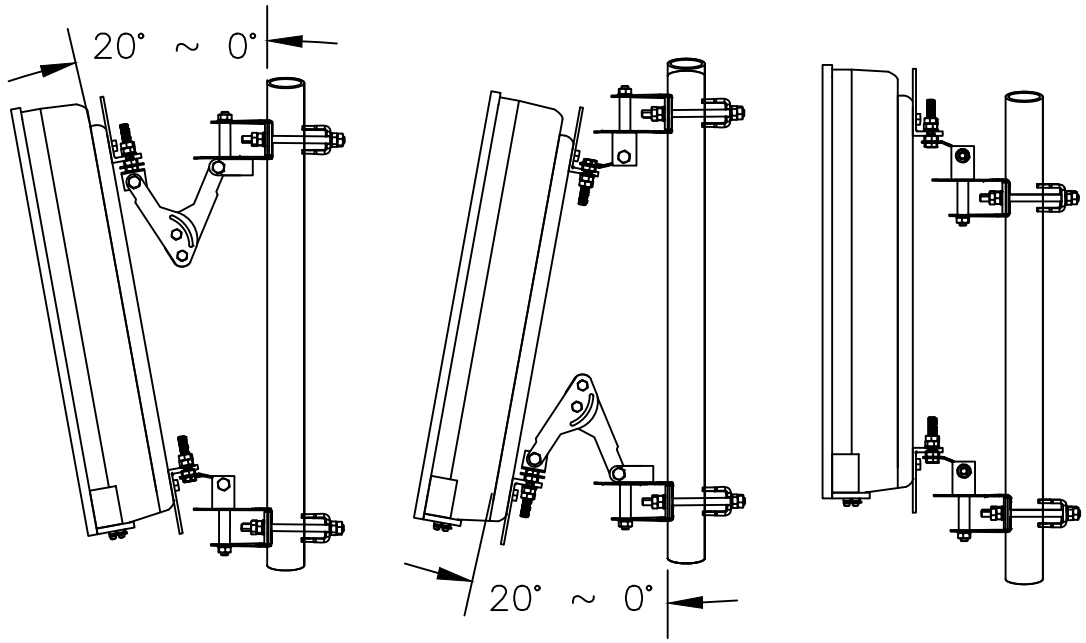
Ⓐ = FAULT (RED)

Ⓑ = OPERATIONAL (GREEN)

Ⓒ = MAINTENANCE (BLUE)

Ⓓ = INTERFACE (GREEN)

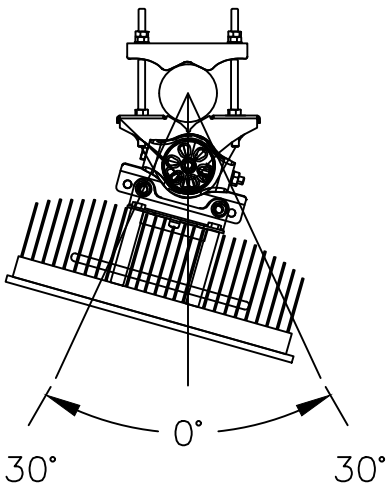
Ⓔ = FUTURE

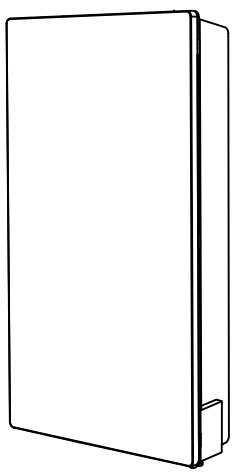


POLE MOUNTING RANGE

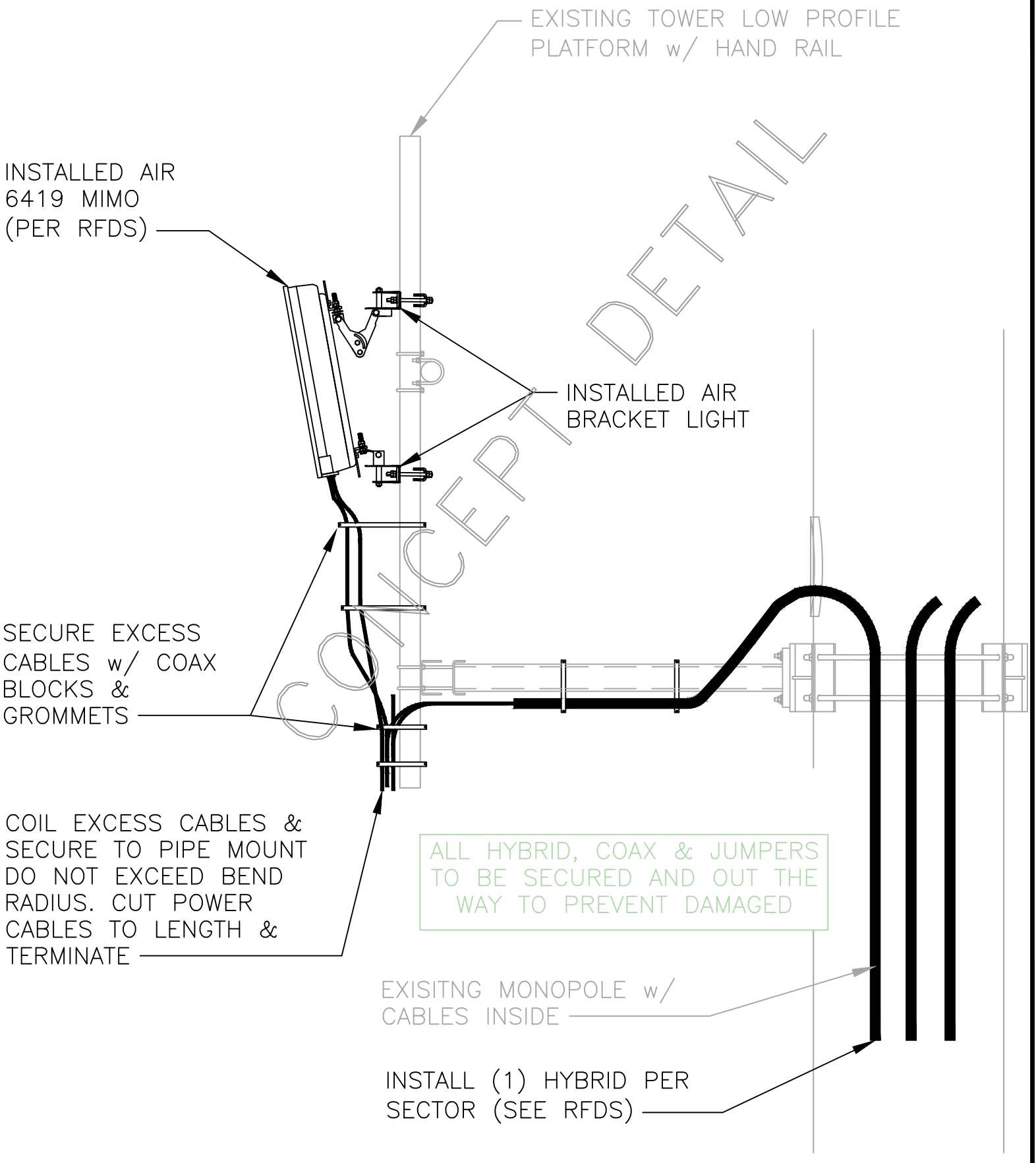
MINIMUM OUTER DIMENSIONS
CIRCULAR 2.99”

MAXIMUM OUTER DIMENSIONS
CIRCULAR 4.49”





ALL MOUNTS TO BE ENGINEERED BY A/E TO MEET STRUCTURAL REQUIREMENTS



AIR6419 Dimensions
w/o and w/ Protrusions (i.e. Carry Handles)

	AIR6419 B41 (Not-to-exceed dimensions)
Dimensions (H x W x D) w/o protrusions	35.2 x 20.9 x 7.0 in
Dimensions (H x W x D) w/ protrusions	36.3 x 20.9 x 9.0 in
Sail Area (no protrusions)	736 sq in
Weight	83 lbs
Note	Two handles increasing its depth by 2” and height by 1.1”

Date: **April 27, 2022**

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Site Number:	7WAN098A
	Site Name:	N/A
Crown Castle Designation:	**BU Number:**	806957
	Site Name:	Williamsburg Gardens
	JDE Job Number:	711980
	Work Order Number:	2097400
	Order Number:	611571 Rev. 0
Engineering Firm Designation:	**TEP Project Number:**	241707.688670
Site Data:	**10010 Oaklyn Drive, Potomac, Montgomery County, MD 20854** **Latitude *38° 59' 42.57"*, Longitude *-77° 12' 14.13"*** **130 Foot - Monopine Tower**	

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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: Proposed Equipment Configuration **Sufficient Capacity**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 115 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Gautam Sopal, E.I. / PHX

Respectfully submitted by:

Martin L. Piercey, P.E.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of **Maryland**
License No. **33570**
Expiration Date: **9/12/2022**

This item has been electronically signed and sealed by Martin L. Piercey, P.E. on 4/27/2022 using a Digital Signature.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Digitally signed by Martin L Piercey
Date: 2022.04.27 16:59:46 -04'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 130-ft monopine tower designed by Valmont Microflect. The tower has been modified multiple times in the past to accommodate additional loading. The anchor rod modifications designed by Paul J. Ford and Company in September of 2008 were determined to be ineffective and not considered structurally in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1.0
Ice Thickness:	1.0 in
Wind Speed with Ice:	40 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
110.0	110.0	3	RFS Celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	3	1-5/8
		3	Commscope	VV-65A-R1_TMO w/ Mount Pipe		
		3	Ericsson	AIR 6419 B41_TMO w/ Mount Pipe		
		3	Ericsson	Radio 4460 B2/B25 B66_TMO		
		3	Ericsson	Radio 4480_TMOV2		
		1	Perfect Vision	PV-RP10S-HR-12-96		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
127.0	127.0	6	JMA Wireless	X7CQAP-FRO-860-VR0 w/ Mount Pipe	8 1	1-5/8 1/2
		1	GPS	GPS_A		
		3	Amphenol	HTXCW631619M000 w/ Mount Pipe		
		3	Samsung Telecom.	MT6407-77A w/ Mount Pipe		
		3	Samsung Telecom.	RFV01U-D1A		
		6	Commscope	CDX1923Q-DS-43		
		3	Samsung Telecom.	RFV01U-D2A		
		2	RFS Celwave	DB-B1-6C-12AB-0Z		
		1	Site Pro 1	RMQP-496-HK		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
118.0	118.0	3	Kathrein	800 10121 w/ Mount Pipe	8 2 2 3	7/8 13/16 3/8 5/16
		6	Commscope	NNHH-65C-R4_CCIV2 w/ Mount Pipe		
		3	Nokia	AHFIB_CCIV2		
		3	Nokia	AHLBBA		
		2	Raycap	DC6-48-60-18-8F		
		3	Alcatel Lucent	RRH4X25-WCS		
		3	Nokia	AHCA_CCIV3		
		1	Tower Mounts	Side Arm Mount [SO 101-3]		
		1	Tower Mounts	Miscellaneous [NA 508-3]		
110.0	110.0	3	Commscope	DT465B-2XR w/ Mount Pipe	4	1-1/4
		3	RFS Celwave	APXVSPP18-C w/ Mount Pipe		
		3	Alcatel Lucent	FD-RRH-2X50-800		
		3	Alcatel Lucent	TD-RRH8X20-25		
		9	RFS Celwave	ACU-A20-N		
108.0	108.0	6	Alcatel Lucent	800 External Notch Filter	-	-
		6	Alcatel Lucent	800MHZ RRH		
		6	Alcatel Lucent	1900MHZ RRH (65MHZ)		
98.0	98.0	3	JMA Wireless	MX08FRO665-21 w/ Mount Pipe	1	1-1/2
		3	Fujitsu	TA08025-B605		
		3	Fujitsu	TA08025-B604		
		1	Raycap	RDIDC-9181-PF-48		
		1	Tower Mounts	Commscope MC-K6MHDX-9-96 (3)		
90.0	90.0	6	Ericsson	KRY 112 71/2	-	-
		1	Tower Mounts	Side Arm Mount [SO 101-3]		
		1	Tower Mounts	Miscellaneous [NA 508-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	261743	CCISites
Tower Foundation Drawings	261734	CCISites
Tower Manufacturer Drawings	261735	CCISites
Tower Reinforcement Drawings	2207035	CCISites
Post-Modification Inspection	2331554	CCISites
Tower Reinforcement Drawings	2942459	CCISites
Post-Modification Inspection	3155122	CCISites

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

1) The tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)[1,2]

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP24.687x23.588x0.25	Pole	3.6%	Pass
125 - 120	Pole	TP25.787x24.687x0.25	Pole	10.0%	Pass
120 - 115	Pole	TP26.886x25.787x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP27.985x26.886x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP29.084x27.985x0.25	Pole	41.0%	Pass
105 - 100	Pole	TP30.184x29.084x0.25	Pole	53.7%	Pass
100 - 99.27	Pole	TP30.344x30.184x0.25	Pole	55.6%	Pass
99.27 - 99.02	Pole + Reinf.	TP30.399x30.344x0.475	Reinf. 9 Compression	43.2%	Pass
99.02 - 97.04	Pole + Reinf.	TP30.834x30.399x0.4625	Reinf. 9 Compression	47.3%	Pass
97.04 - 96.79	Pole + Reinf.	TP30.889x30.834x0.675	Reinf. 9 Compression	33.5%	Pass
96.79 - 96.33	Pole + Reinf.	TP30.99x30.889x0.675	Reinf. 9 Compression	34.1%	Pass
96.33 - 96.08	Pole + Reinf.	TP31.045x30.99x0.45	Reinf. 8 Tension Rupture	47.1%	Pass
96.08 - 94.29	Pole + Reinf.	TP31.439x31.045x0.45	Reinf. 8 Tension Rupture	50.5%	Pass
94.29 - 94.04	Pole + Reinf.	TP31.494x31.439x0.45	Reinf. 7 Tension Rupture	51.0%	Pass
94.04 - 91.5	Pole + Reinf.	TP32.052x31.494x0.45	Reinf. 7 Tension Rupture	55.7%	Pass
91.5 - 91.25	Pole + Reinf.	TP32.107x32.052x0.45	Reinf. 6 Tension Rupture	56.2%	Pass
91.25 - 86.25	Pole + Reinf.	TP33.207x32.107x0.4375	Reinf. 6 Tension Rupture	65.7%	Pass
86.25 - 86.08	Pole + Reinf.	TP33.244x33.207x0.4375	Reinf. 6 Tension Rupture	66.0%	Pass
86.08 - 85.83	Pole + Reinf.	TP33.299x33.244x0.4313	Reinf. 2 Tension Rupture	62.8%	Pass
85.83 - 81	Pole + Reinf.	TP35.515x33.299x0.425	Reinf. 2 Tension Rupture	71.2%	Pass
81 - 74.75	Pole + Reinf.	TP35.237x33.861x0.5188	Reinf. 2 Tension Rupture	68.3%	Pass
74.75 - 71	Pole + Reinf.	TP36.063x35.237x0.5063	Reinf. 2 Tension Rupture	72.9%	Pass
71 - 70.75	Pole + Reinf.	TP36.118x36.063x0.6938	Reinf. 5 Tension Rupture	59.1%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
70.75 - 65.75	Pole + Reinf.	TP37.219x36.118x0.6813	Reinf. 5 Tension Rupture	63.9%	Pass
65.75 - 60.75	Pole + Reinf.	TP38.32x37.219x0.6688	Reinf. 5 Tension Rupture	68.4%	Pass
60.75 - 60	Pole + Reinf.	TP38.485x38.32x0.6688	Reinf. 5 Tension Rupture	69.0%	Pass
60 - 59.75	Pole + Reinf.	TP38.54x38.485x0.6313	Reinf. 1 Tension Rupture	65.8%	Pass
59.75 - 54.75	Pole + Reinf.	TP39.641x38.54x0.6313	Reinf. 1 Tension Rupture	69.6%	Pass
54.75 - 50	Pole + Reinf.	TP42.008x39.641x0.6188	Reinf. 1 Tension Rupture	72.9%	Pass
50 - 43	Pole + Reinf.	TP41.539x39.999x0.8313	Reinf. 4 Tension Rupture	65.2%	Pass
43 - 42.85	Pole + Reinf.	TP41.572x41.539x0.8313	Reinf. 4 Tension Rupture	65.3%	Pass
42.85 - 37.85	Pole + Reinf.	TP42.672x41.572x0.8188	Reinf. 4 Tension Rupture	67.8%	Pass
37.85 - 32.85	Pole + Reinf.	TP43.773x42.672x0.8063	Reinf. 4 Tension Rupture	70.2%	Pass
32.85 - 27.85	Pole + Reinf.	TP44.873x43.773x0.7938	Reinf. 4 Tension Rupture	72.5%	Pass
27.85 - 26.25	Pole + Reinf.	TP45.225x44.873x0.7938	Reinf. 4 Tension Rupture	73.1%	Pass
26.25 - 26	Pole + Reinf.	TP45.28x45.225x0.9063	Reinf. 3 Bolt Shear	62.7%	Pass
26 - 21	Pole + Reinf.	TP46.38x45.28x0.8813	Reinf. 3 Compression	62.3%	Pass
21 - 16	Pole + Reinf.	TP47.48x46.38x0.8813	Reinf. 3 Compression	64.0%	Pass
16 - 11	Pole + Reinf.	TP48.58x47.48x0.8563	Reinf. 3 Compression	65.5%	Pass
11 - 6	Pole + Reinf.	TP49.68x48.58x0.8563	Reinf. 3 Compression	67.0%	Pass
6 - 1	Pole + Reinf.	TP50.78x49.68x0.8313	Reinf. 3 Compression	68.3%	Pass
1 - 0	Pole + Reinf.	TP51x50.78x0.8313	Reinf. 3 Compression	68.6%	Pass
				Summary	
			Pole	59.6%	Pass
			Reinforcement	73.1%	Pass
			Overall	**73.1%**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	86.9	Pass
1,2	Base Plate	-	54.4	Pass
1,2	Base Foundation Structural	-	87.2	Pass
1,2	Base Foundation Soil Interaction	-	68.0	Pass

Structure Rating (max from all components) =	**87.2%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5.

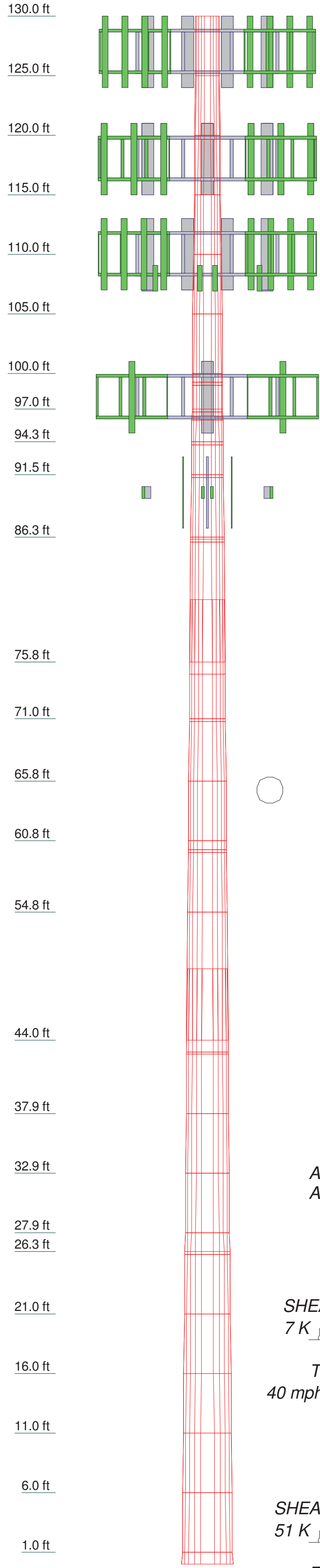
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	12	0.250		23.588	24.687	A572-65	0.3
2	5.00	12	0.250		24.687	25.787		0.3
3	5.00	12	0.250		25.787	26.886		0.4
4	5.00	12	0.250		26.886	27.985		0.4
5	5.00	12	0.250		27.985	29.084		0.4
6	5.00	12	0.250		29.084	30.184		0.4
7–16	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
17	5.00	12	0.438		32.103	33.203		0.7
18–19	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
20	10.08 (6.25)	12	0.425	5.25	33.299	35.515		1.5
21	[illegible]	12	0.519		[illegible]	35.237		1.2
22	3.75?	12	0.506		[illegible]	[illegible]		0.7
23	[illegible]	12	[illegible]		[illegible]	[illegible]		0.1
24	5.00	12	0.681		36.119?	37.219		1.3
25	5.00	12	0.669		37.219	38.320		1.3
26–27	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
28	5.00	12	0.631		38.543?	39.643?		1.2
29	10.75 (7.00)	12	0.619	6.00	39.641	42.008		2.8
30–31	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
32	5.00	12	0.819?		41.572	42.672		1.8
33	5.00	12	0.806		42.672	43.773		1.8
34	5.00	12	0.794		43.773	44.873		1.8
35–36	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
37	5.00	12	0.881		45.280?	46.380?		2.1
38	5.00	12	0.881		46.380	47.480		2.1
39	5.00	12	0.856		47.480	48.580		2.1
40	5.00	12	0.856		48.580	49.680		2.1
41	5.00	12	0.831		49.680	50.780		2.2
42	1.00	12	0.831		50.780	51.000		0.4
								34.1



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Montgomery County, Maryland.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Equivalent Thickness Model
9. TOWER RATING: 73.1%

ALL REACTIONS ARE FACTORED

AXIAL 96 K
SHEAR 7 K
MOMENT 728 kip-ft
TORQUE 0 kip-ft
40 mph WIND - 1.000 in ICE

AXIAL 67 K
SHEAR 51 K
MOMENT 5021 kip-ft
TORQUE 0 kip-ft
REACTIONS - 115 mph WIND

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: **Williamsburg Gardens (BU 806957)**		
Project: **TEP No. 241707.688670**		
Client: Crown Castle	Drawn by: DAR	App'd:
Code: TIA-222-H	Date: 04/27/22	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Montgomery County, Maryland.
Tower base elevation above sea level: 330.00 ft.
Basic wind speed of 115 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Equivalent Thickness Model.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	130.00-125.00	5.00	0.000	12	23.588	24.687	0.250	1.000	A572-65 (65 ksi)
L2	125.00-120.00	5.00	0.000	12	24.687	25.787	0.250	1.000	A572-65 (65 ksi)
L3	120.00-115.00	5.00	0.000	12	25.787	26.886	0.250	1.000	A572-65 (65 ksi)
L4	115.00-110.00	5.00	0.000	12	26.886	27.985	0.250	1.000	A572-65 (65 ksi)
L5	110.00-105.00	5.00	0.000	12	27.985	29.084	0.250	1.000	A572-65 (65 ksi)
L6	105.00-100.00	5.00	0.000	12	29.084	30.184	0.250	1.000	A572-65 (65 ksi)
L7	100.00-99.27	0.73	0.000	12	30.184	30.344	0.250	1.000	A572-65 (65 ksi)
L8	99.27-99.02	0.25	0.000	12	30.344	30.399	0.475	1.900	A572-65 (65 ksi)
L9	99.02-97.04	1.98	0.000	12	30.399	30.834	0.463	1.850	A572-65 (65 ksi)
L10	97.04-96.79	0.25	0.000	12	30.834	30.889	0.675	2.700	A572-65 (65 ksi)
L11	96.79-96.33	0.46	0.000	12	30.889	30.990	0.675	2.700	A572-65 (65 ksi)
L12	96.33-96.08	0.25	0.000	12	30.990	31.045	0.450	1.800	A572-65 (65 ksi)
L13	96.08-94.29	1.79	0.000	12	31.045	31.439	0.450	1.800	A572-65 (65 ksi)
L14	94.29-94.04	0.25	0.000	12	31.439	31.494	0.450	1.800	A572-65 (65 ksi)
L15	94.04-91.50	2.54	0.000	12	31.494	32.052	0.450	1.800	A572-65 (65 ksi)
L16	91.50-91.25	0.25	0.000	12	32.052	32.107	0.450	1.800	A572-65 (65 ksi)
L17	91.25-86.25	5.00	0.000	12	32.107	33.207	0.438	1.750	A572-65 (65 ksi)
L18	86.25-86.08	0.17	0.000	12	33.207	33.244	0.438	1.750	A572-65 (65 ksi)
L19	86.08-85.83	0.25	0.000	12	33.244	33.299	0.431	1.725	A572-65 (65 ksi)
L20	85.83-75.75	10.08	5.250	12	33.299	35.515	0.425	1.700	A572-65 (65 ksi)
L21	75.75-74.75	6.25	0.000	12	33.861	35.237	0.519	2.075	A572-65 (65 ksi)
L22	74.75-71.00	3.75	0.000	12	35.237	36.063	0.506	2.025	A572-65 (65 ksi)
L23	71.00-70.75	0.25	0.000	12	36.063	36.118	0.694	2.775	A572-65 (65 ksi)
L24	70.75-65.75	5.00	0.000	12	36.118	37.219	0.681	2.725	A572-65 (65 ksi)
L25	65.75-60.75	5.00	0.000	12	37.219	38.320	0.669	2.675	A572-65 (65 ksi)
L26	60.75-60.00	0.75	0.000	12	38.320	38.485	0.669	2.675	A572-65 (65 ksi)
L27	60.00-59.75	0.25	0.000	12	38.485	38.540	0.631	2.525	A572-65 (65 ksi)
L28	59.75-54.75	5.00	0.000	12	38.540	39.641	0.631	2.525	A572-65 (65 ksi)
L29	54.75-44.00	10.75	6.000	12	39.641	42.008	0.619	2.475	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L30	44.00-43.00	7.00	0.000	12	39.999	41.539	0.831	3.325	A572-65 (65 ksi)
L31	43.00-42.85	0.15	0.000	12	41.539	41.572	0.831	3.325	A572-65 (65 ksi)
L32	42.85-37.85	5.00	0.000	12	41.572	42.672	0.819	3.275	A572-65 (65 ksi)
L33	37.85-32.85	5.00	0.000	12	42.672	43.773	0.806	3.225	A572-65 (65 ksi)
L34	32.85-27.85	5.00	0.000	12	43.773	44.873	0.794	3.175	A572-65 (65 ksi)
L35	27.85-26.25	1.60	0.000	12	44.873	45.225	0.794	3.175	A572-65 (65 ksi)
L36	26.25-26.00	0.25	0.000	12	45.225	45.280	0.906	3.625	A572-65 (65 ksi)
L37	26.00-21.00	5.00	0.000	12	45.280	46.380	0.881	3.525	A572-65 (65 ksi)
L38	21.00-16.00	5.00	0.000	12	46.380	47.480	0.881	3.525	A572-65 (65 ksi)
L39	16.00-11.00	5.00	0.000	12	47.480	48.580	0.856	3.425	A572-65 (65 ksi)
L40	11.00-6.00	5.00	0.000	12	48.580	49.680	0.856	3.425	A572-65 (65 ksi)
L41	6.00-1.00	5.00	0.000	12	49.680	50.780	0.831	3.325	A572-65 (65 ksi)
L42	1.00-0.00	1.00		12	50.780	51.000	0.831	3.325	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.332	18.787	1306.089	8.355	12.219	106.894	2646.490	9.246	5.652	22.606
	25.470	19.672	1499.476	8.749	12.788	117.256	3038.345	9.682	5.946	23.785
L2	25.470	19.672	1499.476	8.749	12.788	117.256	3038.345	9.682	5.946	23.785
	26.608	20.557	1711.068	9.142	13.357	128.099	3467.087	10.117	6.241	24.963
L3	26.608	20.557	1711.068	9.142	13.357	128.099	3467.087	10.117	6.241	24.963
	27.746	21.442	1941.684	9.536	13.927	139.420	3934.378	10.553	6.535	26.142
L4	27.746	21.442	1941.684	9.536	13.927	139.420	3934.378	10.553	6.535	26.142
	28.884	22.327	2192.142	9.929	14.496	151.221	4441.874	10.989	6.830	27.32
L5	28.884	22.327	2192.142	9.929	14.496	151.221	4441.874	10.989	6.830	27.32
	30.022	23.212	2463.262	10.323	15.066	163.502	4991.237	11.424	7.125	28.498
L6	30.022	23.212	2463.262	10.323	15.066	163.502	4991.237	11.424	7.125	28.498
	31.160	24.097	2755.863	10.716	15.635	176.261	5584.126	11.860	7.419	29.677
L7	31.160	24.097	2755.863	10.716	15.635	176.261	5584.126	11.860	7.419	29.677
	31.326	24.226	2800.429	10.774	15.718	178.164	5674.428	11.923	7.462	29.849
L8	31.247	45.685	5202.361	10.693	15.718	330.976	10541.393	22.485	6.859	14.44
	31.304	45.769	5231.133	10.713	15.747	332.205	10599.693	22.526	6.874	14.471
L9	31.308	44.583	5099.857	10.717	15.747	323.868	10333.693	21.942	6.907	14.935
	31.759	45.231	5325.579	10.873	15.972	333.428	10791.067	22.261	7.024	15.187
L10	31.684	65.551	7610.463	10.797	15.972	476.482	15420.861	32.262	6.455	9.562
	31.741	65.671	7652.147	10.817	16.001	478.240	15505.325	32.321	6.469	9.584
L11	31.741	65.671	7652.147	10.817	16.001	478.240	15505.325	32.321	6.469	9.584
	31.846	65.891	7729.244	10.853	16.053	481.481	15661.543	32.429	6.496	9.624
L12	31.925	44.253	5268.415	10.933	16.053	328.188	10675.237	21.780	7.099	15.777
	31.982	44.333	5296.911	10.953	16.082	329.379	10732.977	21.819	7.114	15.809
L13	31.982	44.333	5296.911	10.953	16.082	329.379	10732.977	21.819	7.114	15.809

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	32.389	44.903	5503.947	11.094	16.285	337.969	11152.489	22.100	7.220	16.044
L14	32.389	44.903	5503.947	11.094	16.285	337.969	11152.489	22.100	7.220	16.044
	32.446	44.983	5533.285	11.114	16.314	339.177	11211.936	22.139	7.234	16.076
L15	32.446	44.983	5533.285	11.114	16.314	339.177	11211.936	22.139	7.234	16.076
	33.024	45.792	5837.291	11.314	16.603	351.578	11827.934	22.537	7.384	16.409
L16	33.024	45.792	5837.291	11.314	16.603	351.578	11827.934	22.537	7.384	16.409
	33.081	45.871	5867.801	11.333	16.632	352.811	11889.755	22.577	7.399	16.442
L17	33.086	44.615	5711.567	11.338	16.632	343.417	11573.183	21.958	7.432	16.988
	34.224	46.163	6327.197	11.731	17.201	367.839	12820.617	22.720	7.727	17.661
L18	34.224	46.163	6327.197	11.731	17.201	367.839	12820.617	22.720	7.727	17.661
	34.262	46.216	6348.871	11.745	17.220	368.684	12864.535	22.746	7.737	17.684
L19	34.265	45.564	6261.751	11.747	17.220	363.625	12688.005	22.425	7.754	17.979
	34.321	45.641	6293.270	11.767	17.249	364.852	12751.871	22.463	7.768	18.014
L20	34.324	44.988	6205.602	11.769	17.249	359.770	12574.232	22.142	7.785	18.318
	36.618	48.021	7547.113	12.562	18.397	410.241	15292.497	23.634	8.379	19.715
L21	36.069	55.694	7902.706	11.936	17.540	450.556	16013.025	27.411	7.684	14.813
	36.297	57.992	8922.226	12.429	18.253	488.815	18078.849	28.542	8.053	15.524
L22	36.301	56.615	8716.641	12.434	18.253	477.552	17662.277	27.864	8.087	15.974
	37.156	57.962	9353.261	12.729	18.680	500.697	18952.242	28.527	8.308	16.411
L23	37.090	79.010	12615.728	12.662	18.680	675.342	25562.885	38.886	7.806	11.251
	37.147	79.133	12674.726	12.682	18.709	677.466	25682.431	38.947	7.820	11.273
L24	37.152	77.734	12459.533	12.686	18.709	665.964	25246.391	38.259	7.854	11.529
	38.291	80.150	13657.302	13.080	19.279	708.391	27673.396	39.447	8.149	11.962
L25	38.296	78.706	13420.474	13.085	19.279	696.107	27193.518	38.737	8.182	12.235
	39.436	81.077	14670.146	13.479	19.850	739.064	29725.693	39.903	8.477	12.677
L26	39.436	81.077	14670.146	13.479	19.850	739.064	29725.693	39.903	8.477	12.677
	39.607	81.432	14864.034	13.538	19.935	745.619	30118.564	40.079	8.522	12.743
L27	39.620	76.942	14072.318	13.552	19.935	705.904	28514.332	37.869	8.622	13.659
	39.677	77.054	14133.802	13.571	19.964	707.976	28638.914	37.924	8.637	13.682
L28	39.677	77.054	14133.802	13.571	19.964	707.976	28638.914	37.924	8.637	13.682
	40.817	79.292	15401.371	13.965	20.534	750.043	31207.354	39.025	8.932	14.15
L29	40.821	77.747	15110.911	13.970	20.534	735.898	30618.802	38.265	8.966	14.49
	43.272	82.463	18030.995	14.817	21.760	828.625	36535.685	40.586	9.600	15.515
L30	42.484	104.838	20529.117	14.022	20.720	990.804	41597.557	51.598	8.492	10.216
	42.712	108.961	23047.206	14.574	21.517	1071.095	46699.889	53.627	8.905	10.713
L31	42.712	108.961	23047.206	14.574	21.517	1071.095	46699.889	53.627	8.905	10.713
	42.746	109.049	23103.305	14.585	21.535	1072.850	46813.559	53.671	8.914	10.723
L32	42.750	107.442	22776.839	14.590	21.535	1057.690	46152.050	52.880	8.947	10.928
	43.889	110.342	24671.525	14.984	22.104	1116.139	49991.199	54.307	9.242	11.288
L33	43.893	108.690	24316.635	14.988	22.104	1100.084	49272.095	53.494	9.275	11.504
	45.032	111.546	26284.256	15.382	22.674	1159.215	53259.028	54.900	9.570	11.87
L34	45.037	109.848	25899.339	15.386	22.674	1142.239	52479.082	54.064	9.604	12.099
	46.176	112.660	27939.401	15.780	23.244	1202.004	56612.801	55.448	9.899	12.471
L35	46.176	112.660	27939.401	15.780	23.244	1202.004	56612.801	55.448	9.899	12.471
	46.540	113.560	28614.148	15.906	23.426	1221.450	57980.021	55.891	9.993	12.59
L36	46.500	129.327	32422.163	15.866	23.426	1384.003	65696.092	63.651	9.691	10.694
	46.557	129.487	32543.030	15.886	23.455	1387.475	65941.001	63.730	9.706	10.71
L37	46.566	125.986	31698.808	15.895	23.455	1351.481	64230.379	62.006	9.773	11.09
	47.705	129.108	34113.892	16.288	24.025	1419.951	69123.994	63.543	10.068	11.425
L38	47.705	129.108	34113.892	16.288	24.025	1419.951	69123.994	63.543	10.068	11.425
	48.844	132.229	36648.630	16.682	24.595	1490.113	74260.060	65.079	10.363	11.759
L39	48.853	128.547	35666.296	16.691	24.595	1450.172	72269.584	63.267	10.430	12.181
	49.992	131.580	38250.935	17.085	25.164	1520.044	77506.765	64.760	10.725	12.525
L40	49.992	131.580	38250.935	17.085	25.164	1520.044	77506.765	64.760	10.725	12.525
	51.130	134.613	40957.520	17.479	25.734	1591.560	82991.040	66.252	11.019	12.869
L41	51.139	130.750	39822.791	17.488	25.734	1547.466	80691.771	64.351	11.086	13.337
	52.278	133.694	42574.250	17.882	26.304	1618.545	86266.972	65.800	11.381	13.692
L42	52.278	133.694	42574.250	17.882	26.304	1618.545	86266.972	65.800	11.381	13.692
	52.506	134.283	43139.323	17.960	26.418	1632.952	87411.963	66.090	11.440	13.763

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.00-125.00				1	1	1			
L2 125.00-120.00				1	1	1			
L3 120.00-115.00				1	1	1			
L4 115.00-110.00				1	1	1			
L5 110.00-105.00				1	1	1			
L6 105.00-100.00				1	1	1			
L7 100.00-99.27				1	1	1			
L8 99.27-99.02				1	1	0.940528			
L9 99.02-97.04				1	1	0.959453			
L10 97.04-96.79				1	1	0.935992			
L11 96.79-96.33				1	1	0.934105			
L12 96.33-96.08				1	1	0.96579			
L13 96.08-94.29				1	1	0.96058			
L14 94.29-94.04				1	1	0.959863			
L15 94.04-91.50				1	1	0.952719			
L16 91.50-91.25				1	1	0.952029			
L17 91.25-86.25				1	1	0.965177			
L18 86.25-86.08				1	1	0.964728			
L19 86.08-85.83				1	1	0.954817			
L20 85.83-75.75				1	1	0.95677			
L21 75.75-74.75				1	1	0.958689			
L22 74.75-71.00				1	1	0.97497			
L23 71.00-70.75				1	1	0.942687			
L24 70.75-65.75				1	1	0.945933			
L25 65.75-60.75				1	1	0.950147			
L26 60.75-60.00				1	1	0.948242			
L27 60.00-59.75				1	1	0.951056			
L28 59.75-54.75				1	1	0.939583			
L29 54.75-44.00				1	1	0.947746			
L30 44.00-43.00				1	1	0.943805			
L31				1	1	0.943437			

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
43.00-42.85									
L32				1	1	0.94542			
42.85-37.85									
L33				1	1	0.948119			
37.85-32.85									
L34				1	1	0.951515			
32.85-27.85									
L35				1	1	0.948031			
27.85-26.25									
L36				1	1	0.939283			
26.25-26.00									
L37				1	1	0.95319			
26.00-21.00									
L38				1	1	0.941571			
21.00-16.00									
L39				1	1	0.957153			
16.00-11.00									
L40 11.00-6.00				1	1	0.946277			
L41 6.00-1.00				1	1	0.963545			
L42 1.00-0.00				1	1	0.961463			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
HB158-1-08U8-S8J18(1-5/8)	B	No	Surface Ar (CaAa)	127.00 - 0.00	2	2	0.500 0.500	1.980		1.300
Mods										
MP3-08 (1.1875in)W	A	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
MP3-08 (1.1875in)W	C	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
MP3-08 (1.1875in)W	B	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
***										
MP3-05 (1.1875in)	A	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
MP3-05 (1.1875in)	C	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
MP3-05 (1.1875in)	B	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
***										
MS-850 (1.1875")W	A	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
MS-850 (1.1875")W	C	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
MS-850 (1.1875")W	B	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
MS-600 (1.1875")	B	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
***										
Sabre PL 5"x1.25"	A	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
Sabre PL 5"x1.25"	C	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
Sabre PL 5"x1.25"	B	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
***										
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Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
127									
AVA7-50(1-5/8)	B	No	No	Inside Pole	127.00 - 0.00	6	No Ice	0.00	0.700
							1/2" Ice	0.00	0.700
							1" Ice	0.00	0.700
LDF4-50A(1/2)	B	No	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	0.150
							1/2" Ice	0.00	0.150
							1" Ice	0.00	0.150
118									
LDF5-50A(7/8)	C	No	No	Inside Pole	118.00 - 0.00	6	No Ice	0.00	0.330
							1/2" Ice	0.00	0.330
							1" Ice	0.00	0.330

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
6-8AWG 3 PAIR(7/8)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.680
							1/2" Ice	0.00	0.680
							1" Ice	0.00	0.680
PWRT-608-S(13/16)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.620
							1/2" Ice	0.00	0.620
							1" Ice	0.00	0.620
12 PAIR(3/8)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.080
							1/2" Ice	0.00	0.080
							1" Ice	0.00	0.080
860-10025(5/16)	C	No	No	Inside Pole	118.00 - 0.00	3	No Ice	0.00	0.000
							1/2" Ice	0.00	0.000
							1" Ice	0.00	0.000
110_TMO HB158-21U6S24-xx M_TMO(1-5/8)	A	No	No	Inside Pole	110.00 - 0.00	3	No Ice	0.00	2.500
							1/2" Ice	0.00	2.500
							1" Ice	0.00	2.500
110_Sprint HB114-13U3M12-X XXF(1-1/4)	A	No	No	Inside Pole	110.00 - 0.00	3	No Ice	0.00	0.992
							1/2" Ice	0.00	0.992
							1" Ice	0.00	0.992
HB114-1-08U4-M5 F(1-1/4)	A	No	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	1.300
							1/2" Ice	0.00	1.300
							1" Ice	0.00	1.300
98 CU12PSM9P6XXX(1-1/2)	B	No	No	Inside Pole	98.00 - 0.00	1	No Ice	0.00	2.350
							1/2" Ice	0.00	2.350
							1" Ice	0.00	2.350
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Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-125.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.792	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L2	125.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L3	120.00-115.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.01
L4	115.00-110.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.02
L5	110.00-105.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.02
L6	105.00-100.00	A	0.000	0.000	0.902	0.000	0.06
		B	0.000	0.000	2.882	0.000	0.03
		C	0.000	0.000	0.902	0.000	0.02

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L7	100.00-99.27	A	0.000	0.000	0.519	0.000	0.01
		B	0.000	0.000	0.808	0.000	0.01
		C	0.000	0.000	0.519	0.000	0.00
L8	99.27-99.02	A	0.000	0.000	0.194	0.000	0.00
		B	0.000	0.000	0.293	0.000	0.00
		C	0.000	0.000	0.194	0.000	0.00
L9	99.02-97.04	A	0.000	0.000	3.001	0.000	0.02
		B	0.000	0.000	3.785	0.000	0.02
		C	0.000	0.000	3.001	0.000	0.01
L10	97.04-96.79	A	0.000	0.000	0.379	0.000	0.00
		B	0.000	0.000	0.478	0.000	0.00
		C	0.000	0.000	0.379	0.000	0.00
L11	96.79-96.33	A	0.000	0.000	0.697	0.000	0.01
		B	0.000	0.000	0.879	0.000	0.00
		C	0.000	0.000	0.697	0.000	0.00
L12	96.33-96.08	A	0.000	0.000	0.379	0.000	0.00
		B	0.000	0.000	0.478	0.000	0.00
		C	0.000	0.000	0.379	0.000	0.00
L13	96.08-94.29	A	0.000	0.000	3.683	0.000	0.02
		B	0.000	0.000	4.392	0.000	0.02
		C	0.000	0.000	3.683	0.000	0.01
L14	94.29-94.04	A	0.000	0.000	0.382	0.000	0.00
		B	0.000	0.000	0.481	0.000	0.00
		C	0.000	0.000	0.382	0.000	0.00
L15	94.04-91.50	A	0.000	0.000	4.971	0.000	0.03
		B	0.000	0.000	5.977	0.000	0.02
		C	0.000	0.000	4.971	0.000	0.01
L16	91.50-91.25	A	0.000	0.000	0.274	0.000	0.00
		B	0.000	0.000	0.373	0.000	0.00
		C	0.000	0.000	0.274	0.000	0.00
L17	91.25-86.25	A	0.000	0.000	6.384	0.000	0.06
		B	0.000	0.000	8.364	0.000	0.05
		C	0.000	0.000	6.384	0.000	0.02
L18	86.25-86.08	A	0.000	0.000	0.298	0.000	0.00
		B	0.000	0.000	0.365	0.000	0.00
		C	0.000	0.000	0.298	0.000	0.00
L19	86.08-85.83	A	0.000	0.000	0.438	0.000	0.00
		B	0.000	0.000	0.537	0.000	0.00
		C	0.000	0.000	0.438	0.000	0.00
L20	85.83-75.75	A	0.000	0.000	9.671	0.000	0.12
		B	0.000	0.000	13.662	0.000	0.09
		C	0.000	0.000	9.671	0.000	0.05
L21	75.75-74.75	A	0.000	0.000	0.888	0.000	0.01
		B	0.000	0.000	1.284	0.000	0.01
		C	0.000	0.000	0.888	0.000	0.00
L22	74.75-71.00	A	0.000	0.000	5.331	0.000	0.04
		B	0.000	0.000	6.816	0.000	0.03
		C	0.000	0.000	5.331	0.000	0.02
L23	71.00-70.75	A	0.000	0.000	0.472	0.000	0.00
		B	0.000	0.000	0.571	0.000	0.00
		C	0.000	0.000	0.472	0.000	0.00
L24	70.75-65.75	A	0.000	0.000	9.442	0.000	0.06
		B	0.000	0.000	11.422	0.000	0.05
		C	0.000	0.000	9.442	0.000	0.02
L25	65.75-60.75	A	0.000	0.000	9.442	0.000	0.06
		B	0.000	0.000	11.422	0.000	0.05
		C	0.000	0.000	9.442	0.000	0.02
L26	60.75-60.00	A	0.000	0.000	1.562	0.000	0.01
		B	0.000	0.000	1.859	0.000	0.01
		C	0.000	0.000	1.562	0.000	0.00
L27	60.00-59.75	A	0.000	0.000	0.580	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.679	0.000	0.00
		C	0.000	0.000	0.580	0.000	0.00
L28	59.75-54.75	A	0.000	0.000	8.358	0.000	0.06
		B	0.000	0.000	10.338	0.000	0.05
		C	0.000	0.000	8.358	0.000	0.02
L29	54.75-44.00	A	0.000	0.000	15.308	0.000	0.13
		B	0.000	0.000	19.565	0.000	0.10
		C	0.000	0.000	15.308	0.000	0.05
L30	44.00-43.00	A	0.000	0.000	2.322	0.000	0.01
		B	0.000	0.000	2.718	0.000	0.01
		C	0.000	0.000	2.322	0.000	0.00
L31	43.00-42.85	A	0.000	0.000	0.348	0.000	0.00
		B	0.000	0.000	0.408	0.000	0.00
		C	0.000	0.000	0.348	0.000	0.00
L32	42.85-37.85	A	0.000	0.000	11.608	0.000	0.06
		B	0.000	0.000	13.588	0.000	0.05
		C	0.000	0.000	11.608	0.000	0.02
L33	37.85-32.85	A	0.000	0.000	11.608	0.000	0.06
		B	0.000	0.000	13.588	0.000	0.05
		C	0.000	0.000	11.608	0.000	0.02
L34	32.85-27.85	A	0.000	0.000	12.504	0.000	0.06
		B	0.000	0.000	14.484	0.000	0.05
		C	0.000	0.000	12.504	0.000	0.02
L35	27.85-26.25	A	0.000	0.000	4.381	0.000	0.02
		B	0.000	0.000	5.015	0.000	0.01
		C	0.000	0.000	4.381	0.000	0.01
L36	26.25-26.00	A	0.000	0.000	0.685	0.000	0.00
		B	0.000	0.000	0.784	0.000	0.00
		C	0.000	0.000	0.685	0.000	0.00
L37	26.00-21.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L38	21.00-16.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L39	16.00-11.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L40	11.00-6.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L41	6.00-1.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L42	1.00-0.00	A	0.000	0.000	2.738	0.000	0.01
		B	0.000	0.000	3.134	0.000	0.01
		C	0.000	0.000	2.738	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-125.00	A	0.973	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	1.476	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L2	125.00-120.00	A	0.969	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.686	0.000	0.06

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.00
L3	120.00-115.00	A	0.965	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.681	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.01
L4	115.00-110.00	A	0.961	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.676	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.02
L5	110.00-105.00	A	0.957	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	3.671	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.02
L6	105.00-100.00	A	0.952	0.000	0.000	1.033	0.000	0.07
		B		0.000	0.000	4.698	0.000	0.07
		C		0.000	0.000	1.033	0.000	0.03
L7	100.00-99.27	A	0.949	0.000	0.000	0.594	0.000	0.01
		B		0.000	0.000	1.128	0.000	0.01
		C		0.000	0.000	0.594	0.000	0.01
L8	99.27-99.02	A	0.949	0.000	0.000	0.222	0.000	0.00
		B		0.000	0.000	0.405	0.000	0.00
		C		0.000	0.000	0.222	0.000	0.00
L9	99.02-97.04	A	0.948	0.000	0.000	3.409	0.000	0.05
		B		0.000	0.000	4.858	0.000	0.05
		C		0.000	0.000	3.409	0.000	0.03
L10	97.04-96.79	A	0.947	0.000	0.000	0.430	0.000	0.01
		B		0.000	0.000	0.613	0.000	0.01
		C		0.000	0.000	0.430	0.000	0.00
L11	96.79-96.33	A	0.946	0.000	0.000	0.792	0.000	0.01
		B		0.000	0.000	1.128	0.000	0.01
		C		0.000	0.000	0.792	0.000	0.01
L12	96.33-96.08	A	0.946	0.000	0.000	0.430	0.000	0.01
		B		0.000	0.000	0.613	0.000	0.01
		C		0.000	0.000	0.430	0.000	0.00
L13	96.08-94.29	A	0.945	0.000	0.000	4.189	0.000	0.05
		B		0.000	0.000	5.498	0.000	0.06
		C		0.000	0.000	4.189	0.000	0.04
L14	94.29-94.04	A	0.944	0.000	0.000	0.434	0.000	0.01
		B		0.000	0.000	0.616	0.000	0.01
		C		0.000	0.000	0.434	0.000	0.00
L15	94.04-91.50	A	0.943	0.000	0.000	5.617	0.000	0.07
		B		0.000	0.000	7.472	0.000	0.08
		C		0.000	0.000	5.617	0.000	0.05
L16	91.50-91.25	A	0.941	0.000	0.000	0.307	0.000	0.01
		B		0.000	0.000	0.490	0.000	0.01
		C		0.000	0.000	0.307	0.000	0.00
L17	91.25-86.25	A	0.938	0.000	0.000	7.328	0.000	0.11
		B		0.000	0.000	10.976	0.000	0.12
		C		0.000	0.000	7.328	0.000	0.07
L18	86.25-86.08	A	0.936	0.000	0.000	0.347	0.000	0.00
		B		0.000	0.000	0.471	0.000	0.00
		C		0.000	0.000	0.347	0.000	0.00
L19	86.08-85.83	A	0.935	0.000	0.000	0.510	0.000	0.01
		B		0.000	0.000	0.692	0.000	0.01
		C		0.000	0.000	0.510	0.000	0.00
L20	85.83-75.75	A	0.930	0.000	0.000	11.628	0.000	0.19
		B		0.000	0.000	18.960	0.000	0.22
		C		0.000	0.000	11.628	0.000	0.12
L21	75.75-74.75	A	0.923	0.000	0.000	1.074	0.000	0.02
		B		0.000	0.000	1.802	0.000	0.02
		C		0.000	0.000	1.074	0.000	0.01
L22	74.75-71.00	A	0.920	0.000	0.000	6.368	0.000	0.08
		B		0.000	0.000	9.087	0.000	0.09
		C		0.000	0.000	6.368	0.000	0.05

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L23	71.00-70.75	A	0.918	0.000	0.000	0.561	0.000	0.01
		B		0.000	0.000	0.742	0.000	0.01
		C		0.000	0.000	0.561	0.000	0.00
L24	70.75-65.75	A	0.914	0.000	0.000	11.221	0.000	0.12
		B		0.000	0.000	14.838	0.000	0.13
		C		0.000	0.000	11.221	0.000	0.09
L25	65.75-60.75	A	0.907	0.000	0.000	11.210	0.000	0.12
		B		0.000	0.000	14.819	0.000	0.13
		C		0.000	0.000	11.210	0.000	0.09
L26	60.75-60.00	A	0.903	0.000	0.000	1.812	0.000	0.02
		B		0.000	0.000	2.352	0.000	0.02
		C		0.000	0.000	1.812	0.000	0.01
L27	60.00-59.75	A	0.902	0.000	0.000	0.668	0.000	0.01
		B		0.000	0.000	0.849	0.000	0.01
		C		0.000	0.000	0.668	0.000	0.00
L28	59.75-54.75	A	0.898	0.000	0.000	9.556	0.000	0.11
		B		0.000	0.000	13.154	0.000	0.12
		C		0.000	0.000	9.556	0.000	0.08
L29	54.75-44.00	A	0.885	0.000	0.000	17.399	0.000	0.22
		B		0.000	0.000	25.098	0.000	0.25
		C		0.000	0.000	17.399	0.000	0.15
L30	44.00-43.00	A	0.874	0.000	0.000	2.670	0.000	0.03
		B		0.000	0.000	3.386	0.000	0.03
		C		0.000	0.000	2.670	0.000	0.02
L31	43.00-42.85	A	0.873	0.000	0.000	0.400	0.000	0.00
		B		0.000	0.000	0.507	0.000	0.00
		C		0.000	0.000	0.400	0.000	0.00
L32	42.85-37.85	A	0.867	0.000	0.000	13.317	0.000	0.13
		B		0.000	0.000	16.876	0.000	0.14
		C		0.000	0.000	13.317	0.000	0.09
L33	37.85-32.85	A	0.856	0.000	0.000	13.296	0.000	0.13
		B		0.000	0.000	16.841	0.000	0.14
		C		0.000	0.000	13.296	0.000	0.09
L34	32.85-27.85	A	0.843	0.000	0.000	14.177	0.000	0.13
		B		0.000	0.000	17.706	0.000	0.14
		C		0.000	0.000	14.177	0.000	0.10
L35	27.85-26.25	A	0.833	0.000	0.000	4.915	0.000	0.04
		B		0.000	0.000	6.040	0.000	0.05
		C		0.000	0.000	4.915	0.000	0.03
L36	26.25-26.00	A	0.830	0.000	0.000	0.768	0.000	0.01
		B		0.000	0.000	0.943	0.000	0.01
		C		0.000	0.000	0.768	0.000	0.00
L37	26.00-21.00	A	0.822	0.000	0.000	15.335	0.000	0.13
		B		0.000	0.000	18.837	0.000	0.14
		C		0.000	0.000	15.335	0.000	0.10
L38	21.00-16.00	A	0.802	0.000	0.000	15.296	0.000	0.13
		B		0.000	0.000	18.774	0.000	0.14
		C		0.000	0.000	15.296	0.000	0.10
L39	16.00-11.00	A	0.777	0.000	0.000	15.246	0.000	0.13
		B		0.000	0.000	18.693	0.000	0.14
		C		0.000	0.000	15.246	0.000	0.09
L40	11.00-6.00	A	0.742	0.000	0.000	15.176	0.000	0.13
		B		0.000	0.000	18.578	0.000	0.13
		C		0.000	0.000	15.176	0.000	0.09
L41	6.00-1.00	A	0.679	0.000	0.000	15.050	0.000	0.12
		B		0.000	0.000	18.373	0.000	0.13
		C		0.000	0.000	15.050	0.000	0.08
L42	1.00-0.00	A	0.559	0.000	0.000	2.962	0.000	0.02
		B		0.000	0.000	3.597	0.000	0.02
		C		0.000	0.000	2.962	0.000	0.01

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	130.00-125.00	0.852	0.492	1.065	0.615
L2	125.00-120.00	1.899	1.096	2.159	1.246
L3	120.00-115.00	1.906	1.100	2.183	1.260
L4	115.00-110.00	1.912	1.104	2.205	1.273
L5	110.00-105.00	1.918	1.108	2.226	1.285
L6	105.00-100.00	1.614	0.932	1.972	1.139
L7	100.00-99.27	1.106	0.638	1.467	0.847
L8	99.27-99.02	1.067	0.616	1.426	0.823
L9	99.02-97.04	0.751	0.434	1.062	0.613
L10	97.04-96.79	0.755	0.436	1.068	0.617
L11	96.79-96.33	0.757	0.437	1.070	0.618
L12	96.33-96.08	0.757	0.437	1.071	0.618
L13	96.08-94.29	0.625	0.361	0.904	0.522
L14	94.29-94.04	0.760	0.439	1.075	0.621
L15	94.04-91.50	0.653	0.377	0.944	0.545
L16	91.50-91.25	0.928	0.536	1.283	0.741
L17	91.25-86.25	0.862	0.498	1.194	0.690
L18	86.25-86.08	0.722	0.417	1.016	0.586
L19	86.08-85.83	0.723	0.417	1.017	0.587
L20	85.83-75.75	1.026	0.592	1.364	0.788
L21	75.75-74.75	1.074	0.620	1.420	0.820
L22	74.75-71.00	0.853	0.492	1.163	0.672
L23	71.00-70.75	0.725	0.419	1.009	0.583
L24	70.75-65.75	0.733	0.423	1.019	0.588
L25	65.75-60.75	0.746	0.431	1.036	0.598
L26	60.75-60.00	0.709	0.409	1.002	0.579
L27	60.00-59.75	0.661	0.382	0.946	0.546
L28	59.75-54.75	0.819	0.473	1.150	0.664
L29	54.75-44.00	0.918	0.530	1.274	0.735
L30	44.00-43.00	0.693	0.400	0.988	0.570
L31	43.00-42.85	0.695	0.401	0.987	0.570
L32	42.85-37.85	0.701	0.405	0.994	0.574
L33	37.85-32.85	0.712	0.411	1.008	0.582
L34	32.85-27.85	0.690	0.398	0.983	0.567
L35	27.85-26.25	0.657	0.379	0.944	0.545
L36	26.25-26.00	0.659	0.380	0.946	0.546
L37	26.00-21.00	0.664	0.383	0.952	0.550
L38	21.00-16.00	0.675	0.389	0.962	0.556
L39	16.00-11.00	0.685	0.395	0.971	0.560
L40	11.00-6.00	0.695	0.401	0.976	0.564
L41	6.00-1.00	0.705	0.407	0.975	0.563
L42	1.00-0.00	0.711	0.410	0.952	0.550

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	HB158-1-08U8-S8J18(1-5/8)	125.00 - 127.00	1.0000	1.0000
L2	3	HB158-1-08U8-S8J18(1-5/8)	120.00 - 125.00	1.0000	1.0000
L3	3	HB158-1-08U8-S8J18(1-5/8)	115.00 - 120.00	1.0000	1.0000
L4	3	HB158-1-08U8-S8J18(1-5/8)	110.00 - 115.00	1.0000	1.0000
L5	3	HB158-1-08U8-S8J18(1-5/8)	105.00 - 110.00	1.0000	1.0000
L6	3	HB158-1-08U8-S8J18(1-5/8)	100.00 - 105.00	1.0000	1.0000
L6	51	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L6	52	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L6	53	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L7	3	HB158-1-08U8-S8J18(1-5/8)	99.27 - 100.00	1.0000	1.0000
L7	51	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L7	52	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L7	53	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L8	3	HB158-1-08U8-S8J18(1-5/8)	99.02 - 99.27	1.0000	1.0000
L8	47	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	48	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	49	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	51	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L8	52	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L8	53	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L9	3	HB158-1-08U8-S8J18(1-5/8)	97.04 - 99.02	1.0000	1.0000
L9	47	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	48	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	49	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	51	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L9	52	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L9	53	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L10	3	HB158-1-08U8-S8J18(1-5/8)	96.79 - 97.04	1.0000	1.0000
L10	47	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	48	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	49	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	51	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L10	52	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L10	53	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L11	3	HB158-1-08U8-S8J18(1-5/8)	96.33 - 96.79	1.0000	1.0000
L11	47	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	48	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	49	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	51	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L11	52	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L11	53	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L12	3	HB158-1-08U8-S8J18(1-5/8)	96.08 - 96.33	1.0000	1.0000
L12	47	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	48	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	49	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	51	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L12	52	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L12	53	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L13	3	HB158-1-08U8-S8J18(1-5/8)	94.29 - 96.08	1.0000	1.0000
L13	43	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	44	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	45	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	47	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L13	48	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000
L13	49	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000
L13	51	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L13	52	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L13	53	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L14	3	HB158-1-08U8-S8J18(1-5/8)	94.04 - 94.29	1.0000	1.0000
L14	43	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	44	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	45	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	47	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	48	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	49	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L15	3	HB158-1-08U8-S8J18(1-5/8)	91.50 - 94.04	1.0000	1.0000
L15	39	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	40	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	41	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	43	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	44	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	45	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	47	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L15	48	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L15	49	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L16	3	HB158-1-08U8-S8J18(1-5/8)	91.25 - 91.50	1.0000	1.0000
L16	39	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	40	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	41	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	43	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L16	44	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L16	45	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L17	3	HB158-1-08U8-S8J18(1-5/8)	86.25 - 91.25	1.0000	1.0000
L17	23	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	24	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	25	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	39	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L17	40	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L17	41	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L18	3	HB158-1-08U8-S8J18(1-5/8)	86.08 - 86.25	1.0000	1.0000
L18	23	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	24	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	25	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	39	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L18	40	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L18	41	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L19	3	HB158-1-08U8-S8J18(1-5/8)	85.83 - 86.08	1.0000	1.0000
L19	23	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	24	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	25	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	39	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L19	40	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L19	41	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L20	3	HB158-1-08U8-S8J18(1-5/8)	75.75 - 85.83	1.0000	1.0000
L20	23	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	24	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	25	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	39	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L20	40	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L20	41	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L21	3	HB158-1-08U8-S8J18(1-5/8)	74.75 - 75.75	1.0000	1.0000
L21	23	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L21	24	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L21	25	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L22	3	HB158-1-08U8-S8J18(1-5/8)	71.00 - 74.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	23	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	24	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	25	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	35	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L22	36	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L22	37	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L23	3	HB158-1-08U8-S8J18(1-5/8)	70.75 - 71.00	1.0000	1.0000
L23	23	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	24	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	25	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	35	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L23	36	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L23	37	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L24	3	HB158-1-08U8-S8J18(1-5/8)	65.75 - 70.75	1.0000	1.0000
L24	23	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	24	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	25	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	35	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L24	36	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L24	37	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L25	3	HB158-1-08U8-S8J18(1-5/8)	60.75 - 65.75	1.0000	1.0000
L25	23	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	24	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	25	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	35	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L25	36	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L25	37	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L26	3	HB158-1-08U8-S8J18(1-5/8)	60.00 - 60.75	1.0000	1.0000
L26	19	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	20	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	21	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	23	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	24	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	25	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	35	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L26	36	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L26	37	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L27	3	HB158-1-08U8-S8J18(1-5/8)	59.75 - 60.00	1.0000	1.0000
L27	19	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	20	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	21	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	35	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L27	36	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L27	37	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L28	3	HB158-1-08U8-S8J18(1-5/8)	54.75 - 59.75	1.0000	1.0000
L28	19	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	20	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	21	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	35	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L28	36	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L28	37	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L29	3	HB158-1-08U8-S8J18(1-5/8)	44.00 - 54.75	1.0000	1.0000
L29	19	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	20	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	21	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	31	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L29	32	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L29	33	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L30	3	HB158-1-08U8-S8J18(1-5/8)	43.00 - 44.00	1.0000	1.0000
L30	19	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000
L30	20	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000
L30	21	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L30	31	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L30	32	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L30	33	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L31	3	HB158-1-08U8-S8J18(1-5/8)	42.85 - 43.00	1.0000	1.0000
L31	19	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	20	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	21	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	31	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L31	32	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L31	33	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L32	3	HB158-1-08U8-S8J18(1-5/8)	37.85 - 42.85	1.0000	1.0000
L32	19	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	20	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	21	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	31	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L32	32	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L32	33	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L33	3	HB158-1-08U8-S8J18(1-5/8)	32.85 - 37.85	1.0000	1.0000
L33	19	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	20	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	21	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	31	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L33	32	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L33	33	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L34	3	HB158-1-08U8-S8J18(1-5/8)	27.85 - 32.85	1.0000	1.0000
L34	19	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	20	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	21	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	27	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	28	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	29	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	31	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L34	32	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L34	33	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L35	3	HB158-1-08U8-S8J18(1-5/8)	26.25 - 27.85	1.0000	1.0000
L35	19	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	20	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	21	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	27	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L35	28	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L35	29	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L36	3	HB158-1-08U8-S8J18(1-5/8)	26.00 - 26.25	1.0000	1.0000
L36	19	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	20	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	21	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	27	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L36	28	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L36	29	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L37	3	HB158-1-08U8-S8J18(1-5/8)	21.00 - 26.00	1.0000	1.0000
L37	19	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	20	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	21	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	27	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L37	28	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L37	29	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L38	3	HB158-1-08U8-S8J18(1-5/8)	16.00 - 21.00	1.0000	1.0000
L38	19	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	20	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	21	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	27	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000
L38	28	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000
L38	29	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L39	3	HB158-1-08U8-S8J18(1-5/8)	11.00 - 16.00	1.0000	1.0000
L39	19	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	20	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	21	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	27	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L39	28	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L39	29	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L40	3	HB158-1-08U8-S8J18(1-5/8)	6.00 - 11.00	1.0000	1.0000
L40	19	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	20	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	21	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	27	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L40	28	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L40	29	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L41	3	HB158-1-08U8-S8J18(1-5/8)	1.00 - 6.00	1.0000	1.0000
L41	19	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	20	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	21	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	27	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L41	28	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L41	29	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L42	3	HB158-1-08U8-S8J18(1-5/8)	0.00 - 1.00	1.0000	1.0000
L42	19	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	20	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	21	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	27	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000
L42	28	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000
L42	29	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L6	51	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L6	52	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L6	53	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L7	51	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L7	52	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L7	53	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L8	47	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	48	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	49	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	51	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L8	52	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L8	53	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L9	47	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	48	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	49	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	51	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000
L9	52	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L9	53	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000
L10	47	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	48	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	49	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	51	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L10	52	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L10	53	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L11	47	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	48	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	49	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	51	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L11	52	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L11	53	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L12	47	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	48	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	49	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	51	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L12	52	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L12	53	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L13	43	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	44	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	45	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	47	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	48	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	49	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	51	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L13	52	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L13	53	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L14	43	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	44	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	45	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	47	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	48	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	49	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L15	39	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	40	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	41	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	43	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	44	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	45	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	47	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L15	48	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L15	49	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L16	39	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	40	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	41	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	43	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L16	44	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L16	45	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L17	23	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	24	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	25	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	39	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L17	40	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L17	41	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L18	23	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	24	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	25	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	39	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000
L18	40	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000
L18	41	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L19	23	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	24	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	25	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	39	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L19	40	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L19	41	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L20	23	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	24	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	25	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	39	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L20	40	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L20	41	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L21	23	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L21	24	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L21	25	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L22	23	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	24	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	25	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	35	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L22	36	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L22	37	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L23	23	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	24	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	25	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	35	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L23	36	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L23	37	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L24	23	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	24	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	25	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	35	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L24	36	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L24	37	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L25	23	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	24	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	25	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	35	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L25	36	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L25	37	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L26	19	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	20	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	21	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	23	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	24	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	25	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	35	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L26	36	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L26	37	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L27	19	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	20	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	21	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	35	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L27	36	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L27	37	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L28	19	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	20	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	21	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	35	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L28	36	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L28	37	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L29	19	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L29	20	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000
L29	21	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000
L29	31	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L29	32	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L29	33	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L30	19	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	20	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	21	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	31	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L30	32	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L30	33	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L31	19	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	20	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	21	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	31	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L31	32	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L31	33	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L32	19	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	20	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	21	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	31	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L32	32	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L32	33	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L33	19	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	20	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	21	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	31	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L33	32	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L33	33	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L34	19	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	20	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	21	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	27	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	28	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	29	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	31	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L34	32	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L34	33	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L35	19	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	20	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	21	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	27	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L35	28	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L35	29	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L36	19	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	20	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	21	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	27	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L36	28	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L36	29	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L37	19	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	20	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	21	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	27	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L37	28	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L37	29	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L38	19	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	20	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	21	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	27	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000
L38	28	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L38	29	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000
L39	19	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	20	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	21	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	27	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L39	28	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L39	29	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L40	19	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	20	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	21	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	27	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L40	28	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L40	29	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L41	19	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	20	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	21	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	27	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L41	28	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L41	29	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L42	19	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	20	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	21	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	27	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000
L42	28	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000
L42	29	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
5/8" x 4' Lightning Rod	C	From Leg	0.00 0.000 2.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.00 0.01 0.01
Pine branches									
Tree Pole Branchs.	C	None		0.000	130.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	124.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	118.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	113.50	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	109.30	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Tree Pole Branchs.	C	None		0.000	104.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	100.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	93.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	89.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	85.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	81.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
127									
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
GPS_A	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.11 0.21 0.28	0.11 0.21 0.28	0.00 0.00 0.01
HTXCW631619M000 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
HTXCW631619M000 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
HTXCW631619M000 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
MT6407-77A w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
RFV01U-D1A	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	C	From Centroid-Leg	4.00 0.000	0.000	127.00	No Ice 1/2" Ice	1.88 2.05	1.25 1.39	0.08 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		g	0.000			1" Ice	2.22	1.54	0.12
CDX1923Q-DS-43	A	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
(2) CDX1923Q-DS-43	B	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
(3) CDX1923Q-DS-43	C	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
RFV01U-D2A	A	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
RFV01U-D2A	B	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
RFV01U-D2A	C	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
DB-B1-6C-12AB-0Z	B	From	4.00	0.000	127.00	No Ice	3.36	2.19	0.02
		Centroid-Le	0.000			1/2" Ice	3.60	2.39	0.05
		g	0.000			1" Ice	3.84	2.61	0.08
DB-B1-6C-12AB-0Z	C	From	4.00	0.000	127.00	No Ice	3.36	2.19	0.02
		Centroid-Le	0.000			1/2" Ice	3.60	2.39	0.05
		g	0.000			1" Ice	3.84	2.61	0.08
Site Pro 1 RMQP-496-HK	C	None		0.000	127.00	No Ice	23.14	21.40	1.95
						1/2" Ice	28.17	26.44	2.34
						1" Ice	33.23	31.60	2.85
118									
800 10121 w/ Mount Pipe	A	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	B	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	C	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	A	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	B	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	C	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
AHFIB_CCIV2	A	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHFIB_CCIV2	B	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHFIB_CCIV2	C	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHLBBA	A	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
AHLBBA	B	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
AHLBBA	C	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
DC6-48-60-18-8F	A	From Leg	4.00	0.000	118.00	No Ice	1.21	1.21	0.03
			0.000			1/2" Ice	1.89	1.89	0.05
			0.000			1" Ice	2.11	2.11	0.08
DC6-48-60-18-8F	B	From Leg	4.00	0.000	118.00	No Ice	1.21	1.21	0.03
			0.000			1/2" Ice	1.89	1.89	0.05
			0.000			1" Ice	2.11	2.11	0.08
RRH4X25-WCS	A	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
RRH4X25-WCS	B	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
RRH4X25-WCS	C	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
AHCA_CCIV3	A	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
AHCA_CCIV3	B	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
AHCA_CCIV3	C	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
(2) 1 5/8 x 6' unistrut	A	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
(2) 1 5/8 x 6' unistrut	B	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
(2) 1 5/8 x 6' unistrut	C	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
Miscellaneous [NA 508-3]	C	None		0.000	118.00	No Ice	10.62	10.62	0.56
						1/2" Ice	13.64	13.64	0.72
						1" Ice	16.86	16.86	0.92
Side Arm Mount [SO 101-3]	C	None		0.000	118.00	No Ice	5.81	5.81	0.25
						1/2" Ice	6.95	6.95	0.34
						1" Ice	8.28	8.28	0.46
110_TMO									
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
VV-65A-R1_TMO w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
VV-65A-R1_TMO w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
VV-65A-R1_TMO w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
AIR 6419 B41_TMO w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
Radio 4480_TMOV2	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
110_Sprint									
DT465B-2XR w/ Mount Pipe	A	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	B	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	C	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
APXVSPP18-C w/ Mount Pipe	A	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
APXVSPP18-C w/ Mount Pipe	B	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
APXVSPP18-C w/ Mount Pipe	C	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
FD-RRH-2X50-800	A	From Face	4.00 0.000	0.000	110.00	No Ice 1/2" Ice	2.06 2.24	1.36 1.52	0.05 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	2.43	1.68	0.09
FD-RRH-2X50-800	B	From Face	4.00	0.000	110.00	No Ice	2.06	1.36	0.05
			0.000			1/2" Ice	2.24	1.52	0.07
			0.000			1" Ice	2.43	1.68	0.09
FD-RRH-2X50-800	C	From Face	4.00	0.000	110.00	No Ice	2.06	1.36	0.05
			0.000			1/2" Ice	2.24	1.52	0.07
			0.000			1" Ice	2.43	1.68	0.09
TD-RRH8X20-25	A	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
TD-RRH8X20-25	B	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
TD-RRH8X20-25	C	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
(3) ACU-A20-N	A	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	B	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	C	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
PV-RP10S-HR-12-96	C	None		0.000	110.00	No Ice	25.30	25.30	1.84
						1/2" Ice	32.20	32.20	2.49
						1" Ice	39.10	39.10	3.15
108									
(2) 800 EXTERNAL NOTCH FILTER	A	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800 EXTERNAL NOTCH FILTER	B	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800 EXTERNAL NOTCH FILTER	C	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800MHZ RRH	A	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 800MHZ RRH	B	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 800MHZ RRH	C	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 1900MHZ RRH (65MHZ)	A	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
(2) 1900MHZ RRH (65MHZ)	B	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
(2) 1900MHZ RRH (65MHZ)	C	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
2.4" Dia. x 6' Mount Pipe	A	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
2.4" Dia. x 6' Mount Pipe	B	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
2.4" Dia. x 6' Mount Pipe	C	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
98									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
TA08025-B605	A	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B605	B	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B605	C	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B604	A	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
TA08025-B604	B	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
TA08025-B604	C	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
RDIDC-9181-PF-48	A	From Leg	4.00	0.000	98.00	No Ice	2.01	1.17	0.02
			0.000			1/2" Ice	2.19	1.31	0.04
			0.000			1" Ice	2.37	1.46	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
Commscope MC-K6MHDX-9-96 (3)	C	None		0.000	98.00	No Ice	15.30	15.30	1.19
						1/2" Ice	20.48	20.48	1.71
						1" Ice	25.66	25.66	2.22
90									
(2) KRY 112 71/2	A	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02
			0.000			1" Ice	0.80	0.64	0.03
(2) KRY 112 71/2	B	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	0.80	0.64	0.03
(2) KRY 112 71/2	C	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02
			0.000			1" Ice	0.80	0.64	0.03
(2) 2.4" Dia. x 6' Mount Pipe	A	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
(2) 2.4" Dia. x 6' Mount Pipe	B	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
(2) 2.4" Dia. x 6' Mount Pipe	C	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
Miscellaneous [NA 508-3]	C	None		0.000	90.00	No Ice	10.62	10.62	0.56
						1/2" Ice	13.64	13.64	0.72
						1" Ice	16.86	16.86	0.92
Side Arm Mount [SO 101-3]	C	None		0.000	90.00	No Ice	5.81	5.81	0.25
						1/2" Ice	6.95	6.95	0.34
						1" Ice	8.28	8.28	0.46
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Load Combinations

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

Comb. No.	Description
25	0.9 Dead+1.0 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
L1	130 - 125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.51	0.11	-0.50
			Max. Mx	20	-4.79	22.40	-0.20
			Max. My	14	-4.79	0.07	-22.49
			Max. Vy	8	8.52	-22.24	-0.21
			Max. Vx	14	8.49	0.07	-22.49
			Max. Torque	8			-0.43
L2	125 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.03	0.06	-0.47
			Max. Mx	20	-5.45	72.79	-0.18
			Max. My	14	-5.45	0.04	-72.73
			Max. Vy	8	10.65	-72.66	-0.22
			Max. Vx	14	10.62	0.04	-72.73
			Max. Torque	8			-0.43
L3	120 - 115	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.14	-0.35	-0.23
			Max. Mx	8	-9.46	-144.11	-0.14
			Max. My	14	-9.46	-0.14	-143.74
			Max. Vy	8	16.74	-144.11	-0.14
			Max. Vx	14	16.71	-0.14	-143.74
			Max. Torque	8			-0.43
L4	115 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.73	-0.39	-0.21
			Max. Mx	8	-10.22	-234.73	-0.14
			Max. My	14	-10.23	-0.17	-234.17
			Max. Vy	8	18.86	-234.73	-0.14
			Max. Vx	2	-18.83	-0.07	233.94

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	6			-0.33
L5	110 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.36	-0.44	-0.18
			Max. Mx	8	-16.85	-367.07	-0.15
			Max. My	14	-16.85	-0.20	-366.31
			Max. Vy	8	27.41	-367.07	-0.15
			Max. Vx	2	-27.38	-0.08	366.10
			Max. Torque	6			-0.33
L6	105 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.95	-0.49	-0.15
			Max. Mx	8	-18.07	-512.62	-0.15
			Max. My	14	-18.07	-0.24	-511.68
			Max. Vy	8	31.06	-512.62	-0.15
			Max. Vx	2	-31.03	-0.08	511.49
			Max. Torque	6			-0.33
L7	100 - 99.27	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.09	-0.49	-0.15
			Max. Mx	8	-18.18	-535.32	-0.15
			Max. My	14	-18.18	-0.24	-534.34
			Max. Vy	8	31.13	-535.32	-0.15
			Max. Vx	2	-31.09	-0.08	534.16
			Max. Torque	6			-0.33
L8	99.27 - 99.02	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.15	-0.50	-0.15
			Max. Mx	8	-18.24	-543.10	-0.15
			Max. My	14	-18.25	-0.24	-542.12
			Max. Vy	8	31.15	-543.10	-0.15
			Max. Vx	2	-31.11	-0.09	541.93
			Max. Torque	6			-0.33
L9	99.02 - 97.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.21	-0.51	0.19
			Max. Mx	8	-21.09	-607.04	-0.04
			Max. My	2	-21.09	-0.09	605.95
			Max. Vy	8	33.50	-607.04	-0.04
			Max. Vx	2	-33.50	-0.09	605.95
			Max. Torque	6			-0.33
L10	97.04 - 96.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.30	-0.52	0.19
			Max. Mx	8	-21.18	-615.41	-0.04
			Max. My	2	-21.18	-0.09	614.33
			Max. Vy	8	33.52	-615.41	-0.04
			Max. Vx	2	-33.52	-0.09	614.33
			Max. Torque	18			0.16
L11	96.79 - 96.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.47	-0.52	0.19
			Max. Mx	8	-21.31	-630.85	-0.04
			Max. My	2	-21.31	-0.09	629.76
			Max. Vy	8	33.57	-630.85	-0.04
			Max. Vx	2	-33.57	-0.09	629.76
			Max. Torque	18			0.16
L12	96.33 - 96.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.54	-0.52	0.19
			Max. Mx	8	-21.37	-639.24	-0.04
			Max. My	2	-21.37	-0.09	638.15
			Max. Vy	8	33.60	-639.24	-0.04
			Max. Vx	2	-33.60	-0.09	638.15
			Max. Torque	18			0.16
L13	96.08 - 94.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.08	-0.54	0.20
			Max. Mx	8	-21.74	-699.56	-0.04
			Max. My	2	-21.74	-0.09	698.46

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	33.80	-699.56	-0.04
			Max. Vx	2	-33.79	-0.09	698.46
			Max. Torque	18			0.16
L14	94.29 - 94.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.15	-0.54	0.21
			Max. Mx	8	-21.81	-708.01	-0.04
			Max. My	2	-21.82	-0.09	706.91
			Max. Vy	8	33.82	-708.01	-0.04
			Max. Vx	2	-33.81	-0.09	706.91
			Max. Torque	18			0.16
L15	94.04 - 91.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.77	-0.57	0.22
			Max. Mx	8	-22.64	-797.04	-0.05
			Max. My	2	-22.64	-0.09	795.92
			Max. Vy	8	35.64	-797.04	-0.05
			Max. Vx	2	-35.64	-0.09	795.92
			Max. Torque	18			0.16
L16	91.5 - 91.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.84	-0.57	0.22
			Max. Mx	8	-22.71	-805.95	-0.05
			Max. My	2	-22.71	-0.09	804.83
			Max. Vy	8	35.66	-805.95	-0.05
			Max. Vx	2	-35.65	-0.09	804.83
			Max. Torque	6			-0.16
L17	91.25 - 86.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.13	-0.62	0.25
			Max. Mx	8	-25.26	-994.44	-0.05
			Max. My	2	-25.26	-0.10	993.29
			Max. Vy	8	38.84	-994.44	-0.05
			Max. Vx	2	-38.84	-0.10	993.29
			Max. Torque	18			0.16
L18	86.25 - 86.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.19	-0.63	0.25
			Max. Mx	8	-25.31	-1001.04	-0.05
			Max. My	2	-25.31	-0.10	999.89
			Max. Vy	8	38.85	-1001.04	-0.05
			Max. Vx	2	-38.85	-0.10	999.89
			Max. Torque	6			-0.16
L19	86.08 - 85.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.26	-0.63	0.25
			Max. Mx	8	-25.37	-1010.76	-0.05
			Max. My	2	-25.37	-0.10	1009.61
			Max. Vy	8	38.88	-1010.76	-0.05
			Max. Vx	2	-38.87	-0.10	1009.61
			Max. Torque	6			-0.16
L20	85.83 - 75.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.32	-0.68	0.28
			Max. Mx	8	-27.06	-1206.70	-0.05
			Max. My	2	-27.06	-0.11	1205.51
			Max. Vy	8	42.40	-1206.70	-0.05
			Max. Vx	2	-42.39	-0.11	1205.51
			Max. Torque	6			-0.16
L21	75.75 - 74.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.51	-0.75	0.32
			Max. Mx	8	-29.71	-1474.01	-0.05
			Max. My	2	-29.71	-0.12	1472.79
			Max. Vy	8	43.15	-1474.01	-0.05
			Max. Vx	2	-43.14	-0.12	1472.79
			Max. Torque	6			-0.16
L22	74.75 - 71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.77	-0.79	0.35

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-30.79	-1636.48	-0.06
			Max. My	2	-30.80	-0.13	1635.24
			Max. Vy	8	43.52	-1636.48	-0.06
			Max. Vx	2	-43.52	-0.13	1635.24
			Max. Torque	6			-0.16
L23	71 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.88	-0.79	0.35
			Max. Mx	8	-30.90	-1647.36	-0.06
			Max. My	2	-30.90	-0.13	1646.12
			Max. Vy	8	43.54	-1647.36	-0.06
			Max. Vx	2	-43.53	-0.13	1646.12
			Max. Torque	6			-0.16
L24	70.75 - 65.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.99	-0.85	0.38
			Max. Mx	8	-32.69	-1866.42	-0.06
			Max. My	2	-32.69	-0.14	1865.14
			Max. Vy	8	44.09	-1866.42	-0.06
			Max. Vx	2	-44.08	-0.14	1865.14
			Max. Torque	6			-0.16
L25	65.75 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.12	-0.91	0.41
			Max. Mx	8	-34.53	-2088.17	-0.06
			Max. My	2	-34.53	-0.14	2086.86
			Max. Vy	8	44.63	-2088.17	-0.06
			Max. Vx	2	-44.62	-0.14	2086.86
			Max. Torque	6			-0.16
L26	60.75 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.45	-0.91	0.42
			Max. Mx	8	-34.81	-2121.66	-0.06
			Max. My	2	-34.81	-0.15	2120.35
			Max. Vy	8	44.70	-2121.66	-0.06
			Max. Vx	2	-44.70	-0.15	2120.35
			Max. Torque	6			-0.16
L27	60 - 59.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.56	-0.92	0.42
			Max. Mx	8	-34.91	-2132.84	-0.06
			Max. My	2	-34.91	-0.15	2131.52
			Max. Vy	8	44.72	-2132.84	-0.06
			Max. Vx	2	-44.72	-0.15	2131.52
			Max. Torque	6			-0.16
L28	59.75 - 54.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.62	-0.98	0.46
			Max. Mx	8	-36.70	-2357.74	-0.06
			Max. My	2	-36.70	-0.16	2356.40
			Max. Vy	8	45.25	-2357.74	-0.06
			Max. Vx	2	-45.24	-0.16	2356.40
			Max. Torque	6			-0.16
L29	54.75 - 44	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.59	-1.03	0.49
			Max. Mx	8	-38.44	-2573.76	-0.06
			Max. My	2	-38.44	-0.17	2572.38
			Max. Vy	8	45.73	-2573.76	-0.06
			Max. Vx	2	-45.72	-0.17	2572.38
			Max. Torque	6			-0.16
L30	44 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.42	-1.12	0.54
			Max. Mx	8	-43.53	-2896.89	-0.06
			Max. My	2	-43.53	-0.18	2895.47
			Max. Vy	8	46.60	-2896.89	-0.06
			Max. Vx	2	-46.59	-0.18	2895.47
			Max. Torque	6			-0.16

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L31	43 - 42.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.50	-1.12	0.54
			Max. Mx	8	-43.62	-2903.88	-0.06
			Max. My	2	-43.62	-0.18	2902.46
			Max. Vy	8	46.60	-2903.88	-0.06
			Max. Vx	2	-46.60	-0.18	2902.46
			Max. Torque	6			-0.16
L32	42.85 - 37.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.23	-1.18	0.58
			Max. Mx	8	-45.99	-3138.17	-0.06
			Max. My	2	-45.99	-0.19	3136.72
			Max. Vy	8	47.12	-3138.17	-0.06
			Max. Vx	2	-47.12	-0.19	3136.72
			Max. Torque	6			-0.16
L33	37.85 - 32.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.98	-1.25	0.61
			Max. Mx	8	-48.42	-3374.95	-0.06
			Max. My	2	-48.42	-0.21	3373.47
			Max. Vy	8	47.61	-3374.95	-0.06
			Max. Vx	2	-47.61	-0.21	3373.47
			Max. Torque	6			-0.16
L34	32.85 - 27.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.78	-1.31	0.65
			Max. Mx	8	-50.88	-3614.15	-0.06
			Max. My	2	-50.88	-0.22	3612.63
			Max. Vy	8	48.09	-3614.15	-0.06
			Max. Vx	2	-48.08	-0.22	3612.63
			Max. Torque	6			-0.16
L35	27.85 - 26.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.68	-1.33	0.66
			Max. Mx	8	-51.66	-3691.18	-0.06
			Max. My	2	-51.66	-0.22	3689.66
			Max. Vy	8	48.24	-3691.18	-0.06
			Max. Vx	2	-48.24	-0.22	3689.66
			Max. Torque	6			-0.16
L36	26.25 - 26	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.84	-1.34	0.66
			Max. Mx	8	-51.82	-3703.24	-0.06
			Max. My	2	-51.82	-0.22	3701.72
			Max. Vy	8	48.24	-3703.24	-0.06
			Max. Vx	2	-48.24	-0.22	3701.72
			Max. Torque	6			-0.16
L37	26 - 21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.96	-1.40	0.70
			Max. Mx	8	-54.58	-3945.62	-0.05
			Max. My	2	-54.58	-0.24	3944.06
			Max. Vy	8	48.72	-3945.62	-0.05
			Max. Vx	2	-48.71	-0.24	3944.06
			Max. Torque	6			-0.16
L38	21 - 16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.11	-1.47	0.74
			Max. Mx	8	-57.38	-4190.23	-0.05
			Max. My	2	-57.38	-0.25	4188.64
			Max. Vy	8	49.15	-4190.23	-0.05
			Max. Vx	2	-49.14	-0.25	4188.64
			Max. Torque	6			-0.16
L39	16 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-89.28	-1.53	0.78
			Max. Mx	8	-60.22	-4436.92	-0.05
			Max. My	2	-60.22	-0.27	4435.30
			Max. Vy	8	49.55	-4436.92	-0.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-49.55	-0.27	4435.30
			Max. Torque	6			-0.16
L40	11 - 6	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-92.46	-1.60	0.81
			Max. Mx	8	-63.08	-4685.63	-0.05
			Max. My	2	-63.08	-0.28	4683.98
			Max. Vy	8	49.95	-4685.63	-0.05
			Max. Vx	2	-49.95	-0.28	4683.98
			Max. Torque	6			-0.16
L41	6 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.63	-1.66	0.85
			Max. Mx	8	-65.98	-4936.33	-0.04
			Max. My	2	-65.98	-0.30	4934.65
			Max. Vy	8	50.35	-4936.33	-0.04
			Max. Vx	2	-50.35	-0.30	4934.65
			Max. Torque	6			-0.16
L42	1 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-96.26	-1.67	0.86
			Max. Mx	8	-66.57	-4986.71	-0.04
			Max. My	2	-66.57	-0.30	4985.02
			Max. Vy	8	50.43	-4986.71	-0.04
			Max. Vx	2	-50.43	-0.30	4985.02
			Max. Torque	6			-0.16

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	96.26	0.00	0.00
	Max. H_x	21	49.94	50.41	0.00
	Max. H_z	3	49.94	0.00	50.41
	Max. M_x	2	4985.02	0.00	50.41
	Max. M_z	8	4986.71	-50.41	-0.00
	Max. Torsion	18	0.16	43.66	-25.20
	Min. Vert	25	49.94	25.21	43.66
	Min. H_x	9	49.94	-50.41	-0.00
	Min. H_z	15	49.94	-0.00	-50.41
	Min. M_x	14	-4984.39	-0.00	-50.41
	Min. M_z	20	-4985.39	50.41	0.00
	Min. Torsion	6	-0.16	-43.66	25.20

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	55.49	0.00	0.00	-0.26	-0.53	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	66.58	-0.00	-50.41	-4985.02	-0.30	0.11
0.9 Dead+1.0 Wind 0 deg - No Ice	49.94	-0.00	-50.41	-4952.11	-0.13	0.11
1.2 Dead+1.0 Wind 30 deg - No	66.58	25.59	-44.32	-4347.75	-2511.12	0.16

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
Ice						
0.9 Dead+1.0 Wind 30 deg - No Ice	49.94	25.59	-44.32	-4319.13	-2494.47	0.15
1.2 Dead+1.0 Wind 60 deg - No Ice	66.58	43.66	-25.20	-2492.36	-4318.53	0.16
0.9 Dead+1.0 Wind 60 deg - No Ice	49.94	43.66	-25.20	-2475.87	-4289.92	0.15
1.2 Dead+1.0 Wind 90 deg - No Ice	66.58	50.41	0.00	0.04	-4986.71	0.12
0.9 Dead+1.0 Wind 90 deg - No Ice	49.94	50.41	0.00	0.12	-4953.70	0.11
1.2 Dead+1.0 Wind 120 deg - No Ice	66.58	43.66	25.21	2492.35	-4318.88	0.04
0.9 Dead+1.0 Wind 120 deg - No Ice	49.94	43.66	25.21	2476.01	-4290.27	0.04
1.2 Dead+1.0 Wind 150 deg - No Ice	66.58	25.21	43.66	4316.75	-2493.99	-0.04
0.9 Dead+1.0 Wind 150 deg - No Ice	49.94	25.21	43.66	4288.40	-2477.40	-0.04
1.2 Dead+1.0 Wind 180 deg - No Ice	66.58	0.00	50.41	4984.39	-1.01	-0.11
0.9 Dead+1.0 Wind 180 deg - No Ice	49.94	0.00	50.41	4951.65	-0.84	-0.11
1.2 Dead+1.0 Wind 210 deg - No Ice	66.58	-25.59	44.32	4347.13	2509.81	-0.16
0.9 Dead+1.0 Wind 210 deg - No Ice	49.94	-25.59	44.32	4318.67	2493.49	-0.15
1.2 Dead+1.0 Wind 240 deg - No Ice	66.58	-43.66	25.20	2491.73	4317.21	-0.16
0.9 Dead+1.0 Wind 240 deg - No Ice	49.94	-43.66	25.20	2475.40	4288.94	-0.15
1.2 Dead+1.0 Wind 270 deg - No Ice	66.58	-50.41	-0.00	-0.67	4985.39	-0.12
0.9 Dead+1.0 Wind 270 deg - No Ice	49.94	-50.41	-0.00	-0.59	4952.72	-0.11
1.2 Dead+1.0 Wind 300 deg - No Ice	66.58	-43.66	-25.21	-2492.98	4317.57	-0.04
0.9 Dead+1.0 Wind 300 deg - No Ice	49.94	-43.66	-25.21	-2476.48	4289.29	-0.04
1.2 Dead+1.0 Wind 330 deg - No Ice	66.58	-25.21	-43.66	-4317.37	2492.68	0.04
0.9 Dead+1.0 Wind 330 deg - No Ice	49.94	-25.21	-43.66	-4288.87	2476.42	0.04
1.2 Dead+1.0 Ice+1.0 Temp	96.26	0.00	0.00	-0.86	-1.67	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	96.26	-0.00	-7.29	-727.03	-1.71	0.03
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	96.26	3.65	-6.31	-629.72	-364.86	0.03
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	96.26	6.31	-3.65	-363.92	-630.72	0.02
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	96.26	7.29	0.00	-0.84	-728.05	0.01
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	96.26	6.31	3.65	362.22	-630.77	-0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	96.26	3.65	6.31	627.98	-364.95	-0.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	96.26	0.00	7.29	725.24	-1.82	-0.03
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	96.26	-3.65	6.31	627.93	361.33	-0.03
1.2 Dead+1.0 Wind 240	96.26	-6.31	3.65	362.13	627.19	-0.02

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	96.26	-7.29	-0.00	-0.95	724.51	-0.01
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	96.26	-6.31	-3.65	-364.01	627.24	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	96.26	-3.65	-6.31	-629.77	361.42	0.02
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	55.49	-0.00	-12.93	-1273.84	-0.45	0.03
Dead+Wind 30 deg - Service	55.49	6.56	-11.36	-1111.04	-641.97	0.04
Dead+Wind 60 deg - Service	55.49	11.19	-6.46	-636.97	-1103.75	0.04
Dead+Wind 90 deg - Service	55.49	12.93	0.00	-0.17	-1274.47	0.03
Dead+Wind 120 deg - Service	55.49	11.20	6.46	636.61	-1103.84	0.00
Dead+Wind 150 deg - Service	55.49	6.46	11.19	1102.74	-637.59	-0.02
Dead+Wind 180 deg - Service	55.49	0.00	12.93	1273.32	-0.64	-0.03
Dead+Wind 210 deg - Service	55.49	-6.56	11.36	1110.51	640.88	-0.04
Dead+Wind 240 deg - Service	55.49	-11.19	6.46	636.45	1102.66	-0.04
Dead+Wind 270 deg - Service	55.49	-12.93	-0.00	-0.35	1273.38	-0.03
Dead+Wind 300 deg - Service	55.49	-11.20	-6.46	-637.13	1102.75	-0.00
Dead+Wind 330 deg - Service	55.49	-6.46	-11.19	-1103.26	636.49	0.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-55.49	0.00	0.00	55.49	0.00	0.000%
2	-0.00	-66.58	-50.41	0.00	66.58	50.41	0.000%
3	-0.00	-49.94	-50.41	0.00	49.94	50.41	0.000%
4	25.59	-66.58	-44.32	-25.59	66.58	44.32	0.000%
5	25.59	-49.94	-44.32	-25.59	49.94	44.32	0.000%
6	43.66	-66.58	-25.20	-43.66	66.58	25.20	0.000%
7	43.66	-49.94	-25.20	-43.66	49.94	25.20	0.000%
8	50.41	-66.58	0.00	-50.41	66.58	-0.00	0.000%
9	50.41	-49.94	0.00	-50.41	49.94	-0.00	0.000%
10	43.66	-66.58	25.21	-43.66	66.58	-25.21	0.000%
11	43.66	-49.94	25.21	-43.66	49.94	-25.21	0.000%
12	25.21	-66.58	43.66	-25.21	66.58	-43.66	0.000%
13	25.21	-49.94	43.66	-25.21	49.94	-43.66	0.000%
14	0.00	-66.58	50.41	-0.00	66.58	-50.41	0.000%
15	0.00	-49.94	50.41	-0.00	49.94	-50.41	0.000%
16	-25.59	-66.58	44.32	25.59	66.58	-44.32	0.000%
17	-25.59	-49.94	44.32	25.59	49.94	-44.32	0.000%
18	-43.66	-66.58	25.20	43.66	66.58	-25.20	0.000%
19	-43.66	-49.94	25.20	43.66	49.94	-25.20	0.000%
20	-50.41	-66.58	-0.00	50.41	66.58	0.00	0.000%
21	-50.41	-49.94	-0.00	50.41	49.94	0.00	0.000%
22	-43.66	-66.58	-25.21	43.66	66.58	25.21	0.000%
23	-43.66	-49.94	-25.21	43.66	49.94	25.21	0.000%
24	-25.21	-66.58	-43.66	25.21	66.58	43.66	0.000%
25	-25.21	-49.94	-43.66	25.21	49.94	43.66	0.000%
26	0.00	-96.26	0.00	0.00	96.26	0.00	0.000%
27	-0.00	-96.26	-7.29	0.00	96.26	7.29	0.000%
28	3.65	-96.26	-6.31	-3.65	96.26	6.31	0.000%
29	6.31	-96.26	-3.65	-6.31	96.26	3.65	0.000%
30	7.29	-96.26	0.00	-7.29	96.26	-0.00	0.000%
31	6.31	-96.26	3.65	-6.31	96.26	-3.65	0.000%
32	3.65	-96.26	6.31	-3.65	96.26	-6.31	0.000%
33	0.00	-96.26	7.29	-0.00	96.26	-7.29	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
34	-3.65	-96.26	6.31	3.65	96.26	-6.31	0.000%
35	-6.31	-96.26	3.65	6.31	96.26	-3.65	0.000%
36	-7.29	-96.26	-0.00	7.29	96.26	0.00	0.000%
37	-6.31	-96.26	-3.65	6.31	96.26	3.65	0.000%
38	-3.65	-96.26	-6.31	3.65	96.26	6.31	0.000%
39	-0.00	-55.49	-12.93	0.00	55.49	12.93	0.000%
40	6.56	-55.49	-11.36	-6.56	55.49	11.36	0.000%
41	11.19	-55.49	-6.46	-11.19	55.49	6.46	0.000%
42	12.93	-55.49	0.00	-12.93	55.49	-0.00	0.000%
43	11.20	-55.49	6.46	-11.20	55.49	-6.46	0.000%
44	6.46	-55.49	11.19	-6.46	55.49	-11.19	0.000%
45	0.00	-55.49	12.93	-0.00	55.49	-12.93	0.000%
46	-6.56	-55.49	11.36	6.56	55.49	-11.36	0.000%
47	-11.19	-55.49	6.46	11.19	55.49	-6.46	0.000%
48	-12.93	-55.49	-0.00	12.93	55.49	0.00	0.000%
49	-11.20	-55.49	-6.46	11.20	55.49	6.46	0.000%
50	-6.46	-55.49	-11.19	6.46	55.49	11.19	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00006385
3	Yes	4	0.00000001	0.00092843
4	Yes	6	0.00000001	0.00011169
5	Yes	6	0.00000001	0.00003492
6	Yes	6	0.00000001	0.00011075
7	Yes	6	0.00000001	0.00003467
8	Yes	5	0.00000001	0.00006388
9	Yes	4	0.00000001	0.00093012
10	Yes	6	0.00000001	0.00011112
11	Yes	6	0.00000001	0.00003479
12	Yes	6	0.00000001	0.00011108
13	Yes	6	0.00000001	0.00003478
14	Yes	5	0.00000001	0.00006412
15	Yes	4	0.00000001	0.00093500
16	Yes	6	0.00000001	0.00011109
17	Yes	6	0.00000001	0.00003472
18	Yes	6	0.00000001	0.00011122
19	Yes	6	0.00000001	0.00003484
20	Yes	5	0.00000001	0.00006363
21	Yes	4	0.00000001	0.00092406
22	Yes	6	0.00000001	0.00011092
23	Yes	6	0.00000001	0.00003473
24	Yes	6	0.00000001	0.00011090
25	Yes	6	0.00000001	0.00003473
26	Yes	4	0.00000001	0.00000001
27	Yes	6	0.00000001	0.00006634
28	Yes	6	0.00000001	0.00006910
29	Yes	6	0.00000001	0.00006915
30	Yes	6	0.00000001	0.00006651
31	Yes	6	0.00000001	0.00006906
32	Yes	6	0.00000001	0.00006897
33	Yes	6	0.00000001	0.00006619
34	Yes	6	0.00000001	0.00006868

35	Yes	6	0.00000001	0.00006866
36	Yes	6	0.00000001	0.00006608
37	Yes	6	0.00000001	0.00006877
38	Yes	6	0.00000001	0.00006883
39	Yes	4	0.00000001	0.00054102
40	Yes	5	0.00000001	0.00008344
41	Yes	5	0.00000001	0.00008184
42	Yes	4	0.00000001	0.00054091
43	Yes	5	0.00000001	0.00008232
44	Yes	5	0.00000001	0.00008247
45	Yes	4	0.00000001	0.00054093
46	Yes	5	0.00000001	0.00008222
47	Yes	5	0.00000001	0.00008253
48	Yes	4	0.00000001	0.00054031
49	Yes	5	0.00000001	0.00008212
50	Yes	5	0.00000001	0.00008193

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	16.007	40	1.102	0.001
L2	125 - 120	14.853	40	1.101	0.000
L3	120 - 115	13.705	40	1.090	0.000
L4	115 - 110	12.573	40	1.070	0.000
L5	110 - 105	11.469	40	1.037	0.000
L6	105 - 100	10.406	40	0.991	0.000
L7	100 - 99.27	9.399	40	0.930	0.000
L8	99.27 - 99.02	9.258	40	0.920	0.000
L9	99.02 - 97.04	9.210	40	0.918	0.000
L10	97.04 - 96.79	8.832	40	0.902	0.000
L11	96.79 - 96.33	8.785	40	0.901	0.000
L12	96.33 - 96.08	8.698	40	0.898	0.000
L13	96.08 - 94.29	8.651	40	0.896	0.000
L14	94.29 - 94.04	8.318	40	0.880	0.000
L15	94.04 - 91.5	8.272	40	0.878	0.000
L16	91.5 - 91.25	7.812	40	0.854	0.000
L17	91.25 - 86.25	7.767	40	0.851	0.000
L18	86.25 - 86.08	6.904	40	0.797	0.000
L19	86.08 - 85.83	6.875	40	0.795	0.000
L20	85.83 - 75.75	6.834	40	0.792	0.000
L21	81 - 74.75	6.062	40	0.733	0.000
L22	74.75 - 71	5.128	40	0.688	0.000
L23	71 - 70.75	4.606	40	0.641	0.000
L24	70.75 - 65.75	4.572	40	0.639	0.000
L25	65.75 - 60.75	3.929	40	0.590	0.000
L26	60.75 - 60	3.337	40	0.539	0.000
L27	60 - 59.75	3.253	40	0.531	0.000
L28	59.75 - 54.75	3.226	40	0.529	0.000
L29	54.75 - 44	2.701	40	0.473	0.000
L30	50 - 43	2.257	40	0.419	0.000
L31	43 - 42.85	1.669	40	0.379	0.000
L32	42.85 - 37.85	1.657	40	0.378	0.000
L33	37.85 - 32.85	1.285	40	0.332	0.000
L34	32.85 - 27.85	0.962	40	0.285	0.000
L35	27.85 - 26.25	0.689	40	0.237	0.000
L36	26.25 - 26	0.612	40	0.222	0.000
L37	26 - 21	0.600	40	0.220	0.000
L38	21 - 16	0.392	40	0.178	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L39	16 - 11	0.228	40	0.136	0.000
L40	11 - 6	0.108	40	0.093	0.000
L41	6 - 1	0.032	40	0.051	0.000
L42	1 - 0	0.001	40	0.008	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	5/8" x 4' Lightning Rod	40	16.007	1.102	0.001	49078
127.00	(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	40	15.314	1.102	0.001	49078
124.00	Tree Pole Branchs.	40	14.622	1.099	0.000	38251
118.00	Tree Pole Branchs.	40	13.249	1.084	0.000	14360
113.50	Tree Pole Branchs.	40	12.238	1.061	0.000	9393
110.00	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	40	11.469	1.037	0.000	7246
109.30	Tree Pole Branchs.	40	11.317	1.031	0.000	6907
108.00	(2) 800 EXTERNAL NOTCH FILTER	40	11.038	1.020	0.000	6341
104.30	Tree Pole Branchs.	40	10.261	0.983	0.000	5121
100.30	Tree Pole Branchs.	40	9.458	0.934	0.000	5148
98.00	MX08FRO665-21 w/ Mount Pipe	40	9.014	0.910	0.000	6147
93.30	Tree Pole Branchs.	40	8.137	0.871	0.000	6138
90.00	(2) KRY 112 71/2	40	7.546	0.838	0.000	5460
89.30	Tree Pole Branchs.	40	7.424	0.831	0.000	5328
85.30	Tree Pole Branchs.	40	6.746	0.786	0.000	4964
81.30	Tree Pole Branchs.	40	6.108	0.736	0.000	6230

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	62.637	4	4.320	0.002
L2	125 - 120	58.123	4	4.313	0.002
L3	120 - 115	53.632	4	4.272	0.001
L4	115 - 110	49.203	4	4.191	0.001
L5	110 - 105	44.884	4	4.062	0.001
L6	105 - 100	40.726	4	3.880	0.001
L7	100 - 99.27	36.788	4	3.642	0.000
L8	99.27 - 99.02	36.235	4	3.603	0.000
L9	99.02 - 97.04	36.046	4	3.596	0.000
L10	97.04 - 96.79	34.569	4	3.535	0.000
L11	96.79 - 96.33	34.385	4	3.529	0.000
L12	96.33 - 96.08	34.046	4	3.519	0.000
L13	96.08 - 94.29	33.862	4	3.510	0.000
L14	94.29 - 94.04	32.559	4	3.448	0.000
L15	94.04 - 91.5	32.379	4	3.439	0.000
L16	91.5 - 91.25	30.576	4	3.344	0.000
L17	91.25 - 86.25	30.401	4	3.334	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L18	86.25 - 86.08	27.022	4	3.122	0.000
L19	86.08 - 85.83	26.911	4	3.114	0.000
L20	85.83 - 75.75	26.749	4	3.103	0.000
L21	81 - 74.75	23.728	4	2.869	0.000
L22	74.75 - 71	20.074	4	2.696	0.000
L23	71 - 70.75	18.030	4	2.512	0.000
L24	70.75 - 65.75	17.899	4	2.503	0.000
L25	65.75 - 60.75	15.379	4	2.311	0.000
L26	60.75 - 60	13.064	4	2.111	0.000
L27	60 - 59.75	12.735	4	2.081	0.000
L28	59.75 - 54.75	12.626	4	2.070	0.000
L29	54.75 - 44	10.572	4	1.853	0.000
L30	50 - 43	8.834	4	1.641	0.000
L31	43 - 42.85	6.532	4	1.486	0.000
L32	42.85 - 37.85	6.485	4	1.480	0.000
L33	37.85 - 32.85	5.030	4	1.298	0.000
L34	32.85 - 27.85	3.767	4	1.115	0.000
L35	27.85 - 26.25	2.697	4	0.929	0.000
L36	26.25 - 26	2.396	4	0.871	0.000
L37	26 - 21	2.350	4	0.863	0.000
L38	21 - 16	1.534	4	0.697	0.000
L39	16 - 11	0.891	4	0.532	0.000
L40	11 - 6	0.421	4	0.365	0.000
L41	6 - 1	0.125	4	0.200	0.000
L42	1 - 0	0.003	4	0.033	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	5/8" x 4' Lightning Rod	4	62.637	4.320	0.002	12905
127.00	(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	4	59.927	4.318	0.002	12905
124.00	Tree Pole Branchs.	4	57.222	4.308	0.002	10026
118.00	Tree Pole Branchs.	4	51.850	4.245	0.001	3713
113.50	Tree Pole Branchs.	4	47.894	4.158	0.001	2425
110.00	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	4	44.884	4.062	0.001	1868
109.30	Tree Pole Branchs.	4	44.291	4.040	0.001	1781
108.00	(2) 800 EXTERNAL NOTCH FILTER	4	43.198	3.995	0.001	1634
104.30	Tree Pole Branchs.	4	40.160	3.852	0.001	1318
100.30	Tree Pole Branchs.	4	37.017	3.660	0.000	1324
98.00	MX08FRO665-21 w/ Mount Pipe	4	35.282	3.564	0.000	1581
93.30	Tree Pole Branchs.	4	31.848	3.412	0.000	1577
90.00	(2) KRY 112 71/2	4	29.536	3.284	0.000	1402
89.30	Tree Pole Branchs.	4	29.057	3.255	0.000	1368
85.30	Tree Pole Branchs.	4	26.406	3.078	0.000	1274
81.30	Tree Pole Branchs.	4	23.910	2.881	0.000	1598

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	130 - 125 (1)	TP24.687x23.588x0.25	5.00	0.00	0.0	19.672	-4.79	1150.81	0.004
L2	125 - 120 (2)	TP25.787x24.687x0.25	5.00	0.00	0.0	20.557	-5.45	1202.58	0.005
L3	120 - 115 (3)	TP26.886x25.787x0.25	5.00	0.00	0.0	21.442	-9.46	1254.35	0.008
L4	115 - 110 (4)	TP27.985x26.886x0.25	5.00	0.00	0.0	22.327	-10.22	1306.11	0.008
L5	110 - 105 (5)	TP29.084x27.985x0.25	5.00	0.00	0.0	23.212	-16.85	1357.88	0.012
L6	105 - 100 (6)	TP30.184x29.084x0.25	5.00	0.00	0.0	24.097	-18.07	1409.65	0.013
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	0.73	0.00	0.0	24.226	-18.18	1417.20	0.013
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	0.25	0.00	0.0	45.769	-18.24	2677.48	0.007
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	1.98	0.00	0.0	45.231	-21.09	2646.03	0.008
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	0.25	0.00	0.0	65.671	-21.18	3841.74	0.006
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	0.46	0.00	0.0	65.891	-21.31	3854.60	0.006
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	0.25	0.00	0.0	44.333	-21.37	2593.46	0.008
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	1.79	0.00	0.0	44.903	-21.74	2626.82	0.008
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	0.25	0.00	0.0	44.983	-21.81	2631.48	0.008
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	2.54	0.00	0.0	45.792	-22.64	2678.82	0.008
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	0.25	0.00	0.0	45.871	-22.71	2683.48	0.008
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	5.00	0.00	0.0	46.163	-25.26	2700.56	0.009
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	0.17	0.00	0.0	46.216	-25.31	2703.64	0.009
L19	86.08 - 85.83 (19)	TP33.299x33.244x0.431	0.25	0.00	0.0	45.641	-25.37	2669.99	0.010
L20	85.83 - 75.75 (20)	TP35.515x33.299x0.425	10.08	0.00	0.0	46.441	-27.06	2716.80	0.010
L21	75.75 - 74.75 (21)	TP35.237x33.861x0.519	6.25	0.00	0.0	57.993	-29.70	3392.56	0.009
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	3.75	0.00	0.0	57.961	-30.78	3390.75	0.009
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	0.25	0.00	0.0	79.133	-30.89	4629.27	0.007
L24	70.75 - 65.75 (24)	TP37.219x36.118x0.681	5.00	0.00	0.0	80.150	-32.68	4688.75	0.007
L25	65.75 - 60.75 (25)	TP38.32x37.219x0.669	5.00	0.00	0.0	81.077	-34.51	4742.99	0.007
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	0.75	0.00	0.0	81.432	-34.80	4763.79	0.007
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	0.25	0.00	0.0	77.054	-34.89	4507.67	0.008
L28	59.75 - 54.75 (28)	TP39.641x38.54x0.631	5.00	0.00	0.0	79.292	-36.68	4638.58	0.008
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	10.75	0.00	0.0	79.831	-38.42	4670.09	0.008
L30	44 - 43 (30)	TP41.539x39.999x0.831	7.00	0.00	0.0	108.961	-43.52	6374.19	0.007
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	0.15	0.00	0.0	109.049	-43.60	6379.36	0.007
L32	42.85 - 37.85 (32)	TP42.672x41.572x0.819	5.00	0.00	0.0	110.342	-45.98	6455.02	0.007
L33	37.85 - 32.85 (33)	TP43.773x42.672x0.806	5.00	0.00	0.0	111.546	-48.40	6525.44	0.007
L34	32.85 - 27.85 (34)	TP44.873x43.773x0.794	5.00	0.00	0.0	112.660	-50.86	6590.62	0.008
L35	27.85 - 26.25 (35)	TP45.225x44.873x0.794	1.60	0.00	0.0	113.560	-51.65	6643.25	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	0.25	0.00	0.0	129.487	-51.81	7575.00	0.007
L37	26 - 21 (37)	TP46.38x45.28x0.881	5.00	0.00	0.0	129.108	-54.57	7552.79	0.007
L38	21 - 16 (38)	TP47.48x46.38x0.881	5.00	0.00	0.0	132.229	-57.37	7735.41	0.007
L39	16 - 11 (39)	TP48.58x47.48x0.856	5.00	0.00	0.0	131.580	-60.21	7697.43	0.008
L40	11 - 6 (40)	TP49.68x48.58x0.856	5.00	0.00	0.0	134.613	-63.08	7874.86	0.008
L41	6 - 1 (41)	TP50.78x49.68x0.831	5.00	0.00	0.0	133.694	-65.98	7821.10	0.008
L42	1 - 0 (42)	TP51x50.78x0.831	1.00	0.00	0.0	134.283	-66.57	7855.55	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 125 (1)	TP24.687x23.588x0.25	22.52	679.90	0.033	0.00	679.90	0.000
L2	125 - 120 (2)	TP25.787x24.687x0.25	72.82	730.42	0.100	0.00	730.42	0.000
L3	120 - 115 (3)	TP26.886x25.787x0.25	144.11	781.54	0.184	0.00	781.54	0.000
L4	115 - 110 (4)	TP27.985x26.886x0.25	234.74	833.12	0.282	0.00	833.12	0.000
L5	110 - 105 (5)	TP29.084x27.985x0.25	367.07	885.01	0.415	0.00	885.01	0.000
L6	105 - 100 (6)	TP30.184x29.084x0.25	512.62	937.09	0.547	0.00	937.09	0.000
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	535.32	944.70	0.567	0.00	944.70	0.000
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	543.10	2040.57	0.266	0.00	2040.57	0.000
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	607.03	2048.08	0.296	0.00	2048.08	0.000
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	615.41	2937.58	0.209	0.00	2937.58	0.000
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	630.85	2957.50	0.213	0.00	2957.50	0.000
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	639.24	2023.21	0.316	0.00	2023.21	0.000
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	699.56	2075.97	0.337	0.00	2075.97	0.000
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	708.01	2083.40	0.340	0.00	2083.40	0.000
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	797.04	2159.57	0.369	0.00	2159.57	0.000
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	805.95	2167.14	0.372	0.00	2167.14	0.000
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	994.44	2259.45	0.440	0.00	2259.45	0.000
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	1001.04	2264.64	0.442	0.00	2264.64	0.000
L19	86.08 - 85.83 (19)	TP33.299x33.244x0.431	1010.76	2241.11	0.451	0.00	2241.11	0.000
L20	85.83 - 75.75 (20)	TP35.515x33.299x0.425	1206.70	2355.90	0.512	0.00	2355.90	0.000
L21	75.75 - 74.75 (21)	TP35.237x33.861x0.519	1474.10	3002.55	0.491	0.00	3002.55	0.000
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	1637.01	3075.53	0.532	0.00	3075.53	0.000
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	1647.93	4161.34	0.396	0.00	4161.34	0.000
L24	70.75 - 65.75 (24)	TP37.219x36.118x0.681	1867.81	4351.29	0.429	0.00	4351.29	0.000
L25	65.75 - 60.75 (25)	TP38.32x37.219x0.669	2090.67	4539.70	0.461	0.00	4539.70	0.000
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	2124.35	4579.97	0.464	0.00	4579.97	0.000
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	2135.59	4348.74	0.491	0.00	4348.74	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L28	59.75 - 54.75 (28)	TP39.641x38.54x0.631	2361.94	4607.14	0.513	0.00	4607.14	0.000
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	2579.50	4767.76	0.541	0.00	4767.76	0.000
L30	44 - 43 (30)	TP41.539x39.999x0.831	2905.15	6579.20	0.442	0.00	6579.20	0.000
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	2912.20	6589.98	0.442	0.00	6589.98	0.000
L32	42.85 - 37.85 (32)	TP42.672x41.572x0.819	3148.58	6855.88	0.459	0.00	6855.88	0.000
L33	37.85 - 32.85 (33)	TP43.773x42.672x0.806	3387.75	7120.47	0.476	0.00	7120.47	0.000
L34	32.85 - 27.85 (34)	TP44.873x43.773x0.794	3629.58	7383.31	0.492	0.00	7383.31	0.000
L35	27.85 - 26.25 (35)	TP45.225x44.873x0.794	3707.52	7502.76	0.494	0.00	7502.76	0.000
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	3719.72	8522.58	0.436	0.00	8522.58	0.000
L37	26 - 21 (37)	TP46.38x45.28x0.881	3965.08	8722.08	0.455	0.00	8722.08	0.000
L38	21 - 16 (38)	TP47.48x46.38x0.881	4212.90	9153.00	0.460	0.00	9153.00	0.000
L39	16 - 11 (39)	TP48.58x47.48x0.856	4462.99	9336.83	0.478	0.00	9336.83	0.000
L40	11 - 6 (40)	TP49.68x48.58x0.856	4715.27	9776.17	0.482	0.00	9776.17	0.000
L41	6 - 1 (41)	TP50.78x49.68x0.831	4969.69	9941.92	0.500	0.00	9941.92	0.000
L42	1 - 0 (42)	TP51x50.78x0.831	5020.82	10030.42	0.501	0.00	10030.42	0.000

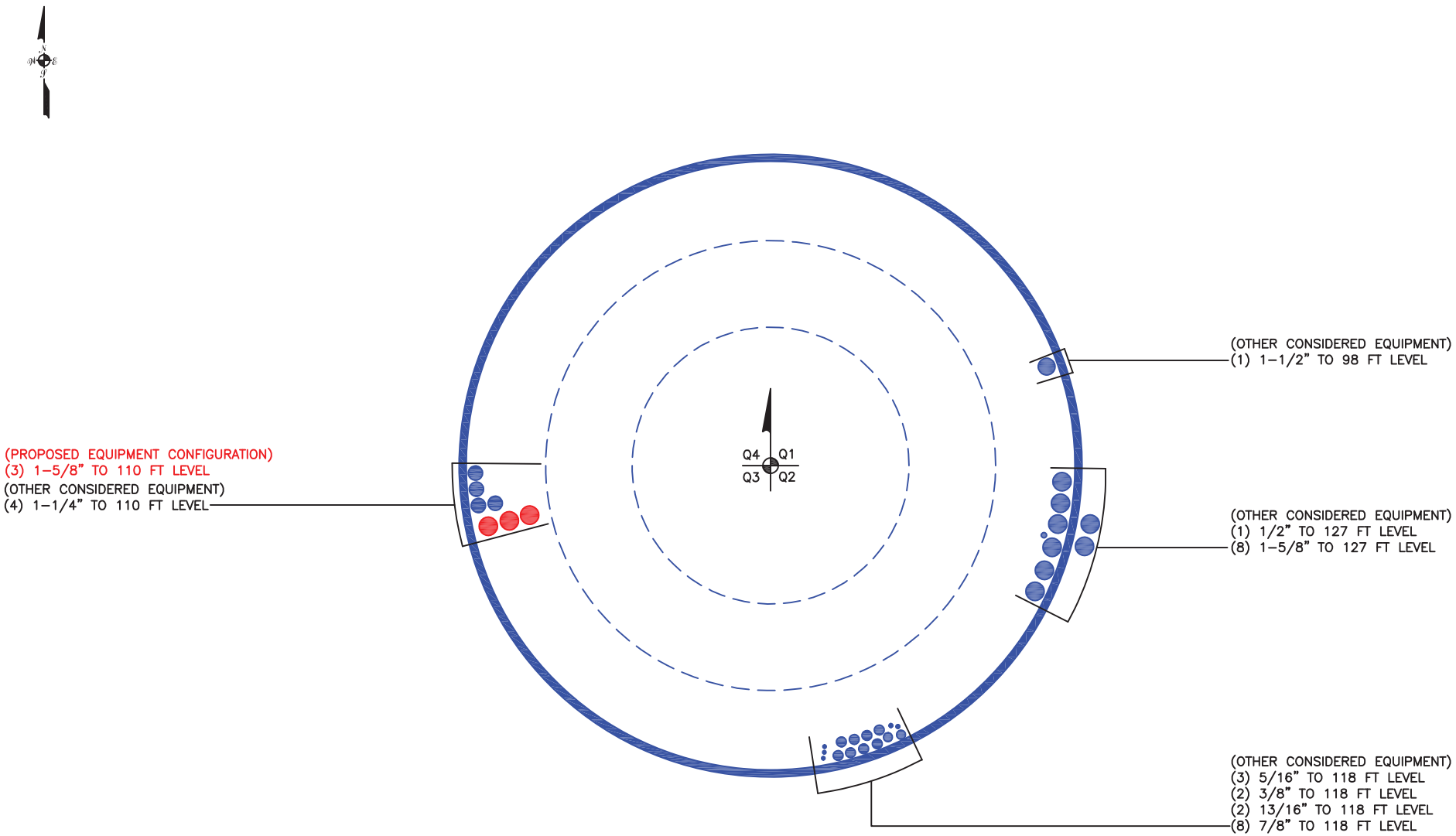
Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 125 (1)	TP24.687x23.588x0.25	8.50	345.24	0.025	0.14	742.13	0.000
L2	125 - 120 (2)	TP25.787x24.687x0.25	10.64	360.77	0.029	0.33	810.39	0.000
L3	120 - 115 (3)	TP26.886x25.787x0.25	16.74	376.30	0.044	0.32	881.67	0.000
L4	115 - 110 (4)	TP27.985x26.886x0.25	18.86	391.83	0.048	0.32	955.94	0.000
L5	110 - 105 (5)	TP29.084x27.985x0.25	27.41	407.36	0.067	0.32	1033.22	0.000
L6	105 - 100 (6)	TP30.184x29.084x0.25	31.06	422.89	0.073	0.32	1113.50	0.000
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	31.13	425.16	0.073	0.32	1125.47	0.000
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	31.15	803.24	0.039	0.32	2114.30	0.000
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	33.50	793.81	0.042	0.32	2120.73	0.000
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	33.52	1152.52	0.029	0.12	3063.10	0.000
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	33.57	1156.38	0.029	0.12	3083.64	0.000
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	33.60	778.04	0.043	0.12	2093.91	0.000
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	33.80	788.05	0.043	0.12	2148.12	0.000
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	33.82	789.45	0.043	0.12	2155.75	0.000
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	35.64	803.65	0.044	0.12	2234.00	0.000
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	35.66	805.04	0.044	0.12	2241.78	0.000
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	38.84	810.17	0.048	0.12	2335.28	0.000
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	38.85	811.09	0.048	0.12	2340.61	0.000
L19	86.08 - 85.83	TP33.299x33.244x0.431	38.88	801.00	0.049	0.12	2315.79	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	(19)							
L20	85.83 - 75.75	TP35.515x33.299x0.425	42.40	815.04	0.052	0.12	2432.97	0.000
	(20)							
L21	75.75 - 74.75	TP35.237x33.861x0.519	43.25	1017.77	0.042	0.16	3108.18	0.000
	(21)							
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	43.66	1017.22	0.043	0.16	3181.53	0.000
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	43.67	1388.78	0.031	0.16	4327.45	0.000
L24	70.75 - 65.75	TP37.219x36.118x0.681	44.29	1406.63	0.031	0.16	4520.82	0.000
	(24)							
L25	65.75 - 60.75	TP38.32x37.219x0.669	44.87	1422.90	0.032	0.16	4712.48	0.000
	(25)							
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	44.96	1429.14	0.031	0.16	4753.91	0.000
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	44.99	1352.30	0.033	0.16	4509.32	0.000
L28	59.75 - 54.75	TP39.641x38.54x0.631	45.56	1391.57	0.033	0.16	4775.06	0.000
	(28)							
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	46.06	1401.03	0.033	0.16	4937.93	0.000
L30	44 - 43 (30)	TP41.539x39.999x0.831	46.98	1912.26	0.025	0.16	6847.43	0.000
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	46.99	1913.81	0.025	0.16	6858.54	0.000
L32	42.85 - 37.85	TP42.672x41.572x0.819	47.57	1936.50	0.025	0.16	7129.40	0.000
	(32)							
L33	37.85 - 32.85	TP43.773x42.672x0.806	48.12	1957.63	0.025	0.16	7398.76	0.000
	(33)							
L34	32.85 - 27.85	TP44.873x43.773x0.794	48.64	1977.18	0.025	0.16	7666.16	0.000
	(34)							
L35	27.85 - 26.25	TP45.225x44.873x0.794	48.81	1992.97	0.024	0.16	7789.09	0.000
	(35)							
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	48.82	2272.50	0.021	0.16	8870.08	0.000
L37	26 - 21 (37)	TP46.38x45.28x0.881	49.34	2265.84	0.022	0.16	9068.33	0.000
L38	21 - 16 (38)	TP47.48x46.38x0.881	49.81	2320.62	0.021	0.16	9512.08	0.000
L39	16 - 11 (39)	TP48.58x47.48x0.856	50.25	2309.23	0.022	0.16	9693.92	0.000
L40	11 - 6 (40)	TP49.68x48.58x0.856	50.68	2362.46	0.021	0.16	10146.00	0.000
L41	6 - 1 (41)	TP50.78x49.68x0.831	51.11	2346.33	0.022	0.16	10308.92	0.000
L42	1 - 0 (42)	TP51x50.78x0.831	51.19	2356.67	0.022	0.16	10399.92	0.000

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED EQUIPMENT CONFIGURATION)
(3) 1–5/8" TO 110 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1–1/4" TO 110 FT LEVEL
Q4
Q1
Q3
Q2
(OTHER CONSIDERED EQUIPMENT)
(1) 1–1/2" TO 98 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 127 FT LEVEL
(8) 1–5/8" TO 127 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 5/16" TO 118 FT LEVEL
(2) 3/8" TO 118 FT LEVEL
(2) 13/16" TO 118 FT LEVEL
(8) 7/8" TO 118 FT LEVEL

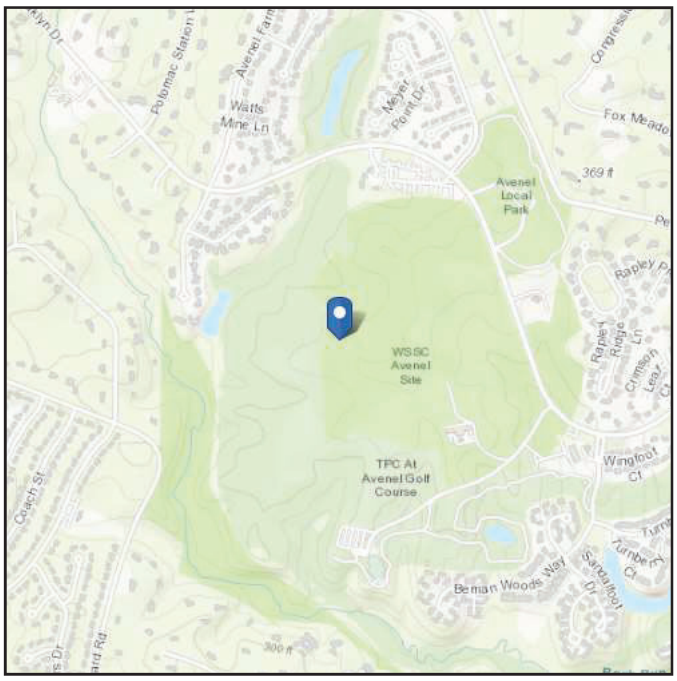
APPENDIX C

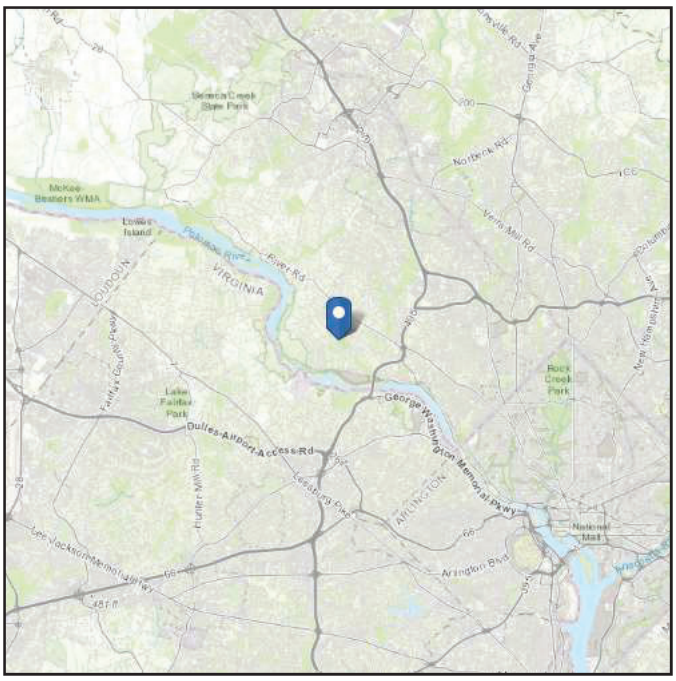
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Elevation:**	330.47 ft (NAVD 88)
Risk Category:	II	**Latitude:**	38.995158
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-77.203925





Wind

Results:

Wind Speed	112 Vmph	115 mph as per jurisdictional requirement
10-year MRI	75 Vmph	
25-year MRI	84 Vmph	
50-year MRI	89 Vmph	
100-year MRI	95 Vmph	

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Tue Apr 19 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

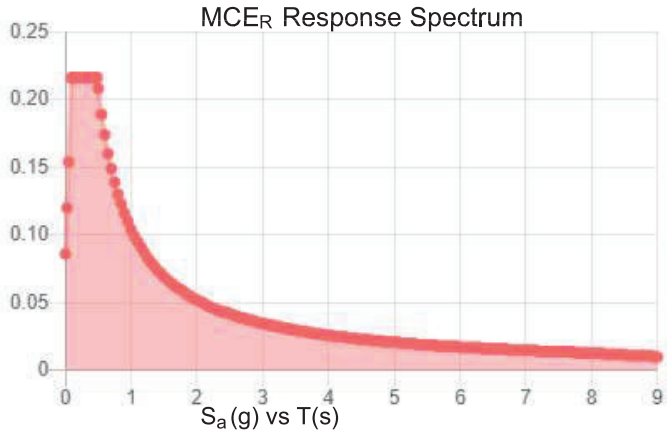
Seismic

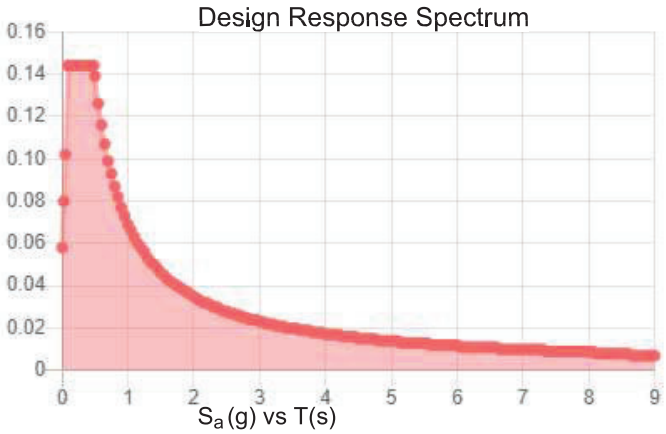
Site Soil Class: D - Default (see Section 11.4.3)

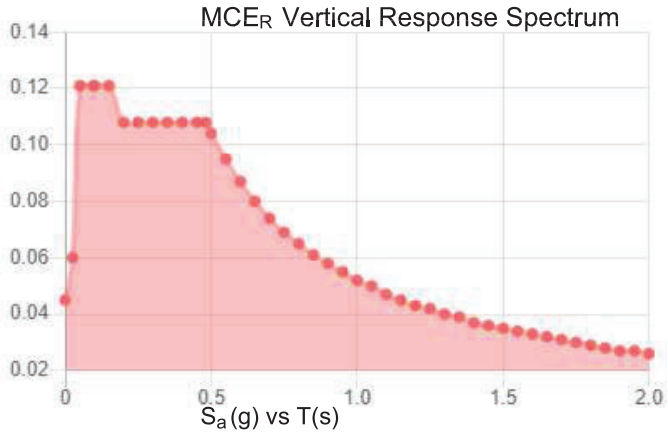
Results:

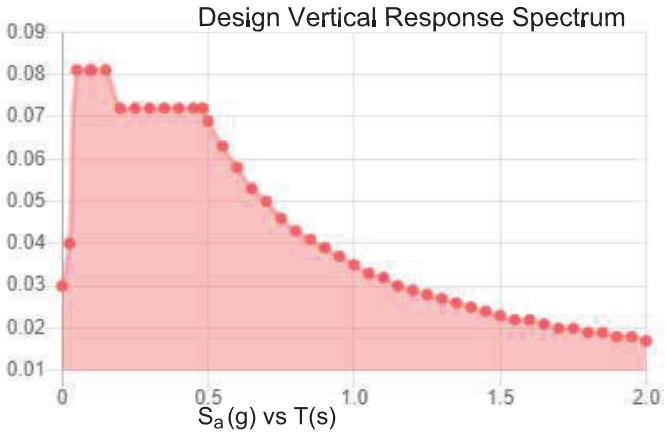
S_S :	0.135	S_{D1} :	0.069
S_1 :	0.043	T_L :	8
F_a :	1.6	PGA :	0.07
F_v :	2.4	PGA_M :	0.112
S_{MS} :	0.216	F_{PGA} :	1.6
S_{M1} :	0.104	I_e :	1
S_{DS} :	0.144	C_v :	0.7

Seismic Design Category B









Data Accessed: **Tue Apr 19 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	40 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Apr 19 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

CCIpole

per TIA-222- H

Site BU: 806957

Work Order: 2097400

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	130	54.25	5.25	12	23.588	35.515	0.25	Auto	A572-65
2	81	37	6	12	33.86	42.008	0.34375	Auto	A572-65
3	50	50	0	12	40.00	51	0.40625	Auto	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	60	channel	MP3-08 (1.1875in)W	3	x				x				x			
2	60	86.08	channel	MP3-05 (1.1875in)	3	x				x				x			
3	0	26.25	plate	MS-850 (1.1875")W	3			x				x				x	
4	26.25	43.1	plate	MS-600 (1.1875")	3			x				x				x	
5	60	71	plate	MS-600 (1.1875")	3			x				x				x	
6	86.08	91.5	plate	MS-600 (1.1875")	3			x				x				x	
7	91.5	94.29	plate	MS-600 (1.1875")	3		x				x				x		
8	94.29	97.04	plate	MS-600 (1.1875")	3				x				x				x
9	96.33	99.27	plate	Sabre PL 5"x1.25"	3			x				x				x	
10																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	7.93	2.8	10.32	0.95	Welded	n/a	PC 8.8 - M20 (100)	47.000	24.000	9.370	1.1875	A572-65
2	5.33	2.09	5.65	0.79	PC 8.8 - M20 (100)	29	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65
3	8.5	1.25	10.625	0.625	Welded	n/a	PC 8.8 - M20 (100)	45.000	17.250	9.063	1.1875	A572-65
4	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
5	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
6	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
7	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
8	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
9	5	1.25	6.25	0.625	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	24.000	4.688	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
MP3-08	Top	16	N	3	2	-	-	-	-	-	-	-	-	-
(1.1875in)W	Bottom	-	-	-	-	70	None	-	-	-	-	60	0.375	-
Sabre PL 5"x1.25"	Top	8	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	8	N	3	3	-	-	-	-	-	-	-	-	-
MS-850	Top	15	N	3	3	-	-	-	-	-	-	-	-	-
(1.1875")W	Bottom	-	-	-	-	80	CJP Groove	8.5	1.25	45	0.25	-	-	-

TNX Geometry Input

Increment (ft): 5 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	130 - 125	5		12	23.588	24.687	0.25	A572-65	1.000
2	125 - 120	5		12	24.687	25.787	0.25	A572-65	1.000
3	120 - 115	5		12	25.787	26.886	0.25	A572-65	1.000
4	115 - 110	5		12	26.886	27.985	0.25	A572-65	1.000
5	110 - 105	5		12	27.985	29.084	0.25	A572-65	1.000
6	105 - 100	5		12	29.084	30.184	0.25	A572-65	1.000
7	100 - 99.27	0.73		12	30.184	30.344	0.25	A572-65	1.000
8	99.27 - 99.02	0.25		12	30.344	30.399	0.475	A572-65	0.941
9	99.02 - 97.04	1.98		12	30.399	30.834	0.4625	A572-65	0.959
10	97.04 - 96.79	0.25		12	30.834	30.889	0.675	A572-65	0.936
11	96.79 - 96.33	0.46		12	30.889	30.990	0.675	A572-65	0.934
12	96.33 - 96.08	0.25		12	30.990	31.045	0.45	A572-65	0.966
13	96.08 - 94.29	1.79		12	31.045	31.439	0.45	A572-65	0.961
14	94.29 - 94.04	0.25		12	31.439	31.494	0.45	A572-65	0.960
15	94.04 - 91.5	2.54		12	31.494	32.052	0.45	A572-65	0.953
16	91.5 - 91.25	0.25		12	32.052	32.107	0.45	A572-65	0.952
17	91.25 - 86.25	5		12	32.107	33.207	0.4375	A572-65	0.965
18	86.25 - 86.08	0.17		12	33.207	33.244	0.4375	A572-65	0.965
19	86.08 - 85.83	0.25		12	33.244	33.299	0.43125	A572-65	0.955
20	85.83 - 81	10.08	5.25	12	33.299	35.515	0.425	A572-65	0.957
21	81 - 74.75	6.25		12	33.861	35.237	0.51875	A572-65	0.959
22	74.75 - 71	3.75		12	35.237	36.063	0.50625	A572-65	0.975
23	71 - 70.75	0.25		12	36.063	36.118	0.69375	A572-65	0.943
24	70.75 - 65.75	5		12	36.118	37.219	0.68125	A572-65	0.946
25	65.75 - 60.75	5		12	37.219	38.320	0.66875	A572-65	0.950
26	60.75 - 60	0.75		12	38.320	38.485	0.66875	A572-65	0.948
27	60 - 59.75	0.25		12	38.485	38.540	0.63125	A572-65	0.951
28	59.75 - 54.75	5		12	38.540	39.641	0.63125	A572-65	0.940
29	54.75 - 50	10.75	6	12	39.641	42.008	0.61875	A572-65	0.948
30	50 - 43	7		12	39.999	41.539	0.83125	A572-65	0.944
31	43 - 42.85	0.15		12	41.539	41.572	0.83125	A572-65	0.943
32	42.85 - 37.85	5		12	41.572	42.672	0.81875	A572-65	0.945
33	37.85 - 32.85	5		12	42.672	43.773	0.80625	A572-65	0.948
34	32.85 - 27.85	5		12	43.773	44.873	0.79375	A572-65	0.952
35	27.85 - 26.25	1.6		12	44.873	45.225	0.79375	A572-65	0.948
36	26.25 - 26	0.25		12	45.225	45.280	0.90625	A572-65	0.939
37	26 - 21	5		12	45.280	46.380	0.88125	A572-65	0.953
38	21 - 16	5		12	46.380	47.480	0.88125	A572-65	0.942
39	16 - 11	5		12	47.480	48.580	0.85625	A572-65	0.957
40	11 - 6	5		12	48.580	49.680	0.85625	A572-65	0.946
41	6 - 1	5		12	49.680	50.780	0.83125	A572-65	0.964
42	1 - 0	1		12	50.780	51.000	0.83125	A572-65	0.961

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	130 - 125	4.79	22.52	8.50
2	125 - 120	5.45	72.82	10.64
3	120 - 115	9.46	144.11	16.74
4	115 - 110	10.22	234.73	18.86
5	110 - 105	16.85	367.07	27.41
6	105 - 100	18.07	512.62	31.06
7	100 - 99.27	18.18	535.32	31.13
8	99.27 - 99.02	18.24	543.10	31.15
9	99.02 - 97.04	21.09	607.04	33.50
10	97.04 - 96.79	21.18	615.41	33.52
11	96.79 - 96.33	21.31	630.85	33.57
12	96.33 - 96.08	21.37	639.24	33.60
13	96.08 - 94.29	21.74	699.56	33.80
14	94.29 - 94.04	21.81	708.01	33.82
15	94.04 - 91.5	22.64	797.04	35.64
16	91.5 - 91.25	22.71	805.95	35.66
17	91.25 - 86.25	25.26	994.44	38.84
18	86.25 - 86.08	25.31	1001.04	38.85
19	86.08 - 85.83	25.37	1010.76	38.88
20	85.83 - 81	27.06	1206.70	42.40
21	81 - 74.75	29.70	1474.10	43.25
22	74.75 - 71	30.78	1637.01	43.66
23	71 - 70.75	30.89	1647.92	43.67
24	70.75 - 65.75	32.68	1867.81	44.29
25	65.75 - 60.75	34.51	2090.67	44.87
26	60.75 - 60	34.80	2124.35	44.96
27	60 - 59.75	34.89	2135.60	44.99
28	59.75 - 54.75	36.68	2361.94	45.56
29	54.75 - 50	38.42	2579.50	46.06
30	50 - 43	43.52	2905.15	46.98
31	43 - 42.85	43.60	2912.20	46.99
32	42.85 - 37.85	45.98	3148.59	47.57
33	37.85 - 32.85	48.40	3387.75	48.12
34	32.85 - 27.85	50.86	3629.58	48.64
35	27.85 - 26.25	51.65	3707.52	48.81
36	26.25 - 26	51.81	3719.72	48.82
37	26 - 21	54.57	3965.08	49.34
38	21 - 16	57.37	4212.90	49.81
39	16 - 11	60.21	4462.99	50.25
40	11 - 6	63.08	4715.27	50.68
41	6 - 1	65.98	4969.69	51.11
42	1 - 0	66.57	5020.83	51.19

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP24.687x23.588x0.25	Pole	3.6%	Pass
125 - 120	Pole	TP25.787x24.687x0.25	Pole	10.0%	Pass
120 - 115	Pole	TP26.886x25.787x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP27.985x26.886x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP29.084x27.985x0.25	Pole	41.0%	Pass
105 - 100	Pole	TP30.184x29.084x0.25	Pole	53.7%	Pass
100 - 99.27	Pole	TP30.344x30.184x0.25	Pole	55.6%	Pass
99.27 - 99.02	Pole + Reinf.	TP30.399x30.344x0.475	Reinf. 9 Compression	43.2%	Pass
99.02 - 97.04	Pole + Reinf.	TP30.834x30.399x0.4625	Reinf. 9 Compression	47.3%	Pass
97.04 - 96.79	Pole + Reinf.	TP30.889x30.834x0.675	Reinf. 9 Compression	33.5%	Pass
96.79 - 96.33	Pole + Reinf.	TP30.99x30.889x0.675	Reinf. 9 Compression	34.1%	Pass
96.33 - 96.08	Pole + Reinf.	TP31.045x30.99x0.45	Reinf. 8 Tension Rupture	47.1%	Pass
96.08 - 94.29	Pole + Reinf.	TP31.439x31.045x0.45	Reinf. 8 Tension Rupture	50.5%	Pass
94.29 - 94.04	Pole + Reinf.	TP31.494x31.439x0.45	Reinf. 7 Tension Rupture	51.0%	Pass
94.04 - 91.5	Pole + Reinf.	TP32.052x31.494x0.45	Reinf. 7 Tension Rupture	55.7%	Pass
91.5 - 91.25	Pole + Reinf.	TP32.107x32.052x0.45	Reinf. 6 Tension Rupture	56.2%	Pass
91.25 - 86.25	Pole + Reinf.	TP33.207x32.107x0.4375	Reinf. 6 Tension Rupture	65.7%	Pass
86.25 - 86.08	Pole + Reinf.	TP33.244x33.207x0.4375	Reinf. 6 Tension Rupture	66.0%	Pass
86.08 - 85.83	Pole + Reinf.	TP33.299x33.244x0.4313	Reinf. 2 Tension Rupture	62.8%	Pass
85.83 - 81	Pole + Reinf.	TP35.515x33.299x0.425	Reinf. 2 Tension Rupture	71.2%	Pass
81 - 74.75	Pole + Reinf.	TP35.237x33.861x0.5188	Reinf. 2 Tension Rupture	68.3%	Pass
74.75 - 71	Pole + Reinf.	TP36.063x35.237x0.5063	Reinf. 2 Tension Rupture	72.9%	Pass
71 - 70.75	Pole + Reinf.	TP36.118x36.063x0.6938	Reinf. 5 Tension Rupture	59.1%	Pass
70.75 - 65.75	Pole + Reinf.	TP37.219x36.118x0.6813	Reinf. 5 Tension Rupture	63.9%	Pass
65.75 - 60.75	Pole + Reinf.	TP38.32x37.219x0.6688	Reinf. 5 Tension Rupture	68.4%	Pass
60.75 - 60	Pole + Reinf.	TP38.485x38.32x0.6688	Reinf. 5 Tension Rupture	69.0%	Pass
60 - 59.75	Pole + Reinf.	TP38.54x38.485x0.6313	Reinf. 1 Tension Rupture	65.8%	Pass
59.75 - 54.75	Pole + Reinf.	TP39.641x38.54x0.6313	Reinf. 1 Tension Rupture	69.6%	Pass
54.75 - 50	Pole + Reinf.	TP42.008x39.641x0.6188	Reinf. 1 Tension Rupture	72.9%	Pass
50 - 43	Pole + Reinf.	TP41.539x39.999x0.8313	Reinf. 4 Tension Rupture	65.2%	Pass
43 - 42.85	Pole + Reinf.	TP41.572x41.539x0.8313	Reinf. 4 Tension Rupture	65.3%	Pass
42.85 - 37.85	Pole + Reinf.	TP42.672x41.572x0.8188	Reinf. 4 Tension Rupture	67.8%	Pass
37.85 - 32.85	Pole + Reinf.	TP43.773x42.672x0.8063	Reinf. 4 Tension Rupture	70.2%	Pass
32.85 - 27.85	Pole + Reinf.	TP44.873x43.773x0.7938	Reinf. 4 Tension Rupture	72.5%	Pass
27.85 - 26.25	Pole + Reinf.	TP45.225x44.873x0.7938	Reinf. 4 Tension Rupture	73.1%	Pass
26.25 - 26	Pole + Reinf.	TP45.28x45.225x0.9063	Reinf. 3 Bolt Shear	62.7%	Pass
26 - 21	Pole + Reinf.	TP46.38x45.28x0.8813	Reinf. 3 Compression	62.3%	Pass
21 - 16	Pole + Reinf.	TP47.48x46.38x0.8813	Reinf. 3 Compression	64.0%	Pass
16 - 11	Pole + Reinf.	TP48.58x47.48x0.8563	Reinf. 3 Compression	65.5%	Pass
11 - 6	Pole + Reinf.	TP49.68x48.58x0.8563	Reinf. 3 Compression	67.0%	Pass
6 - 1	Pole + Reinf.	TP50.78x49.68x0.8313	Reinf. 3 Compression	68.3%	Pass
1 - 0	Pole + Reinf.	TP51x50.78x0.8313	Reinf. 3 Compression	68.6%	Pass
				Summary	
			Pole	59.6%	Pass
			Reinforcement	73.1%	Pass
			Overall	73.1%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity* (100% Max. Allowable)									
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9
130 - 125	1502	n/a	1502	19.64	n/a	19.64	3.6%									
125 - 120	1713	n/a	1713	20.53	n/a	20.53	10.0%									
120 - 115	1944	n/a	1944	21.41	n/a	21.41	18.4%									
115 - 110	2195	n/a	2195	22.29	n/a	22.29	27.7%									
110 - 105	2467	n/a	2467	23.18	n/a	23.18	41.0%									
105 - 100	2760	n/a	2760	24.06	n/a	24.06	53.7%									
100 - 99.27	2804	n/a	2804	24.19	n/a	24.19	55.6%									
99.27 - 99.02	2820	2368	5188	24.24	18.75	42.99	29.5%									43.2%
99.02 - 97.04	2943	2433	5377	24.59	18.75	43.34	32.5%									47.3%
97.04 - 96.79	2959	4758	7717	24.63	36.75	61.38	23.0%								31.3%	33.5%
96.79 - 96.33	2989	4787	7776	24.71	36.75	61.46	23.5%								31.9%	34.1%
96.33 - 96.08	3005	2338	5343	24.75	18.00	42.75	34.7%								47.1%	
96.08 - 94.29	3122	2395	5517	25.07	18.00	43.07	37.5%								50.5%	
94.29 - 94.04	3138	2403	5541	25.12	18.00	43.12	37.8%							51.0%		
94.04 - 91.5	3309	2486	5795	25.56	18.00	43.56	41.8%							55.7%		
91.5 - 91.25	3327	2494	5820	25.61	18.00	43.61	42.2%						56.2%			
91.25 - 86.25	3683	2660	6343	26.49	18.00	44.49	50.2%						65.7%			
86.25 - 86.08	3695	2666	6362	26.52	18.00	44.52	50.5%						66.0%			
86.08 - 85.83	3714	2588	6302	26.57	16.95	43.52	51.6%		62.8%							
85.83 - 81	4084	2748	6831	27.42	16.95	44.37	59.6%		71.2%							
81 - 74.75	6010	2883	8893	38.57	16.95	55.52	49.7%		68.3%							
74.75 - 71	6447	3013	9460	39.48	16.95	56.43	53.5%		72.9%							
71 - 70.75	6477	6149	12626	39.54	34.95	74.49	40.4%		55.1%			59.1%				
70.75 - 65.75	7094	6515	13608	40.76	34.95	75.71	44.3%		59.6%			63.9%				
65.75 - 60.75	7748	6890	14638	41.97	34.95	76.92	48.1%		63.7%			68.4%				
60.75 - 60	7850	6947	14797	42.16	34.95	77.11	48.6%		64.3%			69.0%				
60 - 59.75	7884	6372	14255	42.22	30.96	73.18	50.8%	65.8%								
59.75 - 54.75	8585	6721	15306	43.43	30.96	74.39	54.5%	69.6%								
54.75 - 50	9289	7061	16351	44.59	30.96	75.55	57.8%	72.9%								
50 - 43	11636	11445	23081	53.73	48.96	102.69	44.3%	59.4%			65.2%					
43 - 42.85	11664	11462	23126	53.77	48.96	102.73	44.3%	59.4%			65.3%					
42.85 - 37.85	12624	12050	24675	55.21	48.96	104.17	46.6%	61.7%			67.8%					
37.85 - 32.85	13636	12654	26289	56.65	48.96	105.61	48.8%	63.9%			70.2%					
32.85 - 27.85	14700	13271	27971	58.08	48.96	107.04	50.9%	65.9%			72.5%					
27.85 - 26.25	15052	13472	28524	58.54	48.96	107.50	51.5%	66.5%			73.1%					
26.25 - 26	15107	17381	32489	58.62	62.84	121.45	45.5%	58.6%		62.7%						
26 - 21	16246	18200	34446	60.05	62.84	122.89	47.3%	60.3%		62.3%						
21 - 16	17440	19038	36479	61.49	62.84	124.32	49.2%	61.9%		64.0%						
16 - 11	18692	19896	38587	62.93	62.84	125.76	50.9%	63.4%		65.5%						
11 - 6	20002	20772	40773	64.36	62.84	127.20	52.7%	64.8%		67.0%						
6 - 1	21371	21667	43038	65.80	62.84	128.64	54.4%	66.1%		68.3%						
1 - 0	21652	21848	43501	66.09	62.84	128.92	54.7%	66.3%		68.6%						

Note: Section capacity checked using 5 degree increments.

**Rating per TIA-222-H Section 15.5.*

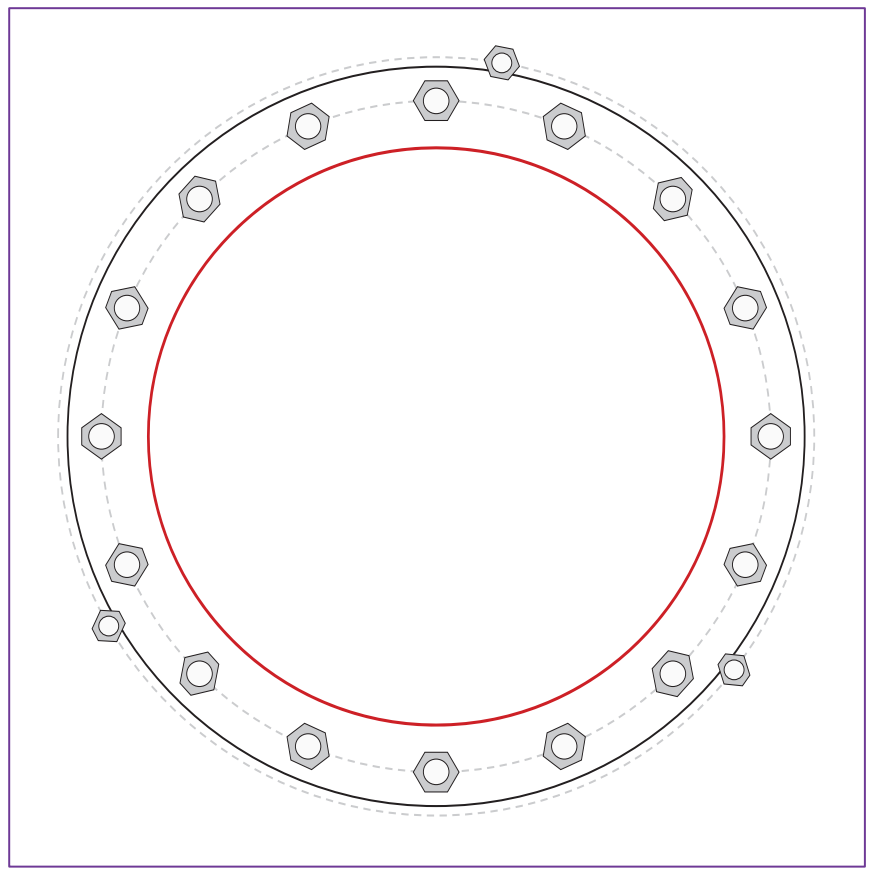
Monopole Base Plate Connection

Site Info	
BU #	806957
Site Name	Williamsburg Gardens
Order #	611571 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	5020.83
Axial Force (kips)	66.57
Shear Force (kips)	51.19

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 59.3" BC

GROUP 2: (3) 1-3/4" ø bolts (F1554-105 N; Fy=105 ksi, Fu=125 ksi) on 67" BC

pos. (deg): 80, 210, 322

Base Plate Data

65.3" OD x 2.75" Plate (S-128; Fy=60 ksi, Fu=80 ksi)

Stiffener Data

N/A

Pole Data

51" x 0.40625" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:

Pu_t = 222.38	ϕPn_t = 243.75	**Stress Rating**
Vu = 3.2	ϕVn = 149.1	**86.9%**
Mu = n/a	ϕMn = n/a	**Pass**

GROUP 2:

Pu_t = 147.93	ϕPn_t = 178.13	**Stress Rating**
Vu = 0	ϕVn = 112.75	**79.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	30.83	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**54.4%**	**Pass**

CCIplate

Elevation (ft)	0	*(Base)*

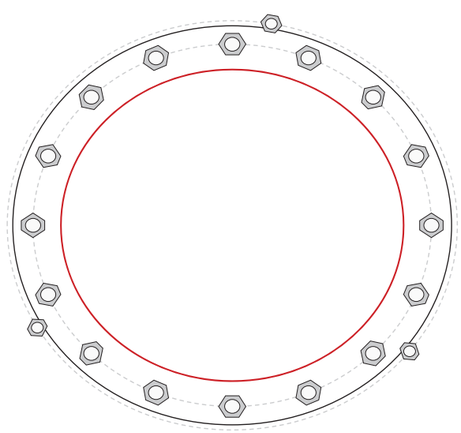
note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	Yes	No	
2	No	No	No	Yes	No	

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η:	l_{ar} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	0	2.25	A615-75	59.3	0.5	0.625	N-Included		No
2	1	22.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
3	1	45	2.25	A615-75	59.3	0.5	0.625	N-Included		No
4	1	67.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
5	1	90	2.25	A615-75	59.3	0.5	0.625	N-Included		No
6	1	112.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
7	1	135	2.25	A615-75	59.3	0.5	0.625	N-Included		No
8	1	157.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
9	1	180	2.25	A615-75	59.3	0.5	0.625	N-Included		No
10	1	202.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
11	1	225	2.25	A615-75	59.3	0.5	0.625	N-Included		No
12	1	247.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
13	1	270	2.25	A615-75	59.3	0.5	0.625	N-Included		No
14	1	292.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
15	1	315	2.25	A615-75	59.3	0.5	0.625	N-Included		No
16	1	337.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
17	2	80	1.75	F1554-105	67	0.5	0.625	N-Included		No
18	2	210	1.75	F1554-105	67	0.5	0.625	N-Included		No
19	2	322	1.75	F1554-105	67	0.5	0.625	N-Included		No

Plot Graphic



Drilled Pier Foundation

BU # :	806957
Site Name:	Williamsburg Gardens
Order Number:	611571 Rev. 0
TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	5020.82	
Axial Force (kips)	66.58	
Shear Force (kips)	51.18	

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	24	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 24' below grade		
Pier Diameter	7	ft
Rebar Quantity	28	
Rebar Size	10	
Clear Cover to Ties	3	in
Tie Size	5	
Tie Spacing	24	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.46	-
Soil Safety Factor	1.86	-
Max Moment (kip-ft)	5362.77	-
Rating*	*68.0%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	549.35	-
End Bearing (kips)	662.99	-
Weight of Concrete (kips)	169.72	-
Total Capacity (kips)	1212.35	-
Axial (kips)	236.30	-
Rating*	*18.6%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.35	-
Critical Moment (kip-ft)	5362.62	-
Critical Moment Capacity	5854.43	-
Rating*	*87.2%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	21.24	-
Critical Shear (kip)	390.19	-
Critical Shear Capacity	851.13	-
Rating*	*43.7%*	-

Tie Spacing Requirements Not Met
Shear-Friction Methodology is Applied

Structural Foundation Rating*	**87.2%**
Soil Interaction Rating*	**68.0%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☑
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

Groundwater Depth	N/A	# of Layers	3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	15	11.5	120	150	0	32	1.209	1.209				22	Cohesionless
3	15	24	9	130	150	0	36	2.156	2.156			20	25	Cohesionless

Radio Frequency Emissions Analysis Report

T-Mobile Wireless Monopole Facility

June 10, 2022

Analysis Format: Theoretical Calculations

Sign Count	
	1
	0
	1
	0
	1

Statement of Compliance

T-Mobile will be compliant with FCC Regulations once the mitigation measures recommended in this report are implemented.

Centerline PN: 950007-204
7WAN098A
CROWN - POTOMAC
10010 OAKLYN DR, POTOMAC, MD 20854

Contents

Overview

Centerline Communications, LLC ("Centerline") has been contracted to provide a Radio Frequency (RF) Analysis for the following T-Mobile wireless monopole facility to determine whether the facility is in compliance with federal standards and regulations regarding RF emissions. This analysis includes theoretical emissions calculations for all existing equipment for T-Mobile .

The facility is located on a Monopole in POTOMAC, Maryland.

Analysis Site Data

Site ID:	7WAN098A
Site Name:	CROWN - POTOMAC
Site Address:	10010 OAKLYN DR, POTOMAC, MD 20854
Site Latitude:	38.994970
Site Longitude:	-77.20390
Facility Type:	Monopole

Compliance Summary

Status:	T-Mobile will be compliant with FCC Regulations Upon Installation of Signage
Site Modeled Composite MPE% (General Public Limit):	0.65 %
T-Mobile Max Modeled MPE% (General Public Limit):	0.29 %
Lock or Control Measures if Present:	Unlocked Gate

In addition to the T-Mobile antennas and radio equipment there are antennas and radio equipment for AT&T & Verizon which have been included in this analysis as part of the overall site compliance determination.

*To be conservative, all sites are considered uncontrolled for modeling purposes unless confirmed otherwise by a site visit.

FCC Guidelines

All power density values used in this report were analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General Population/Uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 600, 700, and 800 MHz Bands is approximately 400 $\mu W/cm^2$, 467 $\mu W/cm^2$, and 567 $\mu W/cm^2$ respectively, and the general population exposure limit for the 1900 MHz PCS, 2100 MHz AWS, 2500 MHz, 3500 MHz CBRS, 5000 MHz LAA, 28GHz, and 39GHz bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density. Reference the Site Antenna Data Table for list of frequencies in operation at this site.

Occupational/Controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure, have been properly trained in RF safety and can exercise control over their exposure. Occupational/Controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure, have been trained in RF safety and can exercise control over his or her exposure by leaving the area or by some other appropriate means. The Occupational/Controlled exposure limits all utilized frequency bands is five (5) times the FCC's General Public / Uncontrolled exposure limit.

Additional details can be found in FCC OET 65.

Calculation Methodology & Data

Centerline has performed theoretical calculations on all transmission equipment located on this facility. All calculations have been performed using the RoofMaster® software from Waterford Consultants LLC. This software performs calculations using a cylindrical model for very conservative power density predictions within the near-field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations the power decreases inversely with the square of the distance. This modeling technique is accurate with low antenna centerlines, such as rooftops, where persons can get close to the antennas and pass through fields in close proximity.

The below calculation in Figure 1 shows the theoretical distribution of power over an imaginary cylinder with equal power distribution in all directions.

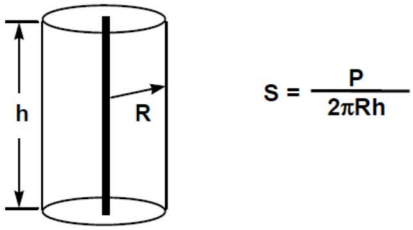


Figure 1: Distribution of power over an imaginary cylinder in all directions

This model can be modified for directional antennas to show directionality of power distribution. This formula will tend to be conservative as it assumes that all power is focused between the 3 dB power roll off points as shown in Figure 2.

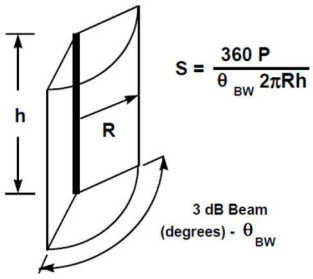


Figure 2: Distribution of power over an imaginary cylinder in all directions inside the half power roll off points (HBW)

The **proposed antenna configuration** for T-Mobile and any other known wireless carriers at this facility are shown below in **Table 1 – Site Antenna Data Table**.

All calculations for this facility were performed assuming that all radios were running at full power and were uncombined in their RF paths with the configuration shown in table 1. FCC OET Bulletin 65 – Edition 97-01 recommends that modeling of this nature should be done as described prior to yield a worst-case scenario. Due to the dynamic nature of many deployed systems the "real world" values will most likely be less than those shown in this report due to worst-case values being shown in all instances.

For all "Other" systems on this facility, exact equipment was used if available. In instances where "Other" system equipment was not available, standard radio configurations for these systems were utilized based upon prior experience with these systems on facilities in this area.

Site Antenna Data Table

Sector	Operator	Frequency Band	TX Power Per Channel	Tx #	ERP	Antenna Make	Antenna Model	Gain (dBd)	Az (°)	Antenna Centerline Height (ft)
A1	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	35	110
A1	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	35	110
A1	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	35	110
A2	T-Mobile	L2500	80	2	27486.4	ERICSSON	AIR6419	22.35	35	110
A2	T-Mobile	N2500	80	2	27486.4	ERICSSON	AIR6419	22.35	35	110
A3	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	35	110
A3	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	35	110
B4	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	115	110
B4	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	115	110
B4	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	115	110
B5	T-Mobile	L2500	80	2	27486.4	ERICSSON	AIR6419	22.35	115	110
B5	T-Mobile	N2500	80	2	27486.4	ERICSSON	AIR6419	22.35	115	110
B6	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	115	110
B6	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	115	110
C7	T-Mobile	L700	40	2	1853.92	RFS	APXVAALL24 43-U-NA20	13.65	255	110
C7	T-Mobile	L600	60	4	4844.08	RFS	APXVAALL24 43-U-NA20	13.05	255	110
C7	T-Mobile	N600	40	2	1614.69	RFS	APXVAALL24 43-U-NA20	13.05	255	110
C8	T-Mobile	L2500	80	2	27486.4	ERICSSON	AIR6419	22.35	255	110
C8	T-Mobile	N2500	80	2	27486.4	ERICSSON	AIR6419	22.35	255	110
C9	T-Mobile	L1900	140	2	10523.4	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	G1900	15	1	563.76	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	U1900	40	1	1503.35	COMMSCOPE	VV-65A-R1	15.75	255	110
C9	T-Mobile	L2100	140	2	12478.3	COMMSCOPE	VV-65A-R1	16.49	255	110
10	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	35	118
11	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	35	118
12	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	35	118
12	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	35	118
13	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	115	118
14	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	115	118
15	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	115	118
15	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	115	118
16	AT&T	700	40	4	3062.81	COMMSCOPE	NNHH-65C-R4	12.82	255	118

17	AT&T	850	40	4	3557.30	COMMSCOPE	NNHH-65C-R4	13.47	255	118
18	AT&T	1900	40	4	4356.32	KATHREIN	80010121	14.35	255	118
18	AT&T	2100	40	4	4356.32	KATHREIN	80010121	14.35	255	118
19	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860-VR0-00	14.72	35	127
20	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860-VR0-00	14.9	35	127
21	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000	15.4	35	127
22	Verizon	3700	50	4	43154.8	SAMSUNG	MT6407	23.34	35	127
23	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860-VR0-00	14.72	115	127
24	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860-VR0-00	14.9	115	127
25	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000	15.4	115	127
26	Verizon	3700	50	4	43154.8	SAMSUNG	MT6407	23.34	115	127
27	Verizon	700	40	4	4743.73	JMA	X7CQAP-FRO-860-VR0-00	14.72	255	127
28	Verizon	850	40	4	4944.47	JMA	X7CQAP-FRO-860-VR0-00	14.9	255	127
29	Verizon	1900	40	4	5547.79	AMPHENOL	HTXCW631619M000	15.4	255	127
30	Verizon	3700	50	4	43154.8	SAMSUNG	MT6407	23.34	255	127
31	Unknown	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	35	98
31	Unknown	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	35	98
31	Unknown	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	35	98
32	Unknown	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	115	98
32	Unknown	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	115	98
32	Unknown	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	115	98
33	Unknown	700	40	4	2565.19	JMA	MX08FRO665-21	12.05	255	98
33	Unknown	600	40	4	2183.33	JMA	MX08FRO665-21	11.35	255	98
33	Unknown	1900	40	4	6013.40	JMA	MX08FRO665-21	15.75	255	98

Table 1: Total Site Antenna data table

Results

All calculations performed based upon the data listed for this facility have produced results that are within allowable limits for General Population for exposure to RF emissions as specified by federal standards.

T-Mobile's RF Exposure: Responsibilities, Procedures & Guidelines document states that microwave dishes are compliant if they are mounted 20 feet or greater above any accessible walking or working surface.

Maximum Predicted MPE Level on Site:	**% of MPE Limit:**
Accessible **General Population** MPE Limits:	**0.65%**
Accessible **Occupational** MPE Limits:	**0.13%**

Ground Level Assessment:	**% of MPE Limit:**
Ground Level **General Population** MPE Limits:	**0.29%**
Ground Level **Occupational** MPE Limits:	**0.06%**

Sector A: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

Sector B: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

Sector C: Transmitting over Ground Level	**% of MPE Limit:**	***Distance from Antenna:**
Accessible **General Population** MPE Limits:	**0.29%**	**0**
Accessible **Occupational** MPE Limits:	**0.06%**	**0**

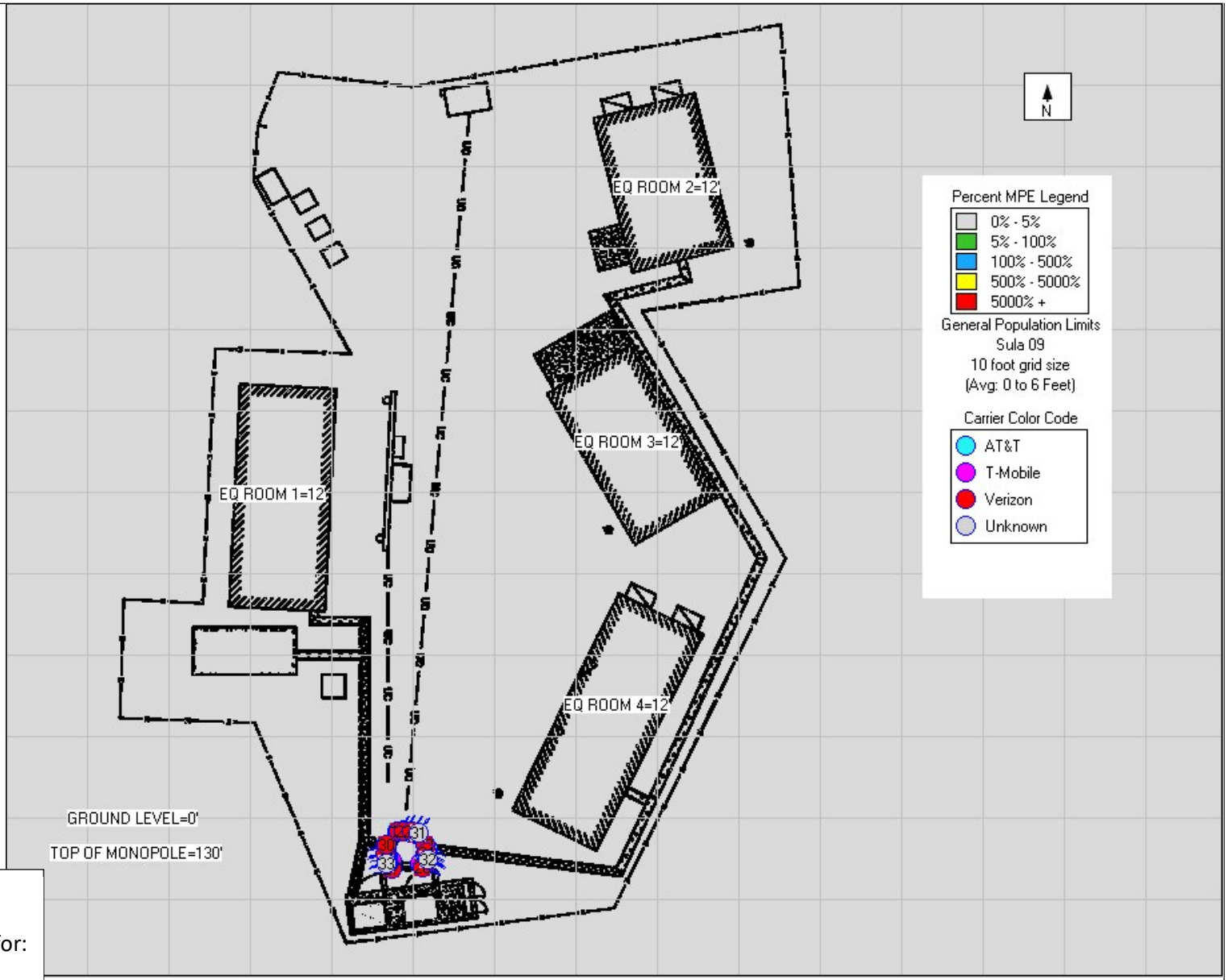
**Distance from Antenna is the distance in feet that the MPE limits are exceeded from the front face of the antenna, outward across an accessible area.*

APPENDIX A: Emissions Thresholds for Walking Surfaces and Signage

Ground (0ft.)

Emissions Thresholds for Walking Surfaces for:

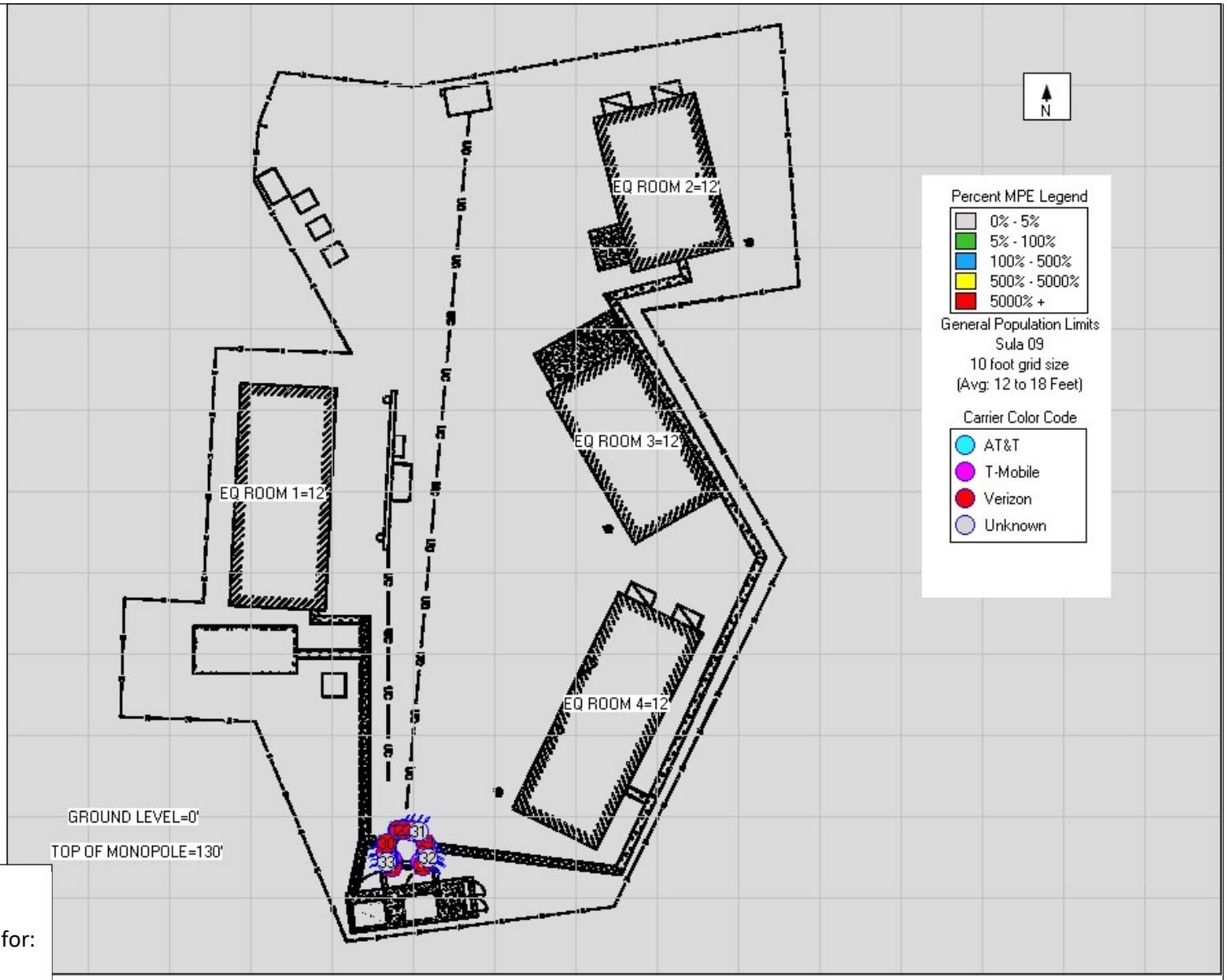
7WAN098A / CROWN - POTOMAC



Monopole Base (0ft.)

Emissions Thresholds for Walking Surfaces for:

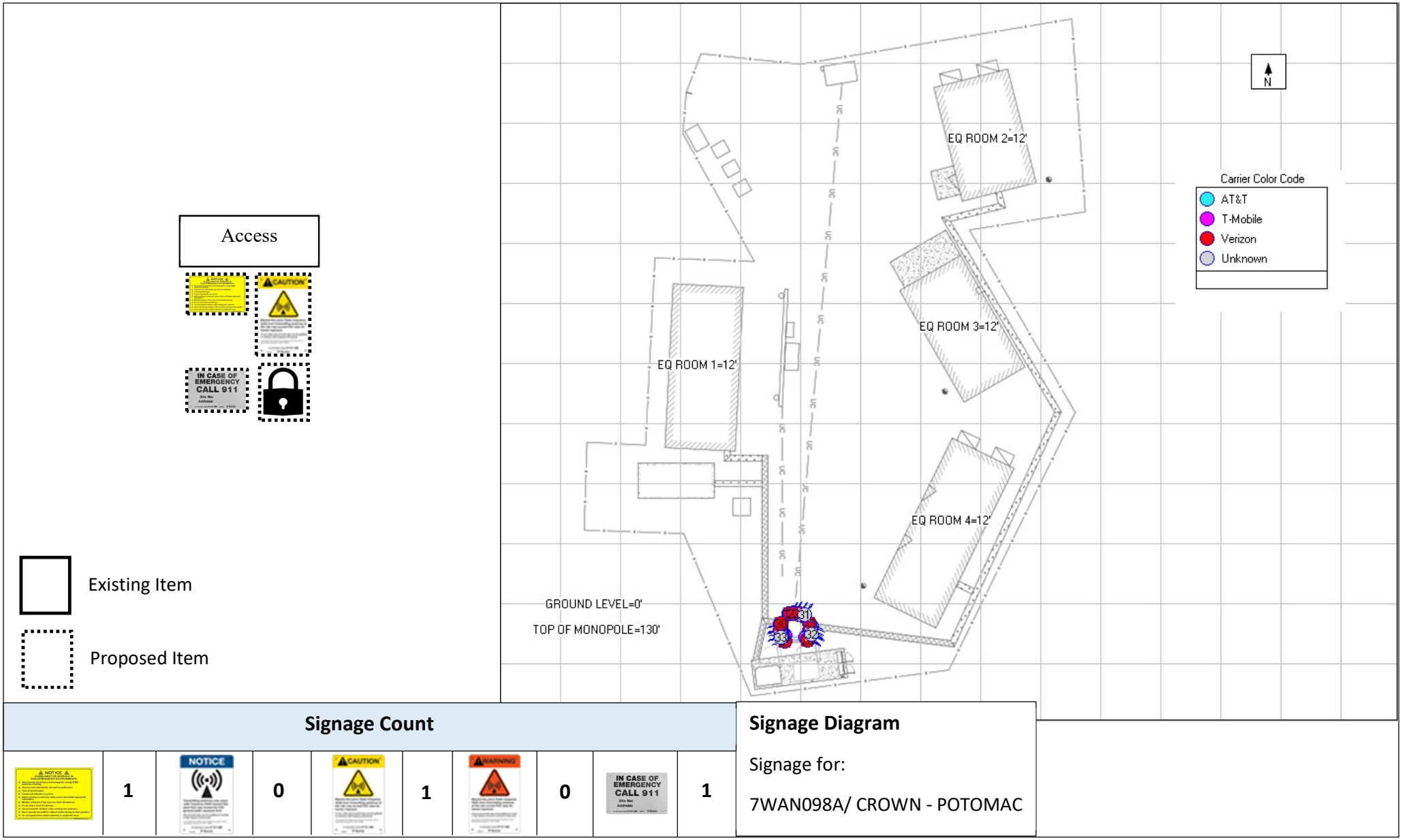
7WAN098A / CROWN - POTOMAC



EQ Rooms (12ft.)

Emissions Thresholds for Walking Surfaces for:

7WAN098A / CROWN - POTOMAC



Signage Count								
NOTICE	1	NOTICE	0	CAUTION	1	WARNING	0	IN CASE OF EMERGENCY CALL 911	1

Signage Diagram

Signage for:

7WAN098A/ CROWN - POTOMAC

Compliance Actions

Access	• Ensure all access points are locked. • Install (1) Guideline sign on the inside of the access point. • Install (1) Caution sign on the inside of the access point. • Install (1) Emergency sign on the inside of the access point.
Alpha Sector	• No Action Needed.
Beta Sector	• No Action Needed.
Gamma Sector	• No Action Needed.
Notes:	• N/A

APPENDIX B: RF Signage Description Table

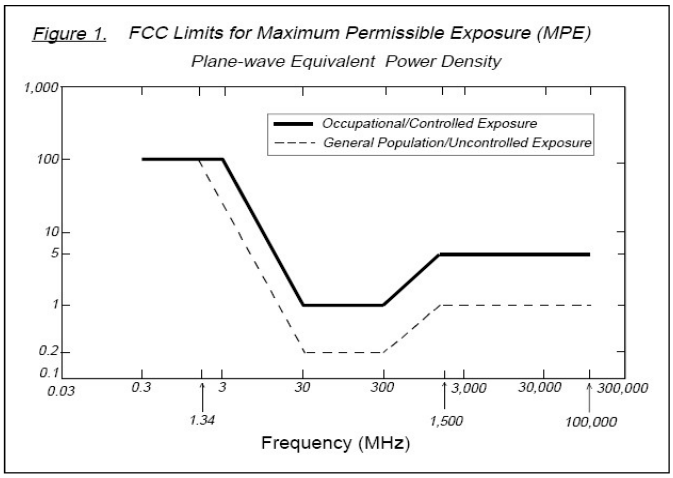
Sign	Description
	**RF Guideline Sign** Gives guidelines on how to proceed in areas that may exceed either the FCC's General Population or Occupational emissions limits.
	**Emergency Sign** Used to inform individuals to call 911 in case of emergency.
 	**Blue Notice Sign** Used to inform individuals that they are entering an area that may exceed the FCC's General Population limits. Must be placed anywhere the public can get within 30 feet vertically or horizontally of an antenna.
 	**Yellow Caution Sign** Used to inform individuals that they are entering an area that may exceed the either the FCC's General Population or Occupational Emissions limits. It must be placed so it is visible from all approachable sides. It must also be just outside of the area predicted to exceed the MPE limits so it can be read without standing within the affected area.
 	**Orange Warning Sign (Previously Red)** Used to inform individuals that they are entering an area that may exceed 5x the FCC's Occupational emissions limit. It must be placed so it is visible from all approachable sides. It must also be just outside of the area predicted to exceed the MPE limits so it can be read without standing within the affected area.

APPENDIX C: FCC Emissions Threshold Limits

Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-I,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-I,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

* Plane-wave equivalent power density



APPENDIX D: Certifications

I, Benjamin Black, preparer of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in T-Mobile's FCC Regulatory Compliance Manual.

Benjamin Black

6/10/2022

I, Yasir Alqadhili, reviewer and approver of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in T-Mobile's FCC Regulatory Compliance Manual.

Yasir Alqadhili

6/10/2022

Montgomery County Planning Department,

1. **JDX COMMENT – The plans do not show any other carrier antennas present at the RAD center of 98', while the structural does show other carrier antennas present at 98'. Please resolve the discrepancy.**

   TEP RESPONSE – Sheets C-2 and S-1 have been updated to show the Dish equipment at 98' RAD center.

2. **JDX COMMENT – The plans depict antennas and equipment belonging to "others" but do not note the names of the other carriers to whom other antennas and equipment belong. Please update the plans to include the names of the carriers for all other antennas and equipment.**

   TEP RESPONSE – Sheets C-1.1, C-2, and S-1 have been updated to callout the equipment by others by their carrier.

Sincerely,

Tower Engineering Professionals, (TEP OPCO)
Geoff McDaniel
Project Manager – Civil Division - Phoenix

T-Mobile

CALL MARYLAND ONE CALL
(800) 282-8555
CALL 3 WORKING DAYS
BEFORE YOU DIG!

T-MOBILE SITE NUMBER: 7WAN098A
T-MOBILE SITE NAME: CROWN - POTOMAC
SITE TYPE: MONOPINE
TOWER HEIGHT: 130'-0"

BUSINESS UNIT #: 806957
SITE ADDRESS: 10010 OAKLYN DRIVE
POTOMAC, MD 20854
COUNTY: MONTGOMERY
JURISDICTION: MONTGOMERY COUNTY

T-MOBILE ANCHOR SITE CONFIGURATION: 67E5998E_1XAIR+1OP+1QP

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	WILLIAMSBURG GARDENS
SITE ADDRESS:	10010 OAKLYN DRIVE POTOMAC, MD 20854
COUNTY:	MONTGOMERY
MAP/PARCEL #:	02835024
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	38° 59' 42.57" (38.99500000)
LONGITUDE:	-77° 12' 14.13" (-77.20388900)
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	331 FT
CURRENT ZONING:	RE-2C/TDP
JURISDICTION:	MONTGOMERY COUNTY
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	WASHINGTON SUBURBAN SANITARY COMM. 14501 SWEITZER LANE LAUREL, MD 20707-5902
TOWER OWNER:	CROWN CASTLE USA, INC. 3530 TORINGDON WAY, STE 300 CHARLOTTE, NC 28277
CARRIER/APPLICANT:	T-MOBILE 12050 BALTIMORE AVENUE BELTSVILLE, MD 20705
ELECTRIC PROVIDER:	PEPCO 800-257-7777
TELCO PROVIDER:	VERIZON 1800-837-4966

PROJECT TEAM

A&E FIRM:	TOWER ENGINEERING PROFESSIONALS 326 TRYON ROAD RALEIGH, NC 27603
	JOSEPH T. CRESS - PROJECT MANAGER (919) 661-6351
	SCOTT C. BRANTLEY - CIVIL ENGINEER (919) 661-6351
	SCOTT C. BRANTLEY - ELECTRICAL ENGINEER (919) 661-6351
TOWER OWNER:	CROWN CASTLE USA, INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	9011 ARBORETUM PARKWAY, SUITE 100 RICHMOND, VA 23236
	CHANDLER DAVIS - PROJECT MANAGER CHANDLER.DAVIS@CROWNCASTLE.COM
	BILLY STUBBS - A&E SPECIALIST BILLY.STUBBS@CROWNCASTLE.COM

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.0	OVERALL SITE PLAN
C-1.1	SITE PLAN
C-1.2	EXISTING & FINAL EQUIPMENT PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	EQUIPMENT SPECS
C-5	EQUIPMENT SPECS
C-6	PLUMBING DIAGRAM & COLOR CODE
S-1	STRUCTURAL
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 22x34. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (3) TMAs
- REMOVE (3) RRUs 11 B12
- REMOVE (12) COAX CABLES
- REMOVE (1) 9x18 HCS 60m CABLES
- INSTALL (9) ANTENNAS
- INSTALL (6) RRUs
- INSTALL (3) 6x24 4AWG 60m CABLES

GROUND SCOPE OF WORK:
- REMOVE (1) RBS 2106 CABINET
- REMOVE (1) DUW30
- REMOVE (6) RU22s
- INSTALL (2) CABINETS
- INSTALL (2) PSU 4813 BOOSTER
- INSTALL (1) BB 6648
- INSTALL (1) IXRe ROUTER
- INSTALL (2) RP 6651s

LOCATION MAP

NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	MARYLAND BUILDING CODES/2018 IBC
MECHANICAL	2018 INTERNATIONAL MECHANICAL CODE
ELECTRICAL	2020 NATIONAL ELECTRICAL CODE

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS: TOWER ENGINEERING PROFESSIONALS
DATED: 4/27/22

MOUNT ANALYSIS: TOWER ENGINEERING PROFESSIONALS
DATED: 5/12/22

ORDER ID: 611571 RFDS VERSION: 9
REVISION: 0 DATED: 2/21/22

ANALYSIS CRITERIA:

APPLICABLE CODES: TIA-222-H / ASCE 7-16
WIND SPEED: 112 MPH
EXPOSURE CATEGORY: C
RISK CATEGORY: II
TOPOGRAPHIC CATEGORY: 1
SEISMIC Ss: 0.135
SEISMIC S1: 0.043
SERVICE WIND SPEED: 60 MPH

APPROVALS

APPROVAL	SIGNATURE	DATE
RF		
CONST.		
FAA		
OPS		
RE		
SR DEV MGR		
REG DIR		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

06/23/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: T-1
REVISION: 2

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:

#4 BARS AND SMALLER	40 ksi
#5 BARS AND LARGER	60 ksi

6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3"
CONCRETE EXPOSED TO EARTH OR WEATHER:	
#6 BARS AND LARGER	2"
#5 BARS AND SMALLER	1–1/2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER:	
SLAB AND WALLS	3/4"
BEAMS AND COLUMNS	1–1/2"

7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
LOCP	LOSS OF COMMERCIAL POWER RELAY
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T · · Mobile · · ·
12050 BALTIMORE AVENUE
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CROWN CASTLE
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CHARLOTTE, NC 28277

TOWER
ENGINEERING
PROFESSIONALS

326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351

N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

SCOTT C. BRANTLEY
58709

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-2
REVISION: 0

NOTE:
SITE PLAN IS BASED ON GIS AND GOOGLE EARTH DATA. TOWER ENGINEERING PROFESSIONALS HAS NOT COMPLETED A BOUNDARY SURVEY FOR THIS PROPERTY.

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006

1 OVERALL SITE PLAN
SCALE: 200' 100' 0 200' 1" = 200'-0" (FULL SIZE) 1" = 400'-0" (11x17)

N

T-Mobile
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SEAL:

STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

05/27/22

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SHEET NUMBER: C-1.0

REVISION: 0

NOTE:
SITE PLAN SHOWN BELOW WAS REPRODUCED FROM INFORMATION PROVIDED BY CROWN CASTLE AND SITE WALK CONDUCTED BY TEP. CONTRACTOR TO VERIFY ALL EXISTING INFORMATION IS AS INDICATED ON SITE PLAN. CONTRACTOR IS TO ESTABLISH THE EXISTENCE AND LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES. IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES.

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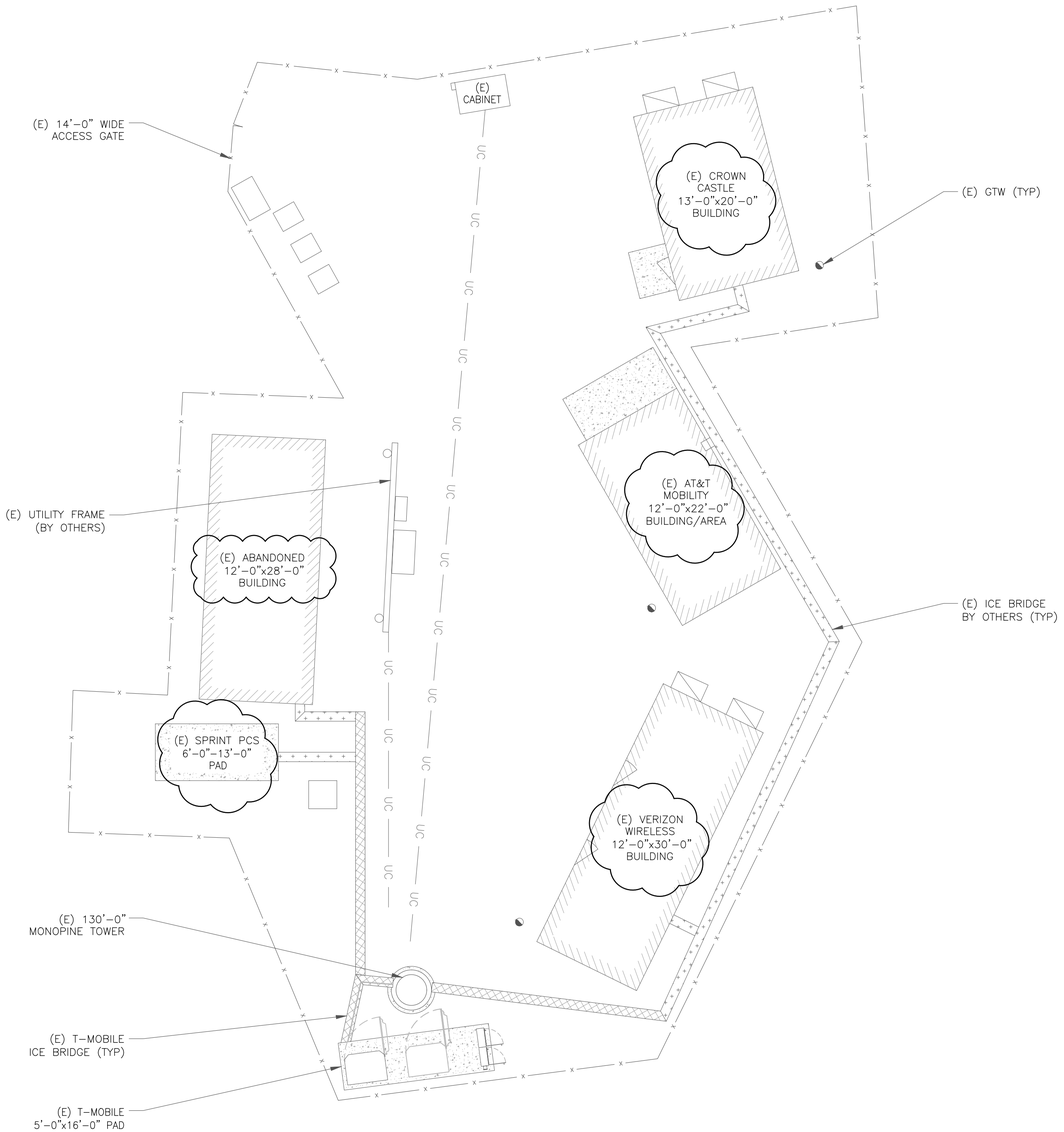

1 SITE PLAN
SCALE: 8' 6' 4' 2' 0 8' 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

N

T-Mobile

12050 BALTIMORE AVENUE
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CROWN CASTLE

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N.C. LICENSE #P-1403

TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
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PROFESSIONAL ENGINEER

06/23/22

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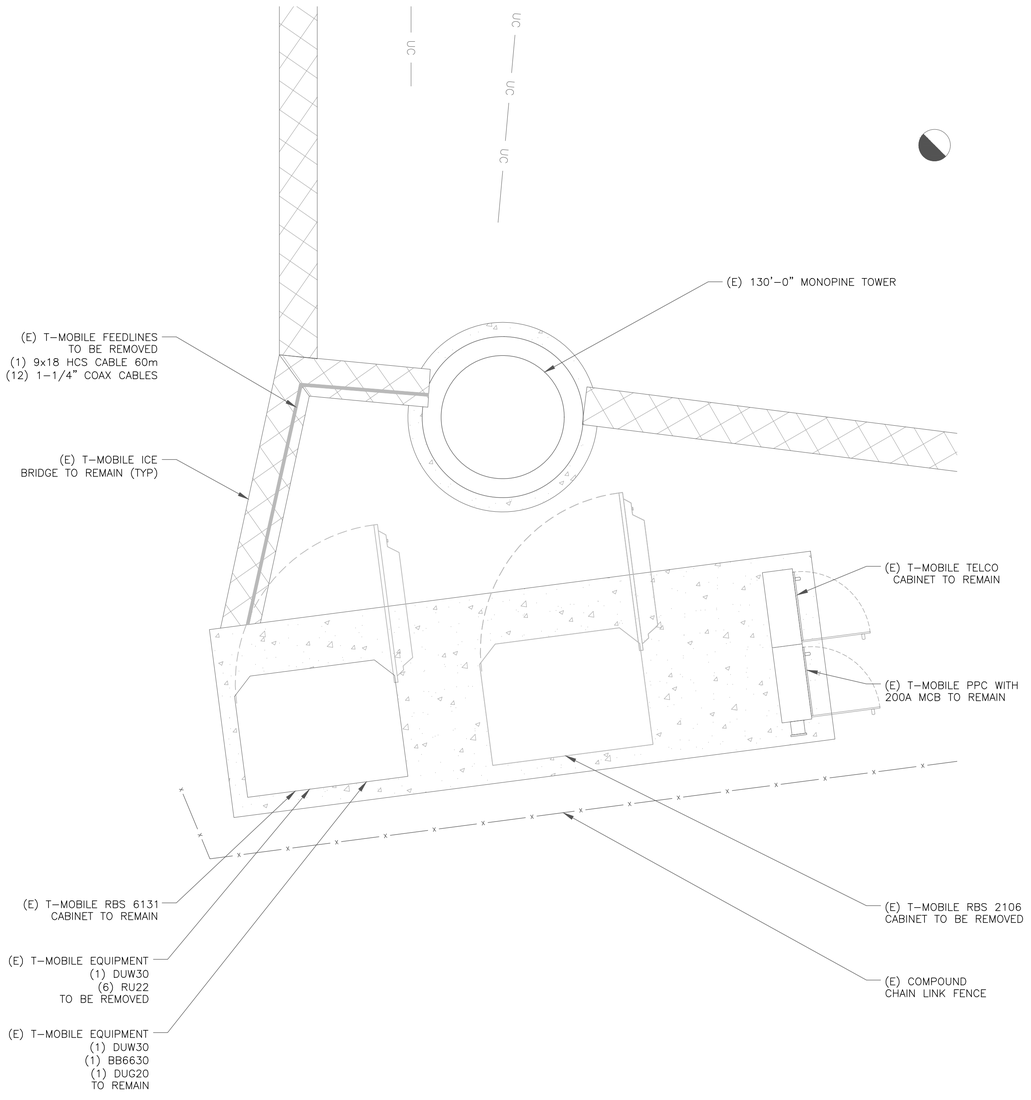
SHEET NUMBER: C-1.1

REVISION: 2

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006



1 EXISTING EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

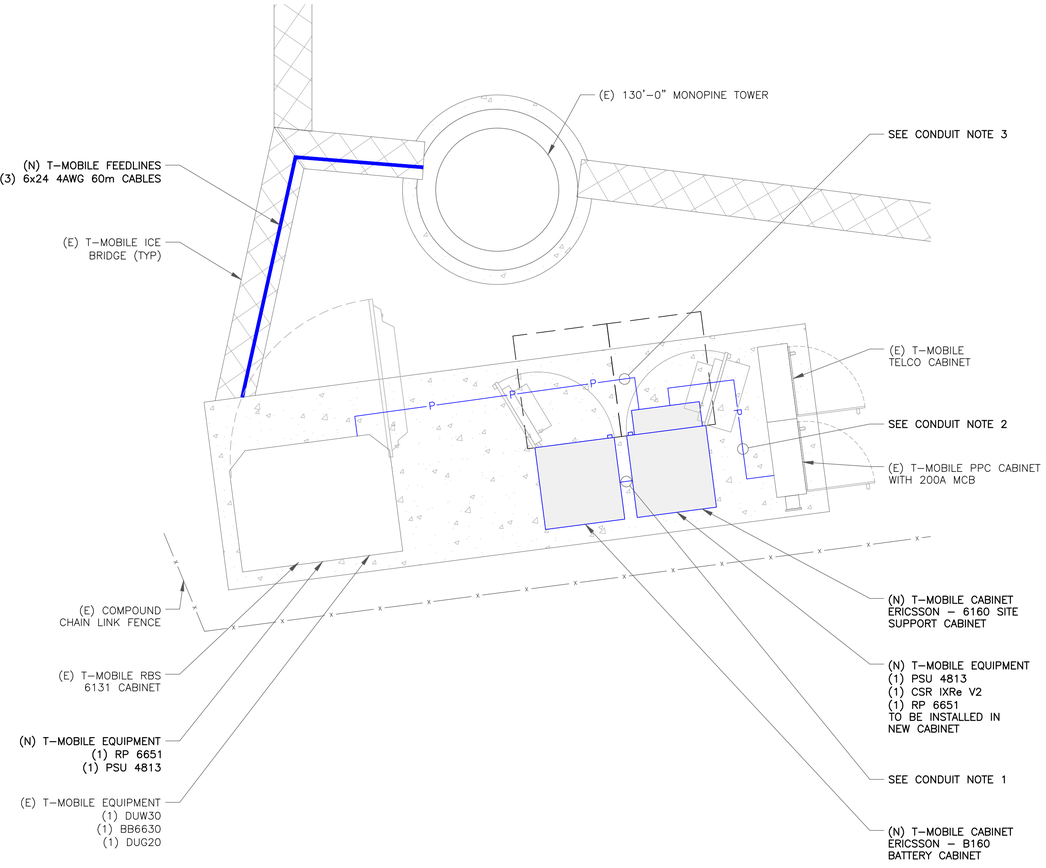
CONDUIT NOTES:

- ALL CONDUIT TO BE SCH40 PVC OR LTFC, AS NOTED. INSTALL WEATHERPROOF FITTINGS.
- ABOVE GRADE CONDUIT RUNS TO BE MARKED WITH HAZARD TAPE TO PREVENT TRIPPING HAZARD.

1. (1) 2" CONDUIT BETWEEN 6160 AND B160 (ABOVE GRADE, LTFC or SCH40 PVC)
2. (1) 2" CONDUIT FROM PPC TO 6160 FOR 125A & 15A BREAKER CONDUCTORS (BELOW GRADE, SCH40 PVC)
3. (1) 1" CONDUIT FROM AAV/WESTELL CABINET TO 6160 CABINET (BELOW GRADE, SCH40 PVC)

NOTE:

ALL RACKS AND EQUIPMENT CABINETS ARE TO HAVE TWO GROUNDING LEADS. ALL EQUIPMENT INSTALLED IN RACKS MUST HAVE A CHASSIS GROUND ATTACHED TO A COMMON BUS BAR ON THE RACK. COMMON BUS BAR MUST BE GROUNDED TO MAIN GROUND BAR. SEE G-1 FOR GROUNDING NOTES.



2 FINAL EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

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BU #: **806957**
WILLIAMSBURG GARDENS

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EXISTING 130'-0"
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ISSUED FOR:

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1	06/09/22	JVZ	CONSTRUCTION	GSM

SEAL:

STATE OF MARYLAND
SCOTT C. BRAY
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06/09/22

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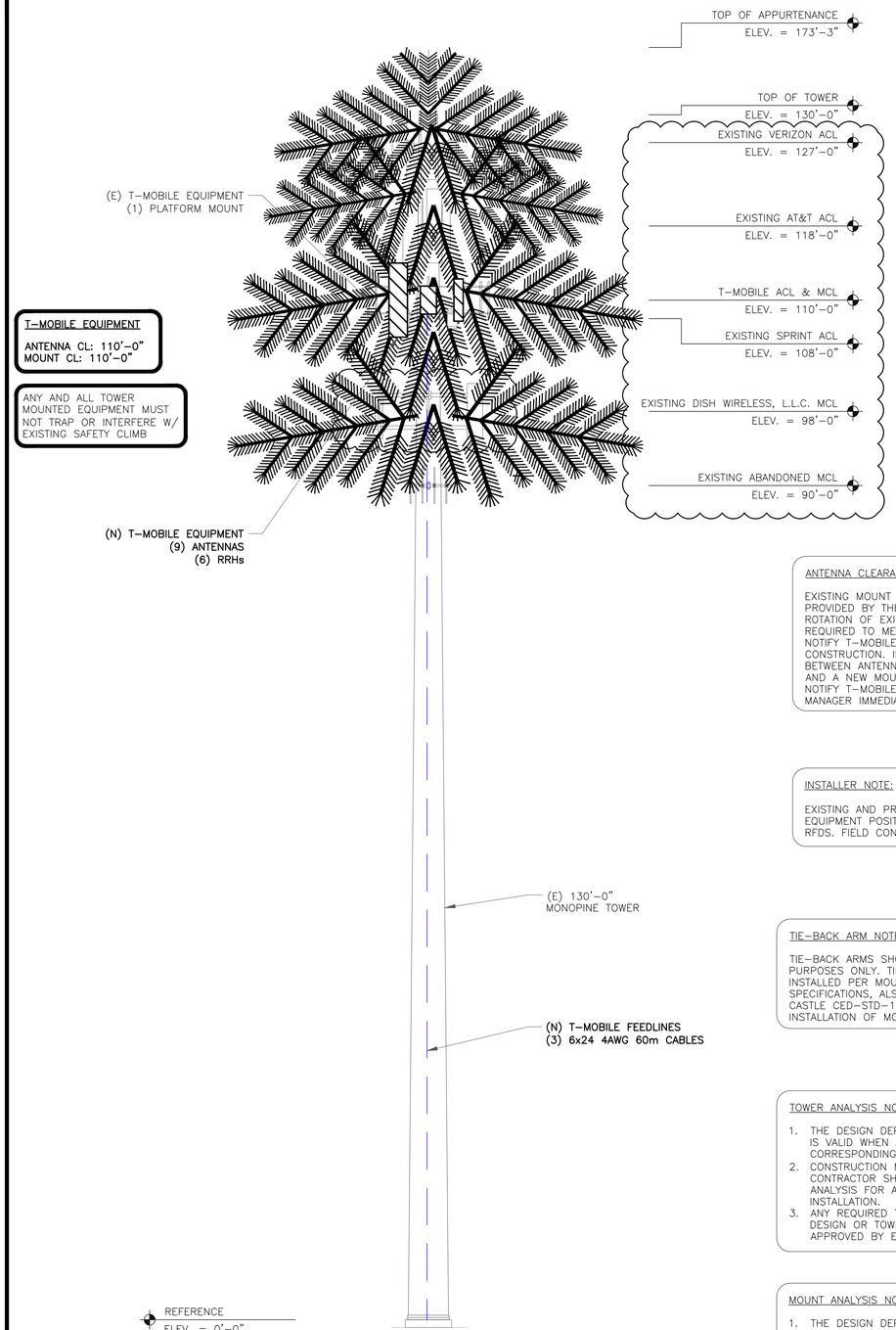
SHEET NUMBER: C-1.2

REVISION: 1



1 FINAL ELEVATION

SCALE: 8' 6' 4' 2' 0 8' — 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

ANTENNA CLEARANCE NOTE:

EXISTING MOUNT SIZE AND ORIENTATION PROVIDED BY THE TOWER OWNER. IF ROTATION OF EXISTING MOUNTS IS REQUIRED TO MEET AZIMUTHS, PLEASE NOTIFY T-MOBILE RF PRIOR TO CONSTRUCTION. IF 36" CLEARANCE BETWEEN ANTENNAS CANNOT BE MET AND A NEW MOUNT IS REQUIRED, PLEASE NOTIFY T-MOBILE CONSTRUCTION MANAGER IMMEDIATELY.

INSTALLER NOTE:

EXISTING AND PROPOSED ANTENNA/ EQUIPMENT POSITIONING SHOWN PER RFDS. FIELD CONDITIONS MAY VARY.

TIE-BACK ARM NOTE:

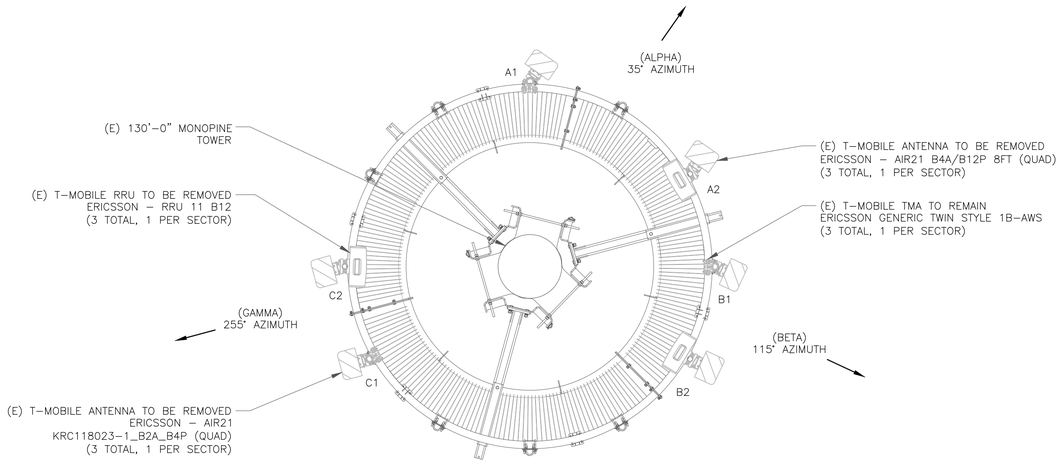
TIE-BACK ARMS SHOWN ARE FOR REFERENCE PURPOSES ONLY. TIE-BACK ARMS TO BE INSTALLED PER MOUNT MANUFACTURERS SPECIFICATIONS, ALSO ADHERING TO CROWN CASTLE CED-STD-10294 STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES.

TOWER ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

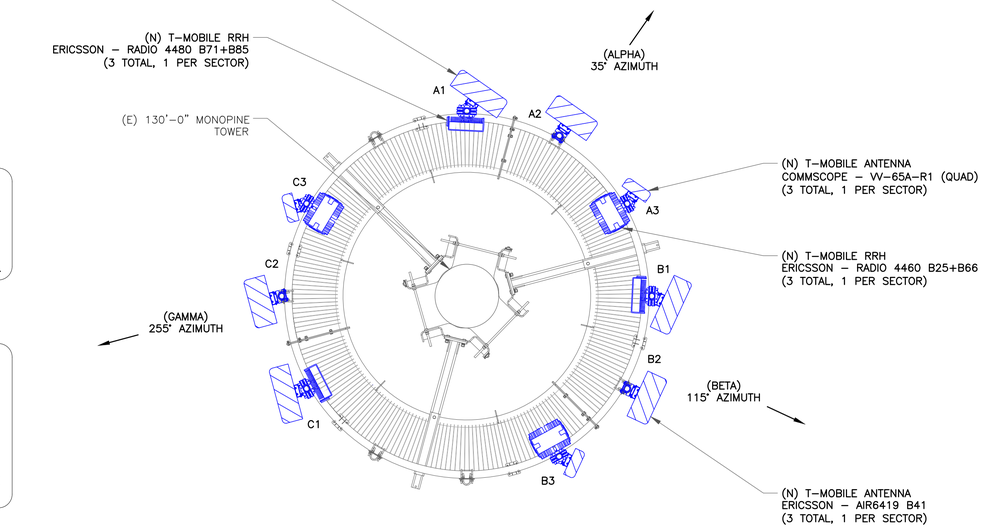
MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.



2 EXISTING ANTENNA LAYOUT

SCALE: 2' 1' 0 2' — 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)



3 FINAL ANTENNA LAYOUT

SCALE: 2' 1' 0 2' — 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

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T-MOBILE SITE NUMBER:
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BU #: **806957**
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SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

06/23/22

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Expiration Date: 01/10/2024

SHEET NUMBER: C-2

REVISION: 2

EXISTING ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	*U1900, *G1900, *U2100	110'-0"	35°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	4°/4°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
ALPHA	A3	*L2100, *L700	110'-0"	35°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	4°/4°	*(1) ERICSSON - RRU 11 B12	*(1) 9x18 HCS 60m
BETA	B1	*U1900, *G1900, *U2100	110'-0"	115°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	2°/2°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
BETA	B3	*L2100, *L700	110'-0"	115°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	2°/2°	*(1) ERICSSON - RRU 11 B12	HYBRID (SHARED)
GAMMA	C1	*U1900, *G1900, *U2100	110'-0"	255°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	4°/4°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
GAMMA	C3	*L2100, *L700	110'-0"	255°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	4°/4°	*(1) ERICSSON - RRU 11 B12	HYBRID (SHARED)

*EQUIPMENT TO BE REMOVED

EXISTING CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
EXISTING	*COAX	1-1/4"	12
EXISTING	*HCS	6x18 HCS 60m	1
CABLE QUANTITY			13

1 EXISTING ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

FINAL ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L700, L600, N600	110'-0"	35°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	(3) 6x24 4AWG 60m
ALPHA	A2	L2500, N2500	110'-0"	35°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
ALPHA	A3	U1900, L2100 L1900, G1900	110'-0"	35°	COMMSCOPE	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)
BETA	B1	L700, L600, N600	110'-0"	115°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	HYBRID (SHARED)
BETA	B2	L2500, N2500	110'-0"	115°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
BETA	B3	U1900, L2100 L1900, G1900	110'-0"	115°	ERICSSON	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)
GAMMA	C1	L700, L600, N600	110'-0"	255°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	HYBRID (SHARED)
GAMMA	C2	L2500, N2500	110'-0"	255°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
GAMMA	C3	U1900, L2100 L1900, G1900	110'-0"	255°	ERICSSON	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)

FINAL CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
NEW	HCS	4AWG 60m	3
CABLE QUANTITY			3

2 PROPOSED ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

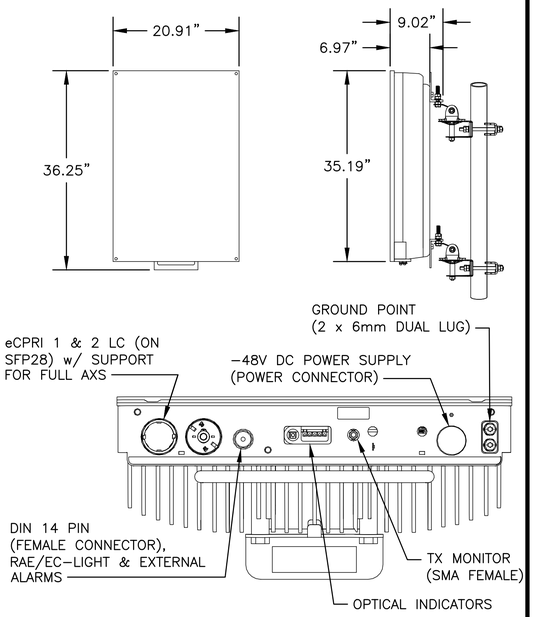
05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

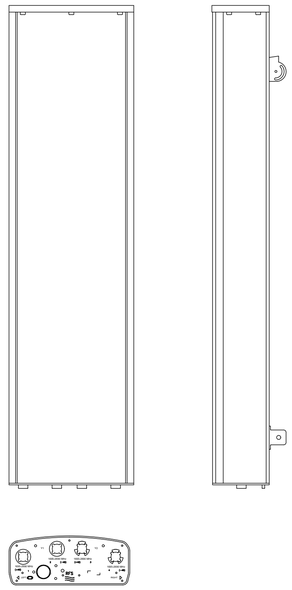
SHEET NUMBER: C-3

REVISION: 0

MANUFACTURER:	ERICSSON
MODEL:	AIR 6419 B41 (2.5GHz M-MIMO)
DIMENSIONS:	36.25" x 20.91" x 9.02" (H x W x D)
WEIGHT:	83 LBS (EXCLUDING MOUNTING KIT)
MOUNT WEIGHT:	13.5 LBS (SXK109 2016/1)



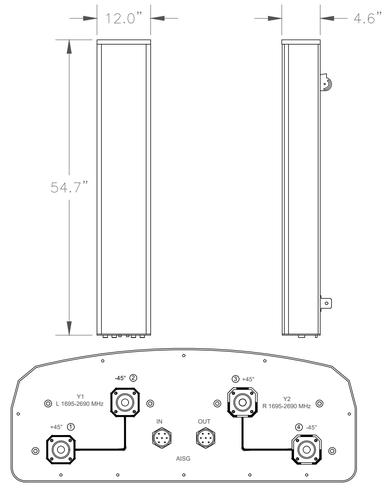
1 ERICSSON – 6419 B41
SCALE: NOT TO SCALE



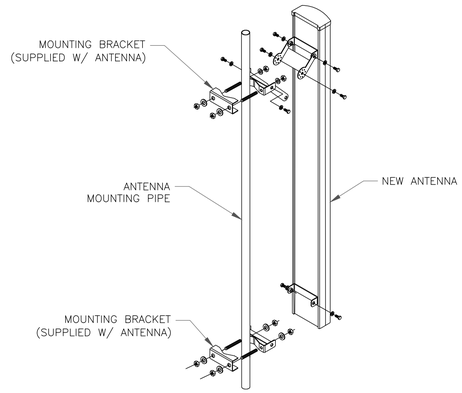
RFS/CELWAVE – APXVAALL24_43-U-NA20
WEIGHT (WITHOUT MOUNTING HARDWARE): 149.90 LBS
SIZE (HxWxD): 95.90x24.00x8.50 IN.

2 RFS/CELWAVE – APXVAALL24_43-U-NA20
SCALE: NOT TO SCALE

MANUFACTURER:	COMMSCOPE
MODEL:	VV-65A-R1
DIMENSIONS:	54.7" x 12.1" x 4.6" (H x W x D)
WEIGHT:	24.7 LB
INTERFACE:	4-PORT 4.3-10 FEMALE
MOUNTING KIT:	600899A-2 (INCLUDED) WEIGHT: 8.6 LB

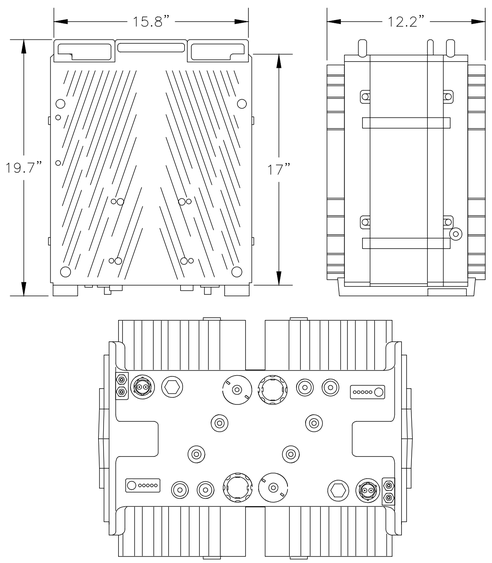


3 COMMSCOPE – VV-65A-R1
SCALE: NOT TO SCALE



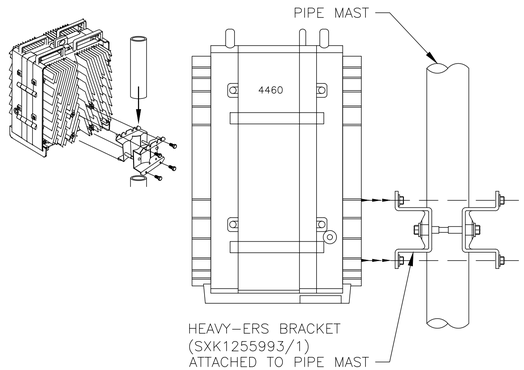
4 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	4460 RADIO B2/25 B66 (KRC 161 912/3)
DIMENSIONS:	19.7" x 15.8" x 12.2" (H" x W" x D")
WEIGHT:	109 LBS
BRACKET WEIGHT:	4.8 LBS (ERS HEAVY #SXK1255993/1)



5 ERICSSON – RADIO 4460 B25+B66
SCALE: NOT TO SCALE

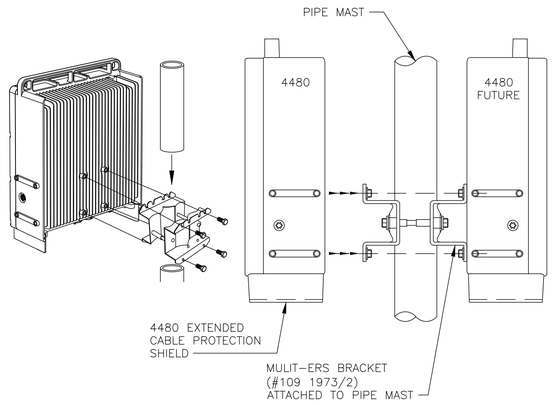
INSTALLATION KIT:	NTB1010029/50	1/RADIO
BRACKET:	ERS HEAVY BRACKET (SXK1255993/1)	1
POWER CONNECTOR:	CIRCULAR CONNECTOR (RNT4437/01)	2
GROUND CABLE:	CABLE -16mm2, GYNE, 2m 1 LUG w/ 2 M6 HOLES, 90° (RPM1192062/2)	1



INSTALLER NOTES:
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

6 ERICSSON – RADIO 4460 MOUNTING DETAIL
SCALE: NOT TO SCALE

INSTALLATION KIT:	TB1010029/10	1/RADIO
BRACKET:	MULTI ERS BRACKET (#109 1973/2)	1
POWER CONNECTOR:	CIRCULAR CONNECTOR (RNT4437/01)	2
GROUND CABLE:	CABLE -16mm2, GYNE, 2m 1 LUG w/ 2 M6 HOLES, 90° (RPM1192062/2)	1



INSTALLER NOTES:
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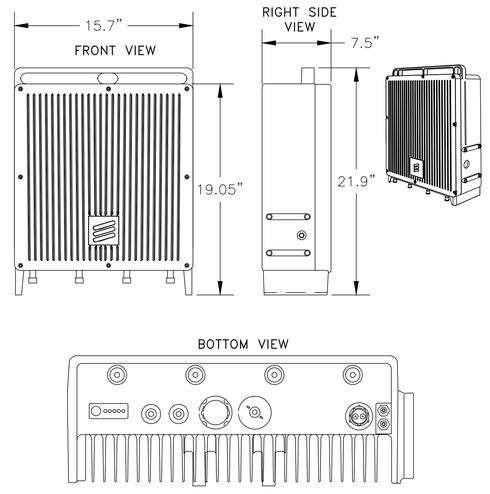
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

7 ERICSSON – RADIO 4480 MOUNTING DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	4480 RADIO (KRC 161 922/1)
DIMENSIONS:	21.9" x 15.7" x 7.5" (H x W x D)
MODEL BAND:	B71, B85 FOR NR AND LTE
WEIGHT:	81 LBS
BRACKET WEIGHT:	3.75 LBS (MULTI ERS #109 1973/2)



8 ERICSSON – RADIO 4480 B71+B85
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER
ENGINEERING
PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

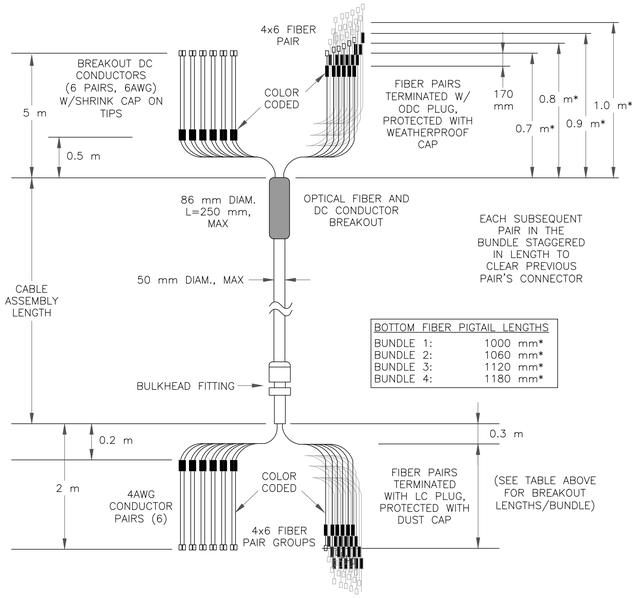
STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

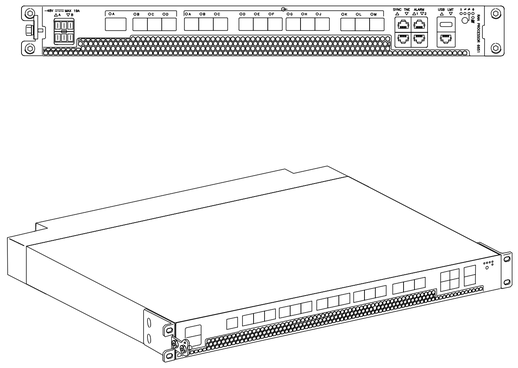
SHEET NUMBER: C-4.1

REVISION: 0



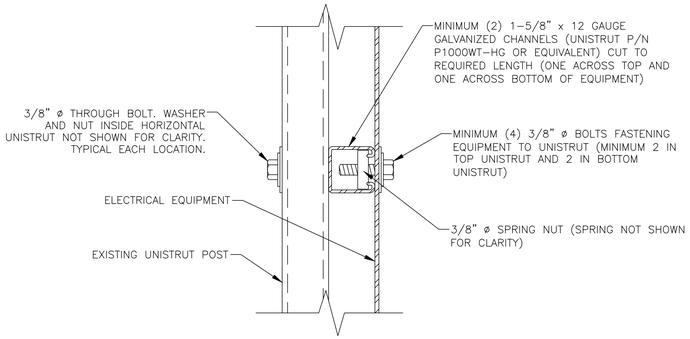
1 HCS DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	6651 RAN PROCESSOR (KDU1370093/11)
WEIGHT:	16.53 LBS
DIMENSIONS:	1.75"x 17.25"x 13.85" (HxWxD)



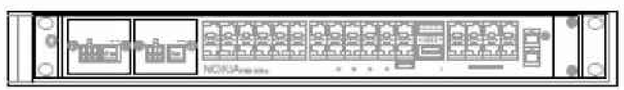
2 BASEBAND RP6651
SCALE: NOT TO SCALE

NOTE: ALL BOLTS TO BE INSTALLED USING LOCK WASHERS AND FLAT WASHERS



3 UNISTRUT ATTACHMENT DETAIL (DESIGNED BY OTHERS)
SCALE: NOT TO SCALE

MANUFACTURER: NOKIA
MODEL: IXR-e
DIMENSIONS: 17.25"x10.0"x1.75"
WEIGHT: TBD



4 CSR IXRE
SCALE: NOT TO SCALE

Attribute	Value
Min Input Voltage	-38 VDC
Output Voltage	3x -58 V DC ports
CB rating	30A/40A/50A
Efficiency	96%
Total output power	6000 Watts (2000 W/port)
Operating Temp	-40°C to +60°C
Alarms	Output fault, DC SPD failure
Mechanical	1 U 19", 13" depth
Certification	IEC 62368-1, UL 62368-1
MTBF	143 Years
Air Flow	Front to Back

5 PSU 4813
SCALE: NOT TO SCALE

T-Mobile
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BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND · SCOTT C. BRANDT · 58709 · PROFESSIONAL ENGINEER

05/27/22

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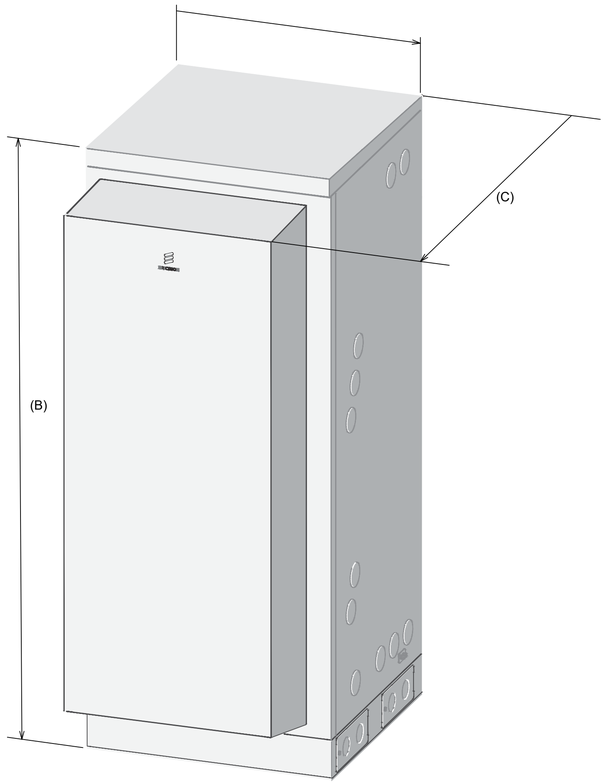
SHEET NUMBER: C-4.2
REVISION: 0

INSTALLER NOTES:

1. INFORMATION SHOWN PROVIDED BY T–MOBILE. CONTRACTOR TO REFERENCE CABINET MANUFACTURER'S SPECIFICATIONS FOR FURTHER DETAILS.
2. CONTRACTOR TO FOLLOW THE LATEST VERSION OF T–MOBILE REGIONAL CONSTRUCTION STANDARDS. CONTACT T–MOBILE FOR DETAILS.



Dimensions	
Width (A)	650 mm / 25.5906 in
Height (B)	1450 mm / 57.08661 in (without base frame) 1600 mm / 62.99213 in (with base frame)
Depth (C)	850 mm / 33.4646 in
Weight	
Empty enclosure	176 kg / 388.014 lb

1 ERICSSON 6160 CABINET DETAILS
SCALE: NOT TO SCALE

2 ERICSSON B160 CABINET DETAILS
SCALE: NOT TO SCALE

SITE SIGNAGE NOTE:
WHERE APPLICABLE, CONTRACTOR TO FOLLOW ALL T–MOBILE SIGNAGE REQUIREMENTS. CONFIRM SITE SIGNAGE WITH T–MOBILE CM PRIOR TO CONSTRUCTION

3 T–MOBILE SIGNAGE
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
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CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
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RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
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T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
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REV	DATE	DRWN	DESCRIPTION	DES./QA
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SEAL:

STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

05/27/22

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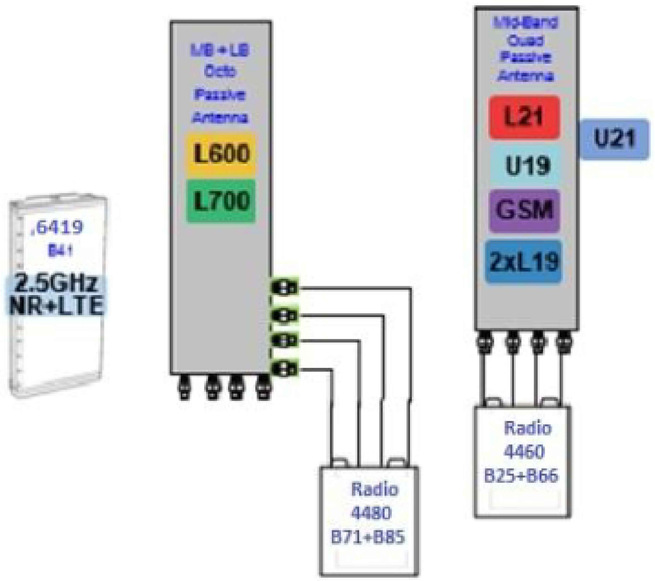
SHEET NUMBER: C-5

REVISION: 0



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

TYPICAL T-MOBILE HYBRID PLUMBING

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO (TECHNOLOGY)	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 1	1	RED		1	B	RED		AIR 32 B2a (G19 CPRI 1)	RED 1 + LC Boot Color	ALPHA G19 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		AIR 32 B2a (L19 CPRI 2)	RED 1 + LC Boot Color	ALPHA B2 L19 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		AIR 32 B66a (L21 CPRI 1)	RED 1 + LC Boot Color	ALPHA L21 CPRI 1	ALPHA
				2	A						
	4	YELLOW		1	B	YELLOW		AIR32 B66Aa (L21 CPRI 2)	RED 1 + LC Boot Color	ALPHA L21 CPRI 2	ALPHA
				2	A						
	5	WHITE		1	B	WHITE		AIR 32 B2a (G19 CPRI 1)	YELLOW 1 + LC Boot Color	BETA G19 CPRI 1	BETA
				2	A						
	6	BLACK		1	B	BLACK		AIR 32 B2a (L19 CPRI 2)	YELLOW 1 + LC Boot Color	BETA B2 L19 CPRI 2	BETA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE	AIR 32 B66a (L21 CPRI 1)	YELLOW 1 + LC Boot Color	BETA L21 CPRI 1	BETA
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE	AIR32 B66Aa (L21 CPRI 2)	YELLOW 1 + LC Boot Color	BETA L21 CPRI 2	BETA
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE	AIR 32 B2a (L19 CPRI 1)	BLUE 1 + LC Boot Color	GAMMA G19 CPRI 1	GAMMA
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE	AIR 32 B2a (L19 CPRI 2)	BLUE 1 + LC Boot Color	GAMMA B2 L19 CPRI 2	GAMMA
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE	AIR 32 B66Aa (L21 CPRI 1)	BLUE 1 + LC Boot Color	GAMMA L21 CPRI 1	GAMMA
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE	AIR32 B66Aa (L21 CPRI 2)	BLUE 1 + LC Boot Color	GAMMA L21 CPRI 2	GAMMA
				2	A						

DC Power

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	AIR 32 B66Aa	ALPHA	ALPHA L21
	0V	B	RED				
2	-48	A	BLACK	GREEN	AIR 32 B2a	ALPHA	ALPHA G/L19
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	AIR 32 B66Aa	BETA	BETA L21
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW	AIR 32 B2a	BETA	BETA G/L19
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE	AIR 32 B66Aa	GAMMA	GAMMA L21
	0V	B	WHITE				
6	-48	A	BLACK	BLACK	AIR 32 B2a	GAMMA	GAMMA G/L19
	0V	B	BLACK				

Alpha RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
RED 1	RED 2	RED 3	RED 4	RED 5	RED 6	RED 7	RED 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 2	1	RED		1	B	RED		Radio 4449	RED 2 + LC Boot Color	ALPHA L700/L600 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		Radio 4449	RED 2 + LC Boot Color	ALPHA N600 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		Radio 4449	YELLOW 2 + LC Boot Color	BETA L700/L600 CPRI 1	BETA
				2	A						
	4	YELLOW		1	B	YELLOW		Radio 4449	YELLOW 2 + LC Boot Color	BETA N600 CPRI 2	BETA
				2	A						
	5	WHITE		1	B	WHITE		Radio 4449	BLUE 2 + LC Boot Color	GAMMA L700/L600 CPRI 1	GAMMA
				2	A						
	6	BLACK		1	B	BLACK		Radio 4449	BLUE 2 + LC Boot Color	GAMMA N600 CPRI 2	GAMMA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE				
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE				
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE				
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE				
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE				
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE				
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Radio 4449	ALPHA	ALPHA L600/N600 B71
	0V	B	RED				
2	-48	A	BLACK	GREEN	Radio 4449	ALPHA	Alpha L700 B85
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Radio 4449	BETA	Beta L600/N600 B71
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW	Radio 4449	BETA	Beta L700 B85
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE	Radio 4449	GAMMA	Gamma L600/N600 B71
	0V	B	WHITE				
6	-48	A	BLACK	BLACK	Radio 4449	GAMMA	Gamma L700 B85
	0V	B	BLACK				

Beta RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
BLUE 1	BLUE 2	BLUE 3	BLUE 4	BLUE 5	BLUE 6	BLUE 7	BLUE 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 3	1	RED		1	B	RED		Radion 4415	RED 3 + LC Boot Color	ALPHA B25 L19 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		Radion 4415	RED 3 + LC Boot Color	ALPHA B25 L19 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		Radion 4415	YELLOW 3 + LC Boot Color	BETA B25 L19 CPRI 1	BETA
				2	A						
	4	YELLOW		1	B	YELLOW		Radion 4415	YELLOW 3 + LC Boot Color	BETA B25 L19 CPRI 2	BETA
				2	A						
	5	WHITE		1	B	WHITE		Radion 4415	BLUE 3 + LC Boot Color	GAMMA B25 L19 CPRI 1	GAMMA
				2	A						
	6	BLACK		1	B	BLACK		Radion 4415	BLUE 3 + LC Boot Color	GAMMA B25 L19 CPRI 2	GAMMA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE				
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE				
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE				
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE				
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE				
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE				
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Radio 4415	Alpha	ALPHA B25 L19
	0V	B	RED				
2	-48	A	BLACK	GREEN	Radio 4415	Beta	BETA B25 L19
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Radio 4415	Gamma	GAMMA B25 L19
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW			
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE			
	0V	B	WHITE				
6	-48	A	BLACK	BLACK			
	0V	B	BLACK				

Gamma RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
YELLOW 1	YELLOW 2	YELLOW 3	YELLOW 4	YELLOW 5	YELLOW 6	YELLOW 7	YELLOW 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO (TECHNOLOGY)	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 4	1	RED		1	B	RED		AIR 6449 L41 CPRI 1	RED 4 + LC Boot Color	Alpha L41 CPRI 1	Alpha
				2	A						
	2	GREEN		1	B	GREEN		AIR 6449 L41 CPRI 2	RED 4 + LC Boot Color	Alpha L41 CPRI 2	Alpha
				2	A						
	3	BLUE		1	B	BLUE		AIR 6449 N41 CPRI 3	RED 4 + LC Boot Color	Alpha N41 CPRI 3	Alpha
				2	A						
	4	YELLOW		1	B	YELLOW		AIR 6449 N41 CPRI 4	RED 4 + LC Boot Color	Alpha N41 CPRI 4	Alpha
				2	A						
	5	WHITE		1	B	WHITE		AIR 6449 L41 CPRI 1	YELLOW 4 + LC Boot Color	Beta L41 CPRI 1	Beta
				2	A						
	6	BLACK		1	B	BLACK		AIR 6449 L41 CPRI 2	YELLOW 4 + LC Boot Color	Beta L41 CPRI 2	Beta
				2	A						
	7	RED	WHITE	1	B	RED	WHITE	AIR 6449 N41 CPRI 3	YELLOW 4 + LC Boot Color	Beta N41 CPRI 3	Beta
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE	AIR 6449 N41 CPRI 4	YELLOW 4 + LC Boot Color	Beta N41 CPRI 4	Beta
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE	AIR 6449 L41 CPRI 1	BLUE 4 + LC Boot Color	Gamma L41 CPRI 1	Gamma
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE	AIR 6449 L41 CPRI 2	BLUE 4 + LC Boot Color	Gamma L41 CPRI 2	Gamma
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE	AIR 6449 N41 CPRI 3	BLUE 4 + LC Boot Color	Gamma N41 CPRI 3	Gamma
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE	AIR 6449 N41 CPRI 4	BLUE 4 + LC Boot Color	Gamma N41 CPRI 4	Gamma
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Air 6449	Alpha	Alpha L/N41
	0V	B	RED				
2	-48	A	BLACK	GREEN	Air 6449	Beta	Beta L/N41
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Air 6449	Gamma	Gamma L/N41
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW			
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE			
	0V	B	WHITE				
6	-48	A	BLACK	BLACK			
	0V	B	BLACK				

Delta RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
GREEN 1	GREEN 2	GREEN 3	GREEN 4	GREEN 5	GREEN 6	GREEN 7	GREEN 8

2 COLOR CODE CHART
SCALE: NOT TO SCALE

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T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

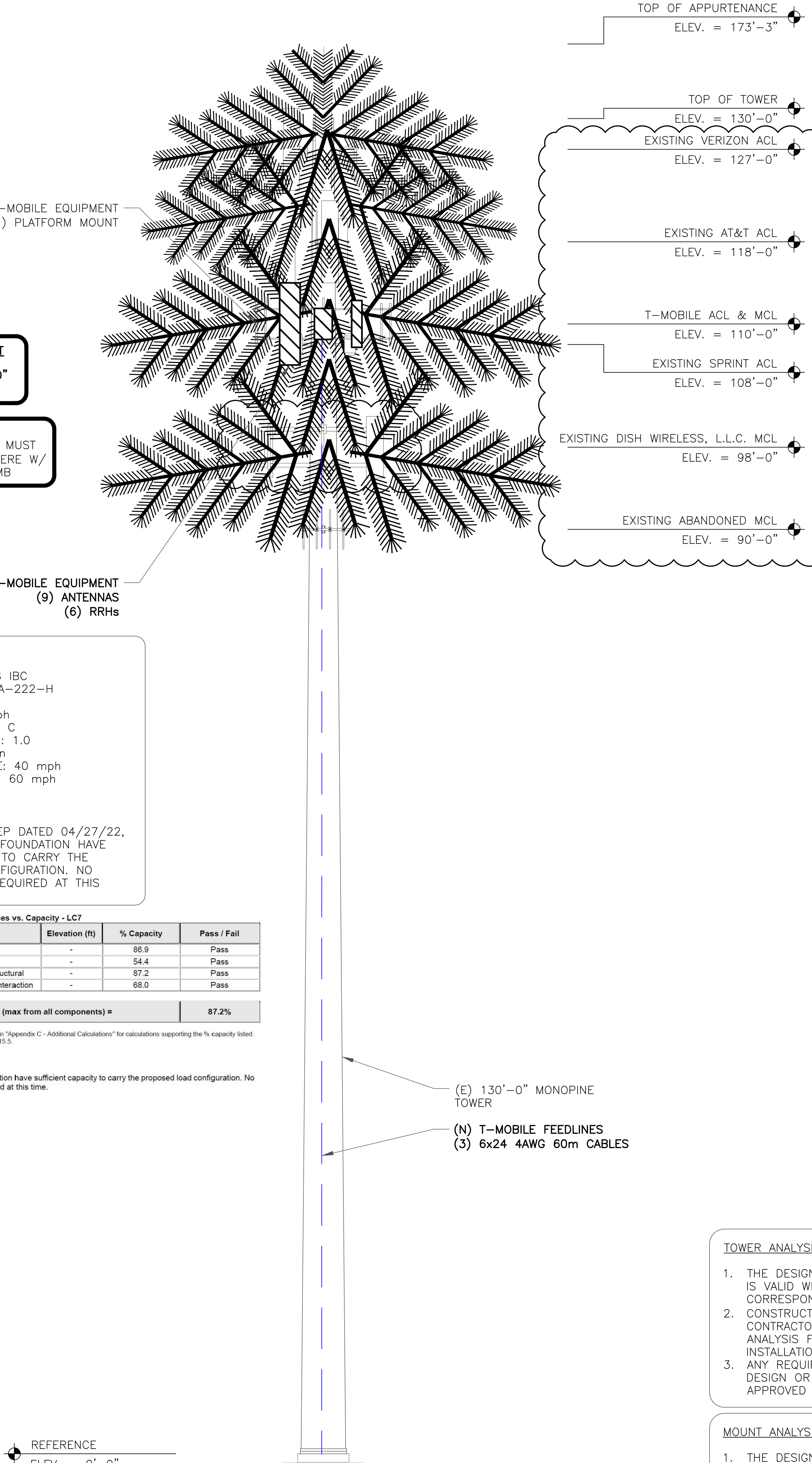
STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

SHEET NUMBER: C-6

REVISION: 0



T-MOBILE EQUIPMENT

ANTENNA CL: 110'-0"
MOUNT CL: 110'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

ANALYSIS CRITERIA:

BUILDING CODE: 2018 IBC
TIA-222 REVISION: TIA-222-H
RISK CATEGORY: II
WIND SPEED: 115 mph
EXPOSURE CATEGORY: C
TOPOGRAPHIC FACTOR: 1.0
ICE THICKNESS: 1.0 in
WIND SPEED WITH ICE: 40 mph
SERVICE WIND SPEED: 60 mph

RECOMMENDATIONS:

PER TOWER SA BY TEP DATED 04/27/22, THE TOWER AND ITS FOUNDATION HAVE SUFFICIENT CAPACITY TO CARRY THE PROPOSED LOAD CONFIGURATION. NO MODIFICATIONS ARE REQUIRED AT THIS TIME.

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	86.9	Pass
1,2	Base Plate	-	54.4	Pass
1,2	Base Foundation Structural	-	87.2	Pass
1,2	Base Foundation Soil Interaction	-	68.0	Pass
Structure Rating (max from all components) =				87.2%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5.

4.1) Recommendations

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

1 FINAL ELEVATION
SCALE: 8' 6' 4' 2' 0 8' 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

ANTENNA CLEARANCE NOTE:

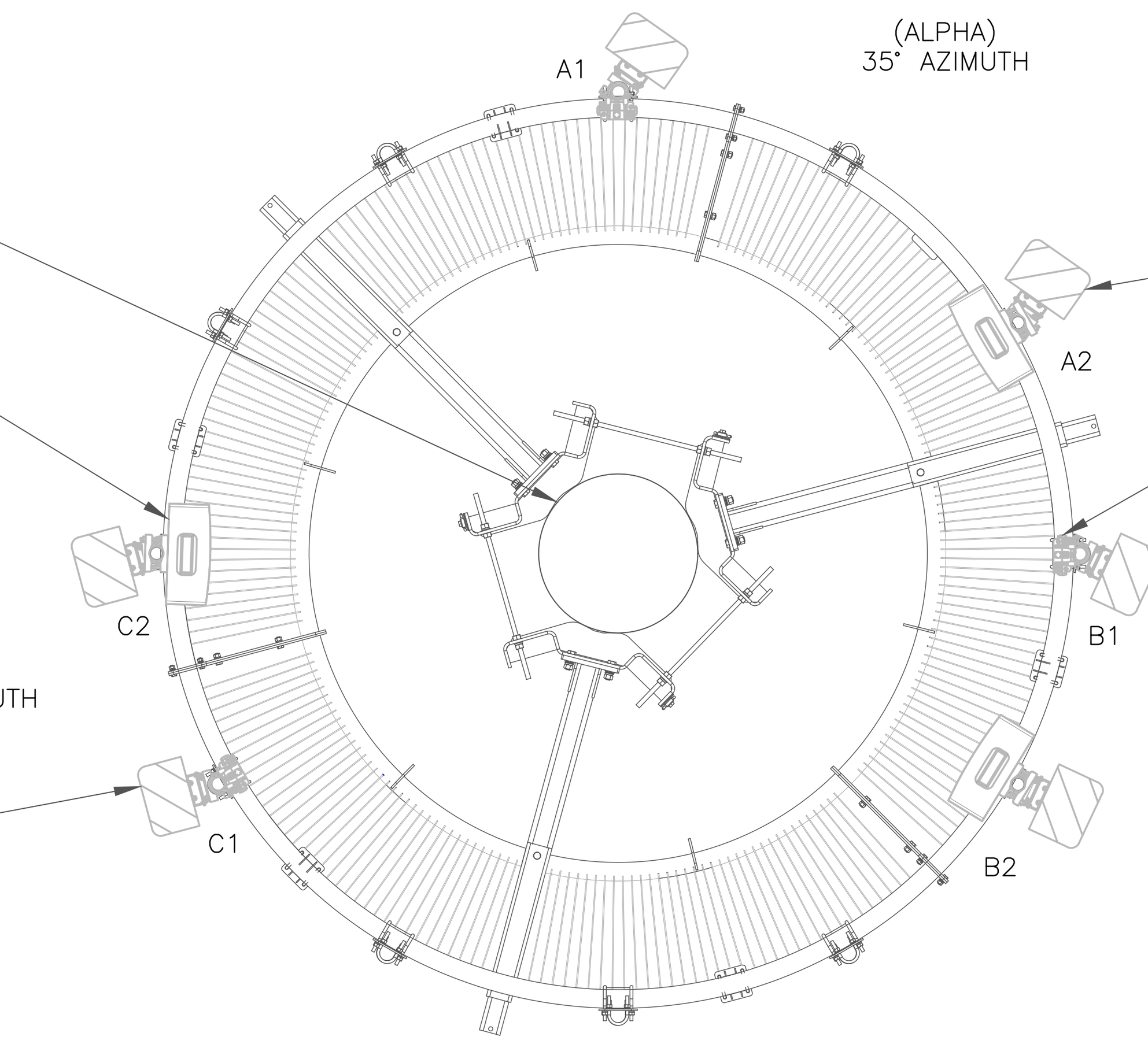
EXISTING MOUNT SIZE AND ORIENTATION PROVIDED BY THE TOWER OWNER. IF ROTATION OF EXISTING MOUNTS IS REQUIRED TO MEET AZIMUTHS, PLEASE NOTIFY T-MOBILE RF PRIOR TO CONSTRUCTION. IF 36" CLEARANCE BETWEEN ANTENNAS CANNOT BE MET AND A NEW MOUNT IS REQUIRED, PLEASE NOTIFY T-MOBILE CONSTRUCTION MANAGER IMMEDIATELY.

INSTALLER NOTE:

EXISTING AND PROPOSED ANTENNA/ EQUIPMENT POSITIONING SHOWN PER RFDS. FIELD CONDITIONS MAY VARY.

TIE-BACK ARM NOTE:

TIE-BACK ARMS SHOWN ARE FOR REFERENCE PURPOSES ONLY. TIE-BACK ARMS TO BE INSTALLED PER MOUNT MANUFACTURERS SPECIFICATIONS, ALSO ADHERING TO CROWN CASTLE CED-STD-10294 STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES.



2 EXISTING ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

ANALYSIS CRITERIA:

BUILDING CODE: 2018 IBC
TIA-222 REVISION: TIA-222-H
RISK CATEGORY: II
WIND SPEED: 115 mph
EXPOSURE CATEGORY: C
TOPOGRAPHIC FACTOR: 1.0
ICE THICKNESS: 1.0 in
WIND SPEED WITH ICE: 40 mph
SERVICE WIND SPEED: 60 mph

RECOMMENDATIONS:

PER MA BY TEP DATED 05/12/22, THE MOUNT HAS SUFFICIENT CAPACITY TO CARRY THE PROPOSED LOAD CONFIGURATION. NO MODIFICATIONS ARE REQUIRED AT THIS TIME.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform w/ Support Rail Mount)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontals	M304	110.0	25.6	Pass
1	Support Arms	SA-2	110.0	37.4	Pass
1	Internals	M526	110.0	32.6	Pass
1	Support Rails	M563	110.0	9.4	Pass
1	Mount Pipes	MP-1	110.0	31.5	Pass
2	Connection Bolts	-	110.0	23.7	Pass
2	Connection Plate	-	110.0	44.0	Pass
Structure Rating (max from all components) =					44.0%

Notes:
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity listed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

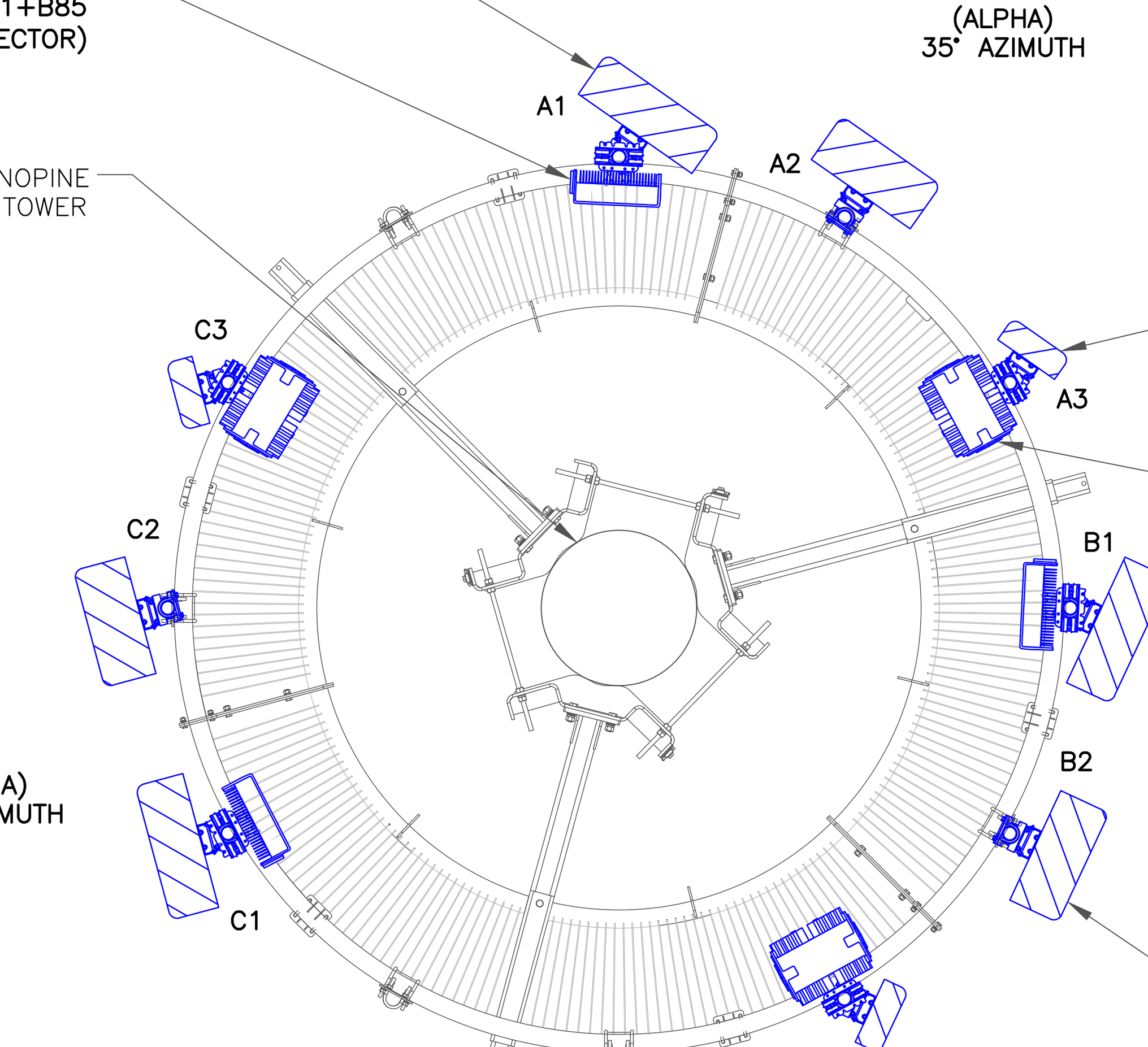
1) If the load differs from that described in Table 1 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The mount and its connection have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

TOWER ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.



3 FINAL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

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N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS
1	06/09/22	JVZ	CONSTRUCTION	GSM
2	06/23/22	SVP	CONSTRUCTION	GSM

SEAL:

06/23/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am duly licensed professional engineer under the laws of the State of Maryland

License No. 51609

Expiration Date: 10/01/2023

SHEET NUMBER: **S-1**

REVISION: **2**

NOTE:
LOAD CALCULATIONS TAKEN FROM INFORMATION PROVIDED BY CROWN CASTLE & BASED ON THE RFDS DATED 2/21/22, 9. CONTRACTOR TO VERIFY LOADS WITH MANUFACTURER'S SPECIFICATIONS PRIOR TO CONSTRUCTION

EXISTING 200A M.C.B, 240/120 VAC, 1ø, 3W PPC PANEL SCHEDULE

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
BTS	0		40	1	A	2	60	3274		PPC
		0		3	B	4			3274	
LIGHT /OFF	0		20	5	A	6	15	180		GFCI
FAN		360	20	7	B	8	80		0	NODE B
SPARE	–	–	–	9	A	10		0		
SPARE	–	–	–	11	B	12	–		–	SPARE
VOLT AMPS	0	360						3454	3274	VOLT AMPS

L1 VOLT AMPERES	3454	L2 VOLT AMPERES
	3634	MAX VOLT AMPERES
	30.3	MAX AMPS
	37.9	MAX AMPS x 125%

PROPOSED 200A M.C.B, 240/120 VAC, 1ø, 3W PPC PANEL SCHEDULE

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
BTS	0		40	1	A	2	60	5740		PPC
		0		3	B	4			5740	
LIGHT /OFF	0		20	5	A	6	15	180		GFCI
FAN		360	20	7	B	8	80		0	NODE B
6160 ENCLOSURE	**2770**	–	**150**	9	A	10		0		
	–	**2770**		11	B	12	**20**		**180**	INTERNAL 6160 GFCI
VOLT AMPS	2770	3130						5920	5920	VOLT AMPS

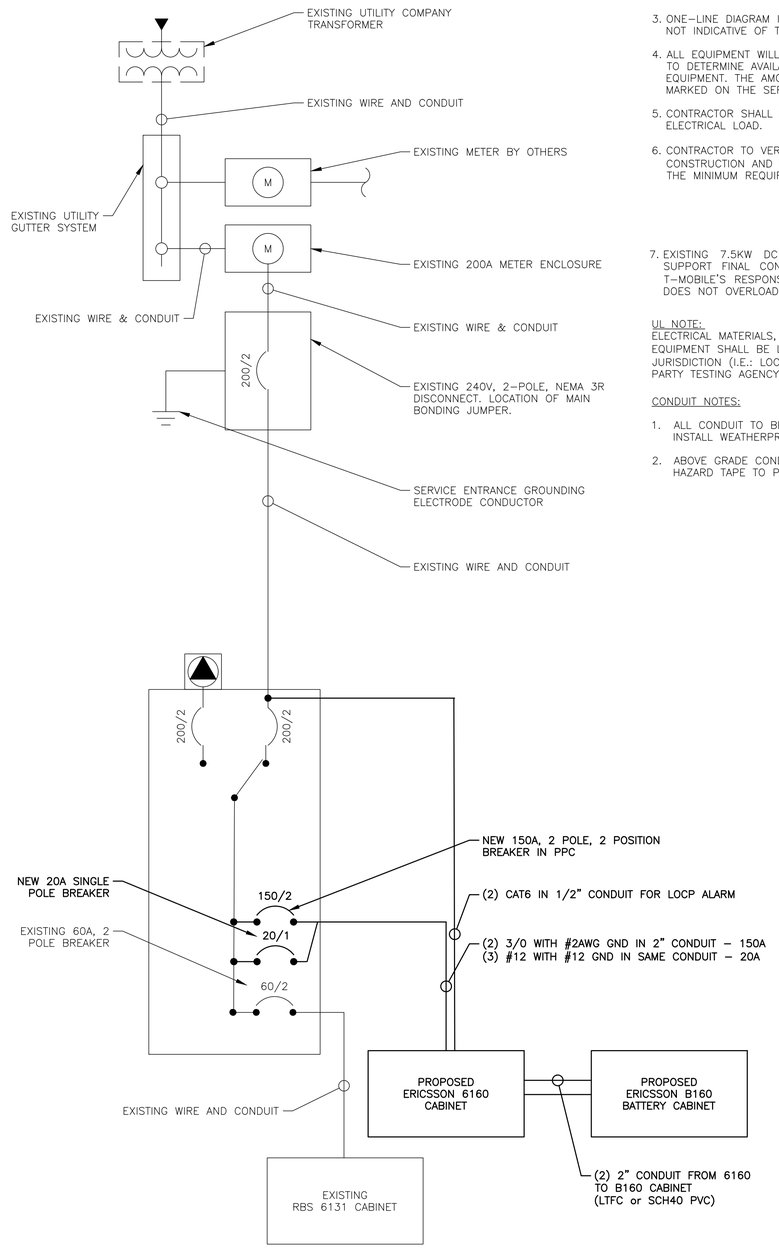
L1 VOLT AMPERES	8690	L2 VOLT AMPERES
	9050	MAX VOLT AMPERES
	75.4	MAX AMPS
	94.3	MAX AMPS x 125%

PROPOSED BREAKER & LOADING IN BOLD

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE

GENERAL NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.



2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

ONE-LINE DIAGRAM NOTES:
1. ELECTRICAL SERVICE SHALL BE 200A, 120/240V, 1ø, 3W.
2. FOR COMPLETE INTERNAL WIRING AND ARRANGEMENT, REFER TO VENDOR PRINTS PROVIDED BY EQUIPMENT MANUFACTURER.

UTILITY NOTES:
1. CONTRACTOR SHALL VERIFY AVAILABLE FAULT CURRENT WITH POWER COMPANY AND ENSURE ALL ELECTRICAL EQUIPMENT IS SUITABLE FOR AVAILABLE FAULT CURRENT.
2. CONTRACTOR SHALL COORDINATE UTILITY SERVICES WITH LOCAL UTILITY COMPANIES. VERIFY ALL REQUIREMENTS WITH UTILITY COMPANY STANDARDS.
3. ONE-LINE DIAGRAM IS FOR SCHEMATIC PURPOSES ONLY AND IS NOT INDICATIVE OF THE ACTUAL EQUIPMENT LAYOUT.
4. ALL EQUIPMENT WILL HAVE A MINIMUM AIC OF 10 KA. CONTRACTOR TO DETERMINE AVAILABLE FAULT CURRENT BEFORE ENERGIZING EQUIPMENT. THE AMOUNT OF AVAILABLE FAULT CURRENT SHALL BE MARKED ON THE SERVICE EQUIPMENT PER NEC 110.24.
5. CONTRACTOR SHALL NOTIFY UTILITY COMPANY OF CHANGES IN ELECTRICAL LOAD.
6. CONTRACTOR TO VERIFY EXISTING CONDUIT(S) SIZE(S) PRIOR TO CONSTRUCTION AND MAY REUSE EXISTING CONDUIT(S) IF THEY MEET THE MINIMUM REQUIREMENTS PER NEC CODE.
7. EXISTING 7.5KW DC GENERATOR ASSUMED TO HAVE CAPACITY TO SUPPORT FINAL CONFIGURATION OF T-MOBILE 6201 CABINET. IT IS T-MOBILE'S RESPONSIBILITY TO VERIFY THE LOAD ON THE DC PLANT DOES NOT OVERLOAD THE CAPACITY OF THE DC GENERATOR.

UL NOTE:
ELECTRICAL MATERIALS, DEVICES, CONDUCTORS, APPLIANCES AND EQUIPMENT SHALL BE LABELED/LISTED BY UL OR ACCEPTED BY JURISDICTION (I.E.: LOCAL COUNTY OR STATE) APPROVED THIRD PARTY TESTING AGENCY

CONDUIT NOTES:
1. ALL CONDUIT TO BE SCH40 PVC OR LTFC, AS NOTED. INSTALL WEATHERPROOF FITTINGS.
2. ABOVE GRADE CONDUIT RUNS TO BE MARKED WITH HAZARD TAPE TO PREVENT TRIPPING HAZARD.

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0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

SHEET NUMBER: E-1
REVISION: 0

T-MOBILE GROUNDING NOTES:

ALL GROUNDS MUST ROUTE DOWNHILL FOR ENTIRE DURATION OF ROUTE

1. PROVIDE LABOR, MATERIALS, INSPECTION, AND TESTING TO PROVIDE CODE COMPLIANCE FOR ELECTRIC, TELEPHONE, AND GROUNDING/LIGHTNING SYSTEMS.

ICE BRIDGE/ EQUIPMENT POST:

#2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED TO GROUND RING (BOTH ENDS), FINAL WELD COLD GALVANIZED, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, ANCHORED TO PAD/PLATFORM TO AVOID TRIP HAZARD USING HAMMER SET ANCHORS.

PEDESTALS, PLINTHS, SSC CABINET, FCOA CABINETS:

1. #2 SOLID COPPER TINNED, 2 HOLE LUG WITH FLAT AND LOCK WASHER AT EQUIPMENT; EXOTHERMICALLY WELDED TO GROUND RING, FINAL WELD COLD GALVANIZED, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, ANCHORED TO PAD TO AVOID TRIP HAZARD USING HAMMER SET ANCHORS. EACH PART REQUIRES A SEPARATE DOWNLEAD, NO DAISY CHAINS.

2. ALL COMPONENTS INSIDE FCOA CABINETS REQUIRE A DEDICATED GROUND.

COVP's:

#6 THHN STRANDED (GREEN JACKET), CONNECTED AT EQUIPMENT SIDE USING OVP TERMINAL BLOCK CONNECTION; MECHANICALLY CONNECTED TO GROUND REFERENCE AT MASTER BUSS BAR USING 2 HOLE LUG WITH FLAT AND LOCK WASHER, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, AND ANCHORED TO PAD/PLATFORM TO AVOID TRIP HAZARD.

ANTENNA/ COVP/ RRU MAST PIPES:

1. ALL VERTICAL MAST PIPES: #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED TO TOP OF PIPE (PIPE, DOWN MOLD), FINAL WELD COLD GALVANIZED, BONDED TO TOP BUSS BAR WITH 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER.

2. EXISTING/REUSED PIPES: #2 SOLID COPPER TINNED, BONDED WITH COLD WATER CLAMP TO TOP OF PIPE, BONDED TO TOP BUSS WITH 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER

AIR TERMINALS:

TO BE INSTALLED, ONLY IF REQUIRED

TMA's, DIPLEXERS AND TRIPLEXERS:

1. #6 THHN, WITH PROPER COPPER COMPRESSION LUG, FLATS AND LOCK WASHERS

2. ALL GROUND LUGS ON TMA MUST BE GROUNDED WITH SEPARATE DOWNLEAD TO BUSS BAR (NO DAISY CHAINS)

ELEVATED STEEL PLATFORMS WITH LUNAR FEET:

#2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (FLAT PLATE MOLD) TO OUTSIDE PERIMETER BEAMS IN FOUR (4) PLACES, FINAL WELD COLD GALVANIZED, BONDED DIRECTLY TO SUBGRADE GROUND RING.

STEEL CANOPY (STEEL PLATFORM OR CONCRETE PAD):

1. #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (PIPE, DOWN MOLD) TO BOTTOM OF ALL VERTICAL SUPPORT POSTS, TYPICALLY FOUR (4) PIPES, FINAL WELD COLD GALVANIZED, BONDED DIRECTLY TO SUBGRADE GROUND RING.

2. #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (PIPE, UP MOLD) TO TOP OF ALL VERTICAL SUPPORT POSTS, TYPICALLY FOUR (4) PIPES, FINAL WELD COLD GALVANIZED, BONDED UP TO CANOPY GRIP-STRUT USING 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER.

RRU:

#6 THHN, WITH PROPER COPPER COMPRESSION LUG, ANTI-OXIDANT TO SECTOR BUSS BAR

FSBE ALARM BOX:

#6 THHN WITH ONE HOLE LUG BONDED TO PREVIOUSLY GROUNDED FCOA, PLINTH OR BUSS BAR.

SURGE SUPPRESSORS:

#6 THHN TO PREVIOUSLY GROUNDED BUSS BAR USING PROPER LUGS

FYGA/FYGB BRACKET:

1. #6 THHN TO PREVIOUSLY GROUNDED BUSS BAR USING PROPER LUGS

2. THROUGH BOLTS WITH FLAT, LOCK ON BRACKET

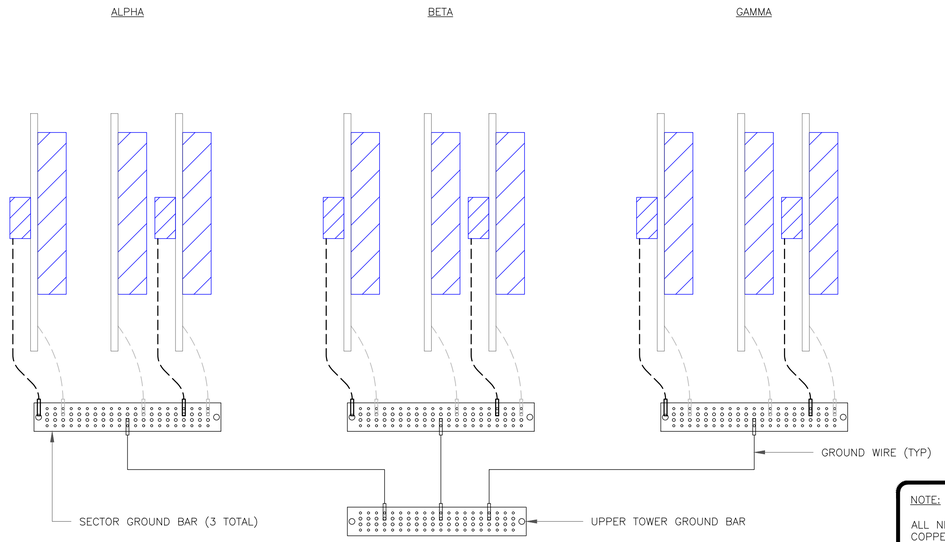
BUSS BARS:

1. PLATFORM / PAD BUSS BAR SHOULD BE MINIMUM 12" TINNED COPPER WITH INSULATORS, AND SHOULD HAVE TWO (2) EXOTHERMICALLY WELDED DOWN LEADS DIRECTLY TO GROUND RING USING #2 SOLID COPPER TINNED WIRE.

2. SECTOR BUSS BAR SHOULD BE PROPERLY SIZED TO ACCOMMODATE NECESSARY GROUNDING FOR EQUIPMENT ON EACH MOUNT, AND MAY BE SOLID COPPER (TINNED NOT REQUIRED). DO NOT USE INSULATORS ON SECTOR BUSS BARS ATTACH DIRECTLY TO TOWER MOUNT STEEL.

GENERAL:

- NO GROUND KITS ON HYBRID TRUNKS (TOP OR BOTTOM)
- NO GROUND KITS ON MICROWAVE IF CABLES (TOP OR BOTTOM)
- MICROWAVE SURGE SUPPRESSORS ARE NOT TO BE INSTALLED UPSTAIRS ON TOWER, DOWNSTAIRS ONLY (BULKHEAD PREFERRED)
- MICROWAVE ODU MUST BE GROUNDED TO TOWER TOP SECTOR OR COLLECTOR BUSS BAR
- ALL TMA'S AND DIPLEXERS MUST BE GROUNDED TO BUSS BAR. NO DAISY CHAIN ON TWIN/DUAL TMA
- ALL LUGS SHOULD BE PROPERLY SIZED FOR CONDUCTOR, BURNDY TINNED COPPER COMPRESSION STYLE
  1. INDOOR (OR INSIDE CABINET) SHOULD HAVE WINDOW
  2. OUTDOOR SHOULD NOT HAVE WINDOW
- CONTRACTOR TO VERIFY EXISTENCE AND LOCATION OF EXISTING SITE GROUND SYSTEM.
- CONTRACTOR SHALL VERIFY THAT GROUNDING ELECTRODES SHALL BE CONNECTED IN A RING USING #2 AWG BARE TINNED COPPER WIRE. THE TOP OF THE GROUND RODS AND THE RING CONDUCTOR SHALL BE 30" BELOW FINISHED GRADE, OR TO FROST DEPTH, WHICHEVER IS GREATER. GROUNDING ELECTRODES SHALL BE DRIVEN ON 10'-0" CENTERS (PROVIDE AND INSTALL AS REQUIRED. REQUIRED PER PLAN BELOW).
- GROUNDING CONDUCTORS SHALL BE OF EQUAL LENGTH, MATERIAL, AND BONDING TECHNIQUE.
- CONTRACTOR SHALL ENSURE GROUND RING IS WITHIN 12 TO 36 INCHES OF THE EQUIPMENT PAD. PROVIDE AND INSTALL GROUNDING CONNECTIONS SHOWN BELOW AS NEEDED PER EXISTING SITE GROUNDING SYSTEM. CONTRACTOR SHALL VERIFY ALL EXISTING SITE GROUNDING CONDITIONS BEFORE STARTING WORK OR PURCHASING EQUIPMENT.
- ALL DOWN CONDUCTORS MUST GO DOWN.



NOTE:

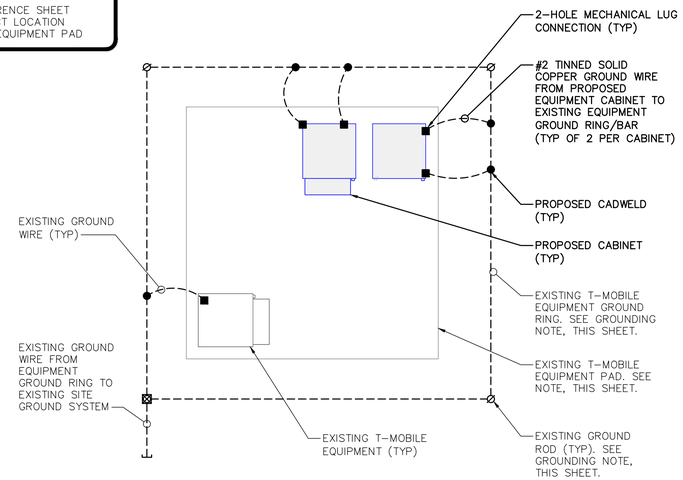
ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

GROUNDING SHOWN TYPICAL PER SECTOR.

1 TYPICAL ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

NOTE:

CONTRACTOR TO REFERENCE SHEET C-1.1 & 1.2 FOR EXACT LOCATION AND ORIENTATION OF EQUIPMENT PAD



2 TYPICAL CABINET GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

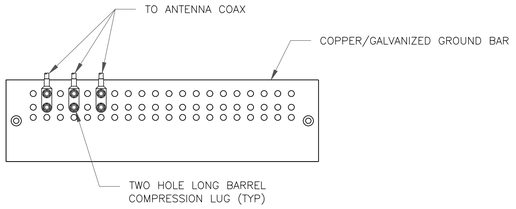
STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

SHEET NUMBER: G-1

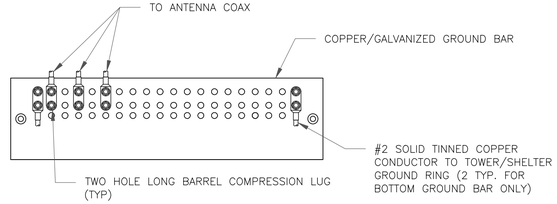
REVISION: 0



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

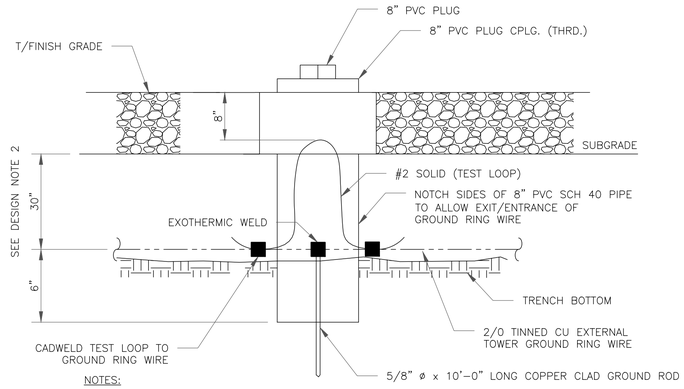
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

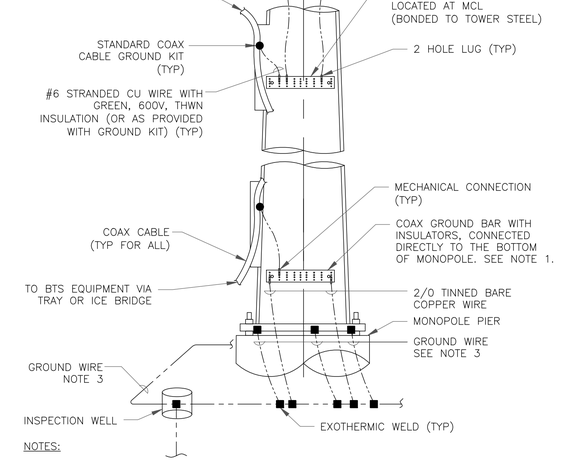
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

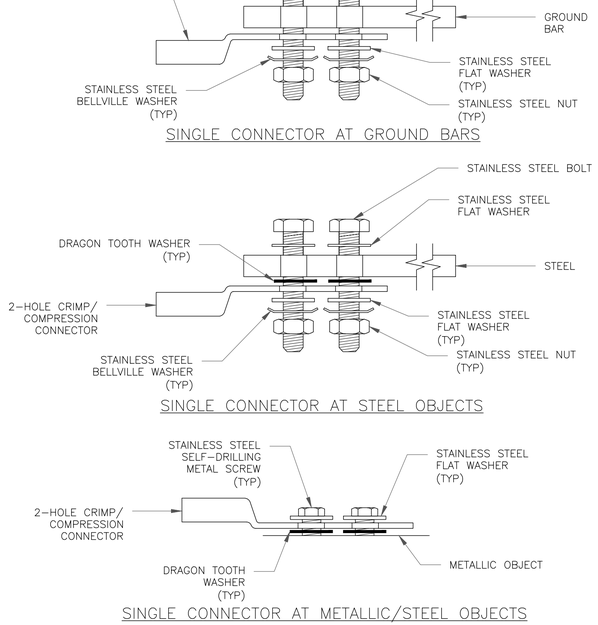
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



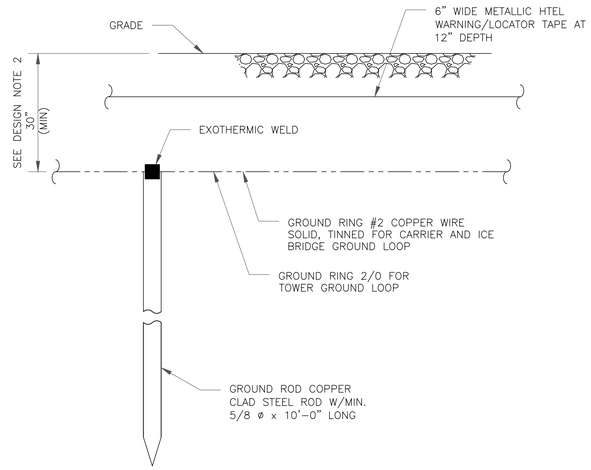
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
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TOWER ENGINEERING PROFESSIONALS
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(919) 661-6351
N.C. LICENSE #P-1403
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T-MOBILE SITE NUMBER:
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SEAL:

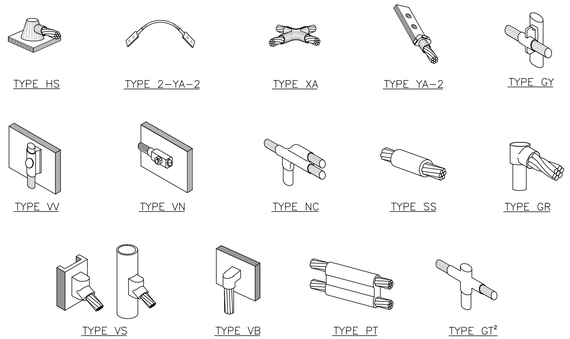
STATE OF MARYLAND
SCOTT C. BRANT
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: G-2

REVISION: 0

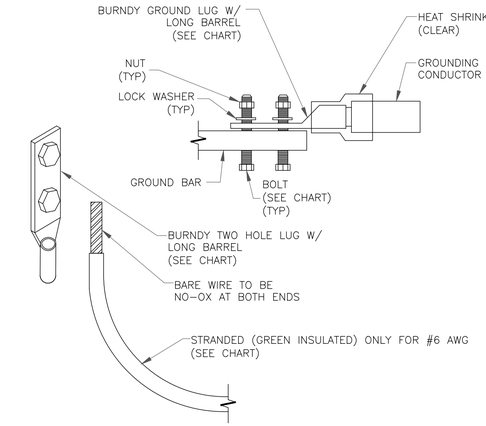


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

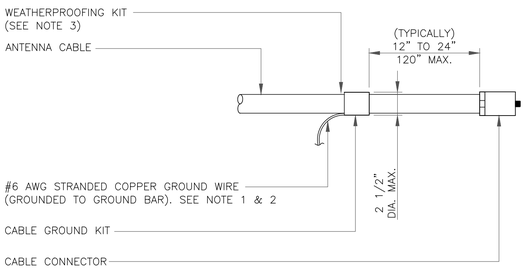
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

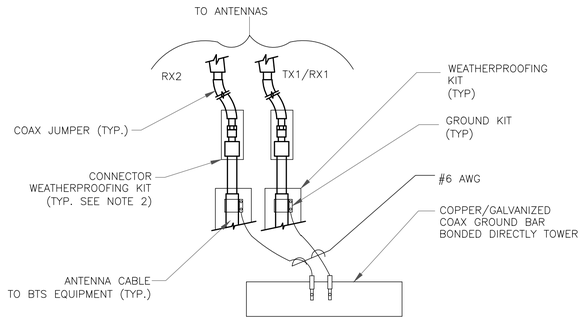
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

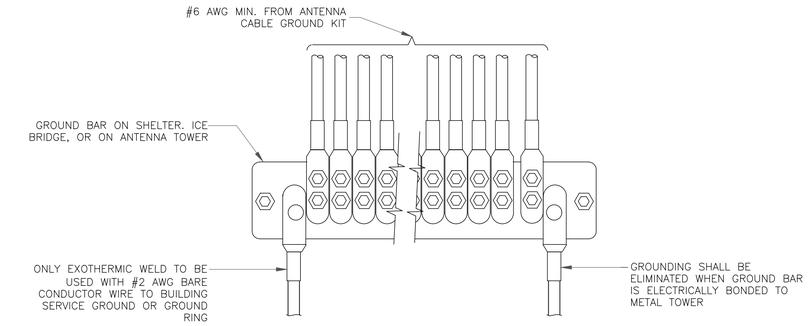
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



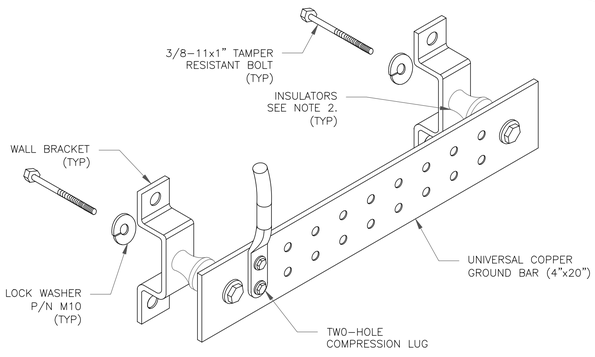
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



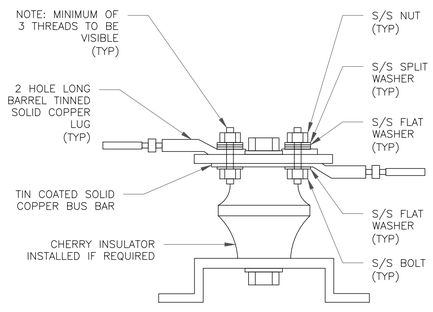
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



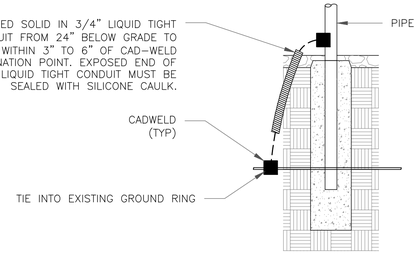
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
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N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
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SEAL:

STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: G-3

REVISION: 0

App No: 2022061827

Application General Information

Applicant Name	Crown Castle USA Inc	Received	6/9/2022
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	T-Mobile	Will site be used to support government telecommunications facilities or other equipment for government use?	No
Solution Type	Other		
Existing	Existing	Gvt. Use Desc.	

Application Description

TOWER SCOPE OF WORK: REMOVE (6) ANTENNAS, (3) TMAs, (3) RRUs 11 B12, (12) COAX CABLES and (1) 9x18 HCS 60m CABLES.
INSTALL (9) ANTENNAS, (6) RRUs and (3) 6x24 4AWG 60m CABLES.
GROUND SCOPE OF WORK: REMOVE (1) RBS 2106 CABINET, (1) DUW30 and (6) RU22. INSTALL (2) CABINETS, (2) PSU 4813 BOOSTER, (1) BB 6648, (1) IXRe ROUTER, (2) RP 6651 and CAM-LOK GENERATOR CONNECTOR.

Site Information

Site Id	55	Zoning	RE-2C
Structure Type	Monopole	Latitude	38.995137
Street Address	10010 Oaklyn Dr	Longitude	-77.203813
County Site Name	Avenel Golf Course	Ground Elevation	331
Carrier Site Name	7WAN098A	City	Potomac
Site Owner	WSSC	Lease Status	Leased
Structure Owner	Crown Castle USA, Inc	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	130		
Provide the proposed height of the replacement structure without any antenna (New Apps Only)		Distance to Residential Property (New, Colocation Only)	
		Distance to Commercial Property (New, Colocation Only)	

Justification of why this site was selected:

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

NearbySites (New Apps Only):

Thursday, June 9, 2022
4:57:26 PM

App No: 2022061827

Screening considerations(New, Colocation Apps Only):

Thursday, June 9, 2022

4:57:26 PM

App No: 2022061827

6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only): Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater? No

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet? No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet? No

Will the proposed installation require more the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets?YN No

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater? No

Does the structure or current installation have concealment elements/measures? No

Will the proposed installation require excavation or expansion outside the current boundaries of the site? No

If yes, describe how the proposed installation does not defeat the existing concealment.

Small Wireless Facility Information

Small Wireless Facility Questions

Small Wireless Facility? No

Is the structure 10% taller than adjacent structures?

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet: 17.02

Please list adjacent structure heights

Tribal Lands? No

Cumulative volume of the proposed antenna(s) exclusive of equipment in cubic feet

ROW Information

PROW? No

Pole Number

ROW owner

ROW width

Thursday, June 9, 2022

4:57:26 PM

App No: 2022061827

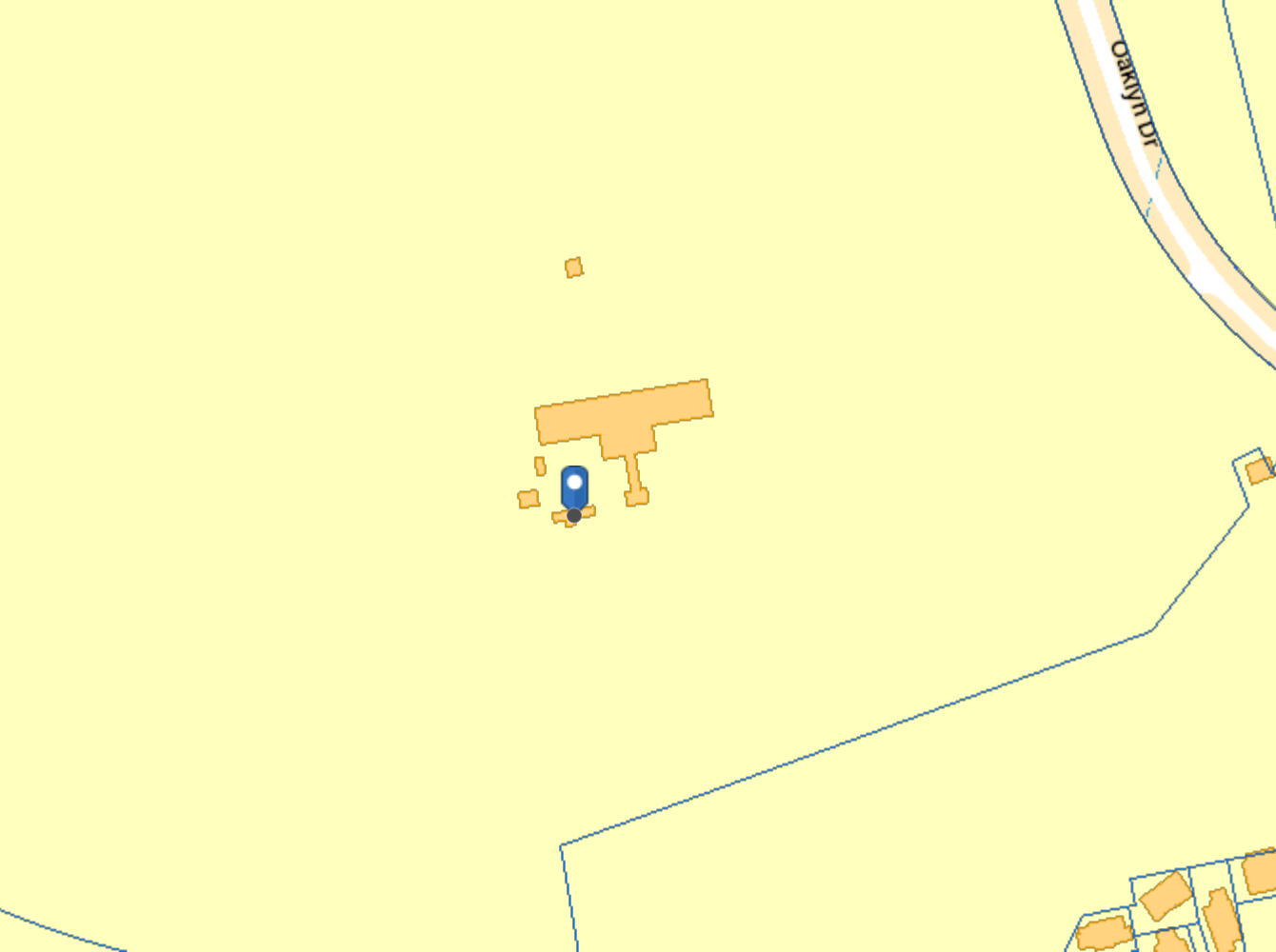
Antenna Information

Antenna Compliance	Yes
Compliance Desc	
Antenna Location	No
Antenna Loc. Desc.	
Env. Assessment	
Cat. Excluded?	
Routine Env. Evaluation	checked

Antenna Model	APXVAALL24_43-U-NA20						
Frequency	Rx:668-688, Tx:622-642 (600) Tx:728-734, Rx:698-704 (700)						
RAD Center	110	Max ERP	3390	Antenna Dimensions	95.9H, 24W, 8.5D	Quantity	3

Antenna Model	AIR6419 B41						
Frequency	Tx:2593-2690, Rx:2496-2592						
RAD Center	110	Max ERP	32886	Antenna Dimensions	36.25H, 20.91W, 9.02D	Quantity	3

Antenna Model	VV-65A-R1						
Frequency	Tx:1965-1975, Rx:1885-1895 PCS & Tx:2135-2155, Rx:1735-1755 AWS						
RAD Center	110	Max ERP	12166	Antenna Dimensions	54.7H, 12.1W, 4.6D	Quantity	3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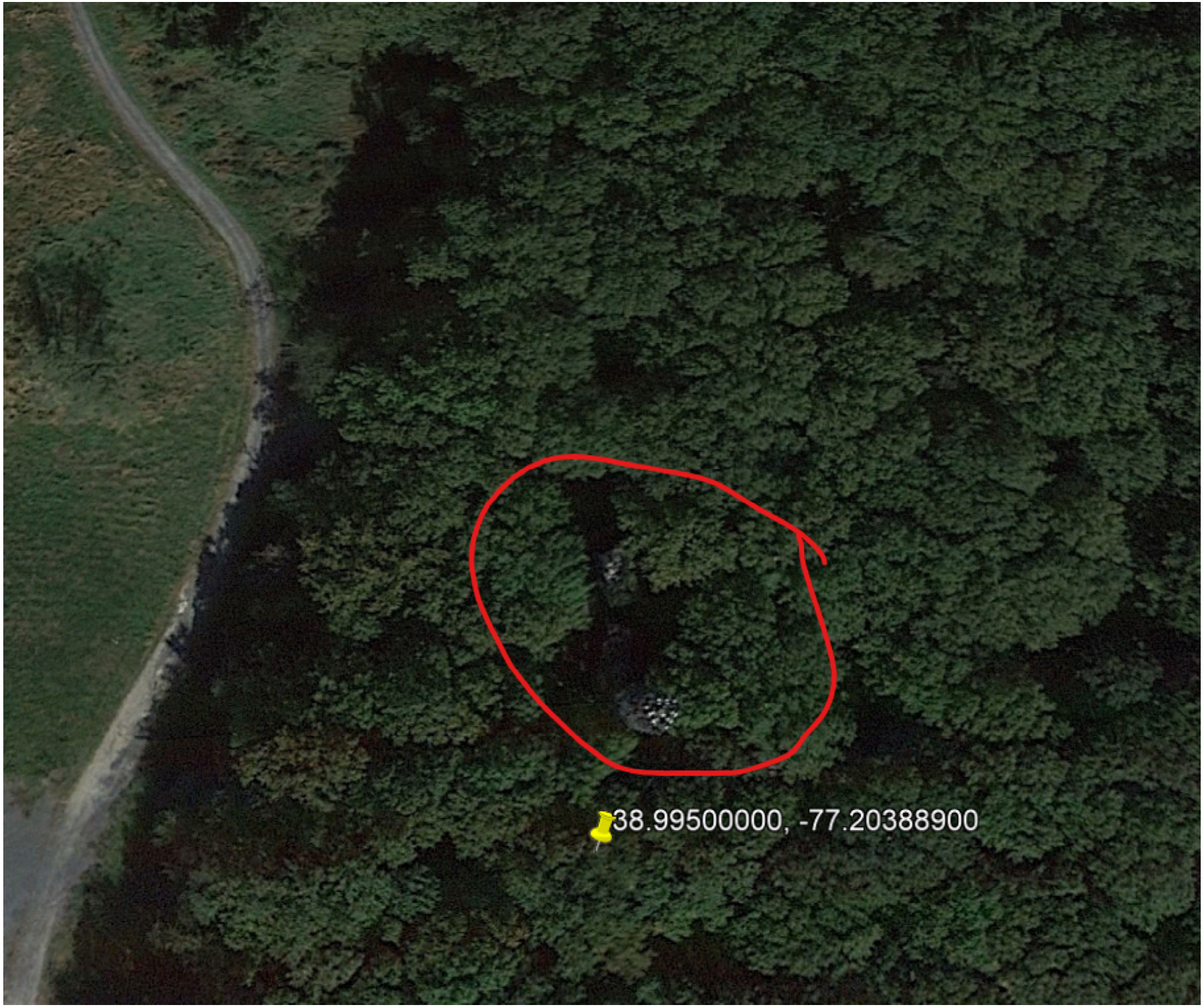
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RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

HIGH BAND LEFT ARRAY (1695-2200 MHZ) [B1]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain	dBi	17.3	17.8	18.5
Horizontal Beamwidth @3dB	Deg	66	59	59
Vertical Beamwidth @3dB	Deg	5.3	4.7	4.3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	25	25
Cross Polar Discrimination (XPD) @ Boresight	dB	19	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	4
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

HIGH BAND RIGHT ARRAY (1695-2200 MHZ) [B2]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain	dBi	17.1	17.8	18.5
Horizontal Beamwidth @3dB	Deg	66	59	59
Vertical Beamwidth @3dB	Deg	5.2	4.7	4.3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	24	25
Cross Polar Discrimination (XPD) @ Boresight	dB	20	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	5
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

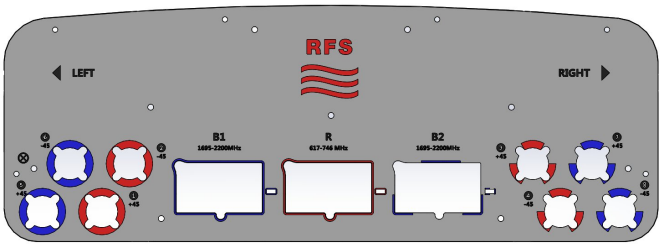
Impedance	Ohm	50.0
Polarization	Deg	±45°

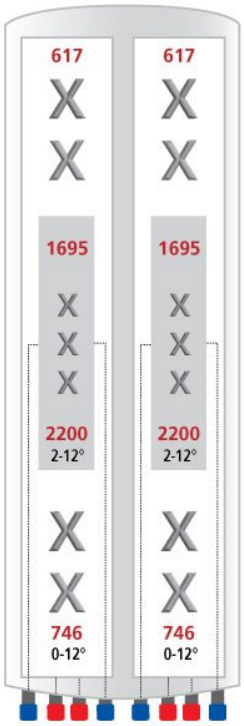
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

External Document Links

APM40_Series_Installation_Instructions
Manual_Overdrive_Instructions
Global RFS Website

Notes

All electrical parameters are compliant with BASTA NGMN 9.6 requirements.

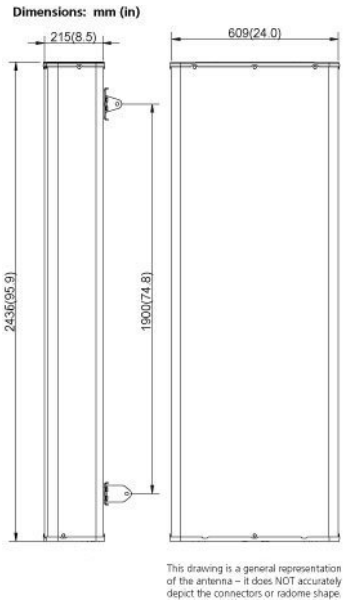
Available Configurations
APXVAARR24_43-U-NA20 -- External ACU is included -- shipping weight 80kg.

For additional mounting information please click "External Document Links".

This data is provisional and subject to changes.

External Link Reference

Global RFS Website	http://www.rfsworld.com



VV-65A-R1

4-port sector antenna, 4x 1695–2690 MHz, 65° HPBW, 1x RET,The two high band arrays utilize a common tilt.

- The RET interface comprises one pair of AISG input/output ports

General Specifications

Antenna Type	Sector
Band	Single band
Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage
Radome Material	PVC, UV resistant
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, total	4

Remote Electrical Tilt (RET) Information

RET Hardware	CommRET v2
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
Input Voltage	10–30 Vdc
Internal RET	High band (1)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	10 W
Protocol	3GPP/AISG 2.0

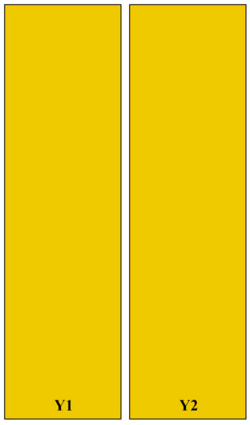
Dimensions

Width	307 mm | 12.087 in
Depth	118 mm | 4.646 in
Length	1390 mm | 54.724 in

VV-65A-R1

Net Weight, without mounting kit	10.8 kg | 23.81 lb

Array Layout



Array ID	Frequency (MHz)	RF Connector	HPBW	RET (SRET)	AISG No.	AISG RET UID
Y1	1695-2690	1 - 2	65°	1	AISG1	CPxxxxxxxxxxxxxxxY1
Y2	1695-2690	3 - 4	65°			

(Sizes of colored boxes are not true depictions of array sizes)

Port Configuration

Electrical Specifications

Impedance	50 ohm
Operating Frequency Band	1695 – 2690 MHz
Polarization	±45°
Total Input Power, maximum	400 W @ 50 °C

Electrical Specifications

Frequency Band, MHz	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2500**	**2490–2690**

Gain, dBi	17.5	17.7	18.2	18.5	18.6
Beamwidth, Horizontal, degrees	66	65	66	63	62
Beamwidth, Vertical, degrees	6.9	6.5	6.1	5.4	5.2
Beam Tilt, degrees	0–12	0–12	0–12	0–12	0–12
USLS (First Lobe), dB	17	18	18	21	21
Front-to-Back Ratio at 180°, dB	30	31	32	29	30
Isolation, Cross Polarization, dB	30	30	30	30	30
Isolation, Inter-band, dB	28	28	28	28	28
VSWR | Return loss, dB	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
Input Power per Port at 50°C, maximum, watts	300	300	300	300	250

Electrical Specifications, BASTA

Frequency Band, MHz	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2500**	**2490–2690**
Gain by all Beam Tilts, average, dBi	17.1	17.5	17.9	18.3	18.2
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.4	±0.4	±0.4	±0.5
Beamwidth, Horizontal Tolerance, degrees	±4.5	±3.5	±2.7	±2.5	±3.2
Beamwidth, Vertical Tolerance, degrees	±0.4	±0.3	±0.5	±0.2	±0.2
USLS, beampeak to 20° above beampeak, dB	16	17	17	18	16
Front-to-Back Total Power at 180° ± 30°, dB	24	26	27	26	26
CPR at Boresight, dB	16	17	17	20	19
CPR at Sector, dB	15	14	13	7	9

Mechanical Specifications

Wind Loading @ Velocity, frontal	494.0 N @ 150 km/h (111.1 lbf @ 150 km/h)
Wind Loading @ Velocity, lateral	102.0 N @ 150 km/h (22.9 lbf @ 150 km/h)
Wind Loading @ Velocity, rear	598.0 N @ 150 km/h (134.4 lbf @ 150 km/h)
Wind Speed, maximum	241 km/h | 149.75 mph

VV-65A-R1

Packaging and Weights

Width, packed	404 mm | 15.906 in
Depth, packed	278 mm | 10.945 in
Length, packed	1527 mm | 60.118 in
Weight, gross	19 kg | 41.888 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant/Exempted

Included Products

600899A-2	–	Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

AIR6419 Dimensions
w/o and w/ Protrusions (i.e. Carry Handles)

	AIR6419 B41 (Not-to-exceed dimensions)
Dimensions (H x W x D) w/o protrusions	35.2 x 20.9 x 7.0 in
Dimensions (H x W x D) w/ protrusions	36.3 x 20.9 x 9.0 in
Sail Area (no protrusions)	736 sq in
Weight	83 lbs
Note	Two handles increasing its depth by 2” and height by 1.1”

Date: **April 27, 2022**

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Site Number:	7WAN098A
	Site Name:	N/A
Crown Castle Designation:	**BU Number:**	806957
	Site Name:	Williamsburg Gardens
	JDE Job Number:	711980
	Work Order Number:	2097400
	Order Number:	611571 Rev. 0
Engineering Firm Designation:	**TEP Project Number:**	241707.688670
Site Data:	**10010 Oaklyn Drive, Potomac, Montgomery County, MD 20854** **Latitude *38° 59' 42.57"*, Longitude *-77° 12' 14.13"*** **130 Foot - Monopine Tower**	

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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: Proposed Equipment Configuration **Sufficient Capacity**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 115 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Gautam Sopal, E.I. / PHX

Respectfully submitted by:

Martin L. Piercey, P.E.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of **Maryland**
License No. **33570**
Expiration Date: **9/12/2022**

This item has been electronically signed and sealed by Martin L. Piercey, P.E. on 4/27/2022 using a Digital Signature.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Digitally signed by Martin L Piercey
Date: 2022.04.27 16:59:46 -04'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 130-ft monopine tower designed by Valmont Microflect. The tower has been modified multiple times in the past to accommodate additional loading. The anchor rod modifications designed by Paul J. Ford and Company in September of 2008 were determined to be ineffective and not considered structurally in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1.0
Ice Thickness:	1.0 in
Wind Speed with Ice:	40 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
110.0	110.0	3	RFS Celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	3	1-5/8
		3	Commscope	VV-65A-R1_TMO w/ Mount Pipe		
		3	Ericsson	AIR 6419 B41_TMO w/ Mount Pipe		
		3	Ericsson	Radio 4460 B2/B25 B66_TMO		
		3	Ericsson	Radio 4480_TMOV2		
		1	Perfect Vision	PV-RP10S-HR-12-96		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
127.0	127.0	6	JMA Wireless	X7CQAP-FRO-860-VR0 w/ Mount Pipe	8 1	1-5/8 1/2
		1	GPS	GPS_A		
		3	Amphenol	HTXCW631619M000 w/ Mount Pipe		
		3	Samsung Telecom.	MT6407-77A w/ Mount Pipe		
		3	Samsung Telecom.	RFV01U-D1A		
		6	Commscope	CDX1923Q-DS-43		
		3	Samsung Telecom.	RFV01U-D2A		
		2	RFS Celwave	DB-B1-6C-12AB-0Z		
		1	Site Pro 1	RMQP-496-HK		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
118.0	118.0	3	Kathrein	800 10121 w/ Mount Pipe	8 2 2 3	7/8 13/16 3/8 5/16
		6	Commscope	NNHH-65C-R4_CCIV2 w/ Mount Pipe		
		3	Nokia	AHFIB_CCIV2		
		3	Nokia	AHLBBA		
		2	Raycap	DC6-48-60-18-8F		
		3	Alcatel Lucent	RRH4X25-WCS		
		3	Nokia	AHCA_CCIV3		
		1	Tower Mounts	Side Arm Mount [SO 101-3]		
		1	Tower Mounts	Miscellaneous [NA 508-3]		
110.0	110.0	3	Commscope	DT465B-2XR w/ Mount Pipe	4	1-1/4
		3	RFS Celwave	APXVSPP18-C w/ Mount Pipe		
		3	Alcatel Lucent	FD-RRH-2X50-800		
		3	Alcatel Lucent	TD-RRH8X20-25		
		9	RFS Celwave	ACU-A20-N		
108.0	108.0	6	Alcatel Lucent	800 External Notch Filter	-	-
		6	Alcatel Lucent	800MHZ RRH		
		6	Alcatel Lucent	1900MHZ RRH (65MHZ)		
98.0	98.0	3	JMA Wireless	MX08FRO665-21 w/ Mount Pipe	1	1-1/2
		3	Fujitsu	TA08025-B605		
		3	Fujitsu	TA08025-B604		
		1	Raycap	RDIDC-9181-PF-48		
		1	Tower Mounts	Commscope MC-K6MHDX-9-96 (3)		
90.0	90.0	6	Ericsson	KRY 112 71/2	-	-
		1	Tower Mounts	Side Arm Mount [SO 101-3]		
		1	Tower Mounts	Miscellaneous [NA 508-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	261743	CCISites
Tower Foundation Drawings	261734	CCISites
Tower Manufacturer Drawings	261735	CCISites
Tower Reinforcement Drawings	2207035	CCISites
Post-Modification Inspection	2331554	CCISites
Tower Reinforcement Drawings	2942459	CCISites
Post-Modification Inspection	3155122	CCISites

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

1) The tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)[1,2]

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP24.687x23.588x0.25	Pole	3.6%	Pass
125 - 120	Pole	TP25.787x24.687x0.25	Pole	10.0%	Pass
120 - 115	Pole	TP26.886x25.787x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP27.985x26.886x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP29.084x27.985x0.25	Pole	41.0%	Pass
105 - 100	Pole	TP30.184x29.084x0.25	Pole	53.7%	Pass
100 - 99.27	Pole	TP30.344x30.184x0.25	Pole	55.6%	Pass
99.27 - 99.02	Pole + Reinf.	TP30.399x30.344x0.475	Reinf. 9 Compression	43.2%	Pass
99.02 - 97.04	Pole + Reinf.	TP30.834x30.399x0.4625	Reinf. 9 Compression	47.3%	Pass
97.04 - 96.79	Pole + Reinf.	TP30.889x30.834x0.675	Reinf. 9 Compression	33.5%	Pass
96.79 - 96.33	Pole + Reinf.	TP30.99x30.889x0.675	Reinf. 9 Compression	34.1%	Pass
96.33 - 96.08	Pole + Reinf.	TP31.045x30.99x0.45	Reinf. 8 Tension Rupture	47.1%	Pass
96.08 - 94.29	Pole + Reinf.	TP31.439x31.045x0.45	Reinf. 8 Tension Rupture	50.5%	Pass
94.29 - 94.04	Pole + Reinf.	TP31.494x31.439x0.45	Reinf. 7 Tension Rupture	51.0%	Pass
94.04 - 91.5	Pole + Reinf.	TP32.052x31.494x0.45	Reinf. 7 Tension Rupture	55.7%	Pass
91.5 - 91.25	Pole + Reinf.	TP32.107x32.052x0.45	Reinf. 6 Tension Rupture	56.2%	Pass
91.25 - 86.25	Pole + Reinf.	TP33.207x32.107x0.4375	Reinf. 6 Tension Rupture	65.7%	Pass
86.25 - 86.08	Pole + Reinf.	TP33.244x33.207x0.4375	Reinf. 6 Tension Rupture	66.0%	Pass
86.08 - 85.83	Pole + Reinf.	TP33.299x33.244x0.4313	Reinf. 2 Tension Rupture	62.8%	Pass
85.83 - 81	Pole + Reinf.	TP35.515x33.299x0.425	Reinf. 2 Tension Rupture	71.2%	Pass
81 - 74.75	Pole + Reinf.	TP35.237x33.861x0.5188	Reinf. 2 Tension Rupture	68.3%	Pass
74.75 - 71	Pole + Reinf.	TP36.063x35.237x0.5063	Reinf. 2 Tension Rupture	72.9%	Pass
71 - 70.75	Pole + Reinf.	TP36.118x36.063x0.6938	Reinf. 5 Tension Rupture	59.1%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
70.75 - 65.75	Pole + Reinf.	TP37.219x36.118x0.6813	Reinf. 5 Tension Rupture	63.9%	Pass
65.75 - 60.75	Pole + Reinf.	TP38.32x37.219x0.6688	Reinf. 5 Tension Rupture	68.4%	Pass
60.75 - 60	Pole + Reinf.	TP38.485x38.32x0.6688	Reinf. 5 Tension Rupture	69.0%	Pass
60 - 59.75	Pole + Reinf.	TP38.54x38.485x0.6313	Reinf. 1 Tension Rupture	65.8%	Pass
59.75 - 54.75	Pole + Reinf.	TP39.641x38.54x0.6313	Reinf. 1 Tension Rupture	69.6%	Pass
54.75 - 50	Pole + Reinf.	TP42.008x39.641x0.6188	Reinf. 1 Tension Rupture	72.9%	Pass
50 - 43	Pole + Reinf.	TP41.539x39.999x0.8313	Reinf. 4 Tension Rupture	65.2%	Pass
43 - 42.85	Pole + Reinf.	TP41.572x41.539x0.8313	Reinf. 4 Tension Rupture	65.3%	Pass
42.85 - 37.85	Pole + Reinf.	TP42.672x41.572x0.8188	Reinf. 4 Tension Rupture	67.8%	Pass
37.85 - 32.85	Pole + Reinf.	TP43.773x42.672x0.8063	Reinf. 4 Tension Rupture	70.2%	Pass
32.85 - 27.85	Pole + Reinf.	TP44.873x43.773x0.7938	Reinf. 4 Tension Rupture	72.5%	Pass
27.85 - 26.25	Pole + Reinf.	TP45.225x44.873x0.7938	Reinf. 4 Tension Rupture	73.1%	Pass
26.25 - 26	Pole + Reinf.	TP45.28x45.225x0.9063	Reinf. 3 Bolt Shear	62.7%	Pass
26 - 21	Pole + Reinf.	TP46.38x45.28x0.8813	Reinf. 3 Compression	62.3%	Pass
21 - 16	Pole + Reinf.	TP47.48x46.38x0.8813	Reinf. 3 Compression	64.0%	Pass
16 - 11	Pole + Reinf.	TP48.58x47.48x0.8563	Reinf. 3 Compression	65.5%	Pass
11 - 6	Pole + Reinf.	TP49.68x48.58x0.8563	Reinf. 3 Compression	67.0%	Pass
6 - 1	Pole + Reinf.	TP50.78x49.68x0.8313	Reinf. 3 Compression	68.3%	Pass
1 - 0	Pole + Reinf.	TP51x50.78x0.8313	Reinf. 3 Compression	68.6%	Pass
				Summary	
			Pole	59.6%	Pass
			Reinforcement	73.1%	Pass
			Overall	**73.1%**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	86.9	Pass
1,2	Base Plate	-	54.4	Pass
1,2	Base Foundation Structural	-	87.2	Pass
1,2	Base Foundation Soil Interaction	-	68.0	Pass

Structure Rating (max from all components) =	**87.2%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5.

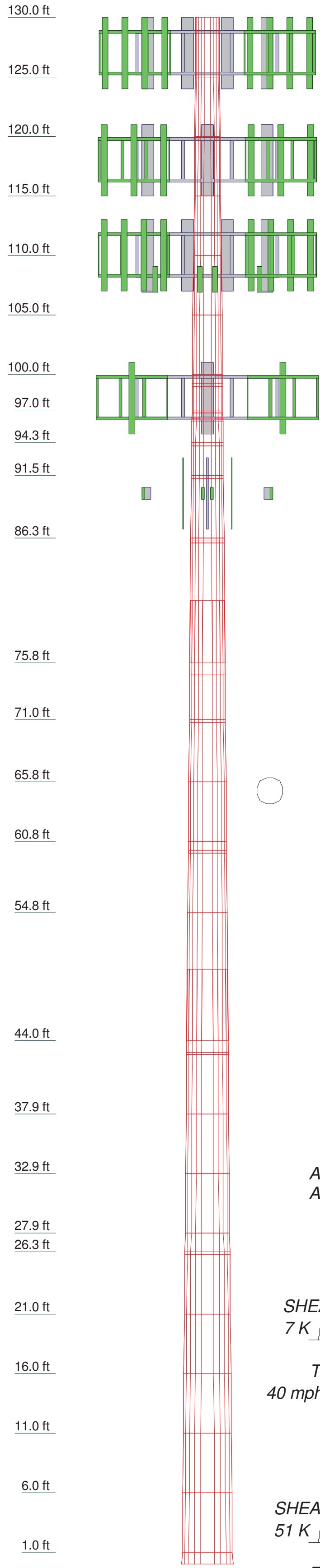
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	12	0.250		23.588	24.687	A572-65	0.3
2	5.00	12	0.250		24.687	25.787		0.3
3	5.00	12	0.250		25.787	26.886		0.4
4	5.00	12	0.250		26.886	27.985		0.4
5	5.00	12	0.250		27.985	29.084		0.4
6	5.00	12	0.250		29.084	30.184		0.4
7–16	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
17	5.00	12	0.438		32.103	33.203		0.7
18–19	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
20	10.08 (6.25)	12	0.425	5.25	33.299	35.515		1.5
21	[illegible]	12	0.519		[illegible]	[illegible]		1.2
22	3.75	12	[illegible]		[illegible]	[illegible]		0.7
23	[illegible]	12	[illegible]		[illegible]	[illegible]		0.1
24	5.00	12	0.681		36.119	37.219		1.3
25	5.00	12	0.669		37.219	38.320		1.3
26–27	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
28	5.00	12	0.631		[illegible]	39.643		1.2
29	10.75 (7.00)	12	0.619	6.00	39.641	42.008		2.8
30–31	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
32	5.00	12	0.819		41.572	42.672		1.8
33	5.00	12	0.806		42.672	43.773		1.8
34	5.00	12	0.794		43.773	44.873		1.8
35–36	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
37	5.00	12	0.881		45.280	46.380		2.1
38	5.00	12	0.881		46.380	47.480		2.1
39	5.00	12	0.856		47.480	48.580		2.1
40	5.00	12	0.856		48.580	49.680		2.1
41	5.00	12	0.831		49.680	50.780		2.2
42	1.00	12	0.831		50.780	51.000		0.4
								34.1



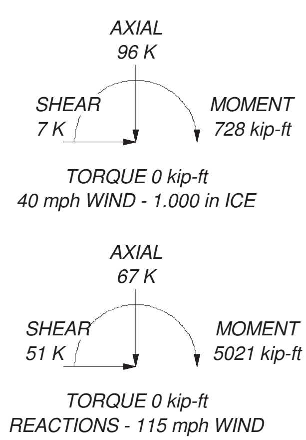
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Montgomery County, Maryland.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Equivalent Thickness Model
9. TOWER RATING: 73.1%

ALL REACTIONS ARE FACTORED



Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: **Williamsburg Gardens (BU 806957)**		
Project: **TEP No. 241707.688670**		
Client: Crown Castle	Drawn by: DAR	App'd:
Code: TIA-222-H	Date: 04/27/22	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Montgomery County, Maryland.
Tower base elevation above sea level: 330.00 ft.
Basic wind speed of 115 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Equivalent Thickness Model.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	130.00-125.00	5.00	0.000	12	23.588	24.687	0.250	1.000	A572-65 (65 ksi)
L2	125.00-120.00	5.00	0.000	12	24.687	25.787	0.250	1.000	A572-65 (65 ksi)
L3	120.00-115.00	5.00	0.000	12	25.787	26.886	0.250	1.000	A572-65 (65 ksi)
L4	115.00-110.00	5.00	0.000	12	26.886	27.985	0.250	1.000	A572-65 (65 ksi)
L5	110.00-105.00	5.00	0.000	12	27.985	29.084	0.250	1.000	A572-65 (65 ksi)
L6	105.00-100.00	5.00	0.000	12	29.084	30.184	0.250	1.000	A572-65 (65 ksi)
L7	100.00-99.27	0.73	0.000	12	30.184	30.344	0.250	1.000	A572-65 (65 ksi)
L8	99.27-99.02	0.25	0.000	12	30.344	30.399	0.475	1.900	A572-65 (65 ksi)
L9	99.02-97.04	1.98	0.000	12	30.399	30.834	0.463	1.850	A572-65 (65 ksi)
L10	97.04-96.79	0.25	0.000	12	30.834	30.889	0.675	2.700	A572-65 (65 ksi)
L11	96.79-96.33	0.46	0.000	12	30.889	30.990	0.675	2.700	A572-65 (65 ksi)
L12	96.33-96.08	0.25	0.000	12	30.990	31.045	0.450	1.800	A572-65 (65 ksi)
L13	96.08-94.29	1.79	0.000	12	31.045	31.439	0.450	1.800	A572-65 (65 ksi)
L14	94.29-94.04	0.25	0.000	12	31.439	31.494	0.450	1.800	A572-65 (65 ksi)
L15	94.04-91.50	2.54	0.000	12	31.494	32.052	0.450	1.800	A572-65 (65 ksi)
L16	91.50-91.25	0.25	0.000	12	32.052	32.107	0.450	1.800	A572-65 (65 ksi)
L17	91.25-86.25	5.00	0.000	12	32.107	33.207	0.438	1.750	A572-65 (65 ksi)
L18	86.25-86.08	0.17	0.000	12	33.207	33.244	0.438	1.750	A572-65 (65 ksi)
L19	86.08-85.83	0.25	0.000	12	33.244	33.299	0.431	1.725	A572-65 (65 ksi)
L20	85.83-75.75	10.08	5.250	12	33.299	35.515	0.425	1.700	A572-65 (65 ksi)
L21	75.75-74.75	6.25	0.000	12	33.861	35.237	0.519	2.075	A572-65 (65 ksi)
L22	74.75-71.00	3.75	0.000	12	35.237	36.063	0.506	2.025	A572-65 (65 ksi)
L23	71.00-70.75	0.25	0.000	12	36.063	36.118	0.694	2.775	A572-65 (65 ksi)
L24	70.75-65.75	5.00	0.000	12	36.118	37.219	0.681	2.725	A572-65 (65 ksi)
L25	65.75-60.75	5.00	0.000	12	37.219	38.320	0.669	2.675	A572-65 (65 ksi)
L26	60.75-60.00	0.75	0.000	12	38.320	38.485	0.669	2.675	A572-65 (65 ksi)
L27	60.00-59.75	0.25	0.000	12	38.485	38.540	0.631	2.525	A572-65 (65 ksi)
L28	59.75-54.75	5.00	0.000	12	38.540	39.641	0.631	2.525	A572-65 (65 ksi)
L29	54.75-44.00	10.75	6.000	12	39.641	42.008	0.619	2.475	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L30	44.00-43.00	7.00	0.000	12	39.999	41.539	0.831	3.325	A572-65 (65 ksi)
L31	43.00-42.85	0.15	0.000	12	41.539	41.572	0.831	3.325	A572-65 (65 ksi)
L32	42.85-37.85	5.00	0.000	12	41.572	42.672	0.819	3.275	A572-65 (65 ksi)
L33	37.85-32.85	5.00	0.000	12	42.672	43.773	0.806	3.225	A572-65 (65 ksi)
L34	32.85-27.85	5.00	0.000	12	43.773	44.873	0.794	3.175	A572-65 (65 ksi)
L35	27.85-26.25	1.60	0.000	12	44.873	45.225	0.794	3.175	A572-65 (65 ksi)
L36	26.25-26.00	0.25	0.000	12	45.225	45.280	0.906	3.625	A572-65 (65 ksi)
L37	26.00-21.00	5.00	0.000	12	45.280	46.380	0.881	3.525	A572-65 (65 ksi)
L38	21.00-16.00	5.00	0.000	12	46.380	47.480	0.881	3.525	A572-65 (65 ksi)
L39	16.00-11.00	5.00	0.000	12	47.480	48.580	0.856	3.425	A572-65 (65 ksi)
L40	11.00-6.00	5.00	0.000	12	48.580	49.680	0.856	3.425	A572-65 (65 ksi)
L41	6.00-1.00	5.00	0.000	12	49.680	50.780	0.831	3.325	A572-65 (65 ksi)
L42	1.00-0.00	1.00		12	50.780	51.000	0.831	3.325	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.332	18.787	1306.089	8.355	12.219	106.894	2646.490	9.246	5.652	22.606
	25.470	19.672	1499.476	8.749	12.788	117.256	3038.345	9.682	5.946	23.785
L2	25.470	19.672	1499.476	8.749	12.788	117.256	3038.345	9.682	5.946	23.785
	26.608	20.557	1711.068	9.142	13.357	128.099	3467.087	10.117	6.241	24.963
L3	26.608	20.557	1711.068	9.142	13.357	128.099	3467.087	10.117	6.241	24.963
	27.746	21.442	1941.684	9.536	13.927	139.420	3934.378	10.553	6.535	26.142
L4	27.746	21.442	1941.684	9.536	13.927	139.420	3934.378	10.553	6.535	26.142
	28.884	22.327	2192.142	9.929	14.496	151.221	4441.874	10.989	6.830	27.32
L5	28.884	22.327	2192.142	9.929	14.496	151.221	4441.874	10.989	6.830	27.32
	30.022	23.212	2463.262	10.323	15.066	163.502	4991.237	11.424	7.125	28.498
L6	30.022	23.212	2463.262	10.323	15.066	163.502	4991.237	11.424	7.125	28.498
	31.160	24.097	2755.863	10.716	15.635	176.261	5584.126	11.860	7.419	29.677
L7	31.160	24.097	2755.863	10.716	15.635	176.261	5584.126	11.860	7.419	29.677
	31.326	24.226	2800.429	10.774	15.718	178.164	5674.428	11.923	7.462	29.849
L8	31.247	45.685	5202.361	10.693	15.718	330.976	10541.393	22.485	6.859	14.44
	31.304	45.769	5231.133	10.713	15.747	332.205	10599.693	22.526	6.874	14.471
L9	31.308	44.583	5099.857	10.717	15.747	323.868	10333.693	21.942	6.907	14.935
	31.759	45.231	5325.579	10.873	15.972	333.428	10791.067	22.261	7.024	15.187
L10	31.684	65.551	7610.463	10.797	15.972	476.482	15420.861	32.262	6.455	9.562
	31.741	65.671	7652.147	10.817	16.001	478.240	15505.325	32.321	6.469	9.584
L11	31.741	65.671	7652.147	10.817	16.001	478.240	15505.325	32.321	6.469	9.584
	31.846	65.891	7729.244	10.853	16.053	481.481	15661.543	32.429	6.496	9.624
L12	31.925	44.253	5268.415	10.933	16.053	328.188	10675.237	21.780	7.099	15.777
	31.982	44.333	5296.911	10.953	16.082	329.379	10732.977	21.819	7.114	15.809
L13	31.982	44.333	5296.911	10.953	16.082	329.379	10732.977	21.819	7.114	15.809

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	32.389	44.903	5503.947	11.094	16.285	337.969	11152.489	22.100	7.220	16.044
L14	32.389	44.903	5503.947	11.094	16.285	337.969	11152.489	22.100	7.220	16.044
	32.446	44.983	5533.285	11.114	16.314	339.177	11211.936	22.139	7.234	16.076
L15	32.446	44.983	5533.285	11.114	16.314	339.177	11211.936	22.139	7.234	16.076
	33.024	45.792	5837.291	11.314	16.603	351.578	11827.934	22.537	7.384	16.409
L16	33.024	45.792	5837.291	11.314	16.603	351.578	11827.934	22.537	7.384	16.409
	33.081	45.871	5867.801	11.333	16.632	352.811	11889.755	22.577	7.399	16.442
L17	33.086	44.615	5711.567	11.338	16.632	343.417	11573.183	21.958	7.432	16.988
	34.224	46.163	6327.197	11.731	17.201	367.839	12820.617	22.720	7.727	17.661
L18	34.224	46.163	6327.197	11.731	17.201	367.839	12820.617	22.720	7.727	17.661
	34.262	46.216	6348.871	11.745	17.220	368.684	12864.535	22.746	7.737	17.684
L19	34.265	45.564	6261.751	11.747	17.220	363.625	12688.005	22.425	7.754	17.979
	34.321	45.641	6293.270	11.767	17.249	364.852	12751.871	22.463	7.768	18.014
L20	34.324	44.988	6205.602	11.769	17.249	359.770	12574.232	22.142	7.785	18.318
	36.618	48.021	7547.113	12.562	18.397	410.241	15292.497	23.634	8.379	19.715
L21	36.069	55.694	7902.706	11.936	17.540	450.556	16013.025	27.411	7.684	14.813
	36.297	57.992	8922.226	12.429	18.253	488.815	18078.849	28.542	8.053	15.524
L22	36.301	56.615	8716.641	12.434	18.253	477.552	17662.277	27.864	8.087	15.974
	37.156	57.962	9353.261	12.729	18.680	500.697	18952.242	28.527	8.308	16.411
L23	37.090	79.010	12615.728	12.662	18.680	675.342	25562.885	38.886	7.806	11.251
	37.147	79.133	12674.726	12.682	18.709	677.466	25682.431	38.947	7.820	11.273
L24	37.152	77.734	12459.533	12.686	18.709	665.964	25246.391	38.259	7.854	11.529
	38.291	80.150	13657.302	13.080	19.279	708.391	27673.396	39.447	8.149	11.962
L25	38.296	78.706	13420.474	13.085	19.279	696.107	27193.518	38.737	8.182	12.235
	39.436	81.077	14670.146	13.479	19.850	739.064	29725.693	39.903	8.477	12.677
L26	39.436	81.077	14670.146	13.479	19.850	739.064	29725.693	39.903	8.477	12.677
	39.607	81.432	14864.034	13.538	19.935	745.619	30118.564	40.079	8.522	12.743
L27	39.620	76.942	14072.318	13.552	19.935	705.904	28514.332	37.869	8.622	13.659
	39.677	77.054	14133.802	13.571	19.964	707.976	28638.914	37.924	8.637	13.682
L28	39.677	77.054	14133.802	13.571	19.964	707.976	28638.914	37.924	8.637	13.682
	40.817	79.292	15401.371	13.965	20.534	750.043	31207.354	39.025	8.932	14.15
L29	40.821	77.747	15110.911	13.970	20.534	735.898	30618.802	38.265	8.966	14.49
	43.272	82.463	18030.995	14.817	21.760	828.625	36535.685	40.586	9.600	15.515
L30	42.484	104.838	20529.117	14.022	20.720	990.804	41597.557	51.598	8.492	10.216
	42.712	108.961	23047.206	14.574	21.517	1071.095	46699.889	53.627	8.905	10.713
L31	42.712	108.961	23047.206	14.574	21.517	1071.095	46699.889	53.627	8.905	10.713
	42.746	109.049	23103.305	14.585	21.535	1072.850	46813.559	53.671	8.914	10.723
L32	42.750	107.442	22776.839	14.590	21.535	1057.690	46152.050	52.880	8.947	10.928
	43.889	110.342	24671.525	14.984	22.104	1116.139	49991.199	54.307	9.242	11.288
L33	43.893	108.690	24316.635	14.988	22.104	1100.084	49272.095	53.494	9.275	11.504
	45.032	111.546	26284.256	15.382	22.674	1159.215	53259.028	54.900	9.570	11.87
L34	45.037	109.848	25899.339	15.386	22.674	1142.239	52479.082	54.064	9.604	12.099
	46.176	112.660	27939.401	15.780	23.244	1202.004	56612.801	55.448	9.899	12.471
L35	46.176	112.660	27939.401	15.780	23.244	1202.004	56612.801	55.448	9.899	12.471
	46.540	113.560	28614.148	15.906	23.426	1221.450	57980.021	55.891	9.993	12.59
L36	46.500	129.327	32422.163	15.866	23.426	1384.003	65696.092	63.651	9.691	10.694
	46.557	129.487	32543.030	15.886	23.455	1387.475	65941.001	63.730	9.706	10.71
L37	46.566	125.986	31698.808	15.895	23.455	1351.481	64230.379	62.006	9.773	11.09
	47.705	129.108	34113.892	16.288	24.025	1419.951	69123.994	63.543	10.068	11.425
L38	47.705	129.108	34113.892	16.288	24.025	1419.951	69123.994	63.543	10.068	11.425
	48.844	132.229	36648.630	16.682	24.595	1490.113	74260.060	65.079	10.363	11.759
L39	48.853	128.547	35666.296	16.691	24.595	1450.172	72269.584	63.267	10.430	12.181
	49.992	131.580	38250.935	17.085	25.164	1520.044	77506.765	64.760	10.725	12.525
L40	49.992	131.580	38250.935	17.085	25.164	1520.044	77506.765	64.760	10.725	12.525
	51.130	134.613	40957.520	17.479	25.734	1591.560	82991.040	66.252	11.019	12.869
L41	51.139	130.750	39822.791	17.488	25.734	1547.466	80691.771	64.351	11.086	13.337
	52.278	133.694	42574.250	17.882	26.304	1618.545	86266.972	65.800	11.381	13.692
L42	52.278	133.694	42574.250	17.882	26.304	1618.545	86266.972	65.800	11.381	13.692
	52.506	134.283	43139.323	17.960	26.418	1632.952	87411.963	66.090	11.440	13.763

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.00-125.00				1	1	1			
L2 125.00-120.00				1	1	1			
L3 120.00-115.00				1	1	1			
L4 115.00-110.00				1	1	1			
L5 110.00-105.00				1	1	1			
L6 105.00-100.00				1	1	1			
L7 100.00-99.27				1	1	1			
L8 99.27-99.02				1	1	0.940528			
L9 99.02-97.04				1	1	0.959453			
L10 97.04-96.79				1	1	0.935992			
L11 96.79-96.33				1	1	0.934105			
L12 96.33-96.08				1	1	0.96579			
L13 96.08-94.29				1	1	0.96058			
L14 94.29-94.04				1	1	0.959863			
L15 94.04-91.50				1	1	0.952719			
L16 91.50-91.25				1	1	0.952029			
L17 91.25-86.25				1	1	0.965177			
L18 86.25-86.08				1	1	0.964728			
L19 86.08-85.83				1	1	0.954817			
L20 85.83-75.75				1	1	0.95677			
L21 75.75-74.75				1	1	0.958689			
L22 74.75-71.00				1	1	0.97497			
L23 71.00-70.75				1	1	0.942687			
L24 70.75-65.75				1	1	0.945933			
L25 65.75-60.75				1	1	0.950147			
L26 60.75-60.00				1	1	0.948242			
L27 60.00-59.75				1	1	0.951056			
L28 59.75-54.75				1	1	0.939583			
L29 54.75-44.00				1	1	0.947746			
L30 44.00-43.00				1	1	0.943805			
L31				1	1	0.943437			

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
43.00-42.85									
L32				1	1	0.94542			
42.85-37.85									
L33				1	1	0.948119			
37.85-32.85									
L34				1	1	0.951515			
32.85-27.85									
L35				1	1	0.948031			
27.85-26.25									
L36				1	1	0.939283			
26.25-26.00									
L37				1	1	0.95319			
26.00-21.00									
L38				1	1	0.941571			
21.00-16.00									
L39				1	1	0.957153			
16.00-11.00									
L40 11.00-6.00				1	1	0.946277			
L41 6.00-1.00				1	1	0.963545			
L42 1.00-0.00				1	1	0.961463			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
HB158-1-08U8-S8J18(1-5/8)	B	No	Surface Ar (CaAa)	127.00 - 0.00	2	2	0.500 0.500	1.980		1.300
Mods										
MP3-08 (1.1875in)W	A	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
MP3-08 (1.1875in)W	C	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
MP3-08 (1.1875in)W	B	No	Surface Af (CaAa)	60.50 - 0.00	1	1	0.500 0.500	7.930	21.460	0.000
***										
MP3-05 (1.1875in)	A	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
MP3-05 (1.1875in)	C	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
MP3-05 (1.1875in)	B	No	Surface Af (CaAa)	88.58 - 60.58	1	1	0.500 0.500	5.330	14.840	0.000
***										
MS-850 (1.1875")W	A	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
MS-850 (1.1875")W	C	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
MS-850 (1.1875")W	B	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.500	19.500	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
MS-600 (1.1875")	B	No	Surface Af (CaAa)	45.10 - 30.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	73.00 - 58.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	93.50 - 85.00	1	1	0.000 0.000	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	95.67 - 91.42	1	1	0.250 0.250	6.000	14.000	0.000
***										
MS-600 (1.1875")	A	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
MS-600 (1.1875")	C	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
MS-600 (1.1875")	B	No	Surface Af (CaAa)	99.04 - 92.29	1	1	-0.250 -0.250	6.000	14.000	0.000
***										
Sabre PL 5"x1.25"	A	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
Sabre PL 5"x1.25"	C	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
Sabre PL 5"x1.25"	B	No	Surface Af (CaAa)	101.27 - 94.33	1	1	0.000 0.000	5.000	12.500	0.000
***										
**********										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
127									
AVA7-50(1-5/8)	B	No	No	Inside Pole	127.00 - 0.00	6	No Ice	0.00	0.700
							1/2" Ice	0.00	0.700
							1" Ice	0.00	0.700
LDF4-50A(1/2)	B	No	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	0.150
							1/2" Ice	0.00	0.150
							1" Ice	0.00	0.150
118									
LDF5-50A(7/8)	C	No	No	Inside Pole	118.00 - 0.00	6	No Ice	0.00	0.330
							1/2" Ice	0.00	0.330
							1" Ice	0.00	0.330

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
6-8AWG 3 PAIR(7/8)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.680
							1/2" Ice	0.00	0.680
							1" Ice	0.00	0.680
PWRT-608-S(13/16)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.620
							1/2" Ice	0.00	0.620
							1" Ice	0.00	0.620
12 PAIR(3/8)	C	No	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.080
							1/2" Ice	0.00	0.080
							1" Ice	0.00	0.080
860-10025(5/16)	C	No	No	Inside Pole	118.00 - 0.00	3	No Ice	0.00	0.000
							1/2" Ice	0.00	0.000
							1" Ice	0.00	0.000
110_TMO HB158-21U6S24-xx M_TMO(1-5/8)	A	No	No	Inside Pole	110.00 - 0.00	3	No Ice	0.00	2.500
							1/2" Ice	0.00	2.500
							1" Ice	0.00	2.500
110_Sprint HB114-13U3M12-X XXF(1-1/4)	A	No	No	Inside Pole	110.00 - 0.00	3	No Ice	0.00	0.992
							1/2" Ice	0.00	0.992
							1" Ice	0.00	0.992
HB114-1-08U4-M5 F(1-1/4)	A	No	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	1.300
							1/2" Ice	0.00	1.300
							1" Ice	0.00	1.300
98 CU12PSM9P6XXX(1-1/2)	B	No	No	Inside Pole	98.00 - 0.00	1	No Ice	0.00	2.350
							1/2" Ice	0.00	2.350
							1" Ice	0.00	2.350
*** ********** *									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-125.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.792	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L2	125.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L3	120.00-115.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.01
L4	115.00-110.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.02
L5	110.00-105.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	1.980	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.02
L6	105.00-100.00	A	0.000	0.000	0.902	0.000	0.06
		B	0.000	0.000	2.882	0.000	0.03
		C	0.000	0.000	0.902	0.000	0.02

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L7	100.00-99.27	A	0.000	0.000	0.519	0.000	0.01
		B	0.000	0.000	0.808	0.000	0.01
		C	0.000	0.000	0.519	0.000	0.00
L8	99.27-99.02	A	0.000	0.000	0.194	0.000	0.00
		B	0.000	0.000	0.293	0.000	0.00
		C	0.000	0.000	0.194	0.000	0.00
L9	99.02-97.04	A	0.000	0.000	3.001	0.000	0.02
		B	0.000	0.000	3.785	0.000	0.02
		C	0.000	0.000	3.001	0.000	0.01
L10	97.04-96.79	A	0.000	0.000	0.379	0.000	0.00
		B	0.000	0.000	0.478	0.000	0.00
		C	0.000	0.000	0.379	0.000	0.00
L11	96.79-96.33	A	0.000	0.000	0.697	0.000	0.01
		B	0.000	0.000	0.879	0.000	0.00
		C	0.000	0.000	0.697	0.000	0.00
L12	96.33-96.08	A	0.000	0.000	0.379	0.000	0.00
		B	0.000	0.000	0.478	0.000	0.00
		C	0.000	0.000	0.379	0.000	0.00
L13	96.08-94.29	A	0.000	0.000	3.683	0.000	0.02
		B	0.000	0.000	4.392	0.000	0.02
		C	0.000	0.000	3.683	0.000	0.01
L14	94.29-94.04	A	0.000	0.000	0.382	0.000	0.00
		B	0.000	0.000	0.481	0.000	0.00
		C	0.000	0.000	0.382	0.000	0.00
L15	94.04-91.50	A	0.000	0.000	4.971	0.000	0.03
		B	0.000	0.000	5.977	0.000	0.02
		C	0.000	0.000	4.971	0.000	0.01
L16	91.50-91.25	A	0.000	0.000	0.274	0.000	0.00
		B	0.000	0.000	0.373	0.000	0.00
		C	0.000	0.000	0.274	0.000	0.00
L17	91.25-86.25	A	0.000	0.000	6.384	0.000	0.06
		B	0.000	0.000	8.364	0.000	0.05
		C	0.000	0.000	6.384	0.000	0.02
L18	86.25-86.08	A	0.000	0.000	0.298	0.000	0.00
		B	0.000	0.000	0.365	0.000	0.00
		C	0.000	0.000	0.298	0.000	0.00
L19	86.08-85.83	A	0.000	0.000	0.438	0.000	0.00
		B	0.000	0.000	0.537	0.000	0.00
		C	0.000	0.000	0.438	0.000	0.00
L20	85.83-75.75	A	0.000	0.000	9.671	0.000	0.12
		B	0.000	0.000	13.662	0.000	0.09
		C	0.000	0.000	9.671	0.000	0.05
L21	75.75-74.75	A	0.000	0.000	0.888	0.000	0.01
		B	0.000	0.000	1.284	0.000	0.01
		C	0.000	0.000	0.888	0.000	0.00
L22	74.75-71.00	A	0.000	0.000	5.331	0.000	0.04
		B	0.000	0.000	6.816	0.000	0.03
		C	0.000	0.000	5.331	0.000	0.02
L23	71.00-70.75	A	0.000	0.000	0.472	0.000	0.00
		B	0.000	0.000	0.571	0.000	0.00
		C	0.000	0.000	0.472	0.000	0.00
L24	70.75-65.75	A	0.000	0.000	9.442	0.000	0.06
		B	0.000	0.000	11.422	0.000	0.05
		C	0.000	0.000	9.442	0.000	0.02
L25	65.75-60.75	A	0.000	0.000	9.442	0.000	0.06
		B	0.000	0.000	11.422	0.000	0.05
		C	0.000	0.000	9.442	0.000	0.02
L26	60.75-60.00	A	0.000	0.000	1.562	0.000	0.01
		B	0.000	0.000	1.859	0.000	0.01
		C	0.000	0.000	1.562	0.000	0.00
L27	60.00-59.75	A	0.000	0.000	0.580	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.679	0.000	0.00
		C	0.000	0.000	0.580	0.000	0.00
L28	59.75-54.75	A	0.000	0.000	8.358	0.000	0.06
		B	0.000	0.000	10.338	0.000	0.05
		C	0.000	0.000	8.358	0.000	0.02
L29	54.75-44.00	A	0.000	0.000	15.308	0.000	0.13
		B	0.000	0.000	19.565	0.000	0.10
		C	0.000	0.000	15.308	0.000	0.05
L30	44.00-43.00	A	0.000	0.000	2.322	0.000	0.01
		B	0.000	0.000	2.718	0.000	0.01
		C	0.000	0.000	2.322	0.000	0.00
L31	43.00-42.85	A	0.000	0.000	0.348	0.000	0.00
		B	0.000	0.000	0.408	0.000	0.00
		C	0.000	0.000	0.348	0.000	0.00
L32	42.85-37.85	A	0.000	0.000	11.608	0.000	0.06
		B	0.000	0.000	13.588	0.000	0.05
		C	0.000	0.000	11.608	0.000	0.02
L33	37.85-32.85	A	0.000	0.000	11.608	0.000	0.06
		B	0.000	0.000	13.588	0.000	0.05
		C	0.000	0.000	11.608	0.000	0.02
L34	32.85-27.85	A	0.000	0.000	12.504	0.000	0.06
		B	0.000	0.000	14.484	0.000	0.05
		C	0.000	0.000	12.504	0.000	0.02
L35	27.85-26.25	A	0.000	0.000	4.381	0.000	0.02
		B	0.000	0.000	5.015	0.000	0.01
		C	0.000	0.000	4.381	0.000	0.01
L36	26.25-26.00	A	0.000	0.000	0.685	0.000	0.00
		B	0.000	0.000	0.784	0.000	0.00
		C	0.000	0.000	0.685	0.000	0.00
L37	26.00-21.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L38	21.00-16.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L39	16.00-11.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L40	11.00-6.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L41	6.00-1.00	A	0.000	0.000	13.692	0.000	0.06
		B	0.000	0.000	15.672	0.000	0.05
		C	0.000	0.000	13.692	0.000	0.02
L42	1.00-0.00	A	0.000	0.000	2.738	0.000	0.01
		B	0.000	0.000	3.134	0.000	0.01
		C	0.000	0.000	2.738	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-125.00	A	0.973	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	1.476	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L2	125.00-120.00	A	0.969	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.686	0.000	0.06

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.00
L3	120.00-115.00	A	0.965	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.681	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.01
L4	115.00-110.00	A	0.961	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.676	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.02
L5	110.00-105.00	A	0.957	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	3.671	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.02
L6	105.00-100.00	A	0.952	0.000	0.000	1.033	0.000	0.07
		B		0.000	0.000	4.698	0.000	0.07
		C		0.000	0.000	1.033	0.000	0.03
L7	100.00-99.27	A	0.949	0.000	0.000	0.594	0.000	0.01
		B		0.000	0.000	1.128	0.000	0.01
		C		0.000	0.000	0.594	0.000	0.01
L8	99.27-99.02	A	0.949	0.000	0.000	0.222	0.000	0.00
		B		0.000	0.000	0.405	0.000	0.00
		C		0.000	0.000	0.222	0.000	0.00
L9	99.02-97.04	A	0.948	0.000	0.000	3.409	0.000	0.05
		B		0.000	0.000	4.858	0.000	0.05
		C		0.000	0.000	3.409	0.000	0.03
L10	97.04-96.79	A	0.947	0.000	0.000	0.430	0.000	0.01
		B		0.000	0.000	0.613	0.000	0.01
		C		0.000	0.000	0.430	0.000	0.00
L11	96.79-96.33	A	0.946	0.000	0.000	0.792	0.000	0.01
		B		0.000	0.000	1.128	0.000	0.01
		C		0.000	0.000	0.792	0.000	0.01
L12	96.33-96.08	A	0.946	0.000	0.000	0.430	0.000	0.01
		B		0.000	0.000	0.613	0.000	0.01
		C		0.000	0.000	0.430	0.000	0.00
L13	96.08-94.29	A	0.945	0.000	0.000	4.189	0.000	0.05
		B		0.000	0.000	5.498	0.000	0.06
		C		0.000	0.000	4.189	0.000	0.04
L14	94.29-94.04	A	0.944	0.000	0.000	0.434	0.000	0.01
		B		0.000	0.000	0.616	0.000	0.01
		C		0.000	0.000	0.434	0.000	0.00
L15	94.04-91.50	A	0.943	0.000	0.000	5.617	0.000	0.07
		B		0.000	0.000	7.472	0.000	0.08
		C		0.000	0.000	5.617	0.000	0.05
L16	91.50-91.25	A	0.941	0.000	0.000	0.307	0.000	0.01
		B		0.000	0.000	0.490	0.000	0.01
		C		0.000	0.000	0.307	0.000	0.00
L17	91.25-86.25	A	0.938	0.000	0.000	7.328	0.000	0.11
		B		0.000	0.000	10.976	0.000	0.12
		C		0.000	0.000	7.328	0.000	0.07
L18	86.25-86.08	A	0.936	0.000	0.000	0.347	0.000	0.00
		B		0.000	0.000	0.471	0.000	0.00
		C		0.000	0.000	0.347	0.000	0.00
L19	86.08-85.83	A	0.935	0.000	0.000	0.510	0.000	0.01
		B		0.000	0.000	0.692	0.000	0.01
		C		0.000	0.000	0.510	0.000	0.00
L20	85.83-75.75	A	0.930	0.000	0.000	11.628	0.000	0.19
		B		0.000	0.000	18.960	0.000	0.22
		C		0.000	0.000	11.628	0.000	0.12
L21	75.75-74.75	A	0.923	0.000	0.000	1.074	0.000	0.02
		B		0.000	0.000	1.802	0.000	0.02
		C		0.000	0.000	1.074	0.000	0.01
L22	74.75-71.00	A	0.920	0.000	0.000	6.368	0.000	0.08
		B		0.000	0.000	9.087	0.000	0.09
		C		0.000	0.000	6.368	0.000	0.05

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L23	71.00-70.75	A	0.918	0.000	0.000	0.561	0.000	0.01
		B		0.000	0.000	0.742	0.000	0.01
		C		0.000	0.000	0.561	0.000	0.00
L24	70.75-65.75	A	0.914	0.000	0.000	11.221	0.000	0.12
		B		0.000	0.000	14.838	0.000	0.13
		C		0.000	0.000	11.221	0.000	0.09
L25	65.75-60.75	A	0.907	0.000	0.000	11.210	0.000	0.12
		B		0.000	0.000	14.819	0.000	0.13
		C		0.000	0.000	11.210	0.000	0.09
L26	60.75-60.00	A	0.903	0.000	0.000	1.812	0.000	0.02
		B		0.000	0.000	2.352	0.000	0.02
		C		0.000	0.000	1.812	0.000	0.01
L27	60.00-59.75	A	0.902	0.000	0.000	0.668	0.000	0.01
		B		0.000	0.000	0.849	0.000	0.01
		C		0.000	0.000	0.668	0.000	0.00
L28	59.75-54.75	A	0.898	0.000	0.000	9.556	0.000	0.11
		B		0.000	0.000	13.154	0.000	0.12
		C		0.000	0.000	9.556	0.000	0.08
L29	54.75-44.00	A	0.885	0.000	0.000	17.399	0.000	0.22
		B		0.000	0.000	25.098	0.000	0.25
		C		0.000	0.000	17.399	0.000	0.15
L30	44.00-43.00	A	0.874	0.000	0.000	2.670	0.000	0.03
		B		0.000	0.000	3.386	0.000	0.03
		C		0.000	0.000	2.670	0.000	0.02
L31	43.00-42.85	A	0.873	0.000	0.000	0.400	0.000	0.00
		B		0.000	0.000	0.507	0.000	0.00
		C		0.000	0.000	0.400	0.000	0.00
L32	42.85-37.85	A	0.867	0.000	0.000	13.317	0.000	0.13
		B		0.000	0.000	16.876	0.000	0.14
		C		0.000	0.000	13.317	0.000	0.09
L33	37.85-32.85	A	0.856	0.000	0.000	13.296	0.000	0.13
		B		0.000	0.000	16.841	0.000	0.14
		C		0.000	0.000	13.296	0.000	0.09
L34	32.85-27.85	A	0.843	0.000	0.000	14.177	0.000	0.13
		B		0.000	0.000	17.706	0.000	0.14
		C		0.000	0.000	14.177	0.000	0.10
L35	27.85-26.25	A	0.833	0.000	0.000	4.915	0.000	0.04
		B		0.000	0.000	6.040	0.000	0.05
		C		0.000	0.000	4.915	0.000	0.03
L36	26.25-26.00	A	0.830	0.000	0.000	0.768	0.000	0.01
		B		0.000	0.000	0.943	0.000	0.01
		C		0.000	0.000	0.768	0.000	0.00
L37	26.00-21.00	A	0.822	0.000	0.000	15.335	0.000	0.13
		B		0.000	0.000	18.837	0.000	0.14
		C		0.000	0.000	15.335	0.000	0.10
L38	21.00-16.00	A	0.802	0.000	0.000	15.296	0.000	0.13
		B		0.000	0.000	18.774	0.000	0.14
		C		0.000	0.000	15.296	0.000	0.10
L39	16.00-11.00	A	0.777	0.000	0.000	15.246	0.000	0.13
		B		0.000	0.000	18.693	0.000	0.14
		C		0.000	0.000	15.246	0.000	0.09
L40	11.00-6.00	A	0.742	0.000	0.000	15.176	0.000	0.13
		B		0.000	0.000	18.578	0.000	0.13
		C		0.000	0.000	15.176	0.000	0.09
L41	6.00-1.00	A	0.679	0.000	0.000	15.050	0.000	0.12
		B		0.000	0.000	18.373	0.000	0.13
		C		0.000	0.000	15.050	0.000	0.08
L42	1.00-0.00	A	0.559	0.000	0.000	2.962	0.000	0.02
		B		0.000	0.000	3.597	0.000	0.02
		C		0.000	0.000	2.962	0.000	0.01

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	130.00-125.00	0.852	0.492	1.065	0.615
L2	125.00-120.00	1.899	1.096	2.159	1.246
L3	120.00-115.00	1.906	1.100	2.183	1.260
L4	115.00-110.00	1.912	1.104	2.205	1.273
L5	110.00-105.00	1.918	1.108	2.226	1.285
L6	105.00-100.00	1.614	0.932	1.972	1.139
L7	100.00-99.27	1.106	0.638	1.467	0.847
L8	99.27-99.02	1.067	0.616	1.426	0.823
L9	99.02-97.04	0.751	0.434	1.062	0.613
L10	97.04-96.79	0.755	0.436	1.068	0.617
L11	96.79-96.33	0.757	0.437	1.070	0.618
L12	96.33-96.08	0.757	0.437	1.071	0.618
L13	96.08-94.29	0.625	0.361	0.904	0.522
L14	94.29-94.04	0.760	0.439	1.075	0.621
L15	94.04-91.50	0.653	0.377	0.944	0.545
L16	91.50-91.25	0.928	0.536	1.283	0.741
L17	91.25-86.25	0.862	0.498	1.194	0.690
L18	86.25-86.08	0.722	0.417	1.016	0.586
L19	86.08-85.83	0.723	0.417	1.017	0.587
L20	85.83-75.75	1.026	0.592	1.364	0.788
L21	75.75-74.75	1.074	0.620	1.420	0.820
L22	74.75-71.00	0.853	0.492	1.163	0.672
L23	71.00-70.75	0.725	0.419	1.009	0.583
L24	70.75-65.75	0.733	0.423	1.019	0.588
L25	65.75-60.75	0.746	0.431	1.036	0.598
L26	60.75-60.00	0.709	0.409	1.002	0.579
L27	60.00-59.75	0.661	0.382	0.946	0.546
L28	59.75-54.75	0.819	0.473	1.150	0.664
L29	54.75-44.00	0.918	0.530	1.274	0.735
L30	44.00-43.00	0.693	0.400	0.988	0.570
L31	43.00-42.85	0.695	0.401	0.987	0.570
L32	42.85-37.85	0.701	0.405	0.994	0.574
L33	37.85-32.85	0.712	0.411	1.008	0.582
L34	32.85-27.85	0.690	0.398	0.983	0.567
L35	27.85-26.25	0.657	0.379	0.944	0.545
L36	26.25-26.00	0.659	0.380	0.946	0.546
L37	26.00-21.00	0.664	0.383	0.952	0.550
L38	21.00-16.00	0.675	0.389	0.962	0.556
L39	16.00-11.00	0.685	0.395	0.971	0.560
L40	11.00-6.00	0.695	0.401	0.976	0.564
L41	6.00-1.00	0.705	0.407	0.975	0.563
L42	1.00-0.00	0.711	0.410	0.952	0.550

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	HB158-1-08U8-S8J18(1-5/8)	125.00 - 127.00	1.0000	1.0000
L2	3	HB158-1-08U8-S8J18(1-5/8)	120.00 - 125.00	1.0000	1.0000
L3	3	HB158-1-08U8-S8J18(1-5/8)	115.00 - 120.00	1.0000	1.0000
L4	3	HB158-1-08U8-S8J18(1-5/8)	110.00 - 115.00	1.0000	1.0000
L5	3	HB158-1-08U8-S8J18(1-5/8)	105.00 - 110.00	1.0000	1.0000
L6	3	HB158-1-08U8-S8J18(1-5/8)	100.00 - 105.00	1.0000	1.0000
L6	51	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L6	52	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L6	53	Sabre PL 5"x1.25"	100.00 - 101.27	1.0000	1.0000
L7	3	HB158-1-08U8-S8J18(1-5/8)	99.27 - 100.00	1.0000	1.0000
L7	51	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L7	52	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L7	53	Sabre PL 5"x1.25"	99.27 - 100.00	1.0000	1.0000
L8	3	HB158-1-08U8-S8J18(1-5/8)	99.02 - 99.27	1.0000	1.0000
L8	47	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	48	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	49	MS-600 (1.1875")	99.02 - 99.04	1.0000	1.0000
L8	51	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L8	52	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L8	53	Sabre PL 5"x1.25"	99.02 - 99.27	1.0000	1.0000
L9	3	HB158-1-08U8-S8J18(1-5/8)	97.04 - 99.02	1.0000	1.0000
L9	47	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	48	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	49	MS-600 (1.1875")	97.04 - 99.02	1.0000	1.0000
L9	51	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L9	52	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L9	53	Sabre PL 5"x1.25"	97.04 - 99.02	1.0000	1.0000
L10	3	HB158-1-08U8-S8J18(1-5/8)	96.79 - 97.04	1.0000	1.0000
L10	47	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	48	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	49	MS-600 (1.1875")	96.79 - 97.04	1.0000	1.0000
L10	51	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L10	52	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L10	53	Sabre PL 5"x1.25"	96.79 - 97.04	1.0000	1.0000
L11	3	HB158-1-08U8-S8J18(1-5/8)	96.33 - 96.79	1.0000	1.0000
L11	47	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	48	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	49	MS-600 (1.1875")	96.33 - 96.79	1.0000	1.0000
L11	51	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L11	52	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L11	53	Sabre PL 5"x1.25"	96.33 - 96.79	1.0000	1.0000
L12	3	HB158-1-08U8-S8J18(1-5/8)	96.08 - 96.33	1.0000	1.0000
L12	47	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	48	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	49	MS-600 (1.1875")	96.08 - 96.33	1.0000	1.0000
L12	51	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L12	52	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L12	53	Sabre PL 5"x1.25"	96.08 - 96.33	1.0000	1.0000
L13	3	HB158-1-08U8-S8J18(1-5/8)	94.29 - 96.08	1.0000	1.0000
L13	43	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	44	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	45	MS-600 (1.1875")	94.29 - 95.67	1.0000	1.0000
L13	47	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L13	48	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000
L13	49	MS-600 (1.1875")	94.29 - 96.08	1.0000	1.0000
L13	51	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L13	52	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L13	53	Sabre PL 5"x1.25"	94.33 - 96.08	1.0000	1.0000
L14	3	HB158-1-08U8-S8J18(1-5/8)	94.04 - 94.29	1.0000	1.0000
L14	43	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	44	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	45	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	47	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	48	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L14	49	MS-600 (1.1875")	94.04 - 94.29	1.0000	1.0000
L15	3	HB158-1-08U8-S8J18(1-5/8)	91.50 - 94.04	1.0000	1.0000
L15	39	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	40	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	41	MS-600 (1.1875")	91.50 - 93.50	1.0000	1.0000
L15	43	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	44	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	45	MS-600 (1.1875")	91.50 - 94.04	1.0000	1.0000
L15	47	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L15	48	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L15	49	MS-600 (1.1875")	92.29 - 94.04	1.0000	1.0000
L16	3	HB158-1-08U8-S8J18(1-5/8)	91.25 - 91.50	1.0000	1.0000
L16	39	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	40	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	41	MS-600 (1.1875")	91.25 - 91.50	1.0000	1.0000
L16	43	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L16	44	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L16	45	MS-600 (1.1875")	91.42 - 91.50	1.0000	1.0000
L17	3	HB158-1-08U8-S8J18(1-5/8)	86.25 - 91.25	1.0000	1.0000
L17	23	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	24	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	25	MP3-05 (1.1875in)	86.25 - 88.58	1.0000	1.0000
L17	39	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L17	40	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L17	41	MS-600 (1.1875")	86.25 - 91.25	1.0000	1.0000
L18	3	HB158-1-08U8-S8J18(1-5/8)	86.08 - 86.25	1.0000	1.0000
L18	23	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	24	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	25	MP3-05 (1.1875in)	86.08 - 86.25	1.0000	1.0000
L18	39	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L18	40	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L18	41	MS-600 (1.1875")	86.08 - 86.25	1.0000	1.0000
L19	3	HB158-1-08U8-S8J18(1-5/8)	85.83 - 86.08	1.0000	1.0000
L19	23	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	24	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	25	MP3-05 (1.1875in)	85.83 - 86.08	1.0000	1.0000
L19	39	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L19	40	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L19	41	MS-600 (1.1875")	85.83 - 86.08	1.0000	1.0000
L20	3	HB158-1-08U8-S8J18(1-5/8)	75.75 - 85.83	1.0000	1.0000
L20	23	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	24	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	25	MP3-05 (1.1875in)	75.75 - 85.83	1.0000	1.0000
L20	39	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L20	40	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L20	41	MS-600 (1.1875")	85.00 - 85.83	1.0000	1.0000
L21	3	HB158-1-08U8-S8J18(1-5/8)	74.75 - 75.75	1.0000	1.0000
L21	23	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L21	24	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L21	25	MP3-05 (1.1875in)	74.75 - 75.75	1.0000	1.0000
L22	3	HB158-1-08U8-S8J18(1-5/8)	71.00 - 74.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	23	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	24	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	25	MP3-05 (1.1875in)	71.00 - 74.75	1.0000	1.0000
L22	35	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L22	36	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L22	37	MS-600 (1.1875")	71.00 - 73.00	1.0000	1.0000
L23	3	HB158-1-08U8-S8J18(1-5/8)	70.75 - 71.00	1.0000	1.0000
L23	23	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	24	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	25	MP3-05 (1.1875in)	70.75 - 71.00	1.0000	1.0000
L23	35	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L23	36	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L23	37	MS-600 (1.1875")	70.75 - 71.00	1.0000	1.0000
L24	3	HB158-1-08U8-S8J18(1-5/8)	65.75 - 70.75	1.0000	1.0000
L24	23	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	24	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	25	MP3-05 (1.1875in)	65.75 - 70.75	1.0000	1.0000
L24	35	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L24	36	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L24	37	MS-600 (1.1875")	65.75 - 70.75	1.0000	1.0000
L25	3	HB158-1-08U8-S8J18(1-5/8)	60.75 - 65.75	1.0000	1.0000
L25	23	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	24	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	25	MP3-05 (1.1875in)	60.75 - 65.75	1.0000	1.0000
L25	35	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L25	36	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L25	37	MS-600 (1.1875")	60.75 - 65.75	1.0000	1.0000
L26	3	HB158-1-08U8-S8J18(1-5/8)	60.00 - 60.75	1.0000	1.0000
L26	19	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	20	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	21	MP3-08 (1.1875in)W	60.00 - 60.50	1.0000	1.0000
L26	23	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	24	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	25	MP3-05 (1.1875in)	60.58 - 60.75	1.0000	1.0000
L26	35	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L26	36	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L26	37	MS-600 (1.1875")	60.00 - 60.75	1.0000	1.0000
L27	3	HB158-1-08U8-S8J18(1-5/8)	59.75 - 60.00	1.0000	1.0000
L27	19	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	20	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	21	MP3-08 (1.1875in)W	59.75 - 60.00	1.0000	1.0000
L27	35	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L27	36	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L27	37	MS-600 (1.1875")	59.75 - 60.00	1.0000	1.0000
L28	3	HB158-1-08U8-S8J18(1-5/8)	54.75 - 59.75	1.0000	1.0000
L28	19	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	20	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	21	MP3-08 (1.1875in)W	54.75 - 59.75	1.0000	1.0000
L28	35	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L28	36	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L28	37	MS-600 (1.1875")	58.00 - 59.75	1.0000	1.0000
L29	3	HB158-1-08U8-S8J18(1-5/8)	44.00 - 54.75	1.0000	1.0000
L29	19	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	20	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	21	MP3-08 (1.1875in)W	44.00 - 54.75	1.0000	1.0000
L29	31	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L29	32	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L29	33	MS-600 (1.1875")	44.00 - 45.10	1.0000	1.0000
L30	3	HB158-1-08U8-S8J18(1-5/8)	43.00 - 44.00	1.0000	1.0000
L30	19	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000
L30	20	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000
L30	21	MP3-08 (1.1875in)W	43.00 - 44.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L30	31	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L30	32	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L30	33	MS-600 (1.1875")	43.00 - 44.00	1.0000	1.0000
L31	3	HB158-1-08U8-S8J18(1-5/8)	42.85 - 43.00	1.0000	1.0000
L31	19	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	20	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	21	MP3-08 (1.1875in)W	42.85 - 43.00	1.0000	1.0000
L31	31	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L31	32	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L31	33	MS-600 (1.1875")	42.85 - 43.00	1.0000	1.0000
L32	3	HB158-1-08U8-S8J18(1-5/8)	37.85 - 42.85	1.0000	1.0000
L32	19	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	20	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	21	MP3-08 (1.1875in)W	37.85 - 42.85	1.0000	1.0000
L32	31	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L32	32	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L32	33	MS-600 (1.1875")	37.85 - 42.85	1.0000	1.0000
L33	3	HB158-1-08U8-S8J18(1-5/8)	32.85 - 37.85	1.0000	1.0000
L33	19	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	20	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	21	MP3-08 (1.1875in)W	32.85 - 37.85	1.0000	1.0000
L33	31	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L33	32	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L33	33	MS-600 (1.1875")	32.85 - 37.85	1.0000	1.0000
L34	3	HB158-1-08U8-S8J18(1-5/8)	27.85 - 32.85	1.0000	1.0000
L34	19	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	20	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	21	MP3-08 (1.1875in)W	27.85 - 32.85	1.0000	1.0000
L34	27	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	28	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	29	MS-850 (1.1875")W	27.85 - 30.00	1.0000	1.0000
L34	31	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L34	32	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L34	33	MS-600 (1.1875")	30.00 - 32.85	1.0000	1.0000
L35	3	HB158-1-08U8-S8J18(1-5/8)	26.25 - 27.85	1.0000	1.0000
L35	19	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	20	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	21	MP3-08 (1.1875in)W	26.25 - 27.85	1.0000	1.0000
L35	27	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L35	28	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L35	29	MS-850 (1.1875")W	26.25 - 27.85	1.0000	1.0000
L36	3	HB158-1-08U8-S8J18(1-5/8)	26.00 - 26.25	1.0000	1.0000
L36	19	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	20	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	21	MP3-08 (1.1875in)W	26.00 - 26.25	1.0000	1.0000
L36	27	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L36	28	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L36	29	MS-850 (1.1875")W	26.00 - 26.25	1.0000	1.0000
L37	3	HB158-1-08U8-S8J18(1-5/8)	21.00 - 26.00	1.0000	1.0000
L37	19	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	20	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	21	MP3-08 (1.1875in)W	21.00 - 26.00	1.0000	1.0000
L37	27	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L37	28	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L37	29	MS-850 (1.1875")W	21.00 - 26.00	1.0000	1.0000
L38	3	HB158-1-08U8-S8J18(1-5/8)	16.00 - 21.00	1.0000	1.0000
L38	19	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	20	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	21	MP3-08 (1.1875in)W	16.00 - 21.00	1.0000	1.0000
L38	27	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000
L38	28	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000
L38	29	MS-850 (1.1875")W	16.00 - 21.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L39	3	HB158-1-08U8-S8J18(1-5/8)	11.00 - 16.00	1.0000	1.0000
L39	19	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	20	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	21	MP3-08 (1.1875in)W	11.00 - 16.00	1.0000	1.0000
L39	27	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L39	28	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L39	29	MS-850 (1.1875")W	11.00 - 16.00	1.0000	1.0000
L40	3	HB158-1-08U8-S8J18(1-5/8)	6.00 - 11.00	1.0000	1.0000
L40	19	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	20	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	21	MP3-08 (1.1875in)W	6.00 - 11.00	1.0000	1.0000
L40	27	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L40	28	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L40	29	MS-850 (1.1875")W	6.00 - 11.00	1.0000	1.0000
L41	3	HB158-1-08U8-S8J18(1-5/8)	1.00 - 6.00	1.0000	1.0000
L41	19	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	20	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	21	MP3-08 (1.1875in)W	1.00 - 6.00	1.0000	1.0000
L41	27	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L41	28	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L41	29	MS-850 (1.1875")W	1.00 - 6.00	1.0000	1.0000
L42	3	HB158-1-08U8-S8J18(1-5/8)	0.00 - 1.00	1.0000	1.0000
L42	19	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	20	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	21	MP3-08 (1.1875in)W	0.00 - 1.00	1.0000	1.0000
L42	27	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000
L42	28	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000
L42	29	MS-850 (1.1875")W	0.00 - 1.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L6	51	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L6	52	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L6	53	Sabre PL 5"x1.25"	100.00 - 101.27	Auto	0.0000
L7	51	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L7	52	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L7	53	Sabre PL 5"x1.25"	99.27 - 100.00	Auto	0.0000
L8	47	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	48	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	49	MS-600 (1.1875")	99.02 - 99.04	Auto	0.0000
L8	51	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L8	52	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L8	53	Sabre PL 5"x1.25"	99.02 - 99.27	Auto	0.0000
L9	47	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	48	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	49	MS-600 (1.1875")	97.04 - 99.02	Auto	0.0000
L9	51	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000
L9	52	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L9	53	Sabre PL 5"x1.25"	97.04 - 99.02	Auto	0.0000
L10	47	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	48	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	49	MS-600 (1.1875")	96.79 - 97.04	Auto	0.0000
L10	51	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L10	52	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L10	53	Sabre PL 5"x1.25"	96.79 - 97.04	Auto	0.0000
L11	47	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	48	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	49	MS-600 (1.1875")	96.33 - 96.79	Auto	0.0000
L11	51	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L11	52	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L11	53	Sabre PL 5"x1.25"	96.33 - 96.79	Auto	0.0000
L12	47	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	48	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	49	MS-600 (1.1875")	96.08 - 96.33	Auto	0.0000
L12	51	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L12	52	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L12	53	Sabre PL 5"x1.25"	96.08 - 96.33	Auto	0.0000
L13	43	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	44	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	45	MS-600 (1.1875")	94.29 - 95.67	Auto	0.0000
L13	47	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	48	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	49	MS-600 (1.1875")	94.29 - 96.08	Auto	0.0000
L13	51	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L13	52	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L13	53	Sabre PL 5"x1.25"	94.33 - 96.08	Auto	0.0000
L14	43	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	44	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	45	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	47	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	48	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L14	49	MS-600 (1.1875")	94.04 - 94.29	Auto	0.0000
L15	39	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	40	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	41	MS-600 (1.1875")	91.50 - 93.50	Auto	0.0000
L15	43	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	44	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	45	MS-600 (1.1875")	91.50 - 94.04	Auto	0.0000
L15	47	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L15	48	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L15	49	MS-600 (1.1875")	92.29 - 94.04	Auto	0.0000
L16	39	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	40	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	41	MS-600 (1.1875")	91.25 - 91.50	Auto	0.0000
L16	43	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L16	44	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L16	45	MS-600 (1.1875")	91.42 - 91.50	Auto	0.0000
L17	23	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	24	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	25	MP3-05 (1.1875in)	86.25 - 88.58	Auto	0.0000
L17	39	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L17	40	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L17	41	MS-600 (1.1875")	86.25 - 91.25	Auto	0.0000
L18	23	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	24	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	25	MP3-05 (1.1875in)	86.08 - 86.25	Auto	0.0000
L18	39	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000
L18	40	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000
L18	41	MS-600 (1.1875")	86.08 - 86.25	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L19	23	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	24	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	25	MP3-05 (1.1875in)	85.83 - 86.08	Auto	0.0000
L19	39	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L19	40	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L19	41	MS-600 (1.1875")	85.83 - 86.08	Auto	0.0000
L20	23	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	24	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	25	MP3-05 (1.1875in)	75.75 - 85.83	Auto	0.0000
L20	39	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L20	40	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L20	41	MS-600 (1.1875")	85.00 - 85.83	Auto	0.0000
L21	23	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L21	24	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L21	25	MP3-05 (1.1875in)	74.75 - 75.75	Auto	0.0000
L22	23	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	24	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	25	MP3-05 (1.1875in)	71.00 - 74.75	Auto	0.0000
L22	35	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L22	36	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L22	37	MS-600 (1.1875")	71.00 - 73.00	Auto	0.0000
L23	23	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	24	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	25	MP3-05 (1.1875in)	70.75 - 71.00	Auto	0.0000
L23	35	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L23	36	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L23	37	MS-600 (1.1875")	70.75 - 71.00	Auto	0.0000
L24	23	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	24	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	25	MP3-05 (1.1875in)	65.75 - 70.75	Auto	0.0000
L24	35	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L24	36	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L24	37	MS-600 (1.1875")	65.75 - 70.75	Auto	0.0000
L25	23	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	24	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	25	MP3-05 (1.1875in)	60.75 - 65.75	Auto	0.0000
L25	35	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L25	36	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L25	37	MS-600 (1.1875")	60.75 - 65.75	Auto	0.0000
L26	19	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	20	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	21	MP3-08 (1.1875in)W	60.00 - 60.50	Auto	0.0000
L26	23	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	24	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	25	MP3-05 (1.1875in)	60.58 - 60.75	Auto	0.0000
L26	35	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L26	36	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L26	37	MS-600 (1.1875")	60.00 - 60.75	Auto	0.0000
L27	19	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	20	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	21	MP3-08 (1.1875in)W	59.75 - 60.00	Auto	0.0000
L27	35	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L27	36	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L27	37	MS-600 (1.1875")	59.75 - 60.00	Auto	0.0000
L28	19	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	20	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	21	MP3-08 (1.1875in)W	54.75 - 59.75	Auto	0.0000
L28	35	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L28	36	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L28	37	MS-600 (1.1875")	58.00 - 59.75	Auto	0.0000
L29	19	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L29	20	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000
L29	21	MP3-08 (1.1875in)W	44.00 - 54.75	Auto	0.0000
L29	31	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L29	32	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L29	33	MS-600 (1.1875")	44.00 - 45.10	Auto	0.0000
L30	19	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	20	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	21	MP3-08 (1.1875in)W	43.00 - 44.00	Auto	0.0000
L30	31	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L30	32	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L30	33	MS-600 (1.1875")	43.00 - 44.00	Auto	0.0000
L31	19	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	20	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	21	MP3-08 (1.1875in)W	42.85 - 43.00	Auto	0.0000
L31	31	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L31	32	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L31	33	MS-600 (1.1875")	42.85 - 43.00	Auto	0.0000
L32	19	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	20	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	21	MP3-08 (1.1875in)W	37.85 - 42.85	Auto	0.0000
L32	31	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L32	32	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L32	33	MS-600 (1.1875")	37.85 - 42.85	Auto	0.0000
L33	19	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	20	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	21	MP3-08 (1.1875in)W	32.85 - 37.85	Auto	0.0000
L33	31	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L33	32	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L33	33	MS-600 (1.1875")	32.85 - 37.85	Auto	0.0000
L34	19	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	20	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	21	MP3-08 (1.1875in)W	27.85 - 32.85	Auto	0.0000
L34	27	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	28	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	29	MS-850 (1.1875")W	27.85 - 30.00	Auto	0.0000
L34	31	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L34	32	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L34	33	MS-600 (1.1875")	30.00 - 32.85	Auto	0.0000
L35	19	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	20	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	21	MP3-08 (1.1875in)W	26.25 - 27.85	Auto	0.0000
L35	27	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L35	28	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L35	29	MS-850 (1.1875")W	26.25 - 27.85	Auto	0.0000
L36	19	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	20	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	21	MP3-08 (1.1875in)W	26.00 - 26.25	Auto	0.0000
L36	27	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L36	28	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L36	29	MS-850 (1.1875")W	26.00 - 26.25	Auto	0.0000
L37	19	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	20	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	21	MP3-08 (1.1875in)W	21.00 - 26.00	Auto	0.0000
L37	27	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L37	28	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L37	29	MS-850 (1.1875")W	21.00 - 26.00	Auto	0.0000
L38	19	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	20	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	21	MP3-08 (1.1875in)W	16.00 - 21.00	Auto	0.0000
L38	27	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000
L38	28	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L38	29	MS-850 (1.1875")W	16.00 - 21.00	Auto	0.0000
L39	19	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	20	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	21	MP3-08 (1.1875in)W	11.00 - 16.00	Auto	0.0000
L39	27	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L39	28	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L39	29	MS-850 (1.1875")W	11.00 - 16.00	Auto	0.0000
L40	19	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	20	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	21	MP3-08 (1.1875in)W	6.00 - 11.00	Auto	0.0000
L40	27	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L40	28	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L40	29	MS-850 (1.1875")W	6.00 - 11.00	Auto	0.0000
L41	19	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	20	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	21	MP3-08 (1.1875in)W	1.00 - 6.00	Auto	0.0000
L41	27	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L41	28	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L41	29	MS-850 (1.1875")W	1.00 - 6.00	Auto	0.0000
L42	19	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	20	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	21	MP3-08 (1.1875in)W	0.00 - 1.00	Auto	0.0000
L42	27	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000
L42	28	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000
L42	29	MS-850 (1.1875")W	0.00 - 1.00	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
5/8" x 4' Lightning Rod	C	From Leg	0.00 0.000 2.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.00 0.01 0.01
Pine branches									
Tree Pole Branchs.	C	None		0.000	130.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	124.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	118.00	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	113.50	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84
Tree Pole Branchs.	C	None		0.000	109.30	No Ice 1/2" Ice 1" Ice	37.00 37.00 37.00	37.00 37.00 37.00	0.30 0.57 0.84

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Tree Pole Branchs.	C	None		0.000	104.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	100.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	93.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	89.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	85.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
Tree Pole Branchs.	C	None		0.000	81.30	No Ice	37.00	37.00	0.30
						1/2" Ice	37.00	37.00	0.57
						1" Ice	37.00	37.00	0.84
127									
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	16.04 17.05 18.08	10.74 11.70 12.67	0.13 0.24 0.37
GPS_A	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.11 0.21 0.28	0.11 0.21 0.28	0.00 0.00 0.01
HTXCW631619M000 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
HTXCW631619M000 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
HTXCW631619M000 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	7.41 8.11 8.82	5.88 6.56 7.25	0.09 0.16 0.24
MT6407-77A w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
RFV01U-D1A	A	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	B	From Centroid-Leg	4.00 0.000 0.000	0.000	127.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	0.08 0.10 0.12
RFV01U-D1A	C	From Centroid-Leg	4.00 0.000	0.000	127.00	No Ice 1/2" Ice	1.88 2.05	1.25 1.39	0.08 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		g	0.000			1" Ice	2.22	1.54	0.12
CDX1923Q-DS-43	A	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
(2) CDX1923Q-DS-43	B	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
(3) CDX1923Q-DS-43	C	From	4.00	0.000	127.00	No Ice	0.37	0.55	0.02
		Centroid-Le	0.000			1/2" Ice	0.46	0.65	0.02
		g	0.000			1" Ice	0.55	0.76	0.03
RFV01U-D2A	A	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
RFV01U-D2A	B	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
RFV01U-D2A	C	From	4.00	0.000	127.00	No Ice	1.88	1.01	0.07
		Centroid-Le	0.000			1/2" Ice	2.05	1.14	0.09
		g	0.000			1" Ice	2.22	1.28	0.11
DB-B1-6C-12AB-0Z	B	From	4.00	0.000	127.00	No Ice	3.36	2.19	0.02
		Centroid-Le	0.000			1/2" Ice	3.60	2.39	0.05
		g	0.000			1" Ice	3.84	2.61	0.08
DB-B1-6C-12AB-0Z	C	From	4.00	0.000	127.00	No Ice	3.36	2.19	0.02
		Centroid-Le	0.000			1/2" Ice	3.60	2.39	0.05
		g	0.000			1" Ice	3.84	2.61	0.08
Site Pro 1 RMQP-496-HK	C	None		0.000	127.00	No Ice	23.14	21.40	1.95
						1/2" Ice	28.17	26.44	2.34
						1" Ice	33.23	31.60	2.85
118									
800 10121 w/ Mount Pipe	A	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	B	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	C	From Leg	4.00	0.000	118.00	No Ice	3.60	2.95	0.07
			0.000			1/2" Ice	4.00	3.34	0.11
			0.000			1" Ice	4.42	3.74	0.17
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	A	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	B	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
(2) NNHH-65C-R4_CCIV2 w/ Mount Pipe	C	From Leg	4.00	0.000	118.00	No Ice	9.68	5.17	0.16
			0.000			1/2" Ice	10.27	5.71	0.27
			0.000			1" Ice	10.87	6.26	0.39
AHFIB_CCIV2	A	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHFIB_CCIV2	B	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHFIB_CCIV2	C	From Leg	4.00	0.000	118.00	No Ice	2.79	1.53	0.07
			0.000			1/2" Ice	3.01	1.71	0.09
			0.000			1" Ice	3.24	1.90	0.11
AHLBBA	A	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
AHLBBA	B	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
AHLBBA	C	From Leg	4.00	0.000	118.00	No Ice	2.82	0.92	0.10
			0.000			1/2" Ice	3.03	1.04	0.12
			0.000			1" Ice	3.26	1.18	0.15
DC6-48-60-18-8F	A	From Leg	4.00	0.000	118.00	No Ice	1.21	1.21	0.03
			0.000			1/2" Ice	1.89	1.89	0.05
			0.000			1" Ice	2.11	2.11	0.08
DC6-48-60-18-8F	B	From Leg	4.00	0.000	118.00	No Ice	1.21	1.21	0.03
			0.000			1/2" Ice	1.89	1.89	0.05
			0.000			1" Ice	2.11	2.11	0.08
RRH4X25-WCS	A	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
RRH4X25-WCS	B	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
RRH4X25-WCS	C	From Leg	4.00	0.000	118.00	No Ice	3.84	3.34	0.09
			0.000			1/2" Ice	4.09	3.59	0.13
			0.000			1" Ice	4.36	3.84	0.16
AHCA_CCIV3	A	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
AHCA_CCIV3	B	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
AHCA_CCIV3	C	From Leg	4.00	0.000	118.00	No Ice	1.53	0.82	0.04
			0.000			1/2" Ice	1.69	0.95	0.05
			0.000			1" Ice	1.85	1.08	0.06
(2) 1 5/8 x 6' unistrut	A	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
(2) 1 5/8 x 6' unistrut	B	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
(2) 1 5/8 x 6' unistrut	C	From Leg	0.00	0.000	118.00	No Ice	0.97	0.02	0.01
			0.000			1/2" Ice	1.39	0.04	0.02
			0.000			1" Ice	1.81	0.07	0.04
Miscellaneous [NA 508-3]	C	None		0.000	118.00	No Ice	10.62	10.62	0.56
						1/2" Ice	13.64	13.64	0.72
						1" Ice	16.86	16.86	0.92
Side Arm Mount [SO 101-3]	C	None		0.000	118.00	No Ice	5.81	5.81	0.25
						1/2" Ice	6.95	6.95	0.34
						1" Ice	8.28	8.28	0.46
110_TMO									
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Leg	4.00	0.000	110.00	No Ice	14.69	6.87	0.18
			0.000			1/2" Ice	15.46	7.55	0.31
			0.000			1" Ice	16.23	8.25	0.45

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
VV-65A-R1_TMO w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
VV-65A-R1_TMO w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
VV-65A-R1_TMO w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.46 4.91 5.36	2.69 3.10 3.52	0.05 0.10 0.15
AIR 6419 B41_TMO w/ Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
Radio 4480_TMOV2	A	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	B	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
Radio 4480_TMOV2	C	From Leg	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	2.88 3.09 3.31	1.40 1.56 1.73	0.08 0.10 0.13
110_Sprint									
DT465B-2XR w/ Mount Pipe	A	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	B	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
DT465B-2XR w/ Mount Pipe	C	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	5.50 5.97 6.45	4.38 4.84 5.30	0.09 0.16 0.25
APXVSPP18-C w/ Mount Pipe	A	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
APXVSPP18-C w/ Mount Pipe	B	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
APXVSPP18-C w/ Mount Pipe	C	From Face	4.00 0.000 0.000	0.000	110.00	No Ice 1/2" Ice 1" Ice	4.60 5.05 5.50	4.01 4.45 4.89	0.09 0.15 0.23
FD-RRH-2X50-800	A	From Face	4.00 0.000	0.000	110.00	No Ice 1/2" Ice	2.06 2.24	1.36 1.52	0.05 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	2.43	1.68	0.09
FD-RRH-2X50-800	B	From Face	4.00	0.000	110.00	No Ice	2.06	1.36	0.05
			0.000			1/2" Ice	2.24	1.52	0.07
			0.000			1" Ice	2.43	1.68	0.09
FD-RRH-2X50-800	C	From Face	4.00	0.000	110.00	No Ice	2.06	1.36	0.05
			0.000			1/2" Ice	2.24	1.52	0.07
			0.000			1" Ice	2.43	1.68	0.09
TD-RRH8X20-25	A	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
TD-RRH8X20-25	B	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
TD-RRH8X20-25	C	From Face	4.00	0.000	110.00	No Ice	3.70	1.29	0.07
			0.000			1/2" Ice	3.95	1.46	0.09
			0.000			1" Ice	4.20	1.64	0.12
(3) ACU-A20-N	A	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	B	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	C	From Face	4.00	0.000	110.00	No Ice	0.07	0.12	0.00
			0.000			1/2" Ice	0.10	0.16	0.00
			0.000			1" Ice	0.15	0.21	0.00
PV-RP10S-HR-12-96	C	None		0.000	110.00	No Ice	25.30	25.30	1.84
						1/2" Ice	32.20	32.20	2.49
						1" Ice	39.10	39.10	3.15
108									
(2) 800 EXTERNAL NOTCH FILTER	A	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800 EXTERNAL NOTCH FILTER	B	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800 EXTERNAL NOTCH FILTER	C	From Leg	1.00	0.000	108.00	No Ice	0.66	0.29	0.01
			0.000			1/2" Ice	0.76	0.36	0.02
			0.000			1" Ice	0.87	0.45	0.02
(2) 800MHZ RRH	A	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 800MHZ RRH	B	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 800MHZ RRH	C	From Leg	1.00	0.000	108.00	No Ice	2.13	1.77	0.05
			0.000			1/2" Ice	2.32	1.95	0.07
			0.000			1" Ice	2.51	2.13	0.10
(2) 1900MHZ RRH (65MHZ)	A	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
(2) 1900MHZ RRH (65MHZ)	B	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
(2) 1900MHZ RRH (65MHZ)	C	From Leg	1.00	0.000	108.00	No Ice	2.32	2.38	0.06
			0.000			1/2" Ice	2.53	2.59	0.08
			0.000			1" Ice	2.74	2.80	0.11
2.4" Dia. x 6' Mount Pipe	A	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
2.4" Dia. x 6' Mount Pipe	B	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
2.4" Dia. x 6' Mount Pipe	C	From Leg	0.50	0.000	108.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
98									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	8.01	4.23	0.11
			0.000			1/2" Ice	8.52	4.69	0.19
			0.000			1" Ice	9.04	5.16	0.29
TA08025-B605	A	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B605	B	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B605	C	From Leg	4.00	0.000	98.00	No Ice	1.96	1.13	0.08
			0.000			1/2" Ice	2.14	1.27	0.09
			0.000			1" Ice	2.32	1.41	0.11
TA08025-B604	A	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
TA08025-B604	B	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
TA08025-B604	C	From Leg	4.00	0.000	98.00	No Ice	1.96	0.98	0.06
			0.000			1/2" Ice	2.14	1.11	0.08
			0.000			1" Ice	2.32	1.25	0.10
RDIDC-9181-PF-48	A	From Leg	4.00	0.000	98.00	No Ice	2.01	1.17	0.02
			0.000			1/2" Ice	2.19	1.31	0.04
			0.000			1" Ice	2.37	1.46	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
(2) 2.4" Dia x 8-ft Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	1.90	1.90	0.03
			0.000			1/2" Ice	2.73	2.73	0.04
			0.000			1" Ice	3.40	3.40	0.06
Commscope MC-K6MHDX-9-96 (3)	C	None		0.000	98.00	No Ice	15.30	15.30	1.19
						1/2" Ice	20.48	20.48	1.71
						1" Ice	25.66	25.66	2.22
90									
(2) KRY 112 71/2	A	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02
			0.000			1" Ice	0.80	0.64	0.03
(2) KRY 112 71/2	B	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	0.80	0.64	0.03
(2) KRY 112 71/2	C	From Leg	2.00	0.000	90.00	No Ice	0.58	0.45	0.01
			0.000			1/2" Ice	0.69	0.54	0.02
			0.000			1" Ice	0.80	0.64	0.03
(2) 2.4" Dia. x 6' Mount Pipe	A	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
(2) 2.4" Dia. x 6' Mount Pipe	B	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
(2) 2.4" Dia. x 6' Mount Pipe	C	From Leg	1.00	0.000	90.00	No Ice	1.43	1.43	0.02
			0.000			1/2" Ice	1.93	1.93	0.04
			0.000			1" Ice	2.31	2.31	0.06
Miscellaneous [NA 508-3]	C	None		0.000	90.00	No Ice	10.62	10.62	0.56
						1/2" Ice	13.64	13.64	0.72
						1" Ice	16.86	16.86	0.92
Side Arm Mount [SO 101-3]	C	None		0.000	90.00	No Ice	5.81	5.81	0.25
						1/2" Ice	6.95	6.95	0.34
						1" Ice	8.28	8.28	0.46
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Load Combinations

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

Comb. No.	Description
25	0.9 Dead+1.0 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
L1	130 - 125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.51	0.11	-0.50
			Max. Mx	20	-4.79	22.40	-0.20
			Max. My	14	-4.79	0.07	-22.49
			Max. Vy	8	8.52	-22.24	-0.21
			Max. Vx	14	8.49	0.07	-22.49
			Max. Torque	8			-0.43
L2	125 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.03	0.06	-0.47
			Max. Mx	20	-5.45	72.79	-0.18
			Max. My	14	-5.45	0.04	-72.73
			Max. Vy	8	10.65	-72.66	-0.22
			Max. Vx	14	10.62	0.04	-72.73
			Max. Torque	8			-0.43
L3	120 - 115	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.14	-0.35	-0.23
			Max. Mx	8	-9.46	-144.11	-0.14
			Max. My	14	-9.46	-0.14	-143.74
			Max. Vy	8	16.74	-144.11	-0.14
			Max. Vx	14	16.71	-0.14	-143.74
			Max. Torque	8			-0.43
L4	115 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.73	-0.39	-0.21
			Max. Mx	8	-10.22	-234.73	-0.14
			Max. My	14	-10.23	-0.17	-234.17
			Max. Vy	8	18.86	-234.73	-0.14
			Max. Vx	2	-18.83	-0.07	233.94

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	6			-0.33
L5	110 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.36	-0.44	-0.18
			Max. Mx	8	-16.85	-367.07	-0.15
			Max. My	14	-16.85	-0.20	-366.31
			Max. Vy	8	27.41	-367.07	-0.15
			Max. Vx	2	-27.38	-0.08	366.10
			Max. Torque	6			-0.33
L6	105 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.95	-0.49	-0.15
			Max. Mx	8	-18.07	-512.62	-0.15
			Max. My	14	-18.07	-0.24	-511.68
			Max. Vy	8	31.06	-512.62	-0.15
			Max. Vx	2	-31.03	-0.08	511.49
			Max. Torque	6			-0.33
L7	100 - 99.27	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.09	-0.49	-0.15
			Max. Mx	8	-18.18	-535.32	-0.15
			Max. My	14	-18.18	-0.24	-534.34
			Max. Vy	8	31.13	-535.32	-0.15
			Max. Vx	2	-31.09	-0.08	534.16
			Max. Torque	6			-0.33
L8	99.27 - 99.02	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.15	-0.50	-0.15
			Max. Mx	8	-18.24	-543.10	-0.15
			Max. My	14	-18.25	-0.24	-542.12
			Max. Vy	8	31.15	-543.10	-0.15
			Max. Vx	2	-31.11	-0.09	541.93
			Max. Torque	6			-0.33
L9	99.02 - 97.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.21	-0.51	0.19
			Max. Mx	8	-21.09	-607.04	-0.04
			Max. My	2	-21.09	-0.09	605.95
			Max. Vy	8	33.50	-607.04	-0.04
			Max. Vx	2	-33.50	-0.09	605.95
			Max. Torque	6			-0.33
L10	97.04 - 96.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.30	-0.52	0.19
			Max. Mx	8	-21.18	-615.41	-0.04
			Max. My	2	-21.18	-0.09	614.33
			Max. Vy	8	33.52	-615.41	-0.04
			Max. Vx	2	-33.52	-0.09	614.33
			Max. Torque	18			0.16
L11	96.79 - 96.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.47	-0.52	0.19
			Max. Mx	8	-21.31	-630.85	-0.04
			Max. My	2	-21.31	-0.09	629.76
			Max. Vy	8	33.57	-630.85	-0.04
			Max. Vx	2	-33.57	-0.09	629.76
			Max. Torque	18			0.16
L12	96.33 - 96.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.54	-0.52	0.19
			Max. Mx	8	-21.37	-639.24	-0.04
			Max. My	2	-21.37	-0.09	638.15
			Max. Vy	8	33.60	-639.24	-0.04
			Max. Vx	2	-33.60	-0.09	638.15
			Max. Torque	18			0.16
L13	96.08 - 94.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.08	-0.54	0.20
			Max. Mx	8	-21.74	-699.56	-0.04
			Max. My	2	-21.74	-0.09	698.46

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	33.80	-699.56	-0.04
			Max. Vx	2	-33.79	-0.09	698.46
			Max. Torque	18			0.16
L14	94.29 - 94.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.15	-0.54	0.21
			Max. Mx	8	-21.81	-708.01	-0.04
			Max. My	2	-21.82	-0.09	706.91
			Max. Vy	8	33.82	-708.01	-0.04
			Max. Vx	2	-33.81	-0.09	706.91
			Max. Torque	18			0.16
L15	94.04 - 91.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.77	-0.57	0.22
			Max. Mx	8	-22.64	-797.04	-0.05
			Max. My	2	-22.64	-0.09	795.92
			Max. Vy	8	35.64	-797.04	-0.05
			Max. Vx	2	-35.64	-0.09	795.92
			Max. Torque	18			0.16
L16	91.5 - 91.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.84	-0.57	0.22
			Max. Mx	8	-22.71	-805.95	-0.05
			Max. My	2	-22.71	-0.09	804.83
			Max. Vy	8	35.66	-805.95	-0.05
			Max. Vx	2	-35.65	-0.09	804.83
			Max. Torque	6			-0.16
L17	91.25 - 86.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.13	-0.62	0.25
			Max. Mx	8	-25.26	-994.44	-0.05
			Max. My	2	-25.26	-0.10	993.29
			Max. Vy	8	38.84	-994.44	-0.05
			Max. Vx	2	-38.84	-0.10	993.29
			Max. Torque	18			0.16
L18	86.25 - 86.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.19	-0.63	0.25
			Max. Mx	8	-25.31	-1001.04	-0.05
			Max. My	2	-25.31	-0.10	999.89
			Max. Vy	8	38.85	-1001.04	-0.05
			Max. Vx	2	-38.85	-0.10	999.89
			Max. Torque	6			-0.16
L19	86.08 - 85.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.26	-0.63	0.25
			Max. Mx	8	-25.37	-1010.76	-0.05
			Max. My	2	-25.37	-0.10	1009.61
			Max. Vy	8	38.88	-1010.76	-0.05
			Max. Vx	2	-38.87	-0.10	1009.61
			Max. Torque	6			-0.16
L20	85.83 - 75.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.32	-0.68	0.28
			Max. Mx	8	-27.06	-1206.70	-0.05
			Max. My	2	-27.06	-0.11	1205.51
			Max. Vy	8	42.40	-1206.70	-0.05
			Max. Vx	2	-42.39	-0.11	1205.51
			Max. Torque	6			-0.16
L21	75.75 - 74.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.51	-0.75	0.32
			Max. Mx	8	-29.71	-1474.01	-0.05
			Max. My	2	-29.71	-0.12	1472.79
			Max. Vy	8	43.15	-1474.01	-0.05
			Max. Vx	2	-43.14	-0.12	1472.79
			Max. Torque	6			-0.16
L22	74.75 - 71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.77	-0.79	0.35

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-30.79	-1636.48	-0.06
			Max. My	2	-30.80	-0.13	1635.24
			Max. Vy	8	43.52	-1636.48	-0.06
			Max. Vx	2	-43.52	-0.13	1635.24
			Max. Torque	6			-0.16
L23	71 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.88	-0.79	0.35
			Max. Mx	8	-30.90	-1647.36	-0.06
			Max. My	2	-30.90	-0.13	1646.12
			Max. Vy	8	43.54	-1647.36	-0.06
			Max. Vx	2	-43.53	-0.13	1646.12
			Max. Torque	6			-0.16
L24	70.75 - 65.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.99	-0.85	0.38
			Max. Mx	8	-32.69	-1866.42	-0.06
			Max. My	2	-32.69	-0.14	1865.14
			Max. Vy	8	44.09	-1866.42	-0.06
			Max. Vx	2	-44.08	-0.14	1865.14
			Max. Torque	6			-0.16
L25	65.75 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.12	-0.91	0.41
			Max. Mx	8	-34.53	-2088.17	-0.06
			Max. My	2	-34.53	-0.14	2086.86
			Max. Vy	8	44.63	-2088.17	-0.06
			Max. Vx	2	-44.62	-0.14	2086.86
			Max. Torque	6			-0.16
L26	60.75 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.45	-0.91	0.42
			Max. Mx	8	-34.81	-2121.66	-0.06
			Max. My	2	-34.81	-0.15	2120.35
			Max. Vy	8	44.70	-2121.66	-0.06
			Max. Vx	2	-44.70	-0.15	2120.35
			Max. Torque	6			-0.16
L27	60 - 59.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.56	-0.92	0.42
			Max. Mx	8	-34.91	-2132.84	-0.06
			Max. My	2	-34.91	-0.15	2131.52
			Max. Vy	8	44.72	-2132.84	-0.06
			Max. Vx	2	-44.72	-0.15	2131.52
			Max. Torque	6			-0.16
L28	59.75 - 54.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.62	-0.98	0.46
			Max. Mx	8	-36.70	-2357.74	-0.06
			Max. My	2	-36.70	-0.16	2356.40
			Max. Vy	8	45.25	-2357.74	-0.06
			Max. Vx	2	-45.24	-0.16	2356.40
			Max. Torque	6			-0.16
L29	54.75 - 44	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.59	-1.03	0.49
			Max. Mx	8	-38.44	-2573.76	-0.06
			Max. My	2	-38.44	-0.17	2572.38
			Max. Vy	8	45.73	-2573.76	-0.06
			Max. Vx	2	-45.72	-0.17	2572.38
			Max. Torque	6			-0.16
L30	44 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.42	-1.12	0.54
			Max. Mx	8	-43.53	-2896.89	-0.06
			Max. My	2	-43.53	-0.18	2895.47
			Max. Vy	8	46.60	-2896.89	-0.06
			Max. Vx	2	-46.59	-0.18	2895.47
			Max. Torque	6			-0.16

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L31	43 - 42.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.50	-1.12	0.54
			Max. Mx	8	-43.62	-2903.88	-0.06
			Max. My	2	-43.62	-0.18	2902.46
			Max. Vy	8	46.60	-2903.88	-0.06
			Max. Vx	2	-46.60	-0.18	2902.46
			Max. Torque	6			-0.16
L32	42.85 - 37.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.23	-1.18	0.58
			Max. Mx	8	-45.99	-3138.17	-0.06
			Max. My	2	-45.99	-0.19	3136.72
			Max. Vy	8	47.12	-3138.17	-0.06
			Max. Vx	2	-47.12	-0.19	3136.72
			Max. Torque	6			-0.16
L33	37.85 - 32.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.98	-1.25	0.61
			Max. Mx	8	-48.42	-3374.95	-0.06
			Max. My	2	-48.42	-0.21	3373.47
			Max. Vy	8	47.61	-3374.95	-0.06
			Max. Vx	2	-47.61	-0.21	3373.47
			Max. Torque	6			-0.16
L34	32.85 - 27.85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.78	-1.31	0.65
			Max. Mx	8	-50.88	-3614.15	-0.06
			Max. My	2	-50.88	-0.22	3612.63
			Max. Vy	8	48.09	-3614.15	-0.06
			Max. Vx	2	-48.08	-0.22	3612.63
			Max. Torque	6			-0.16
L35	27.85 - 26.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.68	-1.33	0.66
			Max. Mx	8	-51.66	-3691.18	-0.06
			Max. My	2	-51.66	-0.22	3689.66
			Max. Vy	8	48.24	-3691.18	-0.06
			Max. Vx	2	-48.24	-0.22	3689.66
			Max. Torque	6			-0.16
L36	26.25 - 26	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.84	-1.34	0.66
			Max. Mx	8	-51.82	-3703.24	-0.06
			Max. My	2	-51.82	-0.22	3701.72
			Max. Vy	8	48.24	-3703.24	-0.06
			Max. Vx	2	-48.24	-0.22	3701.72
			Max. Torque	6			-0.16
L37	26 - 21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.96	-1.40	0.70
			Max. Mx	8	-54.58	-3945.62	-0.05
			Max. My	2	-54.58	-0.24	3944.06
			Max. Vy	8	48.72	-3945.62	-0.05
			Max. Vx	2	-48.71	-0.24	3944.06
			Max. Torque	6			-0.16
L38	21 - 16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.11	-1.47	0.74
			Max. Mx	8	-57.38	-4190.23	-0.05
			Max. My	2	-57.38	-0.25	4188.64
			Max. Vy	8	49.15	-4190.23	-0.05
			Max. Vx	2	-49.14	-0.25	4188.64
			Max. Torque	6			-0.16
L39	16 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-89.28	-1.53	0.78
			Max. Mx	8	-60.22	-4436.92	-0.05
			Max. My	2	-60.22	-0.27	4435.30
			Max. Vy	8	49.55	-4436.92	-0.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-49.55	-0.27	4435.30
			Max. Torque	6			-0.16
L40	11 - 6	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-92.46	-1.60	0.81
			Max. Mx	8	-63.08	-4685.63	-0.05
			Max. My	2	-63.08	-0.28	4683.98
			Max. Vy	8	49.95	-4685.63	-0.05
			Max. Vx	2	-49.95	-0.28	4683.98
			Max. Torque	6			-0.16
L41	6 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.63	-1.66	0.85
			Max. Mx	8	-65.98	-4936.33	-0.04
			Max. My	2	-65.98	-0.30	4934.65
			Max. Vy	8	50.35	-4936.33	-0.04
			Max. Vx	2	-50.35	-0.30	4934.65
			Max. Torque	6			-0.16
L42	1 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-96.26	-1.67	0.86
			Max. Mx	8	-66.57	-4986.71	-0.04
			Max. My	2	-66.57	-0.30	4985.02
			Max. Vy	8	50.43	-4986.71	-0.04
			Max. Vx	2	-50.43	-0.30	4985.02
			Max. Torque	6			-0.16

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	96.26	0.00	0.00
	Max. H_x	21	49.94	50.41	0.00
	Max. H_z	3	49.94	0.00	50.41
	Max. M_x	2	4985.02	0.00	50.41
	Max. M_z	8	4986.71	-50.41	-0.00
	Max. Torsion	18	0.16	43.66	-25.20
	Min. Vert	25	49.94	25.21	43.66
	Min. H_x	9	49.94	-50.41	-0.00
	Min. H_z	15	49.94	-0.00	-50.41
	Min. M_x	14	-4984.39	-0.00	-50.41
	Min. M_z	20	-4985.39	50.41	0.00
	Min. Torsion	6	-0.16	-43.66	25.20

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	55.49	0.00	0.00	-0.26	-0.53	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	66.58	-0.00	-50.41	-4985.02	-0.30	0.11
0.9 Dead+1.0 Wind 0 deg - No Ice	49.94	-0.00	-50.41	-4952.11	-0.13	0.11
1.2 Dead+1.0 Wind 30 deg - No	66.58	25.59	-44.32	-4347.75	-2511.12	0.16

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
Ice						
0.9 Dead+1.0 Wind 30 deg - No Ice	49.94	25.59	-44.32	-4319.13	-2494.47	0.15
1.2 Dead+1.0 Wind 60 deg - No Ice	66.58	43.66	-25.20	-2492.36	-4318.53	0.16
0.9 Dead+1.0 Wind 60 deg - No Ice	49.94	43.66	-25.20	-2475.87	-4289.92	0.15
1.2 Dead+1.0 Wind 90 deg - No Ice	66.58	50.41	0.00	0.04	-4986.71	0.12
0.9 Dead+1.0 Wind 90 deg - No Ice	49.94	50.41	0.00	0.12	-4953.70	0.11
1.2 Dead+1.0 Wind 120 deg - No Ice	66.58	43.66	25.21	2492.35	-4318.88	0.04
0.9 Dead+1.0 Wind 120 deg - No Ice	49.94	43.66	25.21	2476.01	-4290.27	0.04
1.2 Dead+1.0 Wind 150 deg - No Ice	66.58	25.21	43.66	4316.75	-2493.99	-0.04
0.9 Dead+1.0 Wind 150 deg - No Ice	49.94	25.21	43.66	4288.40	-2477.40	-0.04
1.2 Dead+1.0 Wind 180 deg - No Ice	66.58	0.00	50.41	4984.39	-1.01	-0.11
0.9 Dead+1.0 Wind 180 deg - No Ice	49.94	0.00	50.41	4951.65	-0.84	-0.11
1.2 Dead+1.0 Wind 210 deg - No Ice	66.58	-25.59	44.32	4347.13	2509.81	-0.16
0.9 Dead+1.0 Wind 210 deg - No Ice	49.94	-25.59	44.32	4318.67	2493.49	-0.15
1.2 Dead+1.0 Wind 240 deg - No Ice	66.58	-43.66	25.20	2491.73	4317.21	-0.16
0.9 Dead+1.0 Wind 240 deg - No Ice	49.94	-43.66	25.20	2475.40	4288.94	-0.15
1.2 Dead+1.0 Wind 270 deg - No Ice	66.58	-50.41	-0.00	-0.67	4985.39	-0.12
0.9 Dead+1.0 Wind 270 deg - No Ice	49.94	-50.41	-0.00	-0.59	4952.72	-0.11
1.2 Dead+1.0 Wind 300 deg - No Ice	66.58	-43.66	-25.21	-2492.98	4317.57	-0.04
0.9 Dead+1.0 Wind 300 deg - No Ice	49.94	-43.66	-25.21	-2476.48	4289.29	-0.04
1.2 Dead+1.0 Wind 330 deg - No Ice	66.58	-25.21	-43.66	-4317.37	2492.68	0.04
0.9 Dead+1.0 Wind 330 deg - No Ice	49.94	-25.21	-43.66	-4288.87	2476.42	0.04
1.2 Dead+1.0 Ice+1.0 Temp	96.26	0.00	0.00	-0.86	-1.67	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	96.26	-0.00	-7.29	-727.03	-1.71	0.03
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	96.26	3.65	-6.31	-629.72	-364.86	0.03
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	96.26	6.31	-3.65	-363.92	-630.72	0.02
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	96.26	7.29	0.00	-0.84	-728.05	0.01
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	96.26	6.31	3.65	362.22	-630.77	-0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	96.26	3.65	6.31	627.98	-364.95	-0.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	96.26	0.00	7.29	725.24	-1.82	-0.03
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	96.26	-3.65	6.31	627.93	361.33	-0.03
1.2 Dead+1.0 Wind 240	96.26	-6.31	3.65	362.13	627.19	-0.02

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	96.26	-7.29	-0.00	-0.95	724.51	-0.01
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	96.26	-6.31	-3.65	-364.01	627.24	0.00
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	96.26	-3.65	-6.31	-629.77	361.42	0.02
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	55.49	-0.00	-12.93	-1273.84	-0.45	0.03
Dead+Wind 30 deg - Service	55.49	6.56	-11.36	-1111.04	-641.97	0.04
Dead+Wind 60 deg - Service	55.49	11.19	-6.46	-636.97	-1103.75	0.04
Dead+Wind 90 deg - Service	55.49	12.93	0.00	-0.17	-1274.47	0.03
Dead+Wind 120 deg - Service	55.49	11.20	6.46	636.61	-1103.84	0.00
Dead+Wind 150 deg - Service	55.49	6.46	11.19	1102.74	-637.59	-0.02
Dead+Wind 180 deg - Service	55.49	0.00	12.93	1273.32	-0.64	-0.03
Dead+Wind 210 deg - Service	55.49	-6.56	11.36	1110.51	640.88	-0.04
Dead+Wind 240 deg - Service	55.49	-11.19	6.46	636.45	1102.66	-0.04
Dead+Wind 270 deg - Service	55.49	-12.93	-0.00	-0.35	1273.38	-0.03
Dead+Wind 300 deg - Service	55.49	-11.20	-6.46	-637.13	1102.75	-0.00
Dead+Wind 330 deg - Service	55.49	-6.46	-11.19	-1103.26	636.49	0.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-55.49	0.00	0.00	55.49	0.00	0.000%
2	-0.00	-66.58	-50.41	0.00	66.58	50.41	0.000%
3	-0.00	-49.94	-50.41	0.00	49.94	50.41	0.000%
4	25.59	-66.58	-44.32	-25.59	66.58	44.32	0.000%
5	25.59	-49.94	-44.32	-25.59	49.94	44.32	0.000%
6	43.66	-66.58	-25.20	-43.66	66.58	25.20	0.000%
7	43.66	-49.94	-25.20	-43.66	49.94	25.20	0.000%
8	50.41	-66.58	0.00	-50.41	66.58	-0.00	0.000%
9	50.41	-49.94	0.00	-50.41	49.94	-0.00	0.000%
10	43.66	-66.58	25.21	-43.66	66.58	-25.21	0.000%
11	43.66	-49.94	25.21	-43.66	49.94	-25.21	0.000%
12	25.21	-66.58	43.66	-25.21	66.58	-43.66	0.000%
13	25.21	-49.94	43.66	-25.21	49.94	-43.66	0.000%
14	0.00	-66.58	50.41	-0.00	66.58	-50.41	0.000%
15	0.00	-49.94	50.41	-0.00	49.94	-50.41	0.000%
16	-25.59	-66.58	44.32	25.59	66.58	-44.32	0.000%
17	-25.59	-49.94	44.32	25.59	49.94	-44.32	0.000%
18	-43.66	-66.58	25.20	43.66	66.58	-25.20	0.000%
19	-43.66	-49.94	25.20	43.66	49.94	-25.20	0.000%
20	-50.41	-66.58	-0.00	50.41	66.58	0.00	0.000%
21	-50.41	-49.94	-0.00	50.41	49.94	0.00	0.000%
22	-43.66	-66.58	-25.21	43.66	66.58	25.21	0.000%
23	-43.66	-49.94	-25.21	43.66	49.94	25.21	0.000%
24	-25.21	-66.58	-43.66	25.21	66.58	43.66	0.000%
25	-25.21	-49.94	-43.66	25.21	49.94	43.66	0.000%
26	0.00	-96.26	0.00	0.00	96.26	0.00	0.000%
27	-0.00	-96.26	-7.29	0.00	96.26	7.29	0.000%
28	3.65	-96.26	-6.31	-3.65	96.26	6.31	0.000%
29	6.31	-96.26	-3.65	-6.31	96.26	3.65	0.000%
30	7.29	-96.26	0.00	-7.29	96.26	-0.00	0.000%
31	6.31	-96.26	3.65	-6.31	96.26	-3.65	0.000%
32	3.65	-96.26	6.31	-3.65	96.26	-6.31	0.000%
33	0.00	-96.26	7.29	-0.00	96.26	-7.29	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
34	-3.65	-96.26	6.31	3.65	96.26	-6.31	0.000%
35	-6.31	-96.26	3.65	6.31	96.26	-3.65	0.000%
36	-7.29	-96.26	-0.00	7.29	96.26	0.00	0.000%
37	-6.31	-96.26	-3.65	6.31	96.26	3.65	0.000%
38	-3.65	-96.26	-6.31	3.65	96.26	6.31	0.000%
39	-0.00	-55.49	-12.93	0.00	55.49	12.93	0.000%
40	6.56	-55.49	-11.36	-6.56	55.49	11.36	0.000%
41	11.19	-55.49	-6.46	-11.19	55.49	6.46	0.000%
42	12.93	-55.49	0.00	-12.93	55.49	-0.00	0.000%
43	11.20	-55.49	6.46	-11.20	55.49	-6.46	0.000%
44	6.46	-55.49	11.19	-6.46	55.49	-11.19	0.000%
45	0.00	-55.49	12.93	-0.00	55.49	-12.93	0.000%
46	-6.56	-55.49	11.36	6.56	55.49	-11.36	0.000%
47	-11.19	-55.49	6.46	11.19	55.49	-6.46	0.000%
48	-12.93	-55.49	-0.00	12.93	55.49	0.00	0.000%
49	-11.20	-55.49	-6.46	11.20	55.49	6.46	0.000%
50	-6.46	-55.49	-11.19	6.46	55.49	11.19	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00006385
3	Yes	4	0.00000001	0.00092843
4	Yes	6	0.00000001	0.00011169
5	Yes	6	0.00000001	0.00003492
6	Yes	6	0.00000001	0.00011075
7	Yes	6	0.00000001	0.00003467
8	Yes	5	0.00000001	0.00006388
9	Yes	4	0.00000001	0.00093012
10	Yes	6	0.00000001	0.00011112
11	Yes	6	0.00000001	0.00003479
12	Yes	6	0.00000001	0.00011108
13	Yes	6	0.00000001	0.00003478
14	Yes	5	0.00000001	0.00006412
15	Yes	4	0.00000001	0.00093500
16	Yes	6	0.00000001	0.00011109
17	Yes	6	0.00000001	0.00003472
18	Yes	6	0.00000001	0.00011122
19	Yes	6	0.00000001	0.00003484
20	Yes	5	0.00000001	0.00006363
21	Yes	4	0.00000001	0.00092406
22	Yes	6	0.00000001	0.00011092
23	Yes	6	0.00000001	0.00003473
24	Yes	6	0.00000001	0.00011090
25	Yes	6	0.00000001	0.00003473
26	Yes	4	0.00000001	0.00000001
27	Yes	6	0.00000001	0.00006634
28	Yes	6	0.00000001	0.00006910
29	Yes	6	0.00000001	0.00006915
30	Yes	6	0.00000001	0.00006651
31	Yes	6	0.00000001	0.00006906
32	Yes	6	0.00000001	0.00006897
33	Yes	6	0.00000001	0.00006619
34	Yes	6	0.00000001	0.00006868

35	Yes	6	0.00000001	0.00006866
36	Yes	6	0.00000001	0.00006608
37	Yes	6	0.00000001	0.00006877
38	Yes	6	0.00000001	0.00006883
39	Yes	4	0.00000001	0.00054102
40	Yes	5	0.00000001	0.00008344
41	Yes	5	0.00000001	0.00008184
42	Yes	4	0.00000001	0.00054091
43	Yes	5	0.00000001	0.00008232
44	Yes	5	0.00000001	0.00008247
45	Yes	4	0.00000001	0.00054093
46	Yes	5	0.00000001	0.00008222
47	Yes	5	0.00000001	0.00008253
48	Yes	4	0.00000001	0.00054031
49	Yes	5	0.00000001	0.00008212
50	Yes	5	0.00000001	0.00008193

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	16.007	40	1.102	0.001
L2	125 - 120	14.853	40	1.101	0.000
L3	120 - 115	13.705	40	1.090	0.000
L4	115 - 110	12.573	40	1.070	0.000
L5	110 - 105	11.469	40	1.037	0.000
L6	105 - 100	10.406	40	0.991	0.000
L7	100 - 99.27	9.399	40	0.930	0.000
L8	99.27 - 99.02	9.258	40	0.920	0.000
L9	99.02 - 97.04	9.210	40	0.918	0.000
L10	97.04 - 96.79	8.832	40	0.902	0.000
L11	96.79 - 96.33	8.785	40	0.901	0.000
L12	96.33 - 96.08	8.698	40	0.898	0.000
L13	96.08 - 94.29	8.651	40	0.896	0.000
L14	94.29 - 94.04	8.318	40	0.880	0.000
L15	94.04 - 91.5	8.272	40	0.878	0.000
L16	91.5 - 91.25	7.812	40	0.854	0.000
L17	91.25 - 86.25	7.767	40	0.851	0.000
L18	86.25 - 86.08	6.904	40	0.797	0.000
L19	86.08 - 85.83	6.875	40	0.795	0.000
L20	85.83 - 75.75	6.834	40	0.792	0.000
L21	81 - 74.75	6.062	40	0.733	0.000
L22	74.75 - 71	5.128	40	0.688	0.000
L23	71 - 70.75	4.606	40	0.641	0.000
L24	70.75 - 65.75	4.572	40	0.639	0.000
L25	65.75 - 60.75	3.929	40	0.590	0.000
L26	60.75 - 60	3.337	40	0.539	0.000
L27	60 - 59.75	3.253	40	0.531	0.000
L28	59.75 - 54.75	3.226	40	0.529	0.000
L29	54.75 - 44	2.701	40	0.473	0.000
L30	50 - 43	2.257	40	0.419	0.000
L31	43 - 42.85	1.669	40	0.379	0.000
L32	42.85 - 37.85	1.657	40	0.378	0.000
L33	37.85 - 32.85	1.285	40	0.332	0.000
L34	32.85 - 27.85	0.962	40	0.285	0.000
L35	27.85 - 26.25	0.689	40	0.237	0.000
L36	26.25 - 26	0.612	40	0.222	0.000
L37	26 - 21	0.600	40	0.220	0.000
L38	21 - 16	0.392	40	0.178	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L39	16 - 11	0.228	40	0.136	0.000
L40	11 - 6	0.108	40	0.093	0.000
L41	6 - 1	0.032	40	0.051	0.000
L42	1 - 0	0.001	40	0.008	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	5/8" x 4' Lightning Rod	40	16.007	1.102	0.001	49078
127.00	(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	40	15.314	1.102	0.001	49078
124.00	Tree Pole Branchs.	40	14.622	1.099	0.000	38251
118.00	Tree Pole Branchs.	40	13.249	1.084	0.000	14360
113.50	Tree Pole Branchs.	40	12.238	1.061	0.000	9393
110.00	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	40	11.469	1.037	0.000	7246
109.30	Tree Pole Branchs.	40	11.317	1.031	0.000	6907
108.00	(2) 800 EXTERNAL NOTCH FILTER	40	11.038	1.020	0.000	6341
104.30	Tree Pole Branchs.	40	10.261	0.983	0.000	5121
100.30	Tree Pole Branchs.	40	9.458	0.934	0.000	5148
98.00	MX08FRO665-21 w/ Mount Pipe	40	9.014	0.910	0.000	6147
93.30	Tree Pole Branchs.	40	8.137	0.871	0.000	6138
90.00	(2) KRY 112 71/2	40	7.546	0.838	0.000	5460
89.30	Tree Pole Branchs.	40	7.424	0.831	0.000	5328
85.30	Tree Pole Branchs.	40	6.746	0.786	0.000	4964
81.30	Tree Pole Branchs.	40	6.108	0.736	0.000	6230

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	62.637	4	4.320	0.002
L2	125 - 120	58.123	4	4.313	0.002
L3	120 - 115	53.632	4	4.272	0.001
L4	115 - 110	49.203	4	4.191	0.001
L5	110 - 105	44.884	4	4.062	0.001
L6	105 - 100	40.726	4	3.880	0.001
L7	100 - 99.27	36.788	4	3.642	0.000
L8	99.27 - 99.02	36.235	4	3.603	0.000
L9	99.02 - 97.04	36.046	4	3.596	0.000
L10	97.04 - 96.79	34.569	4	3.535	0.000
L11	96.79 - 96.33	34.385	4	3.529	0.000
L12	96.33 - 96.08	34.046	4	3.519	0.000
L13	96.08 - 94.29	33.862	4	3.510	0.000
L14	94.29 - 94.04	32.559	4	3.448	0.000
L15	94.04 - 91.5	32.379	4	3.439	0.000
L16	91.5 - 91.25	30.576	4	3.344	0.000
L17	91.25 - 86.25	30.401	4	3.334	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L18	86.25 - 86.08	27.022	4	3.122	0.000
L19	86.08 - 85.83	26.911	4	3.114	0.000
L20	85.83 - 75.75	26.749	4	3.103	0.000
L21	81 - 74.75	23.728	4	2.869	0.000
L22	74.75 - 71	20.074	4	2.696	0.000
L23	71 - 70.75	18.030	4	2.512	0.000
L24	70.75 - 65.75	17.899	4	2.503	0.000
L25	65.75 - 60.75	15.379	4	2.311	0.000
L26	60.75 - 60	13.064	4	2.111	0.000
L27	60 - 59.75	12.735	4	2.081	0.000
L28	59.75 - 54.75	12.626	4	2.070	0.000
L29	54.75 - 44	10.572	4	1.853	0.000
L30	50 - 43	8.834	4	1.641	0.000
L31	43 - 42.85	6.532	4	1.486	0.000
L32	42.85 - 37.85	6.485	4	1.480	0.000
L33	37.85 - 32.85	5.030	4	1.298	0.000
L34	32.85 - 27.85	3.767	4	1.115	0.000
L35	27.85 - 26.25	2.697	4	0.929	0.000
L36	26.25 - 26	2.396	4	0.871	0.000
L37	26 - 21	2.350	4	0.863	0.000
L38	21 - 16	1.534	4	0.697	0.000
L39	16 - 11	0.891	4	0.532	0.000
L40	11 - 6	0.421	4	0.365	0.000
L41	6 - 1	0.125	4	0.200	0.000
L42	1 - 0	0.003	4	0.033	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	5/8" x 4' Lightning Rod	4	62.637	4.320	0.002	12905
127.00	(2) X7CQAP-FRO-860-VR0 w/ Mount Pipe	4	59.927	4.318	0.002	12905
124.00	Tree Pole Branchs.	4	57.222	4.308	0.002	10026
118.00	Tree Pole Branchs.	4	51.850	4.245	0.001	3713
113.50	Tree Pole Branchs.	4	47.894	4.158	0.001	2425
110.00	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	4	44.884	4.062	0.001	1868
109.30	Tree Pole Branchs.	4	44.291	4.040	0.001	1781
108.00	(2) 800 EXTERNAL NOTCH FILTER	4	43.198	3.995	0.001	1634
104.30	Tree Pole Branchs.	4	40.160	3.852	0.001	1318
100.30	Tree Pole Branchs.	4	37.017	3.660	0.000	1324
98.00	MX08FRO665-21 w/ Mount Pipe	4	35.282	3.564	0.000	1581
93.30	Tree Pole Branchs.	4	31.848	3.412	0.000	1577
90.00	(2) KRY 112 71/2	4	29.536	3.284	0.000	1402
89.30	Tree Pole Branchs.	4	29.057	3.255	0.000	1368
85.30	Tree Pole Branchs.	4	26.406	3.078	0.000	1274
81.30	Tree Pole Branchs.	4	23.910	2.881	0.000	1598

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	130 - 125 (1)	TP24.687x23.588x0.25	5.00	0.00	0.0	19.672	-4.79	1150.81	0.004
L2	125 - 120 (2)	TP25.787x24.687x0.25	5.00	0.00	0.0	20.557	-5.45	1202.58	0.005
L3	120 - 115 (3)	TP26.886x25.787x0.25	5.00	0.00	0.0	21.442	-9.46	1254.35	0.008
L4	115 - 110 (4)	TP27.985x26.886x0.25	5.00	0.00	0.0	22.327	-10.22	1306.11	0.008
L5	110 - 105 (5)	TP29.084x27.985x0.25	5.00	0.00	0.0	23.212	-16.85	1357.88	0.012
L6	105 - 100 (6)	TP30.184x29.084x0.25	5.00	0.00	0.0	24.097	-18.07	1409.65	0.013
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	0.73	0.00	0.0	24.226	-18.18	1417.20	0.013
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	0.25	0.00	0.0	45.769	-18.24	2677.48	0.007
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	1.98	0.00	0.0	45.231	-21.09	2646.03	0.008
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	0.25	0.00	0.0	65.671	-21.18	3841.74	0.006
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	0.46	0.00	0.0	65.891	-21.31	3854.60	0.006
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	0.25	0.00	0.0	44.333	-21.37	2593.46	0.008
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	1.79	0.00	0.0	44.903	-21.74	2626.82	0.008
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	0.25	0.00	0.0	44.983	-21.81	2631.48	0.008
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	2.54	0.00	0.0	45.792	-22.64	2678.82	0.008
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	0.25	0.00	0.0	45.871	-22.71	2683.48	0.008
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	5.00	0.00	0.0	46.163	-25.26	2700.56	0.009
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	0.17	0.00	0.0	46.216	-25.31	2703.64	0.009
L19	86.08 - 85.83 (19)	TP33.299x33.244x0.431	0.25	0.00	0.0	45.641	-25.37	2669.99	0.010
L20	85.83 - 75.75 (20)	TP35.515x33.299x0.425	10.08	0.00	0.0	46.441	-27.06	2716.80	0.010
L21	75.75 - 74.75 (21)	TP35.237x33.861x0.519	6.25	0.00	0.0	57.993	-29.70	3392.56	0.009
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	3.75	0.00	0.0	57.961	-30.78	3390.75	0.009
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	0.25	0.00	0.0	79.133	-30.89	4629.27	0.007
L24	70.75 - 65.75 (24)	TP37.219x36.118x0.681	5.00	0.00	0.0	80.150	-32.68	4688.75	0.007
L25	65.75 - 60.75 (25)	TP38.32x37.219x0.669	5.00	0.00	0.0	81.077	-34.51	4742.99	0.007
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	0.75	0.00	0.0	81.432	-34.80	4763.79	0.007
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	0.25	0.00	0.0	77.054	-34.89	4507.67	0.008
L28	59.75 - 54.75 (28)	TP39.641x38.54x0.631	5.00	0.00	0.0	79.292	-36.68	4638.58	0.008
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	10.75	0.00	0.0	79.831	-38.42	4670.09	0.008
L30	44 - 43 (30)	TP41.539x39.999x0.831	7.00	0.00	0.0	108.961	-43.52	6374.19	0.007
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	0.15	0.00	0.0	109.049	-43.60	6379.36	0.007
L32	42.85 - 37.85 (32)	TP42.672x41.572x0.819	5.00	0.00	0.0	110.342	-45.98	6455.02	0.007
L33	37.85 - 32.85 (33)	TP43.773x42.672x0.806	5.00	0.00	0.0	111.546	-48.40	6525.44	0.007
L34	32.85 - 27.85 (34)	TP44.873x43.773x0.794	5.00	0.00	0.0	112.660	-50.86	6590.62	0.008
L35	27.85 - 26.25 (35)	TP45.225x44.873x0.794	1.60	0.00	0.0	113.560	-51.65	6643.25	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	0.25	0.00	0.0	129.487	-51.81	7575.00	0.007
L37	26 - 21 (37)	TP46.38x45.28x0.881	5.00	0.00	0.0	129.108	-54.57	7552.79	0.007
L38	21 - 16 (38)	TP47.48x46.38x0.881	5.00	0.00	0.0	132.229	-57.37	7735.41	0.007
L39	16 - 11 (39)	TP48.58x47.48x0.856	5.00	0.00	0.0	131.580	-60.21	7697.43	0.008
L40	11 - 6 (40)	TP49.68x48.58x0.856	5.00	0.00	0.0	134.613	-63.08	7874.86	0.008
L41	6 - 1 (41)	TP50.78x49.68x0.831	5.00	0.00	0.0	133.694	-65.98	7821.10	0.008
L42	1 - 0 (42)	TP51x50.78x0.831	1.00	0.00	0.0	134.283	-66.57	7855.55	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 125 (1)	TP24.687x23.588x0.25	22.52	679.90	0.033	0.00	679.90	0.000
L2	125 - 120 (2)	TP25.787x24.687x0.25	72.82	730.42	0.100	0.00	730.42	0.000
L3	120 - 115 (3)	TP26.886x25.787x0.25	144.11	781.54	0.184	0.00	781.54	0.000
L4	115 - 110 (4)	TP27.985x26.886x0.25	234.74	833.12	0.282	0.00	833.12	0.000
L5	110 - 105 (5)	TP29.084x27.985x0.25	367.07	885.01	0.415	0.00	885.01	0.000
L6	105 - 100 (6)	TP30.184x29.084x0.25	512.62	937.09	0.547	0.00	937.09	0.000
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	535.32	944.70	0.567	0.00	944.70	0.000
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	543.10	2040.57	0.266	0.00	2040.57	0.000
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	607.03	2048.08	0.296	0.00	2048.08	0.000
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	615.41	2937.58	0.209	0.00	2937.58	0.000
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	630.85	2957.50	0.213	0.00	2957.50	0.000
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	639.24	2023.21	0.316	0.00	2023.21	0.000
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	699.56	2075.97	0.337	0.00	2075.97	0.000
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	708.01	2083.40	0.340	0.00	2083.40	0.000
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	797.04	2159.57	0.369	0.00	2159.57	0.000
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	805.95	2167.14	0.372	0.00	2167.14	0.000
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	994.44	2259.45	0.440	0.00	2259.45	0.000
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	1001.04	2264.64	0.442	0.00	2264.64	0.000
L19	86.08 - 85.83 (19)	TP33.299x33.244x0.431	1010.76	2241.11	0.451	0.00	2241.11	0.000
L20	85.83 - 75.75 (20)	TP35.515x33.299x0.425	1206.70	2355.90	0.512	0.00	2355.90	0.000
L21	75.75 - 74.75 (21)	TP35.237x33.861x0.519	1474.10	3002.55	0.491	0.00	3002.55	0.000
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	1637.01	3075.53	0.532	0.00	3075.53	0.000
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	1647.93	4161.34	0.396	0.00	4161.34	0.000
L24	70.75 - 65.75 (24)	TP37.219x36.118x0.681	1867.81	4351.29	0.429	0.00	4351.29	0.000
L25	65.75 - 60.75 (25)	TP38.32x37.219x0.669	2090.67	4539.70	0.461	0.00	4539.70	0.000
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	2124.35	4579.97	0.464	0.00	4579.97	0.000
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	2135.59	4348.74	0.491	0.00	4348.74	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L28	59.75 - 54.75 (28)	TP39.641x38.54x0.631	2361.94	4607.14	0.513	0.00	4607.14	0.000
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	2579.50	4767.76	0.541	0.00	4767.76	0.000
L30	44 - 43 (30)	TP41.539x39.999x0.831	2905.15	6579.20	0.442	0.00	6579.20	0.000
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	2912.20	6589.98	0.442	0.00	6589.98	0.000
L32	42.85 - 37.85 (32)	TP42.672x41.572x0.819	3148.58	6855.88	0.459	0.00	6855.88	0.000
L33	37.85 - 32.85 (33)	TP43.773x42.672x0.806	3387.75	7120.47	0.476	0.00	7120.47	0.000
L34	32.85 - 27.85 (34)	TP44.873x43.773x0.794	3629.58	7383.31	0.492	0.00	7383.31	0.000
L35	27.85 - 26.25 (35)	TP45.225x44.873x0.794	3707.52	7502.76	0.494	0.00	7502.76	0.000
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	3719.72	8522.58	0.436	0.00	8522.58	0.000
L37	26 - 21 (37)	TP46.38x45.28x0.881	3965.08	8722.08	0.455	0.00	8722.08	0.000
L38	21 - 16 (38)	TP47.48x46.38x0.881	4212.90	9153.00	0.460	0.00	9153.00	0.000
L39	16 - 11 (39)	TP48.58x47.48x0.856	4462.99	9336.83	0.478	0.00	9336.83	0.000
L40	11 - 6 (40)	TP49.68x48.58x0.856	4715.27	9776.17	0.482	0.00	9776.17	0.000
L41	6 - 1 (41)	TP50.78x49.68x0.831	4969.69	9941.92	0.500	0.00	9941.92	0.000
L42	1 - 0 (42)	TP51x50.78x0.831	5020.82	10030.42	0.501	0.00	10030.42	0.000

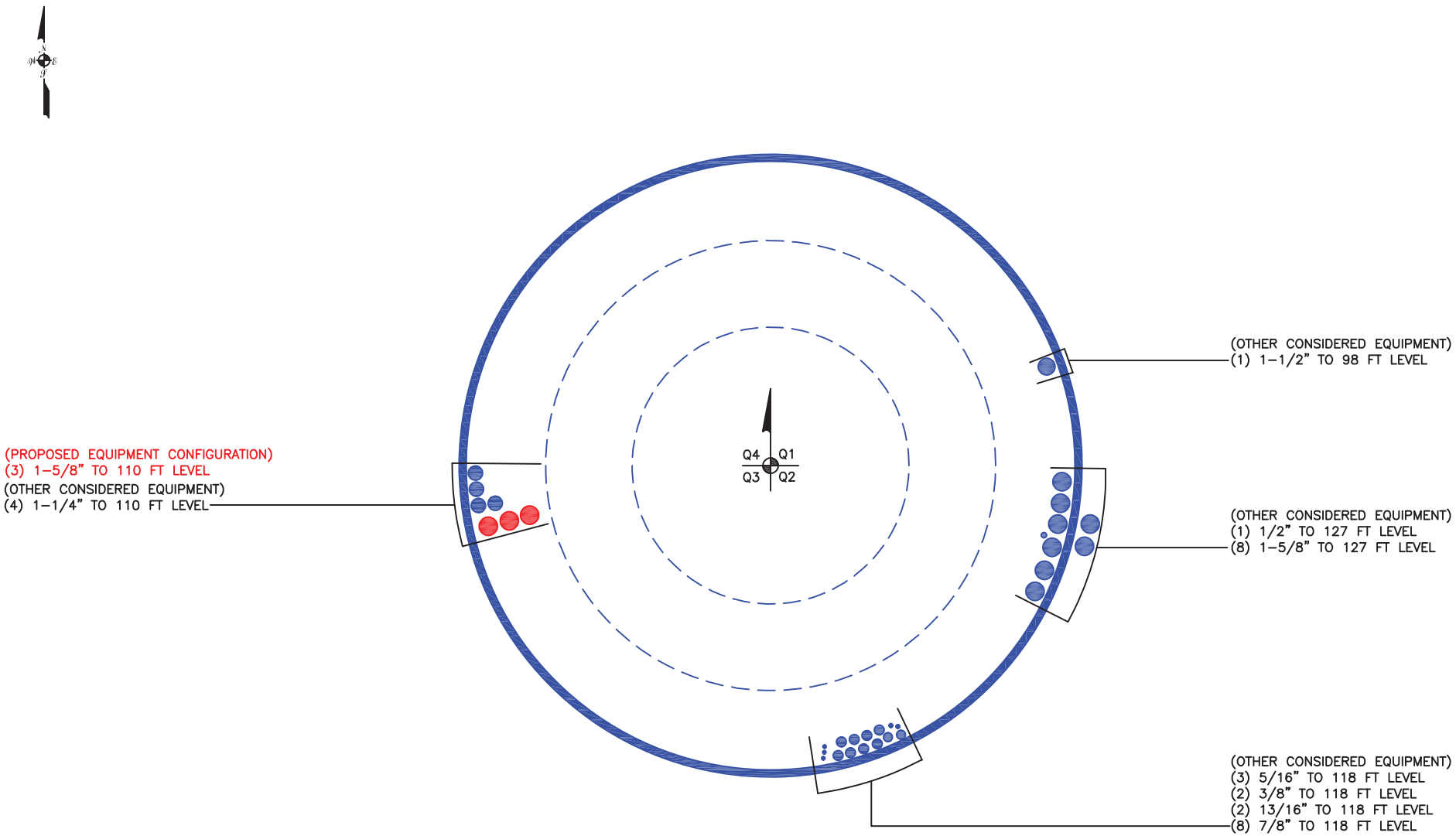
Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 125 (1)	TP24.687x23.588x0.25	8.50	345.24	0.025	0.14	742.13	0.000
L2	125 - 120 (2)	TP25.787x24.687x0.25	10.64	360.77	0.029	0.33	810.39	0.000
L3	120 - 115 (3)	TP26.886x25.787x0.25	16.74	376.30	0.044	0.32	881.67	0.000
L4	115 - 110 (4)	TP27.985x26.886x0.25	18.86	391.83	0.048	0.32	955.94	0.000
L5	110 - 105 (5)	TP29.084x27.985x0.25	27.41	407.36	0.067	0.32	1033.22	0.000
L6	105 - 100 (6)	TP30.184x29.084x0.25	31.06	422.89	0.073	0.32	1113.50	0.000
L7	100 - 99.27 (7)	TP30.344x30.184x0.25	31.13	425.16	0.073	0.32	1125.47	0.000
L8	99.27 - 99.02 (8)	TP30.399x30.344x0.475	31.15	803.24	0.039	0.32	2114.30	0.000
L9	99.02 - 97.04 (9)	TP30.834x30.399x0.463	33.50	793.81	0.042	0.32	2120.73	0.000
L10	97.04 - 96.79 (10)	TP30.889x30.834x0.675	33.52	1152.52	0.029	0.12	3063.10	0.000
L11	96.79 - 96.33 (11)	TP30.99x30.889x0.675	33.57	1156.38	0.029	0.12	3083.64	0.000
L12	96.33 - 96.08 (12)	TP31.045x30.99x0.45	33.60	778.04	0.043	0.12	2093.91	0.000
L13	96.08 - 94.29 (13)	TP31.439x31.045x0.45	33.80	788.05	0.043	0.12	2148.12	0.000
L14	94.29 - 94.04 (14)	TP31.494x31.439x0.45	33.82	789.45	0.043	0.12	2155.75	0.000
L15	94.04 - 91.5 (15)	TP32.052x31.494x0.45	35.64	803.65	0.044	0.12	2234.00	0.000
L16	91.5 - 91.25 (16)	TP32.107x32.052x0.45	35.66	805.04	0.044	0.12	2241.78	0.000
L17	91.25 - 86.25 (17)	TP33.207x32.107x0.438	38.84	810.17	0.048	0.12	2335.28	0.000
L18	86.25 - 86.08 (18)	TP33.244x33.207x0.438	38.85	811.09	0.048	0.12	2340.61	0.000
L19	86.08 - 85.83	TP33.299x33.244x0.431	38.88	801.00	0.049	0.12	2315.79	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	(19)							
L20	85.83 - 75.75	TP35.515x33.299x0.425	42.40	815.04	0.052	0.12	2432.97	0.000
	(20)							
L21	75.75 - 74.75	TP35.237x33.861x0.519	43.25	1017.77	0.042	0.16	3108.18	0.000
	(21)							
L22	74.75 - 71 (22)	TP36.063x35.237x0.506	43.66	1017.22	0.043	0.16	3181.53	0.000
L23	71 - 70.75 (23)	TP36.118x36.063x0.694	43.67	1388.78	0.031	0.16	4327.45	0.000
L24	70.75 - 65.75	TP37.219x36.118x0.681	44.29	1406.63	0.031	0.16	4520.82	0.000
	(24)							
L25	65.75 - 60.75	TP38.32x37.219x0.669	44.87	1422.90	0.032	0.16	4712.48	0.000
	(25)							
L26	60.75 - 60 (26)	TP38.485x38.32x0.669	44.96	1429.14	0.031	0.16	4753.91	0.000
L27	60 - 59.75 (27)	TP38.54x38.485x0.631	44.99	1352.30	0.033	0.16	4509.32	0.000
L28	59.75 - 54.75	TP39.641x38.54x0.631	45.56	1391.57	0.033	0.16	4775.06	0.000
	(28)							
L29	54.75 - 44 (29)	TP42.008x39.641x0.619	46.06	1401.03	0.033	0.16	4937.93	0.000
L30	44 - 43 (30)	TP41.539x39.999x0.831	46.98	1912.26	0.025	0.16	6847.43	0.000
L31	43 - 42.85 (31)	TP41.572x41.539x0.831	46.99	1913.81	0.025	0.16	6858.54	0.000
L32	42.85 - 37.85	TP42.672x41.572x0.819	47.57	1936.50	0.025	0.16	7129.40	0.000
	(32)							
L33	37.85 - 32.85	TP43.773x42.672x0.806	48.12	1957.63	0.025	0.16	7398.76	0.000
	(33)							
L34	32.85 - 27.85	TP44.873x43.773x0.794	48.64	1977.18	0.025	0.16	7666.16	0.000
	(34)							
L35	27.85 - 26.25	TP45.225x44.873x0.794	48.81	1992.97	0.024	0.16	7789.09	0.000
	(35)							
L36	26.25 - 26 (36)	TP45.28x45.225x0.906	48.82	2272.50	0.021	0.16	8870.08	0.000
L37	26 - 21 (37)	TP46.38x45.28x0.881	49.34	2265.84	0.022	0.16	9068.33	0.000
L38	21 - 16 (38)	TP47.48x46.38x0.881	49.81	2320.62	0.021	0.16	9512.08	0.000
L39	16 - 11 (39)	TP48.58x47.48x0.856	50.25	2309.23	0.022	0.16	9693.92	0.000
L40	11 - 6 (40)	TP49.68x48.58x0.856	50.68	2362.46	0.021	0.16	10146.00	0.000
L41	6 - 1 (41)	TP50.78x49.68x0.831	51.11	2346.33	0.022	0.16	10308.92	0.000
L42	1 - 0 (42)	TP51x50.78x0.831	51.19	2356.67	0.022	0.16	10399.92	0.000

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED EQUIPMENT CONFIGURATION)
(3) 1–5/8" TO 110 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1–1/4" TO 110 FT LEVEL
Q4
Q1
Q3
Q2
(OTHER CONSIDERED EQUIPMENT)
(1) 1–1/2" TO 98 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 127 FT LEVEL
(8) 1–5/8" TO 127 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 5/16" TO 118 FT LEVEL
(2) 3/8" TO 118 FT LEVEL
(2) 13/16" TO 118 FT LEVEL
(8) 7/8" TO 118 FT LEVEL

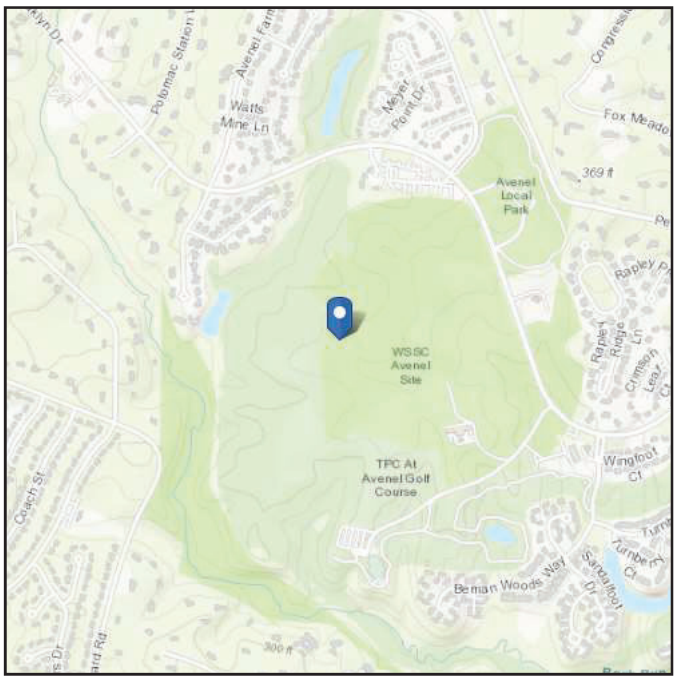
APPENDIX C

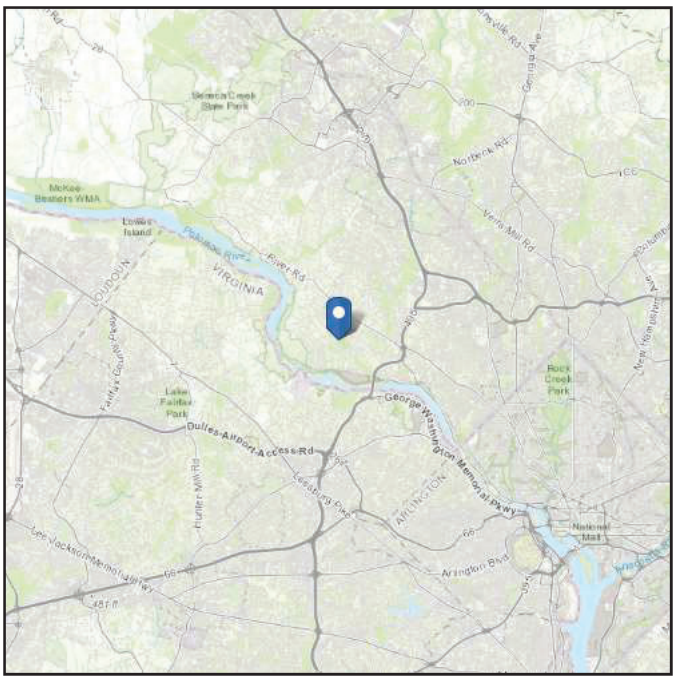
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Elevation:**	330.47 ft (NAVD 88)
Risk Category:	II	**Latitude:**	38.995158
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-77.203925





Wind

Results:

Wind Speed	112 Vmph	115 mph as per jurisdictional requirement
10-year MRI	75 Vmph	
25-year MRI	84 Vmph	
50-year MRI	89 Vmph	
100-year MRI	95 Vmph	

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Tue Apr 19 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

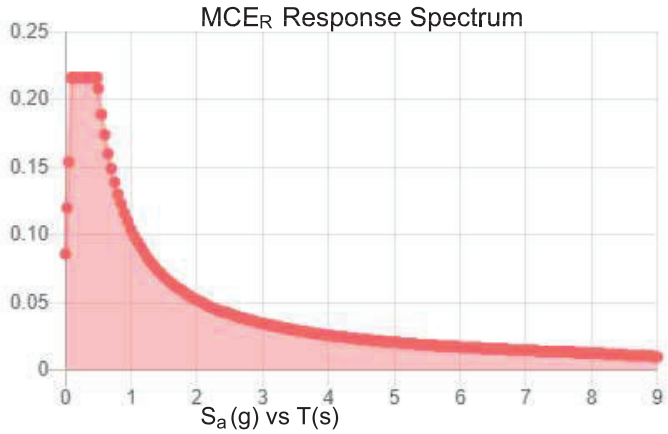
Seismic

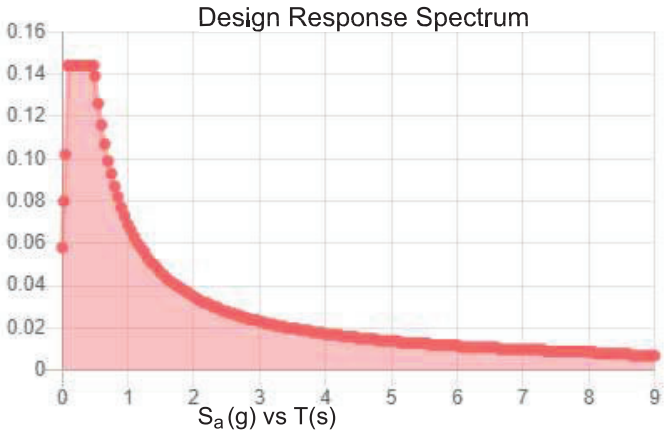
Site Soil Class: D - Default (see Section 11.4.3)

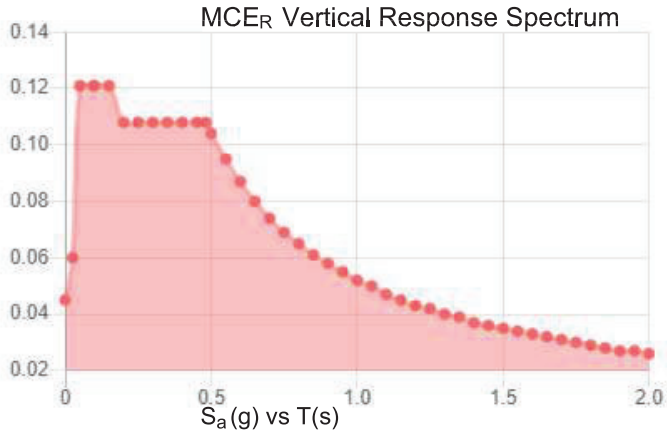
Results:

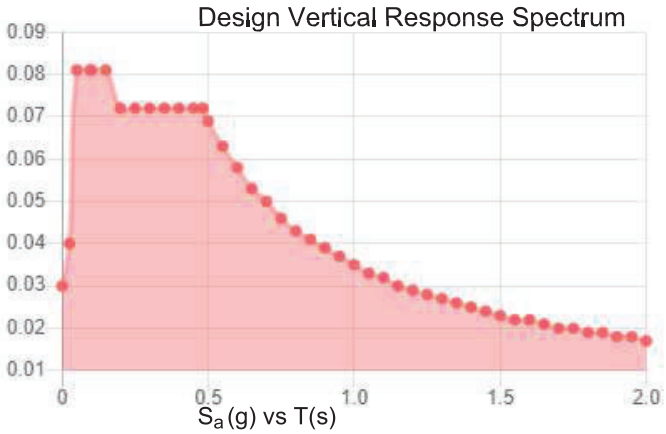
S_S :	0.135	S_{D1} :	0.069
S_1 :	0.043	T_L :	8
F_a :	1.6	PGA :	0.07
F_v :	2.4	PGA_M :	0.112
S_{MS} :	0.216	F_{PGA} :	1.6
S_{M1} :	0.104	I_e :	1
S_{DS} :	0.144	C_v :	0.7

Seismic Design Category B









Data Accessed: **Tue Apr 19 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	40 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Apr 19 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

CCIpole

per TIA-222- H

Site BU: 806957

Work Order: 2097400

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	130	54.25	5.25	12	23.588	35.515	0.25	Auto	A572-65
2	81	37	6	12	33.86	42.008	0.34375	Auto	A572-65
3	50	50	0	12	40.00	51	0.40625	Auto	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	60	channel	MP3-08 (1.1875in)W	3	x				x				x			
2	60	86.08	channel	MP3-05 (1.1875in)	3	x				x				x			
3	0	26.25	plate	MS-850 (1.1875")W	3			x				x				x	
4	26.25	43.1	plate	MS-600 (1.1875")	3			x				x				x	
5	60	71	plate	MS-600 (1.1875")	3			x				x				x	
6	86.08	91.5	plate	MS-600 (1.1875")	3			x				x				x	
7	91.5	94.29	plate	MS-600 (1.1875")	3		x				x				x		
8	94.29	97.04	plate	MS-600 (1.1875")	3				x				x				x
9	96.33	99.27	plate	Sabre PL 5"x1.25"	3			x				x				x	
10																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	7.93	2.8	10.32	0.95	Welded	n/a	PC 8.8 - M20 (100)	47.000	24.000	9.370	1.1875	A572-65
2	5.33	2.09	5.65	0.79	PC 8.8 - M20 (100)	29	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65
3	8.5	1.25	10.625	0.625	Welded	n/a	PC 8.8 - M20 (100)	45.000	17.250	9.063	1.1875	A572-65
4	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
5	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
6	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
7	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
8	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.375	4.750	1.1875	A572-65
9	5	1.25	6.25	0.625	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	24.000	4.688	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
MP3-08	Top	16	N	3	2	-	-	-	-	-	-	-	-	-
(1.1875in)W	Bottom	-	-	-	-	70	None	-	-	-	-	60	0.375	-
Sabre PL 5"x1.25"	Top	8	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	8	N	3	3	-	-	-	-	-	-	-	-	-
MS-850	Top	15	N	3	3	-	-	-	-	-	-	-	-	-
(1.1875")W	Bottom	-	-	-	-	80	CJP Groove	8.5	1.25	45	0.25	-	-	-

TNX Geometry Input

Increment (ft): 5 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	130 - 125	5		12	23.588	24.687	0.25	A572-65	1.000
2	125 - 120	5		12	24.687	25.787	0.25	A572-65	1.000
3	120 - 115	5		12	25.787	26.886	0.25	A572-65	1.000
4	115 - 110	5		12	26.886	27.985	0.25	A572-65	1.000
5	110 - 105	5		12	27.985	29.084	0.25	A572-65	1.000
6	105 - 100	5		12	29.084	30.184	0.25	A572-65	1.000
7	100 - 99.27	0.73		12	30.184	30.344	0.25	A572-65	1.000
8	99.27 - 99.02	0.25		12	30.344	30.399	0.475	A572-65	0.941
9	99.02 - 97.04	1.98		12	30.399	30.834	0.4625	A572-65	0.959
10	97.04 - 96.79	0.25		12	30.834	30.889	0.675	A572-65	0.936
11	96.79 - 96.33	0.46		12	30.889	30.990	0.675	A572-65	0.934
12	96.33 - 96.08	0.25		12	30.990	31.045	0.45	A572-65	0.966
13	96.08 - 94.29	1.79		12	31.045	31.439	0.45	A572-65	0.961
14	94.29 - 94.04	0.25		12	31.439	31.494	0.45	A572-65	0.960
15	94.04 - 91.5	2.54		12	31.494	32.052	0.45	A572-65	0.953
16	91.5 - 91.25	0.25		12	32.052	32.107	0.45	A572-65	0.952
17	91.25 - 86.25	5		12	32.107	33.207	0.4375	A572-65	0.965
18	86.25 - 86.08	0.17		12	33.207	33.244	0.4375	A572-65	0.965
19	86.08 - 85.83	0.25		12	33.244	33.299	0.43125	A572-65	0.955
20	85.83 - 81	10.08	5.25	12	33.299	35.515	0.425	A572-65	0.957
21	81 - 74.75	6.25		12	33.861	35.237	0.51875	A572-65	0.959
22	74.75 - 71	3.75		12	35.237	36.063	0.50625	A572-65	0.975
23	71 - 70.75	0.25		12	36.063	36.118	0.69375	A572-65	0.943
24	70.75 - 65.75	5		12	36.118	37.219	0.68125	A572-65	0.946
25	65.75 - 60.75	5		12	37.219	38.320	0.66875	A572-65	0.950
26	60.75 - 60	0.75		12	38.320	38.485	0.66875	A572-65	0.948
27	60 - 59.75	0.25		12	38.485	38.540	0.63125	A572-65	0.951
28	59.75 - 54.75	5		12	38.540	39.641	0.63125	A572-65	0.940
29	54.75 - 50	10.75	6	12	39.641	42.008	0.61875	A572-65	0.948
30	50 - 43	7		12	39.999	41.539	0.83125	A572-65	0.944
31	43 - 42.85	0.15		12	41.539	41.572	0.83125	A572-65	0.943
32	42.85 - 37.85	5		12	41.572	42.672	0.81875	A572-65	0.945
33	37.85 - 32.85	5		12	42.672	43.773	0.80625	A572-65	0.948
34	32.85 - 27.85	5		12	43.773	44.873	0.79375	A572-65	0.952
35	27.85 - 26.25	1.6		12	44.873	45.225	0.79375	A572-65	0.948
36	26.25 - 26	0.25		12	45.225	45.280	0.90625	A572-65	0.939
37	26 - 21	5		12	45.280	46.380	0.88125	A572-65	0.953
38	21 - 16	5		12	46.380	47.480	0.88125	A572-65	0.942
39	16 - 11	5		12	47.480	48.580	0.85625	A572-65	0.957
40	11 - 6	5		12	48.580	49.680	0.85625	A572-65	0.946
41	6 - 1	5		12	49.680	50.780	0.83125	A572-65	0.964
42	1 - 0	1		12	50.780	51.000	0.83125	A572-65	0.961

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	130 - 125	4.79	22.52	8.50
2	125 - 120	5.45	72.82	10.64
3	120 - 115	9.46	144.11	16.74
4	115 - 110	10.22	234.73	18.86
5	110 - 105	16.85	367.07	27.41
6	105 - 100	18.07	512.62	31.06
7	100 - 99.27	18.18	535.32	31.13
8	99.27 - 99.02	18.24	543.10	31.15
9	99.02 - 97.04	21.09	607.04	33.50
10	97.04 - 96.79	21.18	615.41	33.52
11	96.79 - 96.33	21.31	630.85	33.57
12	96.33 - 96.08	21.37	639.24	33.60
13	96.08 - 94.29	21.74	699.56	33.80
14	94.29 - 94.04	21.81	708.01	33.82
15	94.04 - 91.5	22.64	797.04	35.64
16	91.5 - 91.25	22.71	805.95	35.66
17	91.25 - 86.25	25.26	994.44	38.84
18	86.25 - 86.08	25.31	1001.04	38.85
19	86.08 - 85.83	25.37	1010.76	38.88
20	85.83 - 81	27.06	1206.70	42.40
21	81 - 74.75	29.70	1474.10	43.25
22	74.75 - 71	30.78	1637.01	43.66
23	71 - 70.75	30.89	1647.92	43.67
24	70.75 - 65.75	32.68	1867.81	44.29
25	65.75 - 60.75	34.51	2090.67	44.87
26	60.75 - 60	34.80	2124.35	44.96
27	60 - 59.75	34.89	2135.60	44.99
28	59.75 - 54.75	36.68	2361.94	45.56
29	54.75 - 50	38.42	2579.50	46.06
30	50 - 43	43.52	2905.15	46.98
31	43 - 42.85	43.60	2912.20	46.99
32	42.85 - 37.85	45.98	3148.59	47.57
33	37.85 - 32.85	48.40	3387.75	48.12
34	32.85 - 27.85	50.86	3629.58	48.64
35	27.85 - 26.25	51.65	3707.52	48.81
36	26.25 - 26	51.81	3719.72	48.82
37	26 - 21	54.57	3965.08	49.34
38	21 - 16	57.37	4212.90	49.81
39	16 - 11	60.21	4462.99	50.25
40	11 - 6	63.08	4715.27	50.68
41	6 - 1	65.98	4969.69	51.11
42	1 - 0	66.57	5020.83	51.19

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP24.687x23.588x0.25	Pole	3.6%	Pass
125 - 120	Pole	TP25.787x24.687x0.25	Pole	10.0%	Pass
120 - 115	Pole	TP26.886x25.787x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP27.985x26.886x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP29.084x27.985x0.25	Pole	41.0%	Pass
105 - 100	Pole	TP30.184x29.084x0.25	Pole	53.7%	Pass
100 - 99.27	Pole	TP30.344x30.184x0.25	Pole	55.6%	Pass
99.27 - 99.02	Pole + Reinf.	TP30.399x30.344x0.475	Reinf. 9 Compression	43.2%	Pass
99.02 - 97.04	Pole + Reinf.	TP30.834x30.399x0.4625	Reinf. 9 Compression	47.3%	Pass
97.04 - 96.79	Pole + Reinf.	TP30.889x30.834x0.675	Reinf. 9 Compression	33.5%	Pass
96.79 - 96.33	Pole + Reinf.	TP30.99x30.889x0.675	Reinf. 9 Compression	34.1%	Pass
96.33 - 96.08	Pole + Reinf.	TP31.045x30.99x0.45	Reinf. 8 Tension Rupture	47.1%	Pass
96.08 - 94.29	Pole + Reinf.	TP31.439x31.045x0.45	Reinf. 8 Tension Rupture	50.5%	Pass
94.29 - 94.04	Pole + Reinf.	TP31.494x31.439x0.45	Reinf. 7 Tension Rupture	51.0%	Pass
94.04 - 91.5	Pole + Reinf.	TP32.052x31.494x0.45	Reinf. 7 Tension Rupture	55.7%	Pass
91.5 - 91.25	Pole + Reinf.	TP32.107x32.052x0.45	Reinf. 6 Tension Rupture	56.2%	Pass
91.25 - 86.25	Pole + Reinf.	TP33.207x32.107x0.4375	Reinf. 6 Tension Rupture	65.7%	Pass
86.25 - 86.08	Pole + Reinf.	TP33.244x33.207x0.4375	Reinf. 6 Tension Rupture	66.0%	Pass
86.08 - 85.83	Pole + Reinf.	TP33.299x33.244x0.4313	Reinf. 2 Tension Rupture	62.8%	Pass
85.83 - 81	Pole + Reinf.	TP35.515x33.299x0.425	Reinf. 2 Tension Rupture	71.2%	Pass
81 - 74.75	Pole + Reinf.	TP35.237x33.861x0.5188	Reinf. 2 Tension Rupture	68.3%	Pass
74.75 - 71	Pole + Reinf.	TP36.063x35.237x0.5063	Reinf. 2 Tension Rupture	72.9%	Pass
71 - 70.75	Pole + Reinf.	TP36.118x36.063x0.6938	Reinf. 5 Tension Rupture	59.1%	Pass
70.75 - 65.75	Pole + Reinf.	TP37.219x36.118x0.6813	Reinf. 5 Tension Rupture	63.9%	Pass
65.75 - 60.75	Pole + Reinf.	TP38.32x37.219x0.6688	Reinf. 5 Tension Rupture	68.4%	Pass
60.75 - 60	Pole + Reinf.	TP38.485x38.32x0.6688	Reinf. 5 Tension Rupture	69.0%	Pass
60 - 59.75	Pole + Reinf.	TP38.54x38.485x0.6313	Reinf. 1 Tension Rupture	65.8%	Pass
59.75 - 54.75	Pole + Reinf.	TP39.641x38.54x0.6313	Reinf. 1 Tension Rupture	69.6%	Pass
54.75 - 50	Pole + Reinf.	TP42.008x39.641x0.6188	Reinf. 1 Tension Rupture	72.9%	Pass
50 - 43	Pole + Reinf.	TP41.539x39.999x0.8313	Reinf. 4 Tension Rupture	65.2%	Pass
43 - 42.85	Pole + Reinf.	TP41.572x41.539x0.8313	Reinf. 4 Tension Rupture	65.3%	Pass
42.85 - 37.85	Pole + Reinf.	TP42.672x41.572x0.8188	Reinf. 4 Tension Rupture	67.8%	Pass
37.85 - 32.85	Pole + Reinf.	TP43.773x42.672x0.8063	Reinf. 4 Tension Rupture	70.2%	Pass
32.85 - 27.85	Pole + Reinf.	TP44.873x43.773x0.7938	Reinf. 4 Tension Rupture	72.5%	Pass
27.85 - 26.25	Pole + Reinf.	TP45.225x44.873x0.7938	Reinf. 4 Tension Rupture	73.1%	Pass
26.25 - 26	Pole + Reinf.	TP45.28x45.225x0.9063	Reinf. 3 Bolt Shear	62.7%	Pass
26 - 21	Pole + Reinf.	TP46.38x45.28x0.8813	Reinf. 3 Compression	62.3%	Pass
21 - 16	Pole + Reinf.	TP47.48x46.38x0.8813	Reinf. 3 Compression	64.0%	Pass
16 - 11	Pole + Reinf.	TP48.58x47.48x0.8563	Reinf. 3 Compression	65.5%	Pass
11 - 6	Pole + Reinf.	TP49.68x48.58x0.8563	Reinf. 3 Compression	67.0%	Pass
6 - 1	Pole + Reinf.	TP50.78x49.68x0.8313	Reinf. 3 Compression	68.3%	Pass
1 - 0	Pole + Reinf.	TP51x50.78x0.8313	Reinf. 3 Compression	68.6%	Pass
				Summary	
			Pole	59.6%	Pass
			Reinforcement	73.1%	Pass
			Overall	73.1%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity* (100% Max. Allowable)									
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9
130 - 125	1502	n/a	1502	19.64	n/a	19.64	3.6%									
125 - 120	1713	n/a	1713	20.53	n/a	20.53	10.0%									
120 - 115	1944	n/a	1944	21.41	n/a	21.41	18.4%									
115 - 110	2195	n/a	2195	22.29	n/a	22.29	27.7%									
110 - 105	2467	n/a	2467	23.18	n/a	23.18	41.0%									
105 - 100	2760	n/a	2760	24.06	n/a	24.06	53.7%									
100 - 99.27	2804	n/a	2804	24.19	n/a	24.19	55.6%									
99.27 - 99.02	2820	2368	5188	24.24	18.75	42.99	29.5%									43.2%
99.02 - 97.04	2943	2433	5377	24.59	18.75	43.34	32.5%									47.3%
97.04 - 96.79	2959	4758	7717	24.63	36.75	61.38	23.0%								31.3%	33.5%
96.79 - 96.33	2989	4787	7776	24.71	36.75	61.46	23.5%								31.9%	34.1%
96.33 - 96.08	3005	2338	5343	24.75	18.00	42.75	34.7%								47.1%	
96.08 - 94.29	3122	2395	5517	25.07	18.00	43.07	37.5%								50.5%	
94.29 - 94.04	3138	2403	5541	25.12	18.00	43.12	37.8%							51.0%		
94.04 - 91.5	3309	2486	5795	25.56	18.00	43.56	41.8%							55.7%		
91.5 - 91.25	3327	2494	5820	25.61	18.00	43.61	42.2%						56.2%			
91.25 - 86.25	3683	2660	6343	26.49	18.00	44.49	50.2%						65.7%			
86.25 - 86.08	3695	2666	6362	26.52	18.00	44.52	50.5%						66.0%			
86.08 - 85.83	3714	2588	6302	26.57	16.95	43.52	51.6%		62.8%							
85.83 - 81	4084	2748	6831	27.42	16.95	44.37	59.6%		71.2%							
81 - 74.75	6010	2883	8893	38.57	16.95	55.52	49.7%		68.3%							
74.75 - 71	6447	3013	9460	39.48	16.95	56.43	53.5%		72.9%							
71 - 70.75	6477	6149	12626	39.54	34.95	74.49	40.4%		55.1%			59.1%				
70.75 - 65.75	7094	6515	13608	40.76	34.95	75.71	44.3%		59.6%			63.9%				
65.75 - 60.75	7748	6890	14638	41.97	34.95	76.92	48.1%		63.7%			68.4%				
60.75 - 60	7850	6947	14797	42.16	34.95	77.11	48.6%		64.3%			69.0%				
60 - 59.75	7884	6372	14255	42.22	30.96	73.18	50.8%	65.8%								
59.75 - 54.75	8585	6721	15306	43.43	30.96	74.39	54.5%	69.6%								
54.75 - 50	9289	7061	16351	44.59	30.96	75.55	57.8%	72.9%								
50 - 43	11636	11445	23081	53.73	48.96	102.69	44.3%	59.4%			65.2%					
43 - 42.85	11664	11462	23126	53.77	48.96	102.73	44.3%	59.4%			65.3%					
42.85 - 37.85	12624	12050	24675	55.21	48.96	104.17	46.6%	61.7%			67.8%					
37.85 - 32.85	13636	12654	26289	56.65	48.96	105.61	48.8%	63.9%			70.2%					
32.85 - 27.85	14700	13271	27971	58.08	48.96	107.04	50.9%	65.9%			72.5%					
27.85 - 26.25	15052	13472	28524	58.54	48.96	107.50	51.5%	66.5%			73.1%					
26.25 - 26	15107	17381	32489	58.62	62.84	121.45	45.5%	58.6%		62.7%						
26 - 21	16246	18200	34446	60.05	62.84	122.89	47.3%	60.3%		62.3%						
21 - 16	17440	19038	36479	61.49	62.84	124.32	49.2%	61.9%		64.0%						
16 - 11	18692	19896	38587	62.93	62.84	125.76	50.9%	63.4%		65.5%						
11 - 6	20002	20772	40773	64.36	62.84	127.20	52.7%	64.8%		67.0%						
6 - 1	21371	21667	43038	65.80	62.84	128.64	54.4%	66.1%		68.3%						
1 - 0	21652	21848	43501	66.09	62.84	128.92	54.7%	66.3%		68.6%						

Note: Section capacity checked using 5 degree increments.

**Rating per TIA-222-H Section 15.5.*

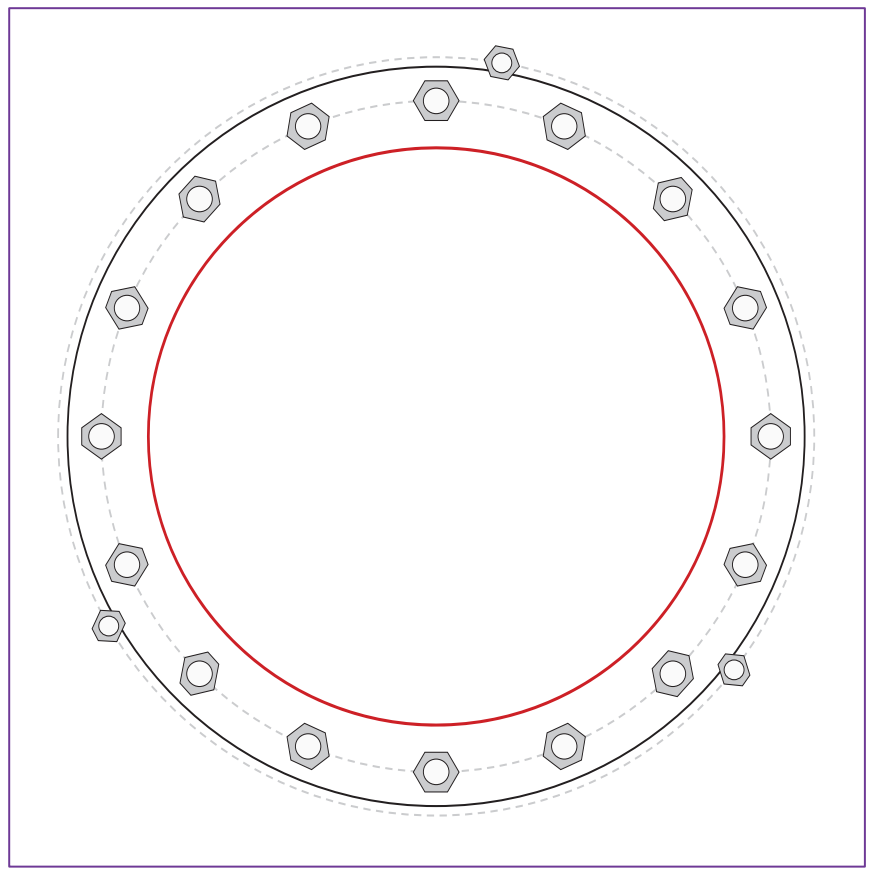
Monopole Base Plate Connection

Site Info	
BU #	806957
Site Name	Williamsburg Gardens
Order #	611571 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	5020.83
Axial Force (kips)	66.57
Shear Force (kips)	51.19

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 59.3" BC

GROUP 2: (3) 1-3/4" ø bolts (F1554-105 N; Fy=105 ksi, Fu=125 ksi) on 67" BC

pos. (deg): 80, 210, 322

Base Plate Data

65.3" OD x 2.75" Plate (S-128; Fy=60 ksi, Fu=80 ksi)

Stiffener Data

N/A

Pole Data

51" x 0.40625" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:

Pu_t = 222.38	ϕPn_t = 243.75	**Stress Rating**
Vu = 3.2	ϕVn = 149.1	**86.9%**
Mu = n/a	ϕMn = n/a	**Pass**

GROUP 2:

Pu_t = 147.93	ϕPn_t = 178.13	**Stress Rating**
Vu = 0	ϕVn = 112.75	**79.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	30.83	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**54.4%**	**Pass**

CCIplate

Elevation (ft)	0	*(Base)*

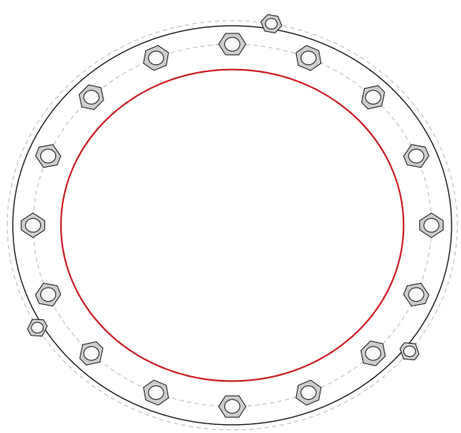
note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	Yes	No	
2	No	No	No	Yes	No	

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η:	l_{ar} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	0	2.25	A615-75	59.3	0.5	0.625	N-Included		No
2	1	22.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
3	1	45	2.25	A615-75	59.3	0.5	0.625	N-Included		No
4	1	67.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
5	1	90	2.25	A615-75	59.3	0.5	0.625	N-Included		No
6	1	112.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
7	1	135	2.25	A615-75	59.3	0.5	0.625	N-Included		No
8	1	157.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
9	1	180	2.25	A615-75	59.3	0.5	0.625	N-Included		No
10	1	202.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
11	1	225	2.25	A615-75	59.3	0.5	0.625	N-Included		No
12	1	247.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
13	1	270	2.25	A615-75	59.3	0.5	0.625	N-Included		No
14	1	292.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
15	1	315	2.25	A615-75	59.3	0.5	0.625	N-Included		No
16	1	337.5	2.25	A615-75	59.3	0.5	0.625	N-Included		No
17	2	80	1.75	F1554-105	67	0.5	0.625	N-Included		No
18	2	210	1.75	F1554-105	67	0.5	0.625	N-Included		No
19	2	322	1.75	F1554-105	67	0.5	0.625	N-Included		No

Plot Graphic



Drilled Pier Foundation

BU # :	806957
Site Name:	Williamsburg Gardens
Order Number:	611571 Rev. 0
TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	5020.82	
Axial Force (kips)	66.58	
Shear Force (kips)	51.18	

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	24	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 24' below grade		
Pier Diameter	7	ft
Rebar Quantity	28	
Rebar Size	10	
Clear Cover to Ties	3	in
Tie Size	5	
Tie Spacing	24	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.46	-
Soil Safety Factor	1.86	-
Max Moment (kip-ft)	5362.77	-
Rating*	*68.0%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	549.35	-
End Bearing (kips)	662.99	-
Weight of Concrete (kips)	169.72	-
Total Capacity (kips)	1212.35	-
Axial (kips)	236.30	-
Rating*	*18.6%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.35	-
Critical Moment (kip-ft)	5362.62	-
Critical Moment Capacity	5854.43	-
Rating*	*87.2%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	21.24	-
Critical Shear (kip)	390.19	-
Critical Shear Capacity	851.13	-
Rating*	*43.7%*	-

Tie Spacing Requirements Not Met
Shear-Friction Methodology is Applied

Structural Foundation Rating*	**87.2%**
Soil Interaction Rating*	**68.0%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☑
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

Groundwater Depth	N/A	# of Layers	3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	15	11.5	120	150	0	32	1.209	1.209				22	Cohesionless
3	15	24	9	130	150	0	36	2.156	2.156			20	25	Cohesionless

T-Mobile

CALL MARYLAND ONE CALL
(800) 282-8555
CALL 3 WORKING DAYS
BEFORE YOU DIG!

T-MOBILE SITE NUMBER: 7WAN098A
T-MOBILE SITE NAME: CROWN - POTOMAC
SITE TYPE: MONOPINE
TOWER HEIGHT: 130'-0"

BUSINESS UNIT #: 806957
SITE ADDRESS: 10010 OAKLYN DRIVE POTOMAC, MD 20854
COUNTY: MONTGOMERY
JURISDICTION: MONTGOMERY COUNTY

T-MOBILE ANCHOR SITE CONFIGURATION: 67E5998E_1XAIR+1OP+1QP

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	WILLIAMSBURG GARDENS
SITE ADDRESS:	10010 OAKLYN DRIVE POTOMAC, MD 20854
COUNTY:	MONTGOMERY
MAP/PARCEL #:	02835024
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	38° 59' 42.57" (38.99500000)
LONGITUDE:	-77° 12' 14.13" (-77.20388900)
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	331 FT
CURRENT ZONING:	RE-2C/TDP
JURISDICTION:	MONTGOMERY COUNTY
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	WASHINGTON SUBURBAN SANITARY COMM. 14501 SWEITZER LANE LAUREL, MD 20707-5902
TOWER OWNER:	CROWN CASTLE USA, INC. 3530 TORINGDON WAY, STE 300 CHARLOTTE, NC 28277
CARRIER/APPLICANT:	T-MOBILE 12050 BALTIMORE AVENUE BELTSVILLE, MD 20705
ELECTRIC PROVIDER:	PEPCO 800-257-7777
TELCO PROVIDER:	VERIZON 1800-837-4966

PROJECT TEAM

A&E FIRM:	TOWER ENGINEERING PROFESSIONALS 326 TRYON ROAD RALEIGH, NC 27603
	JOSEPH T. CRESS - PROJECT MANAGER (919) 661-6351
	SCOTT C. BRANTLEY - CIVIL ENGINEER (919) 661-6351
	SCOTT C. BRANTLEY - ELECTRICAL ENGINEER (919) 661-6351
TOWER OWNER:	CROWN CASTLE USA, INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	9011 ARBORETUM PARKWAY, SUITE 100 RICHMOND, VA 23236
	CHANDLER DAVIS - PROJECT MANAGER CHANDLER.DAVIS@CROWNCASTLE.COM
	BILLY STUBBS - A&E SPECIALIST BILLY.STUBBS@CROWNCASTLE.COM

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.0	OVERALL SITE PLAN
C-1.1	SITE PLAN
C-1.2	EXISTING & FINAL EQUIPMENT PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	EQUIPMENT SPECS
C-5	EQUIPMENT SPECS
C-6	PLUMBING DIAGRAM & COLOR CODE
S-1	STRUCTURAL
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 22x34. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (3) TMAs
- REMOVE (3) RRUs 11 B12
- REMOVE (12) COAX CABLES
- REMOVE (1) 9x18 HCS 60m CABLES
- INSTALL (9) ANTENNAS
- INSTALL (6) RRUs
- INSTALL (3) 6x24 4AWG 60m CABLES

GROUND SCOPE OF WORK:
- REMOVE (1) RBS 2106 CABINET
- REMOVE (1) DUW30
- REMOVE (6) RU22
- INSTALL (2) CABINETS
- INSTALL (2) PSU 4813 BOOSTER
- INSTALL (1) BB 6648
- INSTALL (1) IXRe ROUTER
- INSTALL (2) RP 6651
- INSTALL CAM-LOK GENERATOR CONNECTOR

LOCATION MAP

NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	MARYLAND BUILDING CODES/2018 IBC
MECHANICAL	2018 INTERNATIONAL MECHANICAL CODE
ELECTRICAL	2020 NATIONAL ELECTRICAL CODE

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	TOWER ENGINEERING PROFESSIONALS
DATED:	4/27/22
MOUNT ANALYSIS:	TOWER ENGINEERING PROFESSIONALS
DATED:	5/12/22
ORDER ID:	611571
REVISION:	0
RFDS VERSION:	9
DATED:	2/21/22

ANALYSIS CRITERIA:

APPLICABLE CODES:	TIA-222-H / ASCE 7-16
WIND SPEED:	112 MPH
EXPOSURE CATEGORY:	C
RISK CATEGORY:	II
TOPOGRAPHIC CATEGORY:	1
SEISMIC Ss:	0.135
SEISMIC S1:	0.043
SERVICE WIND SPEED:	60 MPH

APPROVALS

APPROVAL	SIGNATURE	DATE
RF		
CONST.		
FAA		
OPS		
RE		
SR DEV MGR		
REG DIR		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: T-1

REVISION: 0

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:

#4 BARS AND SMALLER	40 ksi
#5 BARS AND LARGER	60 ksi

6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3"
CONCRETE EXPOSED TO EARTH OR WEATHER:	
#6 BARS AND LARGER	2"
#5 BARS AND SMALLER	1–1/2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER:	
SLAB AND WALLS	3/4"
BEAMS AND COLUMNS	1–1/2"

7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   - 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   - 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
LOCP	LOSS OF COMMERCIAL POWER RELAY
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER
ENGINEERING
PROFESSIONALS

326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351

N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

SCOTT C. BRANT
58709

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709
Expiration Date: 01/10/2024

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-2

REVISION: 0

NOTE:
SITE PLAN IS BASED ON GIS AND GOOGLE EARTH DATA. TOWER ENGINEERING PROFESSIONALS HAS NOT COMPLETED A BOUNDARY SURVEY FOR THIS PROPERTY.

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006

1 OVERALL SITE PLAN
SCALE: 200' 100' 0 200' 1" = 200'-0" (FULL SIZE) 1" = 400'-0" (11x17)

N

T-Mobile
12050 BALTIMORE AVENUE
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SEAL:

STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

05/27/22

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SHEET NUMBER: C-1.0

REVISION: 0

NOTE:
SITE PLAN SHOWN BELOW WAS REPRODUCED FROM INFORMATION PROVIDED BY CROWN CASTLE AND SITE WALK CONDUCTED BY TEP. CONTRACTOR TO VERIFY ALL EXISTING INFORMATION IS AS INDICATED ON SITE PLAN. CONTRACTOR IS TO ESTABLISH THE EXISTENCE AND LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES. IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES.

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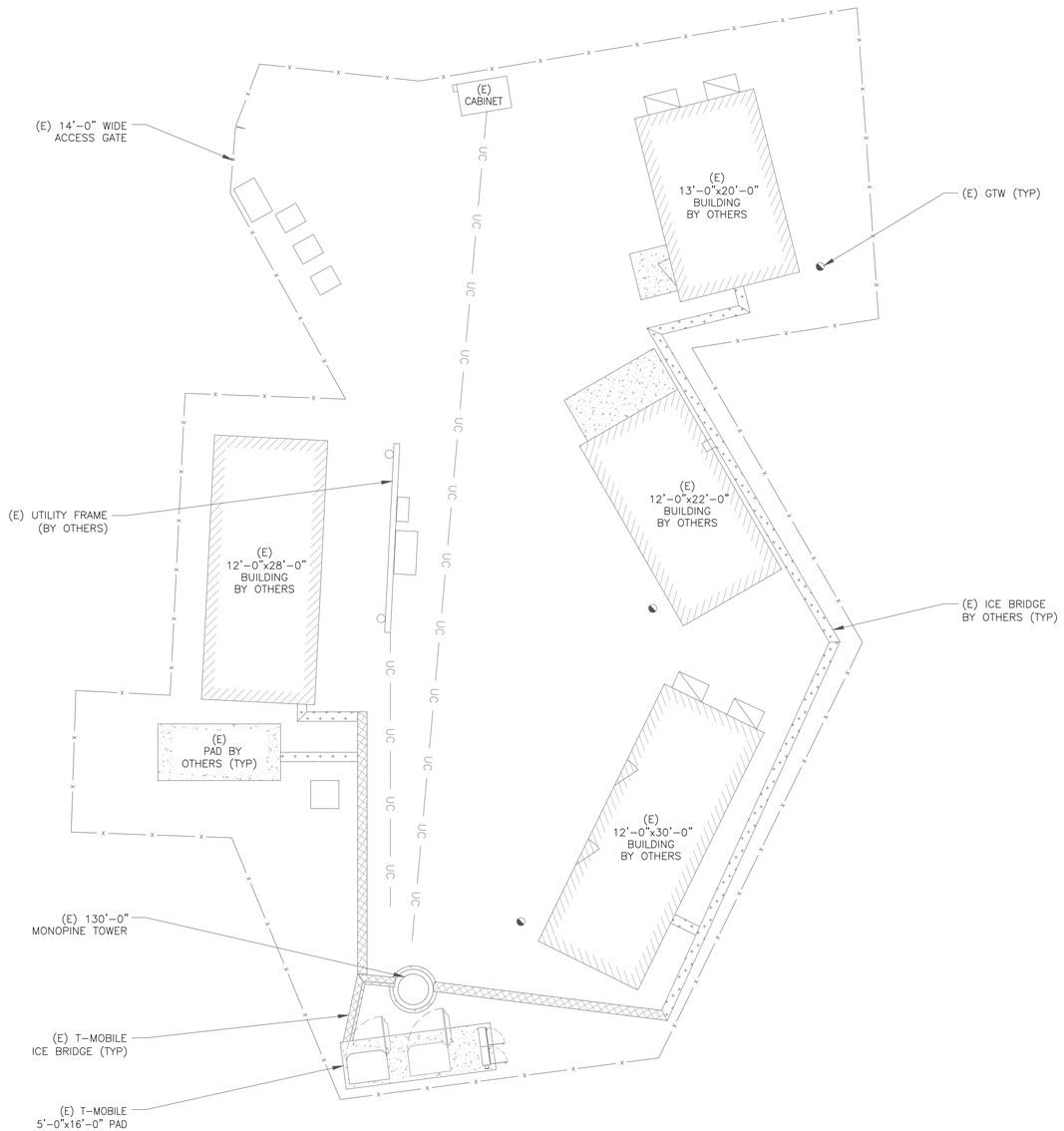

1 SITE PLAN
SCALE: 8' 6' 4' 2' 0 8' 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

N

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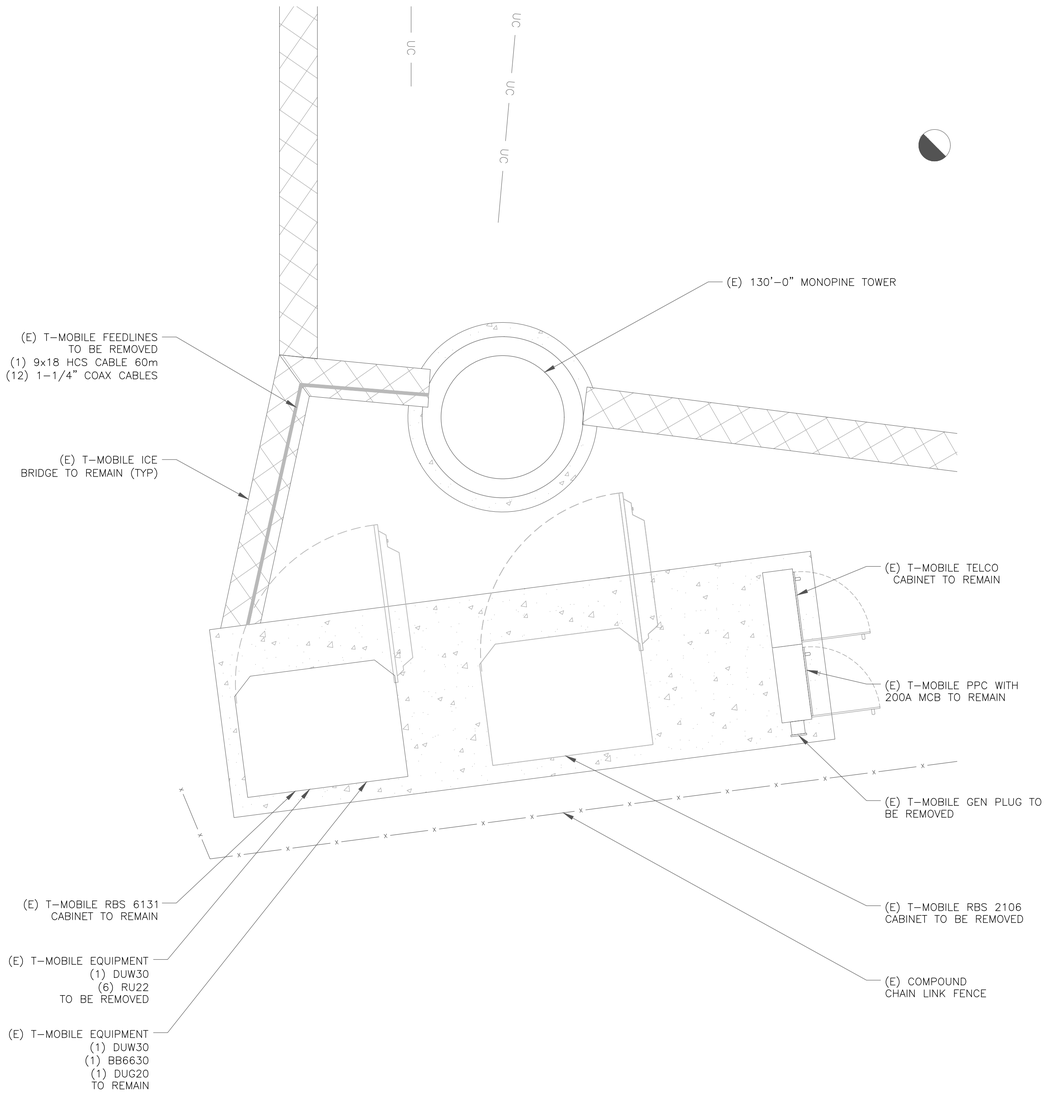
SHEET NUMBER: C-1.1
REVISION: 0

FLOODPLAIN NOTE:
THE TOWER IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO FEMA COMMUNITY PANEL #24031C0430D, DATED 9/29/2006



1 EXISTING EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

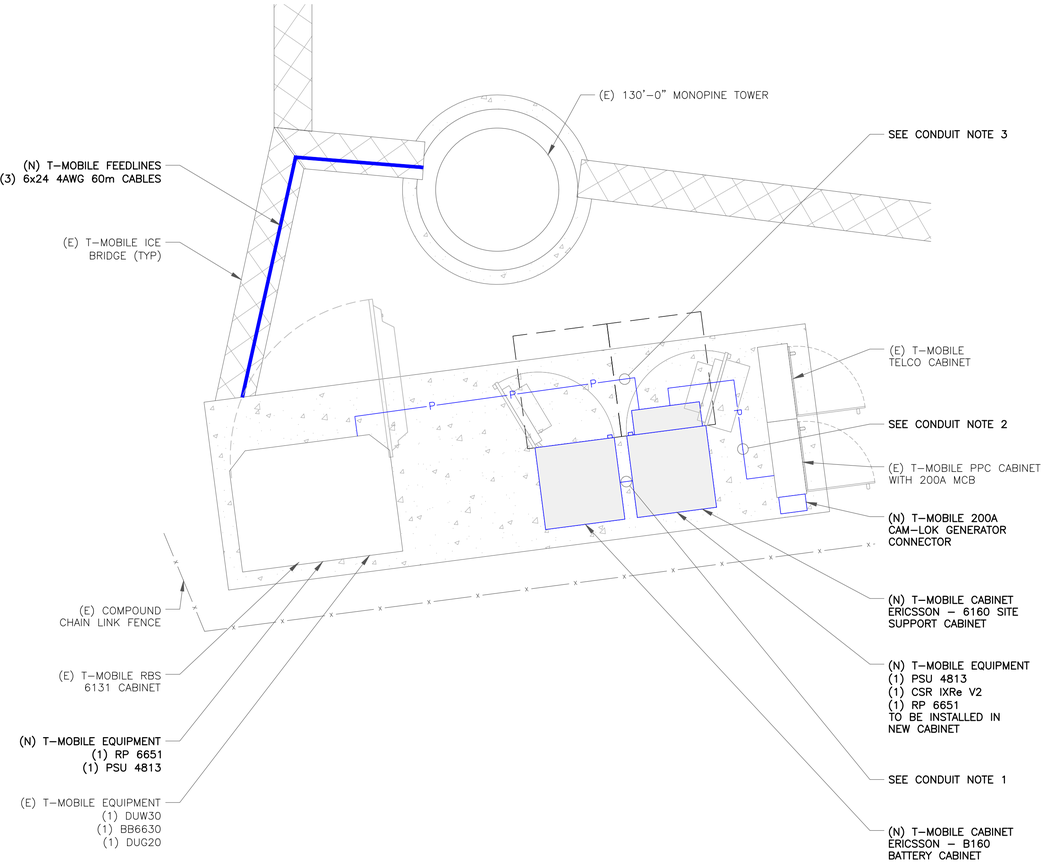
CONDUIT NOTES:

- ALL CONDUIT TO BE SCH40 PVC OR LTFC, AS NOTED. INSTALL WEATHERPROOF FITTINGS.
- ABOVE GRADE CONDUIT RUNS TO BE MARKED WITH HAZARD TAPE TO PREVENT TRIPPING HAZARD.

1. (1) 2" CONDUIT BETWEEN 6160 AND B160 (ABOVE GRADE, LTFC or SCH40 PVC)
2. (1) 2" CONDUIT FROM PPC TO 6160 FOR 125A & 15A BREAKER CONDUCTORS (BELOW GRADE, SCH40 PVC)
3. (1) 1" CONDUIT FROM AAV/WESTELL CABINET TO 6160 CABINET (BELOW GRADE, SCH40 PVC)

NOTE:

ALL RACKS AND EQUIPMENT CABINETS ARE TO HAVE TWO GROUNDING LEADS. ALL EQUIPMENT INSTALLED IN RACKS MUST HAVE A CHASSIS GROUND ATTACHED TO A COMMON BUS BAR ON THE RACK. COMMON BUS BAR MUST BE GROUNDED TO MAIN GROUND BAR. SEE G-1 FOR GROUNDING NOTES.



2 FINAL EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

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BU #: **806957**
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POTOMAC, MD 20854

EXISTING 130'-0"
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SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

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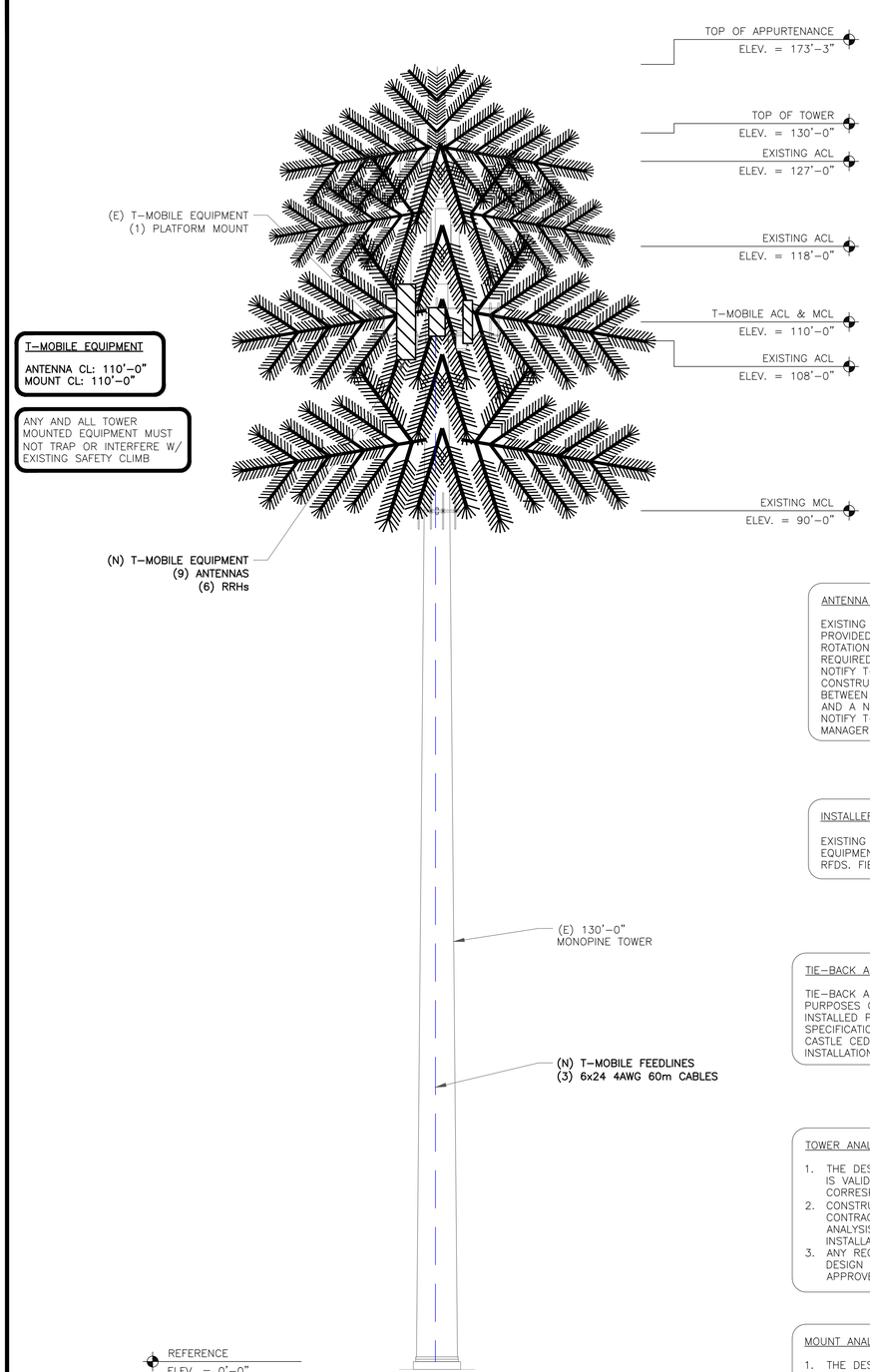
SHEET NUMBER: C-1.2
REVISION: 0



T-MOBILE EQUIPMENT

ANTENNA CL: 110'-0"
MOUNT CL: 110'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

1 FINAL ELEVATION
SCALE: 8' 6' 4' 2' 0 8' 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

ANTENNA CLEARANCE NOTE:

EXISTING MOUNT SIZE AND ORIENTATION PROVIDED BY THE TOWER OWNER. IF ROTATION OF EXISTING MOUNTS IS REQUIRED TO MEET AZIMUTHS, PLEASE NOTIFY T-MOBILE RF PRIOR TO CONSTRUCTION. IF 36" CLEARANCE BETWEEN ANTENNAS CANNOT BE MET AND A NEW MOUNT IS REQUIRED, PLEASE NOTIFY T-MOBILE CONSTRUCTION MANAGER IMMEDIATELY.

INSTALLER NOTE:

EXISTING AND PROPOSED ANTENNA/ EQUIPMENT POSITIONING SHOWN PER RFDS. FIELD CONDITIONS MAY VARY.

TIE-BACK ARM NOTE:

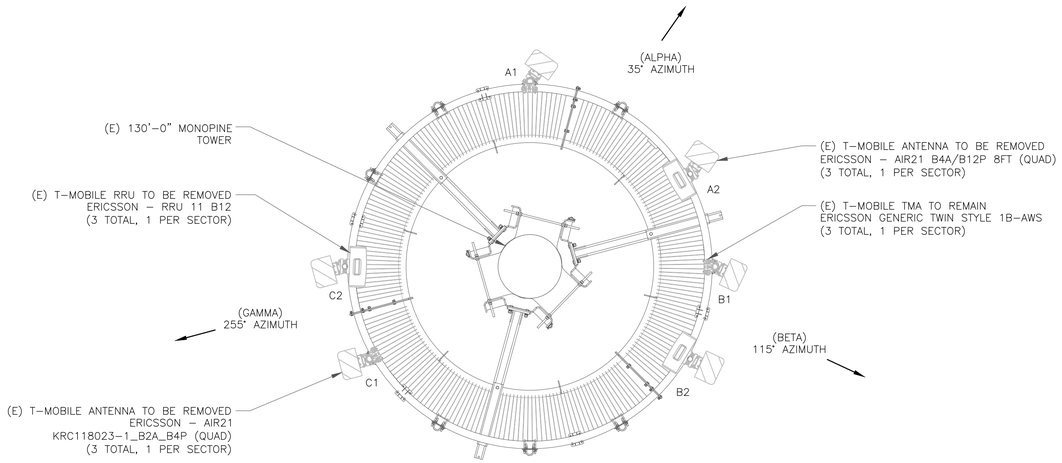
TIE-BACK ARMS SHOWN ARE FOR REFERENCE PURPOSES ONLY. TIE-BACK ARMS TO BE INSTALLED PER MOUNT MANUFACTURERS SPECIFICATIONS, ALSO ADHERING TO CROWN CASTLE CED-STD-10294 STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES.

TOWER ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

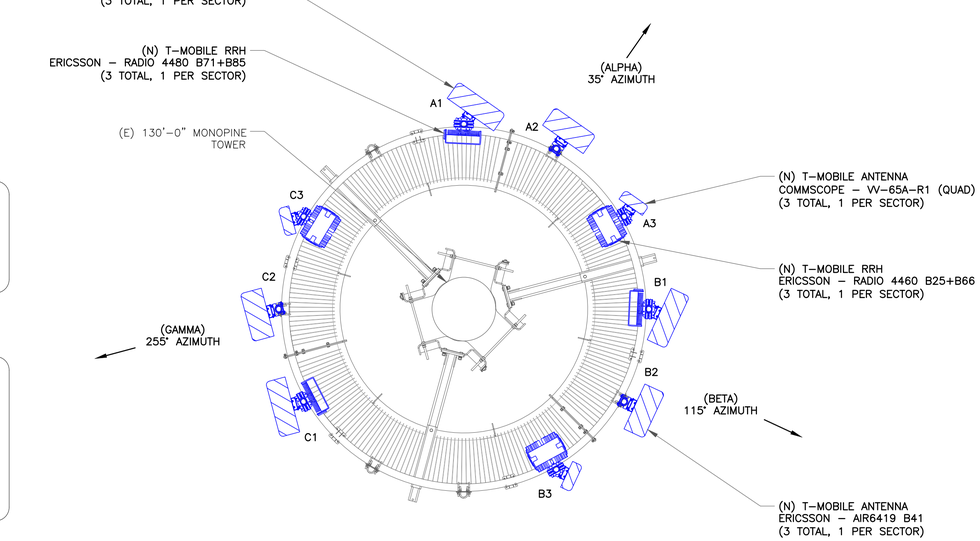
MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.



2 EXISTING ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

N



3 FINAL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

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REVISION: 0

EXISTING ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	*U1900, *G1900, *U2100	110'-0"	35°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	4°/4°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
ALPHA	A3	*L2100, *L700	110'-0"	35°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	4°/4°	*(1) ERICSSON - RRU 11 B12	*(1) 9x18 HCS 60m
BETA	B1	*U1900, *G1900, *U2100	110'-0"	115°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	2°/2°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
BETA	B3	*L2100, *L700	110'-0"	115°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	2°/2°	*(1) ERICSSON - RRU 11 B12	HYBRID (SHARED)
GAMMA	C1	*U1900, *G1900, *U2100	110'-0"	255°	ERICSSON	*AIR21 KRC118023-1_B2A_B4P (QUAD)	0°	4°/4°	*(1) ERICSSON TMA - GENERIC TWIN STYLE 1B-AWS	*(4) 1-1/4" COAX HYBRID (SHARED)
GAMMA	C3	*L2100, *L700	110'-0"	255°	ERICSSON	*AIR21 B4A/B12P 8FT (QUAD)	0°	4°/4°	*(1) ERICSSON - RRU 11 B12	HYBRID (SHARED)

*EQUIPMENT TO BE REMOVED

EXISTING CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
EXISTING	*COAX	1-1/4"	12
EXISTING	*HCS	6x18 HCS 60m	1
CABLE QUANTITY			13

1 EXISTING ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

FINAL ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L700, L600, N600	110'-0"	35°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	(3) 6x24 4AWG 60m
ALPHA	A2	L2500, N2500	110'-0"	35°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
ALPHA	A3	U1900, L2100 L1900, G1900	110'-0"	35°	COMMSCOPE	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)
BETA	B1	L700, L600, N600	110'-0"	115°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	HYBRID (SHARED)
BETA	B2	L2500, N2500	110'-0"	115°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
BETA	B3	U1900, L2100 L1900, G1900	110'-0"	115°	ERICSSON	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)
GAMMA	C1	L700, L600, N600	110'-0"	255°	RFS	APXVAALL24_43-U-NA20 (OCTO)	0°	4°/4°	(1) ERICSSON RRH - RADIO 4480 B71+B85	HYBRID (SHARED)
GAMMA	C2	L2500, N2500	110'-0"	255°	ERICSSON	AIR6419 B41 (ACTIVE ANTENNA - MASSIVE MIMO)	0°	3°/3°	-	HYBRID (SHARED)
GAMMA	C3	U1900, L2100 L1900, G1900	110'-0"	255°	ERICSSON	VV-65A-R1 (QUAD)	0°	3°/3°	(1) ERICSSON RRH - RADIO 4460 B25+B66	HYBRID (SHARED)

FINAL CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
NEW	HCS	4AWG 60m	3
CABLE QUANTITY			3

2 PROPOSED ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

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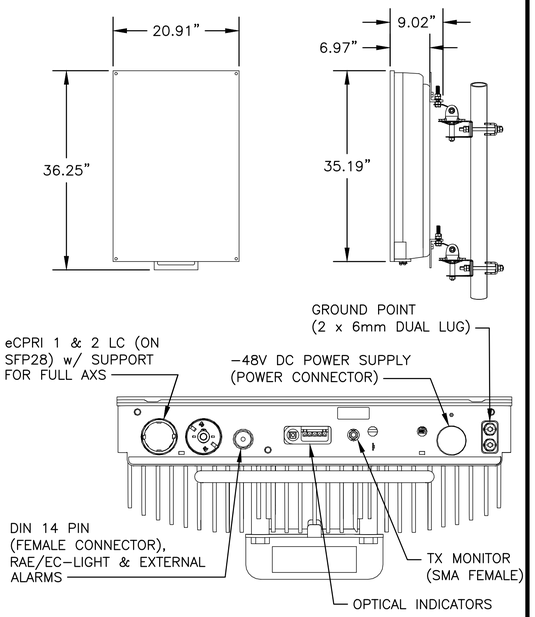
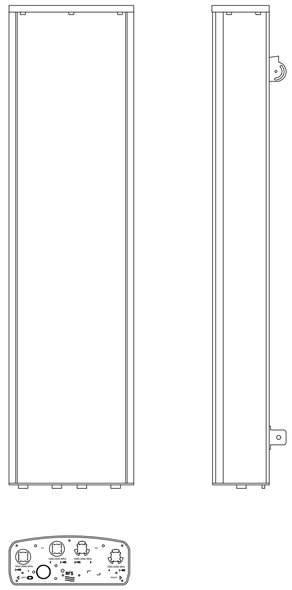
SHEET NUMBER: C-3

REVISION: 0

MANUFACTURER:	ERICSSON
MODEL:	AIR 6419 B41 (2.5GHz M-MIMO)
DIMENSIONS:	36.25" x 20.91" x 9.02" (H x W x D)
WEIGHT:	83 LBS (EXCLUDING MOUNTING KIT)
MOUNT WEIGHT:	13.5 LBS (SXK109 2016/1)



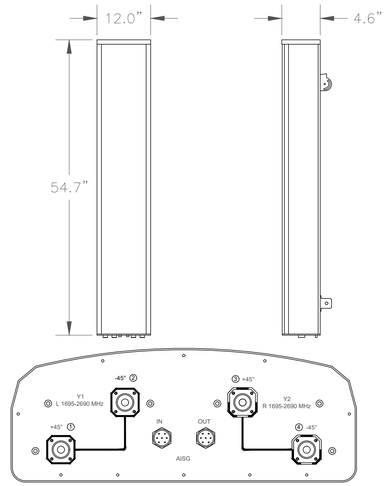
1 ERICSSON – 6419 B41
SCALE: NOT TO SCALE



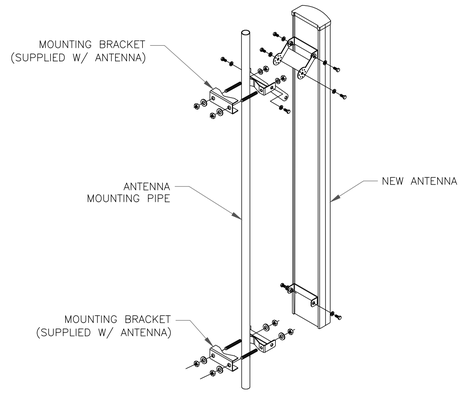
RFS/CELWAVE – APXVAALL24_43-U-NA20
WEIGHT (WITHOUT MOUNTING HARDWARE): 149.90 LBS
SIZE (HxWxD): 95.90x24.00x8.50 IN.

2 RFS/CELWAVE – APXVAALL24_43-U-NA20
SCALE: NOT TO SCALE

MANUFACTURER:	COMMSCOPE
MODEL:	VV-65A-R1
DIMENSIONS:	54.7" x 12.1" x 4.6" (H x W x D)
WEIGHT:	24.7 LB
INTERFACE:	4-PORT 4.3-10 FEMALE
MOUNTING KIT:	600899A-2 (INCLUDED) WEIGHT: 8.6 LB

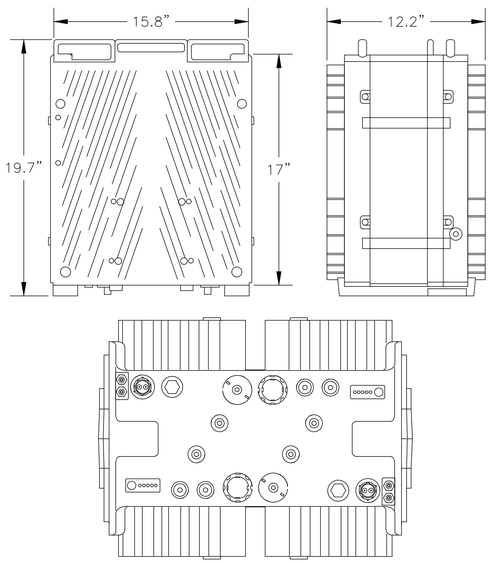


3 COMMSCOPE – VV-65A-R1
SCALE: NOT TO SCALE



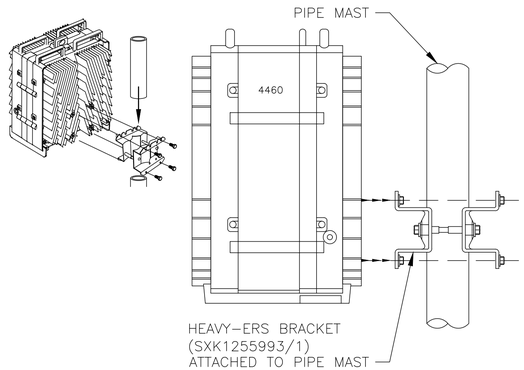
4 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	4460 RADIO B2/25 B66 (KRC 161 912/3)
DIMENSIONS:	19.7" x 15.8" x 12.2" (H" x W" x D")
WEIGHT:	109 LBS
BRACKET WEIGHT:	4.8 LBS (ERS HEAVY #SXK1255993/1)



5 ERICSSON – RADIO 4460 B25+B66
SCALE: NOT TO SCALE

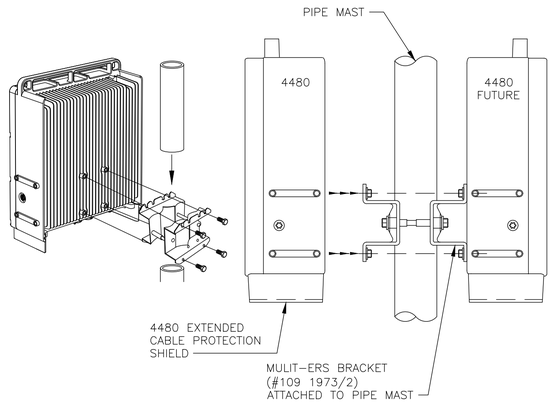
INSTALLATION KIT:	NTB1010029/50	1/RADIO
BRACKET:	ERS HEAVY BRACKET (SXK1255993/1)	1
POWER CONNECTOR:	CIRCULAR CONNECTOR (RNT4437/01)	2
GROUND CABLE:	CABLE -16mm2, GYNE, 2m 1 LUG w/ 2 M6 HOLES, 90° (RPM1192062/2)	1



INSTALLER NOTES:
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

6 ERICSSON – RADIO 4460 MOUNTING DETAIL
SCALE: NOT TO SCALE

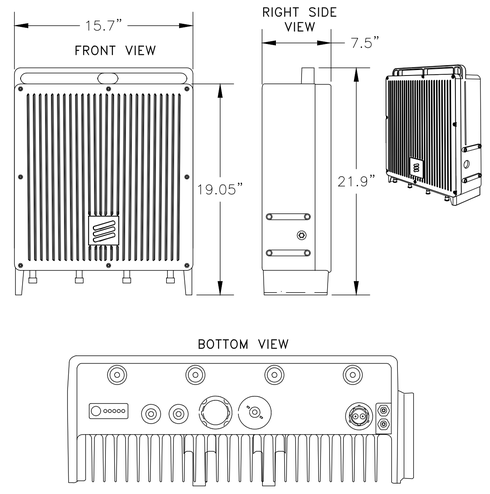
INSTALLATION KIT:	TB1010029/10	1/RADIO
BRACKET:	MULTI ERS BRACKET (#109 1973/2)	1
POWER CONNECTOR:	CIRCULAR CONNECTOR (RNT4437/01)	2
GROUND CABLE:	CABLE -16mm2, GYNE, 2m 1 LUG w/ 2 M6 HOLES, 90° (RPM1192062/2)	1



INSTALLER NOTES:
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

7 ERICSSON – RADIO 4480 MOUNTING DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	4480 RADIO (KRC 161 922/1)
DIMENSIONS:	21.9" x 15.7" x 7.5" (H x W x D)
MODEL BAND:	B71, B85 FOR NR AND LTE
WEIGHT:	81 LBS
BRACKET WEIGHT:	3.75 LBS (MULTI ERS #109 1973/2)



8 ERICSSON – RADIO 4480 B71+B85
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER
ENGINEERING
PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

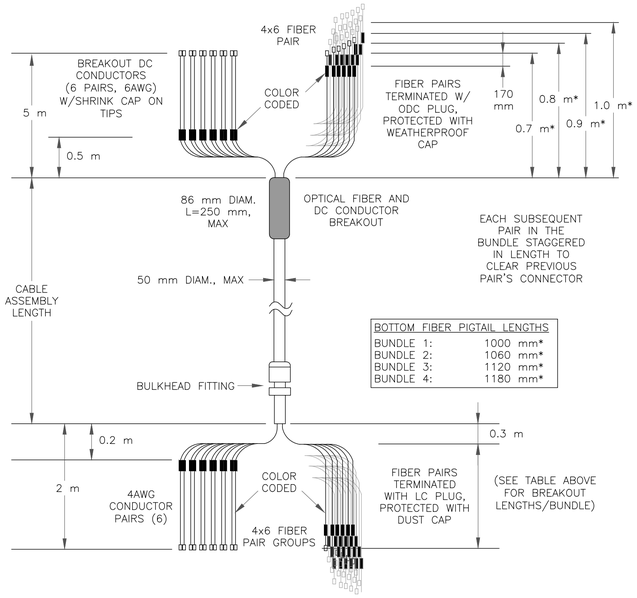
STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

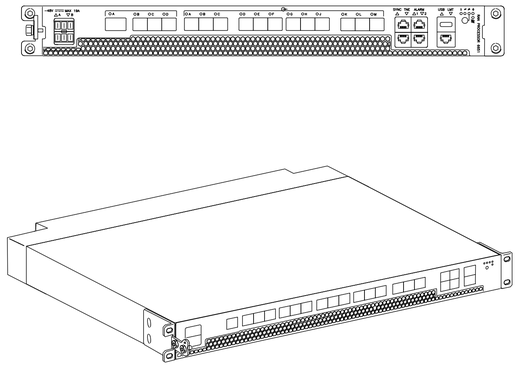
SHEET NUMBER: C-4.1

REVISION: 0



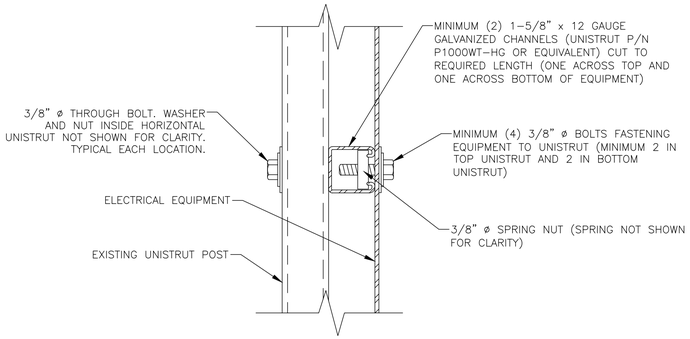
1 HCS DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	ERICSSON
MODEL:	6651 RAN PROCESSOR (KDU1370093/11)
WEIGHT:	16.53 LBS
DIMENSIONS:	1.75"x 17.25"x 13.85" (HxWxD)



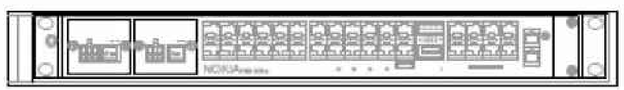
2 BASEBAND RP6651
SCALE: NOT TO SCALE

NOTE: ALL BOLTS TO BE INSTALLED USING LOCK WASHERS AND FLAT WASHERS



3 UNISTRUT ATTACHMENT DETAIL (DESIGNED BY OTHERS)
SCALE: NOT TO SCALE

MANUFACTURER: NOKIA
MODEL: IXR-e
DIMENSIONS: 17.25"x10.0"x1.75"
WEIGHT: TBD



4 CSR IXRE
SCALE: NOT TO SCALE

Attribute	Value
Min Input Voltage	-38 VDC
Output Voltage	3x -58 V DC ports
CB rating	30A/40A/50A
Efficiency	96%
Total output power	6000 Watts (2000 W/port)
Operating Temp	-40°C to +60°C
Alarms	Output fault, DC SPD failure
Mechanical	1 U 19", 13" depth
Certification	IEC 62368-1, UL 62368-1
MTBF	143 Years
Air Flow	Front to Back

5 PSU 4813
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
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N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND · SCOTT C. BRANDT · 58709 · PROFESSIONAL ENGINEER

05/27/22

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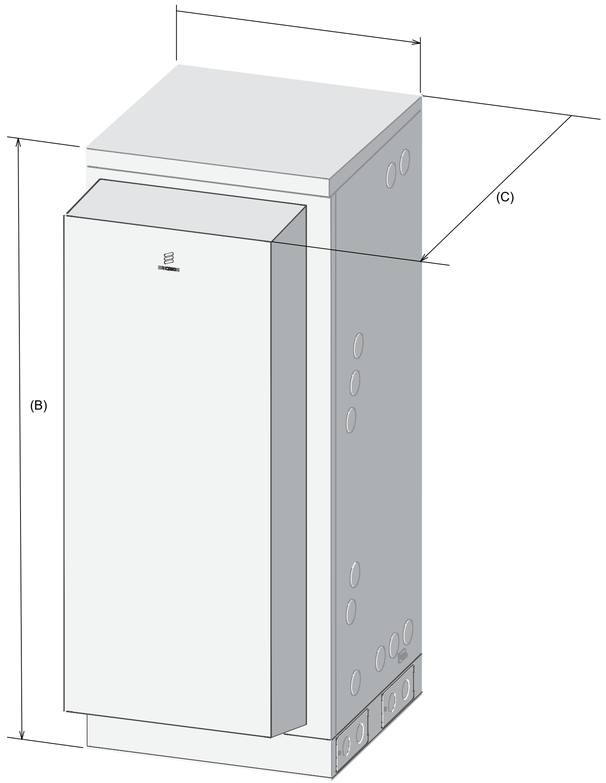
SHEET NUMBER: C-4.2
REVISION: 0

INSTALLER NOTES:

1. INFORMATION SHOWN PROVIDED BY T–MOBILE. CONTRACTOR TO REFERENCE CABINET MANUFACTURER'S SPECIFICATIONS FOR FURTHER DETAILS.
2. CONTRACTOR TO FOLLOW THE LATEST VERSION OF T–MOBILE REGIONAL CONSTRUCTION STANDARDS. CONTACT T–MOBILE FOR DETAILS.



Dimensions	
Width (A)	650 mm / 25.5906 in
Height (B)	1450 mm / 57.08661 in (without base frame) 1600 mm / 62.99213 in (with base frame)
Depth (C)	850 mm / 33.4646 in
Weight	
Empty enclosure	176 kg / 388.014 lb

1 ERICSSON 6160 CABINET DETAILS
SCALE: NOT TO SCALE

2 ERICSSON B160 CABINET DETAILS
SCALE: NOT TO SCALE

SITE SIGNAGE NOTE:
WHERE APPLICABLE, CONTRACTOR TO FOLLOW ALL T–MOBILE SIGNAGE REQUIREMENTS. CONFIRM SITE SIGNAGE WITH T–MOBILE CM PRIOR TO CONSTRUCTION

3 T–MOBILE SIGNAGE
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

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N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
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EXISTING 130'-0"
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SEAL:

STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

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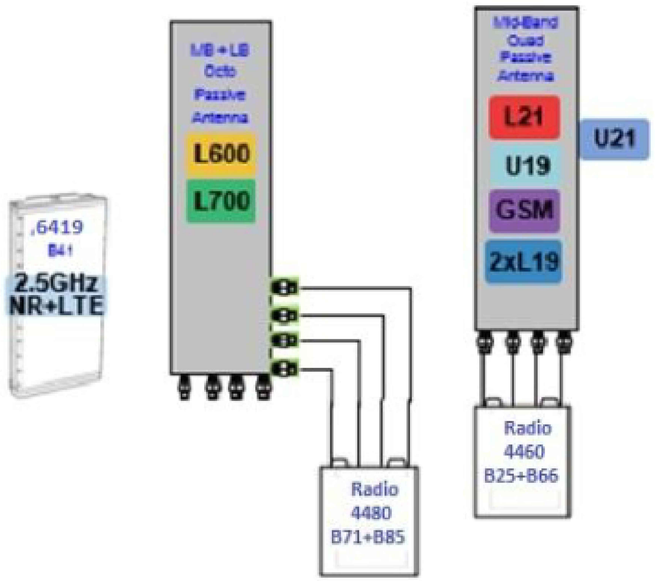
SHEET NUMBER: C-5

REVISION: 0



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

TYPICAL T-MOBILE HYBRID PLUMBING

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO (TECHNOLOGY)	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 1	1	RED		1	B	RED		AIR 32 B2a (G19 CPRI 1)	RED 1 + LC Boot Color	ALPHA G19 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		AIR 32 B2a (L19 CPRI 2)	RED 1 + LC Boot Color	ALPHA B2 L19 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		AIR 32 B66a (L21 CPRI 1)	RED 1 + LC Boot Color	ALPHA L21 CPRI 1	ALPHA
				2	A						
	4	YELLOW		1	B	YELLOW		AIR32 B66Aa (L21 CPRI 2)	RED 1 + LC Boot Color	ALPHA L21 CPRI 2	ALPHA
				2	A						
	5	WHITE		1	B	WHITE		AIR 32 B2a (G19 CPRI 1)	YELLOW 1 + LC Boot Color	BETA G19 CPRI 1	BETA
				2	A						
	6	BLACK		1	B	BLACK		AIR 32 B2a (L19 CPRI 2)	YELLOW 1 + LC Boot Color	BETA B2 L19 CPRI 2	BETA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE	AIR 32 B66a (L21 CPRI 1)	YELLOW 1 + LC Boot Color	BETA L21 CPRI 1	BETA
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE	AIR32 B66Aa (L21 CPRI 2)	YELLOW 1 + LC Boot Color	BETA L21 CPRI 2	BETA
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE	AIR 32 B2a (L19 CPRI 1)	BLUE 1 + LC Boot Color	GAMMA G19 CPRI 1	GAMMA
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE	AIR 32 B2a (L19 CPRI 2)	BLUE 1 + LC Boot Color	GAMMA B2 L19 CPRI 2	GAMMA
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE	AIR 32 B66Aa (L21 CPRI 1)	BLUE 1 + LC Boot Color	GAMMA L21 CPRI 1	GAMMA
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE	AIR32 B66Aa (L21 CPRI 2)	BLUE 1 + LC Boot Color	GAMMA L21 CPRI 2	GAMMA
				2	A						

DC Power

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	AIR 32 B66Aa	ALPHA	ALPHA L21
	0V	B	RED				
2	-48	A	BLACK	GREEN	AIR 32 B2a	ALPHA	ALPHA G/L19
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	AIR 32 B66Aa	BETA	BETA L21
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW	AIR 32 B2a	BETA	BETA G/L19
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE	AIR 32 B66Aa	GAMMA	GAMMA L21
	0V	B	WHITE				
6	-48	A	BLACK	BLACK	AIR 32 B2a	GAMMA	GAMMA G/L19
	0V	B	BLACK				

Alpha RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
RED 1	RED 2	RED 3	RED 4	RED 5	RED 6	RED 7	RED 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 2	1	RED		1	B	RED		Radio 4449	RED 2 + LC Boot Color	ALPHA L700/L600 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		Radio 4449	RED 2 + LC Boot Color	ALPHA N600 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		Radio 4449	YELLOW 2 + LC Boot Color	BETA L700/L600 CPRI 1	BETA
				2	A						
	4	YELLOW		1	B	YELLOW		Radio 4449	YELLOW 2 + LC Boot Color	BETA N600 CPRI 2	BETA
				2	A						
	5	WHITE		1	B	WHITE		Radio 4449	BLUE 2 + LC Boot Color	GAMMA L700/L600 CPRI 1	GAMMA
				2	A						
	6	BLACK		1	B	BLACK		Radio 4449	BLUE 2 + LC Boot Color	GAMMA N600 CPRI 2	GAMMA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE				
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE				
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE				
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE				
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE				
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE				
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Radio 4449	ALPHA	ALPHA L600/N600 B71
	0V	B	RED				
2	-48	A	BLACK	GREEN	Radio 4449	ALPHA	Alpha L700 B85
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Radio 4449	BETA	Beta L600/N600 B71
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW	Radio 4449	BETA	Beta L700 B85
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE	Radio 4449	GAMMA	Gamma L600/N600 B71
	0V	B	WHITE				
6	-48	A	BLACK	BLACK	Radio 4449	GAMMA	Gamma L700 B85
	0V	B	BLACK				

Beta RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
BLUE 1	BLUE 2	BLUE 3	BLUE 4	BLUE 5	BLUE 6	BLUE 7	BLUE 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 3	1	RED		1	B	RED		Radion 4415	RED 3 + LC Boot Color	ALPHA B25 L19 CPRI 1	ALPHA
				2	A						
	2	GREEN		1	B	GREEN		Radion 4415	RED 3 + LC Boot Color	ALPHA B25 L19 CPRI 2	ALPHA
				2	A						
	3	BLUE		1	B	BLUE		Radion 4415	YELLOW 3 + LC Boot Color	BETA B25 L19 CPRI 1	BETA
				2	A						
	4	YELLOW		1	B	YELLOW		Radion 4415	YELLOW 3 + LC Boot Color	BETA B25 L19 CPRI 2	BETA
				2	A						
	5	WHITE		1	B	WHITE		Radion 4415	BLUE 3 + LC Boot Color	GAMMA B25 L19 CPRI 1	GAMMA
				2	A						
	6	BLACK		1	B	BLACK		Radion 4415	BLUE 3 + LC Boot Color	GAMMA B25 L19 CPRI 2	GAMMA
				2	A						
	7	RED	WHITE	1	B	RED	WHITE				
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE				
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE				
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE				
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE				
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE				
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Radio 4415	Alpha	ALPHA B25 L19
	0V	B	RED				
2	-48	A	BLACK	GREEN	Radio 4415	Beta	BETA B25 L19
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Radio 4415	Gamma	GAMMA B25 L19
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW			
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE			
	0V	B	WHITE				
6	-48	A	BLACK	BLACK			
	0V	B	BLACK				

Gamma RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
YELLOW 1	YELLOW 2	YELLOW 3	YELLOW 4	YELLOW 5	YELLOW 6	YELLOW 7	YELLOW 8

TRUNK COLOR CODE	PAIR #	AIR/RRU END ODC		PIN	RBS END PIN	RBS END LC BOOT		RADIO (TECHNOLOGY)	AIR/RRU END COLOR CODE	RBS END FIBER LABELS	SECTOR
RED 4	1	RED		1	B	RED		AIR 6449 L41 CPRI 1	RED 4 + LC Boot Color	Alpha L41 CPRI 1	Alpha
				2	A						
	2	GREEN		1	B	GREEN		AIR 6449 L41 CPRI 2	RED 4 + LC Boot Color	Alpha L41 CPRI 2	Alpha
				2	A						
	3	BLUE		1	B	BLUE		AIR 6449 N41 CPRI 3	RED 4 + LC Boot Color	Alpha N41 CPRI 3	Alpha
				2	A						
	4	YELLOW		1	B	YELLOW		AIR 6449 N41 CPRI 4	RED 4 + LC Boot Color	Alpha N41 CPRI 4	Alpha
				2	A						
	5	WHITE		1	B	WHITE		AIR 6449 L41 CPRI 1	YELLOW 4 + LC Boot Color	Beta L41 CPRI 1	Beta
				2	A						
	6	BLACK		1	B	BLACK		AIR 6449 L41 CPRI 2	YELLOW 4 + LC Boot Color	Beta L41 CPRI 2	Beta
				2	A						
	7	RED	WHITE	1	B	RED	WHITE	AIR 6449 N41 CPRI 3	YELLOW 4 + LC Boot Color	Beta N41 CPRI 3	Beta
				2	A						
	8	GREEN	WHITE	1	B	GREEN	WHITE	AIR 6449 N41 CPRI 4	YELLOW 4 + LC Boot Color	Beta N41 CPRI 4	Beta
				2	A						
	9	BLUE	WHITE	1	B	BLUE	WHITE	AIR 6449 L41 CPRI 1	BLUE 4 + LC Boot Color	Gamma L41 CPRI 1	Gamma
				2	A						
	10	YELLOW	WHITE	1	B	YELLOW	WHITE	AIR 6449 L41 CPRI 2	BLUE 4 + LC Boot Color	Gamma L41 CPRI 2	Gamma
				2	A						
	11	WHITE	WHITE	1	B	WHITE	WHITE	AIR 6449 N41 CPRI 3	BLUE 4 + LC Boot Color	Gamma N41 CPRI 3	Gamma
				2	A						
	12	BLACK	WHITE	1	B	BLACK	WHITE	AIR 6449 N41 CPRI 4	BLUE 4 + LC Boot Color	Gamma N41 CPRI 4	Gamma
				2	A						

PAIR #	REF HOOKUP	PIN LETTER	AIR/RRU END		RADIO (TECHNOLOGY)	SECTOR	SPD LABELS
1	-48	A	BLACK	RED	Air 6449	Alpha	Alpha L/N41
	0V	B	RED				
2	-48	A	BLACK	GREEN	Air 6449	Beta	Beta L/N41
	0V	B	GREEN				
3	-48	A	BLACK	BLUE	Air 6449	Gamma	Gamma L/N41
	0V	B	BLUE				
4	-48	A	BLACK	YELLOW			
	0V	B	YELLOW				
6	-48	A	BLACK	WHITE			
	0V	B	WHITE				
6	-48	A	BLACK	BLACK			
	0V	B	BLACK				

Delta RF Jumper Color Code

Radio 4415 or Sprint 1900				Radio 4449			
port 1	port 2	port 3	port 4	port 1	port 2	port 3	port 4
GREEN 1	GREEN 2	GREEN 3	GREEN 4	GREEN 5	GREEN 6	GREEN 7	GREEN 8

2 COLOR CODE CHART
SCALE: NOT TO SCALE

T-Mobile
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BELTSVILLE, MD 20705

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T-MOBILE SITE NUMBER:
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SEAL:

STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

05/27/22

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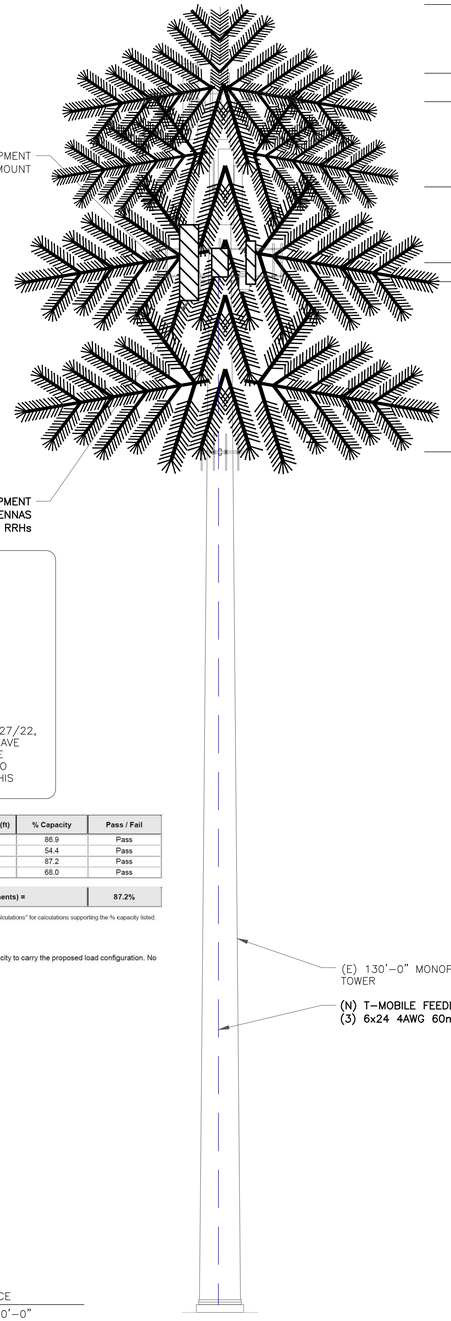
Expiration Date: 01/10/2024

SHEET NUMBER: C-6

REVISION: 0



T-MOBILE EQUIPMENT

ANTENNA CL: 110'-0"
MOUNT CL: 110'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

ANALYSIS CRITERIA:

BUILDING CODE: 2018 IBC
TIA-222 REVISION: TIA-222-H
RISK CATEGORY: II
WIND SPEED: 115 mph
EXPOSURE CATEGORY: C
TOPOGRAPHIC FACTOR: 1.0
ICE THICKNESS: 1.0 in
WIND SPEED WITH ICE: 40 mph
SERVICE WIND SPEED: 60 mph

RECOMMENDATIONS:

PER TOWER SA BY TEP DATED 04/27/22, THE TOWER AND ITS FOUNDATION HAVE SUFFICIENT CAPACITY TO CARRY THE PROPOSED LOAD CONFIGURATION. NO MODIFICATIONS ARE REQUIRED AT THIS TIME.

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	86.9	Pass
1,2	Base Plate	-	54.4	Pass
1,2	Base Foundation Structural	-	87.2	Pass
1,2	Base Foundation Soil Interaction	-	68.0	Pass
	Structure Rating (max from all components) =		**87.2%**	

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5.

4.1) Recommendations

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

1 FINAL ELEVATION
SCALE: 8' 6' 4' 2' 0 8' — 1/8"=1'-0" (FULL SIZE), 1/16"=1'-0" (11x17)

ANTENNA CLEARANCE NOTE:

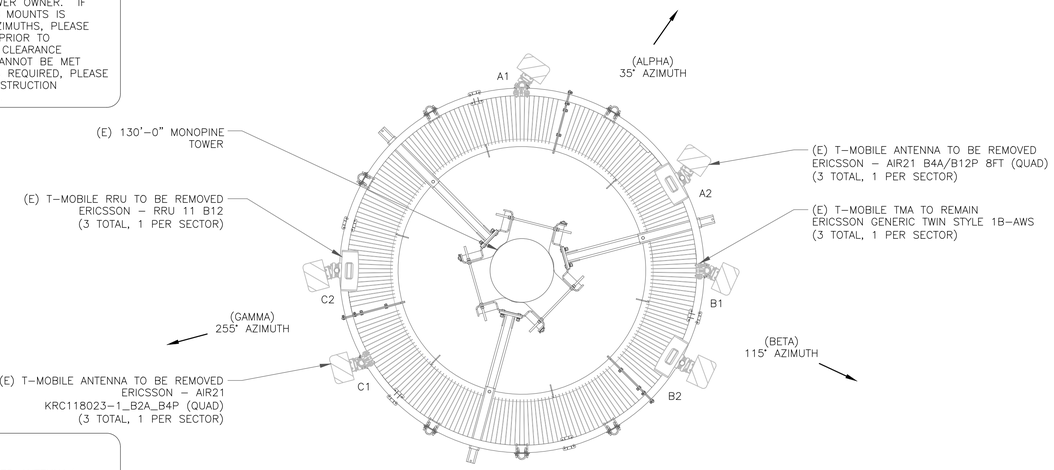
EXISTING MOUNT SIZE AND ORIENTATION PROVIDED BY THE TOWER OWNER. IF ROTATION OF EXISTING MOUNTS IS REQUIRED TO MEET AZIMUTHS, PLEASE NOTIFY T-MOBILE RF PRIOR TO CONSTRUCTION. IF 36" CLEARANCE BETWEEN ANTENNAS CANNOT BE MET AND A NEW MOUNT IS REQUIRED, PLEASE NOTIFY T-MOBILE CONSTRUCTION MANAGER IMMEDIATELY.

INSTALLER NOTE:

EXISTING AND PROPOSED ANTENNA/ EQUIPMENT POSITIONING SHOWN PER RFDS. FIELD CONDITIONS MAY VARY.

TIE-BACK ARM NOTE:

TIE-BACK ARMS SHOWN ARE FOR REFERENCE PURPOSES ONLY. TIE-BACK ARMS TO BE INSTALLED PER MOUNT MANUFACTURERS SPECIFICATIONS, ALSO ADHERING TO CROWN CASTLE CED-STD-10294 STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES.



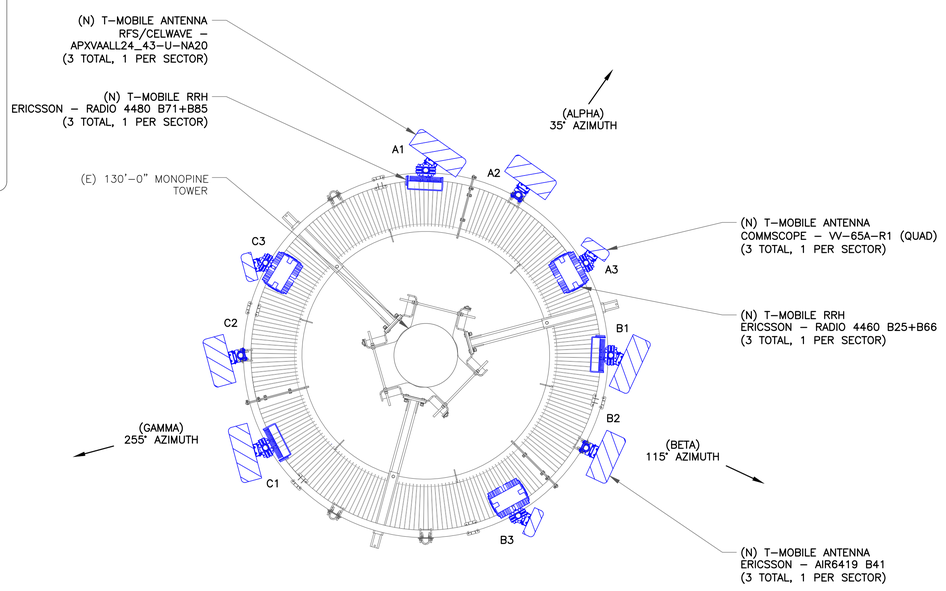
2 EXISTING ANTENNA LAYOUT
SCALE: 2' 1' 0 2' — 3/8"=1'-0" (FULL SIZE), 3/16"=1'-0" (11x17)

ANALYSIS CRITERIA:

BUILDING CODE: 2018 IBC
TIA-222 REVISION: TIA-222-H
RISK CATEGORY: II
WIND SPEED: 115 mph
EXPOSURE CATEGORY: C
TOPOGRAPHIC FACTOR: 1.0
ICE THICKNESS: 1.0 in
WIND SPEED WITH ICE: 40 mph
SERVICE WIND SPEED: 60 mph

RECOMMENDATIONS:

PER MA BY TEP DATED 05/12/22, THE MOUNT HAS SUFFICIENT CAPACITY TO CARRY THE PROPOSED LOAD CONFIGURATION. NO MODIFICATIONS ARE REQUIRED AT THIS TIME.



TOWER ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING TOWER ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE TOWER ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED TOWER MODIFICATION DESIGN OR TOWER REPLACEMENT SHALL BE APPROVED BY EOR.

MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.

3 FINAL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' — 3/8"=1'-0" (FULL SIZE), 3/16"=1'-0" (11x17)

Missing or invalid reference
File: ..\..\..\Desktop\Work in Progress\Crown\TMO\P-325491_L-680892_806957_Williamsburg Gardens_Construction Drawings - Prelim\Construction\DWG\Rev 0\MA.pdf

T-Mobile
12050 BALTIMORE AVENUE
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TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0" MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANDT
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: S-1

REVISION: 0

NOTE:
LOAD CALCULATIONS TAKEN FROM INFORMATION PROVIDED BY CROWN CASTLE & BASED ON THE RFDS DATED 2/21/22, 9. CONTRACTOR TO VERIFY LOADS WITH MANUFACTURER'S SPECIFICATIONS PRIOR TO CONSTRUCTION

EXISTING 200A M.C.B, 240/120 VAC, 1ø, 3W PPC PANEL SCHEDULE

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
BTS	0		40	1	A	2	60	3274		PPC
		0		3	B	4			3274	
LIGHT /OFF	0		20	5	A	6	15	180		GFCI
FAN		360	20	7	B	8	80		0	NODE B
SPARE	–	–	–	9	A	10		0		
SPARE	–	–	–	11	B	12	–		–	SPARE
VOLT AMPS	0	360						3454	3274	VOLT AMPS

L1 VOLT AMPERES	3454	L2 VOLT AMPERES
	3634	MAX VOLT AMPERES
	30.3	MAX AMPS
	37.9	MAX AMPS x 125%

PROPOSED 200A M.C.B, 240/120 VAC, 1ø, 3W PPC PANEL SCHEDULE

LOAD SERVED	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPERES (WATTS) L1	VOLT AMPERES (WATTS) L2	LOAD SERVED
BTS	0		40	1	A	2	60	5740		PPC
		0		3	B	4			5740	
LIGHT /OFF	0		20	5	A	6	15	180		GFCI
FAN		360	20	7	B	8	80		0	NODE B
6160 ENCLOSURE	**2770**	–	**150**	9	A	10		0		
	–	**2770**		11	B	12	**20**		**180**	INTERNAL 6160 GFCI
VOLT AMPS	2770	3130						5920	5920	VOLT AMPS

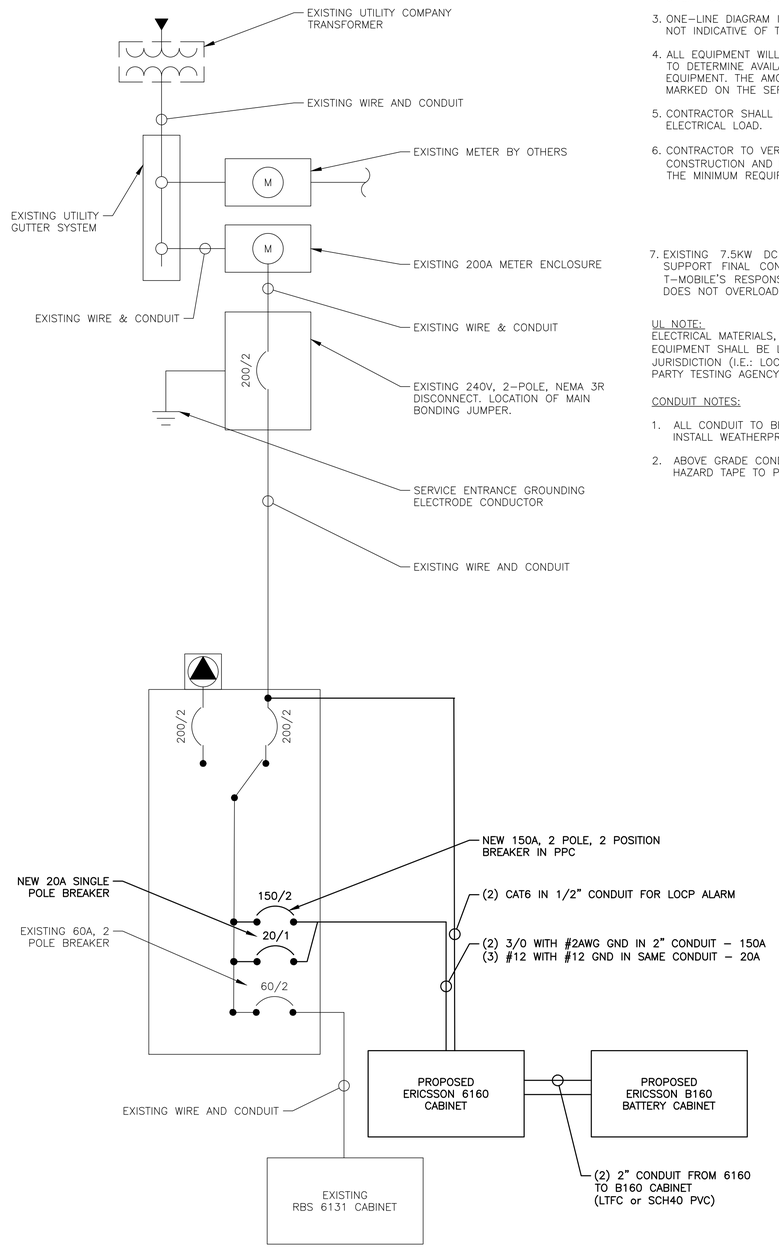
L1 VOLT AMPERES	8690	L2 VOLT AMPERES
	9050	MAX VOLT AMPERES
	75.4	MAX AMPS
	94.3	MAX AMPS x 125%

PROPOSED BREAKER & LOADING IN BOLD

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE

GENERAL NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.



2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

ONE-LINE DIAGRAM NOTES:
1. ELECTRICAL SERVICE SHALL BE 200A, 120/240V, 1ø, 3W.
2. FOR COMPLETE INTERNAL WIRING AND ARRANGEMENT, REFER TO VENDOR PRINTS PROVIDED BY EQUIPMENT MANUFACTURER.

UTILITY NOTES:
1. CONTRACTOR SHALL VERIFY AVAILABLE FAULT CURRENT WITH POWER COMPANY AND ENSURE ALL ELECTRICAL EQUIPMENT IS SUITABLE FOR AVAILABLE FAULT CURRENT.
2. CONTRACTOR SHALL COORDINATE UTILITY SERVICES WITH LOCAL UTILITY COMPANIES. VERIFY ALL REQUIREMENTS WITH UTILITY COMPANY STANDARDS.
3. ONE-LINE DIAGRAM IS FOR SCHEMATIC PURPOSES ONLY AND IS NOT INDICATIVE OF THE ACTUAL EQUIPMENT LAYOUT.
4. ALL EQUIPMENT WILL HAVE A MINIMUM AIC OF 10 KA. CONTRACTOR TO DETERMINE AVAILABLE FAULT CURRENT BEFORE ENERGIZING EQUIPMENT. THE AMOUNT OF AVAILABLE FAULT CURRENT SHALL BE MARKED ON THE SERVICE EQUIPMENT PER NEC 110.24.
5. CONTRACTOR SHALL NOTIFY UTILITY COMPANY OF CHANGES IN ELECTRICAL LOAD.
6. CONTRACTOR TO VERIFY EXISTING CONDUIT(S) SIZE(S) PRIOR TO CONSTRUCTION AND MAY REUSE EXISTING CONDUIT(S) IF THEY MEET THE MINIMUM REQUIREMENTS PER NEC CODE.
7. EXISTING 7.5KW DC GENERATOR ASSUMED TO HAVE CAPACITY TO SUPPORT FINAL CONFIGURATION OF T-MOBILE 6201 CABINET. IT IS T-MOBILE'S RESPONSIBILITY TO VERIFY THE LOAD ON THE DC PLANT DOES NOT OVERLOAD THE CAPACITY OF THE DC GENERATOR.

UL NOTE:
ELECTRICAL MATERIALS, DEVICES, CONDUCTORS, APPLIANCES AND EQUIPMENT SHALL BE LABELED/LISTED BY UL OR ACCEPTED BY JURISDICTION (I.E.: LOCAL COUNTY OR STATE) APPROVED THIRD PARTY TESTING AGENCY

CONDUIT NOTES:
1. ALL CONDUIT TO BE SCH40 PVC OR LTFC, AS NOTED. INSTALL WEATHERPROOF FITTINGS.
2. ABOVE GRADE CONDUIT RUNS TO BE MARKED WITH HAZARD TAPE TO PREVENT TRIPPING HAZARD.

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SEAL:

STATE OF MARYLAND
SCOTT C. BRANTLEY
58709
PROFESSIONAL ENGINEER

05/27/22

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Expiration Date: 01/10/2024

SHEET NUMBER: E-1
REVISION: 0

T-MOBILE GROUNDING NOTES:

ALL GROUNDS MUST ROUTE DOWNHILL FOR ENTIRE DURATION OF ROUTE

1. PROVIDE LABOR, MATERIALS, INSPECTION, AND TESTING TO PROVIDE CODE COMPLIANCE FOR ELECTRIC, TELEPHONE, AND GROUNDING/LIGHTNING SYSTEMS.

ICE BRIDGE/ EQUIPMENT POST:

#2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED TO GROUND RING (BOTH ENDS), FINAL WELD COLD GALVANIZED, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, ANCHORED TO PAD/PLATFORM TO AVOID TRIP HAZARD USING HAMMER SET ANCHORS.

PEDESTALS, PLINTHS, SSC CABINET, FCOA CABINETS:

1. #2 SOLID COPPER TINNED, 2 HOLE LUG WITH FLAT AND LOCK WASHER AT EQUIPMENT; EXOTHERMICALLY WELDED TO GROUND RING, FINAL WELD COLD GALVANIZED, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, ANCHORED TO PAD TO AVOID TRIP HAZARD USING HAMMER SET ANCHORS. EACH PART REQUIRES A SEPARATE DOWNLEAD, NO DAISY CHAINS.

2. ALL COMPONENTS INSIDE FCOA CABINETS REQUIRE A DEDICATED GROUND.

COVP's:

#6 THHN STRANDED (GREEN JACKET), CONNECTED AT EQUIPMENT SIDE USING OVP TERMINAL BLOCK CONNECTION; MECHANICALLY CONNECTED TO GROUND REFERENCE AT MASTER BUSS BAR USING 2 HOLE LUG WITH FLAT AND LOCK WASHER, IN ½" NON-METALLIC SEAL TIGHT CONDUIT, SEALED WITH SILICONE, AND ANCHORED TO PAD/PLATFORM TO AVOID TRIP HAZARD.

ANTENNA/ COVP/ RRU MAST PIPES:

1. ALL VERTICAL MAST PIPES: #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED TO TOP OF PIPE (PIPE, DOWN MOLD), FINAL WELD COLD GALVANIZED, BONDED TO TOP BUSS BAR WITH 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER.

2. EXISTING/REUSED PIPES: #2 SOLID COPPER TINNED, BONDED WITH COLD WATER CLAMP TO TOP OF PIPE, BONDED TO TOP BUSS WITH 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER

AIR TERMINALS:

TO BE INSTALLED, ONLY IF REQUIRED

TMA's, DIPLEXERS AND TRIPLEXERS:

1. #6 THHN, WITH PROPER COPPER COMPRESSION LUG, FLATS AND LOCK WASHERS

2. ALL GROUND LUGS ON TMA MUST BE GROUNDED WITH SEPARATE DOWNLEAD TO BUSS BAR (NO DAISY CHAINS)

ELEVATED STEEL PLATFORMS WITH LUNAR FEET:

#2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (FLAT PLATE MOLD) TO OUTSIDE PERIMETER BEAMS IN FOUR (4) PLACES, FINAL WELD COLD GALVANIZED, BONDED DIRECTLY TO SUBGRADE GROUND RING.

STEEL CANOPY (STEEL PLATFORM OR CONCRETE PAD):

1. #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (PIPE, DOWN MOLD) TO BOTTOM OF ALL VERTICAL SUPPORT POSTS, TYPICALLY FOUR (4) PIPES, FINAL WELD COLD GALVANIZED, BONDED DIRECTLY TO SUBGRADE GROUND RING.

2. #2 SOLID COPPER TINNED, EXOTHERMICALLY WELDED (PIPE, UP MOLD) TO TOP OF ALL VERTICAL SUPPORT POSTS, TYPICALLY FOUR (4) PIPES, FINAL WELD COLD GALVANIZED, BONDED UP TO CANOPY GRIP-STRUT USING 2 HOLE COPPER COMPRESSION LUG, FLAT AND LOCK WASHER.

RRU:

#6 THHN, WITH PROPER COPPER COMPRESSION LUG, ANTI-OXIDANT TO SECTOR BUSS BAR

FSBE ALARM BOX:

#6 THHN WITH ONE HOLE LUG BONDED TO PREVIOUSLY GROUNDED FCOA, PLINTH OR BUSS BAR.

SURGE SUPPRESSORS:

#6 THHN TO PREVIOUSLY GROUNDED BUSS BAR USING PROPER LUGS

FYGA/FYGB BRACKET:

1. #6 THHN TO PREVIOUSLY GROUNDED BUSS BAR USING PROPER LUGS

2. THROUGH BOLTS WITH FLAT, LOCK ON BRACKET

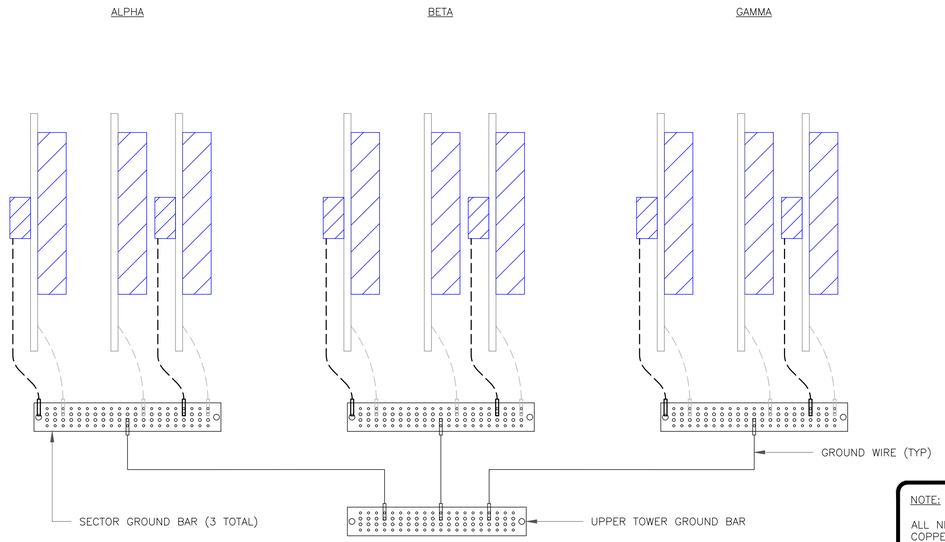
BUSS BARS:

1. PLATFORM / PAD BUSS BAR SHOULD BE MINIMUM 12" TINNED COPPER WITH INSULATORS, AND SHOULD HAVE TWO (2) EXOTHERMICALLY WELDED DOWN LEADS DIRECTLY TO GROUND RING USING #2 SOLID COPPER TINNED WIRE.

2. SECTOR BUSS BAR SHOULD BE PROPERLY SIZED TO ACCOMMODATE NECESSARY GROUNDING FOR EQUIPMENT ON EACH MOUNT, AND MAY BE SOLID COPPER (TINNED NOT REQUIRED). DO NOT USE INSULATORS ON SECTOR BUSS BARS ATTACH DIRECTLY TO TOWER MOUNT STEEL.

GENERAL:

- NO GROUND KITS ON HYBRID TRUNKS (TOP OR BOTTOM)
- NO GROUND KITS ON MICROWAVE IF CABLES (TOP OR BOTTOM)
- MICROWAVE SURGE SUPPRESSORS ARE NOT TO BE INSTALLED UPSTAIRS ON TOWER, DOWNSTAIRS ONLY (BULKHEAD PREFERRED)
- MICROWAVE ODU MUST BE GROUNDED TO TOWER TOP SECTOR OR COLLECTOR BUSS BAR
- ALL TMA'S AND DIPLEXERS MUST BE GROUNDED TO BUSS BAR. NO DAISY CHAIN ON TWIN/DUAL TMA
- ALL LUGS SHOULD BE PROPERLY SIZED FOR CONDUCTOR, BURNDY TINNED COPPER COMPRESSION STYLE
  1. INDOOR (OR INSIDE CABINET) SHOULD HAVE WINDOW
  2. OUTDOOR SHOULD NOT HAVE WINDOW
- CONTRACTOR TO VERIFY EXISTENCE AND LOCATION OF EXISTING SITE GROUND SYSTEM.
- CONTRACTOR SHALL VERIFY THAT GROUNDING ELECTRODES SHALL BE CONNECTED IN A RING USING #2 AWG BARE TINNED COPPER WIRE. THE TOP OF THE GROUND RODS AND THE RING CONDUCTOR SHALL BE 30" BELOW FINISHED GRADE, OR TO FROST DEPTH, WHICHEVER IS GREATER. GROUNDING ELECTRODES SHALL BE DRIVEN ON 10'-0" CENTERS (PROVIDE AND INSTALL AS REQUIRED. REQUIRED PER PLAN BELOW).
- GROUNDING CONDUCTORS SHALL BE OF EQUAL LENGTH, MATERIAL, AND BONDING TECHNIQUE.
- CONTRACTOR SHALL ENSURE GROUND RING IS WITHIN 12 TO 36 INCHES OF THE EQUIPMENT PAD. PROVIDE AND INSTALL GROUNDING CONNECTIONS SHOWN BELOW AS NEEDED PER EXISTING SITE GROUNDING SYSTEM. CONTRACTOR SHALL VERIFY ALL EXISTING SITE GROUNDING CONDITIONS BEFORE STARTING WORK OR PURCHASING EQUIPMENT.
- ALL DOWN CONDUCTORS MUST GO DOWN.



NOTE:

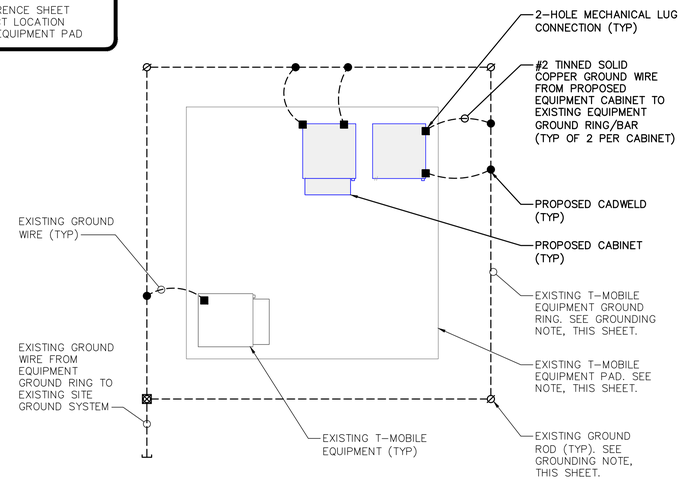
ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

GROUNDING SHOWN TYPICAL PER SECTOR.

1 TYPICAL ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

NOTE:

CONTRACTOR TO REFERENCE SHEET C-1.1 & 1.2 FOR EXACT LOCATION AND ORIENTATION OF EQUIPMENT PAD



2 TYPICAL CABINET GROUNDING DIAGRAM
SCALE: NOT TO SCALE

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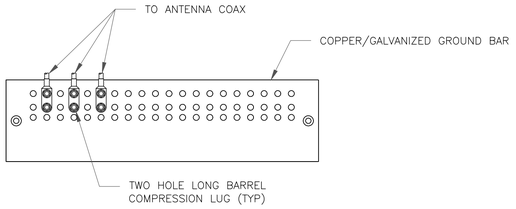
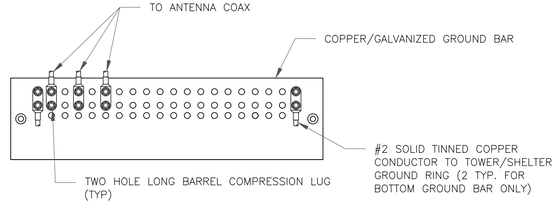


NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

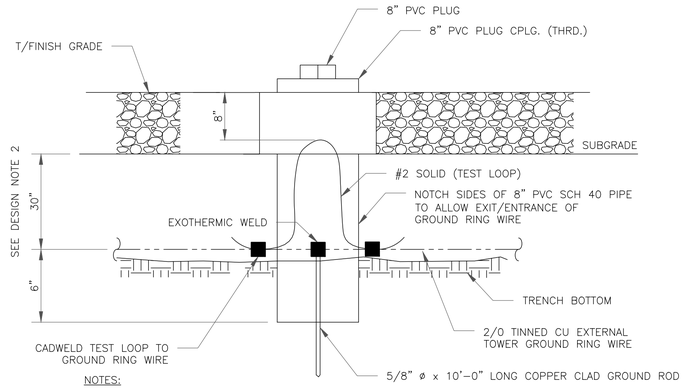
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

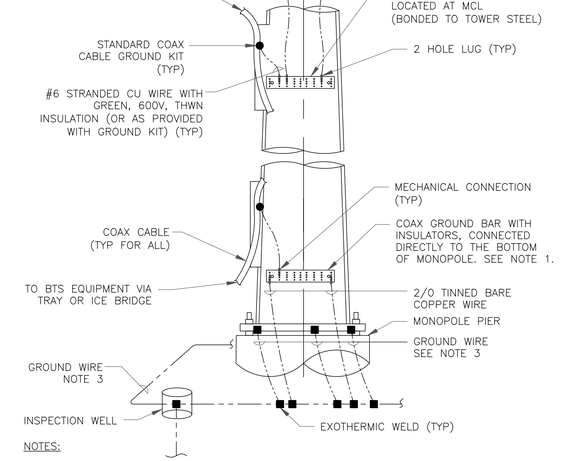
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

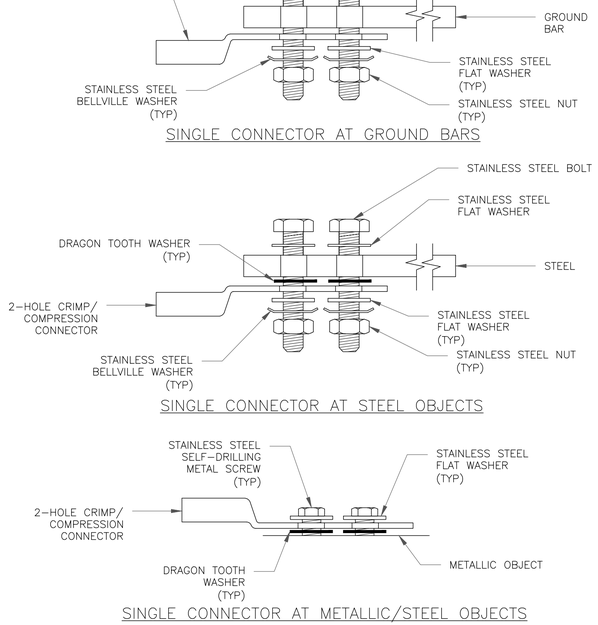
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



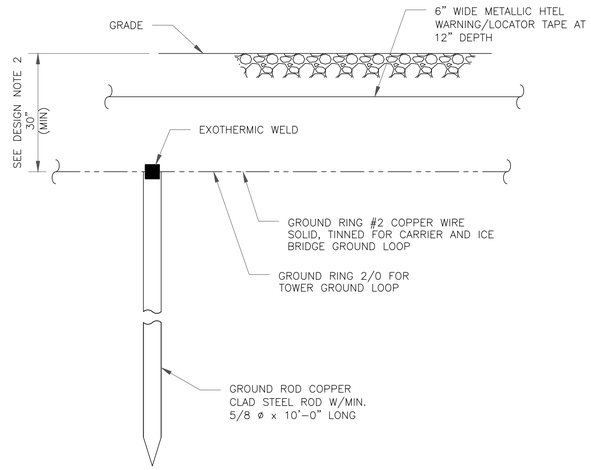
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

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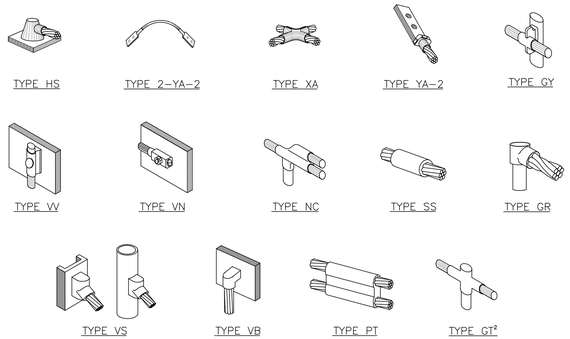
REVISION: 0

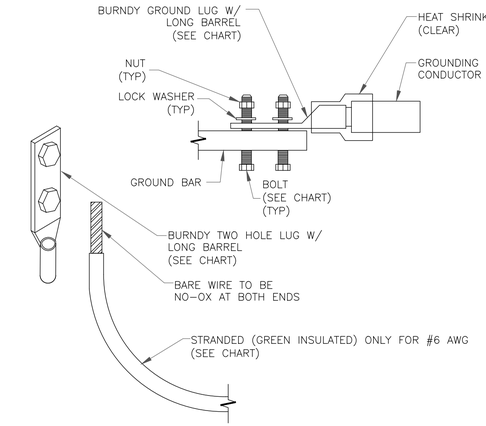


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

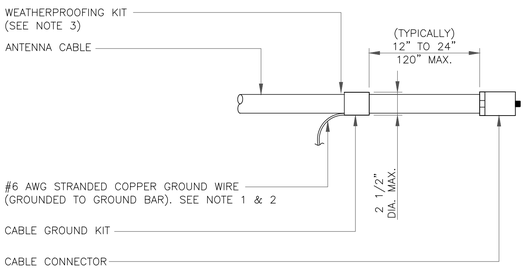
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

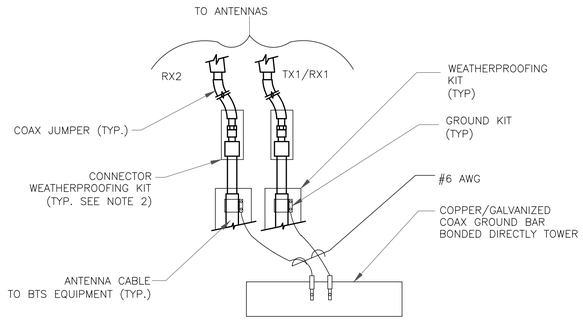
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

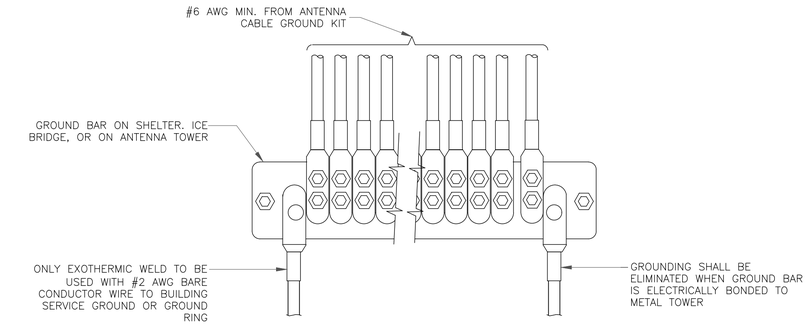
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



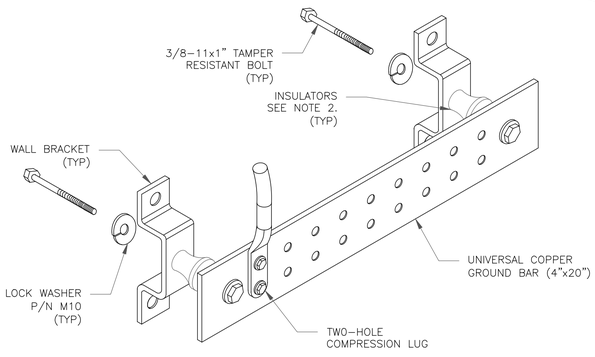
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



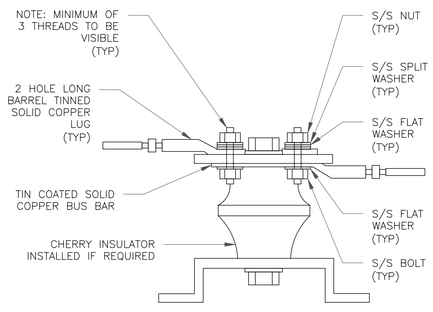
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



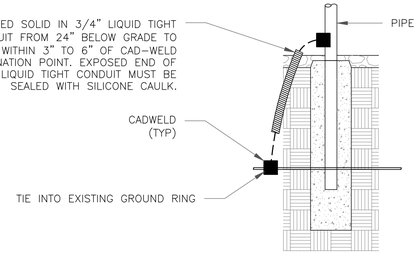
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
N.C. LICENSE #P-1403
TEP JOB #: 241707.680892

T-MOBILE SITE NUMBER:
7WAN098A

BU #: **806957**
WILLIAMSBURG GARDENS

10010 OAKLYN DRIVE
POTOMAC, MD 20854

EXISTING 130'-0"
MONOPINE TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	05/27/22	AUW	CONSTRUCTION	KS

SEAL:

STATE OF MARYLAND
SCOTT C. BRANHAM
58709
PROFESSIONAL ENGINEER

05/27/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 58709 Expiration Date: 01/10/2024

SHEET NUMBER: G-3

REVISION: 0