

Date: **October 12, 2021**



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

**Subject: Structural Analysis Report**

**Carrier Designation:** **T-Mobile Co-Locate**  
**Site Number:** BA20403A  
**Site Name:** N/A

**Crown Castle Designation:** **BU Number:** 856199  
**Site Name:** HWY 101 - Lakeville  
**JDE Job Number:** 677186  
**Work Order Number:** 2027389  
**Order Number:** 578187 Rev. 0

**Engineering Firm Designation:** **TEP Project Number:** 133231.610607

**Site Data:** **1 Casa Grande Road, Petaluma, Sonoma County, CA 94954**  
**Latitude 38° 13' 54.06", Longitude -122° 36' 30.93"**  
**76 Foot - Monopole 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:

LC5: Proposed Equipment Configuration

**Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 92 mph as required by the 2019 California Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Alix D. Hyppolite / CLT

Respectfully submitted by:

Adam M. Amortnont, P.E.



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## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

Table 2 - Other Considered Equipment

### 3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 - Tower Component Stresses vs. Capacity

4.1) Recommendations

### 5) APPENDIX A

tnxTower Output

### 6) APPENDIX B

Base Level Drawing

### 7) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

This tower is a 76-ft monopole tower designed by FDH Velocitel, Inc. The tower has been modified per reinforcement drawings prepared by Crown Castle in November of 2018.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	92 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1.0
<b>Seismic Ss:</b>	1.591
<b>Seismic S1:</b>	0.6
<b>Service Wind Speed:</b>	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)
50.0	50.0	3	Ericsson	AIR6449 B41_T-Mobile w/ Mount Pipe	12 2 1	7/8 1-5/8 1-3/8
		3	RFS Celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	Ericsson	Radio 4480_TMOV2		
		1	Tower Mounts	T-Arm Mount [TA 702-3]		

**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)	
72.0	75.0	3	Commscope	JAHH-65A-R3B	12 2 4	7/8 3/8 3/4	
		3	Ericsson	RRUS 32			
		3	Ericsson	RRUS 4478 B5			
	72.0	1	Tower Mounts	Pipe Mount [PM 601-3]			
		1	Tower Mounts	Pipe Mount [PM 602-3]			
	70.0	70.0	3	Commscope			NNHH-65A-R4
			3	Ericsson			RRUS 4478 B14
			3	Ericsson			RRUS 4415 B25
			2	Raycap			DC6-48-60-18-8F
			3	Commscope			JAHH-65A-R3B
64.0	65.0	3	Ericsson	RRUS 11	6 1 2	7/8 3/8 3/4	
		3	Ericsson	RRUS 32 B66			
		1	Raycap	DC6-48-60-18-8F			
		2	Tower Mounts	Pipe Mount [PM 601-3]			
	64.0	2	Tower Mounts	Pipe Mount [PM 601-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
60.0	60.0	1	Tower Mounts	Pipe Mount [PM 601-3]	6	7/8
	59.0	3	Powerwave Technologies	7721.00		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Reference	Source
Geotechnical Report	6505819	CCISites
Tower Foundation Drawings	4721996	CCISites
Tower Manufacturer Drawings	6534482	CCISites
Tower Reinforcement Drawings	7979008	CCISites
Post-Modification Inspection	8301597	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.
- 3) The following material grades were assumed:
  - a) Anchor bolts: A615-J
  - b) Pole shaft: A572-50
  - c) Base plate: A36
  - d) Concrete compressive strength:  $f'c = 3$  ksi
  - e) Foundation flexural reinforcement:  $f_y = 60$  ksi

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)<sup>1,2</sup>**

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
76 - 71	Pole	TP13.627x13x0.1875	Pole	2.1%	Pass
71 - 66	Pole	TP14.254x13.627x0.1875	Pole	7.5%	Pass
66 - 61	Pole	TP14.881x14.254x0.1875	Pole	14.2%	Pass
61 - 56	Pole	TP15.508x14.881x0.1875	Pole	21.2%	Pass
56 - 51.99	Pole	TP16.26x15.508x0.1875	Pole	26.1%	Pass
51.99 - 46.99	Pole	TP16.263x15.635x0.25	Pole	27.1%	Pass
46.99 - 41.99	Pole	TP16.89x16.263x0.25	Pole	33.0%	Pass
41.99 - 36.99	Pole	TP17.518x16.89x0.25	Pole	38.3%	Pass
36.99 - 31.99	Pole	TP18.145x17.518x0.25	Pole	43.5%	Pass
31.99 - 26.99	Pole	TP18.773x18.145x0.25	Pole	48.7%	Pass
26.99 - 21.99	Pole	TP19.4x18.773x0.25	Pole	53.5%	Pass
21.99 - 16.99	Pole	TP20.028x19.4x0.25	Pole	57.9%	Pass
16.99 - 13	Pole	TP20.529x20.028x0.25	Pole	61.1%	Pass
13 - 12.75	Pole + Reinf.	TP20.56x20.529x0.6	Reinf. 1 Tension Rupture	36.6%	Pass
12.75 - 7.75	Pole + Reinf.	TP21.187x20.56x0.575	Reinf. 1 Tension Rupture	39.6%	Pass
7.75 - 2.75	Pole + Reinf.	TP21.815x21.187x0.5625	Reinf. 1 Tension Rupture	42.5%	Pass
2.75 - 0	Pole + Reinf.	TP22.16x21.815x0.5625	Reinf. 1 Tension Rupture	44.1%	Pass
				Summary	
			Pole	61.1%	Pass
			Reinforcement	44.1%	Pass
			<b>Overall</b>	<b>61.1%</b>	<b>Pass</b>

**Table 5 - Tower Component Stresses vs. Capacity - LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,3	Anchor Rods	-	64.4	Pass
1,2	Base Plate	-	58.2	Pass
1,2	Base Foundation Structural	-	56.6	Pass
1,2	Base Foundation Soil Interaction	-	35.5	Pass

<b>Structure Rating (max from all components) =</b>	<b>64.4%</b>
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Notes:

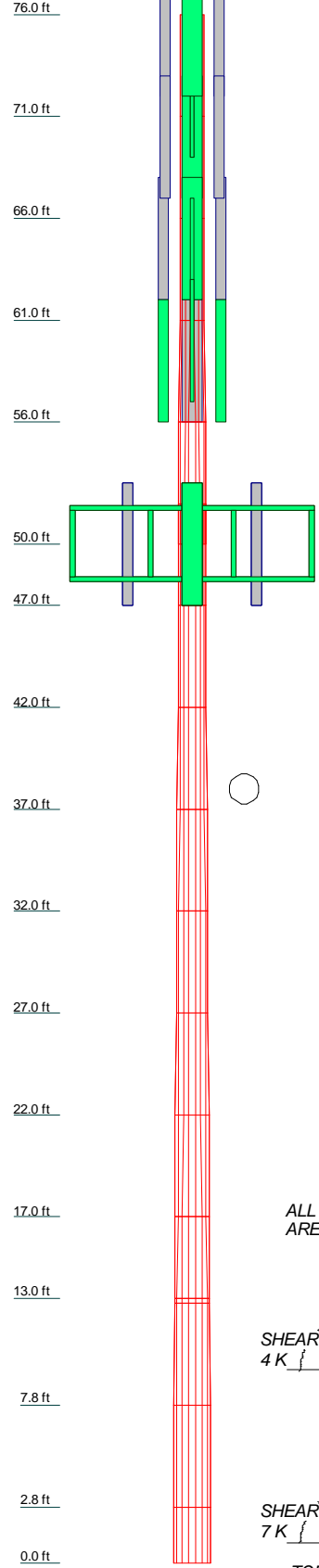
- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
- 2) Rating per TIA-222-H Section 15.5
- 3) Seismic controls. See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity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

#### 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	16	0.1875		13.0000	13.6269	A572-50	0.1
2	5.00	16	0.1875		13.6269	14.2538	A572-50	0.1
3	5.00	16	0.1875		14.2538	14.8808	A572-50	0.1
4	5.00	16	0.1875		14.8808	15.5077	A572-50	0.2
5	6.00	16	0.1875	1.99	15.5077	16.2600	A572-50	0.2
6	5.00	16	0.2500		15.6355	16.2630	A572-50	0.2
7	5.00	16	0.2500		16.2630	16.8904	A572-50	0.2
8	5.00	16	0.2500		16.8904	17.5179	A572-50	0.2
9	5.00	16	0.2500		17.5179	18.1454	A572-50	0.2
10	5.00	16	0.2500		18.1454	18.7729	A572-50	0.2
11	5.00	16	0.2500		18.7729	19.4004	A572-50	0.3
12	5.00	16	0.2500		19.4004	20.0278	A572-50	0.3
13	3.99	16	0.2500		20.5990	20.5990	A572-50	0.2
14	0.25	16	0.6000		20.5990	21.1874	A572-50	0.6
15	5.00	16	0.5750		20.5599	21.1874	A572-50	0.6
16	5.00	16	0.5625		21.1874	21.8149	A572-50	0.6
17	2.75	16	0.5625		21.8149	22.1600	A572-50	0.3



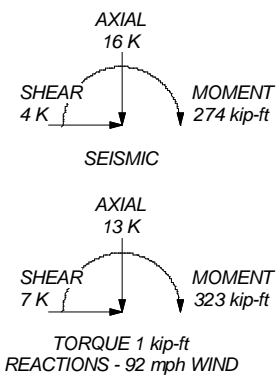
**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Sonoma County, California.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 92 mph basic wind in accordance with the TIA-222-H Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. CCISeismic Note: Seismic loads generated by CCISeismic 3.38
8. CCISeismic Note: Seismic calculations are in accordance with TIA-222-H-1
9. TOWER RATING: 61.1%

ALL REACTIONS ARE FACTORED



 Tower Engineering Professionals	<b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661 6351 FAX: (919) 661 6350		Job: <b>HWY 101 - Lakeville (BU 856199)</b> Project: <b>TEP No. 133231.610607</b>
	Client: <b>Crown Castle</b> Code: <b>TIA-222-H</b> Path:	Drawn by: <b>ahyppolite</b> Date: <b>10/12/21</b>	App'd: Scale: <b>NTS</b> Dwg No. <b>E-1</b>

<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661 6351 FAX: (919) 661 6350	<b>Job</b> HWY 101 - Lakeville (BU 856199)	<b>Page</b> 1 of 20
	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

## 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 Sonoma County, California.

Tower base elevation above sea level: 11.00 ft.

Basic wind speed of 92 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.

Deflections calculated using a wind speed of 60 mph.

TOWER RATING: 64.3%.

CCISEismic Note: Seismic loads generated by CCISEismic 3.38.

CCISEismic Note: Seismic calculations are in accordance with TIA-222-H-1.

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:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(E_v \text{ and } E_h) = 1.0$ .

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



<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661 6351 FAX: (919) 661 6350	<b>Job</b> HWY 101 - Lakeville (BU 856199)	<b>Page</b> 2 of 20
	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

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	76.00-71.00	5.00	0.00	16	13.0000	13.6269	0.1875	0.7500	A572-50 (50 ksi)
L2	71.00-66.00	5.00	0.00	16	13.6269	14.2538	0.1875	0.7500	A572-50 (50 ksi)
L3	66.00-61.00	5.00	0.00	16	14.2538	14.8808	0.1875	0.7500	A572-50 (50 ksi)
L4	61.00-56.00	5.00	0.00	16	14.8808	15.5077	0.1875	0.7500	A572-50 (50 ksi)
L5	56.00-50.00	6.00	1.99	16	15.5077	16.2600	0.1875	0.7500	A572-50 (50 ksi)
L6	50.00-46.99	5.00	0.00	16	15.6355	16.2630	0.2500	1.0000	A572-50 (50 ksi)
L7	46.99-41.99	5.00	0.00	16	16.2630	16.8904	0.2500	1.0000	A572-50 (50 ksi)
L8	41.99-36.99	5.00	0.00	16	16.8904	17.5179	0.2500	1.0000	A572-50 (50 ksi)
L9	36.99-31.99	5.00	0.00	16	17.5179	18.1454	0.2500	1.0000	A572-50 (50 ksi)
L10	31.99-26.99	5.00	0.00	16	18.1454	18.7729	0.2500	1.0000	A572-50 (50 ksi)
L11	26.99-21.99	5.00	0.00	16	18.7729	19.4004	0.2500	1.0000	A572-50 (50 ksi)
L12	21.99-16.99	5.00	0.00	16	19.4004	20.0278	0.2500	1.0000	A572-50 (50 ksi)
L13	16.99-13.00	3.99	0.00	16	20.0278	20.5286	0.2500	1.0000	A572-50 (50 ksi)
L14	13.00-12.75	0.25	0.00	16	20.5286	20.5599	0.6000	2.4000	A572-50 (50 ksi)
L15	12.75-7.75	5.00	0.00	16	20.5599	21.1874	0.5750	2.3000	A572-50 (50 ksi)
L16	7.75-2.75	5.00	0.00	16	21.1874	21.8149	0.5625	2.2500	A572-50 (50 ksi)
L17	2.75-0.00	2.75		16	21.8149	22.1600	0.5625	2.2500	A572-50 (50 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	13.2180	7.6635	158.9308	4.5613	6.6300	23.9715	320.2679	3.7892	2.2139	11.807
L2	13.8572	8.0385	183.4206	4.7844	6.9497	26.3925	369.6185	3.9746	2.3386	12.473
L3	14.4964	8.4134	210.3053	5.0076	7.2695	28.9300	423.7949	4.1600	2.4634	13.138
L4	15.1356	8.7884	239.6965	5.2308	7.5892	31.5839	483.0222	4.3454	2.5881	13.803
L5	15.7748	9.1634	271.7058	5.4540	7.9089	34.3543	547.5256	4.5308	2.7129	14.469
L6	16.4175	9.6134	313.7304	5.7218	8.2926	37.8326	632.2111	4.7533	2.8626	15.267
L7	17.0648	10.0634	366.9261	5.9996	8.6763	41.4548	739.4079	4.9808	2.9986	16.145
L8	17.7121	10.5134	432.1718	6.2774	9.0600	45.1322	869.6152	5.2183	3.1486	17.113
L9	18.3594	10.9634	510.5775	6.5552	9.4437	48.8646	1025.3711	5.4668	3.3136	18.181

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	<b>Project</b>	TEP No. 133231.610607	<b>Date</b>	13:26:49 10/12/21
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Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L10	18.4519	14.2716	577.3896	6.3708	9.2542	62.3925	1163.5217	7.0565	3.1134	12.454
	18.4519	14.2716	577.3896	6.3708	9.2542	62.3925	1163.5217	7.0565	3.1134	12.454
	19.0917	14.7720	640.2803	6.5941	9.5742	66.8758	1290.2553	7.3040	3.2383	12.953
L11	19.0917	14.7720	640.2803	6.5941	9.5742	66.8758	1290.2553	7.3040	3.2383	12.953
	19.7314	15.2724	707.5797	6.8175	9.8942	71.5147	1425.8729	7.5514	3.3632	13.453
L12	19.7314	15.2724	707.5797	6.8175	9.8942	71.5147	1425.8729	7.5514	3.3632	13.453
	20.3712	15.7728	779.4369	7.0409	10.2142	76.3092	1570.6755	7.7988	3.4880	13.952
L13	20.3712	15.7728	779.4369	7.0409	10.2142	76.3092	1570.6755	7.7988	3.4880	13.952
	20.8818	16.1721	840.1488	7.2192	10.4696	80.2468	1693.0184	7.9963	3.5877	14.351
L14	20.8132	38.1433	1913.7441	7.0946	10.4696	182.7912	3856.4645	18.8598	2.8912	4.819
	20.8452	38.2033	1922.7969	7.1057	10.4856	183.3756	3874.7072	18.8895	2.8974	4.829
L15	20.8501	36.6574	1849.6129	7.1146	10.4856	176.3961	3727.2312	18.1251	2.9472	5.126
	21.4898	37.8083	2029.3602	7.3380	10.8056	187.8067	4089.4474	18.6942	3.0720	5.343
L16	21.4923	37.0088	1988.8576	7.3425	10.8056	184.0584	4007.8290	18.2989	3.0969	5.506
	22.1321	38.1348	2175.9591	7.5658	11.1256	195.5814	4384.8648	18.8556	3.2218	5.728
L17	22.1321	38.1348	2175.9591	7.5658	11.1256	195.5814	4384.8648	18.8556	3.2218	5.728
	22.4839	38.7540	2283.6946	7.6887	11.3016	202.0683	4601.9671	19.1618	3.2905	5.85

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L1 76.00-71.00				1	1	1			
L2 71.00-66.00				1	1	1			
L3 66.00-61.00				1	1	1			
L4 61.00-56.00				1	1	1			
L5 56.00-50.00				1	1	1			
L6 50.00-46.99				1	1	1			
L7 46.99-41.99				1	1	1			
L8 41.99-36.99				1	1	1			
L9 36.99-31.99				1	1	1			
L10				1	1	1			
31.99-26.99									
L11				1	1	1			
26.99-21.99									
L12				1	1	1			
21.99-16.99									
L13				1	1	1			
16.99-13.00									
L14				1	1	0.896232			
13.00-12.75									
L15 12.75-7.75				1	1	0.918831			
L16 7.75-2.75				1	1	0.924088			
L17 2.75-0.00				1	1	0.916424			

### 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
LDF5-50A(7/8)	A	No	Surface Ar (CaAa)	50.00 - 48.00	12	12	0.500 0.500	1.0900		0.33
HCS 6X12 6AWG(1-3/8)	A	No	Surface Ar (CaAa)	50.00 - 48.00	1	1	0.500 0.500	1.3800		1.70
HB158-1-08U8-S8J18(	A	No	Surface Ar	50.00 -	2	1	0.500	1.9800		1.30

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	<b>Project</b>	TEP No. 133231.610607	<b>Date</b>	13:26:49 10/12/21
	<b>Client</b>	Crown Castle	<b>Designed by</b>	ahyppolite

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
1-5/8") ***			(CaAa)	48.00			0.500			
feedline shroud 44 ***	A	No	Surface Af (CaAa)	48.00 - 0.00	1	1	0.500 0.500	6.0000	28.0000	18.00
(Area) CCI-65FP-045100 (H) ***	C	No	Surface Af (CaAa)	15.00 - 0.00	1	1	-0.375 -0.375	4.5000	11.0000	0.00
(Area) CCI-65FP-045100 (H)	B	No	Surface Af (CaAa)	15.00 - 0.00	1	1	-0.125 -0.125	4.5000	11.0000	0.00
(Area) CCI-65FP-045100 (H)	A	No	Surface Af (CaAa)	15.00 - 0.00	1	1	0.125 0.125	4.5000	11.0000	0.00
(Area) CCI-65FP-045100 (H) ***	C	No	Surface Af (CaAa)	15.00 - 0.00	1	1	0.375 0.375	4.5000	11.0000	0.00

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
***									
LDF5-50A(7/8)	C	No	No	Inside Pole	72.00 - 0.00	12	No Ice	0.00	0.33
FB-L98B-034-XXX XXX(3/8)	C	No	No	Inside Pole	72.00 - 0.00	1	No Ice	0.00	0.05
FB-L98B-034-XXX XXX(3/8)	C	No	No	Inside Pole	72.00 - 0.00	1	No Ice	0.00	0.05
WR-VG86T(3/4)	C	No	No	Inside Pole	72.00 - 0.00	2	No Ice	0.00	0.53
WR-VG86T(3/4)	C	No	No	Inside Pole	72.00 - 0.00	2	No Ice	0.00	0.53
2.5" Conduit ***	C	No	No	Inside Pole	72.00 - 0.00	1	No Ice	0.00	1.00
LDF5-50A(7/8)	C	No	No	Inside Pole	64.00 - 0.00	6	No Ice	0.00	0.33
FB-L98B-034-XXX XXX(3/8)	C	No	No	Inside Pole	64.00 - 0.00	1	No Ice	0.00	0.05
WR-VG86T(3/4)	C	No	No	Inside Pole	64.00 - 0.00	2	No Ice	0.00	0.53
2.5" Conduit ***	C	No	No	Inside Pole	64.00 - 0.00	2	No Ice	0.00	1.00
LDF5-50A(7/8) ***	C	No	No	Inside Pole	60.00 - 0.00	6	No Ice	0.00	0.33
LDF5-50A(7/8)	A	No	No	Inside Pole	48.00 - 0.00	12	No Ice	0.00	0.33
HCS 6X12	A	No	No	Inside Pole	48.00 - 0.00	1	No Ice	0.00	1.70
6AWG(1-3/8)									
HB158-1-08U8-S8J 18( 1-5/8") ***	A	No	No	Inside Pole	48.00 - 0.00	2	No Ice	0.00	1.30

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
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<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661 6351 FAX: (919) 661 6350	<b>Job</b> HWY 101 - Lakeville (BU 856199)	<b>Page</b> 5 of 20
	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	76.00-71.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.01
L2	71.00-66.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.04
L3	66.00-61.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.05
L4	61.00-56.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L5	56.00-50.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.09
L6	50.00-46.99	A	0.000	0.000	4.298	0.000	0.04
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.04
L7	46.99-41.99	A	0.000	0.000	5.000	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L8	41.99-36.99	A	0.000	0.000	5.000	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L9	36.99-31.99	A	0.000	0.000	5.000	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L10	31.99-26.99	A	0.000	0.000	5.000	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L11	26.99-21.99	A	0.000	0.000	5.000	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L12	21.99-16.99	A	0.000	0.000	5.000	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L13	16.99-13.00	A	0.000	0.000	5.490	0.000	0.10
		B	0.000	0.000	1.500	0.000	0.00
		C	0.000	0.000	3.000	0.000	0.06
L14	13.00-12.75	A	0.000	0.000	0.438	0.000	0.01
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.375	0.000	0.00
L15	12.75-7.75	A	0.000	0.000	8.750	0.000	0.13
		B	0.000	0.000	3.750	0.000	0.00
		C	0.000	0.000	7.500	0.000	0.07
L16	7.75-2.75	A	0.000	0.000	8.750	0.000	0.13
		B	0.000	0.000	3.750	0.000	0.00
		C	0.000	0.000	7.500	0.000	0.07
L17	2.75-0.00	A	0.000	0.000	4.813	0.000	0.07
		B	0.000	0.000	2.063	0.000	0.00
		C	0.000	0.000	4.125	0.000	0.04

**Feed Line Center of Pressure**

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L1	76.00-71.00	0.0000	0.0000	0.0000	0.0000

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	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

Section	Elevation	CP <sub>X</sub>	CP <sub>Z</sub>	CP <sub>X</sub>	CP <sub>Z</sub>
	ft	in	in	Ice in	Ice in
L2	71.00-66.00	0.0000	0.0000	0.0000	0.0000
L3	66.00-61.00	0.0000	0.0000	0.0000	0.0000
L4	61.00-56.00	0.0000	0.0000	0.0000	0.0000
L5	56.00-50.00	0.0000	0.0000	0.0000	0.0000
L6	50.00-46.99	1.1097	-5.5538	0.8876	-4.4424
L7	46.99-41.99	4.0366	-5.9847	3.0866	-4.5762
L8	41.99-36.99	4.1094	-6.0203	3.1289	-4.5839
L9	36.99-31.99	4.1795	-6.0545	3.1693	-4.5911
L10	31.99-26.99	4.2469	-6.0875	3.2079	-4.5981
L11	26.99-21.99	4.3120	-6.1193	3.2447	-4.6048
L12	21.99-16.99	4.3747	-6.1499	3.2801	-4.6111
L13	16.99-13.00	2.6732	-5.1577	2.2204	-4.2841
L14	13.00-12.75	1.9375	-4.7469	1.6887	-4.1374
L15	12.75-7.75	1.9607	-4.7917	1.7062	-4.1698
L16	7.75-2.75	2.0045	-4.8764	1.7392	-4.2311
L17	2.75-0.00	2.0380	-4.9412	1.7644	-4.2778

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 <sub>a</sub> No Ice	K <sub>a</sub> Ice
L6	17	LDF5-50A(7/8)	48.00 - 50.00	1.0000	1.0000
L6	21	HCS 6X12 6AWG(1-3/8)	48.00 - 50.00	1.0000	1.0000
L6	23	HB158-1-08U8-S8J18(1-5/8")	48.00 - 50.00	1.0000	1.0000
L6	25	feedline shroud 44	46.99 - 48.00	1.0000	1.0000
L7	25	feedline shroud 44	41.99 - 46.99	1.0000	1.0000
L8	25	feedline shroud 44	36.99 - 41.99	1.0000	1.0000
L9	25	feedline shroud 44	31.99 - 36.99	1.0000	1.0000
L10	25	feedline shroud 44	26.99 - 31.99	1.0000	1.0000
L11	25	feedline shroud 44	21.99 - 26.99	1.0000	1.0000
L12	25	feedline shroud 44	16.99 - 21.99	1.0000	1.0000
L13	25	feedline shroud 44	13.00 - 16.99	1.0000	1.0000
L13	27	(Area) CCI-65FP-045100 (H)	13.00 - 15.00	1.0000	1.0000
L13	28	(Area) CCI-65FP-045100 (H)	13.00 - 15.00	1.0000	1.0000
L13	29	(Area) CCI-65FP-045100 (H)	13.00 - 15.00	1.0000	1.0000
L13	30	(Area) CCI-65FP-045100 (H)	13.00 - 15.00	1.0000	1.0000
L14	25	feedline shroud 44	12.75 - 13.00	1.0000	1.0000
L14	27	(Area) CCI-65FP-045100 (H)	12.75 - 13.00	1.0000	1.0000
L14	28	(Area) CCI-65FP-045100 (H)	12.75 - 13.00	1.0000	1.0000
L14	29	(Area) CCI-65FP-045100 (H)	12.75 - 13.00	1.0000	1.0000
L14	30	(Area) CCI-65FP-045100 (H)	12.75 - 13.00	1.0000	1.0000
L15	25	feedline shroud 44	7.75 - 12.75	1.0000	1.0000
L15	27	(Area) CCI-65FP-045100 (H)	7.75 - 12.75	1.0000	1.0000
L15	28	(Area) CCI-65FP-045100 (H)	7.75 - 12.75	1.0000	1.0000
L15	29	(Area) CCI-65FP-045100 (H)	7.75 - 12.75	1.0000	1.0000
L15	30	(Area) CCI-65FP-045100 (H)	7.75 - 12.75	1.0000	1.0000
L16	25	feedline shroud 44	2.75 - 7.75	1.0000	1.0000
L16	27	(Area) CCI-65FP-045100 (H)	2.75 - 7.75	1.0000	1.0000
L16	28	(Area) CCI-65FP-045100 (H)	2.75 - 7.75	1.0000	1.0000
L16	29	(Area) CCI-65FP-045100 (H)	2.75 - 7.75	1.0000	1.0000
L16	30	(Area) CCI-65FP-045100 (H)	2.75 - 7.75	1.0000	1.0000

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	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
L17	25	feedline shroud 44	0.00 - 2.75	1.0000	1.0000
L17	27	(Area) CCI-65FP-045100 (H)	0.00 - 2.75	1.0000	1.0000
L17	28	(Area) CCI-65FP-045100 (H)	0.00 - 2.75	1.0000	1.0000
L17	29	(Area) CCI-65FP-045100 (H)	0.00 - 2.75	1.0000	1.0000
L17	30	(Area) CCI-65FP-045100 (H)	0.00 - 2.75	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	25	feedline shroud 44	46.99 - 48.00	Auto	0.5456
L7	25	feedline shroud 44	41.99 - 46.99	Auto	0.5331
L8	25	feedline shroud 44	36.99 - 41.99	Auto	0.5123
L9	25	feedline shroud 44	31.99 - 36.99	Auto	0.4915
L10	25	feedline shroud 44	26.99 - 31.99	Auto	0.4707
L11	25	feedline shroud 44	21.99 - 26.99	Auto	0.4499
L12	25	feedline shroud 44	16.99 - 21.99	Auto	0.4291
L13	25	feedline shroud 44	13.00 - 16.99	Auto	0.4104
L13	27	(Area) CCI-65FP-045100 (H)	13.00 - 15.00	Auto	0.2083
L13	28	(Area) CCI-65FP-045100 (H)	13.00 - 15.00	Auto	0.2083
L13	29	(Area) CCI-65FP-045100 (H)	13.00 - 15.00	Auto	0.2083
L13	30	(Area) CCI-65FP-045100 (H)	13.00 - 15.00	Auto	0.2083
L14	25	feedline shroud 44	12.75 - 13.00	Auto	0.5176
L14	27	(Area) CCI-65FP-045100 (H)	12.75 - 13.00	Auto	0.3568
L14	28	(Area) CCI-65FP-045100 (H)	12.75 - 13.00	Auto	0.3568
L14	29	(Area) CCI-65FP-045100 (H)	12.75 - 13.00	Auto	0.3568
L14	30	(Area) CCI-65FP-045100 (H)	12.75 - 13.00	Auto	0.3568
L15	25	feedline shroud 44	7.75 - 12.75	Auto	0.4984
L15	27	(Area) CCI-65FP-045100 (H)	7.75 - 12.75	Auto	0.3312
L15	28	(Area) CCI-65FP-045100 (H)	7.75 - 12.75	Auto	0.3312
L15	29	(Area) CCI-65FP-045100 (H)	7.75 - 12.75	Auto	0.3312
L15	30	(Area) CCI-65FP-045100 (H)	7.75 - 12.75	Auto	0.3312
L16	25	feedline shroud 44	2.75 - 7.75	Auto	0.4734
L16	27	(Area) CCI-65FP-045100 (H)	2.75 - 7.75	Auto	0.2979
L16	28	(Area) CCI-65FP-045100 (H)	2.75 - 7.75	Auto	0.2979
L16	29	(Area) CCI-65FP-045100 (H)	2.75 - 7.75	Auto	0.2979
L16	30	(Area) CCI-65FP-045100 (H)	2.75 - 7.75	Auto	0.2979
L17	25	feedline shroud 44	0.00 - 2.75	Auto	0.4573
L17	27	(Area) CCI-65FP-045100 (H)	0.00 - 2.75	Auto	0.2764
L17	28	(Area) CCI-65FP-045100 (H)	0.00 - 2.75	Auto	0.2764
L17	29	(Area) CCI-65FP-045100 (H)	0.00 - 2.75	Auto	0.2764
L17	30	(Area) CCI-65FP-045100 (H)	0.00 - 2.75	Auto	0.2764

### User Defined Loads - Seismic

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	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

Description	Elevation	Offset From Centroid	Azimuth Angle	$E_v$	$E_{hx}$	$E_{hz}$	$E_h$
	ft	ft	°	K	K	K	K
CCISeismic Tower Section 1 - 1	73.50	0.00	0.0000	0.03	0.00	0.00	0.12
CCISeismic Tower Section 2 - 1	68.50	0.00	0.0000	0.04	0.00	0.00	0.11
CCISeismic Tower Section 3 - 1	63.50	0.00	0.0000	0.04	0.00	0.00	0.10
CCISeismic Tower Section 4 - 1	58.50	0.00	0.0000	0.04	0.00	0.00	0.09
CCISeismic Tower Section 5 - 1	53.00	0.00	0.0000	0.05	0.00	0.00	0.10
CCISeismic Tower Section 6 - 1	49.49	0.00	0.0000	0.05	0.00	0.00	0.10
CCISeismic Tower Section 7 - 1	44.49	0.00	0.0000	0.06	0.00	0.00	0.09
CCISeismic Tower Section 8 - 1	39.49	0.00	0.0000	0.06	0.00	0.00	0.07
CCISeismic Tower Section 9 - 1	34.49	0.00	0.0000	0.06	0.00	0.00	0.06
CCISeismic Tower Section 10 - 1	29.49	0.00	0.0000	0.06	0.00	0.00	0.05
CCISeismic Tower Section 11 - 1	24.49	0.00	0.0000	0.06	0.00	0.00	0.04
CCISeismic Tower Section 12 - 1	19.49	0.00	0.0000	0.07	0.00	0.00	0.03
CCISeismic Tower Section 13 - 1	15.00	0.00	0.0000	0.06	0.00	0.00	0.01
CCISeismic Tower Section 14 - 1	12.88	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic Tower Section 15 - 1	10.25	0.00	0.0000	0.15	0.00	0.00	0.02
CCISeismic Tower Section 16 - 1	5.25	0.00	0.0000	0.15	0.00	0.00	0.01
CCISeismic Tower Section 17 - 1	1.38	0.00	0.0000	0.08	0.00	0.00	0.00
CCISeismic commscope_cfd JAHH-65A-R3B	72.00	0.00	0.0000	0.01	0.00	0.00	0.04
CCISeismic commscope_cfd JAHH-65A-R3B	72.00	0.00	0.0000	0.01	0.00	0.00	0.04
CCISeismic commscope_cfd JAHH-65A-R3B	72.00	0.00	0.0000	0.01	0.00	0.00	0.04
CCISeismic commscope_cfd NNHH-65A-R4	72.00	0.00	0.0000	0.02	0.00	0.00	0.06
CCISeismic commscope_cfd NNHH-65A-R4	72.00	0.00	0.0000	0.02	0.00	0.00	0.06
CCISeismic commscope_cfd NNHH-65A-R4	72.00	0.00	0.0000	0.02	0.00	0.00	0.06
CCISeismic ericsson RRUS 32	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 32	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 32	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 4478 B5	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 4478 B5	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 4478 B5	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 4478 B14	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 4478 B14	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 4478 B14	72.00	0.00	0.0000	0.02	0.00	0.00	0.05
CCISeismic ericsson RRUS 4415 B25	72.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic ericsson RRUS 4415 B25	72.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic ericsson RRUS 4415 B25	72.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic raycap DC6-48-60-18-8F	72.00	0.00	0.0000	0.01	0.00	0.00	0.03

<p><b>tnxTower</b></p> <p><i>Tower Engineering Professionals</i>  326 Tryon Road  Raleigh, NC 27603  Phone: (919) 661 6351  FAX: (919) 661 6350</p>	<b>Job</b> HWY 101 - Lakeville (BU 856199)	<b>Page</b> 9 of 20
	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

Description	Elevation	Offset From Centroid	Azimuth Angle	$E_v$	$E_{hx}$	$E_{hz}$	$E_h$
	ft	ft	°	K	K	K	K
CCISeismic raycap DC6-48-60-18-8F	72.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic tower mounts (cci) Pipe Mount [PM 601-3]	72.00	0.00	0.0000	0.05	0.00	0.00	0.16
CCISeismic tower mounts (cci) Pipe Mount [PM 602-3]	72.00	0.00	0.0000	0.07	0.00	0.00	0.23
CCISeismic commscope_cfd JAHH-65A-R3B	64.00	0.00	0.0000	0.01	0.00	0.00	0.04
CCISeismic commscope_cfd JAHH-65A-R3B	64.00	0.00	0.0000	0.01	0.00	0.00	0.04
CCISeismic commscope_cfd JAHH-65A-R3B	64.00	0.00	0.0000	0.01	0.00	0.00	0.04
CCISeismic ericsson RRUS 11	64.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic ericsson RRUS 11	64.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic ericsson RRUS 11	64.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic ericsson RRUS 32 B66	64.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic ericsson RRUS 32 B66	64.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic ericsson RRUS 32 B66	64.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic raycap DC6-48-60-18-8F	64.00	0.00	0.0000	0.01	0.00	0.00	0.02
CCISeismic (2) tower mounts (cci) Pipe Mount [PM 601-3]	64.00	0.00	0.0000	0.10	0.00	0.00	0.27
CCISeismic powerwave technologies 7721.00	60.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic powerwave technologies 7721.00	60.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic powerwave technologies 7721.00	60.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic tower mounts (cci) Pipe Mount [PM 601-3]	60.00	0.00	0.0000	0.05	0.00	0.00	0.12
CCISeismic ericsson_cfd AIR6449 B41_T-MOBILE w/ Mount Pipe	50.00	0.00	0.0000	0.03	0.00	0.00	0.06
CCISeismic ericsson_cfd AIR6449 B41_T-MOBILE w/ Mount Pipe	50.00	0.00	0.0000	0.03	0.00	0.00	0.06
CCISeismic ericsson_cfd AIR6449 B41_T-MOBILE w/ Mount Pipe	50.00	0.00	0.0000	0.03	0.00	0.00	0.06
CCISeismic rfs celwave_cfd APXVAARR24_43-U-NA20 w/ Mount Pipe	50.00	0.00	0.0000	0.05	0.00	0.00	0.09
CCISeismic rfs celwave_cfd APXVAARR24_43-U-NA20 w/ Mount Pipe	50.00	0.00	0.0000	0.05	0.00	0.00	0.09
CCISeismic rfs celwave_cfd APXVAARR24_43-U-NA20 w/ Mount Pipe	50.00	0.00	0.0000	0.05	0.00	0.00	0.09
CCISeismic ericsson RADIO 4460 B2/B25 B66_TMO	50.00	0.00	0.0000	0.03	0.00	0.00	0.05
CCISeismic ericsson RADIO 4460 B2/B25 B66_TMO	50.00	0.00	0.0000	0.03	0.00	0.00	0.05
CCISeismic ericsson RADIO 4460 B2/B25 B66_TMO	50.00	0.00	0.0000	0.03	0.00	0.00	0.05
CCISeismic ericsson Radio 4480_TMOV2	50.00	0.00	0.0000	0.02	0.00	0.00	0.04
CCISeismic ericsson Radio	50.00	0.00	0.0000	0.02	0.00	0.00	0.04



<p style="text-align: center;"><b>tnxTower</b></p> <p style="text-align: center;"><b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661 6351 FAX: (919) 661 6350</p>	<p style="text-align: center;"><b>Job</b></p> <p style="text-align: center;">HWY 101 - Lakeville (BU 856199)</p>	<p style="text-align: center;"><b>Page</b></p> <p style="text-align: center;">10 of 20</p>
	<p style="text-align: center;"><b>Project</b></p> <p style="text-align: center;">TEP No. 133231.610607</p>	<p style="text-align: center;"><b>Date</b></p> <p style="text-align: center;">13:26:49 10/12/21</p>
	<p style="text-align: center;"><b>Client</b></p> <p style="text-align: center;">Crown Castle</p>	<p style="text-align: center;"><b>Designed by</b></p> <p style="text-align: center;">ahyppolite</p>

Description	Elevation	Offset From Centroid	Azimuth Angle	$E_v$	$E_{hx}$	$E_{hz}$	$E_h$
	ft	ft	°	K	K	K	K
4480_TMOV2							
CCISeismic ericsson Radio	50.00	0.00	0.0000	0.02	0.00	0.00	0.04
4480_TMOV2							
CCISeismic mounts 2.4" Dia x 6-ft Pipe	50.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic mounts 2.4" Dia x 6-ft Pipe	50.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic mounts 2.4" Dia x 6-ft Pipe	50.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic tower mounts (cci) T-Arm Mount [TA 702-3]	50.00	0.00	0.0000	0.09	0.00	0.00	0.16
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 72 (66ft to72ft)	69.00	0.00	0.0000	0.01	0.00	0.00	0.02
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 72 (56ft to66ft)	61.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 72 (46ft to56ft)	51.00	0.00	0.0000	0.01	0.00	0.00	0.02
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 72 (36ft to46ft)	41.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 72 (26ft to36ft)	31.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 72 (16ft to26ft)	21.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 72 (6ft to16ft)	11.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 72 (0ft to6ft)	3.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72 (66ft to72ft)	69.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72 (56ft to66ft)	61.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72 (46ft to56ft)	51.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72 (36ft to46ft)	41.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72 (26ft to36ft)	31.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72 (16ft to26ft)	21.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72 (6ft to16ft)	11.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni	69.00	0.00	0.0000	0.00	0.00	0.00	0.00

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	<p style="text-align: center;"><b>Project</b></p> <p style="text-align: center;">TEP No. 133231.610607</p>	<p style="text-align: center;"><b>Date</b></p> <p style="text-align: center;">13:26:49 10/12/21</p>
	<p style="text-align: center;"><b>Client</b></p> <p style="text-align: center;">Crown Castle</p>	<p style="text-align: center;"><b>Designed by</b></p> <p style="text-align: center;">ahyppolite</p>

Description	Elevation	Offset From Centroid	Azimuth Angle	$E_v$	$E_{hx}$	$E_{hz}$	$E_h$
	ft	ft	°	K	K	K	K
FB-L98B-034-XXXXXXX(3/8) From 0 to 72 (66ft to72ft)							
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 72 (56ft to66ft)	61.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 72 (46ft to56ft)	51.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 72 (36ft to46ft)	41.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 72 (26ft to36ft)	31.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 72 (16ft to26ft)	21.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 72 (6ft to16ft)	11.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 72 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (66ft to72ft)	69.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (56ft to66ft)	61.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (46ft to56ft)	51.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (36ft to46ft)	41.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (26ft to36ft)	31.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (16ft to26ft)	21.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (6ft to16ft)	11.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (66ft to72ft)	69.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (56ft to66ft)	61.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (46ft to56ft)	51.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (36ft to46ft)	41.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger	31.00	0.00	0.0000	0.00	0.00	0.00	0.00

<p style="text-align: center;"><b><i>tnxTower</i></b></p> <p style="text-align: center;"><b><i>Tower Engineering Professionals</i></b>  326 Tryon Road  Raleigh, NC 27603  Phone: (919) 661 6351  FAX: (919) 661 6350</p>	<b>Job</b> HWY 101 - Lakeville (BU 856199)	<b>Page</b> 12 of 20
	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

<i>Description</i>	<i>Elevation</i>	<i>Offset From Centroid</i>	<i>Azimuth Angle</i>	<i>E<sub>v</sub></i>	<i>E<sub>hx</sub></i>	<i>E<sub>hz</sub></i>	<i>E<sub>h</sub></i>
	<i>ft</i>	<i>ft</i>	<i>°</i>	<i>K</i>	<i>K</i>	<i>K</i>	<i>K</i>
leoni WR-VG86T(3/4) From 0 to 72 (26ft to36ft)							
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (16ft to26ft)	21.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (6ft to16ft)	11.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 72 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic miscel 2.5" Conduit From 0 to 72 (66ft to72ft)	69.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic miscel 2.5" Conduit From 0 to 72 (56ft to66ft)	61.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic miscel 2.5" Conduit From 0 to 72 (46ft to56ft)	51.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic miscel 2.5" Conduit From 0 to 72 (36ft to46ft)	41.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic miscel 2.5" Conduit From 0 to 72 (26ft to36ft)	31.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic miscel 2.5" Conduit From 0 to 72 (16ft to26ft)	21.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic miscel 2.5" Conduit From 0 to 72 (6ft to16ft)	11.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic miscel 2.5" Conduit From 0 to 72 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 64 (56ft to64ft)	60.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 64 (46ft to56ft)	51.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 64 (36ft to46ft)	41.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 64 (26ft to36ft)	31.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 64 (16ft to26ft)	21.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 64 (6ft to16ft)	11.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 64 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 64 (56ft to64ft)	60.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 64 (46ft to56ft)	51.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 64 (36ft to46ft)	41.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic rosenberger leoni FB-L98B-034-XXXXXXX(3/8) From 0 to 64 (26ft to36ft)	31.00	0.00	0.0000	0.00	0.00	0.00	0.00

<p style="text-align: center;"><b>tnxTower</b></p> <p style="text-align: center;"><b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661 6351 FAX: (919) 661 6350</p>	<p style="text-align: center;"><b>Job</b></p> <p style="text-align: center;">HWY 101 - Lakeville (BU 856199)</p>	<p style="text-align: center;"><b>Page</b></p> <p style="text-align: center;">13 of 20</p>
	<p style="text-align: center;"><b>Project</b></p> <p style="text-align: center;">TEP No. 133231.610607</p>	<p style="text-align: center;"><b>Date</b></p> <p style="text-align: center;">13:26:49 10/12/21</p>
	<p style="text-align: center;"><b>Client</b></p> <p style="text-align: center;">Crown Castle</p>	<p style="text-align: center;"><b>Designed by</b></p> <p style="text-align: center;">ahyppolite</p>

Description	Elevation	Offset From Centroid	Azimuth Angle	$E_v$	$E_{hx}$	$E_{hz}$	$E_h$
	ft	ft	°	K	K	K	K
CCISEismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64 (16ft to26ft)	21.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64 (6ft to16ft)	11.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 64 (56ft to64ft)	60.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISEismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 64 (46ft to56ft)	51.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISEismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 64 (36ft to46ft)	41.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 64 (26ft to36ft)	31.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 64 (16ft to26ft)	21.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 64 (6ft to16ft)	11.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic (2) rosenberger leoni WR-VG86T(3/4) From 0 to 64 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic (2) miscel 2.5" Conduit From 0 to 64 (56ft to64ft)	60.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISEismic (2) miscel 2.5" Conduit From 0 to 64 (46ft to56ft)	51.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISEismic (2) miscel 2.5" Conduit From 0 to 64 (36ft to46ft)	41.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISEismic (2) miscel 2.5" Conduit From 0 to 64 (26ft to36ft)	31.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISEismic (2) miscel 2.5" Conduit From 0 to 64 (16ft to26ft)	21.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISEismic (2) miscel 2.5" Conduit From 0 to 64 (6ft to16ft)	11.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISEismic (2) miscel 2.5" Conduit From 0 to 64 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic (6) andrew LDF5-50A(7/8) From 0 to 60 (56ft to60ft)	58.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISEismic (6) andrew LDF5-50A(7/8) From 0 to 60 (46ft to56ft)	51.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISEismic (6) andrew LDF5-50A(7/8) From 0 to 60 (36ft to46ft)	41.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISEismic (6) andrew LDF5-50A(7/8) From 0 to 60	31.00	0.00	0.0000	0.01	0.00	0.00	0.00

<p style="text-align: center;"><b>tnxTower</b></p> <p style="text-align: center;"><b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661 6351 FAX: (919) 661 6350</p>	<p style="text-align: center;"><b>Job</b></p> <p style="text-align: center;">HWY 101 - Lakeville (BU 856199)</p>	<p style="text-align: center;"><b>Page</b></p> <p style="text-align: center;">14 of 20</p>
	<p style="text-align: center;"><b>Project</b></p> <p style="text-align: center;">TEP No. 133231.610607</p>	<p style="text-align: center;"><b>Date</b></p> <p style="text-align: center;">13:26:49 10/12/21</p>
	<p style="text-align: center;"><b>Client</b></p> <p style="text-align: center;">Crown Castle</p>	<p style="text-align: center;"><b>Designed by</b></p> <p style="text-align: center;">ahyppolite</p>

Description	Elevation	Offset From Centroid	Azimuth Angle	$E_v$	$E_{hx}$	$E_{hz}$	$E_h$
	ft	ft	°	K	K	K	K
(26ft to36ft)							
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 60 (16ft to26ft)	21.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 60 (6ft to16ft)	11.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (6) andrew LDF5-50A(7/8) From 0 to 60 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 48 (46ft to48ft)	47.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 48 (36ft to46ft)	41.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 48 (26ft to36ft)	31.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 48 (16ft to26ft)	21.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 48 (6ft to16ft)	11.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (12) andrew LDF5-50A(7/8) From 0 to 48 (0ft to6ft)	3.00	0.00	0.0000	0.01	0.00	0.00	0.00
CCISeismic (12) andrew LDF5-50A(7/8) From 48 to 50 (48ft to50ft)	49.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48 (46ft to48ft)	47.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48 (36ft to46ft)	41.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48 (26ft to36ft)	31.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48 (16ft to26ft)	21.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48 (6ft to16ft)	11.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48 (0ft to6ft)	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic ericsson HCS 6X12 6AWG(1-3/8) From 48 to 50 (48ft to50ft)	49.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 0 to 48 (46ft to48ft)	47.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 0 to 48 (36ft to46ft)	41.00	0.00	0.0000	0.01	0.00	0.00	0.01
CCISeismic (2) rfs celwave HB158-1-08U8-S8J18( 1-5/8")	31.00	0.00	0.0000	0.01	0.00	0.00	0.01

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	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

Description	Elevation	Offset From Centroid	Azimuth Angle	$E_v$	$E_{hx}$	$E_{hz}$	$E_h$
	ft	ft	°	K	K	K	K
From 0 to 48 (26ft to36ft) CCISeismic (2) rfs celwave HB158-1-08U8-S8J18( 1-5/8")	21.00	0.00	0.0000	0.01	0.00	0.00	0.00
From 0 to 48 (16ft to26ft) CCISeismic (2) rfs celwave HB158-1-08U8-S8J18( 1-5/8")	11.00	0.00	0.0000	0.01	0.00	0.00	0.00
From 0 to 48 (6ft to16ft) CCISeismic (2) rfs celwave HB158-1-08U8-S8J18( 1-5/8")	3.00	0.00	0.0000	0.00	0.00	0.00	0.00
From 0 to 48 (0ft to6ft) CCISeismic (2) rfs celwave HB158-1-08U8-S8J18( 1-5/8")	49.00	0.00	0.0000	0.00	0.00	0.00	0.00
From 48 to 50 (48ft to50ft) CCISeismic feedline shroud 44	47.00	0.00	0.0000	0.01	0.00	0.00	0.02
From 0 to 48 (46ft to48ft) CCISeismic feedline shroud 44	41.00	0.00	0.0000	0.05	0.00	0.00	0.06
From 0 to 48 (36ft to46ft) CCISeismic feedline shroud 44	31.00	0.00	0.0000	0.05	0.00	0.00	0.04
From 0 to 48 (26ft to36ft) CCISeismic feedline shroud 44	21.00	0.00	0.0000	0.05	0.00	0.00	0.02
From 0 to 48 (16ft to26ft) CCISeismic feedline shroud 44	11.00	0.00	0.0000	0.05	0.00	0.00	0.01
From 0 to 48 (6ft to16ft) CCISeismic feedline shroud 44	3.00	0.00	0.0000	0.03	0.00	0.00	0.00

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	$C_{AA}$ Front	$C_{AA}$ Side	Weight	
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
****72**** JAHH-65A-R3B	A	From Face	1.00 0.00 3.00	0.0000	72.00	No Ice	3.30	1.98	0.05
JAHH-65A-R3B	B	From Face	1.00 0.00 3.00	0.0000	72.00	No Ice	3.30	1.98	0.05
JAHH-65A-R3B	C	From Face	1.00 0.00 3.00	0.0000	72.00	No Ice	3.30	1.98	0.05
NNHH-65A-R4	A	From Face	1.00 0.00 -2.00	0.0000	72.00	No Ice	5.71	2.32	0.07
NNHH-65A-R4	B	From Face	1.00 0.00 -2.00	0.0000	72.00	No Ice	5.71	2.32	0.07
NNHH-65A-R4	C	From Face	1.00 0.00 -2.00	0.0000	72.00	No Ice	5.71	2.32	0.07
RRUS 32	A	From Face	1.00	0.0000	72.00	No Ice	2.86	1.78	0.06

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	<b>Project</b>	TEP No. 133231.610607	<b>Date</b>	13:26:49 10/12/21
	<b>Client</b>	Crown Castle	<b>Designed by</b>	ahyppolite

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	CAA Front	CAA Side	Weight
			Horz	Lateral	Vert					
			0.00							
			3.00							
RRUS 32	B	From Face	1.00		0.0000	72.00	No Ice	2.86	1.78	0.06
			0.00							
			3.00							
RRUS 32	C	From Face	1.00		0.0000	72.00	No Ice	2.86	1.78	0.06
			0.00							
			3.00							
RRUS 4478 B5	A	From Face	1.00		0.0000	72.00	No Ice	1.84	1.06	0.06
			0.00							
			3.00							
RRUS 4478 B5	B	From Face	1.00		0.0000	72.00	No Ice	1.84	1.06	0.06
			0.00							
			3.00							
RRUS 4478 B5	C	From Face	1.00		0.0000	72.00	No Ice	1.84	1.06	0.06
			0.00							
			3.00							
RRUS 4478 B14	A	From Face	1.00		0.0000	72.00	No Ice	1.84	1.06	0.06
			0.00							
			-2.00							
RRUS 4478 B14	B	From Face	1.00		0.0000	72.00	No Ice	1.84	1.06	0.06
			0.00							
			-2.00							
RRUS 4478 B14	C	From Face	1.00		0.0000	72.00	No Ice	1.84	1.06	0.06
			0.00							
			-2.00							
RRUS 4415 B25	A	From Face	1.00		0.0000	72.00	No Ice	1.64	0.68	0.04
			0.00							
			-2.00							
RRUS 4415 B25	B	From Face	1.00		0.0000	72.00	No Ice	1.64	0.68	0.04
			0.00							
			-2.00							
RRUS 4415 B25	C	From Face	1.00		0.0000	72.00	No Ice	1.64	0.68	0.04
			0.00							
			-2.00							
DC6-48-60-18-8F	B	From Face	1.00		0.0000	72.00	No Ice	1.21	1.21	0.03
			0.00							
			-2.00							
DC6-48-60-18-8F	C	From Face	1.00		0.0000	72.00	No Ice	1.21	1.21	0.03
			0.00							
			-2.00							
Pipe Mount [PM 601-3]	C	None			0.0000	72.00	No Ice	3.17	3.17	0.20
Pipe Mount [PM 602-3]	C	None			0.0000	72.00	No Ice	6.67	6.67	0.28
****64****										
JAHH-65A-R3B	A	From Face	1.00		0.0000	64.00	No Ice	3.30	1.98	0.05
			0.00							
			1.00							
JAHH-65A-R3B	B	From Face	1.00		0.0000	64.00	No Ice	3.30	1.98	0.05
			0.00							
			1.00							
JAHH-65A-R3B	C	From Face	1.00		0.0000	64.00	No Ice	3.30	1.98	0.05
			0.00							
			1.00							
RRUS 11	A	From Face	1.00		0.0000	64.00	No Ice	2.79	1.19	0.05
			0.00							
			1.00							
RRUS 11	B	From Face	1.00		0.0000	64.00	No Ice	2.79	1.19	0.05

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	<b>Project</b>		TEP No. 133231.610607				<b>Date</b>		13:26:49 10/12/21	
	<b>Client</b>		Crown Castle				<b>Designed by</b>		ahyppolite	

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	CAA Front	CAA Side	Weight
			Horz	Lateral	Vert					
			0.00							
			1.00							
RRUS 11	C	From Face	1.00		0.0000	64.00	No Ice	2.79	1.19	0.05
			0.00							
			1.00							
RRUS 32 B66	A	From Face	1.00		0.0000	64.00	No Ice	2.74	1.67	0.05
			0.00							
			1.00							
RRUS 32 B66	B	From Face	1.00		0.0000	64.00	No Ice	2.74	1.67	0.05
			0.00							
			1.00							
RRUS 32 B66	C	From Face	1.00		0.0000	64.00	No Ice	2.74	1.67	0.05
			0.00							
			1.00							
DC6-48-60-18-8F	A	From Leg	1.00		0.0000	64.00	No Ice	1.21	1.21	0.03
			0.00							
			1.00							
(2) Pipe Mount [PM 601-3] *****60*****	C	None			0.0000	64.00	No Ice	3.17	3.17	0.20
7721.00	A	From Leg	1.00		0.0000	60.00	No Ice	3.08	1.84	0.01
			0.00							
			-1.00							
7721.00	B	From Leg	1.00		0.0000	60.00	No Ice	3.08	1.84	0.01
			0.00							
			-1.00							
7721.00	C	From Leg	1.00		0.0000	60.00	No Ice	3.08	1.84	0.01
			0.00							
			-1.00							
Pipe Mount [PM 601-3] *****50*****	C	None			0.0000	60.00	No Ice	3.17	3.17	0.20
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Face	3.00		0.0000	50.00	No Ice	5.19	2.71	0.13
			0.00							
			0.00							
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Face	3.00		0.0000	50.00	No Ice	5.19	2.71	0.13
			0.00							
			0.00							
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Face	3.00		0.0000	50.00	No Ice	5.19	2.71	0.13
			0.00							
			0.00							
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Face	3.00		0.0000	50.00	No Ice	14.69	6.87	0.19
			0.00							
			0.00							
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Face	3.00		0.0000	50.00	No Ice	14.69	6.87	0.19
			0.00							
			0.00							
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Face	3.00		0.0000	50.00	No Ice	14.69	6.87	0.19
			0.00							
			0.00							
RADIO 4460 B2/B25 B66_TMO	A	From Face	3.00		0.0000	50.00	No Ice	2.14	1.69	0.11
			0.00							
			0.00							
RADIO 4460 B2/B25 B66_TMO	B	From Face	3.00		0.0000	50.00	No Ice	2.14	1.69	0.11
			0.00							
			0.00							
RADIO 4460 B2/B25 B66_TMO	C	From Face	3.00		0.0000	50.00	No Ice	2.14	1.69	0.11
			0.00							
			0.00							



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	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
Radio 4480_TMOV2	A	From Face	3.00	0.00	0.0000	50.00	No Ice	2.88	1.40	0.08
Radio 4480_TMOV2	B	From Face	3.00	0.00	0.0000	50.00	No Ice	2.88	1.40	0.08
Radio 4480_TMOV2	C	From Face	3.00	0.00	0.0000	50.00	No Ice	2.88	1.40	0.08
2.4" Dia x 6-ft Pipe	A	From Leg	4.00	0.00	0.0000	50.00	No Ice	1.43	1.43	0.02
2.4" Dia x 6-ft Pipe	B	From Leg	4.00	0.00	0.0000	50.00	No Ice	1.43	1.43	0.02
2.4" Dia x 6-ft Pipe	C	From Leg	4.00	0.00	0.0000	50.00	No Ice	1.43	1.43	0.02
T-Arm Mount [TA 702-3] **	C	None			0.0000	50.00	No Ice	4.75	4.75	0.34

## Compression Checks

## Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio
									$\frac{P_u}{\phi P_n}$
L1	76 - 71 (1)	TP13.6269x13x0.1875	5.00	0.00	0.0	8.0385	-1.96	361.73	0.005
L2	71 - 66 (2)	TP14.2538x13.6269x0.1875	5.00	0.00	0.0	8.4134	-2.63	378.61	0.007
L3	66 - 61 (3)	TP14.8808x14.2538x0.1875	5.00	0.00	0.0	8.7884	-4.15	395.48	0.010
L4	61 - 56 (4)	TP15.5077x14.8808x0.1875	5.00	0.00	0.0	9.1634	-4.80	412.35	0.012
L5	56 - 50 (5)	TP16.26x15.5077x0.1875	6.00	0.00	0.0	9.4641	-5.07	425.89	0.012
L6	50 - 46.99 (6)	TP16.263x15.6355x0.25	5.00	0.00	0.0	12.7703	-8.39	574.66	0.015
L7	46.99 - 41.99 (7)	TP16.8904x16.263x0.25	5.00	0.00	0.0	13.2708	-8.97	597.18	0.015
L8	41.99 - 36.99 (8)	TP17.5179x16.8904x0.25	5.00	0.00	0.0	13.7712	-9.66	619.70	0.016
L9	36.99 - 31.99 (9)	TP18.1454x17.5179x0.25	5.00	0.00	0.0	14.2716	-8.45	642.22	0.013
L10	31.99 - 26.99 (10)	TP18.7729x18.1454x0.25	5.00	0.00	0.0	14.7720	-9.01	664.74	0.014
L11	26.99 - 21.99 (11)	TP19.4004x18.7729x0.25	5.00	0.00	0.0	15.2724	-9.58	687.26	0.014
L12	21.99 - 16.99 (12)	TP20.0278x19.4004x0.25	5.00	0.00	0.0	15.7728	-10.18	709.78	0.014
L13	16.99 - 13 (13)	TP20.5286x20.0278x0.25	3.99	0.00	0.0	16.1721	-10.66	727.75	0.015
L14	13 - 12.75 (14)	TP20.5599x20.5286x0.6	0.25	0.00	0.0	38.2033	-10.71	1719.15	0.006

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	<b>Project</b> TEP No. 133231.610607	<b>Date</b> 13:26:49 10/12/21
	<b>Client</b> Crown Castle	<b>Designed by</b> ahyppolite

Section No.	Elevation ft	Size	L ft	$L_u$ ft	$Kl/r$	A $in^2$	$P_u$ K	$\phi P_n$ K	Ratio $\frac{P_u}{\phi P_n}$
L15	12.75 - 7.75 (15)	TP21.1874x20.5599x0.575	5.00	0.00	0.0	37.8083	-11.67	1701.37	0.007
L16	7.75 - 2.75 (16)	TP21.8149x21.1874x0.5625	5.00	0.00	0.0	38.1348	-12.65	1716.06	0.007
L17	2.75 - 0 (17)	TP22.16x21.8149x0.5625	2.75	0.00	0.0	38.7540	-13.19	1743.93	0.008

### Pole Bending Design Data

Section No.	Elevation ft	Size	$M_{ux}$ kip-ft	$\phi M_{rx}$ kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	$M_{uy}$ kip-ft	$\phi M_{ry}$ kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
L1	76 - 71 (1)	TP13.6269x13x0.1875	2.02	125.69	0.016	0.00	125.69	0.000
L2	71 - 66 (2)	TP14.2538x13.6269x0.1875	9.93	137.78	0.072	0.00	137.78	0.000
L3	66 - 61 (3)	TP14.8808x14.2538x0.1875	20.74	150.42	0.138	0.00	150.42	0.000
L4	61 - 56 (4)	TP15.5077x14.8808x0.1875	34.39	163.61	0.210	0.00	163.61	0.000
L5	56 - 50 (5)	TP16.26x15.5077x0.1875	45.78	174.60	0.262	0.00	174.60	0.000
L6	50 - 46.99 (6)	TP16.263x15.6355x0.25	64.01	237.53	0.269	0.00	237.53	0.000
L7	46.99 - 41.99 (7)	TP16.8904x16.263x0.25	85.01	256.66	0.331	0.00	256.66	0.000
L8	41.99 - 36.99 (8)	TP17.5179x16.8904x0.25	106.91	276.53	0.387	0.00	276.53	0.000
L9	36.99 - 31.99 (9)	TP18.1454x17.5179x0.25	131.83	297.14	0.444	0.00	297.14	0.000
L10	31.99 - 26.99 (10)	TP18.7729x18.1454x0.25	158.45	318.50	0.497	0.00	318.50	0.000
L11	26.99 - 21.99 (11)	TP19.4004x18.7729x0.25	186.37	340.59	0.547	0.00	340.59	0.000
L12	21.99 - 16.99 (12)	TP20.0278x19.4004x0.25	215.51	363.42	0.593	0.00	363.42	0.000
L13	16.99 - 13 (13)	TP20.5286x20.0278x0.25	239.57	382.18	0.627	0.00	382.18	0.000
L14	13 - 12.75 (14)	TP20.5599x20.5286x0.6	241.10	873.33	0.276	0.00	873.33	0.000
L15	12.75 - 7.75 (15)	TP21.1874x20.5599x0.575	272.37	894.43	0.305	0.00	894.43	0.000
L16	7.75 - 2.75 (16)	TP21.8149x21.1874x0.5625	304.92	931.46	0.327	0.00	931.46	0.000
L17	2.75 - 0 (17)	TP22.16x21.8149x0.5625	323.35	962.35	0.336	0.00	962.35	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	76 - 71 (1)	TP13.6269x13x0.1875	1.36	108.52	0.013	0.00	127.89	0.000
L2	71 - 66 (2)	TP14.2538x13.6269x0.1875	1.70	113.58	0.015	0.00	140.10	0.000
L3	66 - 61 (3)	TP14.8808x14.2538x0.1875	2.49	118.64	0.021	0.00	152.86	0.000
L4	61 - 56 (4)	TP15.5077x14.8808x0.1875	2.82	123.71	0.023	0.00	166.18	0.000
L5	56 - 50 (5)	TP16.26x15.5077x0.1875	2.92	127.77	0.023	0.00	177.27	0.000
L6	50 - 46.99 (6)	TP16.263x15.6355x0.25	4.14	172.40	0.024	0.00	242.07	0.000
L7	46.99 - 41.99 (7)	TP16.8904x16.263x0.25	4.22	179.16	0.024	0.00	261.42	0.000
L8	41.99 - 36.99 (8)	TP17.5179x16.8904x0.25	4.41	185.91	0.024	0.00	281.50	0.000
L9	36.99 - 31.99 (9)	TP18.1454x17.5179x0.25	5.18	192.67	0.027	0.42	302.33	0.001

<b>tnxTower</b>  <b>Tower Engineering Professionals</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661 6351 FAX: (919) 661 6350	<b>Job</b>	HWY 101 - Lakeville (BU 856199)	<b>Page</b>	20 of 20
	<b>Project</b>	TEP No. 133231.610607	<b>Date</b>	13:26:49 10/12/21
	<b>Client</b>	Crown Castle	<b>Designed by</b>	ahyppolite

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L10	31.99 - 26.99 (10)	TP18.7729x18.1454x0.25	5.45	199.42	0.027	0.54	323.90	0.002
L11	26.99 - 21.99 (11)	TP19.4004x18.7729x0.25	5.70	206.18	0.028	0.65	346.22	0.002
L12	21.99 - 16.99 (12)	TP20.0278x19.4004x0.25	5.94	212.93	0.028	0.76	369.28	0.002
L13	16.99 - 13 (13)	TP20.5286x20.0278x0.25	6.11	218.32	0.028	0.81	388.22	0.002
L14	13 - 12.75 (14)	TP20.5599x20.5286x0.6	6.12	515.75	0.012	0.81	902.67	0.001
L15	12.75 - 7.75 (15)	TP21.1874x20.5599x0.575	6.37	510.41	0.012	0.86	922.54	0.001
L16	7.75 - 2.75 (16)	TP21.8149x21.1874x0.5625	6.63	514.82	0.013	0.91	959.40	0.001
L17	2.75 - 0 (17)	TP22.16x21.8149x0.5625	6.77	523.18	0.013	0.94	990.81	0.001

**APPENDIX B**  
**BASE LEVEL DRAWING**



(OTHER CONSIDERED EQUIPMENT—IN (3) 2-1/2" CONDUITS)

(1) 3/8" TO 64 FT LEVEL

(2) 3/4" TO 64 FT LEVEL

(6) 7/8" TO 64 FT LEVEL

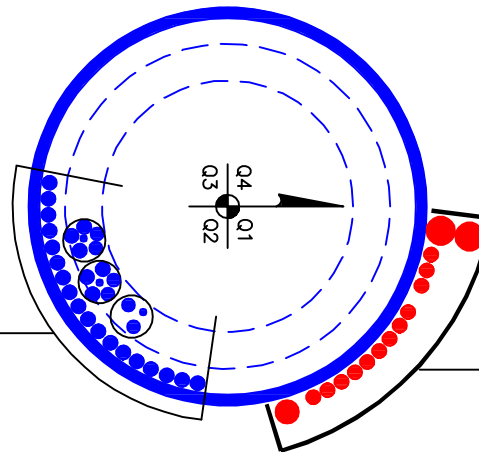
(2) 3/8" TO 72 FT LEVEL

(4) 3/4" TO 72 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)

(12) 7/8" TO 72 FT LEVEL

(6) 7/8" TO 60 FT LEVEL



FEEDLINE SHROUD  
TO 48 FT LEVEL

(PROPOSED EQUIPMENT CONFIGURATION)

(12) 7/8" TO 50 FT LEVEL

(1) 1-3/8" TO 50 FT LEVEL

(2) 1-5/8" TO 50 FT LEVEL

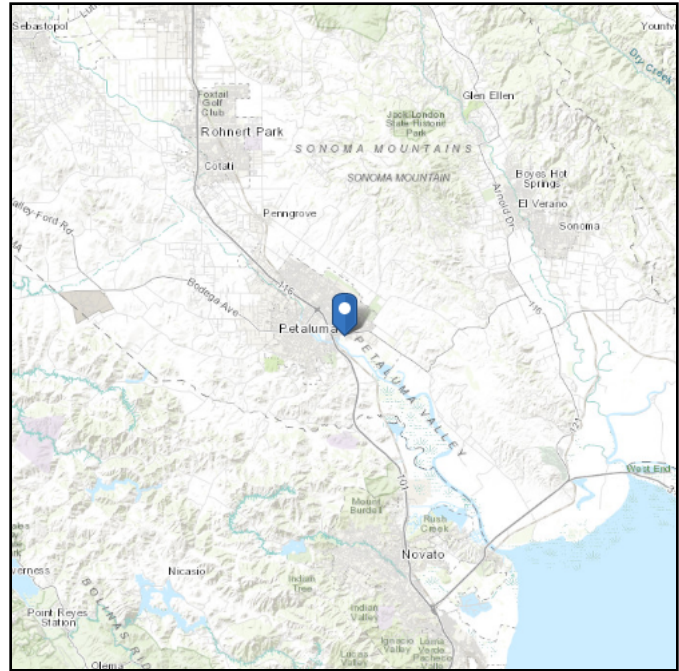
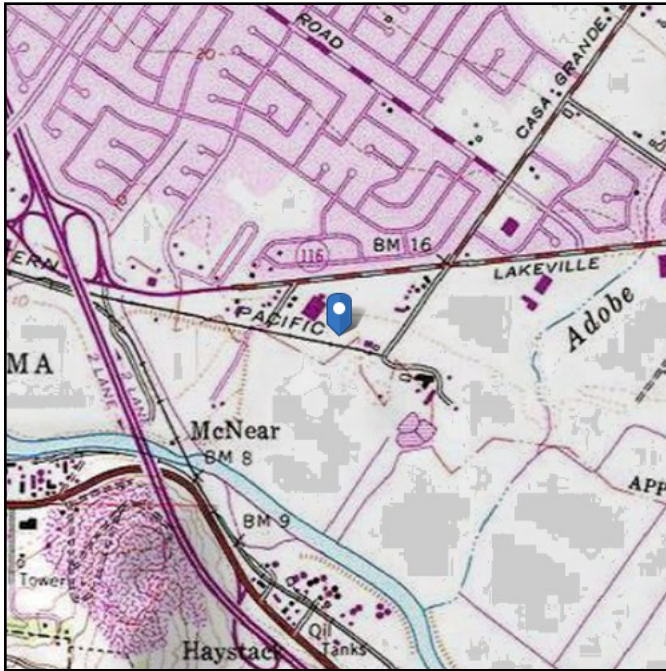
**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-16  
**Risk Category:** II  
**Soil Class:** D - Default (see Section 11.4.3)

**Elevation:** 10.98 ft (NAVD 88)  
**Latitude:** 38.231683  
**Longitude:** -122.608592



## Wind

### Results:

Wind Speed:	92 Vmph
10-year MRI	64 Vmph
25-year MRI	70 Vmph
50-year MRI	74 Vmph
100-year MRI	79 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: Fri Oct 08 2021

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.

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

**Results:**

$S_s$ :	1.591	$S_{D1}$ :	N/A
$S_1$ :	0.6	$T_L$ :	8
$F_a$ :	1.2	PGA :	0.67
$F_v$ :	N/A	PGA <sub>M</sub> :	0.804
$S_{MS}$ :	1.909	$F_{PGA}$ :	1.2
$S_{M1}$ :	N/A	$I_e$ :	1
$S_{DS}$ :	1.273	$C_v$ :	1.418

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

**Data Accessed:** Fri Oct 08 2021

**Date Source:** [USGS Seismic Design Maps](#)



## Ice

---

### Results:

Ice Thickness: 0.00 in.

Concurrent Temperature: 25 F

Gust Speed: 30 mph

**Data Source:** Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

**Date Accessed:** Fri Oct 08 2021

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.

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The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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Site BU: 856199  
Work Order: 2027389



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**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	76	26	1.99	16	13	16.26	0.1875	Auto	A572-50
2	51.99	51.99	0	16	15.64	22.16	0.25	Auto	A572-50

**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	13	14	15	16	
1	0	13	plate	CCI-WAFP-045100	4			x				x				x					x	
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

**Reinforcement Details**

	B (in)	H (in)	Gross Area (in <sup>2</sup> )	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in <sup>2</sup> )	Bolt Hole Size (in)	Reinforcement Material
1	4.5	1	4.5	0.5	Welded	n/a	PC 8.8 - M20 (100)	24.000	20.000	3.250	1.1875	A572-65

# TNX Geometry Input

Increment (ft):  [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	76 - 71	5		16	13.000	13.627	0.1875	A572-50	1.000
2	71 - 66	5		16	13.627	14.254	0.1875	A572-50	1.000
3	66 - 61	5		16	14.254	14.881	0.1875	A572-50	1.000
4	61 - 56	5		16	14.881	15.508	0.1875	A572-50	1.000
5	56 - 51.99	6	1.99	16	15.508	16.260	0.1875	A572-50	1.000
6	51.99 - 46.99	5		16	15.635	16.263	0.25	A572-50	1.000
7	46.99 - 41.99	5		16	16.263	16.890	0.25	A572-50	1.000
8	41.99 - 36.99	5		16	16.890	17.518	0.25	A572-50	1.000
9	36.99 - 31.99	5		16	17.518	18.145	0.25	A572-50	1.000
10	31.99 - 26.99	5		16	18.145	18.773	0.25	A572-50	1.000
11	26.99 - 21.99	5		16	18.773	19.400	0.25	A572-50	1.000
12	21.99 - 16.99	5		16	19.400	20.028	0.25	A572-50	1.000
13	16.99 - 13	3.99		16	20.028	20.529	0.25	A572-50	1.000
14	13 - 12.75	0.25		16	20.529	20.560	0.6	A572-50	0.896
15	12.75 - 7.75	5		16	20.560	21.187	0.575	A572-50	0.919
16	7.75 - 2.75	5		16	21.187	21.815	0.5625	A572-50	0.924
17	2.75 - 0	2.75		16	21.815	22.160	0.5625	A572-50	0.916

## TNX Section Forces

Increment (ft):		TNX Output				
	5	P <sub>u</sub> (K)		M <sub>ux</sub> (kip-ft)	V <sub>u</sub> (K)	
	Section Height (ft)					
1	76 - 71	1.96	2.02	1.36		
2	71 - 66	2.63	9.93	1.70		
3	66 - 61	4.15	20.74	2.49		
4	61 - 56	4.80	34.39	2.82		
5	56 - 51.99	5.07	45.78	2.92		
6	51.99 - 46.99	8.39	64.01	4.14		
7	46.99 - 41.99	8.97	85.01	4.22		
8	41.99 - 36.99	9.66	106.91	4.41		
9	36.99 - 31.99	8.45	131.83	5.18		
10	31.99 - 26.99	9.01	158.45	5.45		
11	26.99 - 21.99	9.58	186.37	5.70		
12	21.99 - 16.99	10.18	215.51	5.94		
13	16.99 - 13	10.66	239.57	6.11		
14	13 - 12.75	10.71	241.10	6.12		
15	12.75 - 7.75	11.67	272.37	6.37		
16	7.75 - 2.75	12.65	304.92	6.63		
17	2.75 - 0	13.19	323.35	6.77		

# Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
76 - 71	Pole	TP13.627x13x0.1875	Pole	2.1%	Pass
71 - 66	Pole	TP14.254x13.627x0.1875	Pole	7.5%	Pass
66 - 61	Pole	TP14.881x14.254x0.1875	Pole	14.2%	Pass
61 - 56	Pole	TP15.508x14.881x0.1875	Pole	21.2%	Pass
56 - 51.99	Pole	TP16.26x15.508x0.1875	Pole	26.1%	Pass
51.99 - 46.99	Pole	TP16.263x15.635x0.25	Pole	27.1%	Pass
46.99 - 41.99	Pole	TP16.89x16.263x0.25	Pole	33.0%	Pass
41.99 - 36.99	Pole	TP17.518x16.89x0.25	Pole	38.3%	Pass
36.99 - 31.99	Pole	TP18.145x17.518x0.25	Pole	43.5%	Pass
31.99 - 26.99	Pole	TP18.773x18.145x0.25	Pole	48.7%	Pass
26.99 - 21.99	Pole	TP19.4x18.773x0.25	Pole	53.5%	Pass
21.99 - 16.99	Pole	TP20.028x19.4x0.25	Pole	57.9%	Pass
16.99 - 13	Pole	TP20.529x20.028x0.25	Pole	61.1%	Pass
13 - 12.75	Pole + Reinf.	TP20.56x20.529x0.6	Reinf. 1 Tension Rupture	36.6%	Pass
12.75 - 7.75	Pole + Reinf.	TP21.187x20.56x0.575	Reinf. 1 Tension Rupture	39.6%	Pass
7.75 - 2.75	Pole + Reinf.	TP21.815x21.187x0.5625	Reinf. 1 Tension Rupture	42.5%	Pass
2.75 - 0	Pole + Reinf.	TP22.16x21.815x0.5625	Reinf. 1 Tension Rupture	44.1%	Pass
				Summary	
			Pole	61.1%	Pass
			Reinforcement	44.1%	Pass
			Overall	61.1%	Pass

## Additional Calculations

Section Elevation (ft)	Moment of Inertia (in <sup>4</sup> )			Area (in <sup>2</sup> )			% Capacity*	
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1
76 - 71	183	n/a	183	8.02	n/a	8.02	2.1%	
71 - 66	210	n/a	210	8.39	n/a	8.39	7.5%	
66 - 61	240	n/a	240	8.77	n/a	8.77	14.2%	
61 - 56	272	n/a	272	9.14	n/a	9.14	21.2%	
56 - 51.99	299	n/a	299	9.44	n/a	9.44	26.1%	
51.99 - 46.99	414	n/a	414	12.74	n/a	12.74	27.1%	
46.99 - 41.99	464	n/a	464	13.24	n/a	13.24	33.0%	
41.99 - 36.99	519	n/a	519	13.74	n/a	13.74	38.3%	
36.99 - 31.99	578	n/a	578	14.24	n/a	14.24	43.5%	
31.99 - 26.99	640	n/a	640	14.74	n/a	14.74	48.7%	
26.99 - 21.99	708	n/a	708	15.24	n/a	15.24	53.5%	
21.99 - 16.99	780	n/a	780	15.74	n/a	15.74	57.9%	
16.99 - 13	840	n/a	840	16.13	n/a	16.13	61.1%	
13 - 12.75	844	1062	1906	16.16	18.00	34.16	26.7%	36.6%
12.75 - 7.75	925	1124	2049	16.66	18.00	34.66	28.9%	39.6%
7.75 - 2.75	1011	1187	2198	17.16	18.00	35.16	31.0%	42.5%
2.75 - 0	1060	1223	2283	17.43	18.00	35.43	32.2%	44.1%

Note: Section capacity checked using 5 degree increments.

Rating per TIA-222-H Section 15.5.

# Monopole Base Plate Connection

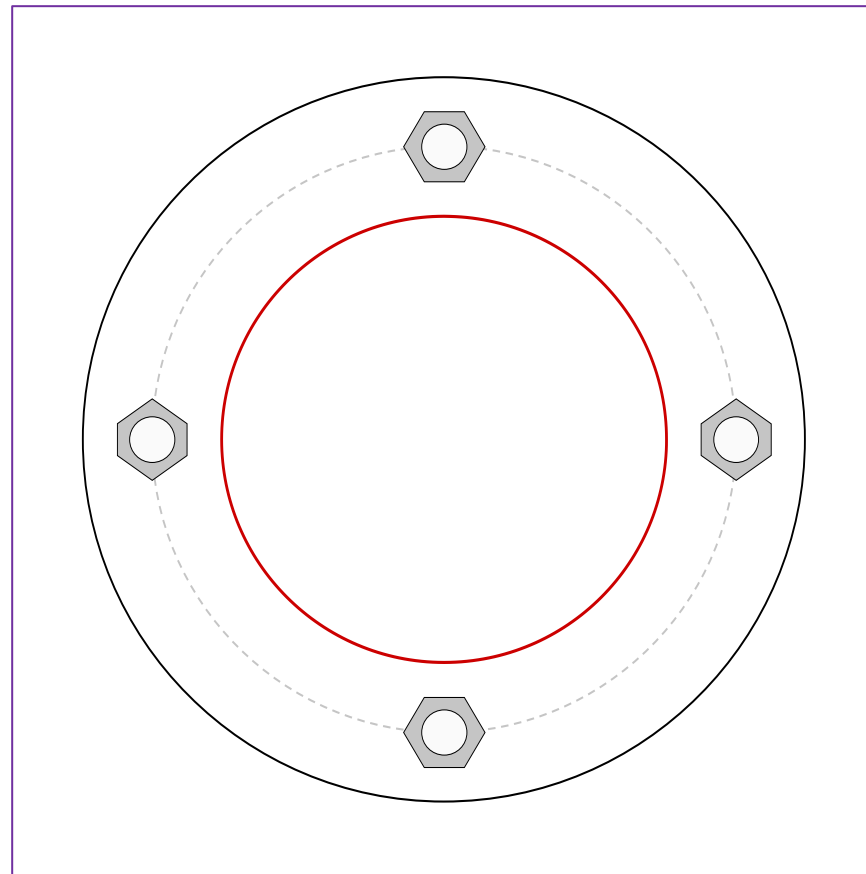


Site Info	
BU #	856199
Site Name	HWY 101 - Lakeville
Order #	578187 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	0.5

Applied Loads	
Moment (kip-ft)	323.00
Axial Force (kips)	13.00
Shear Force (kips)	7.00

\*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(4) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 29.125" BC
Base Plate Data
36" OD x 2.25" Plate (A36; $F_y=36$ ksi, $F_u=58$ ksi)
Stiffener Data
N/A
Pole Data
22.16" x 0.25" 16-sided pole (A572-50; $F_y=50$ ksi, $F_u=65$ ksi)

Anchor Rod Summary			<i>(units of kips, kip-in)</i>
$P_{u,t} = 129.51$	$\phi P_{n,t} = 243.75$	<b>Stress Rating</b>	
$V_u = 1.75$	$\phi V_n = 149.1$	<b>50.6%</b>	
$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>	
Base Plate Summary			
Max Stress (ksi):	19.8	(Flexural)	
Allowable Stress (ksi):	32.4		
Stress Rating:	<b>58.2%</b>	<b>Pass</b>	

## Drilled Pier Foundation

BU # :	856199
Site Name:	HWY 101 - Lakeville
Order Number:	578187 Rev. 0
TIA-222 Revision:	H
Tower Type:	Monopole



Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	323	
Axial Force (kips)	13	
Shear Force (kips)	7	

Material Properties			Rebar 2, Fy Override (ksi)
Concrete Strength, f'c:	3	ksi	
Rebar Strength, Fy:	60	ksi	
Tie Yield Strength, Fyt:	40	ksi	

Pier Design Data		
Depth	24	ft
Ext. Above Grade	1	ft
Pier Section 1		
<i>From 1' above grade to 24' below grade</i>		
Pier Diameter	4	ft
Rebar Quantity	14	
Rebar Size	6	
Clear Cover to Ties	3	in
Tie Size	3	
Tie Spacing		in

Rebar & Pier Options  
Embedded Pole Inputs  
Belled Pier Inputs

### Analysis Results

Soil Lateral Check	Compression	Uplift
D <sub>v=0</sub> (ft from TOC)	5.44	-
Soil Safety Factor	5.57	-
Max Moment (kip-ft)	352.63	-
Rating*	22.8%	-

Soil Vertical Check	Compression	Uplift
Skin Friction (kips)	22.62	-
End Bearing (kips)	161.35	-
Weight of Concrete (kips)	55.61	-
Total Capacity (kips)	183.97	-
Axial (kips)	68.61	-
Rating*	35.5%	-

Reinforced Concrete Flexure	Compression	Uplift
Critical Depth (ft from TOC)	5.09	-
Critical Moment (kip-ft)	352.45	-
Critical Moment Capacity	592.53	-
Rating*	56.6%	-

Reinforced Concrete Shear	Compression	Uplift
Critical Depth (ft from TOC)	20.26	-
Critical Shear (kip)	30.53	-
Critical Shear Capacity	168.56	-
Rating*	17.3%	-

<b>Structural Foundation Rating*</b>	<b>56.6%</b>
<b>Soil Interaction Rating*</b>	<b>35.5%</b>

Min. Steel is assumed

\*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	<input checked="" type="checkbox"/>
N/A	<input type="checkbox"/>
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	<input checked="" type="checkbox"/>
Shear Design Options	
Check Shear along Depth of Pier:	<input checked="" type="checkbox"/>
Utilize Shear-Friction Methodology:	<input type="checkbox"/>
Override Critical Depth:	<input type="checkbox"/>

[Go to Soil Calculations](#)

Soil Profile			
Groundwater Depth	23	# of Layers	7

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ <sub>soil</sub> (pcf)	γ <sub>concrete</sub> (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. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	2	2	120	150	0		0.000	0.000	0.00	0.00			Cohesionless
2	2	4	2	120	150	0.5		0.275	0.275	0.00	0.00			Cohesive
3	4	7	3	120	150	0.5		0.275	0.275	0.12	0.12			Cohesive
4	7	10	3	115	150	0.5		0.275	0.275	0.12	0.12			Cohesive
5	10	18	8	110	150	0.2		0.110	0.110	0.12	0.12			Cohesive
6	18	23	5	115	150	0.75		0.413	0.413	0.12	0.12			Cohesive
7	23	24	1	53	87.6		32	0.00	0.00	0.12	0.12	17.12		Cohesionless





BU: 856199  
 WO: 2027389  
 Order: 578187

Structure: A  
 Rev: 0

**Location**

	Decimal Degrees	Deg	Min	Sec	
Lat:	38.231683	+	38	13	54.06
Long:	-122.608592	-	122	36	30.93

**Code and Site Parameters**

Seismic Design Code:	TIA-222-H-1	
Site Soil:	D (Default)	Default
Risk Category:	II	
<u>USGS Seismic Reference</u>		
S <sub>S</sub> :	1.5910	g
S <sub>1</sub> :	0.6000	g
T <sub>L</sub> :	8	s

**Seismic Design Category Determination**

Importance Factor, I <sub>e</sub> :	1
Acceleration-based site coefficient, F <sub>a</sub> :	1.2000
Velocity-based site coefficient, F <sub>v</sub> :	1.7000
Design spectral response acceleration short period, S <sub>DS</sub> :	1.2728 g
Design spectral response acceleration 1 s period, S <sub>D1</sub> :	0.6800 g
T <sub>s</sub> :	0.5343
Seismic Design Category Based on S <sub>DS</sub> :	D
Seismic Design Category Based on S <sub>D1</sub> :	D
Seismic Design Category Based on S <sub>1</sub> :	N/A
Controlling Seismic Design Category:	D



BU: 856199  
 WO: 2027389  
 Order: 578187

Structure: A  
 Rev: 0

Tower Details		
Tower Type:	Tapered Monopole	
Height, h:	76	ft
Effective Seismic Weight, W:	10.98	kips
Amplification Factor, A <sub>s</sub> :	1.0	2.7.8.1
Seismic Base Shear		
Response Modification Factor, R:	1.5	
Fundamental Period, T:	1.6850	s
Seismic Response Coefficient, C <sub>s</sub>	0.4036	Table 2-12 Note 3
Seismic Response Coefficient Max 1, C <sub>smax</sub>	N/A	
Seismic Response Coefficient Max 2, C <sub>smax</sub>	N/A	
Seismic Response Coefficient Min 1, C <sub>smin</sub>	0.0560	2.7.7.1.1
Seismic Response Coefficient Min 2, C <sub>smin</sub>	0.3200	2.7.7.1.1
Controlling Seismic Response Coefficient, C <sub>sc</sub>	0.4036	
Seismic Base Shear, V:	4.432	kips 2.7.7.1.1
Vertical Distribution Factors		
Period Related Exponent, k:	1.593	
Sum of w <sub>i</sub> h <sub>i</sub> <sup>k</sup>	4816.95	

Tower Section Loads								
Section Number	Length	Top Height	Mid Height, $h_x$	Section Weight, $w_x$	$w_x h_x^k$	$C_{vx}$	$F_{xh}$	$F_{xv}$
1 - 1	5.00	76.00	73.50	0.1333	124.96	0.0259	0.1150	0.0339
2 - 1	5.00	71.00	68.50	0.1396	117.04	0.0243	0.1077	0.0355
3 - 1	5.00	66.00	63.50	0.1460	108.46	0.0225	0.0998	0.0372
4 - 1	5.00	61.00	58.50	0.1524	99.33	0.0206	0.0914	0.0388
5 - 1	6.00	56.00	53.00	0.1912	106.53	0.0221	0.0980	0.0487
6 - 1	5.00	51.99	49.49	0.2125	106.15	0.0220	0.0977	0.0541
7 - 1	5.00	46.99	44.49	0.2210	93.17	0.0193	0.0857	0.0563
8 - 1	5.00	41.99	39.49	0.2295	80.02	0.0166	0.0736	0.0584
9 - 1	5.00	36.99	34.49	0.2380	66.89	0.0139	0.0615	0.0606
10 - 1	5.00	31.99	29.49	0.2465	53.98	0.0112	0.0497	0.0627
11 - 1	5.00	26.99	24.49	0.2550	41.54	0.0086	0.0382	0.0649
12 - 1	5.00	21.99	19.49	0.2635	29.84	0.0062	0.0275	0.0671
13 - 1	3.99	16.99	15.00	0.2164	16.14	0.0034	0.0148	0.0551
14 - 1	0.25	13.00	12.88	0.0290	1.70	0.0004	0.0016	0.0074
15 - 1	5.00	12.75	10.25	0.5807	23.63	0.0049	0.0217	0.1478
16 - 1	5.00	7.75	5.25	0.5893	8.26	0.0017	0.0076	0.1500
17 - 1	2.75	2.75	1.38	0.3289	0.55	0.0001	0.0005	0.0837
				Sum	4.1729	1078.20		

Discrete Loads						
Name	$h_x$	$w_x$	$w_x h_x^k$	$C_{vx}$	$F_{xh}$	$F_{xv}$
commscope_cfd JAHH-65A-R3B	72.00	0.0529	48.00	0.0100	0.0442	0.0135
commscope_cfd JAHH-65A-R3B	72.00	0.0529	48.00	0.0100	0.0442	0.0135
commscope_cfd JAHH-65A-R3B	72.00	0.0529	48.00	0.0100	0.0442	0.0135
commscope_cfd NNHH-65A-R4	72.00	0.0672	60.98	0.0127	0.0561	0.0171
commscope_cfd NNHH-65A-R4	72.00	0.0672	60.98	0.0127	0.0561	0.0171
commscope_cfd NNHH-65A-R4	72.00	0.0672	60.98	0.0127	0.0561	0.0171
ericsson RRUS 32	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 32	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 32	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 4478 B5	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 4478 B5	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 4478 B5	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 4478 B14	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 4478 B14	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 4478 B14	72.00	0.0600	54.44	0.0113	0.0501	0.0153
ericsson RRUS 4415 B25	72.00	0.0400	36.30	0.0075	0.0334	0.0102
ericsson RRUS 4415 B25	72.00	0.0400	36.30	0.0075	0.0334	0.0102
ericsson RRUS 4415 B25	72.00	0.0400	36.30	0.0075	0.0334	0.0102
raycap DC6-48-60-18-8F	72.00	0.0300	27.22	0.0057	0.0250	0.0076
raycap DC6-48-60-18-8F	72.00	0.0300	27.22	0.0057	0.0250	0.0076
tower mounts (cci) Pipe Mount [PM 601-3]	72.00	0.1950	176.94	0.0367	0.1628	0.0496
tower mounts (cci) Pipe Mount [PM 602-3]	72.00	0.2790	253.17	0.0526	0.2329	0.0710
commscope_cfd JAHH-65A-R3B	64.00	0.0529	39.79	0.0083	0.0366	0.0135
commscope_cfd JAHH-65A-R3B	64.00	0.0529	39.79	0.0083	0.0366	0.0135
commscope_cfd JAHH-65A-R3B	64.00	0.0529	39.79	0.0083	0.0366	0.0135
ericsson RRUS 11	64.00	0.0500	37.61	0.0078	0.0346	0.0127
ericsson RRUS 11	64.00	0.0500	37.61	0.0078	0.0346	0.0127
ericsson RRUS 11	64.00	0.0500	37.61	0.0078	0.0346	0.0127
ericsson RRUS 32 B66	64.00	0.0500	37.61	0.0078	0.0346	0.0127
ericsson RRUS 32 B66	64.00	0.0500	37.61	0.0078	0.0346	0.0127
ericsson RRUS 32 B66	64.00	0.0500	37.61	0.0078	0.0346	0.0127
ericsson RRUS 32 B66	64.00	0.0500	37.61	0.0078	0.0346	0.0127
raycap DC6-48-60-18-8F	64.00	0.0300	22.57	0.0047	0.0208	0.0076
(2) tower mounts (cci) Pipe Mount [PM 601-3]	64.00	0.3900	293.36	0.0609	0.2699	0.0993
powerwave technologies 7721.00	60.00	0.0100	6.79	0.0014	0.0062	0.0025
powerwave technologies 7721.00	60.00	0.0100	6.79	0.0014	0.0062	0.0025
powerwave technologies 7721.00	60.00	0.0100	6.79	0.0014	0.0062	0.0025
powerwave technologies 7721.00	60.00	0.0100	6.79	0.0014	0.0062	0.0025
tower mounts (cci) Pipe Mount [PM 601-3]	60.00	0.1950	132.36	0.0275	0.1218	0.0496
ericsson_cfd AIR6449 B41_T-MOBILE w/ Mount Pipe	50.00	0.1284	65.17	0.0135	0.0600	0.0327
ericsson_cfd AIR6449 B41_T-MOBILE w/ Mount Pipe	50.00	0.1284	65.17	0.0135	0.0600	0.0327
ericsson_cfd AIR6449 B41_T-MOBILE w/ Mount Pipe	50.00	0.1284	65.17	0.0135	0.0600	0.0327
rfs celwave_cfd APXVAARR24_43-U-NA20 w/ Mount Pipe	50.00	0.1862	94.52	0.0196	0.0870	0.0474
rfs celwave_cfd APXVAARR24_43-U-NA20 w/ Mount Pipe	50.00	0.1862	94.52	0.0196	0.0870	0.0474
rfs celwave_cfd APXVAARR24_43-U-NA20 w/ Mount Pipe	50.00	0.1862	94.52	0.0196	0.0870	0.0474
ericsson RADIO 4460 B2/B25 B66_TMO	50.00	0.1100	55.85	0.0116	0.0514	0.0280
ericsson RADIO 4460 B2/B25 B66_TMO	50.00	0.1100	55.85	0.0116	0.0514	0.0280
ericsson RADIO 4460 B2/B25 B66_TMO	50.00	0.1100	55.85	0.0116	0.0514	0.0280
ericsson Radio 4480_TMOV2	50.00	0.0800	40.62	0.0084	0.0374	0.0204
ericsson Radio 4480_TMOV2	50.00	0.0800	40.62	0.0084	0.0374	0.0204
ericsson Radio 4480_TMOV2	50.00	0.0800	40.62	0.0084	0.0374	0.0204
ericsson Radio 4480_TMOV2	50.00	0.0800	40.62	0.0084	0.0374	0.0204
mounts 2.4" Dia x 6-ft Pipe	50.00	0.0200	10.15	0.0021	0.0093	0.0051
mounts 2.4" Dia x 6-ft Pipe	50.00	0.0200	10.15	0.0021	0.0093	0.0051
mounts 2.4" Dia x 6-ft Pipe	50.00	0.0200	10.15	0.0021	0.0093	0.0051
mounts 2.4" Dia x 6-ft Pipe	50.00	0.0200	10.15	0.0021	0.0093	0.0051
tower mounts (cci) T-Arm Mount [TA 702-3]	50.00	0.3390	172.11	0.0357	0.1583	0.0863
Sum		4.5707	3195.13			

Linear Loads								
Name	Start Height	End Height	$h_x$	$w_x$	$w_x h_x^k$	$C_{vx}$	$F_{xh}$	$F_{sv}$
(12) andrew LDF5-50A(7/8) From 0 to 72	66.00	72.00	69.00	0.0238	20.15	0.0042	0.0185	0.0060
(12) andrew LDF5-50A(7/8) From 0 to 72	56.00	66.00	61.00	0.0396	27.60	0.0057	0.0254	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 72	46.00	56.00	51.00	0.0396	20.75	0.0043	0.0191	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 72	36.00	46.00	41.00	0.0396	14.66	0.0030	0.0135	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 72	26.00	36.00	31.00	0.0396	9.39	0.0019	0.0086	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 72	16.00	26.00	21.00	0.0396	5.05	0.0010	0.0046	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 72	6.00	16.00	11.00	0.0396	1.80	0.0004	0.0017	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 72	0.00	6.00	3.00	0.0238	0.14	0.0000	0.0001	0.0060
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	66.00	72.00	69.00	0.0003	0.25	0.0001	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	56.00	66.00	61.00	0.0005	0.35	0.0001	0.0003	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	46.00	56.00	51.00	0.0005	0.26	0.0001	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	36.00	46.00	41.00	0.0005	0.19	0.0000	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	26.00	36.00	31.00	0.0005	0.12	0.0000	0.0001	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	16.00	26.00	21.00	0.0005	0.06	0.0000	0.0001	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	6.00	16.00	11.00	0.0005	0.02	0.0000	0.0000	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	0.00	6.00	3.00	0.0003	0.00	0.0000	0.0000	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	66.00	72.00	69.00	0.0003	0.25	0.0001	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	56.00	66.00	61.00	0.0005	0.35	0.0001	0.0003	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	46.00	56.00	51.00	0.0005	0.26	0.0001	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	36.00	46.00	41.00	0.0005	0.19	0.0000	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	26.00	36.00	31.00	0.0005	0.12	0.0000	0.0001	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	16.00	26.00	21.00	0.0005	0.06	0.0000	0.0001	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	6.00	16.00	11.00	0.0005	0.02	0.0000	0.0000	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 72	0.00	6.00	3.00	0.0003	0.00	0.0000	0.0000	0.0001
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	66.00	72.00	69.00	0.0063	5.38	0.0011	0.0050	0.0016
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	56.00	66.00	61.00	0.0106	7.37	0.0015	0.0068	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	46.00	56.00	51.00	0.0106	5.54	0.0012	0.0051	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	36.00	46.00	41.00	0.0106	3.92	0.0008	0.0036	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	26.00	36.00	31.00	0.0106	2.51	0.0005	0.0023	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	16.00	26.00	21.00	0.0106	1.35	0.0003	0.0012	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	6.00	16.00	11.00	0.0106	0.48	0.0001	0.0004	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	0.00	6.00	3.00	0.0063	0.04	0.0000	0.0000	0.0016
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	66.00	72.00	69.00	0.0063	5.38	0.0011	0.0050	0.0016
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	56.00	66.00	61.00	0.0106	7.37	0.0015	0.0068	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	46.00	56.00	51.00	0.0106	5.54	0.0012	0.0051	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	36.00	46.00	41.00	0.0106	3.92	0.0008	0.0036	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	26.00	36.00	31.00	0.0106	2.51	0.0005	0.0023	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	16.00	26.00	21.00	0.0106	1.35	0.0003	0.0012	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	6.00	16.00	11.00	0.0106	0.48	0.0001	0.0004	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 72	0.00	6.00	3.00	0.0063	0.04	0.0000	0.0000	0.0016
misc 2.5" Conduit From 0 to 72	66.00	72.00	69.00	0.0060	5.09	0.0011	0.0047	0.0015
misc 2.5" Conduit From 0 to 72	56.00	66.00	61.00	0.0100	6.97	0.0014	0.0064	0.0025
misc 2.5" Conduit From 0 to 72	46.00	56.00	51.00	0.0100	5.24	0.0011	0.0048	0.0025
misc 2.5" Conduit From 0 to 72	36.00	46.00	41.00	0.0100	3.70	0.0008	0.0034	0.0025
misc 2.5" Conduit From 0 to 72	26.00	36.00	31.00	0.0100	2.37	0.0005	0.0022	0.0025
misc 2.5" Conduit From 0 to 72	16.00	26.00	21.00	0.0100	1.28	0.0003	0.0012	0.0025
misc 2.5" Conduit From 0 to 72	6.00	16.00	11.00	0.0100	0.46	0.0001	0.0004	0.0025
misc 2.5" Conduit From 0 to 72	0.00	6.00	3.00	0.0060	0.03	0.0000	0.0000	0.0015
(6) andrew LDF5-50A(7/8) From 0 to 64	56.00	64.00	60.00	0.0158	10.75	0.0022	0.0099	0.0040
(6) andrew LDF5-50A(7/8) From 0 to 64	46.00	56.00	51.00	0.0198	10.37	0.0022	0.0095	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 64	36.00	46.00	41.00	0.0198	7.33	0.0015	0.0067	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 64	26.00	36.00	31.00	0.0198	4.70	0.0010	0.0043	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 64	16.00	26.00	21.00	0.0198	2.53	0.0005	0.0023	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 64	6.00	16.00	11.00	0.0198	0.90	0.0002	0.0008	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 64	0.00	6.00	3.00	0.0119	0.07	0.0000	0.0001	0.0030
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64	56.00	64.00	60.00	0.0004	0.27	0.0001	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64	46.00	56.00	51.00	0.0005	0.26	0.0001	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64	36.00	46.00	41.00	0.0005	0.19	0.0000	0.0002	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64	26.00	36.00	31.00	0.0005	0.12	0.0000	0.0001	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64	16.00	26.00	21.00	0.0005	0.06	0.0000	0.0001	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64	6.00	16.00	11.00	0.0005	0.02	0.0000	0.0000	0.0001
rosenberger leoni FB-L98B-034-XXXXXX(3/8) From 0 to 64	0.00	6.00	3.00	0.0003	0.00	0.0000	0.0000	0.0001
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 64	56.00	64.00	60.00	0.0085	5.74	0.0012	0.0053	0.0022
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 64	46.00	56.00	51.00	0.0106	5.54	0.0012	0.0051	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 64	36.00	46.00	41.00	0.0106	3.92	0.0008	0.0036	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 64	26.00	36.00	31.00	0.0106	2.51	0.0005	0.0023	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 64	16.00	26.00	21.00	0.0106	1.35	0.0003	0.0012	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 64	6.00	16.00	11.00	0.0106	0.48	0.0001	0.0004	0.0027
(2) rosenberger leoni WR-VG86T(3/4) From 0 to 64	0.00	6.00	3.00	0.0063	0.04	0.0000	0.0000	0.0016
(2) misc 2.5" Conduit From 0 to 64	56.00	64.00	60.00	0.0160	10.86	0.0023	0.0100	0.0041
(2) misc 2.5" Conduit From 0 to 64	46.00	56.00	51.00	0.0200	10.48	0.0022	0.0096	0.0051
(2) misc 2.5" Conduit From 0 to 64	36.00	46.00	41.00	0.0200	7.40	0.0015	0.0068	0.0051
(2) misc 2.5" Conduit From 0 to 64	26.00	36.00	31.00	0.0200	4.74	0.0010	0.0044	0.0051
(2) misc 2.5" Conduit From 0 to 64	16.00	26.00	21.00	0.0200	2.55	0.0005	0.0023	0.0051
(2) misc 2.5" Conduit From 0 to 64	6.00	16.00	11.00	0.0200	0.91	0.0002	0.0008	0.0051
(2) misc 2.5" Conduit From 0 to 64	0.00	6.00	3.00	0.0120	0.07	0.0000	0.0001	0.0031
(6) andrew LDF5-50A(7/8) From 0 to 60	56.00	60.00	58.00	0.0079	5.09	0.0011	0.0047	0.0020
(6) andrew LDF5-50A(7/8) From 0 to 60	46.00	56.00	51.00	0.0198	10.37	0.0022	0.0095	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 60	36.00	46.00	41.00	0.0198	7.33	0.0015	0.0067	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 60	26.00	36.00	31.00	0.0198	4.70	0.0010	0.0043	0.0050

(6) andrew LDF5-50A(7/8) From 0 to 60	16.00	26.00	21.00	0.0198	2.53	0.0005	0.0023	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 60	6.00	16.00	11.00	0.0198	0.90	0.0002	0.0008	0.0050
(6) andrew LDF5-50A(7/8) From 0 to 60	0.00	6.00	3.00	0.0119	0.07	0.0000	0.0001	0.0030
(12) andrew LDF5-50A(7/8) From 0 to 48	46.00	48.00	47.00	0.0079	3.64	0.0008	0.0034	0.0020
(12) andrew LDF5-50A(7/8) From 0 to 48	36.00	46.00	41.00	0.0396	14.66	0.0030	0.0135	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 48	26.00	36.00	31.00	0.0396	9.39	0.0019	0.0086	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 48	16.00	26.00	21.00	0.0396	5.05	0.0010	0.0046	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 48	6.00	16.00	11.00	0.0396	1.80	0.0004	0.0017	0.0101
(12) andrew LDF5-50A(7/8) From 0 to 48	0.00	6.00	3.00	0.0238	0.14	0.0000	0.0001	0.0060
(12) andrew LDF5-50A(7/8) From 48 to 50	48.00	50.00	49.00	0.0079	3.89	0.0008	0.0036	0.0020
ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48	46.00	48.00	47.00	0.0034	1.56	0.0003	0.0014	0.0009
ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48	36.00	46.00	41.00	0.0170	6.29	0.0013	0.0058	0.0043
ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48	26.00	36.00	31.00	0.0170	4.03	0.0008	0.0037	0.0043
ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48	16.00	26.00	21.00	0.0170	2.17	0.0005	0.0020	0.0043
ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48	6.00	16.00	11.00	0.0170	0.77	0.0002	0.0007	0.0043
ericsson HCS 6X12 6AWG(1-3/8) From 0 to 48	0.00	6.00	3.00	0.0102	0.06	0.0000	0.0001	0.0026
ericsson HCS 6X12 6AWG(1-3/8) From 48 to 50	48.00	50.00	49.00	0.0034	1.67	0.0003	0.0015	0.0009
(2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 0 to 48	46.00	48.00	47.00	0.0052	2.39	0.0005	0.0022	0.0013
(2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 0 to 48	36.00	46.00	41.00	0.0260	9.62	0.0020	0.0089	0.0066
(2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 0 to 48	26.00	36.00	31.00	0.0260	6.17	0.0013	0.0057	0.0066
(2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 0 to 48	16.00	26.00	21.00	0.0260	3.32	0.0007	0.0031	0.0066
(2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 0 to 48	6.00	16.00	11.00	0.0260	1.18	0.0002	0.0011	0.0066
(2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 0 to 48	0.00	6.00	3.00	0.0156	0.09	0.0000	0.0001	0.0040
(2) rfs celwave HB158-1-08U8-S8J18( 1-5/8") From 48 to 50	48.00	50.00	49.00	0.0052	2.56	0.0005	0.0024	0.0013
feedline shroud 44 From 0 to 48	46.00	48.00	47.00	0.0360	16.56	0.0034	0.0152	0.0092
feedline shroud 44 From 0 to 48	36.00	46.00	41.00	0.1800	66.62	0.0138	0.0613	0.0458
feedline shroud 44 From 0 to 48	26.00	36.00	31.00	0.1800	42.68	0.0089	0.0393	0.0458
feedline shroud 44 From 0 to 48	16.00	26.00	21.00	0.1800	22.96	0.0048	0.0211	0.0458
feedline shroud 44 From 0 to 48	6.00	16.00	11.00	0.1800	8.20	0.0017	0.0075	0.0458
feedline shroud 44 From 0 to 48	0.00	6.00	3.00	0.1080	0.62	0.0001	0.0006	0.0275
Sum				2.2381	543.62			

# Monopole Base Plate Connection - Seismic



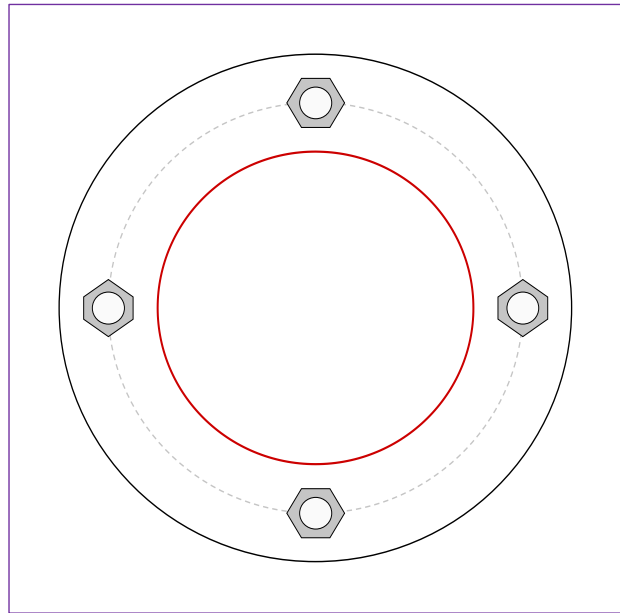
Site Info	
BU #	856199
Site Name	HWY 101 - Lakeville
Order #	578187 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	0.5

Applied Loads	
Moment (kip-ft)	274.00
Axial Force (kips)	16.00
Shear Force (kips)	4.00

\*TIA-222-H Section 15.5 Applied

\*1.5 Overstrength Factor Applied



Connection Properties	Analysis Results
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Anchor Rod Data
(4) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 29.125" BC
Base Plate Data
36" OD x 2.25" Plate (A36; $F_y=36$ ksi, $F_u=58$ ksi)
Stiffener Data
N/A
Pole Data
22.16" x 0.25" 16-sided pole (A572-50; $F_y=50$ ksi, $F_u=65$ ksi)

Anchor Rod Summary	<i>(units of kips, kip-in)</i>	
$P_{u,t} = 164.93$	$\phi P_{n,t} = 243.75$	<b>Stress Rating</b>
$V_u = 1.5$	$\phi V_n = 149.1$	<b>64.4%</b>
$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>
Base Plate Summary		
Max Stress (ksi):	16.98	(Flexural)
Allowable Stress (ksi):	32.4	
Stress Rating:	<b>49.9%</b>	<b>Pass</b>