RYKA CONSULTING

STRUCTURAL ANALYSIS REPORT

Prepared For:

T-Mobile

T-Mobile
19807 North Creek Parkway
Bothell, WA 98011

Project Name:

Washington State Fair - Light Pole
SE04823C

Project Address:

902 S. Meridian
Puyallup, WA 98371

THE APPROVED CONSTRUCTION PLANS AND ALL ENGINEERING MUST BE POSTED ON THE JOB AT ALL INSPECTIONS IN A VISIBLE AND READILY ACCESSIBLE LOCATION.

Site Coordinates:
47.1814
-122.2965

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

Prepared By:
Ryan McDaniel, P.E.
March 15, 2022

PRCTI20220827

PROJECT SCOPE:

T-Mobile proposes the following: Install (1) new equipment mast and (3) new FRP canister shrouds. Replace (3) existing panel antennas (1 per sector) with (3) new panel antennas (1 per sector). Install (3) AEHC active antenna/radios (1 per sector), (9) radiohead units (3 per sector) on new mounting pipes, (3) HCS 2.0 pendants w/ (3) HCS 2.0 hybrid fiber trunks and (12) hybrid fiber jumpers. Remove (12) TMA units (4 per sector) and all coax cables.

ANALYSIS:

The purpose of this analysis is to determine if the existing installation is adequately supported under the proposed loadings and provide any recommendations for modification in order to bring the support structure into compliance if needed. The installation has been analyzed in accordance with ASCE 7-16. The following parameters were used for lateral analysis:

Basic Wind Speed:	98	Risk Category:	II
Wind Exposure:	C	Seismic Design Category:	D
Topographic Factor, kzt:	1.00	Mapped Parameter, Ss:	1.27
		Mapped Parameter, S1:	0.438

This Structural Analysis Report for the existing T-Mobile equipment is inclusive of the entire equipment support structure (i.e. antenna/equipment mounting and support frames) and the existing building structures support system in the affected areas where the installations occur. This analysis is based on the specific assumptions and conditions as stated within the following report.

RESULTS:

Based on our review of the existing structure loadings, we have determined the following:

Design Element	Capacity	Status
Antenna Mount	0.59%	PASS
Monopole Support	0.46%	PASS
Cabinet Anchorage	18.76%	PASS

Equipment Support Rating: 18.8% PASS

Please refer to Appendix A for structural calculations supporting the above results and conclusions sections below for additional comments.

CONTENTS:

1 Antenna Sector Equipment Inventory

Existing Equipment Configuration

Elev. (ft)	Equipment Model	Sector	Mount	Qty.	Carrier
73.50	BSA33R-U6A	1	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	1	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	1	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	1	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	1	Antenna Mount	1	T-Mobile

Final Equipment Configuration

73.50	2D4WHE-21	1	Antenna Mount	1	T-Mobile
65.50	Nokia AEHC 2.5 GHz mMIMO	1	Antenna Mount	1	T-Mobile
65.50	HCS 2.0 Pendant	1	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHFIG	1	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHFIG	1	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHLOA	1	Antenna Mount	1	T-Mobile

See the Architectural and Structural Drawings for configuration, location, and elevations. See the structural calculations for a detailed account of the equipment and the capacity of the support structure.

1 Antenna Sector Equipment Inventory

Existing Equipment Configuration

Elev. (ft)	Equipment Model	Sector	Mount	Qty.	Carrier
73.50	BSA33R-U6A	2	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	2	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	2	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	2	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	2	Antenna Mount	1	T-Mobile

Final Equipment Configuration

73.50	2D4WHE-21	2	Antenna Mount	1	T-Mobile
65.50	Nokia AEHC 2.5 GHz mMIMO	2	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHFIG	2	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHFIG	2	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHLOA	2	Antenna Mount	1	T-Mobile
8.50	HCS 2.0 Pendant	2	Antenna Mount	1	T-Mobile

See the Architectural and Structural Drawings for configuration, location, and elevations. See the structural calculations for a detailed account of the equipment and the capacity of the support structure.

1 Antenna Sector Equipment Inventory

Existing Equipment Configuration

Elev. (ft)	Equipment Model	Sector	Mount	Qty.	Carrier
73.50	BSA33R-U6A	3	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	3	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	3	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	3	Antenna Mount	1	T-Mobile
66.00	TMAT1921B68-21-43 (E14R00P09)	3	Antenna Mount	1	T-Mobile

Final Equipment Configuration

73.50	2D4WHE-21	3	Antenna Mount	1	T-Mobile
65.50	Nokia AEHC 2.5 GHz mMIMO	3	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHFIG	3	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHFIG	3	Antenna Mount	1	T-Mobile
8.50	RRH Nokia AHLOA	3	Antenna Mount	1	T-Mobile
8.50	HCS 2.0 Pendant	3	Antenna Mount	1	T-Mobile

See the Architectural and Structural Drawings for configuration, location, and elevations. See the structural calculations for a detailed account of the equipment and the capacity of the support structure.

2 Reference Documents

The following data was used to model and analyze the structure.

Date	Document	Author
	2018 IBC	International Code Council
	ASCE 7-16	ASCE
1/13/2022	RFDS	T-Mobile
March, 1999	Structural Drawings	Interurban Architects
June 15, 2012	Structural Calculations	Cornerstone Engineering, Inc.

3 Design Comments

An existing telecommunications installation is being reconfigured on an existing monopole. A new FRP shroud will be installed on the pole to conseal the telecommunications equipment. Some antennas and minor equipment are being removed or replaced.

Load combinations are applied per ASCE 7-16 Sections 2.4.1 and 2.4.5. Combinations involving reduced dead loads, live loads, are eliminated because they do not apply, or by inspection. The following load combinations remain:

1. D
2. D + L
3. D + S
5. D + 0.6W
8. D + 0.7Ev + 0.7 Eh

The shroud mast and monopole stresses are check for code conformance. The battery cabinet anchorage is checked. The H-Frame equipment is similar to previous configuration, so the stresses there will not change appreciably.

4 Conclusion

To the best of our knowledge and belief, the Existing Monopole is adequate to support the proposed loading.

5 Scope and Liability

1. This report is prepared with the information furnished to Ryka by our client. If the conditions of the site change, or if new information becomes available, the results of this report are not valid. Ryka should be notified so that the report can be updated and resubmitted.
2. This report is meant to show the level of conformance for the site with the referenced codes. No other assessment is implied.
3. Ryka has not performed invasive testing or inspection which might reveal corrosion, damage, or work not installed per plan. The contractor should report any of these occurrences upon discovery.
4. The contractor hired for construction of items included in this report are responsible for verifying that work described in previous plan sheets has been installed per plan.
5. Ryka has not engineered, tested, or inspected the manufacture of third party vendor items such as mounts, poles, and other support structures. We select equipment from vendors which provide their own engineering and quality control. Ryka cannot be responsible for defective hardware or supports which do not meet the published support capacity.
6. Ryka is not responsible for the conclusions, opinions and recommendations made by others based on the information contained herein.
7. It is assumed that the existing mounting structure is in good condition with no damage that could cause a reduced capacity.

A Appendix – Structural Calculations

SITE PARAMETERS:

Risk Category =	II	(Table 1-1)	Latitude =	47.1814	(USGS)
Site Soil Classification =	D	(Table 20.3-1)	Longitude =	-122.2965	(USGS)

MAPPED ACCELERATION PARAMETERS:

Mapped Parameter, Ss =	1.27	(USGS)
Mapped Parameter, S_1 =	0.438	(USGS)

MAPPED SPECTRAL RESPONSE ACCELERATION PARAMETERS:

Site Coefficient, F_a =	1.00g	(Table 11.4-1)
Site Coefficient, F_v =	1.562g	(Table 11.4-2)
$S_{MS} = F_a S_S$ =	1.27g	(Eq 11.4-4)
$S_{M1} = F_v S_1$ =	0.684g	(Eq 11.4-1)

DESIGN SPECTRAL RESPONSE PARAMETERS:

$S_{DS} = ⅔ S_{MS}$ =	0.847g	(Eq 11.4-3)
$S_{D1} = ⅔ S_{M1}$ =	0.456g	(Eq 11.4-4)

SESIMIC DESIGN CATEGORY

Seismic Design Category =	D	(Tables 11.6-1 and 11.6-2)

SEISMIC DESIGN FORCE FOR NONSTRUCTURAL COMPONENTS:

Average Structure Height, h =	78	ft
Height of Component, z =	73.5	ft
Importance Factor, I_e =	1.00	(Sec 13.1-3)
Response Mod. Factor, R_p =	2.5	(Table 13.5-1 or 13.6-1)
Amplification Factor, a_p =	1.0	(Table 13.6-1)
$F_{p\,max}$ =	1.355	(Eqn 13.3-2)
$F_{p\,min}$ =	0.254	(Eqn 13.3-3)
Seismic Design Force, F_p =	0.391	(Eqn 13.3-1)
Seismic Design Force, Fp =	0.391	(Eq 12.8-1)
Seismic Design Force, Fp =	0.274	(ASD)

DESCRIPTION: TIA 222-H Design Wind to Apputenances

DESIGN CRITERIA:

Risk Category =	II		(Table 2-3)
Exposure Category =	C		(Section 2.6.5)
Topographic Category =	1		(Section 2.6.6.2)
Base Elevation, z_s =	52	ft	
Crest Height, H =	0		
K_h =	None		
Height of Component, z =	73.5	ft	
Velocity Pressure Coeff., K_z =	1.19		(Section 2.6.5.2)
Topographic Factor, K_{zt} =	1.0		(Section 2.6.6.4)
Ground Elevation Factor, K_e =	1.00		(Section 2.6.8)
Directionality Factor, K_d =	0.95		(Section 16.6)
Shielding Factor, K_a =	0.90		(Section 16.6)
Gust Factor, Gh =	1.00		(Section 16.6)
Basic Wind Speed, V =	98	mph	(Section 2.6.4)
Velocity pressure, q_z =	27.7	psf	(Section 2.6.11.6)
Design Wind Force, F_A =	24.9	psf *(EPA)	
Wind Speed, V ice =	30	mph	(Section 2.6.4)
Velocity pressure, q_z =	2.59	psf	(Section 2.6.11.6)
Design Wind Force, F_A =	2.33	psf *(EPA)	
Wind Speed, V maintenance =	30	mph	(Section 16.3)
Velocity pressure, q_z =	2.59	psf	(Section 2.6.11.6)
Design Wind Force, F_A =	2.33	psf *(EPA)	

Item	Flat / Round	Dish / Panel	No Ice						Ice					
			Ca(n)			Ca(t)			Ca(n)			Ca(t)		
			2.5	7	25	2.5	7	25	2.5	7	25	2.5	7	25
BSA33R-U6A	F	0	1.2	1.4	2	0.59	0.69	0.85	1.2	1.4	2	0.7	0.8	1.2
TMAT1921B68-21-43 (E14R00P09)	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
2D4WHE-21	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
Nokia AEHC 2.5 GHz mMIMO	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
HCS 2.0 Pendant	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
RRH Nokia AHFIG	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
RRH Nokia AHLOA	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
48" Dia. X 20'-0" FRP Shroud	R	P	0.5	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6
HPL3 Battery Cabinet	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
HPL3 Equipment Cabinet	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
Cube-RL1003-1	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
CAC Model 200A PPC	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
Rooftop Junction Box	F	P	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2	1.2	1.4	2
3"x 72" S40 Stl Pipe	R	P	0.7	0.8	1.2	0.7	0.8	1.2	0.7	0.8	1.2	0.7	0.8	1.2
P36x 0.375 Stl Pipe	R	P	0.5	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6

Basic Wind Speed, V =	98 mph
Velocity Pressure Coeff., K_z =	1.19
Topographic Factor, K_{zt} =	1.00
Ground Elevation Factor, K_e =	1.00

No Ice Load Coefficients

Item	Height in	Width in	Depth in	Aspect (norm)	Aspect (tan)	C T 2-9	Ca (norm)	Ca (tan)	EPA (norm)	EPA (tan)
BSA33R-U6A	76.5	12.9	6.2	5.9	12.3	55.1	1.35	0.74	43.17	2.44
TMAT1921B68-21-43 (E14R00P09)	9.2	8.7	4.2	1.1	2.2	37.3	1.20	1.20	0.67	0.32
2D4WHE-21	96.0	22.8	7.4	4.2	13.0	65.8	1.28	1.60	19.40	7.89
Nokia AEHC 2.5 GHz mMIMO	38.2	21.5	5.9	1.8	6.5	52.4	1.20	1.38	6.84	2.15
HCS 2.0 Pendant	9.3	14.9	5.8	0.6	1.6	51.5	1.20	1.20	1.15	0.45
RRH Nokia AHFIG	28.7	12.9	5.6	2.2	5.1	49.8	1.20	1.32	3.09	1.47
RRH Nokia AHLOA	22.0	12.1	7.4	1.8	3.0	65.8	1.20	1.22	2.22	1.38
48" Dia. X 20'-0" FRP Shroud	240.0	48.0	48.0	5.0	5.0	426.5	0.56	0.56	44.44	44.44
HPL3 Battery Cabinet	60.4	30.0	31.6	2.0	1.9	280.8	1.20	1.20	15.10	15.91
HPL3 Equipment Cabinet	60.4	30.0	31.6	2.0	1.9	280.8	1.20	1.20	15.10	15.91
Cube-RL1003-1	26.3	22.9	20	1.1	1.3	177.7	1.20	1.20	5.02	4.38
CAC Model 200A PPC	39	20	10	2.0	3.9	88.9	1.20	1.26	6.50	3.42
Rooftop Junction Box	14	16	8	0.9	1.8	71.1	1.20	1.20	1.87	0.93
3"x 72" S40 Stl Pipe	72	3.5	3.5	20.6	20.6	31.1	1.10	1.10	1.93	1.93
P36x 0.375 Stl Pipe	696	36	36	19.3	19.3	319.9	0.60	0.60	104.40	104.40

Wind Speed, V ice =	30	mph
Velocity Pressure Coeff., K_z =	1.19	
Topographic Factor, K_{zt} =	1.00	
Ground Elevation Factor, K_e =	1.00	
Design Ice Thickness =	1.00	in

Ice Load Coefficients

Item	Height in	Width in	Depth in	Aspect (norm)	Aspect (tan)	C T 2-9	Ca (norm)	Ca (tan)	EPA (norm)	EPA (tan)
BSA33R-U6A	78.5	14.9	8.2	5.3	9.6	22.3	1.32	0.86	44.47	3.83
TMAT1921B68-21-43 (E14R00P09)	11.2	10.7	6.2	1.0	1.8	16.9	1.20	1.20	1.00	0.58
2D4WHE-21	98.0	24.8	9.4	4.0	10.4	25.6	1.26	1.51	66.24	9.69
Nokia AEHC 2.5 GHz mMIMO	40.2	23.5	7.9	1.7	5.1	21.5	1.20	1.32	7.87	2.90
HCS 2.0 Pendant	11.3	16.9	7.8	0.7	1.5	21.2	1.20	1.20	0.84	0.73
RRH Nokia AHFIG	30.7	14.9	7.6	2.1	4.0	20.7	1.20	1.27	3.81	2.06
RRH Nokia AHLOA	24.0	14.1	9.4	1.7	2.6	25.6	1.20	1.20	3.77	1.88
48" Dia. X 20'-0" FRP Shroud	242.0	50.0	50.0	4.8	4.8	136.0	0.55	0.55	46.38	46.38
HPL3 Battery Cabinet	62.4	32.0	33.6	2.0	1.9	91.4	1.20	1.20	25.48	17.47
HPL3 Equipment Cabinet	62.4	32.0	33.6	2.0	1.9	91.4	1.20	1.20	16.64	17.47
Cube-RL1003-1	28.3	24.9	22	1.1	1.3	59.8	1.20	1.20	5.24	5.19
CAC Model 200A PPC	41	22	12	1.9	3.4	32.6	1.20	1.24	7.52	4.24
Rooftop Junction Box	16	18	10	0.9	1.6	27.2	1.20	1.20	1.68	1.33
3"x 72" S40 Stl Pipe	74	5.5	5.5	13.5	13.5	15.0	0.94	0.94	2.67	2.67
P36x 0.375 Stl Pipe	698	38	38	18.4	18.4	103.4	0.60	0.60	1,594.37	110.52

Basic Wind Speed, V =	30	mph
Velocity Pressure Coeff., K_z =	1.19	
Topographic Factor, K_{zt} =	1.00	
Ground Elevation Factor, K_e =	1.00	

Maintenance Load Coefficients

Item	Height in	Width in	Depth in	Aspect (norm)	Aspect (tan)	C T 2-9	Ca (norm)	Ca (tan)	EPA (norm)	EPA (tan)
BSA33R-U6A	76.5	12.9	6.2	6.1	12.3	16.9	1.66	1.58	55.90	5.33
TMAT1921B68-21-43 (E14R00P09)	9.2	8.7	4.2	1.1	2.2	11.4	1.20	1.20	0.67	0.32
2D4WHE-21	96.0	22.8	7.4	4.2	13.0	20.1	1.28	1.60	64.14	7.89
Nokia AEHC 2.5 GHz mMIMO	38.2	21.5	5.9	1.8	6.5	16.0	1.20	1.38	6.84	2.15
HCS 2.0 Pendant	9.3	14.9	5.8	0.6	1.6	15.8	1.20	1.20	0.57	0.45
RRH Nokia AHFIG	28.7	12.9	5.6	2.2	5.1	15.2	1.20	1.32	3.09	1.47
RRH Nokia AHLOA	22.0	12.1	7.4	1.8	3.0	20.1	1.20	1.22	3.17	1.38
48" Dia. X 20'-0" FRP Shroud	240.0	48.0	48.0	5.0	5.0	130.6	0.56	0.56	44.44	44.44
HPL3 Battery Cabinet	60.4	30.0	31.6	2.0	1.9	86.0	1.20	1.20	23.88	15.91
HPL3 Equipment Cabinet	60.4	30.0	31.6	2.0	1.9	86.0	1.20	1.20	15.10	15.91
Cube-RL1003-1	26.3	22.9	20	1.1	1.3	54.4	1.20	1.20	4.53	4.38
CAC Model 200A PPC	39	20	10	2.0	3.9	27.2	1.20	1.26	6.50	3.42
Rooftop Junction Box	14	16	8	0.9	1.8	21.8	1.20	1.20	1.28	0.93
3"x 72" S40 Stl Pipe	72	3.5	3.5	20.6	20.6	9.5	1.10	1.10	1.93	1.93
P36x 0.375 Stl Pipe	696	36	36	19.3	19.3	97.9	0.60	0.60	1,585.25	104.40

		Fp =	0.274	W		Velocity pressure, q_z basic =	27.7	psf		
		S_{DS} =	0.847	g		Velocity pressure, q_z ice =	2.59	psf		
						Velocity pressure, q_z maintenance =	2.59	psf		
		Design Ice Thickness =	1.00	in		Shielding Factor, K_a =	0.90			
		Ice Weight =	56.0	pcf		Gust Factor, Gh =	1.00			

Applied Forces (lbs)										
Item	No Ice					Ice			Maintenance	
	Weight	Eh	Ev	F_{no}	F_{to}	Weight	F_{ni}	F_{ti}	F_{nm}	F_{tm}
BSA33R-U6A	45.0	12.3	7.6	1,074.4	60.6	157.5	103.7	8.9	130.39	12.44
TMAT1921B68-21-43 (E14R00P09)	16.0	4.4	2.7	16.6	8.0	29.2	2.3	1.3	1.56	0.75
2D4WHE-21	109.1	29.8	18.5	482.7	196.3	324.6	154.5	22.6	149.60	18.40
Nokia AEHC 2.5 GHz mMIMO	108.0	29.5	18.3	170.3	53.6	192.8	18.4	6.8	15.96	5.03
HCS 2.0 Pendant	8.8	2.4	1.5	28.7	11.2	30.9	1.9	1.7	1.32	1.05
RRH Nokia AHFIG	70.5	19.3	11.9	76.8	36.6	116.0	8.9	4.8	7.20	3.43
RRH Nokia AHLOA	83.8	22.9	14.2	55.2	34.4	123.0	8.8	4.4	7.39	3.22
48" Dia. X 20'-0" FRP Shroud	628.3	171.9	106.4	1,106.2	1,106.2	1,952.9	108.2	108.2	103.66	103.66
HPL3 Battery Cabinet	2,465.0	674.3	417.4	375.8	395.9	2,783.7	59.4	40.8	55.69	37.10
HPL3 Equipment Cabinet	630.0	172.3	106.7	375.8	395.9	948.7	38.8	40.8	35.22	37.10
Cube-RL1003-1	90.0	24.6	15.2	124.9	109.1	202.0	12.2	12.1	10.56	10.22
CAC Model 200A PPC	75.0	20.5	12.7	161.8	85.1	173.0	17.5	9.9	15.16	7.97
Rooftop Junction Box	21.9	6.0	3.7	46.5	23.2	57.2	3.9	3.1	2.99	2.18
3"x 72" S40 Stl Pipe	45.5	12.4	7.7	48.0	48.0	80.0	6.2	6.2	4.50	4.50
P36x 0.375 Stl Pipe	8,283.1	2265.7	1402.6	2,598.4	2,598.4	10,978.4	3,718.6	257.8	3,697.34	243.50

1 Sector Loads (lbs)										
Item	No Ice			Ice			Maintenance			
	Weight	Fno	Fto	Weight	Fno	Fto	Fno	Fto		
Existing 1 Sector Equipment										
BSA33R-U6A	45.0	1,074.4	60.63	157.54	103.71	8.94	130.39	12.44		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
Totals	**109**	**1,141**	**93**	**274**	**113**	**14**	**137**	**15**	**0**	**0**
Proposed Proposed Equipment Sector 1 and 4 Sector Equipment										
2D4WHE-21	109.1	482.7	196.34	324.57	154.49	22.59	149.60	18.40		
Nokia AEHC 2.5 GHz mMIMO	108.0	170.3	53.63	192.83	18.36	6.76	15.96	5.03		
HCS 2.0 Pendant	8.8	28.7	11.17	30.93	1.95	1.71	1.32	1.05		
RRH Nokia AHFIG	70.5	76.8	36.58	115.97	8.89	4.79	7.20	3.43		
RRH Nokia AHFIG	70.5	76.8	36.58	115.97	8.89	4.79	7.20	3.43		
RRH Nokia AHLOA	83.8	55.2	34.36	123.05	8.79	4.39	7.39	3.22		
Totals	**342**	**408**	**172**	**579**	**47**	**22**	**39**	**16**	**0**	**0**

2 Sector Loads (lbs)										
Item	No Ice			Ice			Maintenance			
	Weight	Fno	Fto	Weight	Fno	Fto	Fno	Fto		
Existing 2 Sector Equipment										
BSA33R-U6A	45.0	1,074.4	60.63	157.54	103.71	8.94	130.39	12.44		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
Totals	**109**	**1,141**	**93**	**274**	**113**	**14**	**137**	**15**	**0**	**0**
Proposed Proposed Equipment Sector 2 and 5 Sector Equipment										
2D4WHE-21	109.1	482.7	196.34	324.57	154.49	22.59	149.60	18.40		
Nokia AEHC 2.5 GHz mMIMO	108.0	170.3	53.63	192.83	18.36	6.76	15.96	5.03		
RRH Nokia AHFIG	70.5	76.8	36.58	115.97	8.89	4.79	7.20	3.43		
RRH Nokia AHFIG	70.5	76.8	36.58	115.97	8.89	4.79	7.20	3.43		
RRH Nokia AHLOA	83.8	55.2	34.36	123.05	8.79	4.39	7.39	3.22		
HCS 2.0 Pendant	8.8	28.7	11.17	30.93	1.95	1.71	1.32	1.05		
Totals	**342**	**408**	**172**	**579**	**47**	**22**	**39**	**16**	**0**	**0**

3 Sector Loads (lbs)										
Item	No Ice			Ice			Maintenance			
	Weight	Fno	Fto	Weight	Fno	Fto	Fno	Fto		
Existing 3 Sector Equipment										
BSA33R-U6A	45.0	1,074.4	60.63	157.54	103.71	8.94	130.39	12.44		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
TMAT1921B68-21-43	16.0	16.6	8.01	29.18	2.33	1.35	1.56	0.75		
Totals	**109**	**1,141**	**93**	**274**	**113**	**14**	**137**	**15**	**0**	**0**
Proposed Proposed Equipment Sector 3 and 6 Sector Equipment										
2D4WHE-21	109.1	482.7	196.34	324.57	154.49	22.59	149.60	18.40		
Nokia AEHC 2.5 GHz mMIMO	108.0	170.3	53.63	192.83	18.36	6.76	15.96	5.03		
RRH Nokia AHFIG	70.5	76.8	36.58	115.97	8.89	4.79	7.20	3.43		
RRH Nokia AHFIG	70.5	76.8	36.58	115.97	8.89	4.79	7.20	3.43		
RRH Nokia AHLOA	83.8	55.2	34.36	123.05	8.79	4.39	7.39	3.22		
HCS 2.0 Pendant	8.8	28.7	11.17	30.93	1.95	1.71	1.32	1.05		
Totals	**342**	**408**	**172**	**579**	**47**	**22**	**39**	**16**	**0**	**0**

DESCRIPTION: Antenna Support Mast Stress Analysis

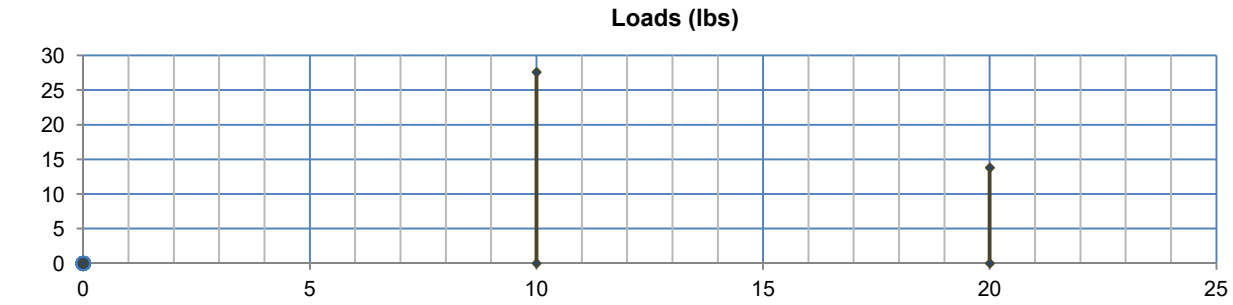
BEAM AND LOADING ATTRIBUTES:

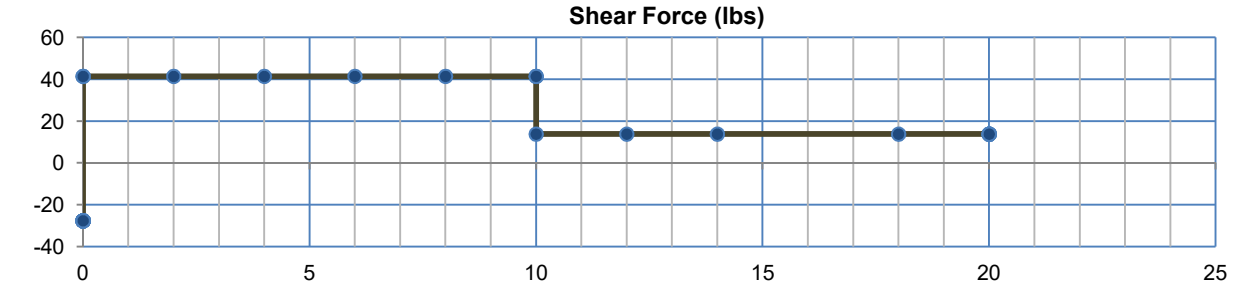
Beam Segments	
x End	EI
0	4,807,301
20	4,807,301
0	0
0	0

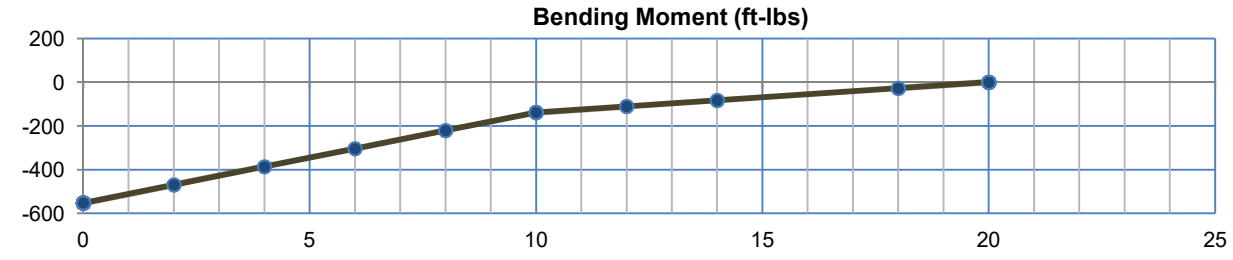
Supports
x
-20
0
0
0
0

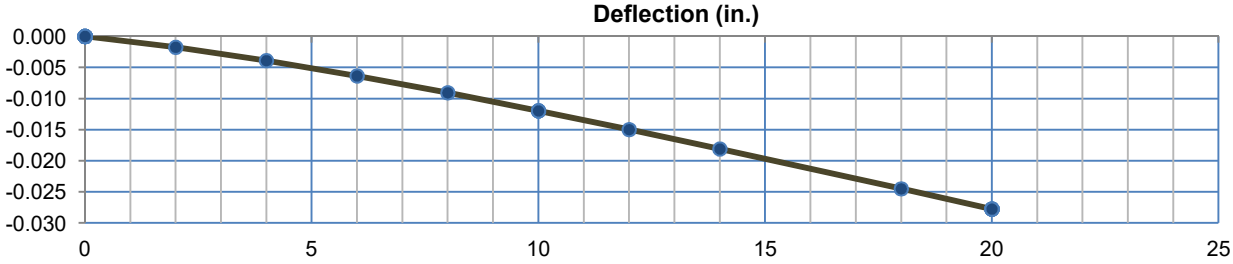
Point Loads		
x	lbs	Moment
10.0	-27.606	0
20.0	-13.803	0
0	0	0
0	0	0
0	0	0

Distributed Loads			
x Start	x End	lbs	lbs
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00









DESCRIPTION: Antenna Support Mast Stress Analysis

BEAM PROPERTIES: Beam shape = **P 10" Sch 100**

A =	22.658	in^2	Sx =	53.293	in^3
Weight =	77.030	plf	Sy =	53.293	in^3
O.O =	10.8	in	Ix =	286.449	in^4
			Iy =	286.449	in^4
			rx =	3.556	in.
			ry =	3.556	in.

MATERIAL PROPERTIES:

E =	29,000	ksi
F_y =	35,000	psi

BEAM LOADING:

Unsupported Length, L =	240	in.
Moment, M =	0.552	kip-ft
=	6,625	in-lbs
Shear, V =	0.041	kips
Deflection, Δ =	0.028	in.
Span Length / Deflection =	8,647	

BEAM STRESS:

Bending stress, f_{bx} =	124	psi	
Allowable Bending , $F_{bx} = 0.6\ F_y$ =	21,000	psi	
Required S_x =	0.3	in^3	**O.K.**
Shear Stress fv =	2	psi	
Allowable Shear Stress = 0.4 Fy =	14,000	psi	**O.K.**
Required Area, A =	0.023	in^2	

SUMMARY:

Utilization = **0.59%** of capacity

DESCRIPTION: Monopole Stress Analysis

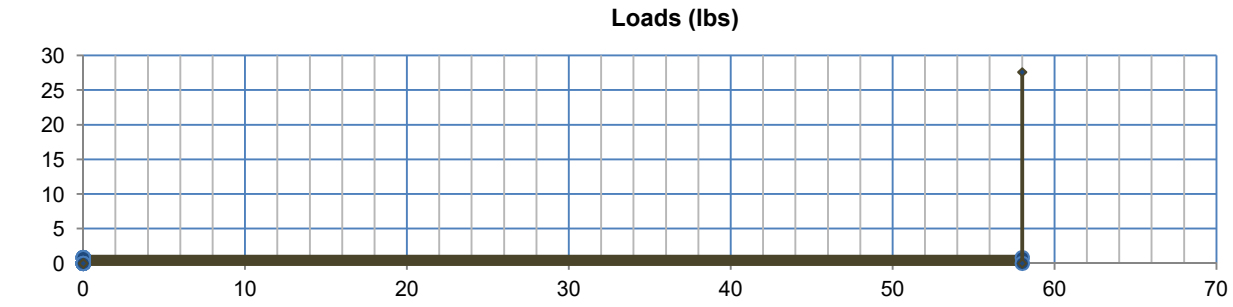
BEAM AND LOADING ATTRIBUTES:

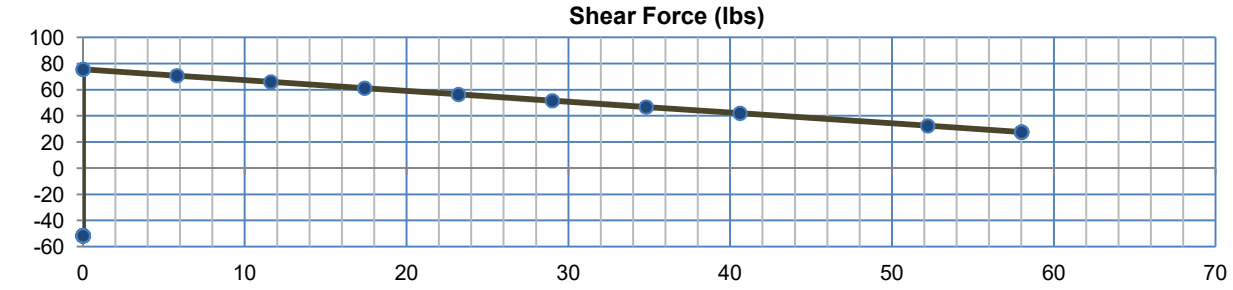
Beam Segments	
x End	EI
0	111,752,732
58	111,752,732
0	0
0	0

Supports
x
-58
0
0
0
0

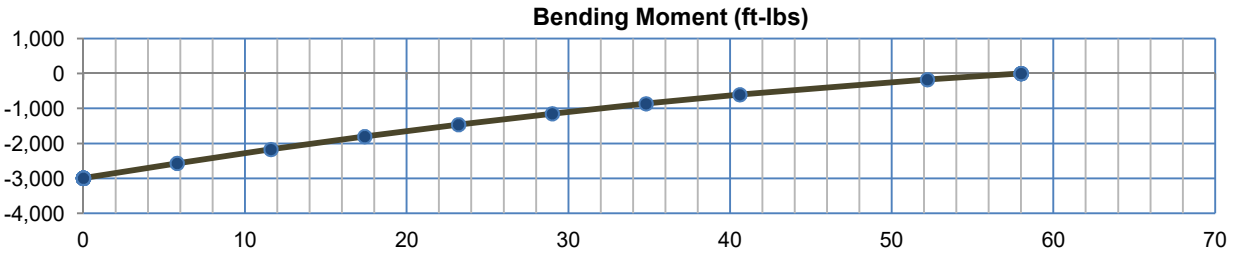
Point Loads		
x	lbs	Moment
58.0	-27.606	0
0.0	0	0
0	0	0
0	0	0
0	0	0

Distributed Loads			
x Start	x End	lbs	lbs
0.00	58.00	-0.83	-0.83
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

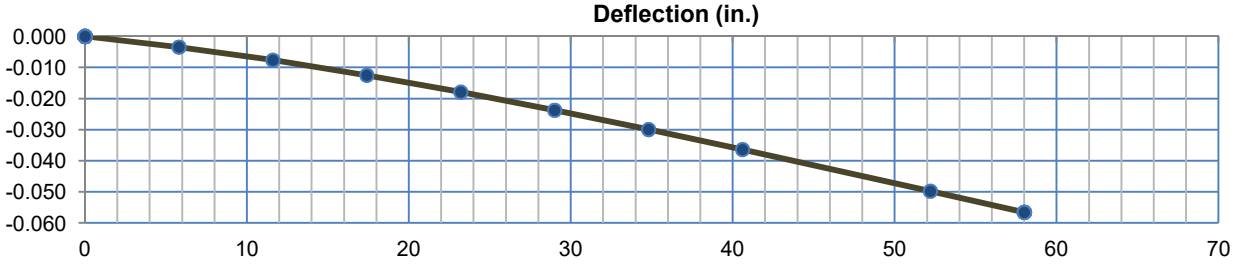




Max. = 76 lbs



Max. = 2993 ft-lbs



Max. = 0.0566 in.

DESCRIPTION: Monopole Stress Analysis

BEAM PROPERTIES: Beam shape = **P36" x 3/8"**

A =	42.0	in^2	Sx =	370	in^3
Weight =	143	plf	Sy =	370	in^3
O.O =	36.0	in	Ix =	6,659	in^4
			Iy =	6,659	in^4
			rx =	12.596	in.
			ry =	12.596	in.

MATERIAL PROPERTIES:

E =	29,000	ksi
F_y =	35,000	psi

BEAM LOADING:

Unsupported Length, L =	696	in.	
Moment, M =	3	kip-ft	
=	35,911	in-lbs	
Shear, V =	0.076	kips	
Deflection, Δ =	0.057	in.	
Span Length / Deflection =	12,305		

BEAM STRESS:

Bending stress, f_{bx} =	97	psi	
Allowable Bending , $F_{bx} = 0.6\ F_y$ =	21,000	psi	
Required S_x =	1.7	in^3	**O.K.**
Shear Stress fv =	2	psi	
Allowable Shear Stress = 0.4 Fy =	14,000	psi	**O.K.**
Required Area, A =	0.042	in^2	

SUMMARY:

Utilization = **0.46%** of capacity

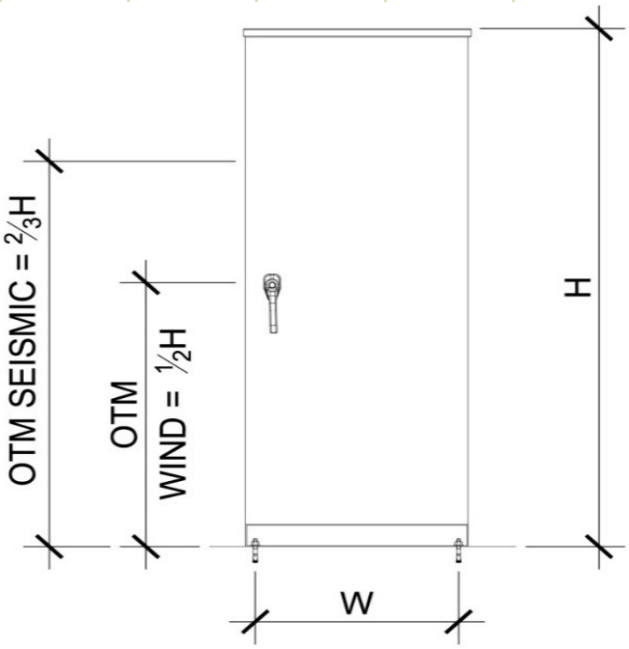
Lateral Code = **ASCE 7**

Applied Forces (lbs)									
Item	Height	Width (in)	Depth	Weight	Eh	Ev	F_{no}	F_{to}	
HPL3 Battery Cabinet	60.4	30.0	30.0	2,465	809	501	221	232	

Total Weight = 2,465 lbs

Total Overturning Moment = 32,581 in-lbs
Tension to Each of (2) Bolts = 543 lbs
Shear to Each Bolt = 202 lbs

M12 HSL 3 Anchor Allowable Tension = 3,270 lbs
M12 HSL 3 Anchor Allowable Shear = 9,390 lbs



SUMMARY

Utilization = **18.8%** of capacity

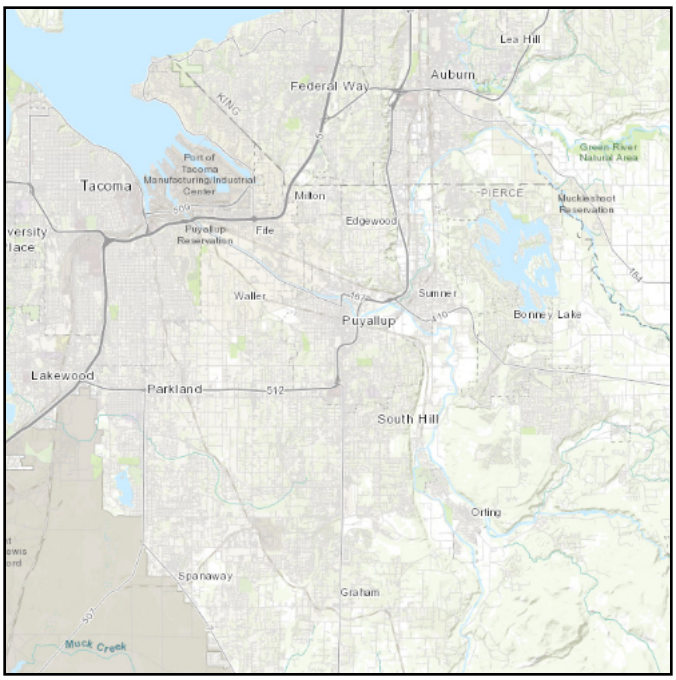
B Appendix – Referenced Documents

ASCE 7 Hazards Report

Address:
902 S Meridian
Puyallup, Washington
98371

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 41.55 ft (NAVD 88)
Latitude: 47.182027
Longitude: -122.296465



Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 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: Mon Jan 24 2022

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

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

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.27	S_{D1} :	N/A
S_1 :	0.438	T_L :	6
F_a :	1	PGA :	0.5
F_v :	N/A	PGA_M :	0.55
S_{MS} :	1.27	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.847	C_v :	1.354

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

Data Accessed: Mon Jan 24 2022

Date Source: USGS Seismic Design Maps

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	25 F
Gust Speed	30 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Mon Jan 24 2022

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

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

Philadelphia Regional Center
2450 Wheatsheaf Lane
Philadelphia, PA 19137
O 215-831-0700
F 215-533-1645
E sales@tiogapipe.com

Houston Regional Center
14950 Heathrow Forest Parkway,
Suite 390, Houston, TX 77032
O 713-433-2111
F 281-397-0132
E sales@tiogapipe.com

Chattanooga Regional Center
1301 Riverfront Parkway, Suite 108
Chattanooga, TN 37402
O 423-899-3398
F 423-899-9695
E sales@tiogapipe.com

PIPE DIMENSIONS AND WEIGHTS

Available in commercial and nuclear

U.S./METRIC

NOMINAL PIPE SIZE	OD	SCHEDULE DESIGNATIONS			WALL THICKNESS		WEIGHT		ID	
INCH MM	INCH MM	ASME			INCH	MM	LBS/ FOOT	KG/ METER	INCH	MM
1/8 6	0.405 10.3	10 STD XS	40 80	10S 40S 80S	0.049 0.068 0.095	1.24 1.73 2.41	0.19 0.24 0.31	0.28 0.37 0.47	0.307 0.269 0.215	7.82 6.84 5.84
1/4 8	0.540 13.7	10 STD XS	40 80	10S 40S 80S	0.065 0.088 0.119	1.65 2.24 3.02	0.33 0.43 0.54	0.49 0.63 0.80	0.410 0.364 0.302	10.40 9.22 7.66
3/8 10	0.675 17.1	10 STD XS	40 80	10S 40S 80S	0.065 0.091 0.126	1.65 2.31 3.20	0.42 0.57 0.74	0.63 0.84 1.10	0.545 0.493 0.423	13.80 12.48 10.70
1/2 15	0.840 21.3	5 10 STD XS 160 XX	40 80	5S 10S 40S 80S	0.065 0.083 0.109 0.147 0.188 0.294	1.65 2.11 2.77 3.73 4.78 7.47	0.54 0.67 0.85 1.09 1.31 1.72	0.80 1.00 1.27 1.62 1.95 2.55	0.710 0.674 0.622 0.546 0.464 0.252	18.00 17.08 15.76 13.84 11.74 6.36
3/4 20	1.050 26.7	5 10 STD XS 160 XX	40 80	5S 10S 40S 80S	0.065 0.083 0.113 0.154 0.219 0.308	1.65 2.11 2.87 3.91 5.56 7.82	0.69 0.86 1.13 1.48 1.95 2.44	1.03 1.28 1.69 2.20 2.90 3.64	0.920 0.884 0.824 0.742 0.612 0.434	23.40 22.48 20.96 18.88 15.58 11.06
1 25	1.315 33.4	5 10 STD XS 160 XX	40 80	5S 10S 40S 80S	0.065 0.109 0.133 0.179 0.250 0.358	1.65 2.77 3.38 4.55 6.35 9.09	0.87 1.41 1.68 2.17 2.85 3.66	1.29 2.09 2.50 3.24 4.24 5.45	1.185 1.097 1.049 0.957 0.815 0.599	30.10 27.86 26.64 24.30 20.70 15.22
1-1/4 32	1.660 42.2	5 10 STD XS 160 XX	40 80	5S 10S 40S 80S	0.065 0.109 0.140 0.191 0.250 0.382	1.65 2.77 3.56 4.85 6.35 9.70	1.11 1.81 2.27 3.00 3.77 5.22	1.65 2.69 3.39 4.47 5.61 7.77	1.530 1.442 1.380 1.278 1.160 0.896	38.90 36.66 35.08 32.50 29.50 22.80
1-1/2 40	1.900 48.3	5 10 STD XS 160 XX	40 80	5S 10S 40S 80S	0.065 0.109 0.145 0.200 0.281 0.400	1.65 2.77 3.68 5.08 7.14 10.15	1.28 2.09 2.72 3.63 4.86 6.41	1.90 3.11 4.05 5.41 7.25 9.55	1.770 1.682 1.610 1.500 1.338 1.100	45.00 42.76 40.94 38.14 34.02 28.00
2 50	2.375 60.3	5 10 STD XS 160 XX	40 80	5S 10S 40S 80S	0.065 0.109 0.154 0.218 0.344 0.436	1.65 2.77 3.91 5.54 8.74 11.07	1.61 2.64 3.66 5.03 7.47 9.04	2.39 3.93 5.44 7.48 11.11 13.44	2.245 2.157 2.067 1.939 1.687 1.503	57.00 54.76 52.48 49.22 42.82 38.16
2-1/2 65	2.875 73.0	5 10 STD XS 160 XX	40 80	5S 10S 40S 80S	0.083 0.120 0.203 0.276 0.375 0.552	2.11 3.05 5.16 7.01 9.53 14.02	2.48 3.53 5.80 7.67 10.02 13.71	3.69 5.26 8.63 11.41 14.92 20.39	2.709 2.635 2.469 2.323 2.125 1.771	68.78 66.90 62.68 58.98 53.94 44.96
3 80	3.500 88.9	5 10 STD XS 160 XX	40 80	5S 10S 40S 80S	0.083 0.120 0.216 0.300 0.438 0.600	2.11 3.05 5.49 7.62 11.13 15.24	3.03 4.34 7.58 10.26 14.34 18.60	4.52 6.46 11.29 15.27 21.35 27.68	3.334 3.260 3.068 2.900 2.624 2.300	84.68 82.80 77.92 73.66 66.64 58.42
3-1/2 90	4.000 101.6	5 10 STD XS XX	40 80	5S 10S 40S 80S	0.083 0.120 0.226 0.318 0.636	2.11 3.05 5.74 8.08 16.15	3.48 4.98 9.12 12.52 22.87	5.18 7.41 13.57 18.64 34.03	3.834 3.760 3.548 3.364 2.728	97.38 95.50 90.12 85.44 69.30
4 100	4.500 114.3	5 10 STD XS 120 140 XX	40 80	5S 10S 40S 80S	0.083 0.120 0.156 0.188 0.237 0.337 0.438 0.531 0.674	2.11 3.05 3.96 4.78 6.02 8.56 11.13 13.49 17.12	3.92 5.62 7.24 8.67 10.80 15.00 19.02 22.53 27.57	5.84 8.37 10.78 12.91 16.08 22.32 28.32 33.54 41.03	4.334 4.260 4.188 4.124 4.026 3.826 3.624 3.438 3.152	110.08 108.20 106.38 104.74 102.26 97.18 92.04 87.32 80.06
4-1/2 115	5.000 127.0	STD XS XX	40 80	40S 80S	0.247 0.355 0.710	6.27 9.02 18.03	12.55 17.63 32.56	18.67 26.24 48.45	4.506 4.290 3.580	114.46 108.96 90.94

NOMINAL PIPE SIZE	OD	SCHEDULE DESIGNATIONS			WALL THICKNESS		WEIGHT		ID	
INCH MM	INCH MM	ASME			INCH	MM	LBS/ FOOT	KG/ METER	INCH	MM
5 125	5.563 141.3	5 10 STD XS 120 160 XX	40 80	5S 10S 40S 80S	0.109 0.134 0.258 0.375 0.500 0.625 0.750	2.77 3.40 6.55 9.53 12.70 15.88 19.05	6.36 7.78 14.63 20.80 27.06 32.99 38.59	9.46 11.56 21.77 30.97 40.28 49.12 57.43	5.345 5.295 5.047 4.813 4.563 4.313 4.063	135.76 134.50 128.20 122.24 115.90 109.54 103.20
6 150	6.625 168.3	5 10 STD XS 120 160 XX	40 80	5S 10S 40S 80S	0.109 0.134 0.188 0.280 0.432 0.562 0.719 0.864	2.77 3.40 4.78 7.11 10.97 14.27 18.26 21.95	7.59 9.30 12.94 18.99 28.60 36.43 45.39 53.21	11.31 13.83 19.28 28.26 42.56 54.21 67.57 79.22	6.407 6.357 6.249 6.065 5.761 5.501 5.187 4.897	162.76 161.50 158.74 154.08 146.36 139.76 131.78 124.40
7 175	7.625 193.7	STD XS XX	40 80	40S 80S	0.301 0.500 0.875	7.65 12.70 22.23	23.57 38.08 63.14	35.10 56.69 94.00	7.023 6.625 5.875	178.40 168.30 149.24
8 200	8.625 219.1	10 20 30 STD 60 XS 100 120 140 XX 160	40 80	5S 10S 40S 80S	0.109 0.148 0.250 0.277 0.322 0.406 0.500 0.594 0.719 0.812 0.875 0.906	2.77 3.76 6.35 7.04 8.18 10.31 12.70 15.09 18.26 20.62 22.23 23.01	9.92 13.41 22.38 24.72 28.58 35.67 43.43 51.00 60.77 67.82 72.49 74.76	14.78 19.97 33.32 36.82 42.55 53.09 64.64 75.92 90.44 100.93 107.93 111.27	8.407 8.329 8.125 8.071 7.981 7.813 7.625 7.437 7.187 7.001 6.875 6.813	213.56 211.58 206.40 205.02 202.74 198.48 193.70 188.92 182.58 177.86 174.64 173.08
9 225	9.625 244.5	STD XS XX	40 80	40S 80S	0.342 0.500 0.875	8.69 12.70 22.23	33.94 48.77 81.85	50.54 72.60 121.85	8.941 8.625 7.875	227.12 219.10 200.04
10 250	10.750 273.0	20 30 STD XS 80 100 120 140 160	40 60 XX	5S 10S 40S 80S	0.134 0.165 0.188 0.250 0.307 0.365 0.500 0.594 0.719 0.844 1.000 1.125	3.40 4.19 4.78 6.35 7.80 9.27 12.70 15.09 18.26 21.44 25.40 28.58	15.21 18.67 21.23 28.06 34.27 40.52 54.79 64.49 77.10 89.38 104.23 115.75	22.61 27.78 31.62 41.76 51.01 60.29 81.53 95.98 114.71 133.01 155.10 172.27	10.482 10.420 10.374 10.250 10.136 10.020 9.750 9.562 9.312 9.062 8.750 8.500	266.20 264.62 263.44 260.30 257.40 254.46 247.60 242.82 236.48 230.12 222.20 215.84
11 275	11.750 298.5	STD XS XX	40 80	40S 80S	0.375 0.500 0.875	9.53 12.70 22.23	45.60 60.13 101.72	67.91 89.51 151.46	11.000 10.750 10.000	279.44 273.10 254.04
12 300	12.750 323.8	20 30 STD 40 XS 60 80 100 120 140 160	40S 80S XX	5S 10S 40S 80S	0.156 0.180 0.188 0.250 0.330 0.375 0.406 0.500 0.562 0.688 0.844 1.000 1.125 1.312	3.96 4.57 4.78 6.35 8.38 9.53 10.31 12.70 14.27 17.48 21.44 25.40 28.58 33.32	21.00 24.19 25.25 33.41 43.81 49.61 53.57 65.48 73.22 88.71 107.42 125.61 139.81 160.42	31.24 35.98 37.61 49.71 65.19 73.86 79.71 97.44 108.93 132.05 159.87 186.92 208.08 238.69	12.438 12.390 12.374 12.250 12.090 12.000 11.938 11.750 11.626 11.374 11.062 10.750 10.500 10.126	315.88 314.66 314.24 311.10 307.04 304.74 303.18 298.40 295.26 288.84 280.92 273.00 266.64 257.16
14 350	14.000 355.6	10 20 STD 40 XS 60 80 100 120 140 160	30 40S 80S	10S	0.188 0.250 0.312 0.375 0.438 0.500 0.594 0.750 0.938 1.094 1.250 1.406	4.78 6.35 7.92 9.53 11.13 12.70 15.09 19.05 23.83 27.79 31.75 35.71	27.76 36.75 45.65 54.62 63.50 72.16 85.13 106.23 130.98 150.93 170.37 189.29	41.36 54.69 67.91 81.33 94.55 107.40 126.72 158.11 194.98 224.66 253.58 281.72	13.624 13.500 13.376 13.250 13.124 13.000 12.812 12.500 12.124 11.812 11.500 11.188	346.04 342.90 339.76 336.54 333.34 330.20 325.42 317.50 307.94 300.02 292.10 284.18

NOMINAL PIPE SIZE	OD	SCHEDULE DESIGNATIONS	WALL THICKNESS		WEIGHT		ID	
INCH MM	INCH MM	ASME	INCH	MM	LBS/ FOOT	KG/ METER	INCH	MM
16 400	16.000 406.4	10S	0.188	4.78	31.78	47.34	15.624	396.84
		10	0.250	6.35	42.09	62.65	15.500	393.70
		20	0.312	7.92	52.32	77.83	15.376	390.56
		STD 30 40S	0.375	9.53	62.64	93.27	15.250	387.34
		XS 40 80S	0.500	12.70	82.85	123.31	15.000	381.00
		60	0.656	16.66	107.60	160.13	14.688	373.08
		80	0.844	21.44	136.74	203.54	14.312	363.52
		100	1.031	26.19	164.98	245.57	13.938	354.02
		120	1.219	30.96	192.61	286.66	13.562	344.48
		140	1.438	36.53	223.85	333.21	13.124	333.34
		160	1.594	40.49	245.48	365.38	12.812	325.42
18 450	18.000 457	10S	0.188	4.78	35.80	53.31	17.624	447.44
		10	0.250	6.35	47.44	70.57	17.500	444.30
		20	0.312	7.92	58.99	87.71	17.376	441.16
		STD 40S	0.375	9.53	70.65	105.17	17.250	437.94
		30	0.438	11.13	82.23	122.38	17.124	434.74
		XS 80S	0.500	12.70	93.54	139.16	17.000	431.60
		40	0.562	14.27	104.76	155.81	16.876	428.46
		60	0.750	19.05	138.30	205.75	16.500	418.90
		80	0.938	23.83	171.08	254.57	16.124	409.34
		100	1.156	29.36	208.15	309.64	15.688	398.28
		120	1.375	34.93	244.37	363.58	15.250	387.14
		140	1.562	39.67	274.48	408.28	14.876	377.66
		160	1.781	45.24	308.79	459.39	14.438	366.52
20 500	20.000 508	10S	0.218	5.54	46.10	68.61	19.564	496.92
		10	0.250	6.35	52.78	78.56	19.500	495.30
		STD 20 40S	0.375	9.53	78.67	117.15	19.250	488.94
		XS 30 80S	0.500	12.70	104.23	155.13	19.000	482.60
		40	0.594	15.09	123.23	183.43	18.812	477.82
		60	0.812	20.62	166.56	247.84	18.376	466.76
		80	1.031	26.19	209.06	311.19	17.938	455.62
		100	1.281	32.54	256.34	381.55	17.438	442.92
		120	1.500	38.10	296.65	441.52	17.000	431.80
		140	1.750	44.45	341.41	508.15	16.500	419.10
		160	1.969	50.01	379.53	564.85	16.062	407.98
22 550	22.000 559	10S	0.218	5.54	50.76	75.55	21.564	547.92
		10	0.250	6.35	58.13	86.55	21.500	546.30
		STD 20 40S	0.375	9.53	86.69	129.14	21.250	539.94
		XS 30 80S	0.500	12.70	114.92	171.10	21.000	533.60
		60	0.875	22.23	197.60	294.27	20.250	514.54
		80	1.125	28.58	251.05	373.85	19.750	501.84
		100	1.375	34.93	303.16	451.45	19.250	489.14
		120	1.625	41.28	353.94	527.05	18.750	476.44
		140	1.875	47.63	403.38	600.67	18.250	463.74
		160	2.125	53.98	451.49	672.30	17.750	451.04

NOMINAL PIPE SIZE	OD	SCHEDULE DESIGNATIONS	WALL THICKNESS		WEIGHT		ID	
INCH MM	INCH MM	ASME	INCH	MM	LBS/ FOOT	KG/ METER	INCH	MM
24 600	24.000 610	10 10S	0.250	6.35	63.47	94.53	23.500	597.30
		STD 20 40S	0.375	9.53	94.71	141.12	23.250	590.94
		XS 80S	0.500	12.70	125.61	187.07	23.000	584.60
		30	0.562	14.27	140.81	209.65	22.876	581.46
		40	0.688	17.48	171.45	255.43	22.624	575.04
		60	0.969	24.61	238.57	355.28	22.062	560.78
		80	1.219	30.96	296.86	442.11	21.562	548.08
		100	1.531	38.89	367.74	547.74	20.938	532.22
		120	1.812	46.02	429.79	640.07	20.376	517.96
		140	2.062	52.37	483.57	720.19	19.876	505.26
		160	2.344	59.54	542.64	808.27	19.312	490.92
26 650	26.000 660	10	0.312	7.92	85.68	127.36	25.376	644.16
		STD 40S	0.375	9.53	102.72	152.88	25.250	640.94
		XS 80S	0.500	12.70	136.30	202.74	25.000	634.60
28 700	28.000 711	10	0.312	7.92	92.35	137.32	27.376	695.16
		STD 40S	0.375	9.53	110.74	164.86	27.250	691.94
		XS 20 80S	0.500	12.70	146.99	218.71	27.000	685.60
		30	0.625	15.88	182.90	272.23	26.750	679.24
30 750	30.000 762	10	0.312	7.92	99.02	147.29	29.376	746.16
		STD 40S	0.375	9.53	118.76	176.85	29.250	742.94
		XS 20 80S	0.500	12.70	157.68	234.68	29.000	736.60
		30	0.625	15.88	196.26	292.20	28.750	730.24
32 800	32.000 813	10	0.312	7.92	105.69	157.25	31.376	797.16
		STD	0.375	9.53	126.78	188.83	31.250	793.94
		XS 20	0.500	12.70	168.37	250.65	31.000	787.60
		30	0.625	15.88	209.62	312.17	30.750	781.24
		40	0.688	17.48	230.29	342.94	30.624	778.04
34 850	34.000 864	10	0.312	7.92	112.36	167.21	33.376	848.16
		STD	0.375	9.53	134.79	200.82	33.250	844.94
		XS 20	0.500	12.70	179.06	266.63	33.000	838.60
		30	0.625	15.88	222.99	332.14	32.750	832.24
		40	0.688	17.48	245.00	364.92	32.624	829.04
36 900	36.000 914	10	0.312	7.92	119.03	176.97	35.376	898.16
		STD	0.375	9.53	142.81	212.57	35.250	894.94
		XS	0.500	12.70	189.75	282.29	35.000	888.60
42 1050	42.000 1067	STD	0.375	9.53	166.86	248.53	41.250	1047.94
		XS	0.500	12.70	221.82	330.21	41.000	1041.60
			0.625	15.88	276.44	411.64	40.750	1035.24
			0.750	19.05	330.72	492.33	40.500	1028.90
48 1200	48.000 1219	STD	0.375	9.53	190.92	284.25	47.250	1199.94
		XS	0.500	12.70	253.89	377.81	47.000	1193.60

PIPING • TUBING • FITTINGS FLANGES • RELATED PRODUCTS

Type	Seamless & Welded
Commodity	Chrome • Stainless • Carbon • Low Temperature
Specifications	A/SA335 • A/SA312 • A/SA213 • A/SA106 • A/SA53/API5L • A/SA333
Sizes (O.D.)	1/8" (3.175mm) - 60" (1524mm) (Larger ODs Available)
Grades	Chrome: P1 • P5 • P9 • P11 • P22 • P91 Stainless: 304 • 304H • 304L • 316 • 316H • 316L • 316LN • 321 • 321H • 347 • 347H • 310 • 310s • 309 • Alloy 20 Low Temp: Grade 1/6 • Grade 3 Carbon: Grade B • Grade C • Galvanized

MILITARY SPEC PIPE & TUBING

Program	MIL-I-45208A Quality Program • Approved Level 1 Supplier
Contact Tioga for	U.S. Navy Specifications • Navy Nuclear • MIC Level 1 • Ultrasonic Testing
Fittings & Flanges	All Fittings & Flanges to Match the Pipe

NUCLEAR MATERIALS

Program	ASME Section III - ASME QSC 467
Specifications	10CFR50 Appendix B • N45.2 • NQA-1 • U.S. Navy Nuclear Specifications
Products	Pipe • Tubing • Fittings • Flanges • Structurals • Fasteners • Forgings • Castings • Weld Rod • Plate
Grades	Carbon • Stainless • Chrome Moly • Nickel Alloys • Duplex • 6 Moly Alloys • Low Temperature • Special Melts • Copper & Titanium

SPECIALTY ALLOYS

Type	Seamless & Welded
Commodity	Nickel • Duplex & Titanium
Specifications & Grades	Alloy 800 • Alloy 825 • Alloy 600 • Alloy 625 • Alloy 400 • 6% Moly Grades • Duplex A790 UNS 31803 • 316LN
Sizes (O.D.)	1/8" (3.175mm) - 8" (203.2mm)
Wall Dimensions	0.035" (.889mm) - 0.875" (22.23mm)

TIOGA SPECIALTIES

- Project Management
- 24/7 Emergency Service
- Just-In-Time Programs
- Inventory in Stock
- All Schedule Walls
- Special Heavy Walls to 4" (101.6mm)
- Header Pipe to 4" Wall (101.6mm)
- Special Intermediate Walls
- Average & Minimum Walls
- Saw Cut up to 40" (1016mm)
- Cutting: Square & Miter
- Custom Lengths and OD's
- End Preps-Various
- Hard to Find Metals & Sizes
- Se Habla Español
- Exceptional Mill/Sourcing Relations
- Dedicated Project Solution Teams
- Vendor Managed Inventory Programs
- Mobile On-Site Inventory Programs
- Quick Response Programs
- Low Total Cost Solutions
- International Export & Packaging
- EN PED 97/23/EC
- ISO 9001-2008
- MIC Level 1 Supplier
- In-House Testing
- Destructive Examination
- Non-Destructive Examination
- In-House Hydrostatic Testing
- Full EDI Capabilities
- Customized e-business Solutions
- Emergency Forged and Buttweld Fittings

Note: Actual dimensions can vary from the figures based on specifications/manufacturing tolerances. The Data for weight is based on the following calculation for wrought steel pipe:
LB/Foot = (Outside diameter [in.] – Wall Thickness [in.]) x (Wall Thickness [in.]) x (10.69)
KG/Meter = (Outside diameter [mm] – Wall Thickness [mm]) x (Wall Thickness [mm]) x (0.0246615)

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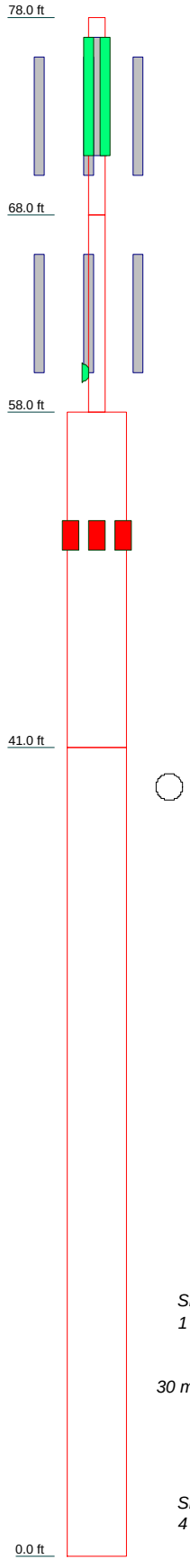
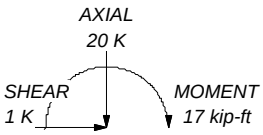
tiogapipe.com

Tioga™

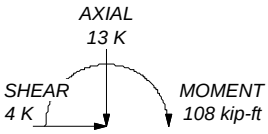
Section	Size	Length (ft)	Grade	Weight (K)
1	P10x.718	10.000	A53-B-35	0.8
2	P10x.718	10.000		0.8
3	P36x3/8	17.000		2.4
4	P36x3/8	41.000		5.9
				9.8



ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
30 mph WIND - 0.5000 in ICE



TORQUE 0 kip-ft
REACTIONS - 90 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BSA33R-U6A w/ Mount Pipe	74	Valmont CWT8-LL	74
BSA33R-U6A w/ Mount Pipe	74	36" x 10' Tall Canister	73
BSA33R-U6A w/ Mount Pipe	74	36" x 10' Tall Canister	63
(4) E15Z01P33	74	8'x2 1/2" Pipe Mount	60
(4) E15Z01P33	74	1' Dish	60
(4) E15Z01P33	74	Light	51
Valmont CWT8-LL	74	Light	51
Valmont CWT8-LL	74	Light	51

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Pierce County, Washington.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 90 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 30 mph basic wind with 0.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 13.5%

Technology Associates EC, Inc.
7117 SW Beveland Street, Suite 101
Tigard, OR
Phone: (971) 245-3120
FAX:

Job: ***Washington State Fair***			
Project: ***SE04823C***			
Client: T-Mobile	Drawn by: jeremiah.donart	App'd:	
Code: TIA-222-G	Date: 06/27/19	Scale: NTS	
Path: C:\Users\jeremiah.donart\Documents\Structural\T-Mobile Seattle Sites\SE04823C\Rev 1\Analysis\SC Pole.eri		Dwg No. E-1	

PRCTI20220827

DATA SHEET

Bi-Sector™ Antenna

BSA33R-U6A

- Six foot (1.9m), Singleband, eight port Bi-Sector™ Antenna. Deploying a pair of CCI's Patented Asymmetrical 33° Shaped Beams covering 1695-2400 MHz frequencies
- Eight wide high band ports covering 1695-2400 MHz
- Narrow Enclosure, 12.9" (327 mm) width. Narrowest Enclosure in the Industry for this type of Antenna
- Full Spectrum Compliance for 1695-2400 MHz
- LTE Optimized Asymmetric Shaped Beams for improved LTE data throughput by minimizing beam crossover, providing for an efficient use of valuable radio capacity and frequency spectrum. Essential for today's LTE Data Networks
- Exceeds minimum PIM performance requirements
- Options to order with 4.3-10 connector or 7/16 DIN connectors
- Options to order with Variable Electrical Tilt (VET) or with Remote Electrical Tilt (RET)
- Equipped with Two Field Replaceable, integrated AISG 2.0 compliant Remote Electrical Tilt (RET) or Two Variable Electrical Tilt knobs (VET)

Overview

This version of the CCI Bi-Sector™ Singleband Array is an eight port antenna, with eight wide high band ports covering 1695-2400 MHz. The CCI Bi-Sector ™ array uses a pair of CCI's Patented Asymmetric 33° Shaped Beams. The CCI Bi-Sector™ Array provides the capability to deploy Dual 4x4 Multiple-input Multiple-output (MIMO) in the high band array. The CCI Bi-Sector™ Array utilizes two RET controllers, with a separate RET control for each pair of CCI's Patented Asymmetric Shaped Beams and is also available with Manual Variable Electrical Tilt option.

The CCI Bi-Sector™ Singleband Array, allow operators to reduce antenna count and replace existing 65° networks, while increasing cell site capacity and LTE data throughput by minimizing overlap between CCI's Patented Asymmetric 33° Shaped Beams. This design approach lowers interference between sectors. All of this is achieved through a single panel array, producing significant CAPEX and OPEX cost savings for the operator.

CCI antennas are designed and produced to ISO 9001 certification standards for reliability and quality in our state-of-the-art manufacturing facilities.

Applications

- Dual 4x4 MIMO on High Band
- Ready for Network Standardization on 4.3-10 connectors
- Ideal Antenna Solution for structurally constrained sites, where data throughput, capacity and limited spectrum is a concern
- With CCI's Bi-Sector™ Antenna, wireless operators can connect multiple platforms to a single antenna, reducing tower load, lease expense, deployment time and installation cost

SPECIFICATIONS

Bi-Sector™ Antenna

BSA33R-U6A

Electrical

Ports	8 × High Band Ports for 1695-2400 MHz			
Frequency Range	1695-1880 MHz	1850-1990 MHz	1920-2180 MHz	2300-2400 MHz
Gain[1]	17.4 dBi	17.9 dBi	18.6 dBi	19.0 dBi
Gain (Average)[2]	16.6 dBi	17.3 dBi	17.7 dBi	18.6 dBi
Azimuth Beamwidth (-3dB)	37°	35°	33°	29°
Elevation Beamwidth (-3dB)	9.9°	9.1°	8.6°	7.7°
Electrical Downtilt	0° to 10°	0° to 10°	0° to 10°	0° to 10°
Elevation Sidelobes (1st Upper)	< -17 dB	< -17 dB	< -17 dB	< -18 dB
Front-to-Back Ratio @180°	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 32 dB	> 32 dB	> 32 dB	> 32 dB
Cross-Polar Discrimination (at Peak)	> 25 dB	> 25 dB	> 25 dB	> 25 dB
InterBeam Co-Pol Isolation (Average)	> 27 dB	> 30 dB	> 29 dB	> 27 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Voltage Standing Wave Ratio(VSWR)	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2×20W)	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc
Input Power Continuous Wave (CW)	300 watts	300 watts	300 watts	300 watts
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 ohms	50 ohms	50 ohms	50 ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground

[1]Peak gain across sub-bands.
[2]Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V9.6.

Mechanical

Dimensions (LxWxD)	76.5x12.9x6.2 in (1942x327x158 mm)
Survival Wind Speed	> 150 mph (> 241 kph)
Front Wind Load	237 lbs (1053 N) @ 100 mph (161 kph)
Side Wind Load	133 lbs (593 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	9.2 ft^2 (0.9 m^2)
Weight*	45.0 lbs (20.4 kg)
RET System Weight	3.3 lbs (1.5 kg)
Connector	8 x 7-16 DIN long neck female or 4.3-10 female
Mounting Pole	2 to 5 in (5 to 12 cm)

**Weight excludes mounting and RET*

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Section 1 - Site Information

Site ID: SE04823C
Status: Final
Version: 2
Project Type: Anchor
Approved: 1/13/2022 12:5:16 PM
Approved By: LARRY.WEST16@T-MOBILE.COM
Last Modified: 1/13/2022 12:5:16 PM
Last Modified By: LARRY.WEST16@T-MOBILE.COM

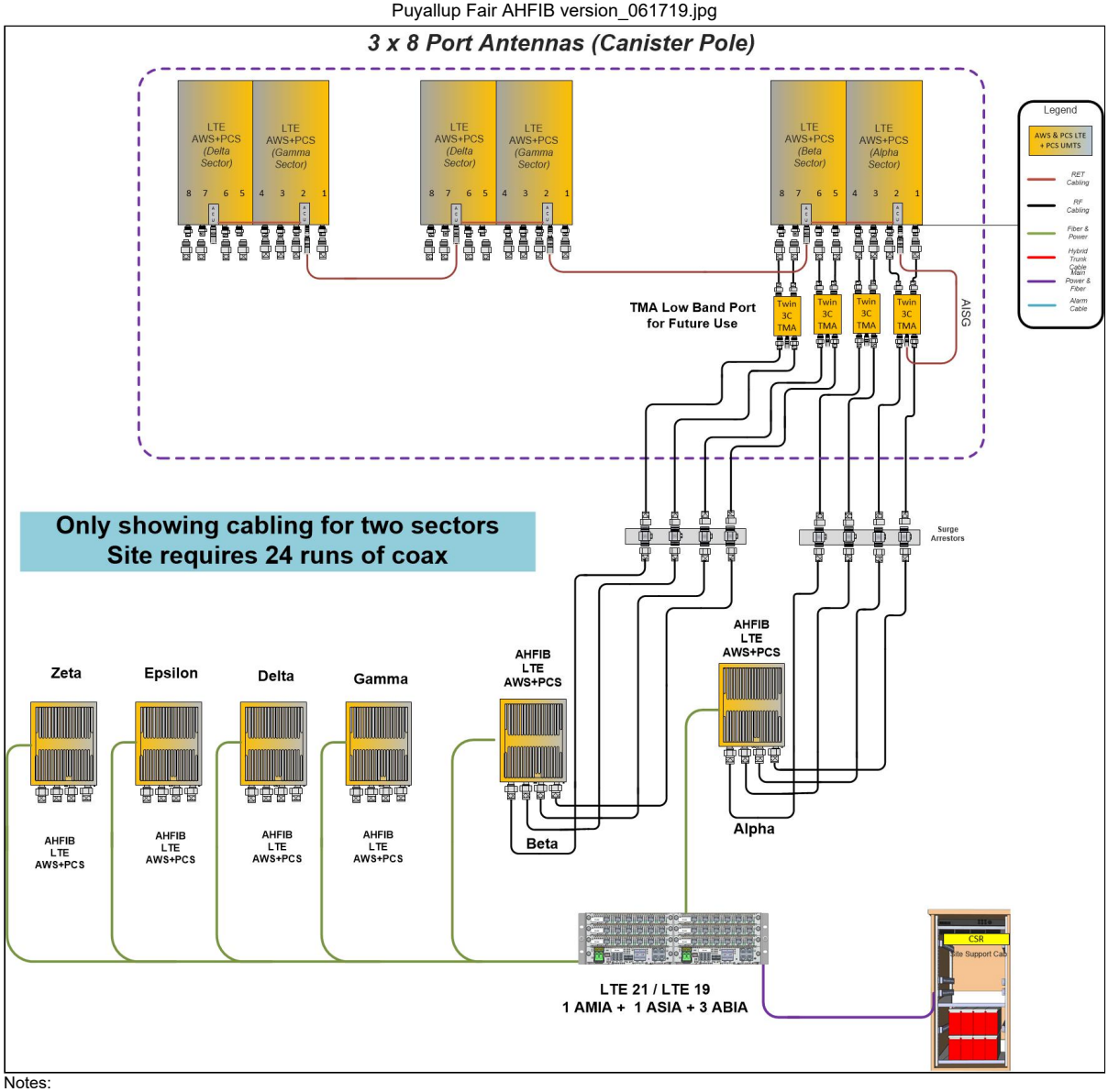
Site Name: Washington State Fair - Light Pole
Site Class: Light Pole
Site Type: Structure Non Building
Plan Year:
Market: SEATTLE WA
Vendor: Nokia
Landlord: Not Specified

Latitude: 47.18194445
Longitude: -122.29569450
Address: 902 S. Meridian
City, State: Puyallup, WA
Region: WEST

RAN Template: 56761EK			AL Template: 56761EK	
Sector Count: 6	**Antenna Count:** 6	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 9

Section 2 - Existing Template Images

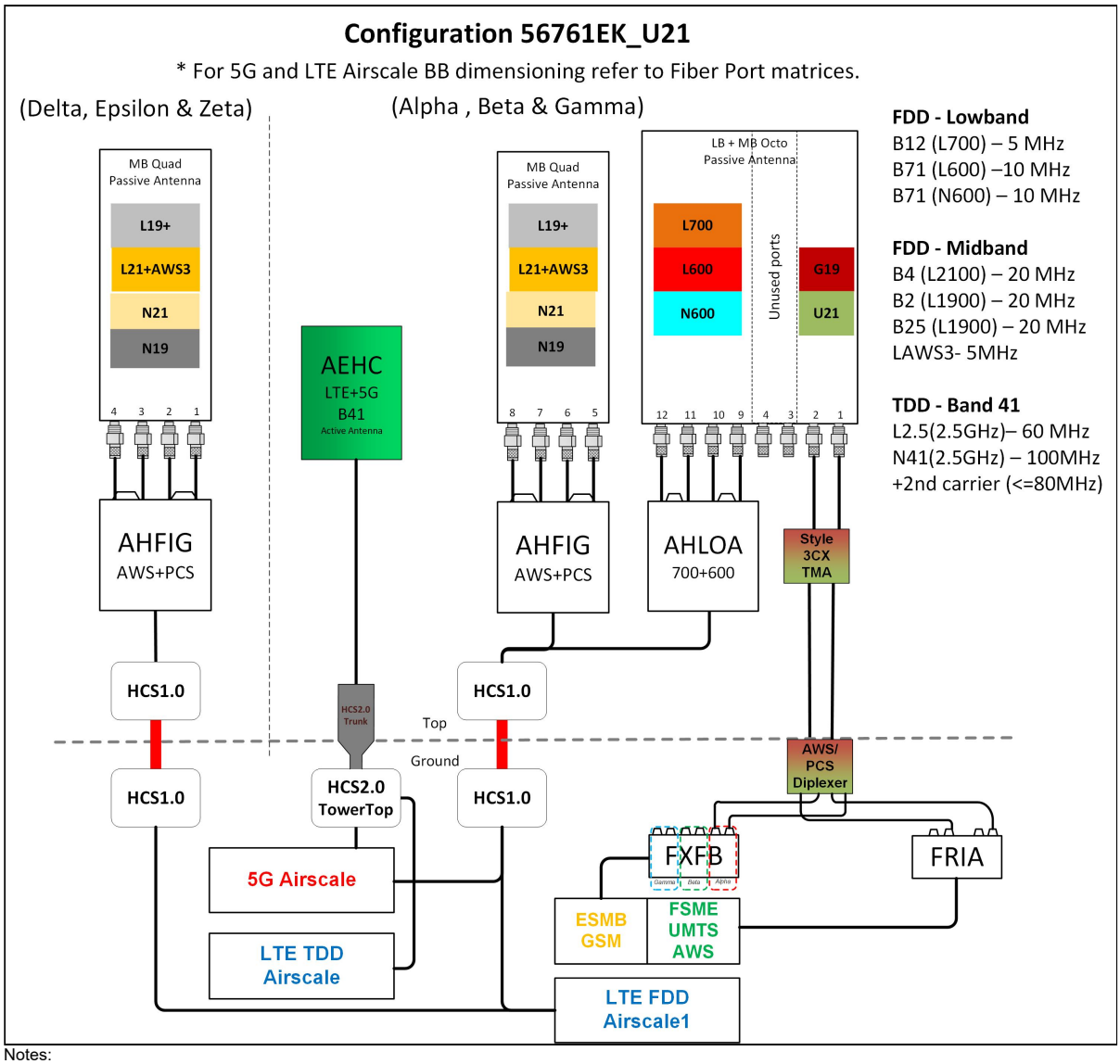
Puyallup Fair AHFIB version_061719.jpg



Notes:

Section 3 - Proposed Template Images

56761EK_U21.jpg



Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 93E_No U2100

Enclosure	1	2	3
Enclosure Type	FCOA Cabinet (Nokia)	Purcell HPL2 w/ 400A DC	H-Frame Mount (Nokia)
Baseband	ASIA L2100 L1900		
Baseband Submodule	ABIA **(x 3)** L2100 L1900		
Baseband Subrack	AMOB L2100 L1900		
Hybrid Cable System	15' HCS 2.0 Jumper Cable - 10AWG 2PR Airscale **(x 6)**		
Junction Box	Nokia HCS 2.0 Roof-Top Junction Box		
Power subsystem		Batteries *Select size* Breakers *Select size* Rectifier Shelf *Select size*	
Radio			AHFIB **(x 6)** L2100 L1900
Transport System		CSR 7210 SAS-Mxp L2100 L1900	

Proposed RAN Equipment

Template: 56761EK

Enclosure	1	2	3	4
Enclosure Type	Ancillary Equipment (Nokia)	Purcell HPL3 600A DC plant	Tower Top Mount (Nokia)	Purcell LB3 Battery Cabinet (4 strings)
Baseband		ASIB: L1900, L2100 ASIB: L700, L600, L1900, L2100 ASIB: L2500 ASIL: N600, N2500, N1900 (DARK), N2100 (DARK)		
Baseband Submodule		ABIA **(x 4)**: L1900, L2100 ABIC **(x 3)**: L2500 ABIO: N2500 ABIA: L700, L600 ABIO: N600, N1900 (DARK), N2100 (DARK) ABIO: N1900 (DARK), N2100 (DARK)		
Baseband Subrack		AMIA **(x 3)**		
Hybrid Cable System	200' HCS 2.0 Trunk - 12#6AWG 24 SM FIBER PR **(x 3)** Voltage Booster PowerPlus w/ 2 Amplifier Raycap 15' HCS 2.0 Jumper Cable - 10AWG 2PR Airscale **(x 3)** 15' HCS 2.0 Jumper Cable - 2x6AWG 2PR AHFIG **(x 3)** 15' HCS 2.0 Jumper Cable - 2x6AWG 4PR AEHC **(x 3)** Extra Amplifier for PowerPlus Voltage Booster			
Junction Box	Nokia HCS 2.0 Tower Junction Box **(x 3)**			
Power subsystem		Breakers *Select size* Rectifier Shelf *Select size*		Batteries *Select size*
Radio			AHFIG **(x 6)**: L1900, L2100, N1900 (DARK), N2100 (DARK) AHLOA **(x 3)**: L700, L600, N600	
Transport System		CSR IXRe V2 (Gen2)		

RAN Scope of Work:

1/12/22: LW - per redlines, added HCS cables and removed COVP equipment

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Section 6 - A&L Equipment

Existing Template: 93E_No U2100
Proposed Template: 56761EK

Sector 1 (Existing) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	CCI - BSA33R-U6A (+27°) (Multi-Beam)	
Azimuth	10	
M. Tilt	0	
Height	74	
Ports	**P1**	**P2**
Active Tech.	L2100, L1900	L2100, L1900
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	6	
Cables	1/2" Coax - 150 ft. **(x2)**	1/2" Coax - 150 ft. **(x2)**
TMAs	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 1 (Proposed) view from front (Note: the images show view from behind)					
Coverage Type	A - Outdoor Macro				
Antenna	1		2		3
Antenna Model	Rosenberger - 2D4WHE-21 (0°) (Multi-Beam)		Rosenberger - 2D4WHE-21 (+28°) (Multi-Beam)		AEHC (Active Antenna - Massive MIMO)
Azimuth	10		10		10
M. Tilt	0		0		0
Height	73		73		65
Ports	P1	P2	P3	P4	P5
Active Tech.	L700 L600 N600	L700 L600 N600	L1900 L2100	L1900 L2100	L2500 N2500
Dark Tech.			N1900 N2100	N1900 N2100	
Restricted Tech.					
Decomm. Tech.					
E. Tilt					
Cables					
TMAs					
Diplexers / Combiners					
Radio					
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 2 (Existing) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	CCI - BSA33R-U6A (-27°) (Multi-Beam)	
Azimuth	10	
M. Tilt	0	
Height	74	
Ports	**P1**	**P2**
Active Tech.	L2100, L1900	L2100, L1900
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt		6
Cables	1/2" Coax - 150 ft. **(x2)**	1/2" Coax - 150 ft. **(x2)**
TMAs	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 2 (Proposed) view from front (Note: the images show view from behind)

Coverage Type	A - Outdoor Macro				
Antenna	1		2		3
Antenna Model	Rosenberger - 2D4WHE-21 (0°) (Multi-Beam)		Rosenberger - 2D4WHE-21 (+28°) (Multi-Beam)		AEHC (Active Antenna - Massive MIMO)
Azimuth	130		130		130
M. Tilt	0		0		0
Height	73		73		65
Ports	P1	P2	P3	P4	P5
Active Tech.	L700 L600 N600	L700 L600 N600	L1900 L2100	L1900 L2100	L2500 N2500
Dark Tech.			N1900 N2100	N1900 N2100	
Restricted Tech.					
Decomm. Tech.					
E. Tilt					
Cables					
TMAs					
Diplexers / Combiners					
Radio					
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 3 (Existing) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	CCI - BSA33R-U6A (+27°) (Multi-Beam)	
Azimuth	130	
M. Tilt	0	
Height	74	
Ports	P1	P2
Active Tech.	L2100 L1900	L2100 L1900
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	6	
Cables	1/2" Coax - 150 ft. **(x2)**	1/2" Coax - 150 ft. **(x2)**
TMAs	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 3 (Proposed) view from front (Note: the images show view from behind)

Coverage Type	A - Outdoor Macro				
Antenna	1		2		3
Antenna Model	Rosenberger - 2D4WHE-21 (0°) (Multi-Beam)		Rosenberger - 2D4WHE-21 (+28°) (Multi-Beam)		AEHC (Active Antenna - Massive MIMO)
Azimuth	250		250		250
M. Tilt	0		0		0
Height	73		73		65
Ports	P1	P2	P3	P4	P5
Active Tech.	L700 L600 N600	L700 L600 N600	L1900 L2100	L1900 L2100	L2500 N2500
Dark Tech.			N1900 N2100	N1900 N2100	
Restricted Tech.					
Decomm. Tech.					
E. Tilt					
Cables					
TMAs					
Diplexers / Combiners					
Radio					
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 4 (Existing) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	CCI - BSA33R-U6A (-27°) (Multi-Beam)	
Azimuth	130	
M. Tilt	0	
Height	74	
Ports	P1	P2
Active Tech.	L2100 L1900	L2100 L1900
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt		6
Cables	1/2" Coax - 150 ft. **(x2)**	1/2" Coax - 150 ft. **(x2)**
TMAs	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 4 (Proposed) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	Rosenberger - 2D4WHE-21 (-28°) (Multi-Beam)	
Azimuth	10	
M. Tilt	0	
Height	73	
Ports	**P1**	**P2**
Active Tech.	L1900 L2100	L1900 L2100
Dark Tech.	N1900 N2100	N1900 N2100
Restricted Tech.		
Decomm. Tech.		
E. Tilt		
Cables		
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 5 (Existing) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	CCI - BSA33R-U6A (+27°) (Multi-Beam)	
Azimuth	250	
M. Tilt	0	
Height	74	
Ports	P1	P2
Active Tech.	L2100 L1900	L2100 L1900
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	6	
Cables	1/2" Coax - 150 ft. **(x2)**	1/2" Coax - 150 ft. **(x2)**
TMAs	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 5 (Proposed) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	Rosenberger - 2D4WHE-21 (-28°) (Multi-Beam)	
Azimuth	130	
M. Tilt	0	
Height	73	
Ports	P1	P2
Active Tech.	L1900 L2100	L1900 L2100
Dark Tech.	N1900 N2100	N1900 N2100
Restricted Tech.		
Decomm. Tech.		
E. Tilt		
Cables		
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 6 (Existing) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	CCI - BSA33R-U6A (-27°) (Multi-Beam)	
Azimuth	250	
M. Tilt	0	
Height	74	
Ports	P1	P2
Active Tech.	L2100 L1900	L2100 L1900
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt		6
Cables	1/2" Coax - 150 ft. **(x2)**	1/2" Coax - 150 ft. **(x2)**
TMAs	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)	CommScope Twin Style 3CX - TMAT1921B68-21-43 (E14R00P09) (AtAntenna)
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Sector 6 (Proposed) view from front (Note: the images show view from behind)		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	Rosenberger - 2D4WHE-21 (-28°) (Multi-Beam)	
Azimuth	250	
M. Tilt	0	
Height	73	
Ports	P1	P2
Active Tech.	L1900 L2100	L1900 L2100
Dark Tech.	N1900 N2100	N1900 N2100
Restricted Tech.		
Decomm. Tech.		
E. Tilt		
Cables		
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
56761EK	56761EK

SE04823C_Anchor_2

Print Name: Standard
PORs: L600_Regional Capacity Anchor_Phase 3

Section 7 - Power Systems Equipment

	Existing Power Systems Equipment
Enclosure	1
Enclosure Type	Purcell HPL2 w/ 400A DC
Power subsystem	Batteries *Select size* Breakers *Select size* Rectifier Shelf *Select size*
Transport System	CSR 7210 SAS-Mxp L2100 L1900

Proposed Power Systems Equipment