



#### PROVIDING THE TOWER DATA YOU NEED

Site Name: Warwick Tower Structure Type: Structure Height: Make: Parish: Warwick Latitude: 32.256385 Longitude: -64.833335 Date of Visit: 7/13/2022 Employees on Site: Angie Shyrigh

Guyed Tower 250' Valmont **ASR:** KD48X180 Tower Owner: Government of Bermuda Address: Middle Road Ben Shyrigh

**Proventus Structural Services, LLC** Please contact Angie Shyrigh with any questions regarding the content of this report. (614)312-8107

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## **Purpose of this Site Visit**

To fulfill the inspection requirements set forth in the TIA/EIA222-H, Annex J.1 standard for Maintenance and Condition Assessment of communication structures.

## **General Information**

If a manufacturer's plate is installed, record the information here: Model: KD48X250 Order NO: A123835 1

## Elevations

Ground to top of pier pad: 1' Top of pier pad to top of base plate: 2" Top of base plate to top of structure: 247' 6" Tip height of highest appurtenance: 255' What is the highest appurtenance? Lightning rod extension

## Leg Orientation

Legs are labeled in a clockwise fashion with "A leg" as the northernmost leg. Azimuth of "A leg": 350°

# Summary of Deficiencies Found

Elevation	Location	Description	Recommendation	Priority			
0'	Tower foundation	Light honeycombing is present on the tower foundation.	Monitor the condition of the concrete for cracking or degradation.	Monitor			
248'	AB and CA Faces	Horizontal members are not installed on these faces.	Consult the engineer of record to determine if these horizontals require to be installed.	To be scheduled			
Throughout height	Tower surface	The galvanizing is wearing thin and rust is forming, advancing to category 2 in the upper portions. A few isolated regions of pitting rust were observed, and loss of material was undetectable at the time of this inspection.	Paint the tower within 12 months to retard the advancement of corrosion. Ensure attention is paid to surface preparation and complete coverage of all tower surfaces.	To be scheduled			
0' - 50'	Varies	Category 2 rust is present on the tower connection bolt assemblies.	It is recommended the bolt assemblies be brushed and treated within 12 months.	To be scheduled			
50' - 250'	Varies	Category 3 rust is present on the tower connection bolt assemblies.	It is recommended these bolt assemblies be replaced within 12 months.	To be scheduled			
Throughout height	BC Face	The safety cable keepers are degraded beyond functionality, and as a result the safety cable has rubbed the surface of the tower horizontals and worn away the galvanizing.	It is recommended the safety cable be secured and prevented from rubbing the tower.	To be scheduled			
125', 249'	Varies	<ul> <li>Multiple deficiencies were observed with the old lighting system: <ul> <li>Advanced, pitting category 3 rust is present on the lighting conduit, junction boxes and hardware securing it to the tower</li> <li>The side light conduit is taped yet broken resulting in the wiring being exposed</li> <li>The side light conduit is not secured to the tower and is instead resting on the diagonals</li> <li>The side light fixtures are upside down</li> <li>The B leg side light lens is broken</li> <li>The C leg lens is entirely missing</li> </ul> </li> </ul>	Remove the old lighting system and associated components entirely. Dispose of off-site.	To be scheduled			
255'	BC Leg	A lightning rod extension is present; however a lightning rod is not. At the time of the 2013	Install a lightning rod.	To be scheduled			

		inspection the lightning rod was		
Throughout height	Climbing face	observed to be present. Category 3 rust is present on the safety cable and associated components.	It is recommended the safety cable system and associated components be replaced.	To be scheduled
Varies	Varies	Numerous out of service and abandoned pieces of tower mounted equipment were observed.	It is recommended out of service or otherwise abandoned equipment be completely removed from the structure to reduce the resources required to maintain safe connection to the structure as well as to maintain accurate loading records.	To be scheduled
Varies	Varies	The stiff-arm associated with each antenna #16, #62 and #87 is connected to a tower bracing member.	To prevent damage to the bracing member it is recommended the stiff-arm connections be relocated to tower legs.	To be scheduled
206'	C Leg	To be scheduled		
Throughout height	Varies	At each guy attachment elevation, category 3 rust was observed on the thimbles and guy wire ends. At the thimbles, loss of material of occurring. Category 2 rust was observed on the shackles and guy wires.	Replace the thimbles, treat the shackles and pins with zinc rich compound. Monitor the condition of the guy wires and replace prior to rust advancing to pitting stage.	To be scheduled
Throughout height	Varies	Category 1 to 2 rust is present on the guy wires, becoming more advanced in the upper portions of the tower.	Monitor the condition and replace the guy wires prior to advancement to category 3 rust/loss of material.	Monitor
Ground	Varies	At each guy anchor, category 1 to 2 rust was observed on the guy attachment hardware. Isolated regions of category 3 rust were observed, but loss of material was not detected at the time of this inspection.	It is recommended the affected regions be brushed and treated with zinc rich compound and monitored for advancement.	To be scheduled
Ground	Varies	End sleeves are not present on the preformed ends of the 1" Ø guy wires. Mild "bird caging" (flaring of strand ends) was observed.	It is recommended end sleeves be installed to protect the ends of the guy grips. (9) 1" end sleeves are required to correct.	To be scheduled
0'	All anchors	The guy anchors are not secured with fencing or bollards.	It is recommended that the guy anchors be secured against vandalism by fencing or secured against farm equipment impacts with bollards.	To be scheduled
Ground	Varies	<ul> <li>The guy ground wire has become detached from the wires at the following locations: <ul> <li>Anchor A, levels 3 and 4</li> <li>Anchor B, levels 3 and 5</li> </ul> </li> <li>Anchor C, levels 1, 3 and 4</li> </ul>	Reconnect the ground leads.	To be scheduled

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Ground	Anchor B	The fan plate is not in alignment with the tower. It points approximately 3 degrees to the left as standing behind fan plate looking at the tower.	It is recommended the engineer of record be consulted to determine corrective course of action. Photo document the condition on a regular basis to determine if	To be scheduled, monitor
			movement is occurring.	

## Access and Compound

- Access road
- Compound gates & fencing
- Compound substrate
- Shelter exteriors

#### Observations

The structure's access and compound are in fair, functional condition with no deficiencies observed.

# **Concrete Foundations**

- Ground condition
  - o Settlement, movement, earth cracks
  - o Erosion
  - Site condition (standing water, drainage, trees, etc.)
- Anchorage condition
  - Nuts and/or locking device (tightened)
  - o Grout condition
  - Anchorage and/or anchor rod condition
- Concrete condition
  - o Cracking, spalling, or splitting
  - Chipped or broken concrete
  - Honeycombing
  - Low spots to collect moisture

Elevation	Location	Description	Recommendation	Priority
0'	Tower foundation	Light honeycombing is present on the tower foundation.	Monitor the condition of the concrete for cracking or degradation.	Monitor

## **Structure Condition**

- Damaged members (legs and bracing)
- Loose members
- Missing members
- Climbing facilities, platforms, catwalks all secure
- Loose and/or missing bolts and/or locking devices
- Visible cracks in welded connections

Elevation	Location	Description	Recommendation	Priority
248'	AB and CA Faces	Horizontal members are not installed on these faces.	Consult the engineer of record to determine if these horizontals require to be installed.	To be scheduled

## Finish

- Paint and/or galvanizing condition
- Rust and/or corrosion condition including mounts and accessories
- FAA or ICAO color marking conditions
- Water collection in members (to be remedied, e. g. unplug drain holes, etc.)

#### Note: Corrosion Definitions

<u>Category 1 rust</u>: light discoloration of steel surface, galvanizing may be wearing thin however rust does not penetrate steel and there is no loss of material. Recommended action is generally to monitor and record condition to determine the advancement of the condition.

<u>Category 2 rust</u>: discoloration is heavy and light pitting may be present. Recommended action is generally to brush region and treat with zinc rich compound. After treatment, region should be monitored, and condition recorded at regular intervals to determine advancement of condition. <u>Category 3 rust</u>: heavy pitting, flaking and/or loss of material is present. Recommended action is generally to replace component. If component replacement is not feasible, a review of condition by a professional engineer is recommended to determine course of action.

Observatio				
Elevation	Location	Description	Recommendation	Priority
Throughout height	Tower surface	The galvanizing is wearing thin and rust is forming, advancing to category 2 in the upper portions. A few isolated regions of pitting rust were observed, and loss of material was undetectable at the time of this inspection.	Paint the tower within 12 months to retard the advancement of corrosion. Ensure attention is paid to surface preparation and complete coverage of all tower surfaces.	To be scheduled
0' - 50'	Varies	Category 2 rust is present on the tower connection bolt assemblies.	It is recommended the bolt assemblies be brushed and treated within 12 months.	To be scheduled
50' - 250'	Varies	Category 3 rust is present on the tower connection bolt assemblies.	It is recommended these bolt assemblies be replaced within 12 months.	To be scheduled
Throughout height	BC Face	The safety cable keepers are degraded beyond functionality, and as a result the safety cable has rubbed the surface of the tower horizontals and worn away the galvanizing.	It is recommended the safety cable be secured and prevented from rubbing the tower.	To be scheduled

# Lighting

- Conduit, junction boxes and fasteners (weather tight and secure)
- Drain and vent openings (unobstructed)
- Wiring condition
- Light lenses
- Photocell facing north
- Bulb condition
- Controller function if accessible

Light Type	Elevation	Location
Incandescent Sidelight	125'	A leg
Incandescent Sidelight	125'	B leg
Incandescent Sidelight	125'	C leg
Strobe Beacon	249'	A leg
LED Beacon	249'	C Leg

Elevation	Location	Description	Recommendation	Priority
125', 249'	Varies	<ul> <li>Multiple deficiencies were observed with the old lighting system: <ul> <li>Advanced, pitting category 3 rust is present on the lighting conduit, junction boxes and hardware securing it to the tower</li> <li>The side light conduit is taped yet broken resulting in the wiring being exposed</li> <li>The side light conduit is not secured to the tower and is instead resting on the diagonals</li> <li>The side light fixtures are upside down</li> <li>The B leg side light lens is broken</li> <li>The C leg lens is entirely missing</li> <li>The old beacon lens is entirely missing</li> </ul> </li> </ul>	Remove the old lighting system and associated components entirely. Dispose of off-site.	To be scheduled

# Grounding

- Connections
- Corrosion
- Lightning protection (secured to structure)

Elevation	Location	Description	Recommendation	Priority
255'	BC Leg	A lightning rod extension is present; however a lightning rod is not. At the time of the 2013 inspection the lightning rod was observed to be present.	Install a lightning rod.	To be scheduled

## **Personnel Safety**

- Presence and condition of safety cable system
- Integrity of climbing facilities
- Availability of adequate anchorage points throughout height of climb

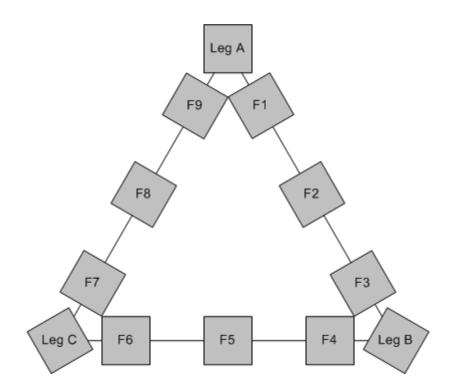
## **Observations and Issues Found**

Elevation	Location	Description	Recommendation	Priority		
Throughout	Climbing	Category 3 rust is present on the	It is recommended the safety	To be scheduled		
height	face	safety cable and associated	cable system and associated			
		components.	components be replaced.			

## Antennas and Lines

- Antenna condition
- Mount and/or ice shield condition (bent, loose, and/or missing members)
- Feedline condition (flanges, seals, dents, jacket damage, grounding, etc.)
- Feedline hanger condition (snap-ins, bolt on, kellum grips, etc.)
- Secured to structure

## Coax Position Diagram



## Loading

				~	LOADING ITEMS	6	•	F				FEEDLINES		MOUNT DESCRIP		JNT DESCRIPTION	ON																									
#	Elev.	A-7	Connected to:	Type	Make	Model	C	Dimension	s	Quant	Quant Size		Ourant Sina	Numt Size		Quant Size Las		Quant Siza	ant Size Loosti		Quant. Size L	uant Siza		Quant. Size		Quant Size Lo				want Siza		want Siza				Location		Connected to:	Daca	Din	nensio	ons
#	Elev.	Az.	Connected to:	Туре	Make	Wodel	н	w	D	Quant.	Size	Size Localit	on	CL Eev.	Connected to:	Desc.	Н	w	D																							
1	31' 0"	260°	CLAMPSET	PANEL	AMPHENOL	5963300G	75.40"	17.00"	6.00"					31' 0"	C LEG	CLAMPSETS	N/A	N/A	N/A																							
2	27' 0"	N/A	CLAMPSET	RADIO	ERICSSON	RRUS 11 B12	19.60"	16.90"	7.00"	1	3/8"	OUTSIDE	F8	27' 0"	C LEG	CLAMPSETS	N/A	N/A	N/A																							
3	24' 0"	N/A	CLAMPSET	RADIO	ERICSSON	RADIO 4415	16.54"	13.46"	6.30"					24' 0"	C LEG	CLAMPSETS	N/A	N/A	N/A																							
4	75' 0"	260°	CLAMPSET	PANEL	AMPHENOL	BXA-80090 8CF-2DIN	94.70"	8.10"	5.70"	1	7/8"	OUTSIDE	F7	74' 0"	C LEG	CLAMPSETS	N/A	N/A	N/A																							
5	74' 0"				NON	E				1	3/8"	OUTSIDE	F9			NONE	-	•																								
6	89' 0"				NON	E				4 1	1/4" 3/8"	OUTSIDE	F6			NONE																										
7	91' 0"	55°	CLAMPSET	PANEL	ILLEGIBLE	ILLEGIBLE	12.00"	12.00"	2.00"	1	3/8"	OUTSIDE	F1	94' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A																							
8	95' 6"	60°	CLAMPSET	PANEL	AMPHENOL	BXA-80090 8CF-2DIN	94.70"	8.10"	5.70"	2	7/8"	OUTSIDE	F7	95' 6"	B LEG	CLAMPSETS	N/A	N/A	N/A																							
9	93' 0"				NON	E					N	ONE		93' 0"	A LEG	MOUNT REMNANT	4"	6"	4"																							
10	106' 0"				NON	E				1	1/2"	OUTSIDE	F3			NONE																										
11	106' 0"				NON	E					N	ONE		106' 0"	C LEG	STANDOFF	1' 4"	2"	2' 0"																							
12	108' 0"	60°	BRACKET	MW DISH	ANDREW	ILLEGIBLE	36' 0" Ø	-	15.20"																																	
13	108' 0"	N/A	MW DISH	RADIO	ILLEGIBLE	ILLEGIBLE	10.00"	10.00"	5.00"	2	1/2"	OUTSIDE	F3	108' 0"	A LEG	BRACKET	N/A	N/A	N/A																							
14	108' 0"	N/A	MW DISH	RADIO	ILLEGIBLE	ILLEGIBLE	10.00"	10.00"	5.00"																																	
15	110' 6"	50°	STANDOFF	PARAGRID	ILLEGIBLE	ILLEGIBLE	36.00"	6.00"	6.00"	1	1 1/4"	OUTSIDE	F3	110' 0"	B LEG	STANDOFF	1'4"	2"	2' 0"																							
16	114' 0"	50°	STANDOFF	MW DISH	COMMSCOPE	ILLEGIBLE	48.00"	-	29.50"					113' 0"																												
17	114' 0"	N/A	MW DISH	RADIO	DRAGONWAVE	RHHP15B	7.50"	7.50"	3.50"	2	3/8"	OUTSIDE	F6		0" A LEG	STANDOFF	4' 0"	3 1/2"	4' 0"																							
18	114' 0"	N/A	MW DISH	RADIO	DRAGONWAVE	RHHP15B	7.50"	7.50"	3.50"																																	
19	121' 0"	10°	PIPE MOUNT	PANEL	COMBA	ODI2-065R16M18J-GQ	78.70"	17.50"	5.10"		N	ONE		121' 0"	A LEG	PIPE MOUNT	8' 0"	3 1/2"	' 1' 0"																							
20	121' 0"	130°	PIPE MOUNT	PANEL	COMBA	ODI2-065R16M18J-GQ	78.70"	17.50"	5.10"		N	ONE		121' 0"	B LEG	PIPE MOUNT	8' 0"	3 1/2"	1' 0"																							
21	121' 0"	250°	PIPE MOUNT	PANEL	COMBA	ODI2-065R16M18J-GQ	78.70"	17.50"	5.10"		N	ONE		121' 0"	C LEG	PIPE MOUNT	8' 0"	3 1/2"	1' 0"																							
22	126' 0"	210°	CLAMPSET	MW DISH	UBIQUITI	AIRFIBER 60	16.26" Ø	-	12.60"	1	1/4"	OUTSIDE	F6	126' 0"	C LEG	CLAMPSETS	N/A	N/A	N/A																							
23	130' 0"	10°	STANDOFF	PANEL	KP PERFORMANCE	KPP-2S3SX8-65	50.50"	9.70"	2.60"	1	3/8"	3/8"	OUTSIDE	F3	129' 6"	B LEG	STANDOFF	1'6"	2 1/2"	2' 0"																						
24	130' 6"	N/A	STANDOFF	RADIO	MIMOSA	A5C	11.81"	5.94"	3.35"	1	3/0	OUTSIDE	гэ	129 0	BLEG	STANDOFF	10	2 1/2	20																							
25	130' 0"	320°	CLAMPSET	PANEL	AMPHENOL	BXA-80090 8CF-2DIN	94.70"	8.10"	5.70"	2	7/8"	OUTSIDE	F7	130' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A																							
26	131' 0"	350°	BRACKET	MW DISH	RADIOWAVES	MSS2-11V	24.0" Ø	-	10.00"	1	3/8"	OUTSIDE	F6	131' 0"	C LEG	BRACKET	N/A	N/A	N/A																							
27	131' 0"	N/A	MW DISH	ODU	MIMOSA	B11	10.20"	9.60"	2.80"	1	3/6	OUTSIDE	FU	131.0	CLEG	BRACKET	IVA	IVA	IVA																							
28	136' 0"	250°	BRACKET	DISH	MIMOSA	B5	17.4 Ø	-	14.30"	1	3/8"	OUTSIDE	F6	137' 0"	C LEG	BRACKET	N/A	N/A	N/A																							
29	138' 0"	60°	STANDOFF	PANEL	KP PERFORMANCE	KPPA-5GHZHV4P65S	17.00"	11.00"	3.90"	1	3/8"	OUTSIDE	F6	138' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A																							
30	138' 6"	N/A		RADIO	MIMOSA	A5C	11.81"	5.94"	3.35"		5/0	JUISIDE	10	130 0	A LLG	OLAIVIE OL 10			(WA																							
31	138' 0"	300°	BRACKET	PANEL	KP PERFORMANCE	KPPA-5GHZHV4P65S	17.00"	11.00"	3.90"					138' 0"	C LEG	BRACKET	N/A	N/A	N/A																							
32	138' 6"	N/A	DIVIONEI	RADIO	MIMOSA	A5C	11.81"	5.94"	3.35"	1	3/8" OUTS	OUTSIDE	F6		0110	DIVIONEI		1.1	ч <b>л</b>																							
_		N/A	HOSE CLAMPS	RADIO	MIMOSA	A5C	11.81"	5.94"	3.35"					139' 0"	C LEG	HOSE CLAMPS	N/A	N/A	N/A																							
34	141' 0"	270°	BRACKET	DISH	MIMOSA	B5	17.4 Ø	-	14.30"	1	3/8"	OUTSIDE	F6	141' 0"	C LEG	BRACKET	N/A	N/A	N/A																							
35	142' 0"	60°	BRACKET	MW DISH	RADIOWAVES	MSS2-11V	24.0" Ø	-	10.00"	1	3/8"	OUTSIDE	F6	142' 0"	B LEG	BRACKET	N/A	N/A	N/A																							
36	142' 0"	N/A	MW DISH	ODU	MIMOSA	B11	10.20"	9.60"	2.80"	'	5/0	COTOIDE	10	142 0	DIEO	DIVIONEI	IVA		IVA.																							
37	146' 0"	260°		PANEL	KP PERFORMANCE	KP-5HVX8-65	34.00"	11.00"	3.90"										]																							
38	147' 0"	N/A	STANDOFF	RADIO	MIMOSA	A5C	11.81"	5.94"	3.35"	2	3/8"	OUTSIDE	F6	146' 0"	C LEG	STANDOFF	2' 0"	2"	3' 0"																							
39	147' 0"	N/A		RADIO	MIMOSA	A5C	11.81"	5.94"	3.35"																																	
40	143' 0"	N/A	CLAMPSET	RADIO	ERICSSON	RADIO 4415	16.54"	13.46"	6.30"	2	3/8"			143' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A																							
41	145' 0"	N/A	CLAMPSET	RADIO	ERICSSON	RRUS 11 B12	19.60"	16.90"	7.00"	2	3/8 1/4"	OUTSIDE	F9	145' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A																							
42	151' 0"	350°	CLAMPSET	PANEL	AMPHENOL	5963300G	75.40"	17.00"	6.00"	<i>_</i>	1/4			151' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A																							

		LOADING ITEMS								FEEI	DLINES		MOUNT DESCRIPTION					$\square$	
#	Elev.	Az.	Connected to:	nnected to: Type	Make	Model	Dimensions		Quant.	Size	Location			Connected to:	Desc.	Dim	nensio	ns	
#	Elev.	A2.	connected to.	Type	Make	Model	Н	W	D	Quant.	Size	Location		CL Bev.	. connected to.	Desc.	н	w	D
43	150' 6"	5°	CLAMPSET	MW DISH	ILLEGIBLE	ILLEGIBLE	24.00"	-	9.00"	1	1/4"	INSIDE	B LEG	150' 6"	B LEG	CLAMPSETS	N/A	N/A	N/A
44	150' 6"	N/A	MW DISH	RADIO	CAMBIUM	PTP-820S-7-196A-1W3-L-ESS	9.06"	9.17"	3.86"	1	1/4	INSIDE	BLEG	150 0	BLEG	CLAIVESETS	IVA	IVA	IVA
45	150' 6"	265°	CLAMPSET	MW DISH	ILLEGIBLE	ILLEGIBLE	24.00"	-	9.00"	1	1/4"	INSIDE	B LEG	150' 6"	C LEG	CLAMPSETS	N/A	N/A	N/A
46	150' 6"	N/A	MW DISH	RADIO	CAMBIUM	PTP-820S-7-196A-1W3-L-ESS	9.06"	9.17"	3.86"		1/4		DLLG	130 0	0 LLG	OLAIM SETS			IVA
47	154' 0"	5°	CLAMPSET	MW DISH	UBIQUITI	AIRFIBER 60	16.26" Ø	-	12.60"	1	3/8"	OUTSIDE	F9	154' 0"	B LEG	CLAMPSETS	N/A	N/A	N/A
48	154' 0"	210°	CLAMPSET	MW DISH	UBIQUITI	AIRFIBER 60	16.26" Ø	-	12.60"	1	3/8"	OUTSIDE	F9	154' 0"	C LEG	CLAMPSETS	N/A	N/A	N/A
49	156' 0"	5°	CLAMPSET	MW DISH	KP PERFORMANCE	KP-5PDC5C-1	15.31"Ø	-	4.00"	1	3/8"	OUTSIDE	F9	156' 0"	B LEG	CLAMPSETS	N/A	N/A	N/A
50	157' 0"	N/A	HOSE CLAMPS	ODU	MIMOSA	B5C	10.50"	6.20"	3.00"	1	3/8"	OUTSIDE	F9	157' 0"	B LEG	HOSE CLAMPS	N/A	N/A	N/A
51	155' 6"	250°	CLAMPSET	MW DISH	KP PERFORMANCE	KP-5PDC5C-1	15.31"Ø	-	4.00"	1	3/8"	OUTSIDE	F9	156' 6"	C LEG	CLAMPSETS	N/A	N/A	N/A
52	157' 0"	N/A	HOSE CLAMPS	ODU	MIMOSA	B5C	10.50"	6.20"	3.00"	1	3/8"	OUTSIDE	F9	157' 0"	C LEG	HOSE CLAMPS	N/A	N/A	N/A
53	158' 6"	N/A	HOSE CLAMPS	RADIO	SIKLU	MH-N366-CCP-POE-MWB	9.40"	7.30" Ø	-	1	3/8"	OUTSIDE	F9	158' 6"	C LEG	HOSE CLAMPS	N/A	N/A	N/A
54	157' 0"	N/A	HOSE CLAMPS	CAMERA	SUNBA	601-D25X	10.00"	6.00" Ø	-	1	3/8"	OUTSIDE	F9	157' 0"	A LEG	HOSE CLAMPS	N/A	N/A	N/A
55	158' 6"	N/A	HOSE CLAMPS	RADIO	SIKLU	MH-N366-CCP-POE-MWB	9.40"	7.30" Ø	-	1	3/8"	OUTSIDE	F9	158' 6"	B LEG	HOSE CLAMPS	N/A	N/A	N/A
56	156' 0"	N/A	HOSE CLAMPS	RADIO	ILLEGIBLE	ILLEGIBLE	10.00"	7.50"	2.00"	2	1/4	OUTSIDE	F9	156' 0"	B LEG	HOSE CLAMPS	N/A	N/A	N/A
57	160' 0"	5°	CLAMPSET	MW DISH	KP PERFORMANCE	KP-5PDC5C-2	24.97" Ø	-	5.50"	1	3/8"	OUTSIDE	F9	160' 0"	B LEG	CLAMPSETS	N/A	N/A	N/A
58	162' 0"	N/A	HOSE CLAMPS	ODU	MIMOSA	B5C	10.50"	6.20"	3.00"		3/0	OUTSIDE	гэ	162' 0"	B LEG	HOSE CLAMPS	N/A	N/A	N/A
59	156' 0"	N/A	CLAMPSET	RADIO	CAITTA	ZXSDR R8862A S7100	16.60"	8.60"	6.50"	1	4/4"			156' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A
60	166' 0"	N/A	HOSE CLAMPS	YAGI	WESTELL TECHNOLOGIES	AY/746-896/11	8.00"	2.20"	33.10"	1	1/4" 3/8"	OUTSIDE	E F8	166' 0"	A LEG	HOSE CLAMPS	N/A	N/A	N/A
61	168' 0"	N/A	HOSE CLAMPS	YAGI	WESTELL TECHNOLOGIES	AY/746-896/11	8.00"	2.20"	33.10"	1	3/8			168' 0"	B LEG	HOSE CLAMPS	N/A	N/A	N/A
62	165' 0"	280°	STANDOFF	MW DISH	COMMSCOPE	ILLEGIBLE	48.0" Ø	-	29.50"						CLEG				
63	165' 0"	N/A	MW DISH	RADIO	DRAGONWAVE	RHHP15B	7.50"	7.50"	3.50"	2	3/8"	OUTSIDE	F6	165' 0"		STANDOFF	4' 0"	3 1/2"	4' 0"
64	165' 0"	N/A	MW DISH	RADIO	DRAGONWAVE	RHHP15B	7.50"	7.50"	3.50"										
65	165' 0"				NON	E				6	7/8"	OUTSIDE	F9			NONE			
66	168' 0"	N/A	CLAMPSET	RADIO	AIRSPAN	B41	24.00"	10.00"	14.00"					168' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A
67	168' 0"	N/A	CLAMPSET	RADIO	AIRSPAN	B41	24.00"	10.00"	14.00"					168' 0"	C LEG	CLAMPSETS	N/A	N/A	N/A
68	173' 0"	130°	PIPE MOUNT	PANEL	KP PERFORMANCE	KPP-2S3SX8-65	50.50"	9.70"	2.60"					173' 0"	B LEG	PIPE MOUNT	5'6"	2 7/8"	1' 0"
69	170' 0"	160°	PIPE MOUNT	PANEL	KP PERFORMANCE	KPP-2S3SX8-65	50.50"	9.70"	2.60"	7	3/8	OUTSIDE	F9	170' 0"	C LEG	CLAMPSETS	N/A	N/A	N/A
70	172' 0"	N/A	CLAMPSET	RADIO	AIRSPAN	B41	24.00"	10.00"	14.00"		3/0		F9	172' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A
71	172' 0"	N/A	CLAMPSET	RADIO	AIRSPAN	B41	24.00"	10.00"	14.00"					172' 0"	B LEG	CLAMPSETS	N/A	N/A	N/A
72	173' 0"	350°	PIPE MOUNT	PANEL	KP PERFORMANCE	KPP-2S3SX8-65	50.50"	9.70"	2.60"					173' 0"	A LEG	PIPE MOUNT	5'6"	2 7/8"	1' 0"
73	173' 0"	260°	PIPE MOUNT	PANEL	KP PERFORMANCE	KPP-2S3SX8-65	50.50"	9.70"	2.60"					173' 0"	A LEG	PIPE MOUNT	5'6"	2 7/8"	1' 0"
74	174' 0"	N/A	STANDOFF	OMNI	ILLEGIBLE	ILLEGIBLE	96.00"	2.50"	-	1	1 1/4"	OUTSIDE	F3	174' 0"	C LEG	STANDOFF	2'0"	2"	4' 0"
75	182' 0"	100°		DISH	SIKLU	EH-ANT-2FT-DL5	24.00" Ø	-	13.00"		4/4"								
76	182' 0"	N/A	STANDOFF	RADIO	SIKLU	EH-8010FX-ODUH-N-2C1P-EX-D	9.00"	7.00"	2.75"	1	1/4"	OUTSIDE	F6	182' 0"	B LEG	STANDOFF	1'6"	2"	2' 0"
77	182' 0"	N/A	1 1	RADIO	MIMOSA	B5C	10.50"	6.20"	3.00"	2	3/8"								
78	182' 0"	210°		DISH	SIKLU	EH-ANT-2FT-DL5	24.00" Ø	-	13.00"										
79	182' 0"	N/A	STANDOFF	RADIO	SIKLU	EH-8010FX-ODUH-N-2C1P-EX-D	9.00"	7.00"	2.75"	1	1/4"	OUTSIDE	F6	182' 0"	CLEG	STANDOFF	1'6"	2"	2' 0"
80	182' 0"	N/A		RADIO	MIMOSA	B5C	10.50"	6.20"	3.00"	2	3/8"								
81	183' 0"							6	7/8"	OUTSIDE	F9			NONE					
82	193' 0"			25.60"	7.90"	1.20"		a /a !!		=-						<b>.</b>			
83	193' 0"	N/A	PANEL	RADIO	REDLINE	RDL-3000	11.45"	10.57"	2.50"	1	3/8"	OUTSIDE	F6	189' 0"	A LEG	CLAMPSETS	N/A	N/A	N/A
84	192' 0"	270°	STANDOFF	PANEL	REDLINE	AFS-DBG-0360-1-2-PANEL	25.60"	7.90"	1.20"		0.401		50	4001.07	01.50		51.07	0.0/07	41.07
85	192' 0"	N/A	PANEL	RADIO	REDLINE	RDL-3000	11.45"	10.57"	2.50"	1 1	3/8"	OUTSIDE	F6	189' 0"	CLEG	STANDOFF	5' 0"	2 3/8"	1'6"
86	206' 0"	N/A	STANDOFF	OMNI	ILLEGIBLE	ILLEGIBLE	60.00"	2.00"	-	1	1 1/4"	OUTSIDE	F3	205' 6"	C LEG	STANDOFF	2'0"	2 1/2"	6' 0"
87	210' 0"	50°	STANDOFF	MW DISH	COMMSCOPE	ILLEGIBLE	48.0" Ø	-	30.00"				-						H
88	210'0"	N/A	MW DISH	RADIO	DRAGONWAVE	RLHP15B2	7.50"	7.50"	3.75"	2	3/8"	OUTSIDE	F6	205' 0"	A LEG	STANDOFF	4' 0"	3 1/2"	4' 0"
	210'0"	N/A	MW DISH	RADIO	DRAGONWAVE	RLHP15B2	7.50"	7.50"	3.75"					2			.	1	
05	210.0	1.64			DIAGONINATE		1.00	1.50	5.75	1			<u> </u>			L	1	<u>ــــــــــــــــــــــــــــــــــــ</u>	

#### Proventus Structural Services, LLC Please contact Angie Shyrigh with any questions regarding the content of this report. (614)312-8107

	LOADING ITEMS								FEED	DLINES	-		MOU	NT DESCRIPTION		-	<u> </u>		
#	Elev.	ev. Az. Conn	Connected to:	Туре	Make	Model	Dimensions		Quant.	Size	Location		CL Elev.	Connected to:	Desc.	Din	nensio	ons	
#	Elev.	A2.	Az. Connected to: Type Make		Model	H W		D	Quant.	Size	LUCALI	on	CL Bev.	connected to.		н	w	D	
90					NONE					1	1 1/4"	OUTSIDE	F3			NONE			
91	219' 6"	N/A	STANDOFF	OMNI	ILLEGIBLE	ILLEGIBLE	96.00"	2.50" Ø	-	1	1 1/4"	OUTSIDE	F3	218' 0"	C LEG	STANDOFF	2'0"	2 1/2"	6' 0"
92	221' 0"	N/A	STANDOFF	OMNI	ILLEGIBLE	ILLEGIBLE	72.00"	2.00" Ø	-	1	7/8"	OUTSIDE	F2	221' 0"	B LEG	STANDOFF	2'0"	2 3/8"	6' 0"
93	231' 6"	N/A	STANDOFF	OMNI	ILLEGIBLE	ILLEGIBLE	96.00"	2.50" Ø	-	1	1 1/4"	OUTSIDE	F3	229' 6"	A LEG	STANDOFF	2' 0"	2 1/2"	6' 0"
94	231' 6"	N/A	STANDOFF	RADIO	ILLEGIBLE	ILLEGIBLE	18.00"	6.00"	4.00"	1	1 1/4							2 1/2	00
95	230' 0"				NON	E				1	1/2"	OUTSIDE	F3		NONE				
96	233' 0"	N/A	STANDOFF	OMNI	ILLEGIBLE	ILLEGIBLE	72.00"	2.00" Ø	-	1	7/8"	OUTSIDE	F2	233' 0"	C LEG	STANDOFF	2'0"	2 3/8"	6' 0"
97	244' 0"	N/A	STANDOFF	OMNI	ILLEGIBLE	ILLEGIBLE	96.00"	2.50" Ø	-	2	1/4"	OUTSIDE	A LEG	244' 0"	A LEG	STANDOFF	2' 0"	2 1/2"	6' 0"
98	244' 0"	N/A	STANDOFF	RADIO	ILLEGIBLE	ILLEGIBLE	18.00"	6.00"	4.00"	2	1/4	OUTSIDE	A LEG	244 0		STANDOFF	20	2 1/Z	00
99	246' 6"	N/A	STANDOFF	OMNI	ILLEGIBLE	ILLEGIBLE	72.00"	2.00" Ø	-	1	7/8"	OUTSIDE	F2	246' 6"	C LEG	STANDOFF	2'0"	2 3/8"	6' 0"

Elevation	Location	Description	Recommendation	Priority
Varies	Varies	Numerous out of service and abandoned pieces of tower mounted equipment were observed.	It is recommended out of service or otherwise abandoned equipment be completely removed from the structure to reduce the resources required to maintain safe connection to the structure as well as to maintain accurate loading records.	To be scheduled
Varies	Varies	The stiff-arm associated with each antenna #16, #62 and #87 is connected to a tower bracing member.	To prevent damage to the bracing member it is recommended the stiff-arm connections be relocated to tower legs.	To be scheduled
206'	C Leg	Electrical tape is currently being used to connect this antenna (#86) to its mount.	Replace the tape with hot dip galvanized brackets.	To be scheduled

## **Guy Wires and Associated Hardware**

Items inspected include:

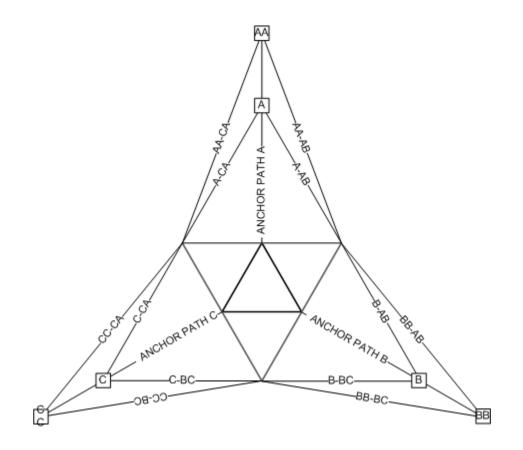
- Strand condition (corrosion, breaks, nicks, kinks, etc.)
- Guy hardware conditions
  - o Turnbuckles or equivalent (secure and safety properly applied)
  - Cable thimbles properly in place (if required)
  - Service sleeves properly in place (if required)
  - Cable connectors (end fittings)
    - Cable clamps applied and bolts tight
    - Wire serving properly applied
    - No signs of slippage or damaged strands
    - Preformed wraps properly applied, fully wrapped and sleeves in place
    - Poured sockets secure and showing no separation
    - Shackles, bolts, pins and cotter pins secure and in good condition
- Guy tensions

Note: 1) Minor variations in guy tensions are to be expected due to temperature and low wind speed conditions. The cause of significant changes should be determined immediately, and proper remedial action taken. Possible cause may be initial construction loosening, previously experienced extreme wind or ice, anchor movements, base settlement, or connection slippage.

2) Tension variations at a single level are to be expected because of anchor elevation differences, construction deviations and wind effects.

## **Guy Anchor and Guy Wire Position Codes**

- The northernmost anchor is designated "A" followed by "B" and "C" clockwise.
- Outer anchors are designated with a double letter.
- Torque arm guy wires are labeled according to the anchor plate to which it is attached followed by the two paths the guy wire is between.



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## **Guy Tension Results**

Note: the ideal initial tension range is 7% under or 15% over the engineered tension. In the absence of engineered tensions, ideal initial tension is considered to be 10% of the manufacturer's rated breaking strength.

Temperature	86°
Wind Speed	11MPH
Wind Direction	SW

Guy Position	Anchor	Anchor	Attachment		Ideal	Initial Tension R	ange	Measured													
& Level	Distance	Elevation	Elevation	Guy Wire Diameter	Low	Target	High	Tension	Result												
A-1			58'	7/8" 1X19 EHS	7412	7970	9166	7500	ACCEPTABLE TENSION												
A-2								88'	7/8" 1X19 EHS	7412	7970	9166	5200	35% UNDER TARGET TENSION							
A-3	136'	-5'	133'	1" 1X19 EHS	9719	10450	12018	10700	ACCEPTABLE TENSION												
A-4			178'	1" 1X19 EHS	9719	10450	12018	8200	22% UNDER TARGET TENSION												
A-5											238'	1" 1X19 EHS	9719	10450	12018	6200	41% UNDER TARGET TENSION				
B-1		-10'	58'	7/8" 1X19 EHS	7412	7970	9166	6900	13% UNDER TARGET TENSION												
B-2			-10'	-10'	-10'	-10'	-10'	-10'	-10'	-10'	-10'	-10'	88'	7/8" 1X19 EHS	7412	7970	9166	9200	15% OVER TARGET TENSION		
B-3	136'												-10'	-10'	133'	1" 1X19 EHS	9719	10450	12018	4600	56% UNDER TARGET TENSION
B-4														178'	1" 1X19 EHS	9719	10450	12018	8700	17% UNDER TARGET TENSION	
B-5			238'	1" 1X19 EHS	9719	10450	12018	5800	44% UNDER TARGET TENSION												
C-1			58'	7/8" 1X19 EHS	7412	7970	9166	7900	ACCEPTABLE TENSION												
C-2			88'	7/8" 1X19 EHS	7412	7970	9166	8400	ACCEPTABLE TENSION												
C-3	136'	-5'	-5'	-5'	-5'	-5'	-5'	-5'	-5'	-5'	-5'	133'	1" 1X19 EHS	9719	10450	12018	7900	24% UNDER TARGET TENSION			
C-4					178'	1" 1X19 EHS	9719	10450	12018	6300	40% UNDER TARGET TENSION										
C-5					238'	1" 1X19 EHS	9719	10450	12018	7100	32% UNDER TARGET TENSION										

Results

4 of 15 guy wires are within the acceptable tension range.

1 of 15 guy wires are over the acceptable tension range.

10 of 15 guy wires are under the acceptable tension range.

#### **Recommendations**

The majority of the guy wire tensions are outside of the acceptable tension ranges. It is recommended that a tension service be performed within the next two years, and at regular 3 year intervals.

Observatio		Description	<b>B</b> acommondation	Driarity
Elevation Throughout height	<b>Location</b> Varies	DescriptionAt each guy attachment elevation, category 3 rust was observed on the thimbles and guy wire ends. At the thimbles, loss of material of occurring.Category 2 rust was observed on the shackles and guy wires.	Recommendation Replace the thimbles, treat the shackles and pins with zinc rich compound. Monitor the condition of the guy wires and replace prior to rust advancing to pitting stage.	Priority To be scheduled
Throughout height	Varies	Category 1 to 2 rust is present on the guy wires, becoming more advanced in the upper portions of the tower.	Monitor the condition and replace the guy wires prior to advancement to category 3 rust/loss of material.	Monitor
Ground	Varies	At each guy anchor, category 1 to 2 rust was observed on the guy attachment hardware. Isolated regions of category 3 rust were observed, but loss of material was not detected at the time of this inspection.	It is recommended the affected regions be brushed and treated with zinc rich compound and monitored for advancement.	To be scheduled
Ground	Varies	End sleeves are not present on the preformed ends of the 1" Ø guy wires. Mild "bird caging" (flaring of strand ends) was observed.	It is recommended end sleeves be installed to protect the ends of the guy grips. (9) 1" end sleeves are required to correct.	To be scheduled
0'	All anchors	The guy anchors are not secured with fencing or bollards.	It is recommended that the guy anchors be secured against vandalism by fencing or secured against farm equipment impacts with bollards.	To be scheduled
Ground	Varies	<ul> <li>The guy ground wire has become detached from the wires at the following locations:</li> <li>Anchor A, levels 3 and 4</li> <li>Anchor B, levels 3 and 5</li> <li>Anchor C, levels 1, 3 and 4</li> </ul>	Reconnect the ground leads.	To be scheduled
Ground	Anchor B	The fan plate is not in alignment with the tower. It points approximately 3 degrees to the left as standing behind fan plate looking at the tower.	It is recommended the engineer of record be consulted to determine corrective course of action. Photo document the condition on a regular basis to determine if movement is occurring.	To be scheduled, monitor

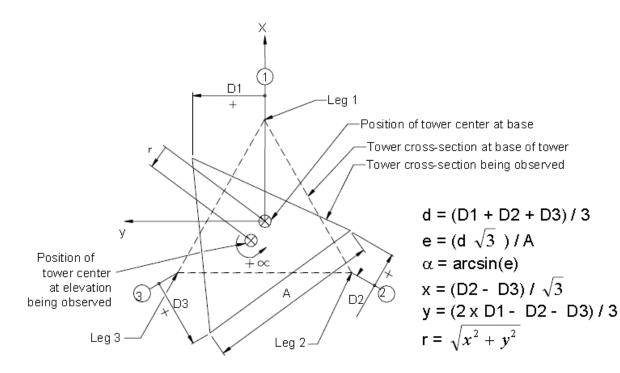
## **Tower Alignment**

#### Observations

The tower twist and plumb are within acceptable limits.

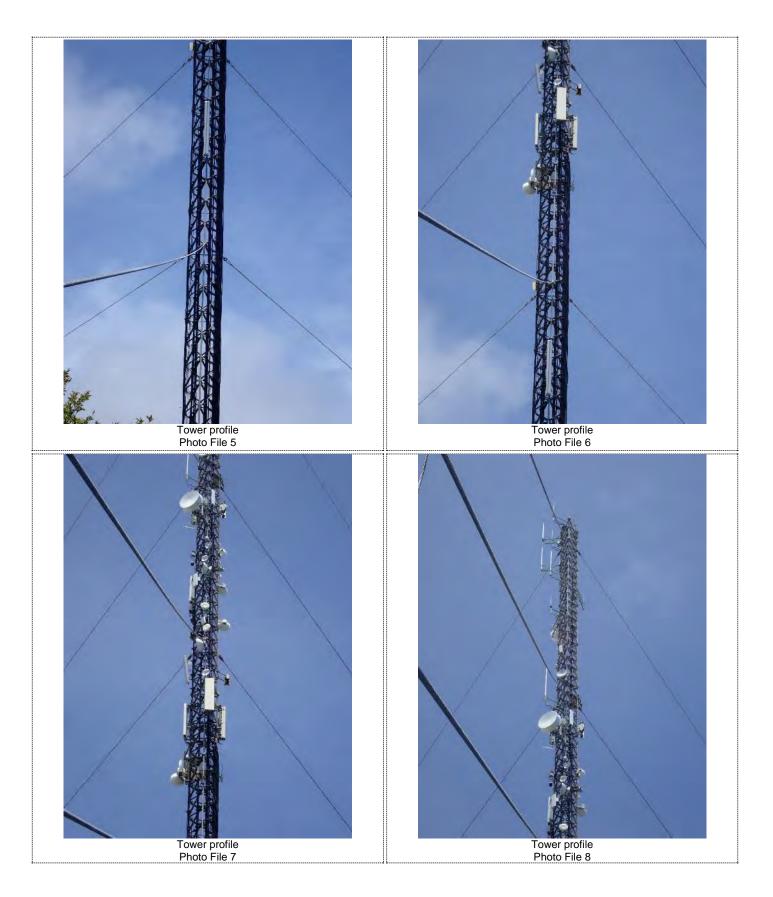
Temperature	86°
Wind Speed	11MPH
Wind Direction	SW

	OBSE	RVED MAST	DATA		CAL	CULATED T	WIST	CALCULATED OUT-OF-PLUMB			
Mast Elevation in FT.	A IN.	D1 IN.	D2 IN.	D3 IN.	d IN.	e	a DEG.	x IN.	y IN.	r IN.	
0.00	48.00	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	
58.00	48.00	1.1	0.3	1.6	1.00	0.04	2.07	-0.75	0.10	0.76	
88.00	48.00	1.1	0.3	2.4	1.27	0.05	2.62	-1.21	-0.17	1.22	
133.00	48.00	0.2	0.2	1.4	0.60	0.02	1.24	-0.69	-0.40	0.80	
178.00	48.00	-0.5	-1.4	0.2	-0.57	-0.02	-1.17	-0.92	0.07	0.93	
238.00	48.00	-0.5	-0.3	-0.1	-0.30	-0.01	-0.62	-0.12	-0.20	0.23	



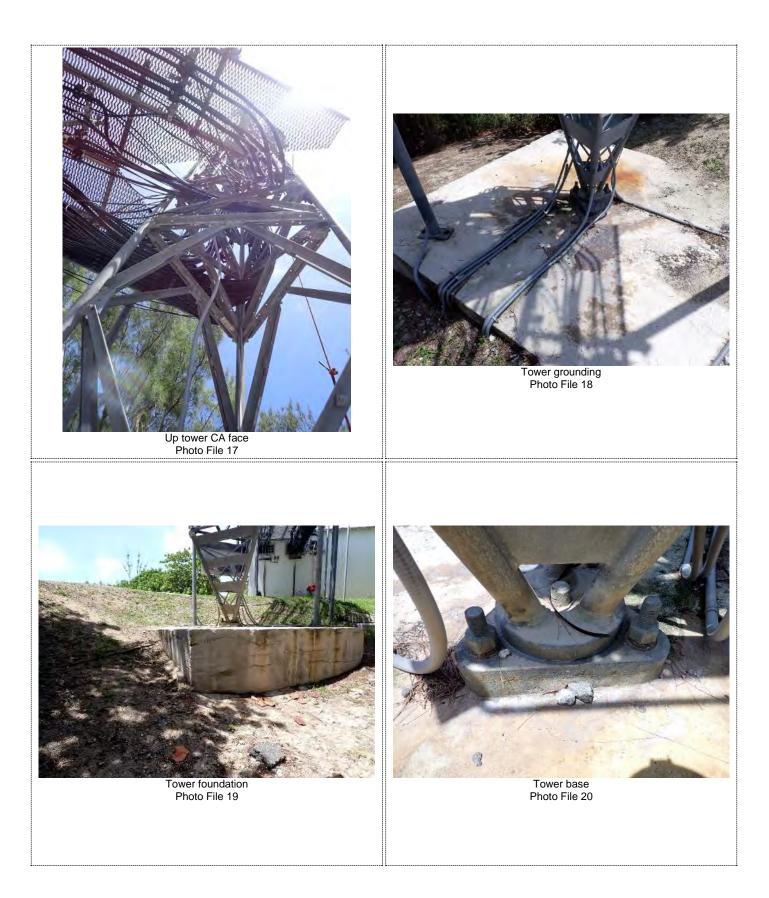
## **Photos**













Tower base Photo File 21



Tower base Photo File 22

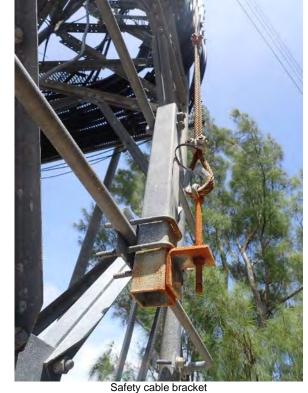


Photo File 23



Safety cable bracket Photo File 24



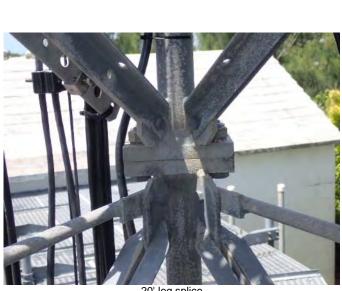
Safety cable condition Photo File 25



Abandoned feedline hangers Photo File 26







20' leg splice Photo File 29



20' leg splice Photo File 30

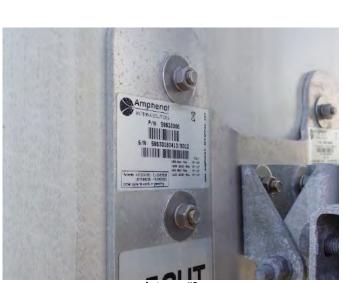


Photo File 31



Photo File 32





Antenna #3 Photo File 37



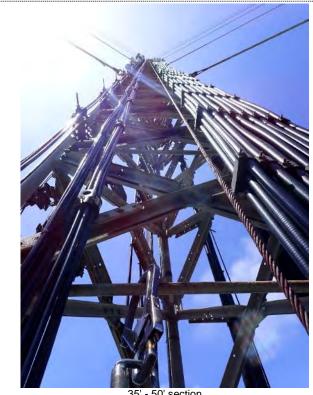
35' leg splice Photo File 38



35' leg splice Photo File 39



35' leg splice Photo File 40

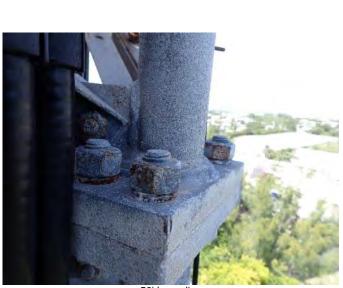


35' - 50' section Photo File 41



Tower surface condition Photo File 42

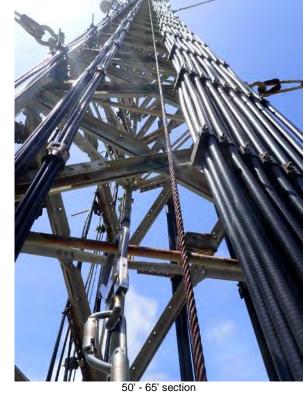




50' leg splice Photo File 45



50' leg splice Photo File 46









Tower surface condition Photo File 49



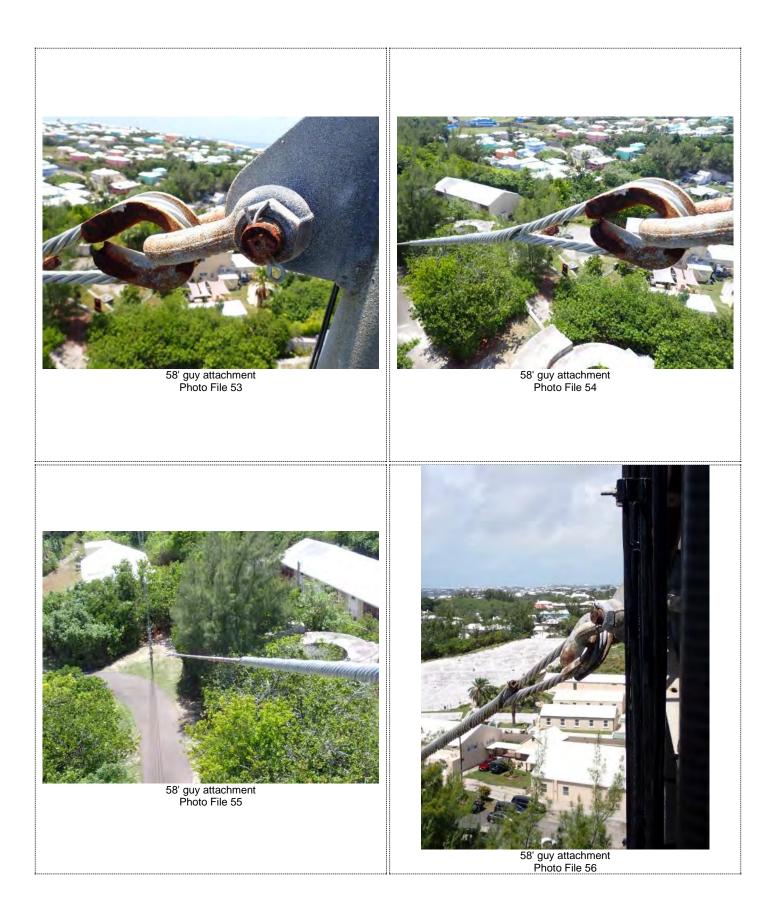
58' guy attachment Photo File 50



58' guy attachment Photo File 51



58' guy attachment Photo File 52





58' guy attachment Photo File 57

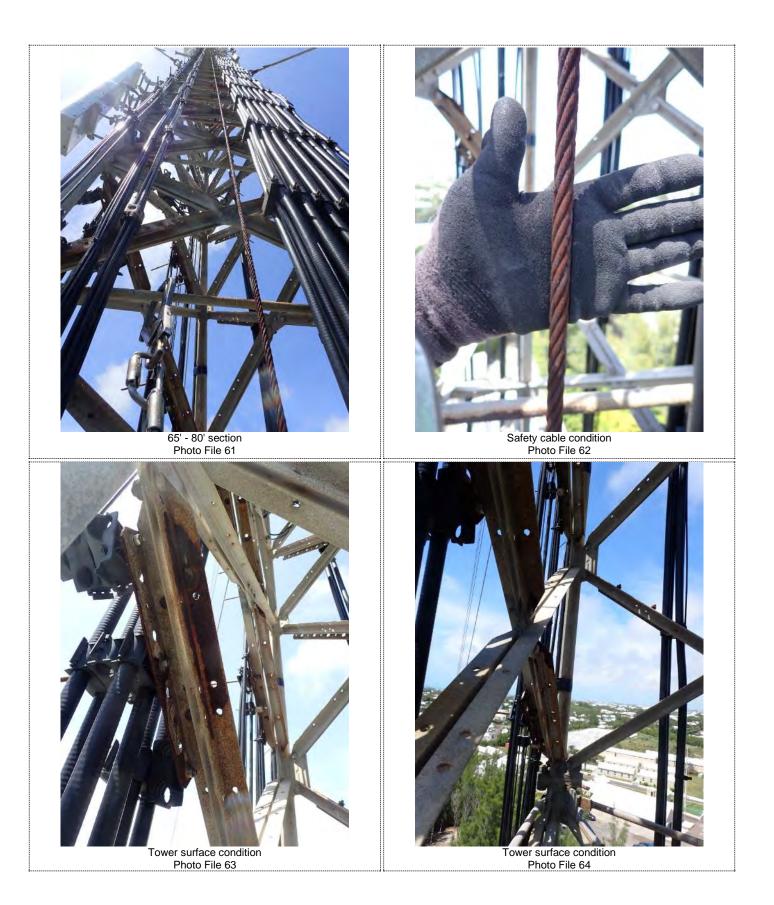


65' leg splice Photo File 58



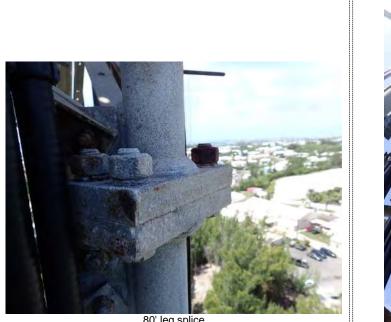


65' leg splice Photo File 60



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80' leg splice Photo File 69



80' - 95' section Photo File 70

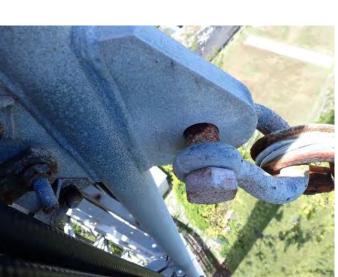




Safety cable keeper condition Photo File 72



88' guy attachment Photo File 73



88' guy attachment Photo File 74



88' guy attachment Photo File 75



88' guy attachment Photo File 76



88' guy attachment Photo File 77



88' guy attachment Photo File 78



88' guy attachment Photo File 79



88' guy attachment Photo File 80



Abandoned feedlines Photo File 81



Abandoned feedlines Photo File 82



95' leg splice Photo File 83



95' leg splice Photo File 84





95' - 110' section Photo File 86



Antenna #7 Photo File 87



Antenna #7 label Photo File 88

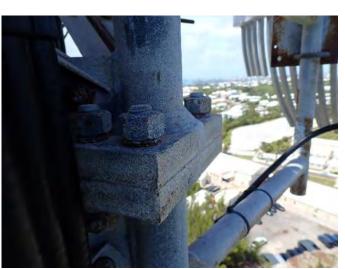


Mount remnant #9 Photo File 89



Antenna #12, radios #13, #14 Photo File 90





110' leg splice Photo File 93



Dead feedlines Photo File 94



110' - 125' section Photo File 95



Antenna #19 Photo File 96





125' leg splice Photo File 101



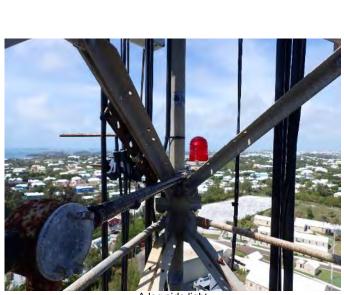
125' leg splice Photo File 102



125' leg splice Photo File 103



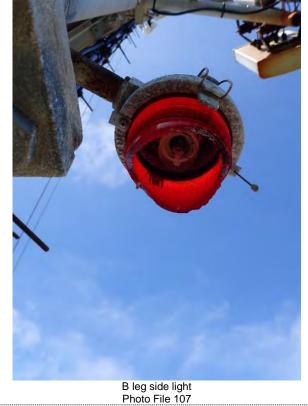
125' - 140' section Photo File 104



A leg side light Photo File 105



B leg side light Photo File 106





Side light conduit Photo File 108





Antenna #25 Photo File 113



Antenna #25 label Photo File 114



Antenna #26, radio #27 Photo File 115





133' guy attachment Photo File 117



133' guy attachment Photo File 118



133' guy attachment Photo File 119

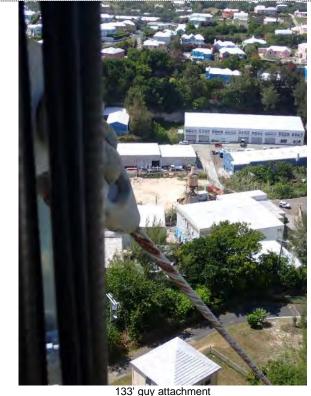




133' guy attachment Photo File 121



133' guy attachment Photo File 122



133' guy attachment Photo File 123



133' guy attachment Photo File 124



Radios #32, #33 Photo File 127

Radio #33 Photo File 128



Antenna #29, radio #30 Photo File 129



140' leg splice Photo File 130



140' leg splice Photo File 131



140' leg splice Photo File 132



140' - 155' section Photo File 133



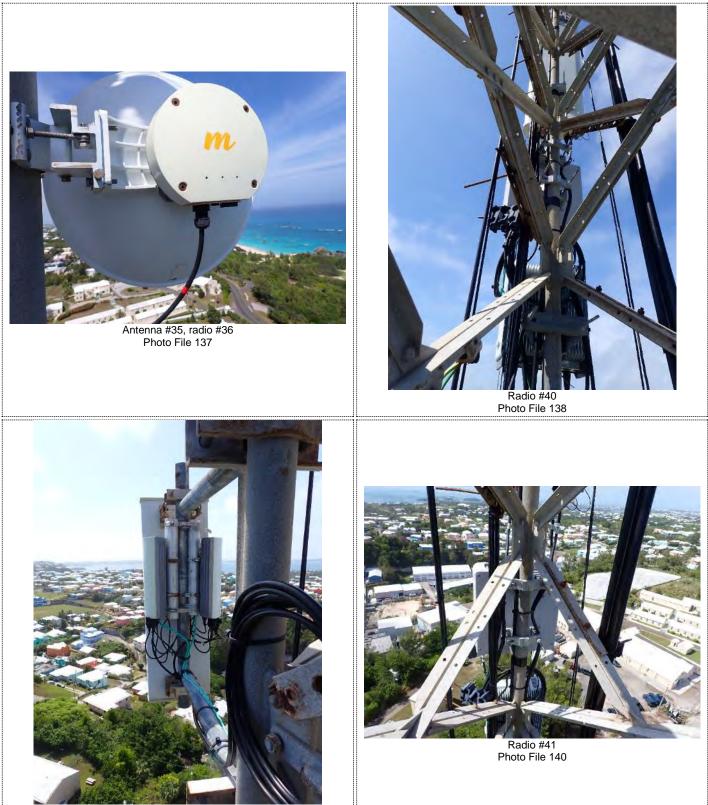
Tower surface condition Photo File 134



Tower surface condition Photo File 135



Antenna #34 Photo File 136



Antenna #37, radios #38, #39 Photo File 139

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Radio #46 label Photo File 145



Antenna #47 Photo File 146





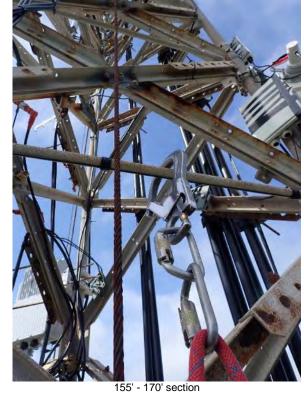
155' leg splice Photo File 148



155' leg splice Photo File 149



155' leg splice Photo File 150



155' - 170' sectio Photo File 151

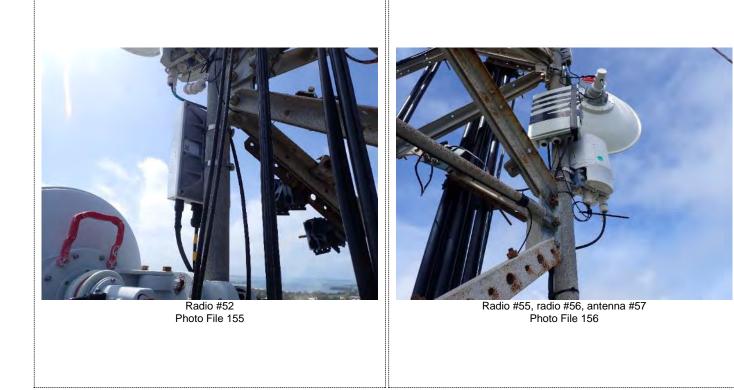




Radio #50 Photo File 153



Antenna #51 Photo File 154



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Radio #54 Photo File 157



Camera #55 Photo File 158

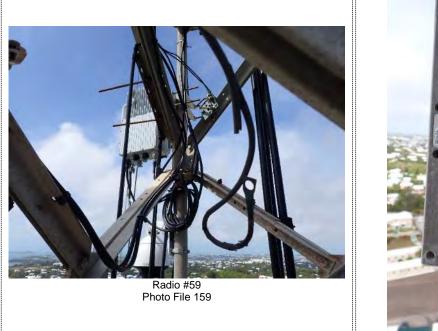




Photo File 160

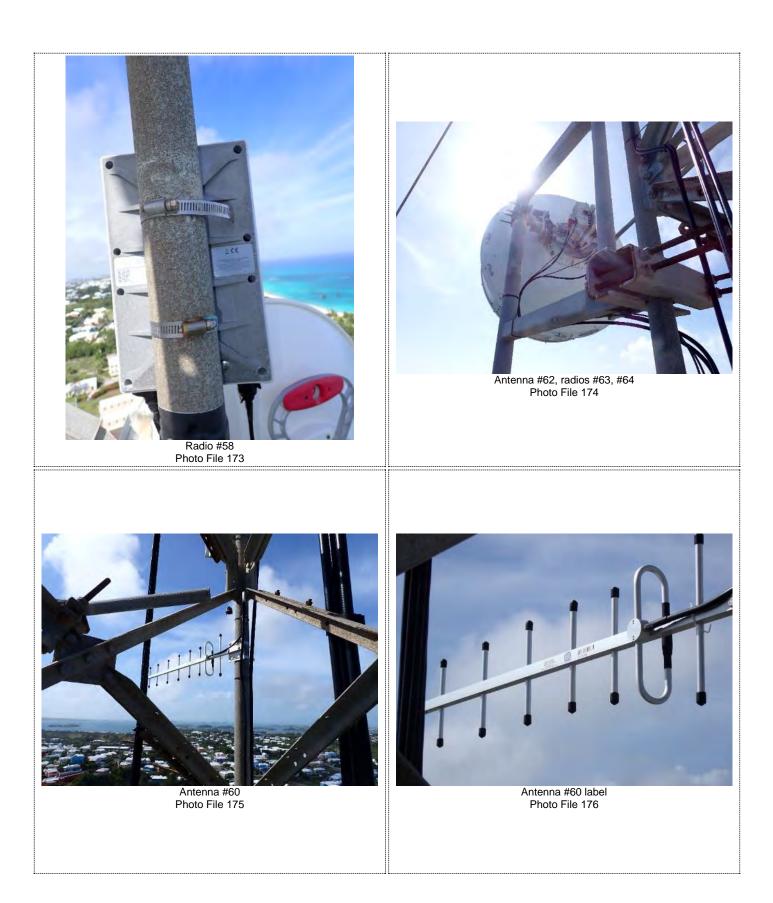


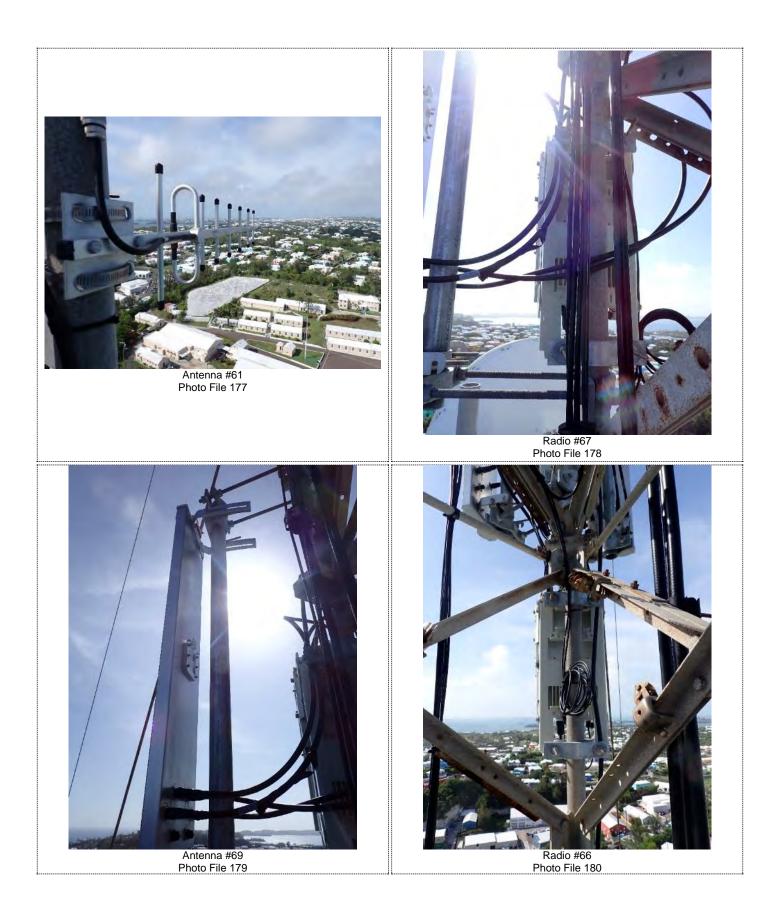
Antenna #51 Photo File 164

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Radio #67, antenna #69 Photo File 187

Antenna #69 Photo File 188

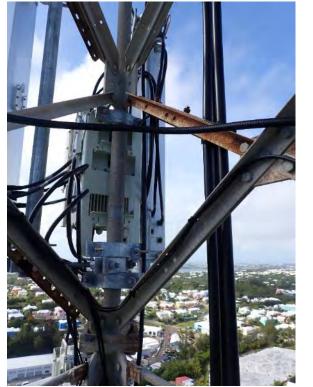


Antenna #68 Photo File 192

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Antenna #68 label Photo File 193



Radio #70, antennas #72, #73 Photo File 194



Radio #70, antennas #72, #73 Photo File 195



Antenna #74 Photo File 196





178' guy attachment Photo File 201



178' guy attachment Photo File 202



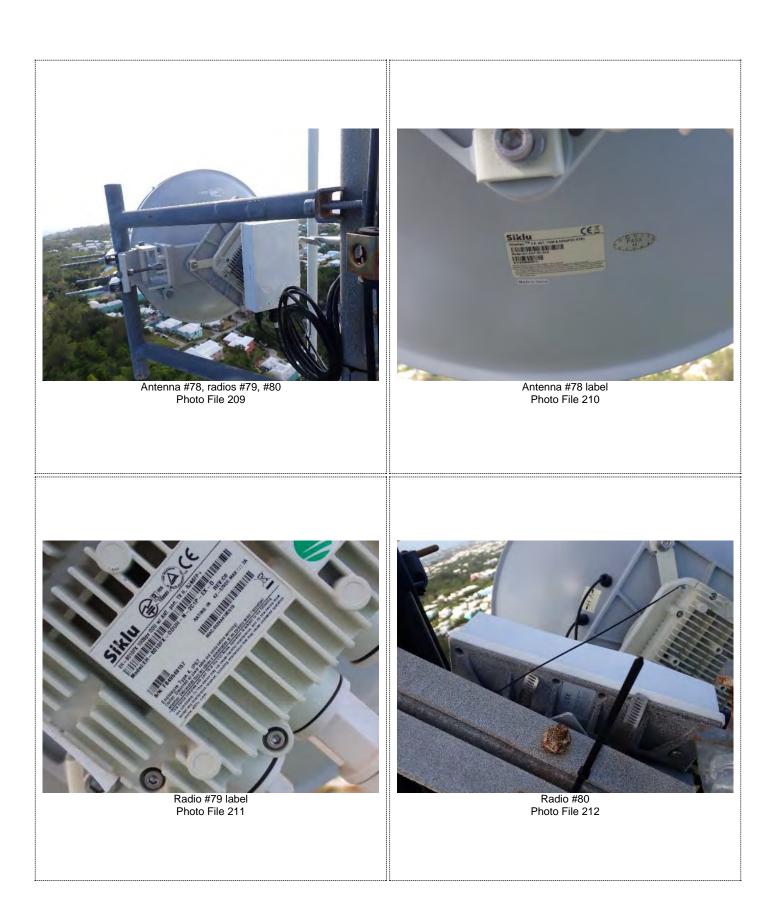


178' guy attachment Photo File 205



178' guy attachment Photo File 206







185' leg splice Photo File 213



185' leg splice Photo File 214



185' leg splice Photo File 215



185' - 200' section Photo File 216

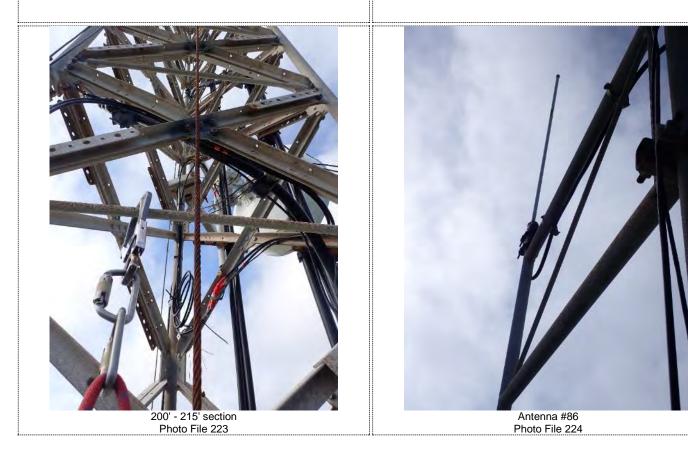




200' leg splice Photo File 221



200' leg splice Photo File 222





Tower surface condition Photo File 225



Antenna #86 Photo File 226



Antenna #87, radios #88, #89 Photo File 227



Stiff arm attached to tower diagonal Photo File 228





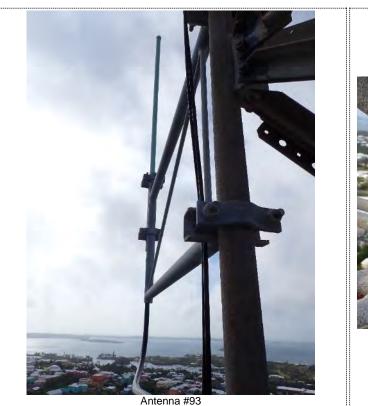
230' leg splice Photo File 233



230' leg splice Photo File 234



Antenna #93 Photo File 236



Antenna #93 Photo File 237



240' leg splice Photo File 238





240' leg splice Photo File 240



238' guy attachment Photo File 241



238' guy attachment Photo File 242



238' guy attachment Photo File 243



238' guy attachment Photo File 244



238' guy attachment Photo File 245



238' guy attachment Photo File 246





238' guy attachment Photo File 248



240' leg splice Photo File 249

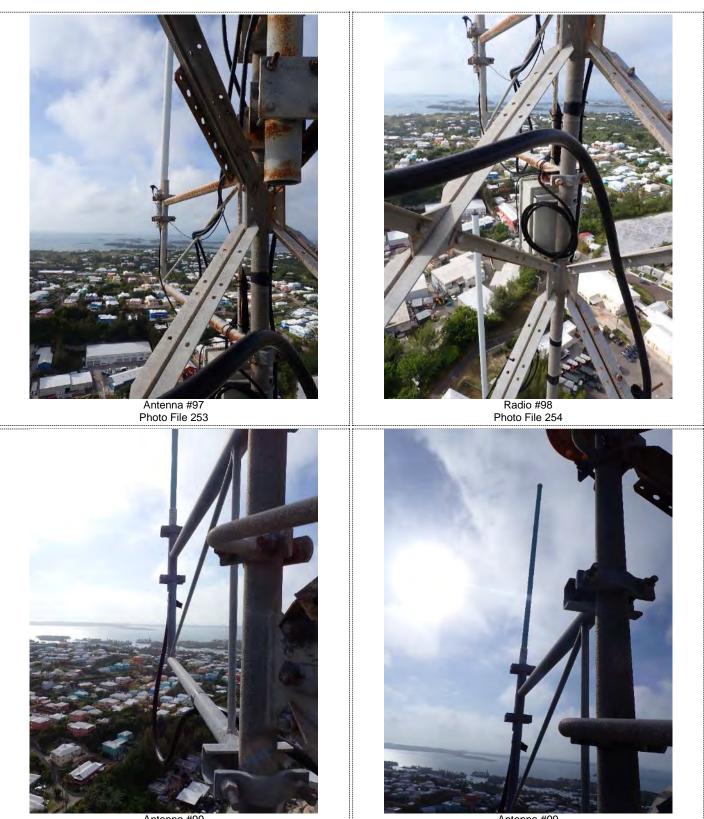


240' leg splice Photo File 250



240' leg splice Photo File 251



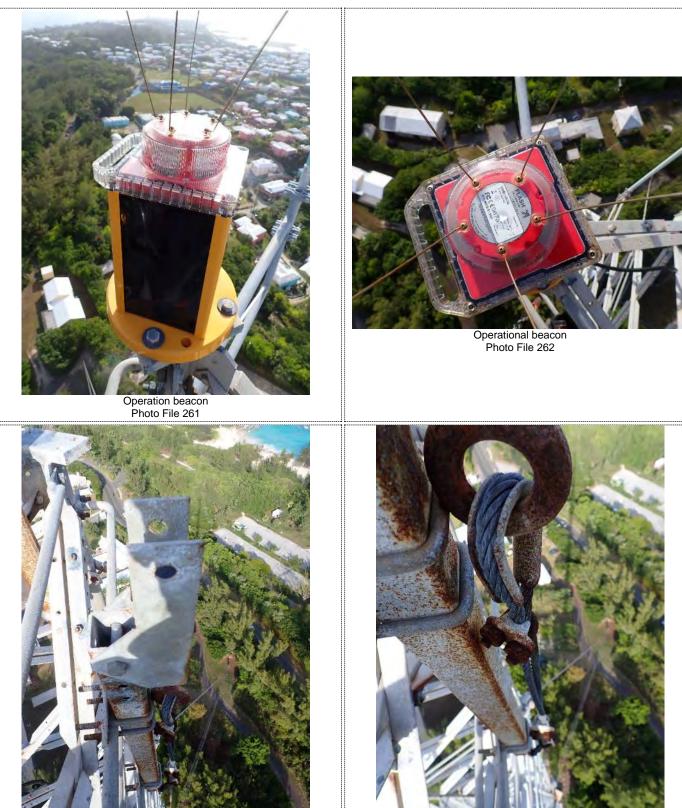


Antenna #99 Photo File 255

Antenna #99 Photo File 256



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Top safety cable bracket Photo File 263

Top safety cable bracket Photo File 264



Anchor A Photo File 265



Anchor A Photo File 266



Anchor A Photo File 267



Anchor A Photo File 268



Anchor A grounding Photo File 272

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Anchor A Photo File 273

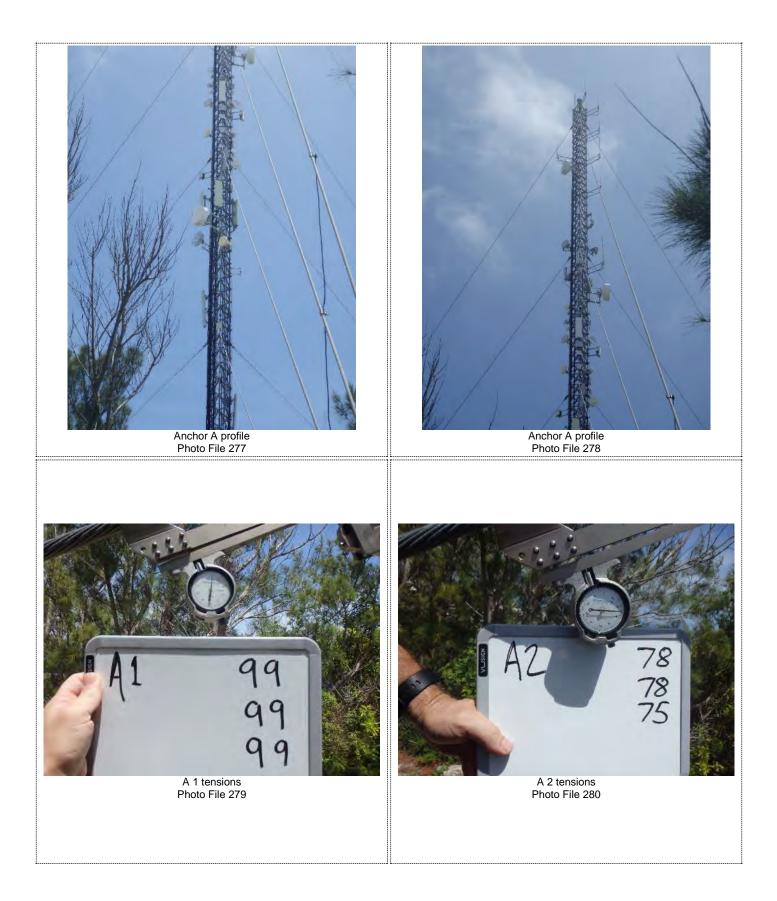


Anchor A Photo File 274

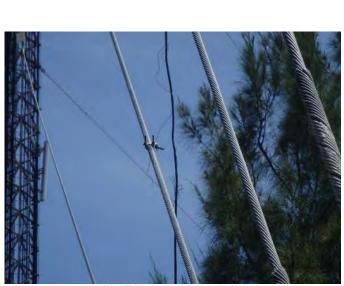


Anchor A profile Photo File 275

Anchor A profile Photo File 276







A 3 disconnected ground wire Photo File 285



A 4 disconnected ground wire Photo File 286



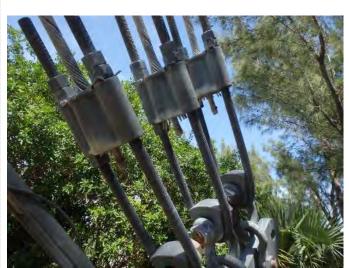
Anchor B Photo File 287 <image>







Anchor B Photo File 297

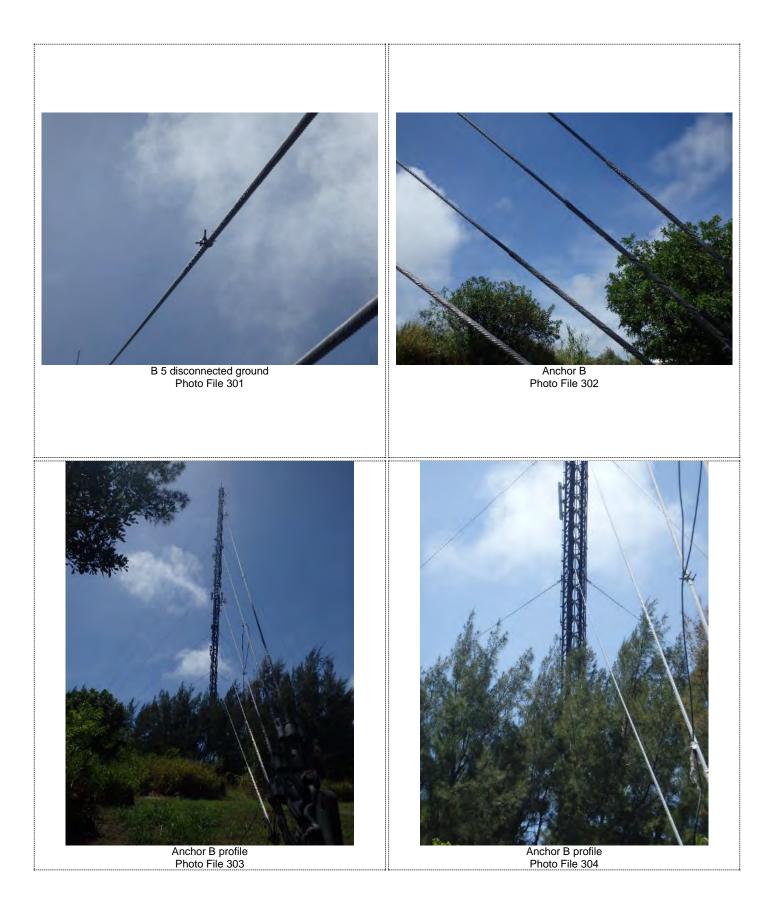


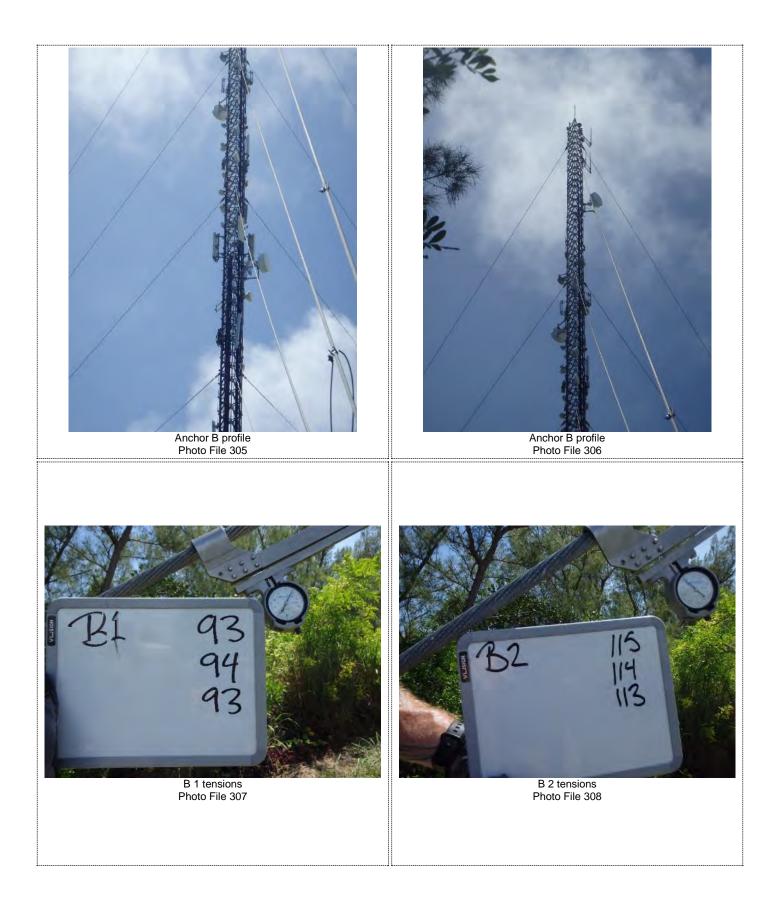
Anchor B Photo File 298

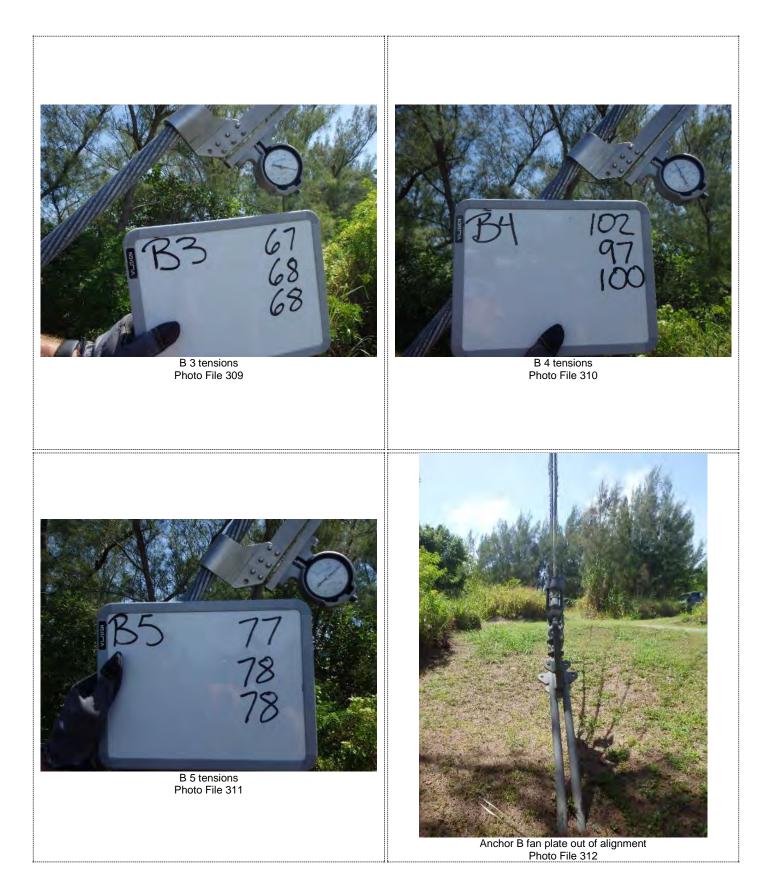


Anchor B grounding Photo File 299









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Anchor C Photo File 313



Anchor C Photo File 314





Anchor C Photo File 317

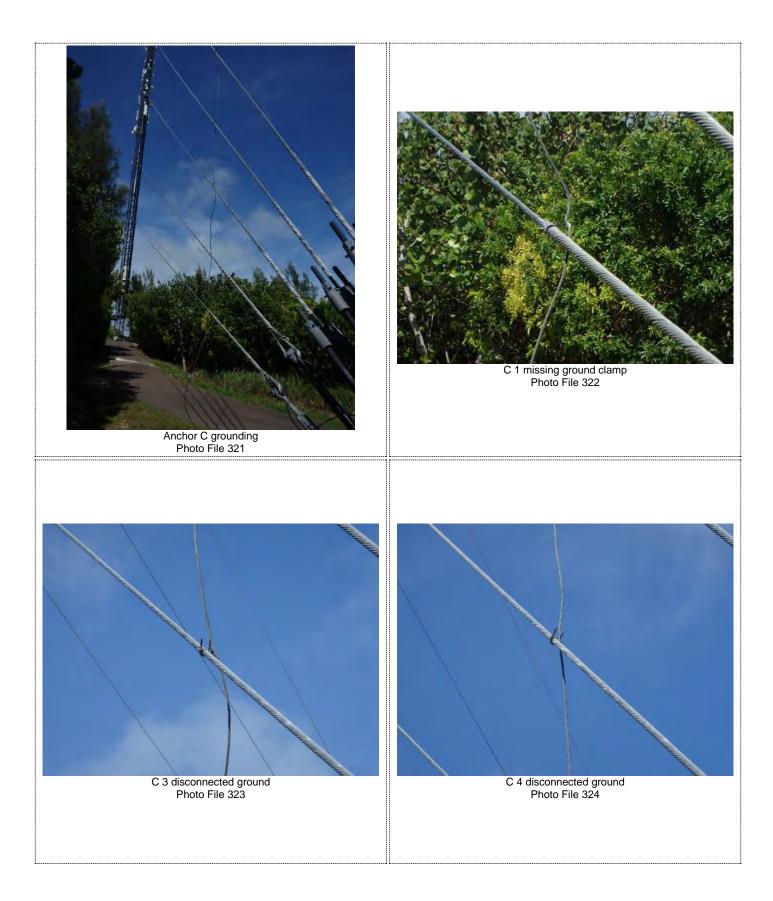


Anchor C Photo File 318



Proventus Structural Services, LLC Please contact Angie Shyrigh for any questions regarding the content of this report. (614) 312-8107 or <u>angie @proventusonline.com</u>

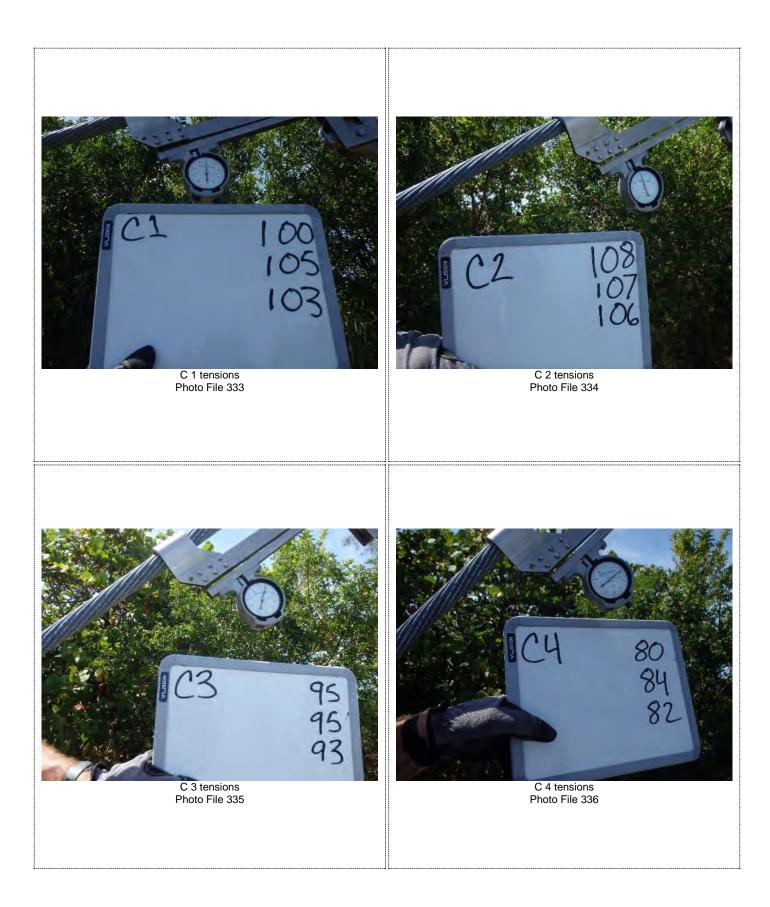
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