ENVIRONMENT CANADA
MAINTENANCE INSPECTION

21.6m (70.9 ft) KNOCK-DOWN
SELF-SUPPORT TOWER

WGJ Montreal River Harbour, Ontario

Prepared by:

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Prepared for:

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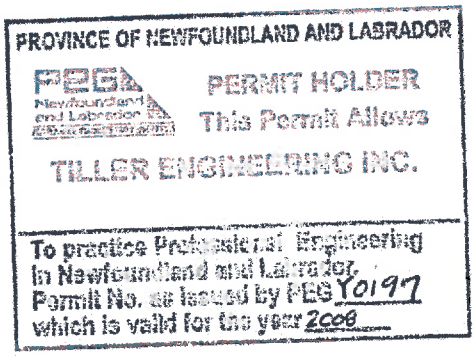


1.0 SITE INFORMATION

Site Name:	WGJ Montreal River Harbour	
Tower Owner:	Environment Canada	
Coordinates:	Latitude:	N 47° 14' 52"
	Longitude:	W 84° 35' 45"
Tower Structure:	Height:	21.6 m (70.9 ft.)
	Construction Type:	4 Leg Self-support, Knock-down
	Panel Height:	Varies
	Face Width:	Varies
	Manufacturer:	CWSR-81 Design
Site Access:	4WD	
Inspected by:	Joe Parsons & Keith Martin. B. Tech.	
Personnel on site:	Bruce Murray of Environment Canada	
Weather Conditions:	-12°C, 1.5 mph NW,	
Date of Inspection:	February 20, 2008	
Project Manager:	Leonard Szarko, P. Eng.	
Report Preparation:	Joe Parsons/Keith Martin	
Report Review:	Jonathan E. Walsh, P. Eng.	
Report Approved By:	Jonathan E. Walsh, P. Eng.	

2.0 SCOPE

Tiller Engineering Inc. was retained by Environment Canada to perform tower maintenance inspections as per Appendix D of CSA S37-01 Antennas, Towers, and Antenna-Supporting Structures.

3.0 INSPECTION OBSERVATIONS

3.1 GENERAL SITE

A. General: The compound was snow covered but appeared satisfactory. See Appendix A, Photo #7.

B. Access: The access road to site was snow covered and steep. A four-wheel drive is required for access.

C. Fencing: The site fence exhibits minor surface corrosion on various locations. See Appendix A, Photos #12 and #13.

Fence grounding connections exhibits moderate surface corrosion. See Appendix A, Photo #12.

D. Security: The compound fence has barbed wire installed and a locked gate.

There is no anti-climb installed at the base of the tower.

E. Due Diligence: There is no site warning signage installed on tower compound fence or tower. Warning signs on building doors are satisfactory.

3.2 TOWER STRUCTURE

A. Tower Members: The tower members located behind the ladder access to the radome exhibits heavy surface corrosion. See Appendix A, Photo #14.

B. Connections: The tower connections appear satisfactory.

C. Foundations: The four foundations appear satisfactory. See Appendix A, Photo #2.

3.3 STAIRS AND FALL ARREST SYSTEM

A. Stairs: The hand rail and steps exhibits minor surface corrosion. See Appendix A, Photos #11 and #14.

B. Fall Arrest System: The tower is not equipped with a fall arrest system. The stairs and platforms are equipped with a hand rail. See Appendix A, Photo #5.

3.4 ANTENNAS AND TRANSMISSION LINES

A. Antennas: The 5.5 m radome appears satisfactory. See Appendix A, Photo #3.

The mounting hardware for antenna # 2 exhibits moderate surface corrosion. See Appendix A, Photo #20.

The second Di-pole on antenna #3 has one missing u-bolt. See Appendix A, Photo #17.

B. Transmission Line: All transmission lines are connected with Ty-wraps. The transmission lines are not grounded.

C. Antenna Building This tower is not equipped with an antenna building on the tower.

Antenna Schedule:			
Ant #	**Antenna Type and Model**	**TX Line**	**Azimuth (TN)**
1	Ticon 18 foot	Hard Line	Omni
Comments:	Model EEC s/n:84-1		
2	Yagi	½ Andrews	169 Degrees
Comments:	Located on face 2-3 at 12 feet		
3	Yagi	3/8 Andrews	169 Degrees
Comments:	Located on face 2-3 at 20 feet		
4	210-C4	½ Andrews	116 Degrees
Comments:	Located on face 1-2 from 30 -50 feet		
5	One dipole antenna	½ Andrews	20 Degrees
Comments:	Located on the bottom of antenna # 4 at 30 feet		
6	210-C4	½ Andrews	291 Degrees
Comments:	Located on Leg 4 from 50 – 70 feet		
7	SD-218 VHF antenna	7/8 Andrews	281 Degrees
Comments:	Located on Leg 3 from 50 – 70 feet		

3.5 WAVEGUIDE BRIDGE, PORT AND CABLE TRAYS

A. Waveguide Bridge: The waveguide bridge appears satisfactory. See Appendix A, Photo #5.

B. Waveguide Port: The waveguide port appears satisfactory. See Appendix A, Photo #4.

3.6 GROUNDING

A. Tower: The tower grounding appears satisfactory.

B. Waveguide Post: The waveguide posts are not grounded.

C. Equipment Shelter: The area was snow covered; building grounding was not determined.

D. TX Grounding: The TX lines are not equipped with grounding at the waveguide port, the base of the tower or at the antenna.

3.7 OBSTRUCTION MARKING

A. Lighting: The lighting summary is as follows:

Light	Type/Make	Location	Elev. m (ft.)	Ice Shield (Y/N)	Teck Line (in)
1	D.O.L	Top	21.6(70.8)	N/A	Unknown
Comments: D.O.L's were on photocell located on radome.					
2	Access Lights				
Comments: Tower access lights were working at time of inspection.					

B. Paint: The tower was not painted.

C. Lighting electrical: Junction boxes and electrical conduit exhibits moderate surface corrosion throughout the tower. See Appendix A, Photos #8, #9 and #10.

3.8 GALVANIZING

A. General: The tower and tower components exhibits minor to moderate surface corrosion throughout.

3.9 EQUIPMENT SHELTER

A. Condition: The two (2) buildings on site appear satisfactory.

B. Electrical: The buildings electrical components appear satisfactory.

3.10 ADDITIONAL COMMENTS

- There is a snow meter located at the base of the tower with no protection from falling ice. See Appendix A, Photo #16.

4.0 ALIGNMENT & TWIST

A. Tower Alignment: The tower alignment is within allowable tolerances.

B. Tower Twist: The tower twist is within allowable tolerances.

5.0 CONCLUSIONS AND RECOMMENDATIONS:

Item	Description	Priority
1	Install engineered anti-climb at base of tower access stairs "use Marion Bridge anti-climb as a reference".	A
2	Install site warning signage indicating falling ice and RF hazard on fence perimeter.	A
3	Install hangers and hardware for all TX lines throughout tower.	B
4	Install ground kits for all TX lines.	B
5	Install bus bar and ground lead for TX lines in tower.	B
6	Install bus bar and ground lead at base of tower and port entry.	B
7	Install grounding to existing waveguide post.	B
8	Install missing u-bolt in the second di-pole on antenna #3.	B
9	Wire brush and cold galvanize all corroded fencing components.	C
10	Wire brush and cold galvanize corroded tower members behind ladder leading to dome.	C
11	Wire brush and cold galvanize corroded hand rail and steps.	C
12	Wire brush and cold galvanize corroded antenna mount for antenna #2.	C
13	Replace or wire brush and cold galvanize all corroded electrical components throughout the tower.	C
14	Replace corroded bolts in the platform grating.	C
15	Replace corroded bolts in grounding connections on site fence.	C
16	Relocate photocell to a more accessible location.	C

Priority Rating System A Priority Rating System of A, B, C, D or E is to be placed on each conclusion. Recommendation, or item identified in the tower inspection report as requiring attention. The ratings are related to safety, structural integrity, system performance, and proper maintenance of the tower and attachments. In all cases, safety of the public and Environment Canada personnel is of paramount importance.

Priority A—Safety – Includes items or faults which, if not corrected, may lead to collapse or failure of the structural system or antenna or may pose a threat to the safety of personnel that might be on site. Such faults would include:

- Damaged members
- Loose connections
- Excessively poor alignment of the tower or guy tensions
- Extreme corrosion of structural elements
- Damaged guys or hardware
- Lack of adequate daylight and night obstruction markings

Priority B—Performance – Includes items or faults, which have or will significantly impact on the quality or reliability of transmission signals. These faults are generally related to:

- Antennas and transmission lines, their mountings, connectors, and groundings.
- Loose connectors, safety cables, and anti-rotation chain at anchors (on FM and AM towers).
- Poor guy grounding on low band VHF transmitters, which may also result in poor performance.

Note – Priority A and B have to be addressed as soon as possible, if not completed during the inspection. If there are issues of a critical nature, they should be reported to the control base when discovered.

Priority C—Maintenance – Includes items or faults, which do not have a immediate effect on the performance or safety but rather items and faults, if not corrected, will in time shorten the service life of the antenna or tower or its elements. Faults in this category might include:

- Corrosion on parts such as conduit and lighting hardware.
- Other non-structural elements and minor corrosion on structural elements.
- Damage grounding of the tower base and guys.

Priority D—Future Attention – Includes items or faults, which require attention during the next scheduled visit. These faults are not expected to cause further damage or outages if corrections of the item or fault, is delayed.

Priority E—Housekeeping – Includes items or faults related to the general condition of the transmitter site, access road, which when corrected will improve the overall workmanship and ease of maintenance at the site. Includes items such as condition of:

- Ladder, Safety Rail, Anti-climb
- Access Road, Fencing, Gate, Locks
- Antenna and Transmission Line
- And the Ease of Access to the Site.

APPENDIX A
PHOTOGRAPHS

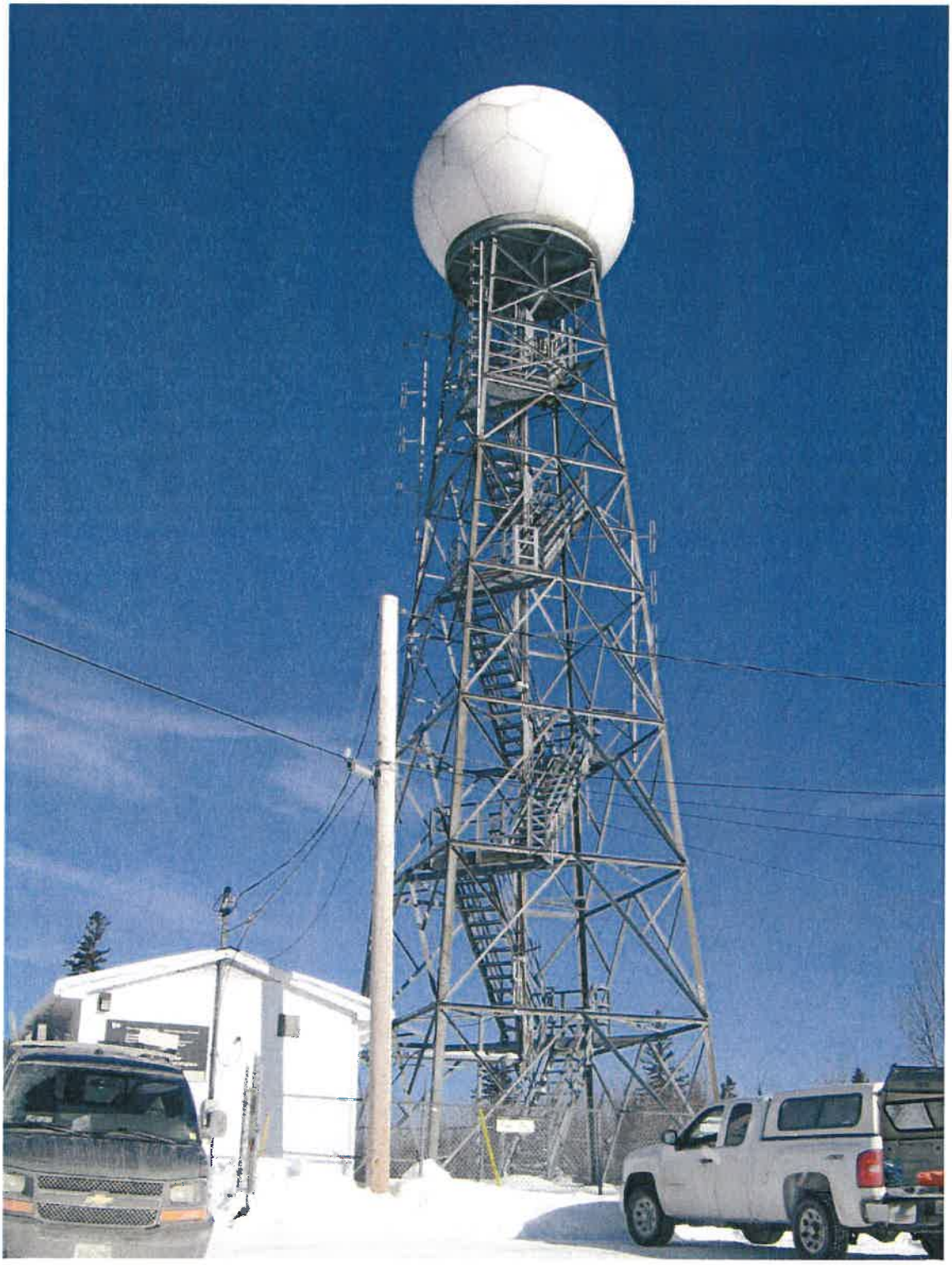


Photo #1: Tower Profile

Photo #2: Tower Foundations Typical 4 Locations

Photo #3: Radome

Photo #4: Port Entry

Photo #5: Wave Guide Bridge

Photo #6: Site Layout

Photo #7: Fencing

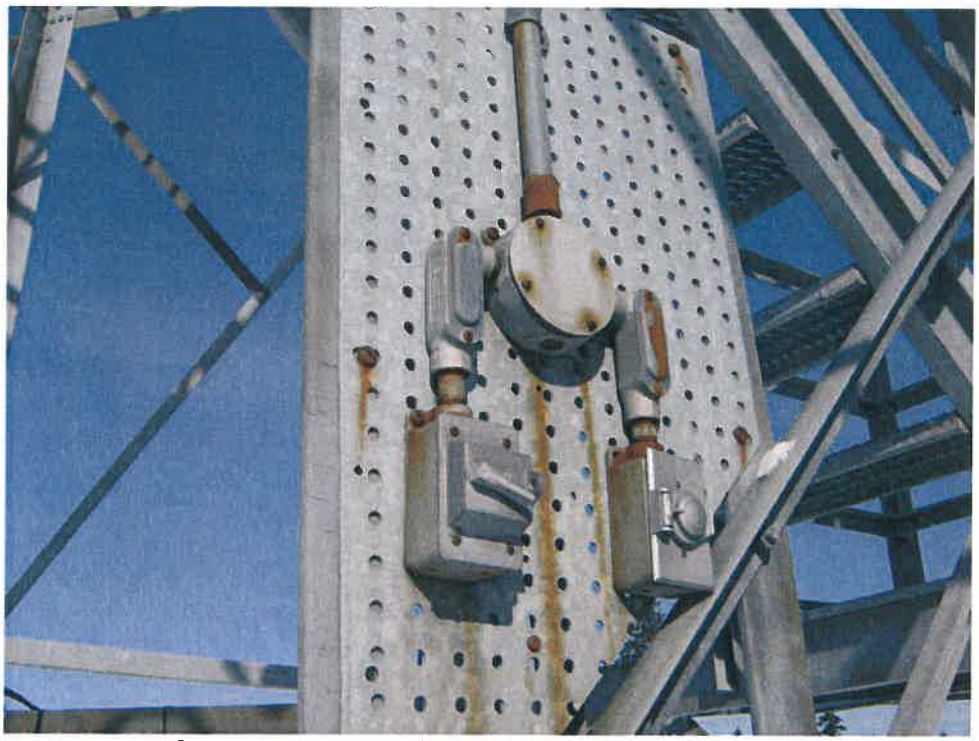


Photo #8: Corroded Electrical Components

Photo #9: Corroded Electrical Conduit

Photo #10: Corroded Electrical Control Box

Photo #11: Corroded Steps

Photo #12: Corroded Fencing Components

Photo #13: Corroded Fencing Components #2

Photo #14: Corroded Tower Members

Photo #14: Corroded Tower Members

Photo #15: Un-secured TX Lines

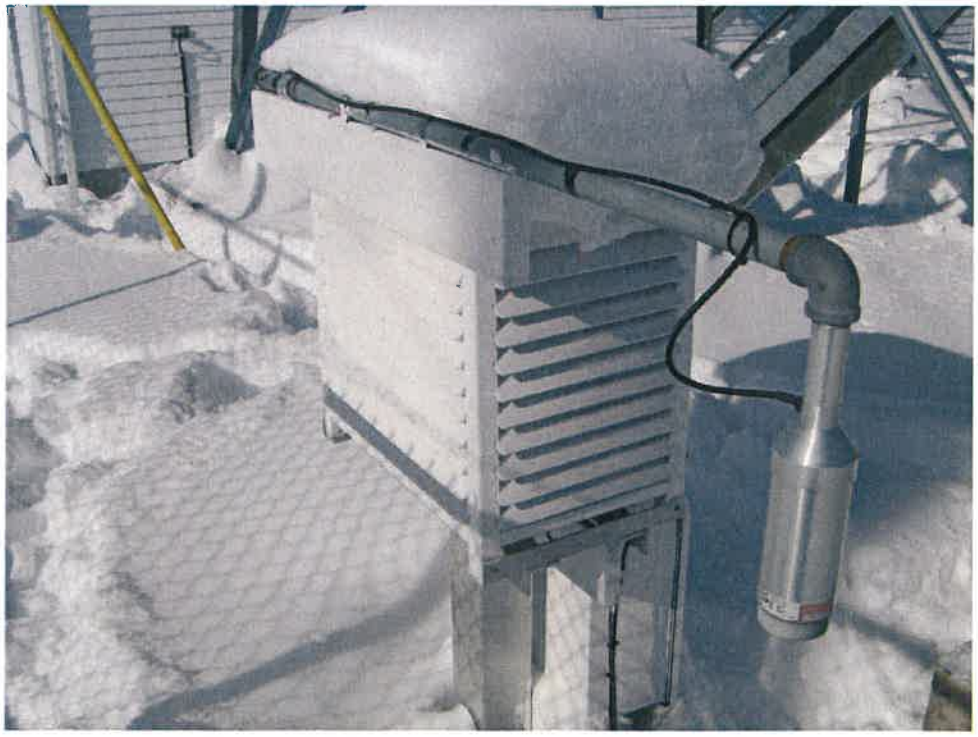


Photo #16: Un-Protected Snow Meter

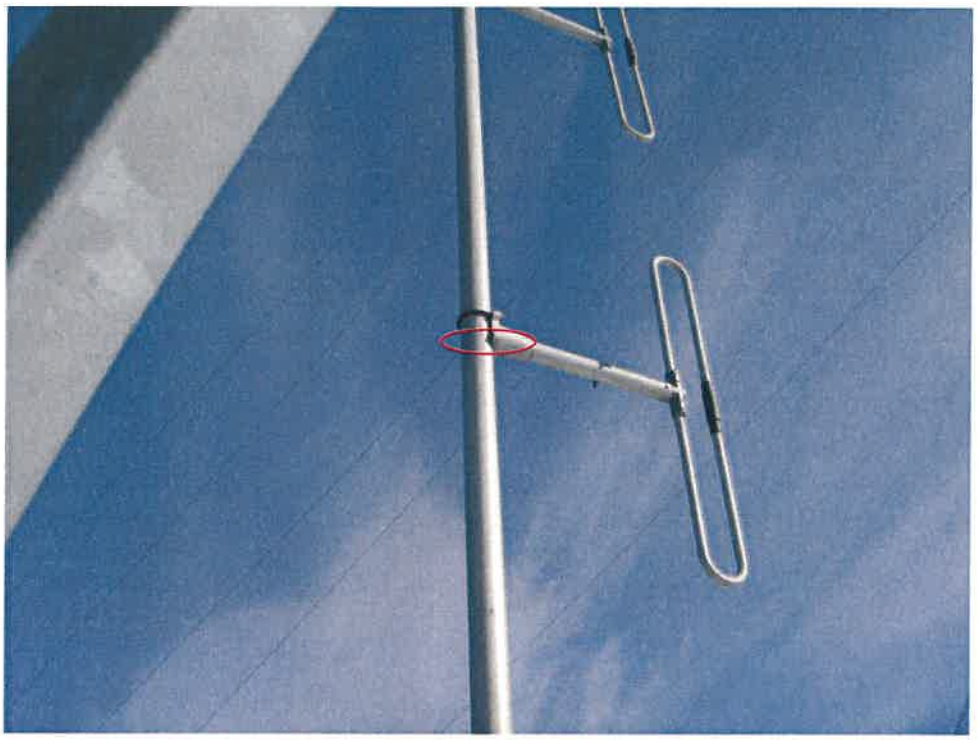


Photo #17: Missing U-Bolt

Photo #18: Corroded Plate Bolts

Photo #19: Corroded Grating Bolts

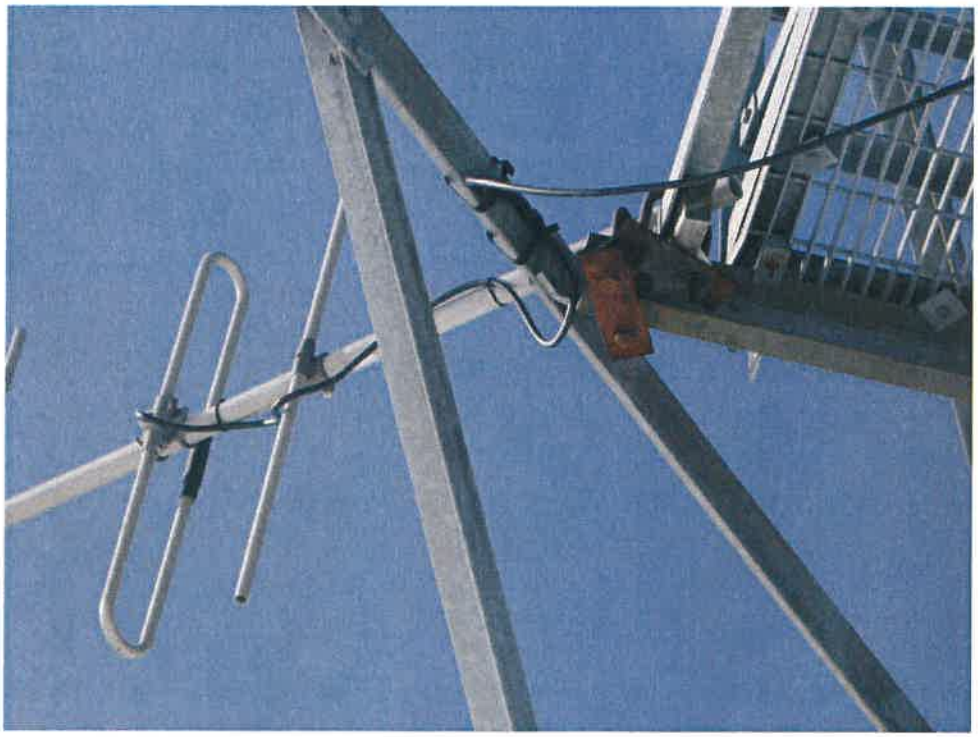


Photo #20: Corroded Antenna Mount

USE OF INFORMATION IN THIS REPORT

This report was prepared by Tiller Engineering Inc. for the client noted for purposes described in the "Scope of Work" in this report. The material reflects Tiller Engineering Inc.'s best judgment based on the information made available, at the time of report preparation and the time allocated to complete the work. This inspection is not a guarantee or warranty of the installation.

Any use which a third party makes of this report or reliance on or decisions made based on it, are the responsibility of such third parties. Tiller Engineering Inc. accepts no responsibility for damages, if any, suffered by any third party or use of the report information by anyone, outside the specific indicated scope, as a result of decisions made or actions based on this report. Further, any use outside the specific indicated scope is done at the full responsibility of the user. Maximum liability pursuant to this report is the total fee received.

MAINTENANCE REVIEW SAMPLING PROCEDURES

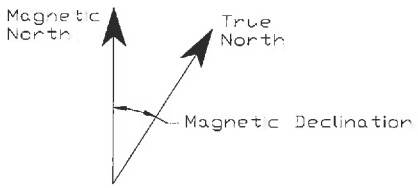
The tower inspection is limited to a random visual sampling of the steel tower members, bolts, connections, antennas, anchors, appurtenances and associated equipment. Sampling is defined as a set of observations and/or measurements on a subset of the whole that may be considered characteristic of the structure as a whole. It provides the ability to analyze the entire system and comment on general conformance. The size of the sample is based on the scope of work as defined by the client, previous information that is made available, and knowledge of the structure and systems. All inspections are performed in accordance with CSA Standard S37-01, Antennas, Towers, and Antenna-Supporting Structures. This sampling generally conforms to the guidelines noted in Appendix D of CSA Standard S37-01, Antennas, Towers, and Antenna-Supporting Structures. This inspection is not a guarantee or warranty of conformance of either component of the installation.

The inspection sampling refers to surface inspection observations only, except as noted otherwise. The foundation, guys and anchor hardware inspection is limited to an above grade surface inspection of these systems. No subsurface investigation was performed.

DISTINCTION BETWEEN TRUE AND MAGNETIC NORTH

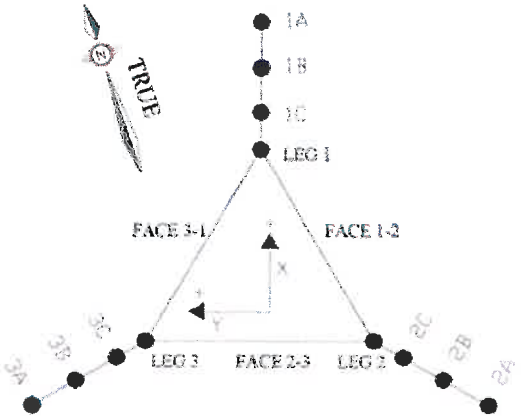
Magnetic North is the direction in which a compass points as determined by the Earth's magnetic field. This direction is constantly changing with time. True (or Geographic) North is the direction to the North Pole and is the basis for most maps because it is constant. The difference between True North and Magnetic North is called Magnetic Declination. According to Natural Resources Canada the Magnetic Declination in Montreal river, Ontario for the year 2008 is roughly 7º 23' West.

In all reports and calculations created by Tiller Engineering Inc. True North is used unless otherwise specified.



INSPECTION REFERENCES
Tower Orientation:

1. The tower legs and anchors are referenced clockwise from true north with Tower Leg 1 and Anchor 1 being the first clockwise from North.
2. If a guyed tower has only one anchor at each azimuth, anchors B and C at each azimuth can be omitted.
3. A face is labeled according to the legs between which it lies. For example, Face 1-2 is the face between Leg 1 and Leg 2.
4. When there is a torsion resistor at a guy elevation and therefore two guys at that level, the left and right guys are as observed from the anchor base, facing the tower.



Tower Alignment and Twist:

1. Measurements of deflections in the X and/or Y directions are measured from behind the anchor furthest from the base of the tower (Anchors 1A, 2A and 3A).
2. Counter clockwise tower rotation is taken as positive. (i.e. A tower leg as viewed from the associated anchor has moved to the right)

Guy Tensions:

1. Tensions are measured using a pulse or swing technique as per CSA Standard S37-01, Antennas, Towers, and Antenna-Supporting Structures.
2. Guy tension measurements are adjusted for the temperature at the time of making the measurements.
3. Initial tension is between 8% to 15% of the breaking strength, typically 10%, unless noted.

Antenna Schedule:

1. All antenna azimuths are from field measurements unless noted.
2. All elevations are to the center of the antenna unless noted. VHF and whips are referenced to their base unless noted. FM and TV antennas are referenced to bottom and top out to out unless noted.

Tower Mast:

1. Face width is the horizontal distance bolt to bolt unless noted.
2. Panel height is the vertical distance bolt to bolt of horizontals unless noted.
3. All elevations are referenced from the bottom of the tower leg (above star/tapered base).