

# ENVIRONMENT CANADA MAINTENANCE INSPECTION

## 21m (68.9 ft) KNOCK-DOWN SELF-SUPPORT TOWER

XNI Lasseter Lake, Ontario

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**Prepared by:**



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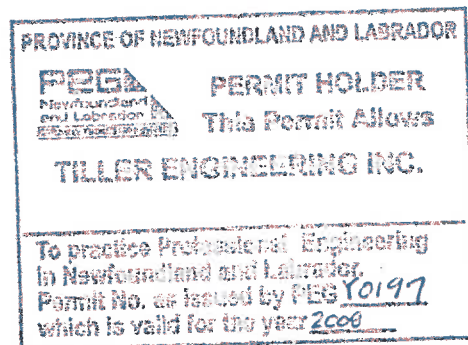
**Prepared for:**

**Environment Canada  
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## 1.0 SITE INFORMATION

**Site Name:** XNI Lasseter Lake

**Tower Owner:** Environment Canada

**Coordinates:** Latitude: N 48° 51' 17"  
Longitude: W 89° 07' 17"

**Tower Structure:** Height: 21 m (68.9 ft.)  
Construction Type: 4 Leg Self-support, Knock-down  
Panel Height: Varies  
Face Width: Varies  
Manufacturer: Unknown

**Site Access:** 4WD

**Inspected by:** Joe Parsons, Keith Martin B.Tech.

**Personnel on site:** Mike Michon of Environment Canada

**Weather Conditions:** -13°C, 1.5 mph NW,

**Date of Inspection:** February 22, 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 #6.
- B. Access:** The tower is located approximately 500 feet off the main road. Access road was cleared of snow at time of inspection.
- C. Fencing:** The site fence is shared with Bell Canada. The fence appears satisfactory. See Appendix A, Photos #1 and #6.
- D. Security:** The site has barbed wire installed and locked gates. There is a locked anti-climb gate at the base of the stairs to the tower. The anti-climb gate is inefficient to prevent entry. See Appendix A, Photo #9.
- E. Due Diligence:** There are no site warning signs installed on fence perimeter to indicate falling ice or RF hazards.
- Bell Canada has a sign on gate to indicate shut-down require from Environment Canada before climbing Bell Canada's tower. See Appendix A, Photo #20.

#### 3.2 TOWER STRUCTURE

- A. Tower Members:** Diagonal on Face 1-2 at 6 feet has minor damage to galvanizing. See Appendix A, Photo #18.
- All other tower members appear satisfactory.
- B. Connections:** 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:**

Two bolts were loose in hand rail on fourth level of stairs "tighten by Tiller while on site".

**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 5.5m Ticon Radome appears satisfactory. See Appendix A, Photo #3.

The Yagi antenna on face 2-3 appears satisfactory.

**B. Transmission Line:**

The TX line for the Yagi antenna was broken clear from 0 to 20 feet. Ty-wrapped on by Tiller. See Appendix A, Photo #17.

**C. Antenna Building**

The tower is not equipped with an antenna building.

Antenna Schedule:			
Ant #	Antenna Type and Model	TX Line	Azimuth (TN)
1	EEC, s/n: 81-4	Hard Line	Omni
Comments:			
2	Yagi	LMR-600	152 Degrees
Comments: Located on face 2-3 at top of tower.			

### 3.5 WAVEGUIDE BRIDGE, PORT AND CABLE TRAYS

- A. Waveguide Bridge:** The waveguide bridge appears satisfactory. See Appendix A, Photo #5.
- B. Waveguide Port:** Seal is broken on PVC pipe entering building. See Appendix A, Photo #4.

### 3.6 GROUNDING

- A. Tower:** The tower grounding on leg two (2) was broken. Repaired by Tiller. See Appendix A, Photos #14 and #15.
- B. Waveguide Post:** The eight waveguide posts were not grounded.
- C. Equipment Shelter:** The wind guard at the main entrance was damaged. See Appendix A, Photo #13. The remainder of the shelter appeared satisfactory.

### 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		N/A	Unknown
<b>Comments:</b> D.O.L's were on photocell located on radome.					
2	Tower access Lights				
<b>Comments:</b> Access lights were working at time of inspection.					

- B. Paint:** The tower was not painted.
- C. Lighting electrical:** Teck cables going up tower are secured with light duty Ty-wraps.

### 3.8 GALVANIZING

- A. General:** Bolts holding down platform grating

exhibits minor surface corrosion.

### **3.9 EQUIPMENT SHELTER**

**A. Condition:**

The equipment shelter appears satisfactory.

**B. Electrical:**

The equipment shelter electrical components appear satisfactory.

### **3.10 ADDITIONAL COMMENTS**

- Grounding appears to be uncovered at base of tower.
- Fence grounding was not determined due to snow cover. Recommended grounding for all corner post and every second interior post.

### **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:**

<b>Item</b>	<b>Description</b>	<b>Priority</b>
1	Install engineered anti-climb at base of tower access stairs to tower "use Marion Bridge anti-climb as a reference"..	A
2	Install warning signage indicating falling ice and RF hazard on fence perimeter.	A
3	Replace existing exterior outlets with GFI approved outlets.	A
4	Install grounding to the eight (8) waveguide post.	C
5	Install heavy duty Ty-wraps on teck cables going up tower.	C
6	Wire brush and cold galvanize damaged diagonal on face 1-2 at 6 feet.	C
7	Wire brush and cold galvanize corroded handrail at top of tower.	C
8	Replace corroded bolts in grating hold-down clips.	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**

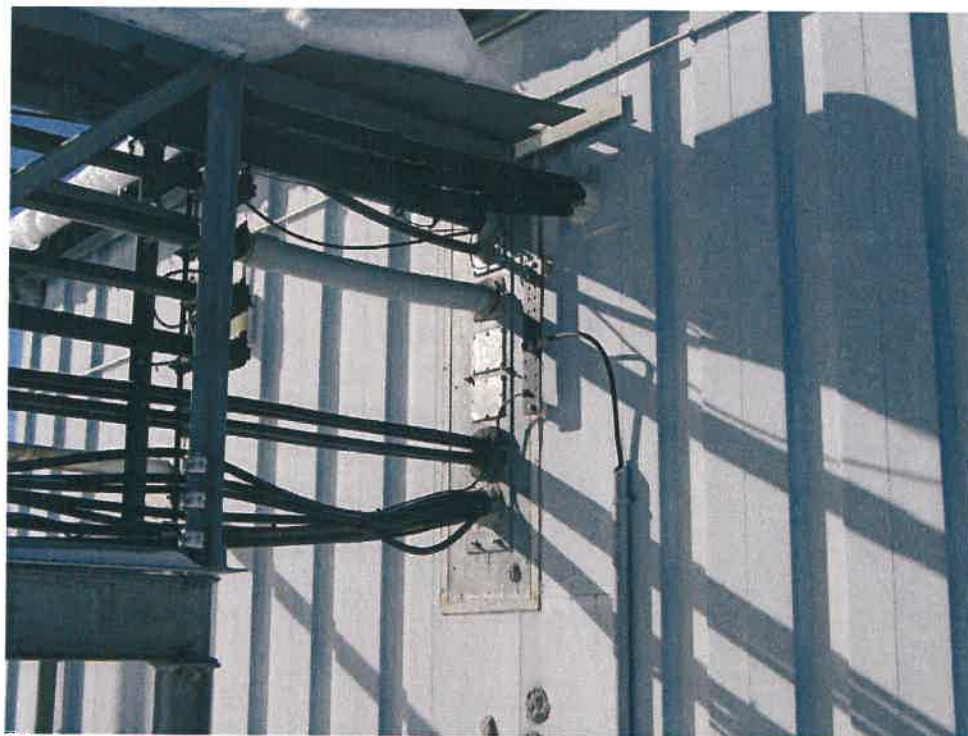


**Photo #2: Snow Covered Foundations**



**Photo #3: Radome**





**Photo #4: Port Entry**



**Photo #5: Integral Stairs and Platforms**



**Photo #6: Waveguide Bridge**



**Photo #7: Waveguide Bridge 2**





**Photo #8: Site Building**



**Photo #9: Anti-Climb**





**Photo #10: Fencing**



**Photo #11: Photocell**



**Photo #12: Tower Outlet**



**Photo #13: Damaged Wind Break**





**Photo #14: Broken Leg Grounding**



**Photo #15: Repaired Leg Grounding**



**Photo #16: Loose Bolt "Tighten by Tiller"**



**Photo #17: Loose TX Line**





**Photo #18: Damaged Diagonal Face 1-2 @ 6 Feet**



**Photo #19: Corroded Hand Rail**



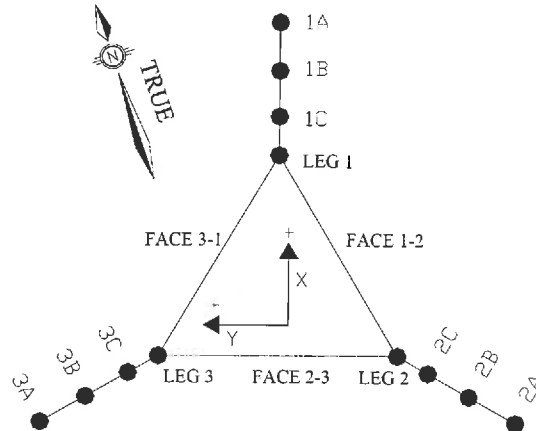
**Photo #20: Bell Canada's Safety Sign**

## **APPENDIX B GENERAL NOTES**

## 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).