

TOWERS: All You Need To Know

1.1 Introduction

On 01 January 2008, a new policy with respect to antenna towers came into effect at Industry Canada. The policy applies to all antenna support structures, including those erected by Amateur Radio operators. You can view the complete policy, CPC-2-0-03 Issue 4, at the following site:

<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>

Though the policy does change things with respect to an Amateur's antenna plans – details below – much remains the same.

- Generally speaking, you are entitled to erect some sort of directional antenna, even if you live in an urban neighbourhood. Many Amateurs are reluctant to install a tower due to an anticipated negative reaction from their neighbours. However, first, a reasonable antenna installation is an ordinary accessory use of a residence and, second, the response of one's neighbours to the installation is often surprisingly accepting. If one takes the time to educate one's neighbours, their response is usually pretty good.
- Although the word "tower" appears throughout this article, the recommended term for public use is "antenna support structure." The word "tower" has a different meaning and image in the minds of neighbours and local authorities.
- Your installation should be reasonable. While "reasonable" is open to interpretation, for normal urban lots you should probably restrict your plans to a tower with one HF Yagi or Quad antenna and the usual VHF/UHF antenna(s), with the overall height (including antennas and mast) less than 15 m. Such an installation is common, and therefore improves the argument that you are operating within the limits of your certificate qualifications. When deciding where to erect your tower, ensure that no part of your antenna will reach beyond the boundaries of your property.
- Record and keep details (including photographs) of the construction of your tower and foundation. These can be useful if an issue arises after the tower and beam have been installed. If a safety issue arises at a later date, these records may prove invaluable.
- Keep the installation as neat as possible, not only to improve safety but to reduce the chance of complaints from the people who have to look at it.

1.2 Industry Canada Policy CPC-2-0-03, Issue 4

Let's look first at the good news in the new policy.

1.2.1 Support Structures and Antennas Less Than 15 m in Height

Most importantly, Amateurs and others erecting a structure of less than 15 metres, about 49 feet, two and one-half inches, including mast and antennas, enjoy some exclusions from the full impact of the new policy. Some of the very detailed requirements of the policy can be avoided by keeping your structure below this height.

However, RAC and Industry Canada strongly recommend that a modified form of some of the requirements be met when any tower is planned. Specifically, the following protocol should be undertaken:

- a) Advise your neighbours, at least those within a circumference of three times the height of your tower, of your plans. A sample letter of notification can be found in Section 1.4.4.
- b) Contact your local Land Use Authority (LUA), which is usually the municipal government, of your plans. Find out what their protocol is. If their protocol seems to be straight forward then go ahead. If it seems to be very restrictive, akin to what you have to do to secure permission for structures 15 m or higher, then you should contact IC. See Section 1.5.7. Also read the fine print to see if the phrase "Amateur" appears anywhere in their policy.
- c) Be prepared to show, if necessary, that the structure and its antenna are sound in terms of engineering,
- d) Be prepared to show, if necessary, that the structure and its antennas comply with Health Canada's Safety Code 6, *Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 KHZ to 300 GHZ* to use the proper title for SC6. This sets out safety requirements for the installation and use of radio frequency devices operating in the frequency range from 10 kHz to 300 GHz. SC6 can be downloaded from the following link. More on SC6 in S1.3.

http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php

It is also available as a download in our Student Success Pages

Copies of documents that can be used for advising neighbours and the Land Use Authority can be found in Section 1.4.

1.2.2 Principal Exclusions

The CPC-2-0-03 Issue 4 policy includes a number of specific exclusions for maintenance of existing structures, and as noted above, installation of new structures of less than 15 m in height. These relieve the operator of the otherwise complicated requirements for notice to the LUA and the public, and some other requirements, in the following circumstances.

- When maintaining existing radio apparatus, including the antenna system, transmission line, mast, tower or other antenna-supporting structure.

- Addition or modification of an antenna system (including improving the structural integrity of its integral mast to facilitate sharing). This includes changes to the transmission line or the antenna-supporting structure, or adding radio apparatus to existing infrastructure (a building, water tower, etc.), provided that the addition or modification does not result in an overall height increase above the existing structure of 25% of the original structure's height.
- Maintenance of an antenna system's painting or lighting in order to comply with Transport Canada's requirements.
- Installation, for a limited duration (typically not more than 3 months), of an antenna system that is used for a special event, or one that is used to support local, provincial, territorial or national emergency operations during the emergency, and is removed within 3 months after the emergency or special event.
- New antenna systems, including masts, towers or other antenna-supporting structures, with a height of less than 15 metres above ground level. It is important to note that the Land Use Authority cannot decrease this 15 m point, above which full LUA and community consultation is required. If your structure is below that height, by federal policy, you are excluded from onerous consultation requirements.

1.2.3 Support Structures and Antennas More Than 15 m in Height

And now the bad news! For planned structures of 15 m or more in total height, IC policy provides no “wiggle room”. You have to follow one of two paths:

- 1) The protocol of your local LUA.
- 2) If your LUA has no protocol then you must follow the default IC protocol as outlined in CPC-2-0-3.

Regardless of the protocol you follow, getting permission for larger structures will not happen overnight as you will see. Your plans should accommodate the prescribed delays in the protocol. The following is an outline of the key points in the Industry Canada protocol, including prescribed delays and waiting periods:

- Distribution of a formal notice of intent that you plan to erect a tower. It must be distributed to local citizens (at least to those within a radius of three times the height of the tower), to the land use authority, and to Industry Canada. Sample documentation will be found in Section 1.4.
- If the planned structure will exceed 30 metres (about 98 feet, five inches) in total height, the proponent must also publish a notice of intent in the community newspaper. In a small community, the choice of a community newspaper for publication of notice may be simple. In a large city, this notice can be published in a neighbourhood newspaper and need not be in one of the major daily newspapers in that city. If your community is not served by a newspaper, a sign on your property may suffice. It is recommended that you consult with Industry Canada in such a situation.
- The land use authority must be allowed 120 days to respond, but they may extend that period by providing notice to the proponent that they intend to do so.

- The public must be allowed 30 days to respond.
- The proponent must address all "reasonable and relevant" concerns, must "resolve them in a mutually acceptable manner", and must keep detailed records of this process.
- After responding in writing to a question or concern, the proponent must allow an additional 21 days for that person or authority to respond.
- The proponent must be prepared to show why he/she cannot use an existing tower or building instead of erecting a new tower.
- The proponent must secure from the land use authority, at the close of the 120-day consultation, a formal notice of its approval; informal staff approval (i.e. telephone contact) will not be sufficient;
- The proponent must show that the Canadian Environmental Assessment Act has been reviewed and that any actions required to comply with it and any local environmental assessment rules have been undertaken; if a formal environmental assessment is required (very rare, but possible, for example, if the tower is near a waterway) the proponent must complete the required assessment process.
- The proponent must provide a written attestation that the erected system is in compliance with Health Canada's Safety Code 6 for protection of the general public, and must retain evidence of measurements and analysis done to prove that attestation and make it available to Industry Canada upon request.
- The proponent must notify nearby broadcast stations, and ensure compliance with Transport Canada / NAV Canada aeronautical traffic safety requirements.

1.3 Safety Code 6 (SC6)

Up to frequencies of 300 MHz, which cover the Amateur HF and VHF bands, and really only commencing at frequencies above 100 MHz, SC6 says that exposure limit for the general public should be 2 Watts per square metre continuously over a 6 minute period.

Disraeli said that there were three kinds of falsehoods: white lies, damned lies, and statistics. To overcome any concerns about your proposed tower and antennas you might find it useful to present some statistics to your LUA.

We have pointed you towards the site for SC6. You might also be interested in the FCC bulletin that covers the same area.

http://www.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65b.pdf

Now on to practical matters. Let's evaluate the following system.

- 8 Element Yagi with 8dBi of gain
- Height 10m above ground adjacent to a bungalow 10m x 10m point. For purposes of evaluation let's point the antenna so that it crosses the center of the house.
- Transmitter output is 100W. We are going to assume lossless feedline.
- We are going to assume 100% duty cycle at this time.

Before we get further into looking at what's happening, there are two terms that must be understood.

- Public Limit (Uncontrolled in the USA) is the closest location that the general public may approach. Or in simple terms, build a fence to prevent access.
- Worker Limit (Controlled in the USA) is the closest a worker may approach before other precautions must apply.

We'll do a calculation for persons standing 5m (16.5 feet) from the tower. Are they safe?

1) The old method of doing analysis was to look at the power and maximum gain of the antenna and run the calculation using these values to determine the level of exposure. We will use the calculator at the web site below: One has to change metres to feet, and multiply the final value by a factor of 10 to convert from mW per square centimetre to W per square metre. Don't forget to select "effects of ground reflections".

http://hintlink.com/power_density.htm

Using ground reflection we get the following results.

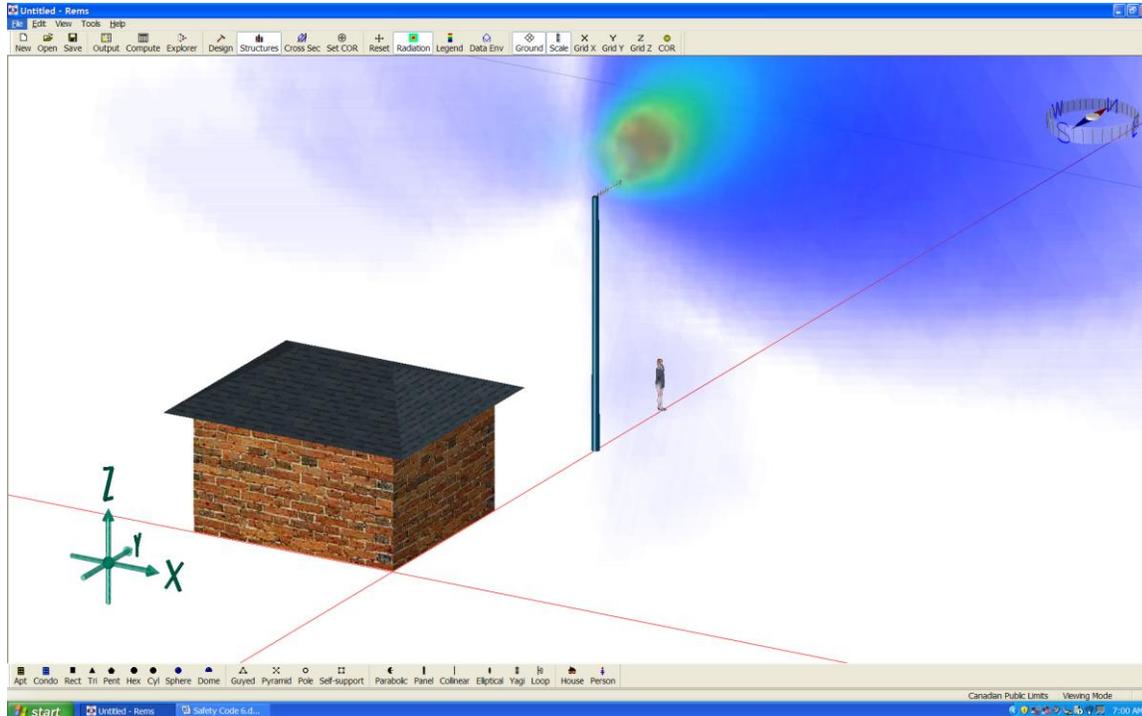
Public limit occurs at 8.03 m (26.35 feet)

Worker limit occurs at 3.6 m (11.61 feet)

In the notes of the results it does suggest that antenna pattern may be used to reduce the exposure (which is the correct way). However this is more difficult in determining the result. A far more accurate method is visual demonstrated in the graphical images in the next section. Safety Code 6 (SC6) is based on the frequency of operation. This means that allowable power levels vary based on frequency. You might want to run scenarios for other frequencies and power levels through the same calculator.

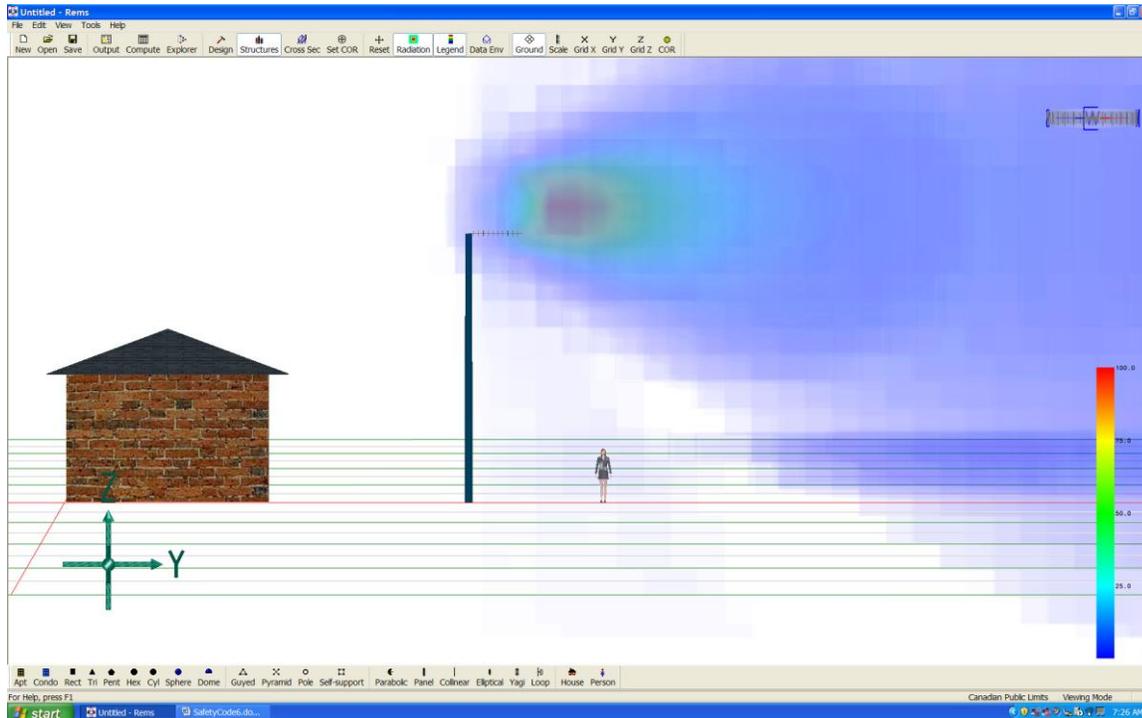
2) Based on the initial statement when looking at antenna farms, or various antennas located in close proximity to one another, we might look at the combined totals of all the antennas. When they are on the same bands as defined by SC6 the calculation is relatively easy. However when the frequencies cover several bands, this now becomes difficult. Remember our initial statement.

A tool that performs this type of analysis is REMS by *i2s Technologies Inc.*, a Canadian company. The major strength of REMS is that it does an analysis on all frequencies from 1MHz to 150GHz simultaneously for all of the antennas entered in to an 800m x 800m x 800m area. This type of analysis creates over 500 million data points per antenna for a full view coverage calculation. Here is the graphical presentation of the solution using the REMS software for the scenario presented earlier.



With REMS we can present the data visually. In REMS the antenna data must be supplied so that it can accurately account for all directions.

In the illustration image has been rotated to clearly show our installation. If you are viewing either image in colour blue is below the 1% level and red is 100% or greater than the allowable limit..



As we can clearly see, no need for concern. However with the calculator used previously a false concern may have been raised. What these images don't show is that the images can be rotated in all direction and zoomed in for detailed comparison.

1.4 Documentation You Will Need To Collect

The following documents should be collected **before** approaching your local LUA about the installation of your support structure and appurtenant antennas, especially if you hoping to erect a tower/antenna combination greater than 15 m in height. The intention here is to ensure that you have covered every concern the LUA may express. Each of these will be referenced as an appendix and should identified on your table of contents on your submission cover sheet. This is included in the Sample Documentation Section 1.4.

- A plot plan of your property, showing the outline of your house and the site of the proposed antenna support structure. Be sure to include distances from the antenna support structure to the lot lines. Normally this would be the distance to the front and back lot lines, and to each side lot line. If you are planning to use a Yagi or a quad you should determine it "footprint", the maximum distance it will reach as measured from the centre of your antenna support structure. You will need to consider this before you site your antenna support structure. If your antenna is going to extend over your property line then you have to adjust the location of the base of your structure to accommodate this or get your neighbour's agreement in writing. You also need to consider future expansion, i.e. installation of an antenna with a larger footprint.

Source: Your mortgage papers normally include a plot plan, which should be adequate, unless you have made any additions to your house.

- A plan showing the lots in your neighbourhood and the streets within the "3X" radius, measured from the base of your antenna support structure. This plan shows where home are located on the lots, and includes names/addresses/telephone numbers of the owners.

Source: Your town's planning and zoning department.

- A specification sheet from the manufacturer of your antenna support structure for your brand and model. If possible, it should specify: model number, height, load it will bear (weight expressed in kg or lbs.), and maximum wind load in sq.m. or sq.ft. at a given wind velocity..
- Construction plans for the base and erection of your antenna support structure (including guying, if appropriate).
- A specification sheet for any proposed antenna(s), showing weight (expressed in kg or lbs.) and wind load expressed in sq. m. or sq. ft. at a given wind velocity.
- A specification sheet for the rotor you will be using.
- A letter of permission from the landlord if the applicant is not the home owner).
- A copy of your homeowner's general liability policy, or at least a cover sheet from your insurance agent, stating you have coverage.
- A copy of the letter you sent to your neighbours advising them of the proposed structure – see Section 1.4.4.
- A copy of the required newspaper notice if your structure is to be more than 30 m in height or the alternate approach you employed if you do not have access to a local newspaper.
- A copy of your IC Amateur Radio qualification certificate(s).
- A copy of the IC guide for your local LUA. You can download this at the following site:

<http://strategis.ic.gc.ca/epic/site/smt-gst.nsf/en/sf08839e.html>

1.5 Samples of Documentation You Will Have To Prepare To Assist With The Installation of Radio Amateur Antennas and Supporting Structures

You have probably surmised that you will have a lot of paper work to complete when you deal with your local LUA. We are providing some samples of documentation that you can employ. You will have to decide which ones you will use and number them accordingly. The following documents should be used as guidelines only and modified as necessary to meet the specific criteria of your installation. These documents have been generated after discussion with Industry Canada, municipalities and Radio Amateurs, and are provided to you to assist you in following the guidelines imposed by Industry Canada. RAC by no means warrants or guarantees that by following the process you will be able to erect the antenna and supporting structure that you desire, but it should provide a good basis in assisting you in dealing with a local LUA and your neighbours.

1.5.1 SAMPLE LUA NOTIFICATION LETTER[YOUR LETTERHEAD]

[Date]

[Municipality]

[Address]

[Date]

Attention: Land Use Authority

To Whom It Might Concern:

Re: Proposed Antenna Support Structure Installation at [Your Municipal Address and/or Legal Description]

I am the registered owner [or tenant] of the above-noted property and an Amateur Radio Operator qualified pursuant to the provisions of the Radiocommunication Act. In order to operate within the limits of my Industry Canada Certificate, I wish to erect an antenna support structure at this address.

The details of my proposed installation are attached.

The regulator of the Amateur Radio Service is Industry Canada, under the Radiocommunication Act Industry Canada expects Amateur Radio operators and Land Use Authorities to comply with all aspects of CPC-2-0-03 Issue 4, effective January 1, 2008.

I would be pleased to answer any questions that you may have with respect to the proposed installation or provide any further information. You may contact me at [your telephone number].

As time is of the essence with respect to my proposed installation I would be grateful if you could advise me if you have any concerns at your earliest convenience.

Yours truly,

[Your signature]

cc: IC District Office

1.5.2 SAMPLE INFORMATION SHEET FOR LUA [Use this as a cover page for your notification submission to your LUA]

- Name of Applicant:
- Call Sign
- Class of Certificate issued by Industry Canada:
- Certificate Held Since:
- Address of Applicant: (City or Town, Province, Postal Code)
- Home Telephone - Area Code: Number:
- Work Telephone - Area Code: Number:
- Can you be called at work? (Y/N) ___
- Name of Property Owner, if Different from Applicant:.
- Distance to Nearest Property Line:
- Number of Neighbours Within 3X the Height of Antenna Support Structure:

1.5.3 SAMPLE NOTIFICATION DOCUMENT

NOTIFICATION TO [Town/City] of [Name] LAND USE AUTHORITY OF PROPOSED INSTALLATION OF A SUPPORT ANTENNA STRUCTURE

Submitted by:

[Name of Applicant]

[Address of Applicant: (City or Town, Province, Postal Code)]

[Home telephone: Area code and telephone number of applicant]

Work telephone: [Area code and telephone number, or omit]

[Date]

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1) PREAMBLE

This is a notification to a local authority for the erection and maintenance of a private, non-commercial antenna system for personal use by the Applicant, an individual authorized by Industry Canada under the authority of the Radiocommunication Act. [Name] is the holder of an Amateur [Basic/Advanced] Class Certificate, Call Sign [].

[Name], and has been authorized to operate by the Government of Canada since [year]. A copy of my Amateur Radio Operator Certificate is attached as **Appendix []**.

[Name] is the [an] owner of the property located at [Address].

[Alternative:]

[Name] has the permission of the property owner to erect this antenna system. Permission is attached as **Appendix []**.

An Amateur Radio antenna system is normally carried above the roofline, and Amateur Radio, inherently non-commercial, the antenna system is an ordinary accessory use of a residence.

2) DESCRIPTION OF THE PROPOSED SYSTEM

a) The Support and Base

[Name] proposes to erect a support manufactured by [____ Manufacturing Company], Model number [], to a height of [] metres. A copy of the manufacturer's specification sheet is attached as **Appendix []**.

The support will be guyed at in accordance with the manufacturer's instructions for the proposed height. See **Appendix []**.

[Alternative:]

The tower is unguyed at this height, as the tower is designed to hold the weight and wind load of the proposed antennas without guying under such circumstances.]

[Alternative:]

In addition, the support will be bracketed to the house at a height of __ metres.] The system has been designed for wind loading of [] kg/per square metre/lbs. per square foot, equivalent to a wind speed of [] km/h or miles/hour.

When installed as designed, the support, according to the manufacturer's specifications, is capable of holding [] square metres/ square feet of antennas at the top.

A property plot plan, showing the outline of the house and the site of the proposed antenna support structure is attached as **Appendix []**. This shows distances from the base of the proposed antenna support structure to the various lot lines.

Base: Details of the construction of the base are in **Appendix []**.

b) The Antenna(s)

The following antenna(s) will be mounted on the support structure. Copies of the manufacturer's specifications are attached as **Appendix []**.

Description of Antenna #1:

- Manufacturer:
- Model Number:
- Type: (Yagi, vertical, cubical quad)
- Weight of the antenna: __ kg/lb
- Wind Load of Antenna #1: ____ square metres/ square feet):
- Maximum Transmitter Power Output into Feed Line for Antenna #1:
- Type of Feed Line (place an X): RG -58 __, RG-8X __, RG-213 __, Other __
- If other, specify loss per 100 ft in dB: __ dB
- Maximum Forward Gain of Antenna #1:

Description of Antenna #2:

- Manufacturer:
- Model Number:
- Type: (Yagi, vertical, cubical quad)
- Weight of the antenna: __ kg/lb
- Wind Load of Antenna #2: ____ square metres/ square feet
- Maximum Transmitter Power Output into Feed Line for Antenna #2:
- Type of Feed Line (place an X): RG -58 __, RG-8X __, RG-213 __, Other __
- If other, specify loss per 100 ft in dB: __ dB
- Maximum Forward Gain of Antenna #2:

Description of Antenna #3:

- Manufacturer:
- Model Number:
- Type: (Yagi, vertical, cubical quad)
- Weight of the antenna: __ kg/lb
- Wind Load of Antenna #1: __ square metres/ square feet):
- Maximum Transmitter Power Output into Feed Line for Antenna #3:
- Type of Feed Line (place an X): RG -58 __, RG-8X __, RG-213 __, Other __
- If other, specify loss per 100 ft in dB: __ dB
- Maximum Forward Gain of Antenna #3:

Total wind load of the proposed system: [] square metres/square feet. Safety factor: ____.

Wind load is the equivalent horizontal force that will act on the structure. It is directly related to the surface area of the antenna.

Safety factor describes the ratio between the maximum resistance load and the normal load. For example, if the wind load on an antenna is 10, and the structure can withstand a wind load of 20, the safety factor is 2.

Any wire antennas that may be hung from the structure are inconsequential, and not included in these calculations, as the wire itself will break long before any damage could be done to the support.

c) Site Selection

The proposed site, see site plan attached as **Appendix []**, was chosen because [mounting against the house provided a rigid mounting a significant way up the support / the site is approximately on the mid-line of the property / the site minimizes visual impact on neighbours / and permits location of all guy supports more than [] metres from all lot lines / the Town setback requirement virtually dictated the choice / in addition, the height of the structure does not exceed the distance to any property boundary].

3) WHY THIS HEIGHT?

For communications at frequencies above 30 MHz, trees and buildings cause significant signal loss. Thus, antennas that are above, free and clear of such obstructions, permit the Amateur Radio operator to use significantly lower power levels. These are the frequencies at which most local emergency communications are conducted. In addition, doubling the height of the antenna is considered to be approximately equivalent to doubling the power output. Considered together, these two factors are strong arguments for higher antennas and lower power. For communications at frequencies below 30 MHz, the height of an antenna has a controlling impact on the angle at which signals are transmitted. Unless the antenna is high enough, some paths are simply not open. In other words, communications to certain parts of the world will be strictly limited, or nonexistent with lower antennas, especially lower antennas that are not very directional.

See Utlaut, W.F., Effect of Antenna Radiation Angles Upon HF Radio Signals Propagated Over Long Distances, J. of Research of the National Bureau of Standards D. Radio Propagation, Vol. 65D, No. 2, March-April 1961, pp. 167-174, and Epstein, M.R., et al, AA Comparison of Long-Distance HF Radio Signal Reception at High and Low Receiving Sites, Radio Science, Vol. 1 (new series) No. 7, July 1966, pp. 751, 762.

4) GOOD ENGINEERING PRACTICE

The antenna system will be erected in accordance with good engineering practice and will be permanently and effectively grounded in accordance with the applicable Building Code.

5) INSURANCE

[Name's] standard homeowners policy [renter's policy], [Section ___], provides for personal liability and medical payments coverage due to failure of an Amateur Radio antenna structure, without additional premium. See **Appendix []**

6) PROPERTY VALUES

Research by Amateur Radio Organizations has failed to discover a single study in appraisal literature, or anywhere else, which has tends to show that home values are harmed by the presence of amateur radio antenna systems.

[The following is an optional paragraph which should be included only if the Amateur has the facts to back it up.]

[Alternative:]

[Name] wishes to call attention to the many other amateur antenna systems in [name of municipality], of varying heights, which have existed for some years now.] Abutting and nearby homes have not suffered a decline in value, and have not risen at a slower rate than comparable properties when sold in the open market. Rather, they have increased in value in proportion to property value increases elsewhere in [city/town]. Furthermore, the assessment of those properties has not noted any effect by degrading assessed value on that [those] property [properties]. Nor does [Name] believe that an assessment will reduce the value of this property after the installation of the proposed antenna system.

7) LAW

[Name] wishes to call attention to Federal law that can affect the ability of a municipality to regulate in the area of support antenna structures.

The Radiocommunication Act provides authority for the holder of an Amateur Radio Operator Certificate to operate within the limits of that Certificate. Industry Canada has set out environmental and consultation information that the holder of an Amateur Radio Operator Certificate must follow in erecting a support antenna structure. This is outlined in Industry Canada Document CPC 2-0-03 Issue 4 that is attached as **Appendix []**.

In general, Radio Amateurs must ensure that:

1. Their stations are installed and operated in a manner that causes no adverse environmental effects. See **Appendix []**, Potential of Radio Frequency Interference, and **Appendix []**, Bioeffects.
2. That they consult with their land use authority and their neighbours prior to the installation of the antenna(s) and supporting structure over 15 m in height.

With respect to environmental concerns, Industry Canada expects Radio Amateurs to follow a document published by the Department of Health and Welfare in 1991 referred to as Safety Code 6, Limits of Exposure to Radio Frequency Fields at Frequencies From 10 kHz to 300 GHz. Field strength and exposure time is used to determine if the signal emitted by a radio transmitter can be considered safe.

While Industry Canada requires that Amateur Radio stations meet the requirements of Safety Code 6, generally most Amateur installations will never exceed the recommended exposure limits. There are many reasons for this including the fact that most Amateur installations are operated at relatively low power levels (typically 100 watts), are not on a 100% continuous duty cycle and the amount of transmission time is often limited.

It should also be noted that to meet the requirements of Safety Code 6 it is often necessary for the antenna to be elevated as high as possible. [Name] has reviewed Safety Code 6 and confirms that his/her installation meets all of the safety guidelines.

8) CONSULTATION

Industry Canada expects Amateur Radio operators to address the concerns of the community in a responsible manner and to seriously consider all requests put forward by a Land Use Authority. Industry Canada requires that the Land Use Authority of the municipality be notified of the proposed installation for any installation in excess of 15 m. As outlined in CPC-2-0-03 the regulation of antenna and the supporting structure falls exclusively within the domain of the Federal government. The policy followed by Industry Canada for the erection of support antenna structures by Radio Amateurs does not have the effect of conferring any Federal power on the Land Use Authority nor does it confer any right of veto.

[Name] in accordance with Industry Canada guidelines has notified all of his/her neighbours as identified on the enclosed neighbourhood plan of his/her intention to install the antenna(s) and support structure. The homes are those within the “3 times” radius measured from the base of the proposed structure. This neighborhood plan shows where homes are located on the lots, and includes names and addresses of the owners plus their telephone numbers. See **Appendix []**.

A sample copy of the letter sent to the neighbours is attached as **Appendix []**. You will note that in accordance with the IC guidelines [Name] has invited any of his/her neighbours to contact him/her for further information.

In accordance with Industry Canada guidelines, [Name] is more than happy to answer any questions that you may have with respect to the installation of the antenna and support structure. [Optional]

[Name] does intend to follow the procedure enacted by you for a development permit for the antenna and supporting structure solely for the purposes of furthering the consultation between him/her and the local authority. [Name] by agreeing to follow this procedure and paying any fees with respect thereto is not in any manner accepting the jurisdiction of the local authority to regulate in this area.

CONCLUSION

For the reasons set forth above, [Name] submits he/she has complied with Industry Canada directives with respect to consulting with the local Land Use Authority and neighbours. This document is intended to address any concerns the local authority may have.

Should any questions arise, please feel free to contact me. Respectfully submitted,

[Name]

[Signature]

1.5.4 SAMPLE LETTER TO NEIGHBOURS

Industry Canada say that you should circulate the following letter, or some variation of it, to all your neighbours that fall under the "3X rule. This means all neighbours within 3 times the height of your proposed antenna supporting structure as measured from the base of the structure. If you want to erect an antenna supporting structure that is 15m in height then your target audience are any neighbours whose properties are 45m or less from the base of the proposed structure.

[YOUR LETTERHEAD]

[Date]

[Mr./Mrs. Neighbour] [Address]

Dear _____:

Re: Installation of an Amateur Radio Antenna and Supporting Structure

As you are likely aware, I am an Amateur Radio operator (or a Ham Radio operator, as it is commonly referred to). My Amateur Radio Operator Certificate is issued by Industry Canada under the authority of the Radiocommunication Act. In order to operate within the limits of my certificate of qualifications issued by Industry Canada is my intention to erect an antenna and the accompanying supporting structure. Industry Canada requests that I inform you of my intention to erect this structure and any questions that you may have.

What is the proposed structure? The structure will be a tower manufactured by [] at a height of [] metres. There will be [guy wires/no guy wires] on the tower. At the top of the tower I intend to erect what is called a [Yagi antenna/cubical quad], very similar to a television antenna. This will consist of a boom approximately [____] cm in diameter and [____] m in length. (modify this section as needed).

Running perpendicular to the boom will be a number of elements of approximately ____ m in length and ____ cm in width. The antenna can be rotated at the top of the tower.

Is this structure really necessary? Yes it is. As an Amateur Radio operator I may operate within the limits of Industry Canada's regulations and for effective communications this type of structure is necessary.

Why is that? The higher the antenna, the more efficient it is for communications. By having the antenna at this height, I can communicate more effectively and reduce the amount of power that I need to operate. Having the antenna at this height will assist in meeting safety concerns.

Why can you not continue to use the antenna that you are presently using? There are many reasons for that. The installation I have at the present time is _____. This type of antenna is not very efficient. This requires that I use more power. In short, the type of installation I presently use is not allowing me to operate within the limits of Industry Canada regulations.

Is it really necessary to have a structure that big? Actually, this installation is very much a compromise for an urban area. Amateur operators often have towers 30 m in height with much larger antennas. However, I recognize that that this of installation would not be suitable in an urban area and I have scaled back my antenna and supporting structure to a generally accepted installation for an urban area. At a height of _____

metres, the antenna will not seem as large as described. This type of antenna is very common and very efficient. It can be rotated and pointed in a specific direction where I am attempting to communicate. The elements attached to the boom of the antenna help to direct my signal as effectively as possible.

Why does the antenna have to be at that height? In order to communicate with minimum power and maximum efficiency, the antenna should be as high as possible. The height at which I will be installing the antenna represents a fair compromise between the most efficient height of the antenna and one that is suitable for an urban neighbourhood.

You mentioned the height of the antenna would help with interference and safety concerns?

That is correct. The higher the antenna the less likely it is that there will be radio frequency interference (RFI). I believe my station meets all Industry Canada guidelines for reducing or eliminating radio frequency interference (RFI). For example, my station is well grounded and has the appropriate filtering devices installed. Unfortunately there is no national standard in Canada that manufacturers of electronic consumer devices must follow to ensure such devices are not subject to radio frequency interference. Some less expensive televisions, radios and other electronic devices may suffer from what is called “breakthrough” even though my station has been properly grounded and filtered. In those circumstances Industry Canada requires that I work with you to try and eliminate or reduce any “breakthrough”, but in some cases due to the manufacturer’s design it is impossible to completely eliminate this interference. If you do suffer from RFI, I would be more than happy to work with you to try to rectify the problem. In addition, Industry Canada has a very informative video that explains how one can reduce or eliminate interference to consumer equipment.

What about safety? As an Amateur Radio operator, I am required to meet the guidelines published by the Department of Health and Welfare in 1991 referred to as Safety Code 6, Limits of Exposure to Radio Frequency Fields at Frequencies from 10 kHz to 300 GHz. I am confident my installation meets all of the requirements of Safety Code 6.

Why is that? I have heard conflicting stories about how safe emissions are from radio transmitters?

There is conflicting evidence as to possible health effects from radio transmitters. However, there is no need to be concerned with my installation. The typical power I run is ___ watts, which is the same type of power emitted from a standard household light bulb. Further, the type of operating I do is not at 100% duty cycle and my transmissions are limited to evenings and weekends. The Radio Frequency (RF) exposure from my station will be a small percentage of the maximum exposure limits set out in Safety Code 6. In short, the transmissions from my station are negligible and in any event will meet all of the guidelines in Safety Code 6. Further, the antenna at the height I wish to use ensures that any RF transmissions are above the surrounding houses.

How safe is the structure? The structure is extremely safe. The tower sits in a cement base of ___ cubic metres of cement. The antenna and its supporting structure can survive wind gusts up to ___ km/h. Barring a freak act of nature it is extremely unlikely that the support structure will fail. Should it fail it will not topple like a chimney but will collapse upon itself.

What about lightning? The antenna and its supporting structure are properly grounded and I have taken all steps to protect my station from lightning. In fact, as lightning will follow the best path to the ground, the support antenna structure will provide a cone of protection to surrounding houses from any lightning strikes.

What about safety for my children? The location of the tower will be in my backyard, which is fenced off from other structures. In addition, I will be installing anti-climb devices on the tower to dissuade anyone from attempting to climb the structure.

I am a little confused about Amateur Radio -is it the same as CB? Amateur Radio operators are licensed or certified in nearly all countries of the world and provide an efficient and secondary communications link. In order to qualify for an Amateur Radio Operator Certificate in Canada one must pass fairly stringent exams dealing with radio theory, radio regulations and operating practices. Amateur Radio provides a vital service to the community. For example, when the Hurricane Katrina struck New Orleans a few years ago, Amateur Radio was the only communications link in and out of the city for some time. Amateur Radio operators also assist the local community to provide effective communications for many non-profit events such as [here make reference to some of the local activities amateurs are involved in].

What if I have any further questions?

I would be happy to answer them or sit down with you to explain in detail the proposed installation. I can be reached at _____. If you have any major concerns I would be most appreciative if you could submit these to me in writing.

[Your signature]

1.5.5 Sample Appendix []: POTENTIAL OF RADIO FREQUENCY INTERFERENCE

Some neighbours may be concerned about the likelihood of radio frequency interference (RFI) to radiosensitive equipment (RSE). [Name] would refer to Industry Canada **Client Procedure Circular 3-14-01 Determination of Harmful Interference With Respect to Radio-Sensitive Equipment**.

Industry Canada takes the position that with respect to RFI:

Both users of the radio frequency spectrum and users of radiosensitive equipment (RSE) have a right to have a reasonable expectation that they may enjoy the use of their equipment. When those rights conflict, one requires a resolution process. Industry Canada takes its authority to make determinations as to the existence of RFI pursuant to Section 5(1)(l) of the Radiocommunication Act. However, Industry Canada makes it clear that they have no responsibility to resolve cases of RFI and will limit its activities to the following:

- Recommending co-operative efforts with the radio apparatus owner.
- Recommending that complainants contact the manufacturer or distributor (or their service agents) of the affected equipment for assistance; and
- Referring complainants to various self-help information products available.

In addition, the regulator makes it clear that where RSE owners refuse to co-operate, Industry Canada will indicate that the RSE owner's sole recourse is to improve the immunity of their equipment or accept the consequences of the RFI. It also notes that where owners of radio transmitting apparatus are unwilling to work with the RSE owner toward the solution, Industry Canada may place limits on their authority to operate.

After all mutual avenues of resolution have been explored, Industry Canada may make a formal determination as to whether RFI exists and whether it is the fault of the transmitting station. Industry Canada will charge the RSE owner a fee for making such determination in the event the investigation determines that the RSE is lacking in immunity.

Nonetheless, amateurs generally, and [Name] in particular, are prepared to offer aid beyond the requirements of CPC-3-14-01, working closely with neighbours who may be affected by radio transmissions and scientific experiments. [Name] pledges his cooperation with any individual who may be affected, whether or not an abutter.

The erection of this antenna system will have a tendency to DECREASE, not increase, the likelihood of television interference, as higher antenna systems, with directional arrays, are farther away from neighbouring sets, and transmit over nearby homes. Lower, wire antennas, erected in trees, or from a house to a tree, for example, have a greater likelihood of interference, as they would direct more energy toward a neighbouring TV set.

1.5.6 Sample Appendix []: SETBACK

The careful reader of this application will note that the height of the proposed antenna structure is greater than the distance from its base to the nearest property line. Despite this fact, the site was carefully chosen with the best interests of the community in mind. Accidents involving such structures are rare.

The most likely method of failure occurs when a nearby tree falls, as a result of a storm, on a guy wire. The tower is then pulled in the direction of the guy wire that was struck. As it comes down, the antenna system and the tower catch on trees and branches of trees, and the antenna structure remains up, but at a 20 - 40 degree tilt. As the antennas atop the tower are likely to have a wingspan of 6 - 15 metres, this is the most likely scenario. Something will catch, and the system never reaches the ground.

The other failure mode, which may occur when an antenna system is completely out in the open, involves a tower twisting and buckling. In effect, the structure corkscrews onto the ground. Towers do not fall the full length of their height.

It should be noted that incidences of damage caused by a falling antenna system are so rare that the presence of an Amateur Radio antenna system has no impact on the cost or availability of insurance for the homeowner.

1.5.7 SAMPLE APPENDIX - INDUSTRY CANADA LETTER #1 – For use when your LUA appears to be unaware of the changes outlined in CPC-2-0-03

[YOUR LETTERHEAD]

[Date]

Industry Canada District Office
[Address]

To whom it Might Concern:

Re: Proposed Antenna Support Structure Installation
[Your Municipal Address and/or Legal Description]

I am an Amateur Radio Operator holding the call sign [your call sign] under the authority of the Government of Canada and wish to erect an antenna support structure at the above-noted address. In that respect, I intend to comply with the requirements mandated by Industry Canada as set out in CPC-2-0-03 Issue4.

In the course of preparing the documentation to submit to my local Land Use Authority for my proposed support antenna structure, I have become aware that the Municipality of [your municipality] has enacted a bylaw [reference by-law name and number] that purports to limit the height and location of antenna support structures. They seem to be unaware of the latest version of CPC-2-0-03, nor are they familiar with the IC Guide to Assist Land Use Authorities in Developing Antenna Siting Protocols

I have written to the municipality suggesting that their by-law is ultra vires and would not be applicable to federally licensed antenna support structures. A copy of the reply from the municipality is attached. You will note the municipality has taken the position the the by-law is enforceable against Amateur Radio installations.

It is my intention to fully comply with CPC-2-0-03 Issue 4 and consult with the municipality with respect to the proposed structure [you may, here, want to include a copy of your submission to your LUA]. Given the position taken by the municipality with respect to the by-law, I would be grateful for the assistance of Industry Canada if the municipality maintains with respect to the height and siting of my proposed installation.

I would be happy to discuss this issue with you at any time and can be reached at [your telephone number]. If you wish to speak to the municipality directly I understand the appropriate person to speak to is [here you may want to reference the name and phone number of the person at the municipal planning department who would deal with the by-law].

Yours truly,

[Your signature],

c.c. Industry Canada, Regional Office

c.c. [Your Member of Parliament]

1.5.8 SAMPLE APPENDIX - INDUSTRY CANADA LETTER #2 – For use when your LUA has ignored or rejected your submission

[YOUR LETTERHEAD]

[Date]

Industry Canada District Office
[Address]

To Whom It Might Concern:

Re: Proposed Antenna Support Structure Installation
[Your Municipal Address and/or Legal Description]
Call Sign:[your Call Sign]

I am in receipt of a letter of [Date] the Municipality of [your municipality], which has taken the position they will not agree to the installation of the proposed antenna support structure [or if the municipality has denied the granting of any kind of permit you should reference that as well].

I do not believe that the municipality has any grounds to deny or oppose my proposed antenna support structure [in practice you will find that local authorities do not give any reasons as to why they are opposed to the installation, but if they do, you should be prepared to address same].

I am of the view that I have fully complied with the consultation requirement as mandated by CPC-0-2-03 Issue 4. I am attaching a copy of my complete submission to my local LUA. [It is also helpful to add if none of your immediate neighbours are opposed to the installation, if that is the case]. Accordingly, I would hereby request that Industry Canada exercise its authority under the Radiocommunication Act and adjudicate this matter.

As time is of the essence for the installation of the antenna support structure, I would appreciate your earliest reply.

Yours truly,

[Your signature]

1.5.9 SAMPLE Appendix []: BIOEFFECTS - SAFETY CODE 6

[Use this section to provide sample calculations as discussed in S4.3]

NOTES