MARKHAM

Report to: Development Services Committee Report Date: January 17, 2012

**SUBJECT:** RECOMMENDATION REPORT:
Update to Policy for Establishing Telecommunication Facilities (PR 11 128702)

**PREPARED BY:** Anna Henriques, Senior Planner, extension 7922

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**RECOMMENDATION:**

1) That the report dated January 17, 2012, entitled, "Update to Policy for Establishing Telecommunication Facilities (PR 11 128702)", be received;

2) That the document attached as Appendix "A", entitled, "Policy for the Establishment of Telecommunication Facilities", be adopted;

3) And That Staff be authorized and directed to do all things necessary to give effect to this resolution.

**PURPOSE:**

The purpose of this report is to update the Town's existing Policy for the Establishment of Telecommunication Facilities (June 2009), as outlined in this report and the attached draft policy (see Appendix "A").

**BACKGROUND:**

**Introduction**

Radiocommunication and broadcasting services have become an integral component of the way society operates today. These services are used daily by the public, safety and security organizations, government, wireless service providers, broadcasters, utilities and businesses. In order for radiocommunication and broadcasting services to work, antenna systems including masts, towers and other supporting structures are required. There is a certain measure of flexibility in the placement of antenna systems which is constrained to some degree by the need to achieve acceptable coverage for the service area, the availability of sites, technical limitations and safety. Municipalities are challenged with balancing the location and design requirements of the proponent while also minimizing the impact of telecommunication facilities on the community and local surroundings.

**Jurisdiction**

The federal government has exclusive and comprehensive jurisdiction over telecommunication facilities. The Radiocommunication Act appoints Industry Canada as the approval authority for the location and operation of telecommunication facilities in Canada. Due to the federal government's exclusive and comprehensive jurisdiction over telecommunication facilities, traditional land use controls such as zoning by-laws and site plan control do not apply.

**Spectrum Management & Telecommunications Client Procedures Circular (January 2008) (Radiocommunication & Broadcasting Antenna Systems)**

In exercising its mandate to approve telecommunication facilities, Industry Canada has issued a Client Procedures Circular (January 2008) ("CPC 2-0-03") which generally

outlines the process and responsibilities to be followed by anyone seeking to install or modify an antenna system (the "proponent"). There are four areas that the proponent is responsible for, prior to obtaining Industry Canada approval and installing a telecommunication facility, as outlined in Industry Canada's CPC – 2-0-03, and generally described below:

1. Investigating the sharing or use of existing infrastructure such as locating an additional antenna on an existing telecommunication tower or other existing support structure such as a rooftop, water tower, utility pole, etc.
2. Consulting the local municipality (if required). Depending on the nature of the proposed telecommunication facility, municipal consultation may or may not be required, as per Industry Canada requirements (CPC – 2-0-03). This will be discussed further in this report.
3. Consulting with the Public (if required). Depending on the nature of the proposed telecommunication facility, public consultation may or may not be required, as per Industry Canada requirements (CPC – 2-0-03). This will be discussed further in this report.
4. Satisfying Industry Canada's general & technical requirements such as compliance with Safety Code 6 (Health Canada's safety guidelines for exposure to radio frequency fields: *Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3kHz to 300GHz)*

In addition to the above, CPC-2-0-03 specifically outlines requirements for municipal consultation and public consultation, to be followed by the proponent, in the event that the local municipality does not have it's own policy in place relating to the establishment of telecommunication facilities. Staff note that Industry Canada's CPC-2-0-03 deals primarily with requirements for municipal and public consultation only, there is no guidance with respect to the siting and design of telecommunication facilities.

**Industry Canada encourages local municipalities to establish policies relating to the establishment of telecommunication facilities**

Industry Canada recognizes the importance of municipal consultation as part of the approval process for telecommunication facilities and relies on local municipalities to provide guidance to proponents relating to the optimum siting of facilities, to meet community needs . Specifically, Industry Canada strongly encourages local municipalities to establish a policy framework outlining their preferences regarding public consultation requirements and the location and design of telecommunication facilities. Such a policy serves to guide proponents, as well as municipal staff, when considering and commenting on proposed telecommunication facilities within their municipality.

Due to federal jurisdiction over telecommunication facilities, Industry Canada advises local municipalities to establish local policies that are reasonable and no more restrictive than the Industry Canada CPC-2-0-03 requirements.

The Town of Markham established its own policy in June 2002. This policy was last updated in June 2009 (see Appendix "B"). Further revisions to the policy are recommended at this time, to address concerns raised by Council and area residents relating to the siting of facilities in close proximity to sensitive land uses.

**Presentation to Development Services Committee, October 18, 2011**

Staff provided a presentation which reviewed the Town's existing policy relative to Industry Canada requirements. Options for a revised policy, to address concerns raised by Council and area residents, were also presented to the Committee (see Appendix "C").

In addition to the staff presentation, there were also presentations from two industry experts, Mr. Stephen D'Agostino (representing Rogers, Bell and Telus) (see Appendix "D") and Dr. Ray Copes from Public Health Ontario (see Appendix "E"). The purpose of these of presentations was to understand key issues respecting the establishment of Telecommunication facilities: jurisdiction, site section and health concerns.

Mr. D'Agostino's presentation provided a general overview of how wireless telecommunications networks work and identified siting constraints and challenges experienced by service providers. In addition, Mr. D'Agostino provided information on co-location, different types of installations (towers, poles, roof mount, camouflage, etc.) and the emerging Long Term Evolution (LTE) technology which provides high speed data transmission rates and requires placement of supporting facilities closer to end users (ie. residential areas).

Dr. Ray Cope's presentation focused on the potential health risks associated with radio frequency (RF) exposure. Dr. Copes advised, based on medical evidence and research, that there is inconclusive evidence between the possible association respecting environmental exposure to RF-EMF and cancer. Furthermore, Dr. Copes indicated that current medical evidence and research suggests that RF exposure is most problematic only when it occurs very close to the body (ie. cell phone next to your ear).

## OPTIONS/ DISCUSSION:

**Proposed revisions to Town Policy**

Based on the input received from the Development Services Committee meeting on October 18 and further staff review, some additional, minor, revisions are proposed for the Town's new Policy (in addition to what was presented at the October 18 DSC meeting). These minor, additional revisions include:

- For proposals on Town owned lands/facilities and where public consultation is not required, the Town will apply best efforts to finalize the site plan review process as soon as possible
- Municipal letters of non-concurrence shall clearly specify reasons for non-concurrence
- Replacement towers are exempt from requirement for public consultation provided the proposed replacement tower height does not exceed the height of the existing tower by more than 25% and provided the public consultation

notification area for the replacement tower and the existing tower remains the same; and,

- Information required as part of the notification package for community information sessions clearly outlined and consistent with Industry Canada's CPC-2-0-03 requirements.

The following tables outline proposed revisions to the Town's existing Policy as it relates to municipal consultation and public consultation requirements, as well as site selection and design requirements.

| **Municipal Consultation: Exemptions** | | |
|---|---|---|
| **Industry Canada CPC 2-0-03, January 1, 2008** | **Existing Markham Policy (June 2009)** | **Proposed Revisions** |
| • Maintenance of existing antenna systems<br><br>• Additions/Modification of antenna systems on existing structures – max height increase of 25%<br><br>• Maintenance of antenna systems & supporting structures<br><br>• Temporary antenna systems (ie,. max 3 months)<br><br>• New antenna systems & structures less than 15 metres in height<br><br>**despite exemption criteria above, individual/local circumstances vary & may require consultation with the municipality* | • Same exemptions as IC except, new antenna systems & structures less than 15m in height **not exempt** from municipal review<br><br>• All co-locations on existing telecommunication towers<br><br>• Amateur radio telecommunication towers, subject to conditions | • include statement re: consideration of individual/local circumstances & possible need to consult with municipality despite exemptions |
| **Public Consultation: Exemptions** | | |
| • Maintenance of existing antenna system's painting or lighting<br><br>•Addition/Modification of antenna systems on existing structures-max height increase of 25% | • Same exemptions as IC<br><br>•Telecommunication towers within industrial, institutional and commercial zoned areas provided the tower base is located a minimum 120m, or a distance of 3x the height of proposed tower (whichever is | • include statement re: consideration of individual/local circumstances & possible need to consult with public despite exemptions<br><br>• Revise Town exemption: Towers which are located |

| | | |
|---|---|---|
| •Maintenance of antenna systems & supporting structures<br><br>•Temporary antenna systems (ie.max 3 months)<br><br>•New antenna systems & structures less than 15m in height<br><br>** Despite exemption criteria above, individual/local circumstances vary & may require consultation with municipality & public* | greater), away from a residential zone. | within Industrial, Institutional & Commercial zones provided tower is min 120m, or distance 3x height of tower (whichever is greater), away from lands that permit sensitive land uses such as residential uses, schools & daycares<br><br>• Replacement of existing towers provided:<br>i. proposed height of replacement tower does not exceed height of existing tower by more than 25%; and,<br>ii. public consultation notification area for proposed location of replacement tower and existing tower remains the same (ie. location of replacement tower does not generate need to notify additional properties, agencies, etc.) |
| **Public Consultation: Notification Requirements** | | |
| • At minimum, written notice required to the public & neighbouring municipalities within a radius of 3x tower height<br><br>•Proposals>30m-notice in the local community newspaper required | • Community Information Session required.<br>• notice of session required by mail to:<br>i. property owners within a 120m radius or 3x tower height whichever is greater;<br>ii. ratepayer associations<br>iii. Condominium corporations (not individual condo owners)<br><br>• Proposals >45m - notice in the local community newspaper required | • proposals >30m require notice in local newspaper (including description of info required for notice) |

The following table outlines proposed revisions to the Town's existing Policy as it relates to site selection and design.

| Site Selection | |
|---|---|
| **Existing Markham Policy (June 2009)** | **Proposed Revisions** |
| • Maximizing distance from residential zones<br>•Avoidance of sites with natural features & areas of topographical prominence<br>•Use of existing support structures (ie. existing towers, light poles, roofs, etc.), where possible<br>•Avoidance of Heritage Conservation Districts & Heritage Conservation Study Area<br>•Encourage Town owned lands/facilities as possible sites | • Encourage proposals that maximize distance from sensitive land uses, such as residential uses, schools & daycares, where feasible<br>•Encourage avoidance of properties designated or listed under Part IV of the Ontario Heritage Act, where feasible<br>•Encourage integration of telecommunication facilities within new buildings, where feasible |
| **Design** | |
| • Co-location strongly encouraged<br>• minimize visual impact (unobtrusive & stealth design techniques recommended)<br>• compatible w/surrounding area<br>• signage permitted if related to tower, or other on-site land uses, provided it complies with Town sign by-law. | • Encourage public art installations<br>• Co-location encouraged only if facility located a min 120m away from sensitive land uses (stealth design techniques encouraged)<br>• Colours for all components of telecommunication facilities shall be neutral, non-reflective and colour matched, if possible. |

**Consultation with Industry Canada & Service Providers (Rogers, Bell & Telus)**
Staff have consulted with Industry Canada & service providers (Rogers, Bell & Telus) for comment. Both Industry Canada and the service providers were generally supportive of the draft Policy. Based on input received from the service providers and further staff review, the following additional minor revisions, in addition to the ones presented to DSC on October 18, 2011, are recommended for the new Policy moving forward:

The service providers and Industry Canada identified the following concerns with the draft Policy:

- Telecommunication facilities less than 15 metres in height require municipal review
- For proposals that require public consultation, the notification shall be provided to property owners and relevant stakeholders within a radius of 120 metres or 3 times the tower height (measured from the Tower base), whichever is greater
- Towers located within Industrial, Institutional and Commercial zones are exempt from public consultation requirements provided the tower is a minimum of 120

metres, or a distance 3 times the tower height (whichever is greater), away from lands that permit sensitive land uses such as residential, schools and daycares.

The Town's existing Policy requires municipal review for towers less than 15 metres in height, however, they are exempt from public consultation. This requirement is inconsistent with Industry Canada's CPC-2-0-03 which exempts towers with a height of less than 15m from the requirement to consult with the local municipality. This requirement has worked well for the Town in the past and therefore, staff recommend that we continue with this requirement. Staff advised Industry Canada and the service providers that the Town's existing policy states that "in cases where public consultation is not required, the Town shall apply its best efforts to finalize the site plan application process within 2 weeks of receiving a written request from the proponent". Staff propose to keep this provision in the revised policy to address Industry Canada and service provider concerns (Appendix "A").

Regarding notification for public consultation, The Town's existing Policy requires notification within a radius of 3 times the tower height or 120m (from tower base), whichever is greater. The service providers indicated that notification based on a radius of 3 times the tower height would serve as an incentive to keep telecommunication facilities shorter. Staff recommend that the notification requirement remain at 120m or 3 times the tower height, whichever is greater, consistent with the notification radius required for most applications under the Planning Act.

With respect to the public consultation exemption, staff recommend that in order for towers to be exempt from the requirement for public consultation, they must be located in Industrial, Institutional or Commercial areas and away from sensitive land uses such as residential, schools and daycares, to address concerns raised by Council and the general public.

**Conclusion**

Staff have reviewed other municipal policies throughout Ontario and Canada and have consulted with Industry experts when considering potential revisions to the Town's existing policy. The proposed draft policy addresses concerns relating to the siting of telecommunications facilities, outlines the Town's expectations relating to site selection, facility design and consultation requirements, and is generally consistent with Industry Canada's requirements. It is on this basis that staff recommend that the attached draft Policy for the Establishment of Telecommunication Facilities be adopted, to guide proponents and Town staff when considering proposals in the Town of Markham.

**FINANCIAL CONSIDERATIONS AND TEMPLATE: (external link)**

There is the potential for the Town to receive revenue for telecommunication facilities located on Town owned property.

**HUMAN RESOURCES CONSIDERATIONS**

Not applicable

**ALIGNMENT WITH STRATEGIC PRIORITIES:**
The draft Policy aligns with the strategic priority of growth management and providing necessary infrastructure for residents and businesses.

**BUSINESS UNITS CONSULTED AND AFFECTED:**
Not applicable

**RECOMMENDED BY:**

Rino Mostacci, MCIP, RPP
Director, Planning & Urban Design

Jim Baird, MCIP, RPP
Commissioner, Development Services

**ATTACHMENTS:**

Appendix "A" – Draft Policy for the Establishment of Telecommunication Facilities
Appendix "B" – Existing Town Policy for the Establishment of Telecommunication Towers (June, 2009)
Appendix "C" – Staff presentation to DSC, October 18, 2011
Appendix "D" – Service Provider (Rogers, Bell & Telus) presentation to DSC, October 18, 2011
Appendix "E" – Public Health Ontario presentation to DSC, October 18, 2011

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TOWN OF MARKHAM

Policy for Establishing Telecommunication Towers

2012

**INTRODUCTION**

Radiocommunication and broadcasting services have become an integral component of the way society operates today. These services are used daily by the public, safety and security organizations, government, wireless service providers, broadcasters, utilities and businesses. In order for radiocommunciation and broadcasting services to work, antenna systems including masts, towers and other supporting structures are required. There is a certain measure of flexibility in the placement of antenna systems which is constrained to some degree by the need to achieve acceptable coverage for the service area; the availability of sites; technical limitations and safety. Municipalities are challenged with balancing the location and design requirements of the proponent while also minimizing the impact of telecommunication facilities on the community and local surroundings.

This policy applies to anyone (referred to in this document as the proponent) who is planning to install or modify an antenna system, regardless of the type of installation or service. This includes, amongst others, Personal Communications Services (PCS) and cellular, fixed wireless, broadcasting, land-mobile, license-exempt and amateur radio operators.

**JURISDICTION**

The federal government has exclusive jurisdiction over telecommunication facilities. The Radiocommunication Act appoints Industry Canada as the approval authority for the location and operation of telecommunication facilities in Canada. Industry Canada does recognize the importance of municipal consultation as part of the approval process and as such, encourages proponents to consult with the local municipality to obtain their input and comments. In addition, Industry Canada encourages local municipalities to establish a policy framework outlining their preferences with respect to the siting and design of telecommunication facilities, as well as, public consultation requirements.

Industry Canada's most recent release of a "Client Procedures Circular" in June 2007, came into effect on January 1, 2008 ("CPC-2-0-03"). CPC-2-0-03 outlines the process that must be followed by Proponents seeking to install or modify a Telecommunication Tower, where a Land Use Authority (municipality) does not have a consultation protocol. Although Industry Canada has provided a Default Public Consultation Process in CPC 2-0-03, they encourage the establishment of policies from local municipalities recognizing they are best positioned to contribute to optimum siting of facilities to meet their own community needs. The Town of Markham fully recognizes it's role as a commenting agency as part of the approval process for telecommunications facilities.

## OBJECTIVES

The purpose of this policy is to establish a local land-use consultation framework to guide proponents, the Town and the public when considering proposals for possible telecommunication facilities within the Town of Markham. Specifically, the objectives of this policy are:

- To outline a consistent and timely process to be followed by the Proponent and the Town for reviewing and commenting on Telecommunication Facility proposals which are not exempt by this policy;
- To outline the Town's expectations and preferences regarding appropriate site selection and design for telecommunications facilities which encourage proposals that minimize impacts on residents, and respects natural heritage, cultural heritage and sensitive land uses , to the greatest extent possible;
- To establish criteria and guidelines, including timeframes, for evaluating proposals and issuing Municipal Letters of Concurrence or Non-concurrence;
- To provide a clear consultation process that requires proponents to adequately engage and inform the Public, and other required agencies, regarding non-excluded telecommunications facilities;
- To identify the Town of Markham as the designated "Land Use Authority" (LUA) for all lands within the Town of Markham's municipal boundaries.
- To provide for a high calibre wireless telecommunications service, to promote economic development and to meet the business and safety needs of the community.

## CONSULTATION EXEMPTIONS

i. Municipal Consultation Exemptions

The following telecommunication facilities proposals are exempt from the requirement to consult with the Town and do not require the submission of a site plan application:

- Maintenance of existing radio apparatus including the antenna system, transmission line, mast, tower or other antenna-supporting structures
- Addition or modification of an antenna system (including improving the structural integrity of its integral mast to facilitate sharing), the transmission line, antenna-supporting structure or other radio apparatus to existing infrastructure, a building, water tower, etc. provided 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;

- Replacement of ground supported towers provided:
    i) the replacement tower does not exceed the original, existing tower height by more than 25%; and ,
    ii) public consultation notification area for proposed location of replacement tower and existing tower remains the same (ie. location of replacement tower does not generate the need to notify additional properties, agencies, etc.)
- Co-location on an existing Telecommunication Tower; and
- Amateur radio Telecommunication Towers provided:
    a. they are strictly for personal use
    b. the antenna boom or other appurtenance attached to the antenna are more than 1 metre from the property line;
    c. no structure is placed in a front yard; and,
    d. the antenna and associated equipment is less than 10 metres in height;

Despite the above exemptions, individual and local circumstances may vary and it may be prudent for the proponent to consult with the municipality. Therefore, despite a proposal meeting the exclusion criteria above, the following should also be taken into consideration when determining if municipal consultation is required:

- The antenna system's physical dimensions, including the antenna, mast and tower, compared to the local surroundings;
- The location of the proposed antenna system on the property and its proximity to neighbouring residents;
- The likelihood of an area being a community-sensitive location; and
- Transport Canada marking and lighting requirements for the proposed structure.

ii. Public Consultation Exemptions

Public consultation is not required for telecommunication facilities which meet one, or more, of the following criteria:

- All Telecommunication Facility proposals exempt from municipal consultation;
- New antenna systems, including masts, towers or other antenna-supporting structure, with a height of less than 15 metres above ground level.
- Telecommunication Towers within industrial, institutional and commercial zoned areas, where the Telecommunication Tower base is located a minimum of 120 metres or a distance of 3 times the height of the proposed Telecommunication Tower, whichever is greater, away from lands that permit sensitive land uses such as residential, schools and daycares.

In addition to the above, the replacement of an existing tower is exempt from public consultation provided all of the following is met:

- The proposed height of the replacement tower does not exceed the height of the existing tower by more than 25%
- Public consultation notification area for proposed location of replacement tower and existing tower remains the same (ie. location of replacement tower does not generate the need to notify additional properties, agencies, etc.)

Despite the above exemptions, individual and local circumstances may vary and it may be prudent for the proponent to consult with the municipality. Therefore, despite a proposal meeting the exclusion criteria above, the following should also be taken into consideration when determining if public consultation is required:

- The antenna system's physical dimensions, including the antenna, mast and tower, compared to the local surroundings;
- The location of the proposed antenna system on the property and its proximity to neighbouring residents;
- The likelihood of an area being a community-sensitive location; and
- Transport Canada marking and lighting requirements for the proposed structure.

**PRELIMINARY CONSULTATION**

Where not exempt from the requirement to consult with the Town under this policy, preliminary consultation shall be required between the Proponent and Town staff prior to submitting a site plan application. The purpose of the pre-consultation meeting is to:

- Determine if the proposal is exempt from municipal consultation, as outlined in this policy;
- Discuss the appropriateness of the proposed location and/or appropriateness of co-location opportunities;
- Discuss preliminary issues and concerns;
- Review the process to be followed, including possible requirements for public consultation;
- Identify additional documents, drawings, information, etc., required as part of the application;
- application fees;
- Identify list of agencies to be consulted; and
- Consider possible appropriate locations on Town owned land or facilities that may be suitable for the proposed Telecommunication Tower.

The preliminary consultation meeting shall **not** mark the official commencement of the 120-day consultation and site plan review process, between the Town and the Proponent, as identified in the Application Process section of this policy.

Where not exempt from the requirement to consult with the public under this policy, the Proponent will be requested to consult adjacent municipalities within 120 metres or three times the height of the proposed Telecommunication Tower, whichever is greater, by circulating proposals to the Clerk and Planning Director/Commissioner of the adjacent municipality. The Proponent shall provide confirmation of this consultation to the Town.

**APPLICATION PROCESS**

All proposals for telecommunication facilities that are not exempt from municipal review as per this policy, shall be required to submit a site plan application for review. Applications for site plan review shall be submitted to the attention of the Director of Planning and Urban Design.

The Town recognizes that while this policy requires proponents to follow the site plan application review process, site plan approval is not required in accordance with the Planning Act.

Due to the exclusive federal jurisdiction over telecommunication facilities, traditional land use controls such as zoning by-laws and site plan control do not apply. The submission of a site plan application for telecommunication facilities in the Town of Markham merely serves as a framework for consultation with the Town and the public, if required. A site plan application shall be supported by an information package which includes the following information:

- site plan application, including standard submission requirements and applicable processing fee
- site selection/justification report outlining the following:
    - description of other alternatives considered including as co-location, use of existing support structures and other sites;
    - rationale for the proposed site as the preferred option;
    - the purpose of the proposed telecommunications facility
    - a site plan outlining the proposed location of the telecommunication facility and associated equipment with setbacks to existing lot lines and buildings and structures
    - existing and proposed landscaping (including an inventory of existing vegetation and proposed vegetation for screening purposes)
    - colour photographs of the site with the proposed telecommunication facility superimposed
- information required as per municipal building permit process (if required)
- information required as per Conservation Authority permit process (if required)
- environmental Impact Statement, if required, under the existing land use designation
- confirmation of appropriate utility locations, such as gas companies and hydro providers, have been consulted
- confirmation that municipalities and all other public authorities having an interest in the lands located within 120 metres or three times the height of the proposed telecommunication facility, whichever is greater, have been consulted

The Town, when it receives an application for a Telecommunication Tower, shall:

- circulate the application to relevant departments and external agencies, including the local ward councillor, for information and comment. All comments received will be forwarded to the proponent;
- work with the proponent to address all reasonable and relevant concerns as identified through the application review process and/or public consultation process. If revisions are required to plans, these should be submitted to the Town;
- Provide guidance to the Proponent regarding the public consultation process, including direction regarding the format to be used for the notices for the community information meeting. if required;
- Make recommendations to be received by Development Services Committee, if required, when the Proponent presents the proposal, based on the outcome of application review process and/or public consultation process; and,
- Conclude the site plan review process/municipal consultation process by issuing a letter of concurrence or non-concurrence. There is no requirement for a site plan agreement. However, the proponent may be required to enter into an undertaking acceptable to the Town which may included requirements such as:
    - The location and design of the Telecommunication Tower;
    - In the case of a lease between the Town and a Proponent, the removal of all structures upon expiration of the lease;
    - The provision of landscaping and tree preservation, including any required financial securities;
    - Compliance with the requirements of Industry Canada's CPC-2-0-17 Conditions of License for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements;
    - In case of a lease between the Town and a Proponent, lease provisions acceptable to the Town Solicitor

**Submission of the site plan application shall mark the official commencement of the consultation and site plan application review process with the Town. The consultation and site plan application review process shall take no more than 120 days to complete for proposals that require Public Consultation.** The **Town will endeavour to complete the circulation of an application and make its views known to the Proponent within 60 days.**

**In cases where public consultation is not required, the Town shall apply its best efforts to finalize the site plan application review process within 2 weeks of receiving a written request from the proponent.**

**PROPOSALS ON TOWN OWNED LANDS/FACILITIES**

Telecommunication facility proposals on Town owned lands/facilities will require an internal municipal review and endorsement by the Development Services Committee. In addition, lease agreements will be required to be executed as a final step in the approval process, to the satisfaction of the Chief Administrator Officer and Town Solicitor. Where Public Consultation is not required, as per this policy, the Town shall apply its best efforts to finalize the site plan application review process as soon as possible.

**SITE SELECTION CRITERIA**

The Proponent shall make every effort to identify a location that minimizes the total number of Telecommunication Towers in the area, existing or proposed. In this regard, the Proponent shall be encouraged to co-locate on existing Telecommunication Towers, such as water towers, rooftops, existing towers, etc. wherever possible. Proponents shall consider the visual impact when proposing co-location on existing Telecommunication Towers within sensitive areas such as residential zones in consultation with Staff. Where Proponents require a new Telecommunication Tower to meet network needs, when selecting a location, the following shall be considered:

- Maximizing the distance from sensitive land uses such as residential, schools and daycares, where possible, and minimizing any negative visual impacts;
- Avoiding significant natural features (both topographical and vegetative), including hazard lands (floodplains, steep slopes);
- Avoiding areas of topographical prominence, where possible, to minimize any negative visual impacts;
- Use of existing support structures (ie. existing towers, light poles, roofs, etc.) where appropriate and possible;
- Ensuring that access requirements are sensitively integrated;
- Avoiding new Telecommunication Towers in Heritage Conservation Districts, Heritage Conservation Study Areas and properties listed under Part IV of the Ontario Heritage Act, where possible;
- Engagement with cellular service providers early in the development process, to facilitate the integration of telecommunication facilities with new buildings, where possible; and,
- Consider the use of Town owned lands and/or facilities where technically feasible and of a location and design acceptable to the Town.

**DESIGN**

Telecommunication Facilities shall be located and designed to minimize visual impacts. The type, size, location, height, width, configuration, and colour of a Telecommunication Facility shall be selected to be compatible and complementary with the surroundings and to be as unobtrusive as possible, where permitted by Transport Canada and/or NAV Canada. Telecommunication Tower designs that mimic other features customarily found in an area context are encouraged where appropriate. Camouflage

designs and Public Art installations are highly encouraged, particularly at prominent locations. Examples of these types of designs may include clock towers, flag poles, church steeples, etc. Where appropriate, the Proponent shall be encouraged to consult with other telecommunication providers in an effort to co-locate or build Telecommunication Towers that can accommodate additional users, subject to compliance with Industry Canada's CPC-2-0-17 Conditions of License for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements.

The following design guidelines should be taken into consideration when designing a new telecommunication facility:

- New telecommunication facilities which are located more than 120 metres from sensitive land uses such as residential, schools and daycares, shall be designed with co-location capacity
- New telecommunication facilities which are located within 120 metres of sensitive land uses such as residential, schools and daycares are not required to be co-locatable. However, these facilities shall use stealth design techniques including but not limited to camouflaging antenna with church steeples, clock towers, flagpoles, etc.
- New telecommunication facilities which are located at prominent locations, community sensitive locations and/or are of a size and scale that may negatively impact the local surrounding area, public art installations are highly encouraged to mitigate any potential impacts.
- Accessory equipment shall be buried underground, if possible, or incorporated within buildings located on the same property, if possible. For outdoor, above grade equipment shelters, landscaping at the base of the telecommunication facility is encouraged to provide screening and to enhance the appearance of the area. Landscaping or a lump sum cash payment in lieu of landscaping will be provided where appropriate, at the discretion of the Town.
- Colours for all components of the telecommunication facility shall be neutral, non-reflective and colour-matched, if possible.
- No signs or other material not directly related to this equipment, or other on-site land uses shall be permitted on the Telecommunication Tower unless Proponents comply with the Town's sign by-law. A small plaque shall be provided at the base of the telecommunication facility, identifying the owner/operator and contact information.

**PUBLIC CONSULTATION**

The Proponent is responsible for organizing and holding a community information session. For proposed Telecommunication facilities that require public consultation, the Proponent is responsible for providing a notification package, by regular mail, to the following recipients:

- all owners of properties within a radius 120 metres or 3 times the height of the proposed Telecommunication Tower, measured from the base of a tower or the outside perimeter of a

supporting structure (ie. the furthest point of the supporting mechanism such as a rooftop, building edge, etc.), whichever is greater;

- adjacent municipalities within 120 metres or three times the height of the proposed Telecommunication Tower, whichever is greater, by circulating proposals to the Clerk and Planning Director/Commissioner of the adjacent municipality.

- area rate payer associations;

- condominium developments. Notice may be provided to the condominium corporation instead of individually assessed property owners within the condominium development; and,

- the Chairman of Town's Development Services Committee, the local Ward Councillor, the Director of Planning & Urban Design and the Town Clerk.

The notification package shall include the following information:

- The municipal address of the proposed telecommunication facility and a map of the proposed location of the facility on the subject property;
- A description of and rational for the proposed telecommunication facility, and any accessory equipment, including its dimensions, colour, type, design, etc.
- Simulated images of the proposal;
- An attestation that the general public will be protected in compliance with Health Canada's Safety Code 6 including combined effects within the local radio environment at all times;
- Identification of areas accessible to the general public and the access/demarcation measures to control public access;
- The project's status under the Canadian Environmental Assessment Act;
- Transport Canada's aeronautical obstruction marking requirements (whether painting, lighting or both), if available; if not available, the proponent's expectation of Transport Canada's requirements together with an undertaking to provide Transport Canada's requirements once they become available;
- An attestation that the installation will respect good engineering practices including structural adequacy;
- Reference to the Town of Markham's Telecommunication Facilities Policy (URL)
- Notice that general information relating to antenna systems is available on Industry Canada's Spectrum Management and Telecommunications website (http://strategis.ic.gc.ca/antenna);
- The time and location of the community information session;
- Information on how to submit comments to the proponent, including the closing date for submission of comments (minimum of 30 days must be provided from receipt of notification)
- Contact information for a representative of the proponent, the Town of Markham and the local Industry Canada office;
- A statement that specifies the Town's role as a commenting agency only and that any decision relating to the application will be made by Industry Canada.

Confirmation of the above notification (to required recipients) must be provided to the Town once the required notice has been provided. In addition to the above notification requirements, proposed telecommunication facilities which are 30 metres in height or greater, require notice in the local community paper. The newspaper notice shall contain the following information:

- A description of the proposed telecommunication facility;
- The address of the proposed telecommunication facility including a map of the proposed location on the subject property;
- Contact information for a representative of the proponent, the Town of Markham and the local Industry Canada office;
- A statement that specifies the Town's role as a commenting agency only and that any decision relating to the application will be made by Industry Canada.

**COMMUNITY INFORMATION SESSION**

The proponent is responsible for organizing and facilitating the community information session. A representative from the Town and the local ward councillor may attend for information purposes or to assist with answering questions.

The proponent shall distribute comments cards at the community information session and prepare a record of all attendees and comments submitted.

Following the community information session, the proponent shall provide a follow-up letter addressed to the Director of Planning & Urban Design (copied to the Chairman of the Development Services Committee, the Ward Councillor, the Town Clerk and to all those who submitted comments (either at community information session or written submission), indicating how all "reasonable and relevant" concerns raised have been addressed. Should any modification of the proposed facility be agreed to, in order to address any reasonable and relevant concerns, revised plans or drawings (and any other required information) must be submitted to the Town as soon as possible.

The proponent will also be required to provide a presentation to the Development Services Committee, advising the Committee of the proposal and how all reasonable and relevant concerns have been addressed.

**ADDITIONAL CONSULTATION REQUIRED**

Proponents shall undertake to consult with interested agencies, including but not limited to, Transport Canada, NAV Canada, Ministry of Transportation, Toronto Region Conservation Authority, and the Regional Municipality of York, if required. Proposed telecommunication facilities that require municipal consultation will be circulated to relevant outside agencies for comments as part of the Town's site plan circulation and review process.

## CONCLUDING CONSULTATION

Once the site plan application review process has been completed, the following will take place:

### Where Public Consultation is Not Required

For a Telecommunication Facility proposal that is exempt from public consultation as identified in this policy, the Director of Planning and Urban Design has the authority to provide a letter of concurrence or non-concurrence. A letter of concurrence or non-concurrence, signed by the Director of Planning & Urban Design, subject to conditions if required, shall document concurrence or non-concurrence between the Town and the proponent and shall conclude the consultation process. Where the Town issues a letter of non-concurrence associated with a proposal, the Town's letter shall specify the reasons why.

### Where Public Consultation is Required

For Telecommunication Tower proposals requiring public consultation, the Proponent will provide a deputation to the Development Services Committee to seeking concurrence from the Committee following the public information session. The Development Services Committee will either provide a position of concurrence, subject to conditions if required, or non-concurrence. The Committee Resolution will be forwarded to Industry Canada. If the Committee provides concurrence, the Proponent will be required to submit 15 copies of the site plan and elevations to the Director of Planning and Urban Design. An letter of concurrence or non-concurrence, signed by the Director of Planning and Urban Design, subject to conditions if required, shall document concurrence or non-concurrence between the Town and the Proponent and shall conclude the consultation process. Where the Town issues a letter of non-concurrence associated with a proposal, the Town's letter shall specify the reasons why.

For a Telecommunications Tower located on town owned lands and/or facilities, lease agreements will be required to be executed as a final step in the approval process, to the satisfaction of the Chief Administrator Officer and Town Solicitor.

**DEFINITIONS**

**Co-location** – the sharing of a Telecommunication Tower (or other support structure) by two or more proponents

**Telecommunication Facility** – the components (individually or combined) required to provide wireless communication service such as transmitters, receivers, antennae, signalling and control equipment, support structures and accessory equipment.

**Proponent** – anyone planning to install or modify a telecommunication facility such as Personal Communications Services (PCS) and cellular, fixed wireless, broadcasting, land-mobile, license-exempt and amateur radio operators.

**Telecommunication Tower** – all types of towers, including but not limited to, a monopole, tripole, lattice tower, guyed tower, self-support tower, pole, mast, or other support structure, which is used to support one antenna or more and which may be located at ground level or on the roof of a building.

**Reasonable and Relevant Concerns** – relate to the requirements of Industry Canada's "Client Procedures Circular" ("CPC 2-0-03")(January 2008) and to the particular amenities or important characteristics of the area surrounding the proposed telecommunication facility. Examples of reasonable and relevant concerns, as per Industry Canada's CPC 2-0-03, are:

- Why is the use of an existing antenna system or structure not possible?
- Why is an alternate site not possible?
- What is the proponent doing to ensure that the antenna system is not accessible to the general public?
- How is the proponent trying to integrate the antenna into the local surroundings?
- What options are available to satisfy aeronautical obstruction marking requirements at the proposed site?
- What are steps the proponent took to ensure compliance with the general requirements of this document including the Canadian Environmental Assessment Act (CEAA), Safety Code 6, etc.?

Examples of concerns that are not reasonable and relevant, as per Industry Canada's CPC 2-0-03, are:

- Disputes with members of the public relating to the proponent's service, but unrelated to antenna installations;
- Potential effects that a proposed telecommunication facility will have on property values or municipal taxes;

- Questions whether the Radiocommunication Act, CPC-2-0-03, Safety Code 6, locally established by-laws, other legislation, procedures or processes are valid or should be reformed in some manner.

# TOWN OF MARKHAM

## Policy for Establishing Telecommunication Towers

**June 2009**

## INTRODUCTION

Radiocommunications and broadcasting services (e.g. personal communications services and cellular, fixed wireless, broadcasting, etc.) have become an important component of the way business, and society in general, operates today. These services are used daily by the public, safety and security organizations, government, wireless service providers, broadcasters, utilities and businesses; from cell phones and pagers to instant text and photo messaging, e-mail messages and connection to the web. For these services to work, systems including masts, towers, antennae and other supporting structures are required. There is a certain amount of flexibility in the placement of Telecommunication Towers constrained by some degree by: the need to achieve acceptable coverage for the service area; the availability of sites; technical limitations; and safety. Accordingly, municipalities are experiencing an increasing demand to accommodate Telecommunication Towers by balancing the location and design requirements of the Proponent with the desire to minimize the impact on the community and local surroundings.

The approval authority for Telecommunication Towers is with Industry Canada under the *Radiocommunication Act.* Their most recent release of a "Client Procedures Circular" was June 2007, which came into effect on January 1, 2008 ("CPC-2-0-03"). CPC 2-0-03 outlines the process that must be followed by Proponents seeking to install or modify a Telecommunication Tower, where a Land Use Authority ("LUA") does not have a consultation protocol. Although Industry Canada has provided a Default Public Consultation Process in CPC 2-0-03, they encourage the establishment of policies from LUA's recognizing they are best positioned to contribute to optimum siting of facilities to meet their own community needs. The Town of Markham established its own policy in June 2002 and due to Industry Canada's update and changing technology, the Town is proposing to update its policy at this time. The purpose of this policy is to provide guidance to the Town, Proponents, and the general public in considering proposals to locate Telecommunication Towers within the Town of Markham.

It is intended that by outlining the procedures to be followed for Telecommunication Tower proposals, a framework for identifying and resolving any land use conflicts at an early stage in the process will be established. The consultation process for a Telecommunication Tower will be in accordance with the Town's site plan process, as outlined in this policy. It is acknowledged that Proponents following the Town's usual site plan process are not subject to Site Plan approval in accordance with the *Planning Act.* Final approval for Telecommunication Towers is with Industry Canada. It is anticipated that Proponents will continue to pursue innovative technology that will reduce the visual impact on the community.

## DEFINITIONS

**Co-location means** the sharing of a Telecommunication Tower by two or more Proponents.

**Telecommunication Tower** - means all types of towers including but not limited to: a monopole; tripole; lattice tower; guyed tower; self-support tower; pole; mast; or other structure, which are used to support one or more telecommunication antennae for the purpose of radio telecommunications and which may be located at ground level or on the roof of a building.

**Proponent** means a company, organization or person that is subject to Industry Canada's CPC-2-0-03, or its successors.

## OBJECTIVES

The intent of this policy is:

- to balance demands for new Telecommunication Towers on both private and publicly owned property, with
  - i) a desire to preserve the natural and cultural landscape and minimize community impacts
  - ii) a view to generating a new source of non-assessment based revenue for the Town;
- to outline a general process to be followed by the Proponent and the Town for reviewing and commenting on Telecommunication Tower proposals, which are not exempt by this policy, and to provide an opportunity for public consultation;
- to provide for high calibre wireless telecommunications service, in order to promote economic development, and meet the business and safety needs of the public and community;
- To provide a process to implement Industry Canada's CPC-2-0-03 for all Proponents;
- To clarify that the Town of Markham is the designated "Land Use Authority" (LUA) for all lands within the Town of Markham municipal boundaries.

## PRELIMINARY CONSULTATION

Where not exempt from the requirement to consult with the Town under this policy, preliminary consultation shall be required between Proponents and Town staff through a process outlined on Markham's web page at Markham.ca under Forms and Applications and Planning. At the pre-consultation meeting, municipal staff shall provide details outlining:

- consider the appropriateness of the proposed location and/or appropriateness of co-location opportunities
- provide preliminary comments;
- the process to be followed, including requirements for public consultation;
- any additional documents, drawings required as part of the application;
- fees for the application;
- list of agencies to be consulted; and
- location of Town owned land or facilities that may be a suitable site for a Telecommunication Tower.

Where not exempt from the requirement to consult with the public under this policy, the Proponent will be requested to consult adjacent municipalities within 120 metres or three times the height of the proposed Telecommunication Tower, whichever is greater, by circulating proposals to the Clerk and Planning Director/Commissioner of the adjacent municipality. The Proponent shall provide confirmation of this consultation to the Town.

**SITE SELECTION CRITERIA**

The Proponent shall make every effort to identify a location that minimizes the total number of Telecommunication Towers in the area, existing or proposed. In this regard, the Proponent shall be encouraged to co-locate on existing Telecommunication Towers, such as water towers, rooftops, existing towers, etc. wherever possible. Proponents shall consider the visual impact when proposing co-location on existing Telecommunication Towers within sensitive areas such as residential zones in consultation with Staff. Where Proponents require a new Telecommunication Tower to meet network needs, when selecting a location, the following shall be considered:

- maximizing the distance from residential zones, where possible, and minimizing any negative visual impacts;
- avoiding significant natural features (both topographic and vegetative), including hazard lands (floodplains, steep slopes);
- avoiding areas of topographical prominence, where possible, to minimize any negative visual impacts;
- ensuring that access requirements are sensitively integrated ;
- avoiding new Telecommunication Towers in Heritage Conservation Districts and Heritage Conservation Study Areas; and
- consider the use of Town owned lands and/or facilities where technically feasible and of a location and design acceptable to the Town.

**DESIGN**

Where co-location is not available, a Telecommunication Tower shall be located and designed to minimize visual impact and to avoid disturbance of significant natural features. The type, size, location, height, width, configuration, and colour of a Telecommunication Tower shall be selected to blend in with the surroundings to be as unobtrusive as possible, where permitted by Transport Canada and/or NAV Canada. (Landscaping or a lump sum cash payment in lieu of landscaping will be provided where appropriate, at the discretion of the Town.) Telecommunication Towers should be designed to fit into and be compatible with the immediate context and the surrounding area. Telecommunication Tower designs that mimic other features customarily found in an area context are encouraged where appropriate. These features may include appropriately located clock towers, flag poles, church steeples etc. No signs or other material not directly related to this equipment, or other on-site land uses shall be permitted on the Telecommunication Tower unless Proponents comply with the Town's sign by-law.

Where appropriate, the Proponent shall be encouraged to consult with other telecommunication providers in an effort to co-locate or build Telecommunication Towers that can accommodate additional users, subject to compliance with Industry Canada's CPC-2-0-17 *Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements.*

The Proponent will be encouraged to relocate the Telecommunication Tower if another more suitable location becomes available provided:

a) the move to an alternate location is economically feasible;
b) the alternate location is appropriate from a radio frequency engineering perspective; and
c) that the alternate location is one on which the Proponent is permitted to locate on subject to reasonable commercial terms.

A small plaque shall be placed at the base of the Telecommunication Tower identifying the owner/operator and a contact number.

**APPLICATION PROCESS**

A proposal for a Telecommunication Tower and modifications to an existing Telecommunication Tower ,that are not exempt from Municipal Review under this policy, shall be supported by an information package including the information required as outlined in the checklist attached as part of this policy. Each Telecommunication Tower Proponent shall follow the Town's site plan process for consultation purposes including the pre-consultation process as outlined on the Town of Markham web page and the accompanying application.

The Town, when it receives an application for a Telecommunication Tower shall:

- provide guidance to the Proponent regarding the public consultation process;
- provide direction to the Proponent regarding the format to be used for the notice for the community information session and a mailing list of parties to be notified;
- provide direction to the Proponent to determine an appropriate location for the community information session;
- make recommendations to be received by Development Services Committee when the Proponent presents the proposal, based on the public consultation process and discussions with the Proponent;

Any Telecommunication Tower proposed on Town owned lands and/or facilities will require an internal municipal review. No public consultation will be required for Telecommunication Towers on Town owned lands and/or facilities where the proposed Telecommunication Tower is otherwise exempt from the requirement to consult with the public by CPC-2-0-03 or this policy.

**SITE PLAN FEES**

The Proponent shall be subject to the Town's existing site plan application fee determined at the time of application. Other fees may apply if additional applications to other approval authorities, e.g. Regional Municipality of York, TRCA, etc. are required.

**UNDERTAKING**

The Proponent may be required to enter into an undertaking acceptable to the Town which may include such requirements as:

- the location and design of the Telecommunication Tower;
- in the case of a lease between the Town and a Proponent, the removal of all structures upon expiration of the lease;

- the provision for landscaping;
- compliance with the requirements of Industry Canada's CPC-2-0-17 *Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements*;
- in the case of a lease between the Town and a Proponent, lease provisions acceptable to the Town Solicitor.

**EXEMPTIONS TO MUNICIPAL REVIEW**

The following proposals for a Telecommunication Tower will be exempt from the requirement to consult with the Town and will not require the submission of a site plan application:

- maintenance of 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), the transmission line, antenna-supporting structure or other radio apparatus to existing infrastructure, a building, water tower, etc. provided 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; and
- Co-location on an existing Telecommunication Tower.; and
- amateur radio Telecommunication Towers provided:
  a. They are strictly for personal use
  b. The antenna boom or other appurtenance attached to the antenna are more than 1 metre from any property line;
  c. No structure is placed in a front yard; and,
  d. The antenna and associated equipment is less than 10 metres in height;

**PUBLIC CONSULTATION**

The Proponent is responsible for organizing and holding a community information session. For a proposed Telecommunication Tower or alterations to an existing Telecommunication Tower that requires public consultation, the Proponent shall provide the following notices of the information session:

- give notice by regular mail to all owners of properties within a radius 120 metres or 3 times the height of the proposed Telecommunication Tower, measured from the base, whichever is greater;
- Give notice by regular mail to area ratepayer associations;
- For a Telecommunication Tower that is proposed to be 45 metres or more in height, place a notice in the local community paper;

- If a condominium development is located within the required circulation radius, notice may be given to the condominium corporation, instead of all owners assessed in respect of the condominium development; and
- Notice is to be provided to the Chairman of Development Services Committee, the Ward Councillor, Director of Planning and the Town Clerk

The notification of the information session shall include the following information:

- the proposed location of the Telecommunication Tower within the subject property;
- physical details of the Telecommunication Tower including its height, colour, type, design, including any accessory equipment;
- the time and location of the community information session;
- the name and telephone number of a contact person employed by the Proponent, as well as a Town contact person;
- information package.

The Proponent shall distribute comment cards at the public information session and prepare a record of all attendees who submitted a comment card and:

- provide a follow-up letter addressed to the Director of Planning, copied to the Chairman of Development Services Committee, the Ward Councillor, the Town Clerk and to all attendees of the community information meeting who submitted comment cards and those who made written submissions, to indicate the Proponent's formal response to any concerns or issues raised in the comment cards or from written submissions. Should any modification of the proposed structure be agreed to, then further details e.g. revised plans or drawings must be submitted to the Town as soon as possible;
- the Proponent shall also include a request to provide a presentation to the Development Services Committee.

**EXEMPTIONS TO PUBLIC CONSULTATION**

For a Telecommunication Tower which meets the following criteria, public consultation is not required.

- All Telecommunication Tower proposals exempt from Municipal Review;
- New antenna systems, including masts, towers or other antenna-supporting structure, with a height of less than 15 metres above ground level.
- Telecommunication Towers within industrial, institutional, and commercial zoned areas, where the Telecommunication Tower base is located a minimum of 120 metres or a distance of 3 times the height of the proposed Telecommunication Tower, whichever is greater, away from a residential zone;

(In cases where no public consultation is required, the Town shall apply its best efforts to finalize the site plan application within 2 weeks of receiving a written request from the Proponent.)

**APPROVALS REQUIRED**

Proponents shall undertake to get all required approvals, including but not limited to, Transport Canada, NAV Canada, Ministry of Transportation, Toronto Region Conservation Authority, and the Regional Municipality of York, if required.

## CONCLUDING CONSULTATION

### Where Public Consultation Is Not Required

For a Telecommunication Tower proposal that is exempt from public consultation as identified in this policy, the Director of Planning has authority to approve the site plan application. Approval of the site plan by the Director of Planning, subject to conditions if required, shall document concurrence between the Town and the Proponent.

### Where Public Consultation Is Required

For Telecommunication Tower proposals requiring public consultation, the Proponent will provide a deputation to the Development Services Committee to seek approval of the site plan application from the Committee following the public information session. The Development Services Committee will either approve the application subject to conditions if required, or deny the application. The Committee Resolution will be forwarded to Industry Canada. If the Committee approves the proposal, the Proponent will be required to submit 15 copies of the site plan and elevations for final approval to the Director of Planning. Approval of the site plan by the Director of Planning, subject to conditions if required, shall document concurrence between the Town and the Proponent.

For a Telecommunication Tower located on Town owned lands and/or facilities, lease agreements will be required to be executed as a final step in the approval process, to the satisfaction of the Chief Administrator Officer and Town Solicitor

The Town will endeavor to complete the circulation of the Proposal and make its views known to the Proponent within 60 days. In all cases, the entire consultation process shall not exceed 120 days, as per Industry Canada's requirement.

## CHECKLIST FOR TELECOMMUNICATION TOWERS

1. Site Plan Application (including all standard submission requirements)

2. A site selection/justification report outlining the location of non-tower and co-location options which have been considered, and why the Proponent's proposal is the preferred option. This report shall include details with respect to the coverage and capacity of the existing facilities in the surrounding area, and confirm the need for a new tower at the proposed location with this context.

   ☐ Yes ☐ No

3. Map/inventory of all towers within the Proponent's search area.

   ☐ Yes ☐ No

4. PIN printout/survey

   ☐ Yes ☐ No

5. Colour images with support structure superimposed (simulated).

   ☐ Yes ☐ No

6. Information required as per municipal building permit process (if required)

   ☐ Yes ☐ No

7. Information required as per Conservation Authority permit process (if required)

   ☐ Yes ☐ No

8. Environmental impact statement, if required under the existing land use designation.

   ☐ Yes ☐ No

9. Confirmation of appropriate utility locates, such as gas companies and hydro providers, have been consulted.

   ☐ Yes ☐ No

10. Confirmation that Transport Canada has been consulted.

    ☐ Yes ☐ No

11. Copy of Standard Town Telecommunications Lease, if required.

☐ Yes ☐ No

12. Sign-off from/circulation to other Proponents

☐ Yes ☐ No

# DEVELOPMENT SERVICES COMMITTEE

## UPDATE ON POLICY FOR ESTABLISHING TELECOMMUNICATION TOWERS

October 18, 2011

# Presentation Outline

1. Introduction
2. Jurisdiction
3. Consultation Process & Requirements:
   Town of Markham & Industry Canada
4. Town Site Selection Criteria & Design Guidelines
5. Summary of Options for Revised Policy
6. Next Steps

# Introduction

## Purpose of Presentation:

1. Understand key issues respecting the establishment of Telecommunication Facilities: ***jurisdiction, site selection & health concerns***
2. Review Markham Policy relative to Industry Canada requirements
3. Outline options for revised Policy

# Jurisdiction

## Radiocommunication Act


- Approval Authority

### Industry Canada Responsible for:

- Approval of sites for radio apparatus (antenna systems & supporting structures)
- Issuance of radio authorizations (ie. licenses, etc.)

# Jurisdiction

Industry Canada Industrie Canada

## Client Procedures Circular, CPC 2-0-03 (January 1, 2008)

### Proponents responsible for:

1. Investigating the sharing or use of existing infrastructure prior to considering new antenna supporting structures
2. **Consulting with municipality (if required) to determine local requirements**
3. **Undertaking Public Consultation (if required)** & addressing relevant concerns, either by municipal requirements or IC default process
4. Satisfying IC's general & technical requirements (ie. Safety Code 6, etc.)

# Jurisdiction

## Municipality responsible for:

1. Establishing local policy
    - Local consultation requirements
    - Preferences for site selection
    - Preferences regarding design & landscaping/screening
2. Commenting on proposals
    - Provide municipal position: concurrence or non-concurrence

# Consultation

Industry Canada Industrie Canada

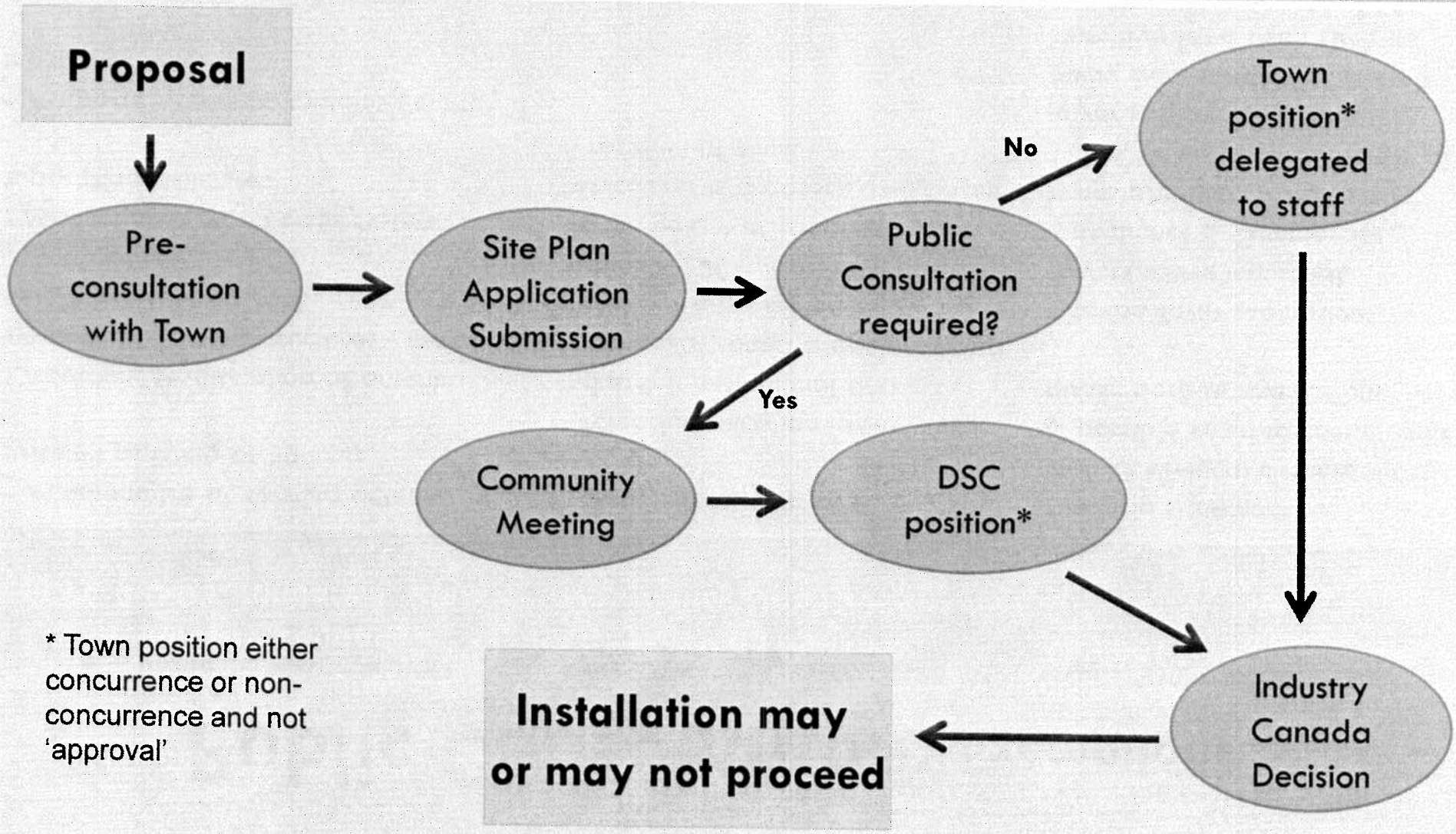
## Purpose of Consultation:

1. Discuss siting options with the municipality
2. Ensure local processes, if any, adhered to
3. Address **reasonable & relevant** concerns (municipal & public)
4. Obtain municipal position (concurrence or non-concurrence), if required

# Municipal Consultation: Exemptions

| Industry Canada CPC 2-0-03, January 1, 2008 | Existing Markham Policy (June 2009) | Options for Revised Policy |
|---|---|---|
| • Maintenance of existing antenna system's painting or lighting<br><br>• Addition/Modification of antenna systems on existing structures - max height increase of 25%<br><br>• Maintenance of antenna systems & supporting structures<br><br>• Temporary antenna systems (ie. max 3 months)<br><br>• New antenna systems & structures less than 15m in height<br><br>* *Despite exemption criteria above, individual/local circumstances vary & may require consultation with municipality & the public* | • Same exemptions as IC except, new antenna systems & structures less than 15m in height **not exempt** from municipal review<br><br>• All co-locations on existing telecommunication towers<br><br>• Amateur radio telecommunication towers, subject to conditions | • include statement re: individual/local circumstances & possible need to consult with municipality despite exemptions |

# Markham Consultation/Review Process



# Public Consultation: Exemptions

| Industry Canada CPC 2-0-03, January 1, 2008 | Existing Markham Policy (June 2009) | Options for Revised Policy |
|---|---|---|
| • Maintenance of existing antenna system's painting or lighting<br><br>• Addition/Modification of antenna systems on existing structures - max height increase of 25%<br><br>• Maintenance of antenna systems & supporting structures<br><br>• Temporary antenna systems (ie. max 3 months)<br><br>• New antenna systems & structures less than 15m in height<br><br>** Despite exemption criteria above, individual/local circumstances vary & may require consultation with municipality & public* | • Same exemptions as IC<br><br>• Telecommunication towers within industrial, institutional and commercial zoned areas provided the tower base is located a minimum 120m, or a distance of 3x the height of proposed tower (whichever is greater), away from a residential zone. | • include statement re: individual/local circumstances & possible need to consult with public despite exemptions<br><br>• Revise Town exemption: Towers within Industrial, Institutional & Commercial zones provided tower is min 120m, or distance 3x height of tower (whichever is greater), away from **lands that permit sensitive land uses such as residential uses, schools & daycares** |

# Public Consultation: Notification Requirements

| Industry Canada<br>CPC 2-0-03, January 1, 2008 | Existing Markham<br>Policy (June 2009) | Options for<br>Revised Policy |
|---|---|---|
| • At minimum, written notice required to the public & neighbouring municipalities within a radius of 3x tower height<br><br>• Proposals >30m - notice in the local community newspaper required | • Community Information Session required.<br><br>• notice of session required by mail to:<br>i. property owners within a 120m radius or 3x tower height whichever is greater;<br><br>ii. ratepayer associations<br><br>iii. Condominium corporations (not individual condo owners)<br><br>• Proposals >45m - notice in the local community newspaper required | • proposals >30m require notice in local newspaper |

# Public Consultation: Responding to the Public

Industry Canada Industrie Canada

## Proponent required to address ***reasonable & relevant**** concerns

*** reasonable & relevant concerns relate to IC requirements or local characteristics of area surrounding proposed antenna system.**

*Examples of concerns considered reasonable & relevant include:*

- *why is the use of an existing antenna system/structure not possible?*
- *why is an alternate site not possible?*
- *how is the proponent trying to integrate the antenna into the local surroundings?*

*Examples of concerns that are not reasonable & relevant include:*

- *disputes with members of the public relating to the proponent's service and unrelated to antenna installations*
- *potential effects that a proposal will have on property values or municipal taxes*
- *questions whether the Radiocommunication Act, IC requirements, Safety Code 6, locally established by-laws, other legislation, procedures/processes are valid or should be reformed in some way*

***Town Protocol should make reference to the addressing of 'reasonable & relevant' concerns***

# Site Selection Criteria

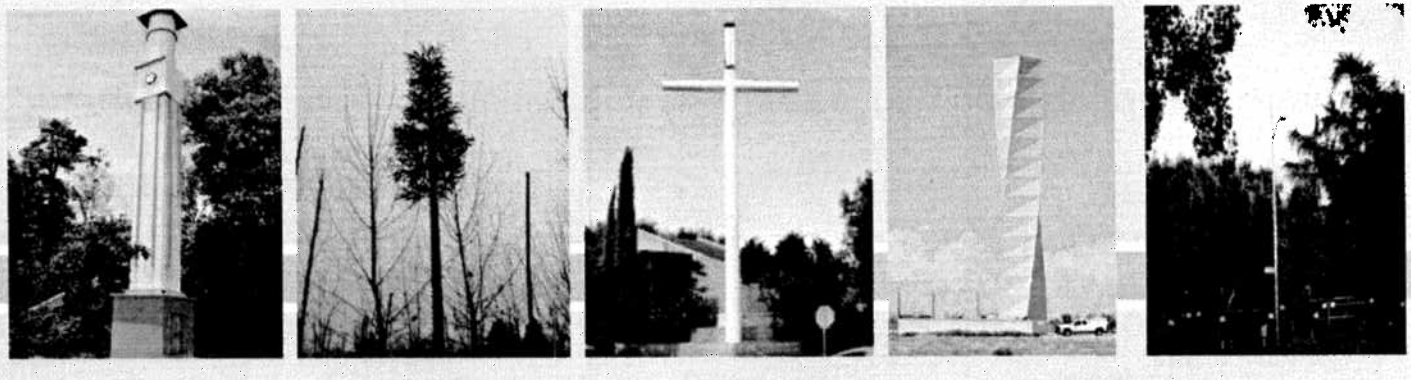
## Existing Town Policy:

- Maximizing distance from residential zones
- Avoidance of sites with natural features & areas of topographical prominence
- Use of existing support structures (ie. existing towers, light poles, roofs, etc.), where possible
- Avoidance of Heritage Conservation Districts & Heritage Conservation Study Area
- Encourages Town owned lands/facilities as possible sites

## Options for Revised Town Policy:

- Encourage proposals that maximize distance from sensitive land uses, such as residential uses, schools & daycares, where feasible
- Encourage avoidance of properties designated or listed under Part IV of the Ontario Heritage Act, where feasible
- Encourage integration of telecommunication facilities within new buildings, where feasible

# Design



## Existing Town Policy:

- Co-location strongly encouraged
- minimize visual impact (unobtrusive & stealth design techniques recommended)
- compatible w/surrounding area
- signage permitted if related to tower, or other on-site land uses, provided it complies with Town sign by-law

## Options for Revised Policy:

- Encourage public art installations

# Summary of Options for Revised Policy

| Requirement | Options for Revised Policy |
|---|---|
| **Municipal Consultation: Exemptions** | • include statement re: individual/local circumstances & possible need to consult with municipality despite exemptions |
| **Public Consultation: Exemptions** | • include statement re: individual/local circumstances & possible need to consult with public despite exemptions<br>• revise Town exemption: Towers within Industrial, Institutional & Commercial zones provided tower is min 120m, or distance 3x height of tower (whichever is greater), away from **lands that permit sensitive land uses such as residential uses, schools & daycares** |
| **Public Consultation: Notification Requirements** | • proposals >30m require notice in local newspaper |
| **Public Consultation: Responding to the Public** | • include reference regarding the addressing of 'reasonable & relevant' concerns |
| **Site Selection Criteria** | • encourage proposals that maximize distance from sensitive land uses, such as residential uses, schools & daycares, where feasible<br>• Encourage avoidance of properties designated or listed under Part IV of the Ontario Heritage Act, where feasible<br>• encourage integration of telecommunication facilities within new buildings, where feasible |
| **Design** | • encourage public art installations |
| **General** | • clearly outline Town's role in providing Town position: concurrence or non-concurrence (not 'approval') |

# Next Steps

1. Continue staff review
2. Consult with Service Providers
3. Revised Policy & Staff Report – Dec 2011

# Building Canada's Advanced Wireless Networks: The Future is Here

## Meeting with Markham Development Services Committee

October 18, 2011

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# A Paradigm Shift

- **Changing technology and growing competition** are creating a paradigm shift in the wireless industry.

- 2010 marks the year when mobile data transactions eclipsed traditional voice.
  - **Data traffic is expected to double every year** through 2014.
  - **Data requires exponentially greater broadband capacity** than voice.
  - As demand for CAPACITY increases at a cell site, the COVERAGE area decreases.

- This is compounded by the growing number of entrants in the wireless industry.
  - 3 incumbent providers: Bell, Rogers and TELUS.
  - new entrants actively building networks in Ontario: Globalive, Public Mobile, Dave Wireless.

- The only **solution** that will meet the escalating growth in demand for wireless service is construction of **additional wireless facilities**.

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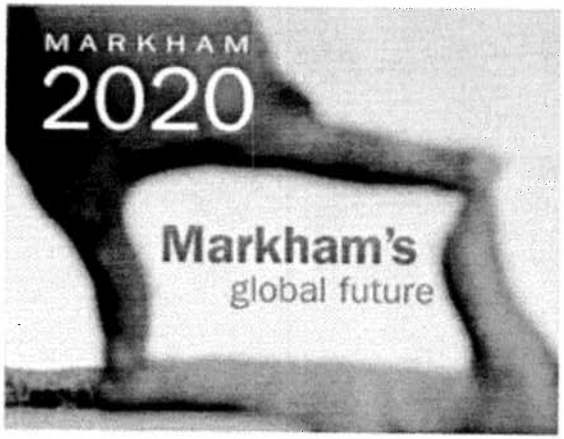
## The Town of Markham and Wireless Connectivity




- Expansion of multiple high-speed wireless networks is a powerful economic enabler that supports:
  - Markham's projected population growth of over 50% in next 25 years;
  - Markham's goal to increase employment by 75% over the same time period;
  - The goals and objectives set out in the Markham 2020 Strategic Directions report, such as becoming a "Networked Markham", a "Global Markham", and an "Infrastructure Markham".

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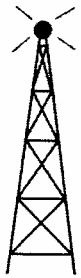
# Wireless Telecommunications: Networks

1 Line Supports
1 Customer

Wireline Switch

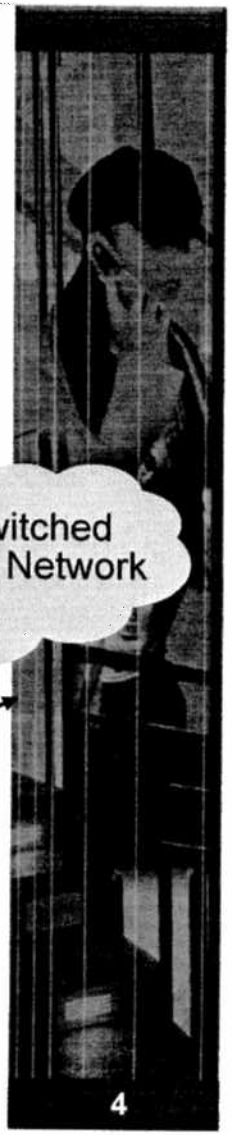
Public Switched Telephone Network

1 Radio Link
Supports
25 Customers



1 Site Supports
1000 Customers

Wireline Switch



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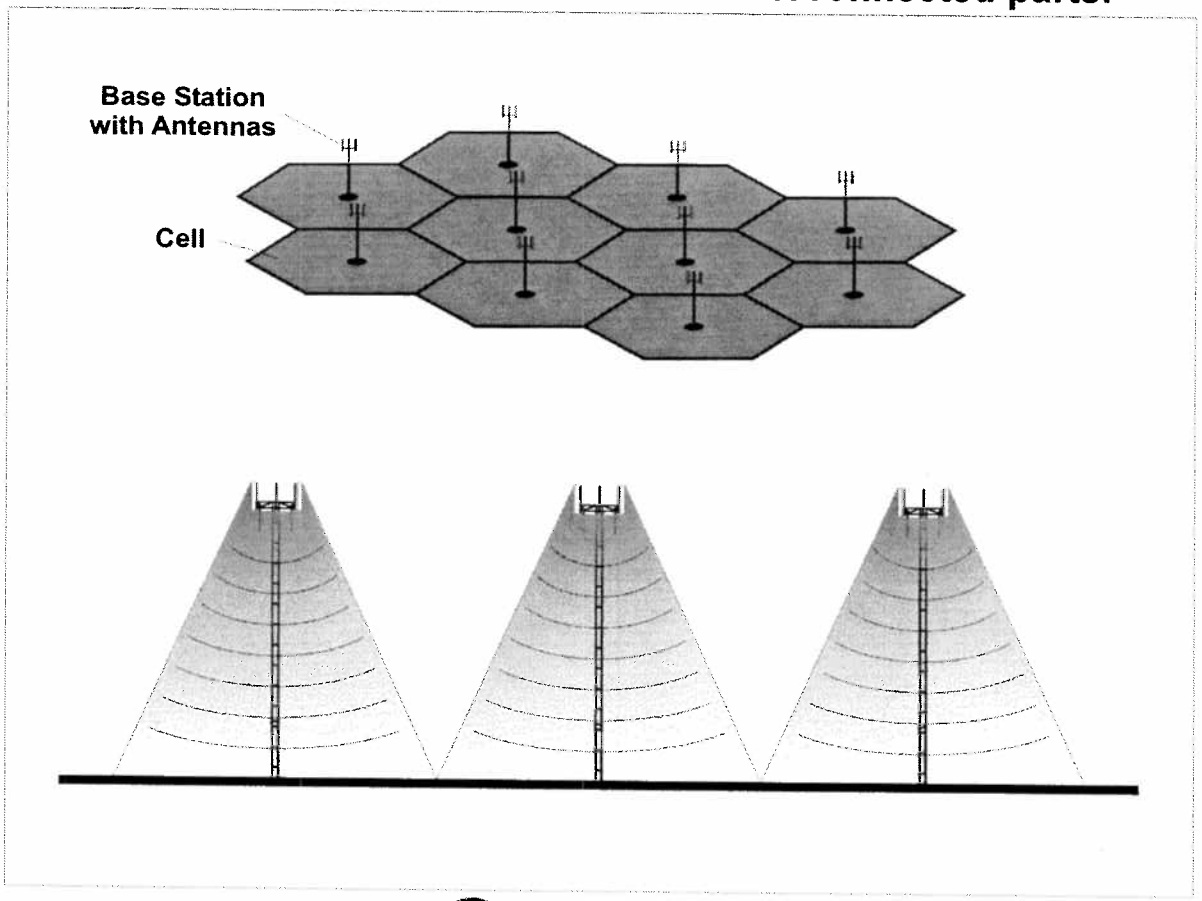
# What is a Cellular Network?

**A network is a series of interconnected parts.**

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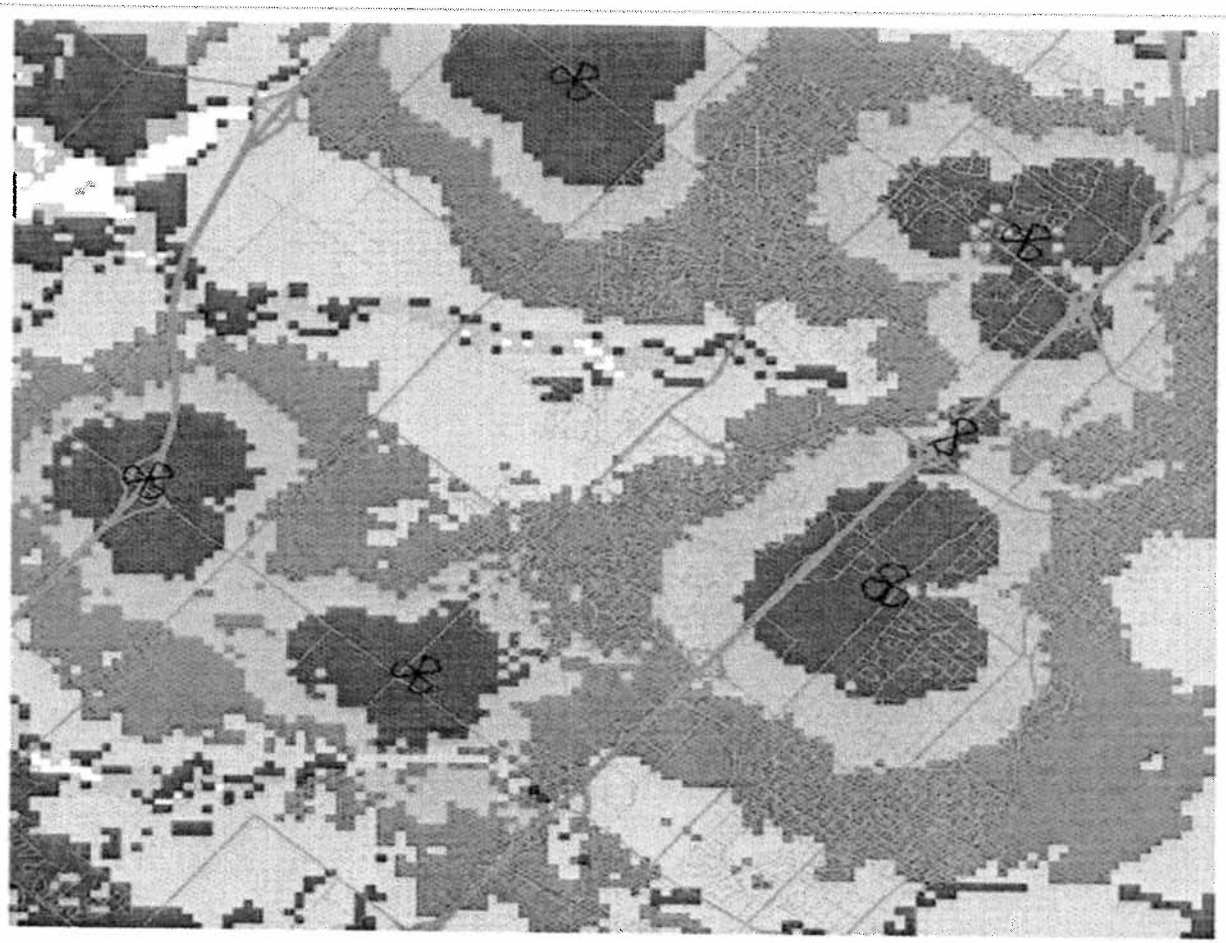
# Wireless Telecommunications: Existing Coverage Example



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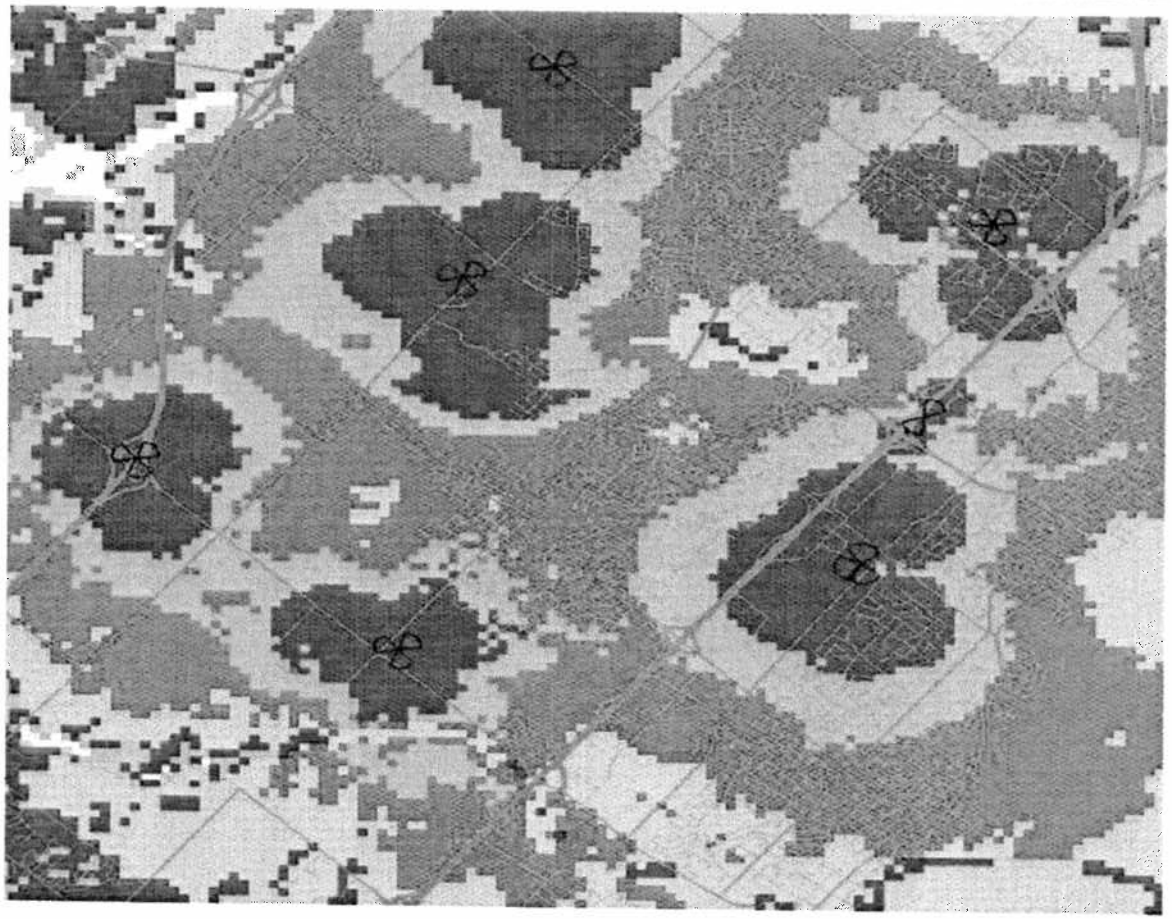
# Wireless Telecommunications: Coverage with New Tower Example



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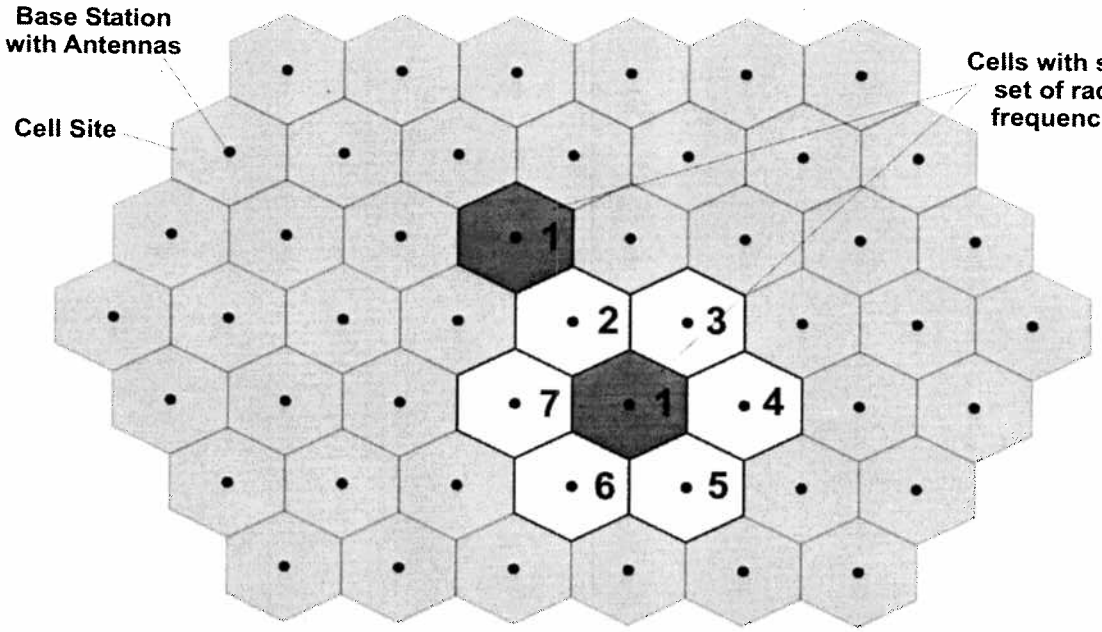
# What is a Cellular Network?

## Frequencies may not overlap




Each number in the Cell represents a different set of radio frequencies.
To avoid interference of radio frequencies the same set of frequencies can not be located adjacent to one another

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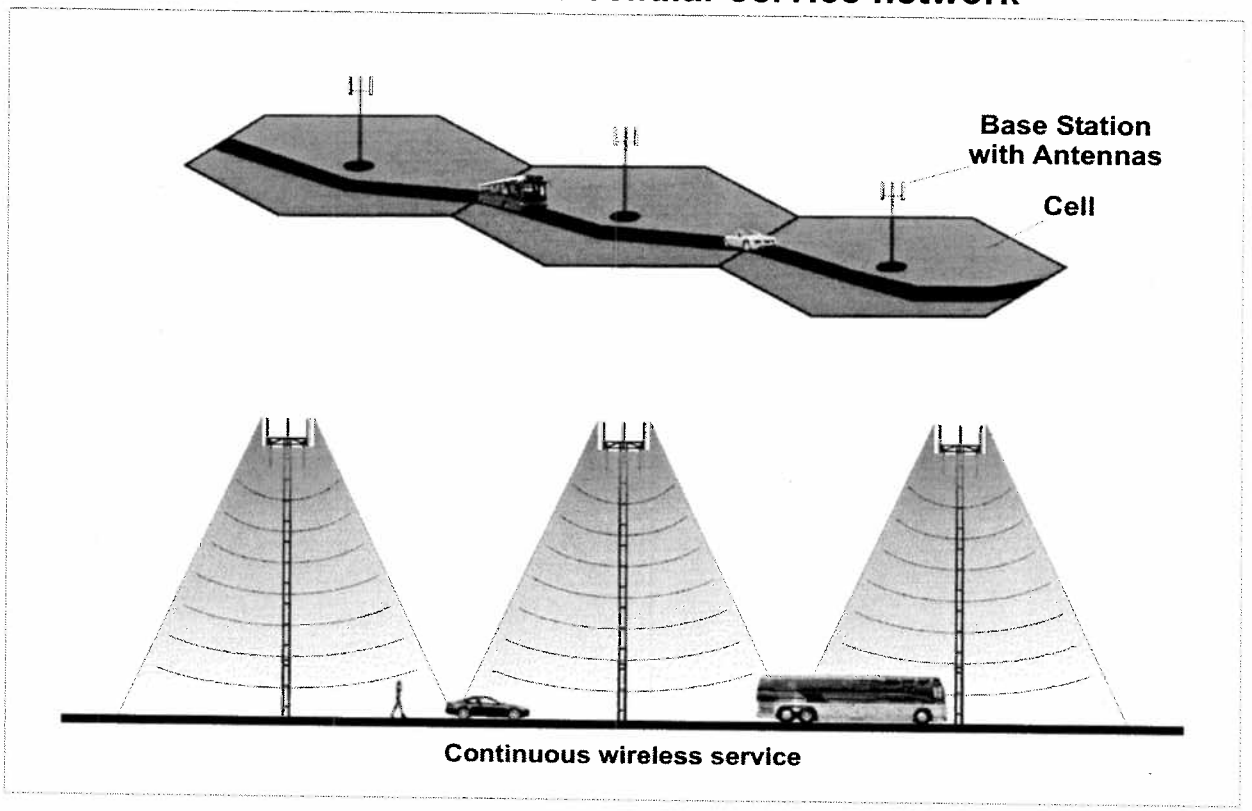
# Evolution of the Cellular Network

## A continuous cellular service network




Each cell only serves a fixed number of calls

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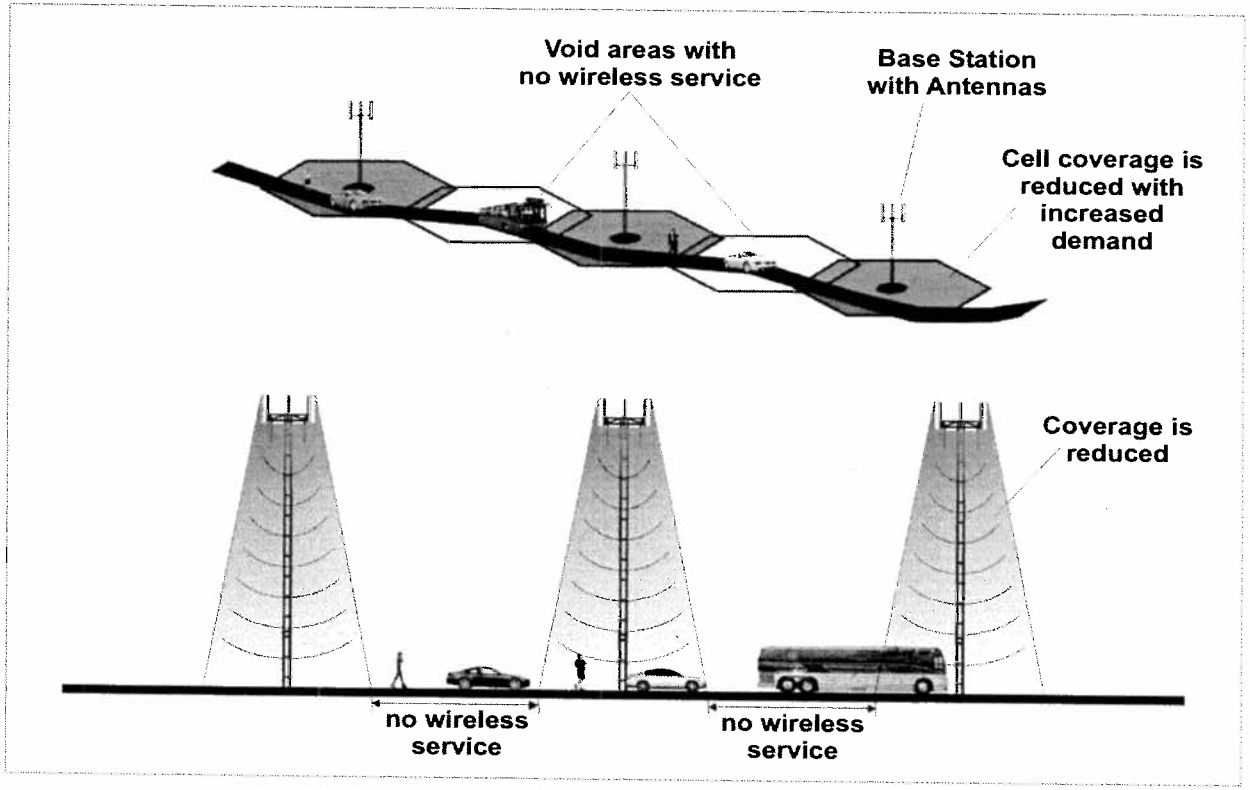
# Evolution of the Cellular Network

## Increased users creates gaps in service




Number of calls in a cell is limited. When a cell reaches its maximum capacity it reduces its footprint in order to provide service to the strongest (closest) signals.

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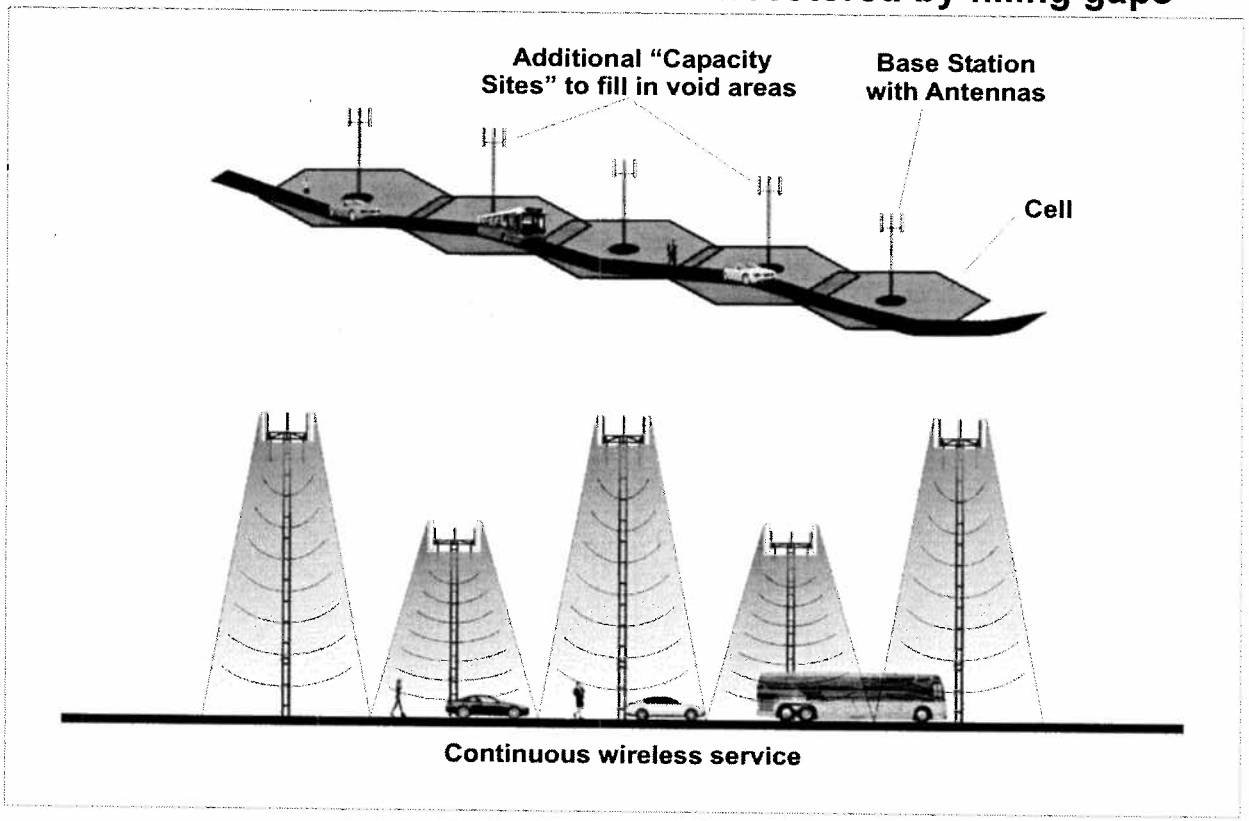
# Evolution of the Cellular Network

## Continuous cellular network restored by filling gaps




New towers constructed to fill in the void areas, restoring continuous wireless service

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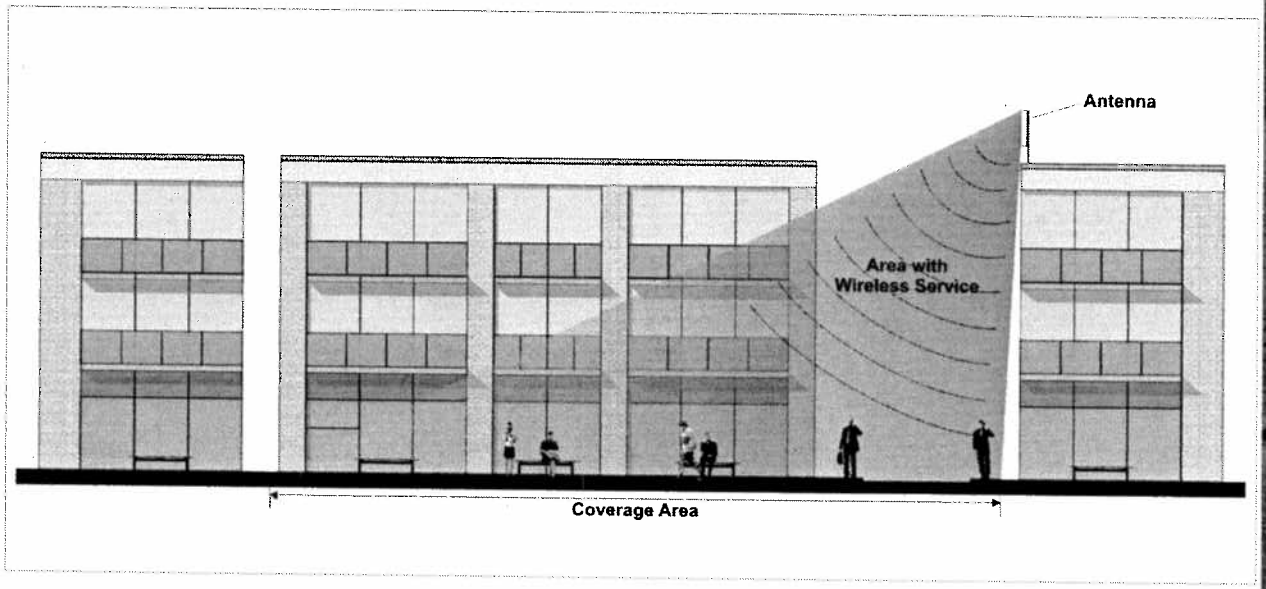
# EVOLUTION OF THE CELLULAR NETWORK

## Cellular Service at Street Level

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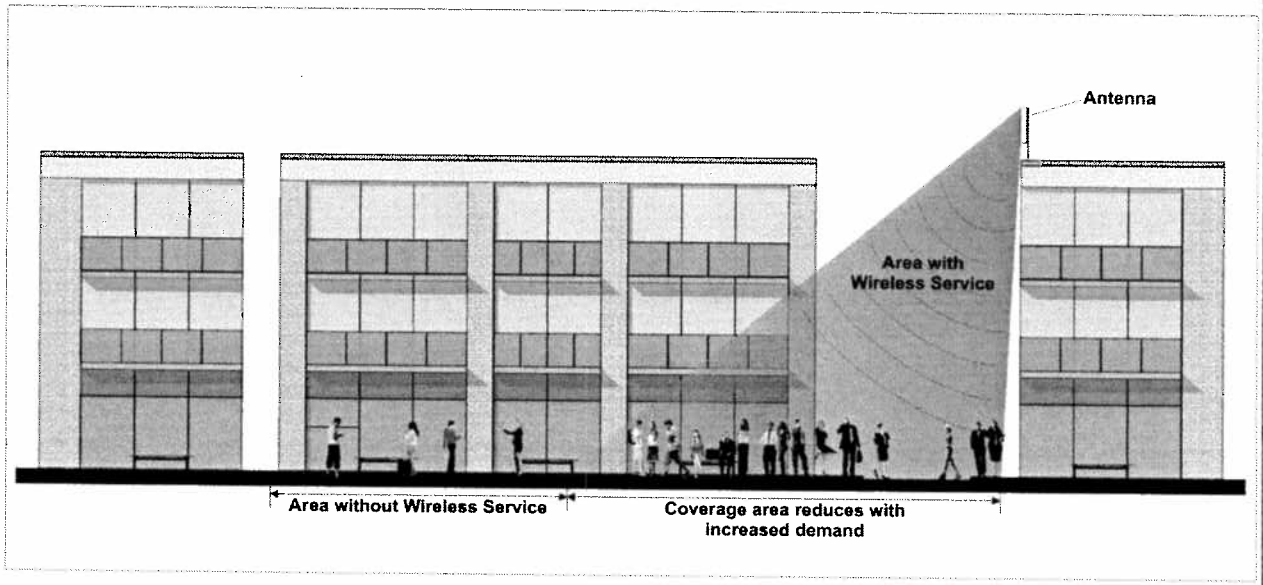
# EVOLUTION OF THE CELLULAR NETWORK

## Cellular Service coverage reduces with increased demand

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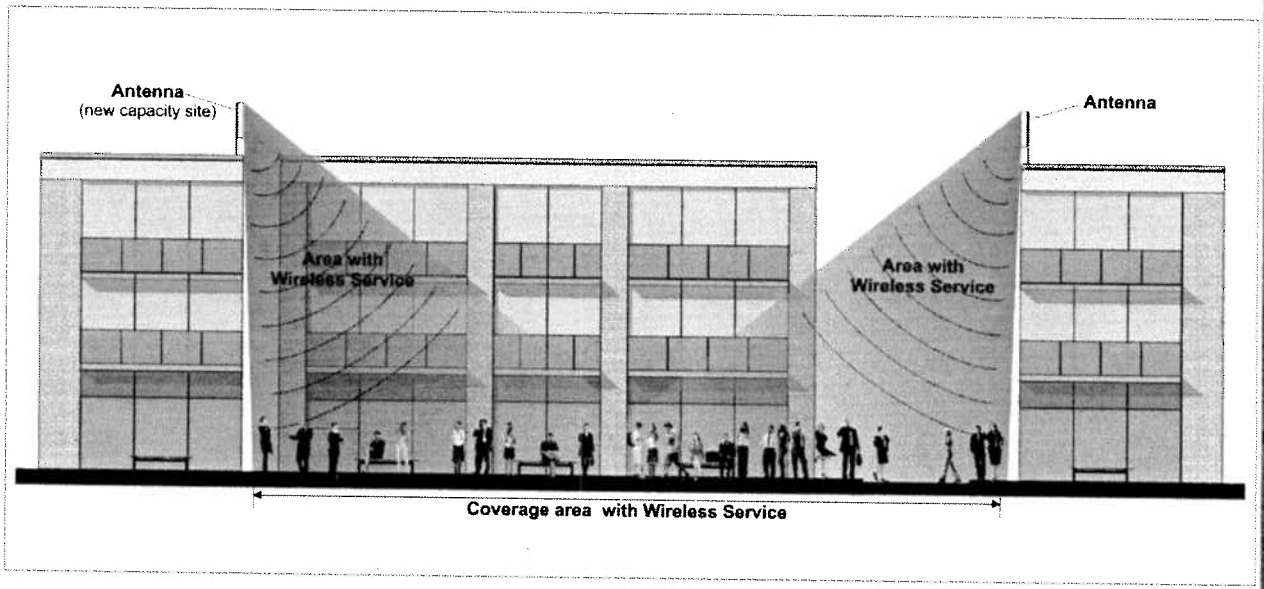
# EVOLUTION OF THE CELLULAR NETWORK

## Continuous Cellular Service Restored

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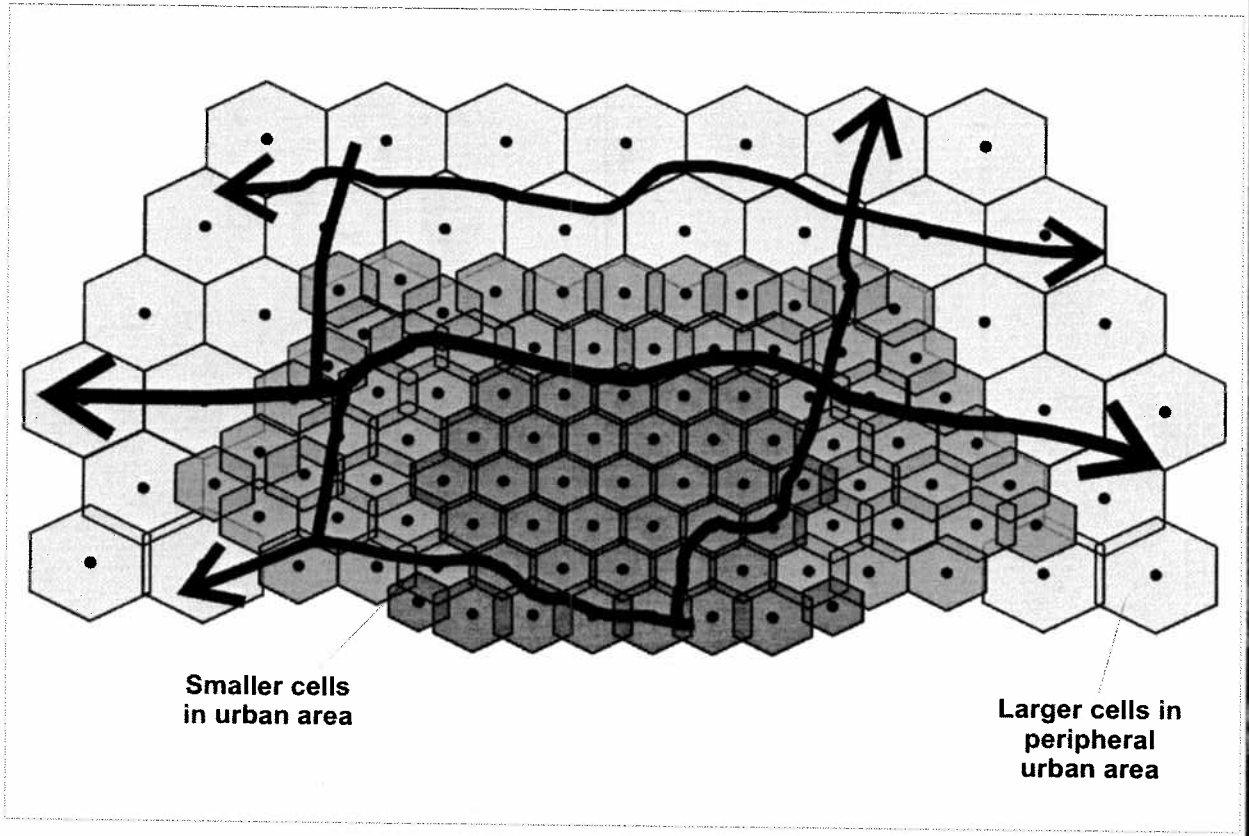
# What is a Cellular Network?

**The number of cell sites is related to the concentration of use and increasing public demand.**

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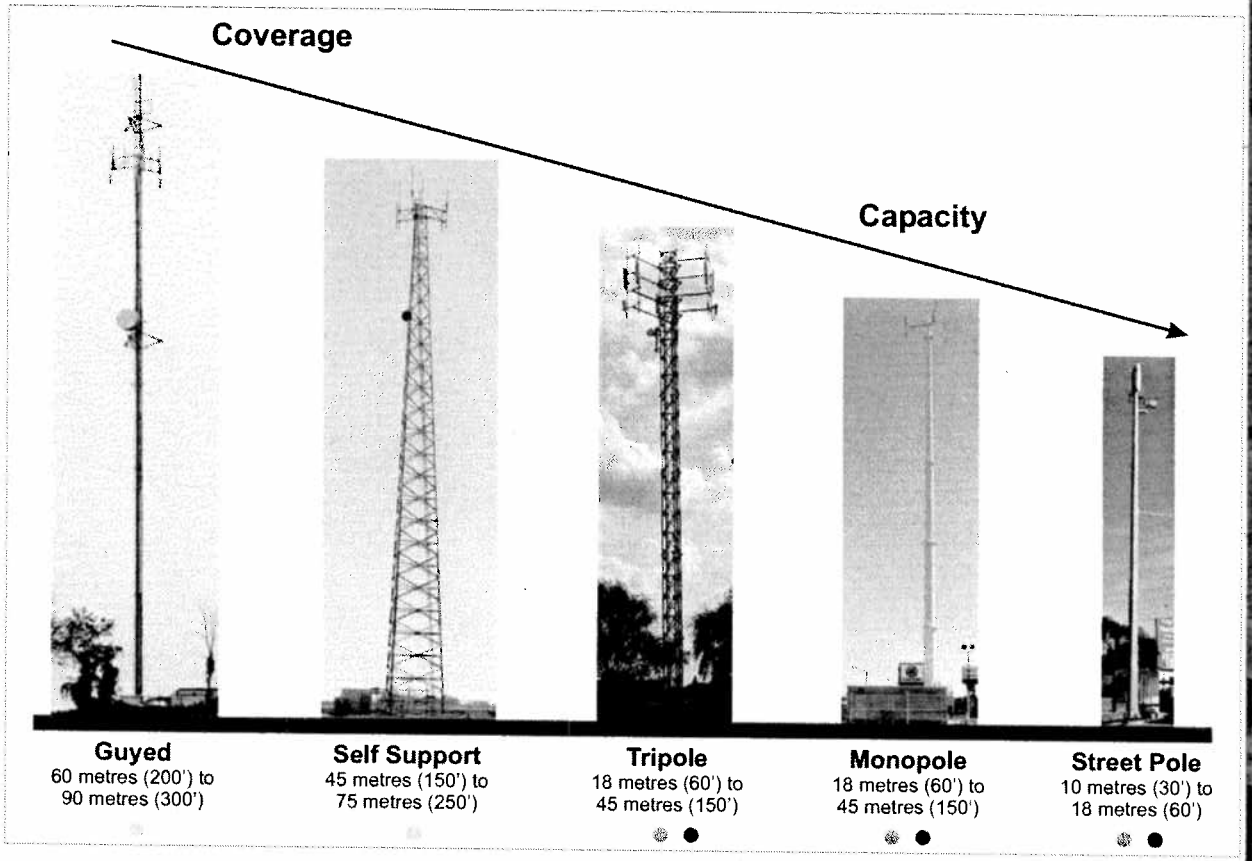
# WHAT IS A CELLULAR NETWORK

## Coverage and Capacity

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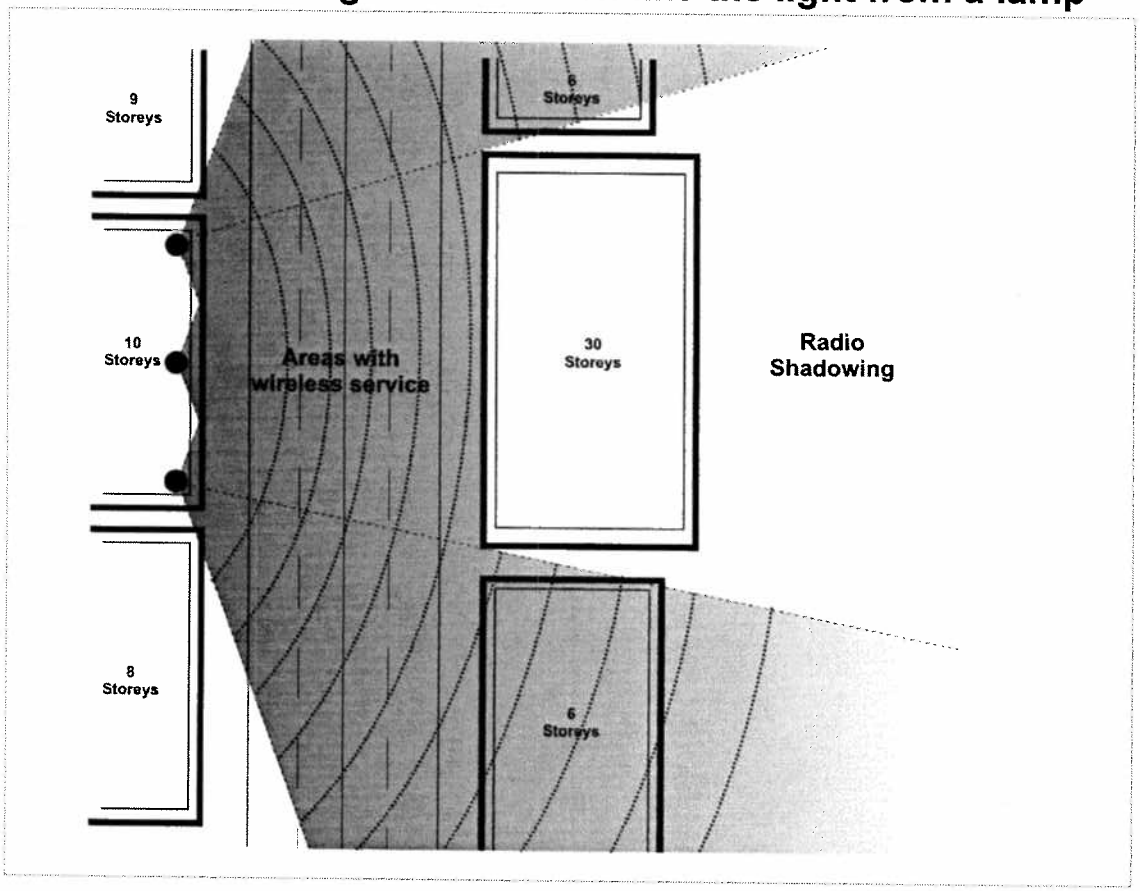
# LIMITATIONS OF CELLULAR SERVICES

## Radio Signals are much like the light from a lamp

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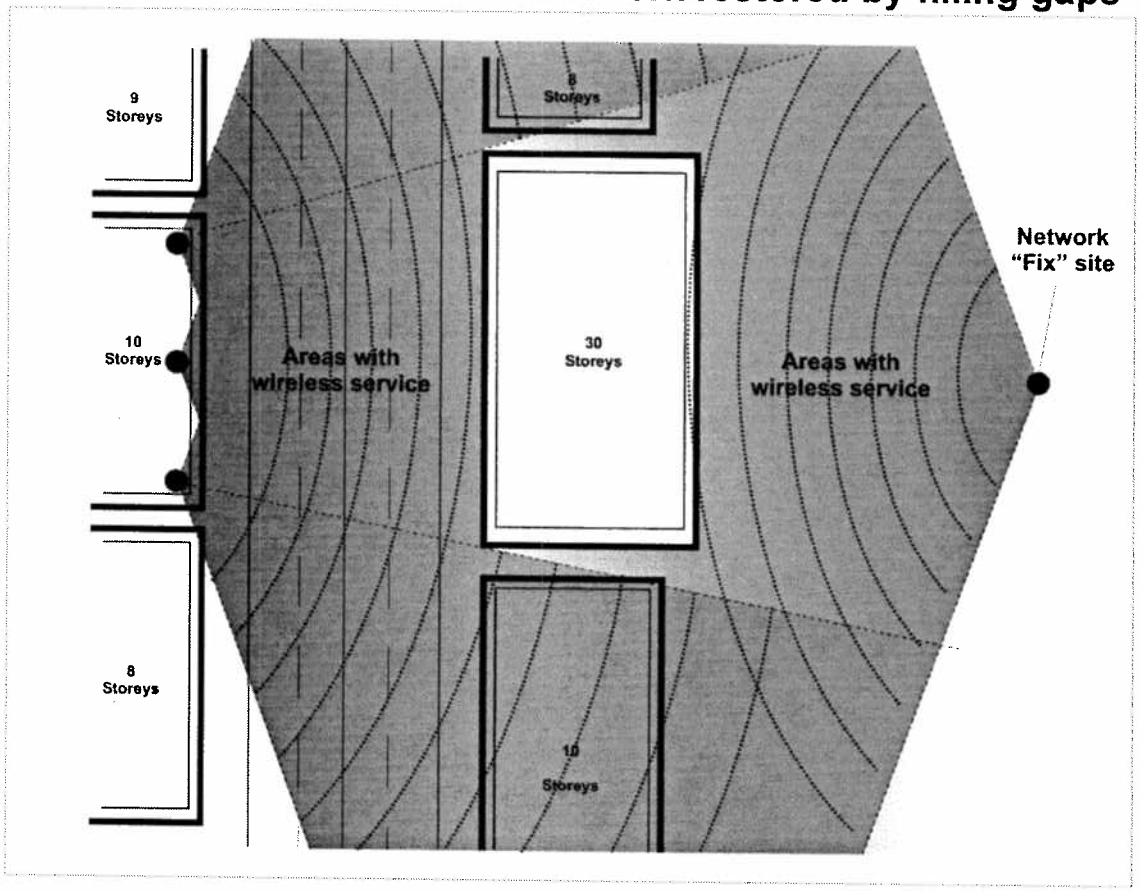
# LIMITATIONS OF CELLULAR SERVICES

## Continuous wireless network restored by filling gaps

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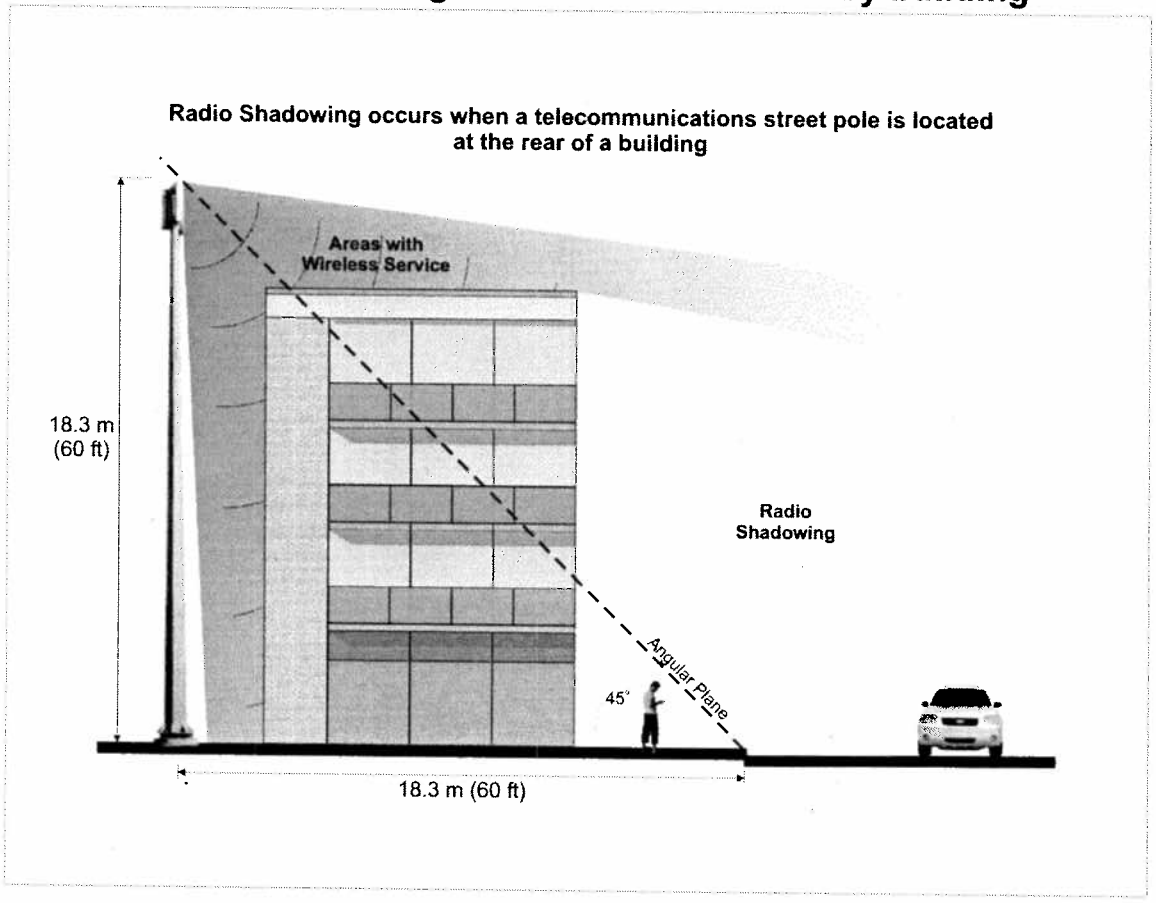
# SHADOWING

## Radio Shadowing at street level created by building

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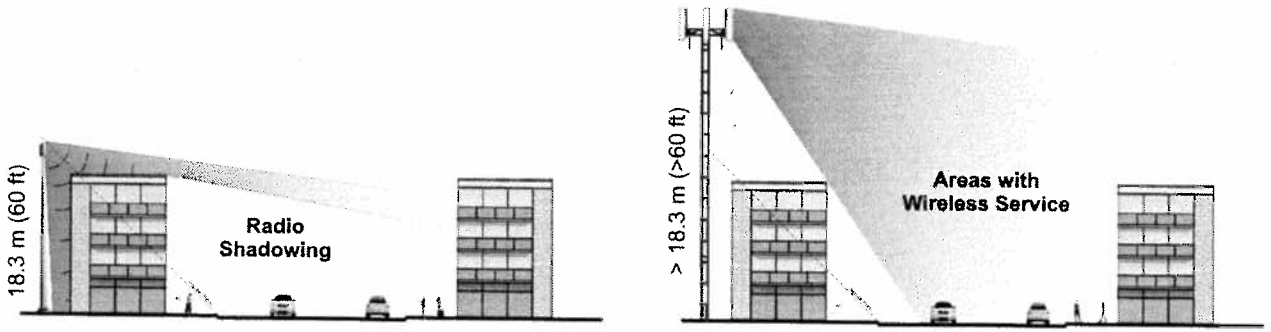
# SHADOWING

**A higher installation will eliminate Radio Shadowing at street level**




**The antenna must have a clear line-of-sight path to the street in order to provide coverage at street level. However, a higher installation will reduce network capacity and cause interference with adjacent cells.**

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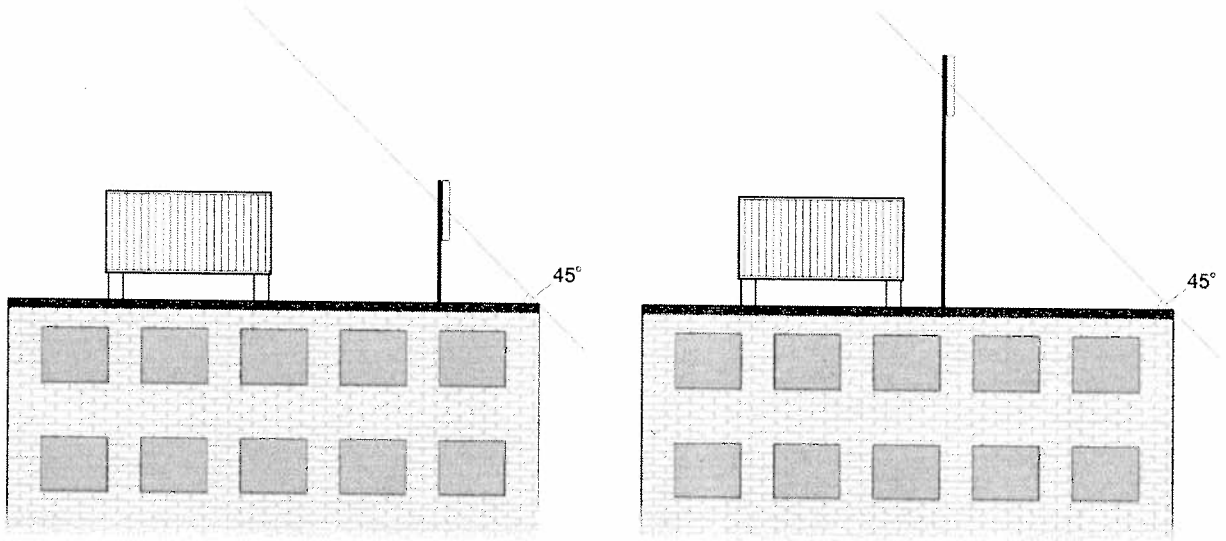
# ANTENNA HEIGHT

## Height of antenna increases with setback from building edge




The centre of the roof mounted antenna must be above a 45 degree plane from the building edge to provide radio signals at street-level

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## LIMITATIONS OF CELLULAR SERVICES

- Antenna height must be above building roof lines to avoid "Radio Shadowing□
- Antennae mounted on rooftops must be located at edge of building to provide wireless service at street level
- Existing buildings or structures may not be of appropriate height for optimal wireless service

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## SITING CONSTRAINT SUMMARY

- expected usage patterns of wireless service including proximity to users;
- local terrain and building types which can be a significant challenge as a result of shadowing;
- interaction with existing radio base stations;
- line of site requirements for high quality communications;
- opportunities to use existing structures;
- the availability of a willing landlord; and
- the industry's commitment to high service standards and customer satisfaction.

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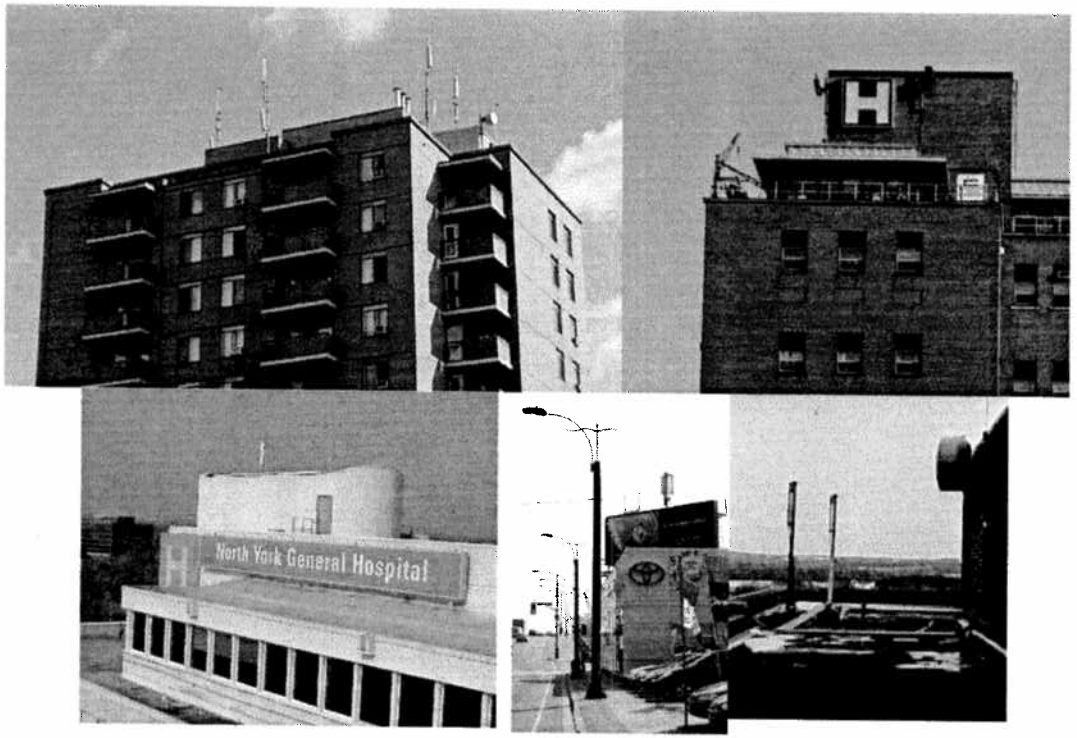
# TYPES OF INSTALLATIONS

**Antennas can be mounted on roof tops of buildings or on towers.**

Roof Mount Antennas:

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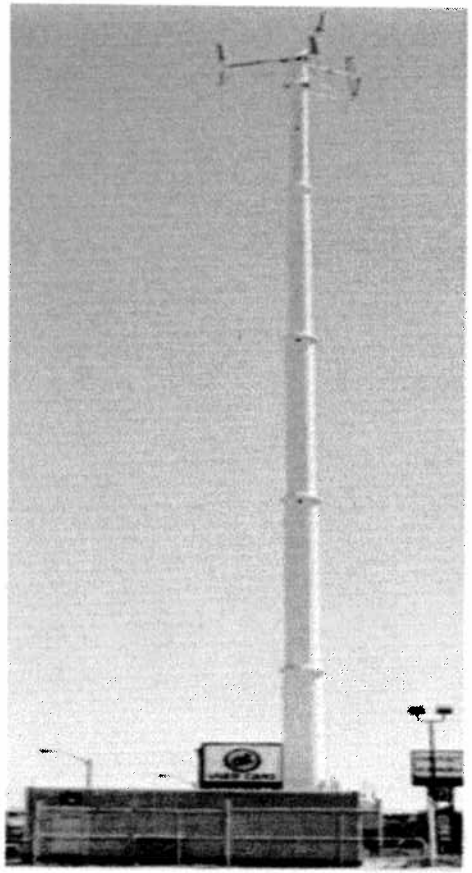
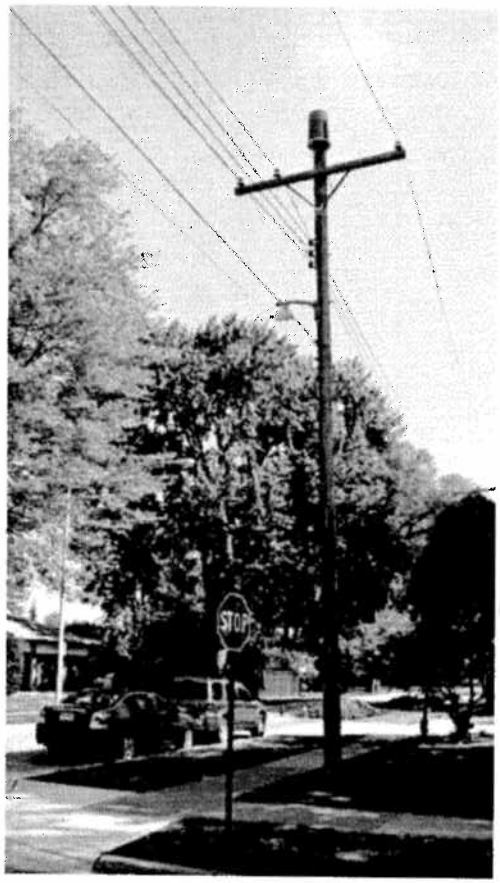
# TYPES OF INSTALLATIONS

**Monopole**



**Street Pole**

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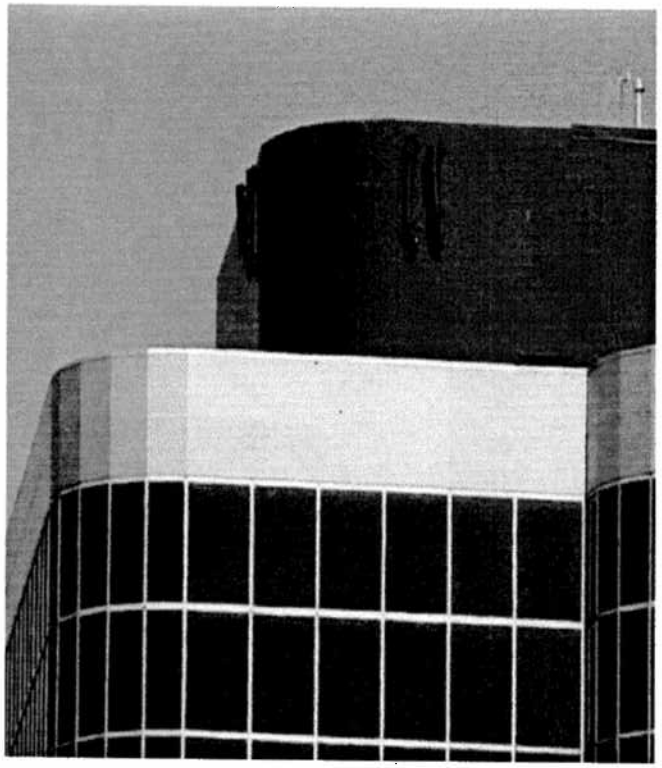
# TYPES OF INSTALLATIONS

## Flush Mounted Antenna

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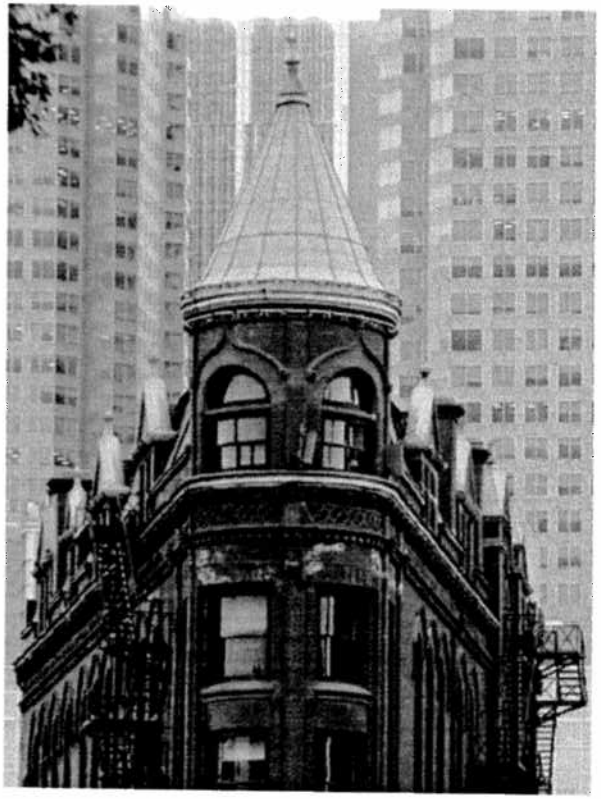
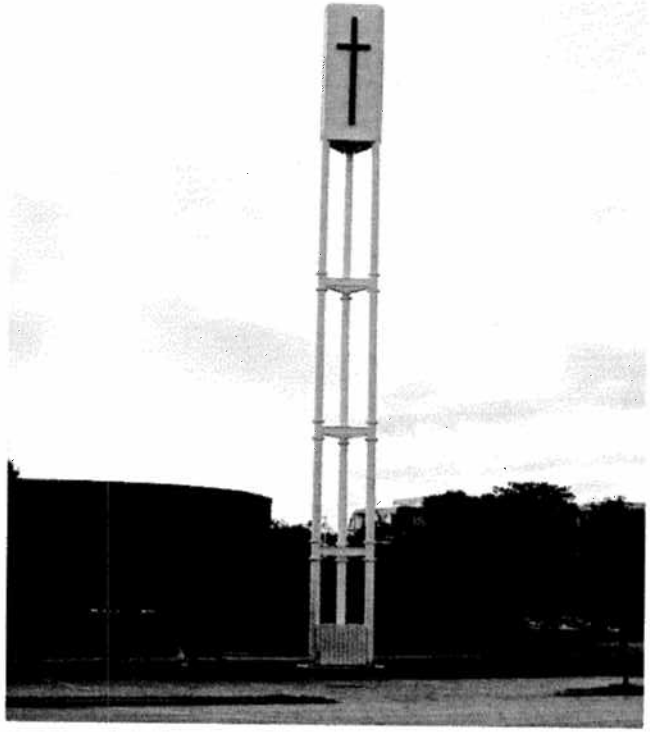
# TYPES OF INSTALLATIONS

## Stealth Designs and Camouflaged Sites





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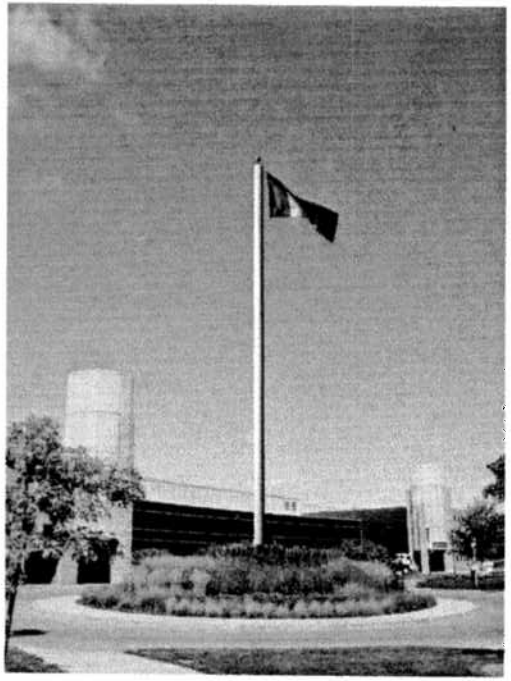
# TYPES OF INSTALLATIONS
## More Camouflaged Sites



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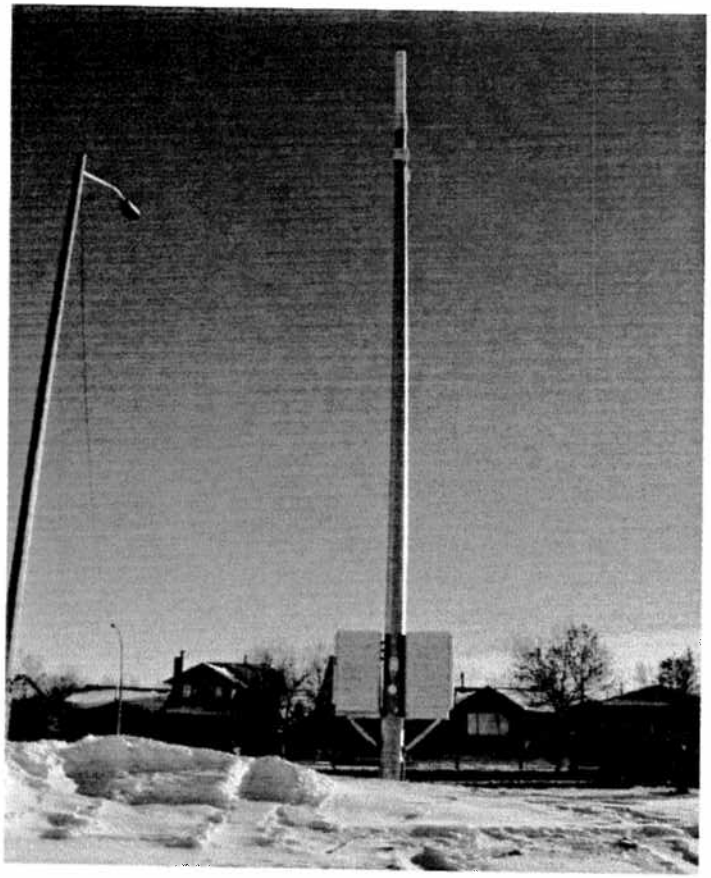
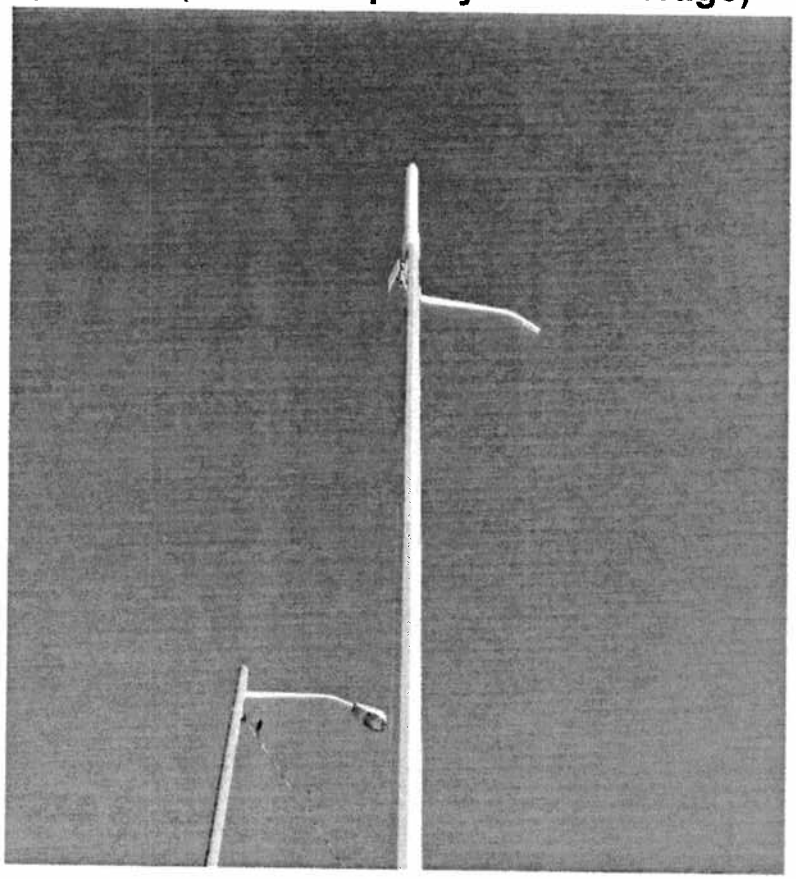
# TYPES OF INSTALLATIONS

**Micro Sites on Utility Poles (limited capacity and coverage)**





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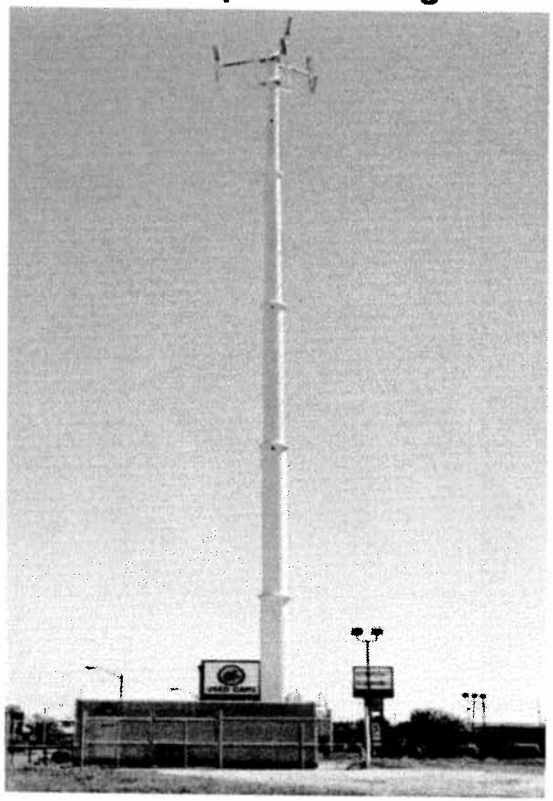
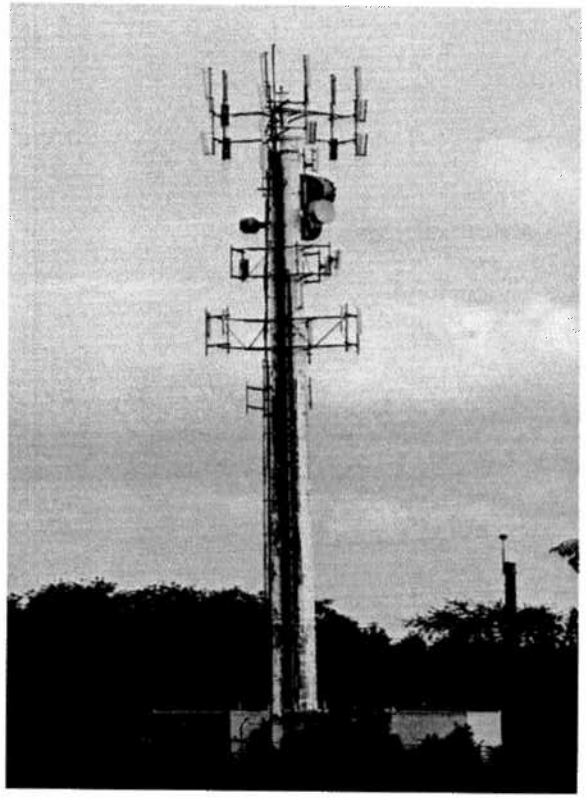
# CO-LOCATION

**Visual Impact of Single-Carrier tower vs. Co-location tower**



Single-Carrier Tower



Co-location Tower

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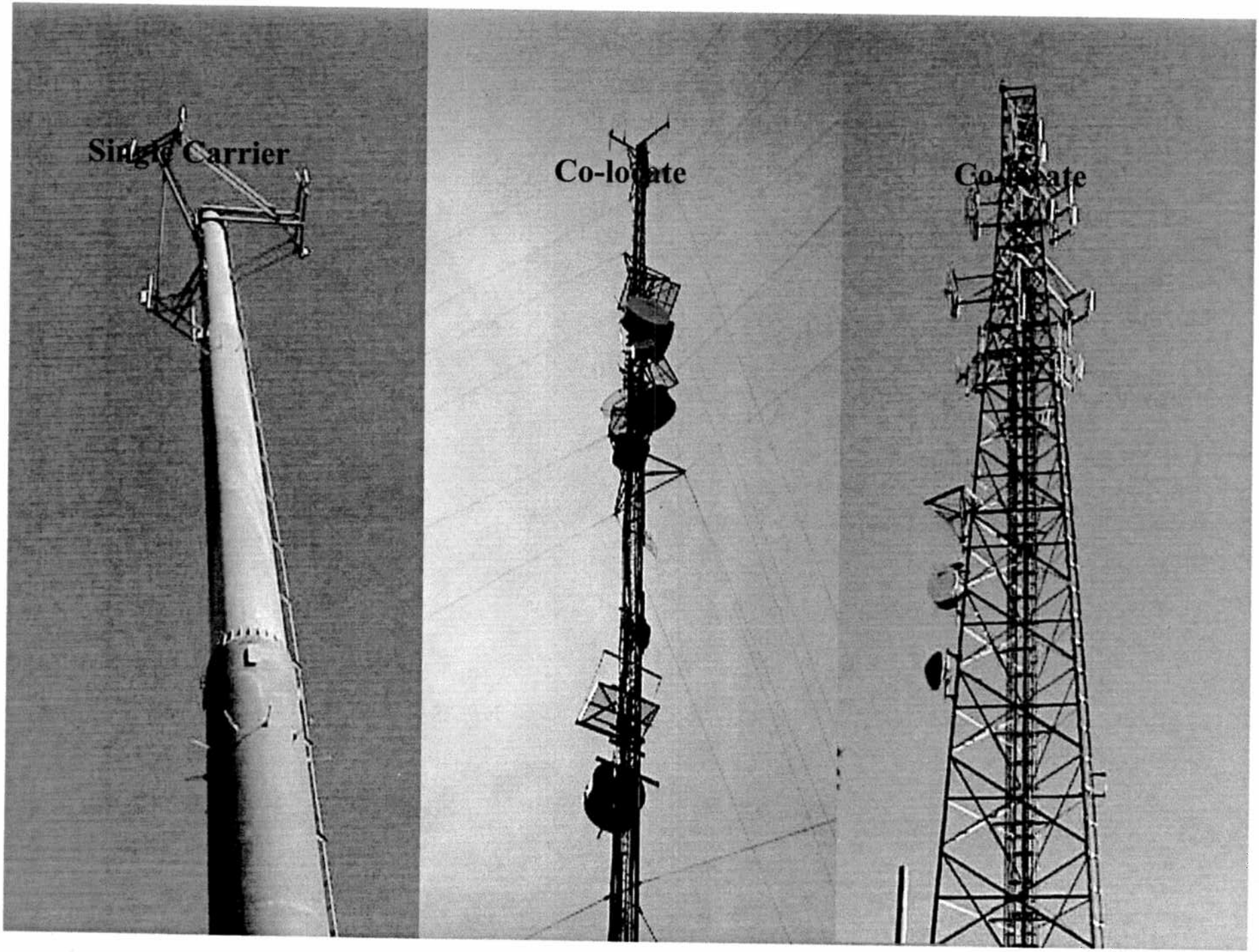
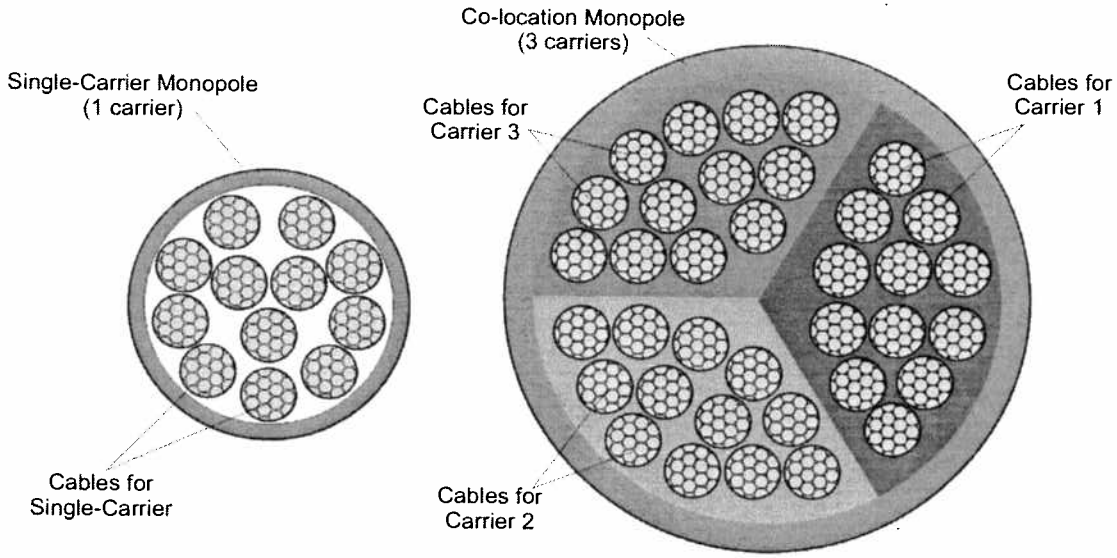

Single Carrier
Co-locate
Co-locate

# CO-LOCATION

## Cross Section of Single-Carrier and Co-location Monopole towers




A monopole must carry all cables to the antennas within the shaft of the tower. The more wireless carriers sharing a monopole, the larger the diameter the shaft of the tower needs to be in order to contain them. A single-carrier monopole is the thinnest possible monopole tower.

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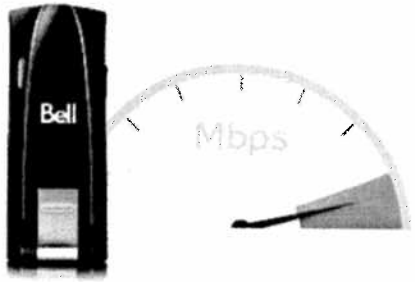
## EMERGING TECHNOLOGY - LTE

- The wireless industry constantly needs to upgrade network coverage and capacity to maintain momentum with new and emerging technologies
- LTE (Long Term Evolution 4G) is the latest upgrade to the HSPA UMTS 3G technology wireless networks
- Massive demand for high-speed wireless mobile data services have created capacity issues for all carriers' networks.

Windows Phone

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## EMERGING TECHNOLOGY - LTE

- LTE (4G) brings about unparalleled data transmission speeds (download, upload, video-streaming) as well as new services (mobile gps, mapping, high-speed wireless internet etc…)

- Many homes, businesses and community services will take advantage of the option to become completely 'wireless' without sacrificing service quality


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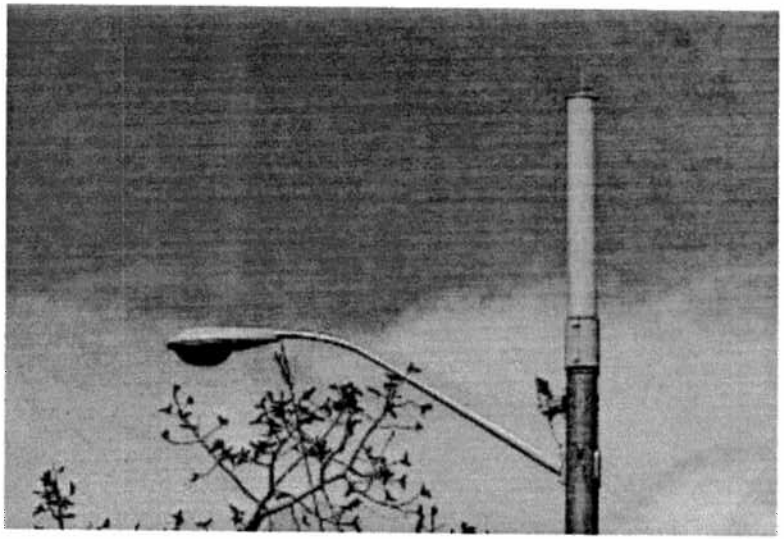
# EMERGING TECHNOLOGY - INFRASTRUCTURE

- The Wireless Carriers will need to convert existing roof-top and tower locations to LTE as a preliminary step
- The networks will also require a good number of 'capacity' sites in order to handle the high volume of users on the network
- Capacity sites *typically* require less height than regular coverage sites and less antenna loading
- Capacity site placement needs to be close to its users.



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## Carriers and the Federal Government

- The Federal Government has exclusive and comprehensive jurisdiction over radio communications and telecommunications.
- Industry Canada policy governs the way carriers consult with land use authorities with regard to antenna systems (Client Policy Circular CPC-2-0-03).
- This policy identifies a number of circumstances under which carriers are excluded from the requirement to consult with land use authorities in recognition of their low impact including:
  - New antenna systems less than 15 m
  - Addition or modifications to existing systems
- The exclusions are designed to encourage low-impact sites.
- The policy also stipulates that building approvals are no longer accepted as evidence of land use authority concurrence.

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## Municipal Approval Process

- The wireless industry wants to work with local government to develop protocols that enable us to meet the needs of your community...our customers...and the regulator (Industry Canada).

- ***Clarity, certainty*** and ***timeliness*** are key elements of any approval process.
  - With these in place, industry can focus its resources on securing successful sites, sensitive to their surrounds and land uses.

- We recognize and are mindful of community concerns with regard to site aesthetics.
  - Wherever possible, wireless providers will share (co-locate) facilities and/or locate infrastructure on existing structures
  - For sensitive locations, we implement customized, unobtrusive or stealth design options to minimize visual impact.
  - We will partner with local government to leverage existing infrastructure and where possible will work with the development community to ensure new buildings are designed to accommodate wireless communications equipment.

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# Thank you.

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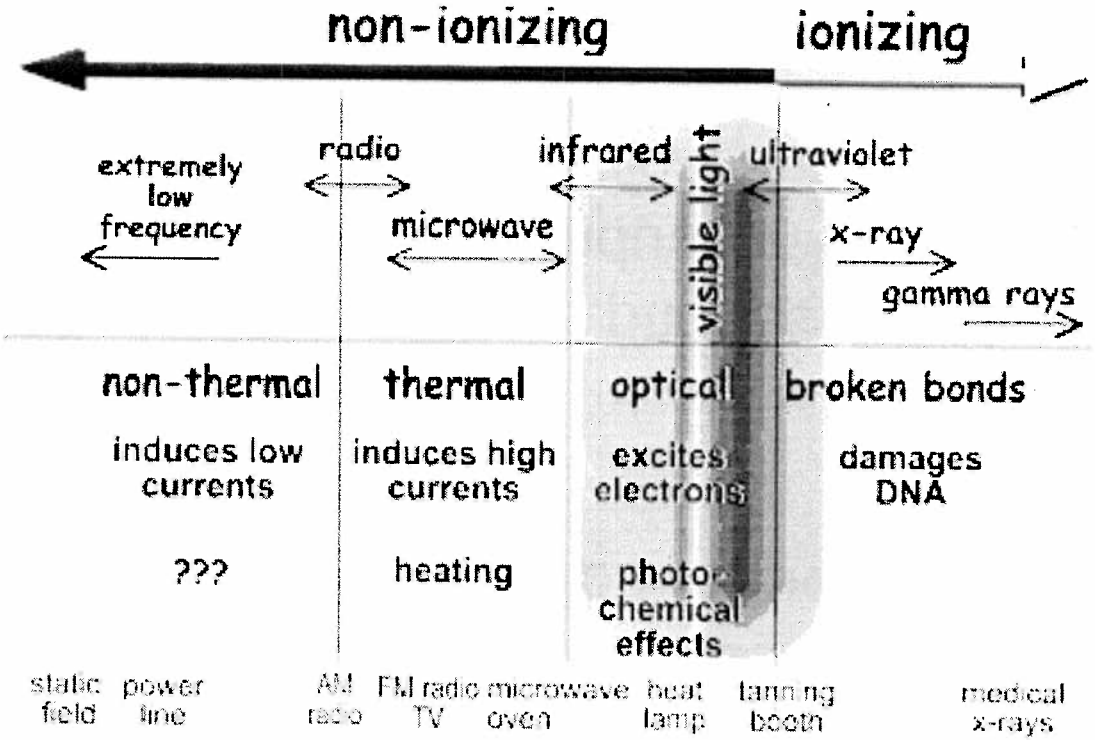
# EXPOSURE TO RADIO-FREQUENCY ELECTROMAGNETIC FIELDS

Ray Copes, MD, MSc
Director, Environmental and Occupational Health
Public Health Ontario
Associate Professor, University of Toronto

# PUBLIC HEALTH ONTARIO

- Arm's length agency funded by Province of Ontario.
- Became operational in 2008.
- Provide science and technical advice and support to the health care system (e.g. public health units) and the Government of Ontario.
- Also run the Public Health Labs.
- Environ monitoring equipment available for loan to HUs.
- Do not have regulatory or statutory powers; do not make policy.
- Role in research and teaching through links to, and appointments at, Ontario universities.

# Ionizing vs. Non-ionizing effects



# Does cell phone use cause cancer?

- May 2011 IARC meeting, 30 scientists 14 countries to assess carcinogenicity of Radio Frequency (RF) electromagnetic fields.
- Frequency 30kHz-300GHz.
- Sources: cell phones, cordless phones, Bluetooth, amateur radio, dielectric and induction heaters, pulsed radar, broadcast antennas, medical applications.
- The 'hazard' isn't new, the applications are.
- Effects other than cancer currently being reviewed by WHO

# RF Exposures

- Workers –highest exposures are near field
- Public – Use of transmitters held close to the body, can give greater dose to brain than work exposures
- Exposures from cell phone base stations, TV, radio, Bluetooth are all orders of magnitude lower than cell phones
- New 3G phones emit 100 times less RF than GSM phones
- For energy deposition to brain, cell phone use is unique

# Exposure Standards for RF

- Based on tissue heating as mechanism for adverse effects
- Canadian (Safety Code 6) and international stds (ICNIRP) similar
- Critics argue limits set on tissue heating are not stringent enough
- Regulatory bodies argue lack of consistency in research with non-thermal end points and whether there is link to '*adverse*' effects on health.
- Despite proliferation of wireless technologies, measurements done in community settings are typically small fraction of current limits.

# Evidence for Carcinogenicity of RF?

- Time trend, case-control, cohort studies
- Time trend – surveillance data have *not* indicated evidence of increase in gliomas or other tumours of interest potentially linked to cell phone use
- While some interpret as reassuring, this is a relatively insensitive indicator of risk
- IARC considered one cohort and 5 case-control studies

# Cell Phone studies

***Danish cohort*** – 257 gliomas in 420,095 subscribers between 1982 and 1995, subscriber incidence close to national average.

***INTERPHONE -*** 2708 glioma cases, 2972 controls
**OR 0.81 (95% CI 0.70 -0.94)** for ever versus never users
For highest decile of exposure **OR 1.40 (95% CI 1.03-1.89)**
Suggestion of increased risk for ipsilateral and temporal lobe tumours (where RF dose would be greatest)

***Hardell*** -pooled analysis based on cases ascertained up to 2003.
OR glioma >1 year of use **1.3 (95% CI 1.1-1.6)** increasing to **3.2 (95% CI 2.0-5.1)** for >2000h use
Ipsilateral use assoc w/ higher risk, cordless phones similar

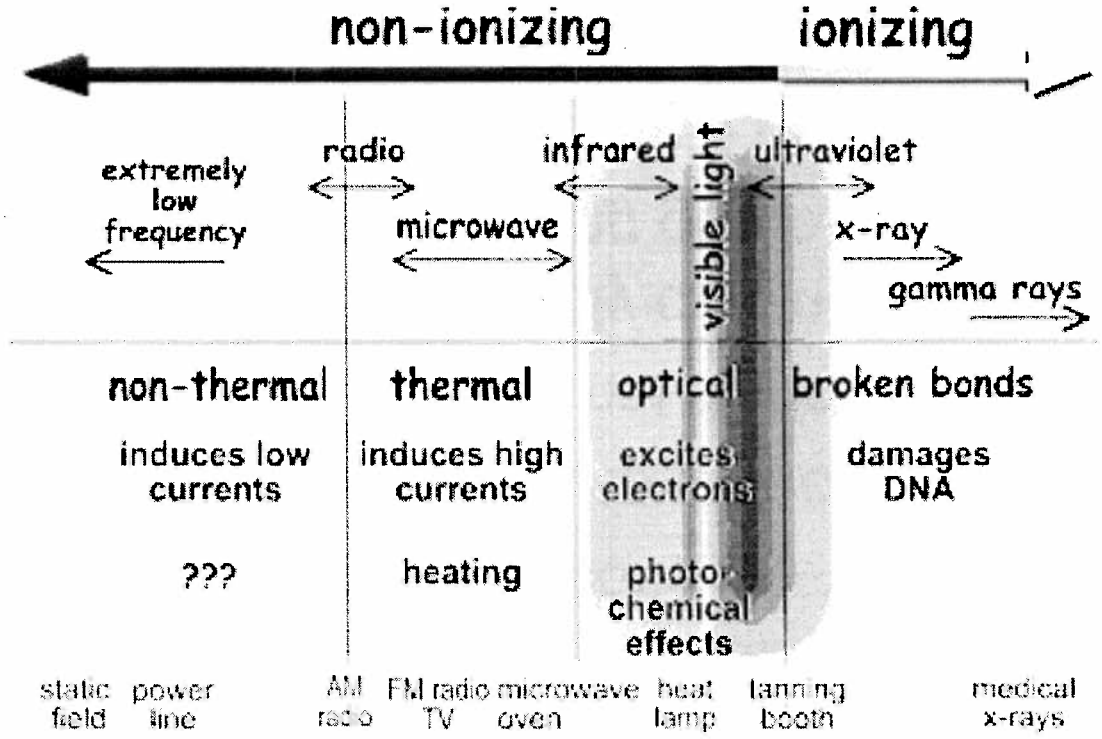
***Sato*** – some evidence ipsilateral risk of acoustic neuroma

# Conclusion of IARC Working Group

- Inconsistencies across studies; recall, selection bias possible; inadequate observations to meet latency

  Findings cannot be dismissed as reflecting bias alone.
- Human evidence '*limited*', animal evidence '*limited*'
- IARC Classification 2B 'possibly carcinogenic' supported by 'large majority' of the working group.
- This is based on exposure from cell phone use.
- *"In reviewing studies that addressed the possible association between environmental exposure to RF-EMF and cancer, the working group found the available evidence insufficient for any conclusion".*

# Ionizing vs. Non-ionizing effects



# Radiation agents reviewed in the International Agency for Research on Cancer's (IARC) monograph series from Samet 2011

| Agent | Group | IARC Monograph Volume No | Year |
|---|---|---|---|
| Ultraviolet radiation | 1 | 40, 55 | 1986, 1992 |
| Radon-222 and its decay products | 1 | 43, 78 | 1988, 2001 |
| Ultraviolet radiation A (NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other relevant data) | 2A | 55 | 1992 |
| Ultraviolet radiation B (NB: Overall evaluation upgraded from 2B to 2A with supporting evidence fromother relevant data) | 2A | 55 | 1992 |
| Ultraviolet radiation C (NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other relevant data) | 2A | 55 | 1992 |
| Solar radiation | 1 | 55 | 1992 |
| X- and Gamma (γ)-Radiation | 1 | 75 | 2000 |
| Radium-224 and its decay products | 1 | 78 | 2001 |
| Radium-226 and its decay products | 1 | 78 | 2001 |
| Radium-228 and its decay products | 1 | 78 | 2001 |
| Radioiodines, short-lived isotopes, including iodine-131, from atomic reactor accidents and nuclear weapons detonation (exposure during childhood) | 1 | 78 | 2001 |
| Radionuclides, α-particle-emitting, internally deposited (NB: Specific radionuclides for which there is sufficient evidence for carcinogenicity to humans are also listed individually as Group 1 agents) | 1 | 78 | 2001 |
| Radionuclides, β-particle-emitting, internally deposited (NB: Specific radionuclides for which there is sufficient evidence for carcinogenicity to humans are also listed individually as Group 1 agents) | 1 | 78 | 2001 |
| Magnetic fields (extremely low-frequency) | 2B | 80 | 2002 |
| Magnetic fields (static) | 3 | 80 | 2002 |

Classification of carcinogenic hazards to humans:
Group 1: Carcinogenic to humans.
Group 2A: Probably carcinogenic to humans.
Group 2B: Possibly carcinogenic to humans.
Group 3: Not classifiable as to carcinogenicity to humans.
Group 4: Probably not carcinogenic to humans.

# Reducing RF Exposure

- Cell phone use dominates exposures
- Can reduce exposure through:
  - reducing use
  - -texting
  - -selection of phone with lower SAR
  - -use of speaker, headset
  - -avoid use where there is weak signal
- Unclear whether this reduces risk of adverse effects
- Potential for exposure reduction in other settings less clear, although using wireless laptops on desk rather than lap may also be effective in exposure reduction