

ISED Consultation on a New Set of
Service Areas for
Spectrum Licensing

DGSO-002-18 (due 14th Feb 2019)

Response Submission by the
Toronto Police Service

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1.0 Executive Summary

The goal of providing interoperable communications systems between First Responders and Emergency Management personnel has long been the goal of Federal, Provincial and Municipal Public Safety Agencies across Canada. Yet it remains elusive given the complexity of systems design, funding cycles and the different needs of the agencies involved.

The Canadian Government defines the term “public safety” as services or applications related to the preservation of life and protection of property. This definition is consistent with descriptions used in previous policy and technical standards related to public safety¹. The government further defines the categories of users or agencies that may be eligible for licensing in designated public safety spectrum, such as P25 two-way radio systems as follows:

Category 1 – police, fire and emergency medical services; often called first responders with “mission critical” requirements.

Category 2 – forestry, public works, public transit, hazardous material clean-up, border protection, and other agencies contributing to public safety; and

Category 3 – other government agencies and certain non-government agencies or entities.

The City of Toronto operates a shared P25 two-way radio system for Category 1 users (including the Toronto Police Service (TPS), Fire Service and Paramedic services using dozens radio tower sites within the city boundaries. These radio systems are licensed on a “site by site” basis by ISED based on the need for radio coverage within the municipality by First Responders.

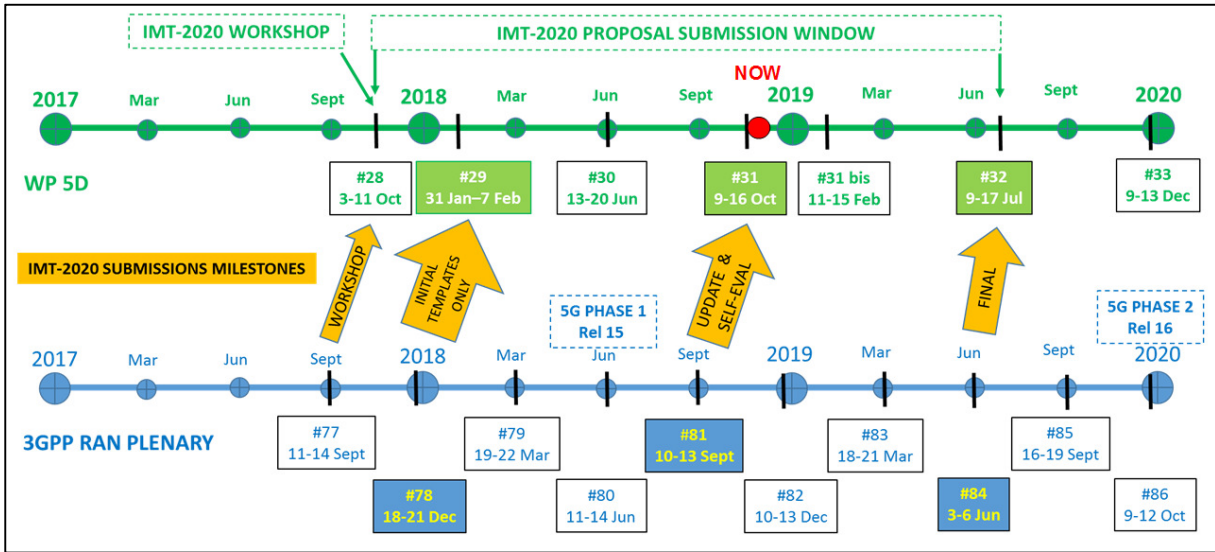
Traditionally group voice communications has been the baseline requirement for First Responders, and this is being augmented with group collaboration tools such as text messaging, videos, and location services.

Two way radios are being supplemented with smart phones, mobile terminals, lap top computers and tablets all of which currently operate on systems provided by commercial wireless carriers. These public systems currently provide 4G/LTE services for mobile broadband users and often revert to 3G services for voice calls and short message services (text messages). In fact, TPS already has hundreds front lines officers equipped with smart phones, and hundreds vehicles with Mobile Workstations that use 4G/LTE modems for connectivity.

In addition we have been testing improved LTE Quality of Service, Priority and Pre-emption with a national broadband carrier that shows great promise with a Release 13 3GPP Radio Access Network.

The specifications for 5G are well underway with Phase 1 already complete and Phase 2 by the end of 2019, and TPS looks forward to the arrival of 5G in the City of Toronto that will provide even better throughput with reduced latency that is an enabler for First Responders and Emergency Management personnel.

¹ [RP-25 Policy Principles for Public Safety Radio Interoperability](#)



We understand that within the next few years that new wireless technology (named “5G”), will become a reality in Canada, likely being deployed in cities with the highest population density, with spectrum auctions (perhaps based on the new Service Areas for Licensing) beginning in 2020, initially the new 5G channels could work using 4G/LTE control channels, and the ultimate vision for 5G is very exciting, and will certainly provide new opportunities and new applications for Public Safety agencies and First Responders.

- **5G vision - for real: Perfect storm of multiple technology breakthroughs:**
 - Low latency radio with fully flexible network
 - Artificial Intelligence and Automation
 - Device revolution for Augmented/Virtual Reality
 - Vertical industries going wireless
- **What is 5G New Radio?**
 - Operation from low to very high bands: 0.4 – 100GHz; including standalone operation in unlicensed bands
 - Ultra-wide bandwidth: Up to 100MHz in <6GHz; up to 400MHz in >6GHz
 - Set of different numerologies for optimal operation in different frequency ranges
 - Native forward compatibility mechanisms
 - New channel coding for user data channels and for control channels
 - Native support for Low Latency and Ultra Reliability
 - Flexible and modular RAN architecture: split front-haul, split control- and user-plane
 - Native end-to-end support for Network Slicing (addressing needs of vertical markets)

Given that 5G will require a “small cell” network design approach, and that certain new 5G spectrum bands may have difficulty with in-building penetration, TPS agrees that a new set of Service Areas for Spectrum Licensing will be required.

Our approach favours “Option 1” as described in DGSO-002-18 since it conforms to a municipal boundary approach, and can be co-ordinated with revised Municipal Access Agreements taking into account Public Safety concerns.

2.0 Design Principles

Under Canada’s Constitution each Province and Territory has the responsibility for providing Public Safety and Emergency Management services for its residents. In turn the Provincial (and Territorial) Governments have delegated these services to each and every Municipality, which is under the obligation for service delivery.

With respect to the design principles as stated by ISED:

1. Recognize geographic differences: consider the unique characteristics of urban and rural areas in Canada
2. Foster demand: areas should have either a population base or some economic value to support commercial viability
3. Maintain technological and competitive neutrality: not favouring or discriminating against one technology or group of stakeholders over another
4. Ensure boundaries are in low population areas to minimize potential interference issues.
5. Ensure areas nest within the existing Tier 4 service areas to maintain continuity with ISED’s existing licensing structure.
6. Use the ISED’s existing grid cells as constituent building blocks.

Question 1: Design principles

Q1A—ISED is seeking comments on the proposed design principles when providing responses, include supporting arguments for or against the proposed principles.

Q1B—ISED is seeking any suggestions on additional design principles that should be considered.

Our Response for Q1A

- Recognize geographic differences: consider the unique characteristics of urban and rural areas in Canada
Agreed, but every City and Regional Municipality is somewhat different.
- Foster demand: areas should have either a population base or some economic value to support commercial viability
Agreed, but Cities and Regional Municipalities likely will not have a problem in this regard.
- Maintain technological and competitive neutrality: not favouring or discriminating against one technology or group of stakeholders over another.
Agreed, but Public Service Agencies will require improved Quality of Service, Priority and Pre-emption

for First Responders in times of network congestion with the appropriate support for such Internet Traffic Management Practices as approved by the CRTC.

- Ensure boundaries are in low population areas to minimize potential interference issues.
Not Agreed. For Cities, boundaries should align with Municipal boundaries to ensure that Service Areas can align with Municipal Access Agreements. In the case of the GTA, the boundaries should reflect the City of Toronto and the Golden Horseshoe Regional Municipalities such Halton, Peel, York, Durham, etc.
- Ensure areas nest within the existing Tier 4 service areas to maintain continuity with ISED’s existing licensing structure.
Agreed.
- Use the ISED’s existing grid cells as constituent building blocks.
Agreed, but some variance should be allowed to favour City and Regional Municipal Boundaries in the Golden Horseshoe Area of Ontario (Durham, Toronto, York, Peel, Halton, Hamilton and Niagara).

Our Response for Q1B

An additional design principle needs to be considered in that a revised “template” Municipal Access Agreement should be developed by the Federation of Canadian Municipalities and agreed by CRTC, before any 5G spectrum auctions are held. Such a consideration was suggested in the CRTC’s recent filing to the Legislative Review Committee:

“New legislation should provide a single regulatory body, such as the CRTC, with direct authority to resolve disputes, order access and establish guidelines (as appropriate) with respect to all passive infrastructure owned by utilities such as power, gas, water and local authorities. This additional authority should also be applicable to non-traditional structures for which access will be essential for the efficient deployment of many future technologies. This would include light poles, bridges, water towers, street furniture and privately owned buildings such as high-rises and office towers.”

Public Safety Agencies have developed a good understanding of the need for street level two way radio coverage, but increasingly smart phones are prevalent, and 80% (or more) of broadband “mobile” data comes from within buildings. Such new environments can provide difficulty in determining the exact location (including the vertical location) of 911 calls, that even NG9-1-1 will find problematic. Hence in-building small cell 5G systems must provide good positional data from the public end users including the “z” axis.

We are also aware of the current FCC proposals for the timely deployment of 5G in urban areas:

1. A ban on local regulations designed to prohibit wireless infrastructure deployment;
2. Standardization of the fee structure cities can charge for reviewing small cell projects;
3. Established a 60-day shot clock for attaching small cells to existing structures and 90 days for new builds;
4. And set “modest guardrails on other municipal rules that may prohibit service.”

With our suggestion we look forward to the smaller License Areas as indicated above and would like to represent Public Safety’s views on the need for any revised Municipal Access Agreements under review by ISED and the CRTC.

3.0 New Service Area Discussions - Option 1

Question 2: Option 1 - Boundaries based on Statistics Canada 2016 census subdivisions

Q2A—ISED is seeking comments on the suitability of Option 1 in addressing the proposed design principles.

Q2B—ISED is seeking comments on whether adjacent urban CSDs should be combined into a single service area.

Q2C—ISED is seeking comments on whether there should be a minimum or maximum size for the service areas and if very small CSDs should be amalgamated into the larger surrounding or adjacent CSD.

Q2D—ISED is seeking comments to gauge if this option is suitable for northern and rural areas.

Our Response for Q2A

We believe that Option 1 is the "best fit" solution in addressing the proposed design decisions in the Golden Horseshoe Area of Ontario. We are pleased that ISED recognizes that there may be interest in serving entire urban areas such as the Golden Horseshoe Area, and we suggest that alignment with Regional Municipal Boundaries is the best option, rather than subdividing the license into smaller Census Subdivision Areas.

Our Response for Q2B

We are suggesting that where two-tier Regional Municipalities exist in the Golden Horseshoe Area, then the Tier 5 license should be aligned to regional boundaries (rather than Municipal boundaries).

Our Response for Q2C

Our response is related to the Golden Horseshoe Area and we have no opinion beyond that.

Our Response for Q2D

No comment, except to say that Public Safety and Emergency Management concerns should be a consideration no matter where the Tier 5 areas are used.

3.1 Suggested Tier 5 Areas for the Golden Horseshoe Area

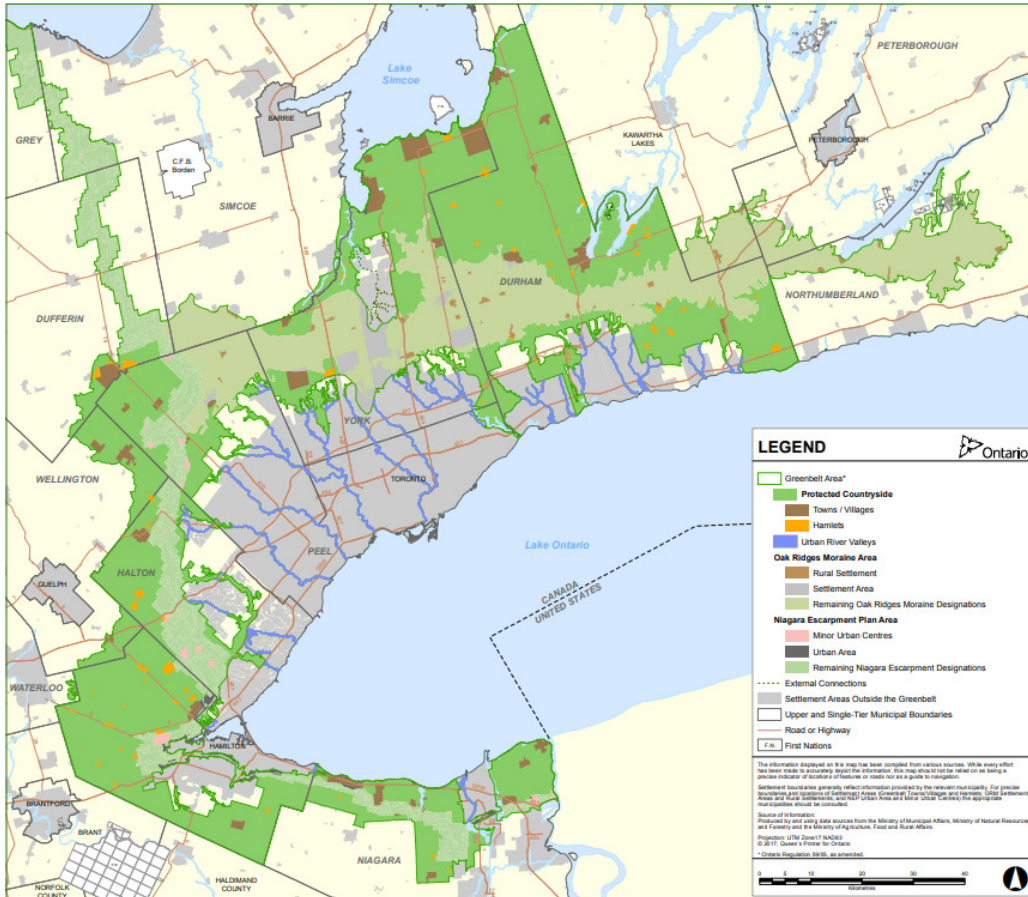


Figure 1 TPS suggested Tier 5 Service Areas in the Golden Horseshoe

Tier 5 License Areas	Area (Sq Km)	Population
Region of Durham	2,523	645,862
City of Toronto	630	2,732,000
Region of York	1,762	1,100,000
Region of Peel	1,247	1,382,000
Region of Halton	964	548,435
City of Hamilton	1,138	536,917
Region of Niagara	1,854	447,888

Our suggested approach affects CSD's in current Tier 4 areas 4-077, 4-083 and 4-084.

4.0 New Service Area Discussions - Option 2

Question 3: Option 2- Boundaries based on population centres

Q3A—ISED is seeking comments on the suitability of Option 2 in addressing the proposed design principles.

Q3B—ISED is seeking comments on the proposed minimum population for small population centre service areas. A rationale should be provided if a different population is proposed.

Q3C—ISED is seeking comments on whether the “other” service areas (remainder areas in each Tier 4) should be licensed differently (e.g. on a shared or first-come, first-served basis).

Q3D—ISED is seeking comments on whether this option is suitable for northern or rural areas.

Q3E—ISED is seeking comments on whether population centres, which have adjacent boundaries, should be amalgamated to form a single service area.

Our Response for questions Q3 (A to E)

No comment, except to say that Public Safety and Emergency Management concerns should be a consideration no matter where the Tier 5 areas are used.

5.0 New Service Area Discussions - Alternative Proposals

Question 4: Alternative proposals

ISED invites interested parties to submit alternative proposals for smaller service areas. All alternative service area proposals must be applicable to all of Canada and promote the federal government's policy objectives.

Submissions should include a rationale for the proposal, an explanation of how it satisfies ISED's policy objectives and how it meets each of the proposed design principles, and any other relevant information. One or more maps should also be included, preferably including one which covers all of Canada. Maps should be in a format that is readily accessible by ISED (e.g. in ArcGIS or MapInfo format, or publically available on the Internet with a link provided). Submissions should adhere to the requirements listed above in order to allow other stake holders sufficient information to provide informed comments.

Our Response for question Q4

No comment, except to say that Public Safety and Emergency Management concerns should be a consideration no matter where the Tier 5 areas are used.

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