

**Agenda – Standing Policy Committee on Innovation and Economic Development –
May 13, 2020**

REPORTS

Item No. 2 Cell Reception and Small Cell Technology Implementation

WINNIPEG PUBLIC SERVICE RECOMMENDATION:

1. That this report be received as information.

ADMINISTRATIVE REPORT

Title: Cell Reception and Small Cell Technology Implementation

Critical Path: Standing Policy Committee on Innovation and Economic Development

AUTHORIZATION

Author	Department Head	CFO	CAO
Doug Hamm	Glen Cottick, A/CIO John Kiernan, Director, PP&D	N/A	M. Ruta, Interim CAO

EXECUTIVE SUMMARY

Wireless carriers are interested in introducing new technology to improve cellular reception throughout Winnipeg. Their service strategies change the delivery method significantly: rather than continuing to build only traditional large-scale “Macro Cell” towers, carriers are now planning to introduce “Small Cell” sites throughout Winnipeg. These sites physically appear similar to Wi-Fi hotspots, though they are focused on delivering cellular service (i.e. mobile phone voice and data) as opposed to Wi-Fi Internet. While traditional Macro Cell towers are sufficient for current generation (“4G”) cellular service, Small Cell sites are required for next generation (“5G”) service.

The City is interested in better understanding the opportunities, issues, and value proposition for Small Cell and the eventual implementation of next generation “5G” cellular service and appreciates the great importance of a well-managed implementation. A key benefit is the competitive advantage afforded to the geographic region by maintaining a strong foundation of wireless communication upon which to build business and innovation, including Smart City synergies. Any municipality that falls behind others will be at a competitive disadvantage; hence the desire to progress in a well-planned way that is considerate of all factors, including health and safety of citizens.

In support of this opportunity, the City intends to undertake carefully planned Small Cell trials conducted by wireless carriers starting in 2020; this will be accomplished through open collaboration between an internal City working group and the various stakeholders. While the City is not the approving authority for wireless telecommunication and radiocommunication facilities, and the regulation of radiocommunication facilities in local area plans or zoning by-laws is not within the legislative authority of the City, these activities will nevertheless contribute to supporting Winnipeg’s transformation into one of Canada’s smartest, best-connected cities to live, work, innovate, and invest.

RECOMMENDATIONS

1. That this report be received as information.

REASON FOR THE REPORT

On May 27, 2019, the Standing Policy Committee on Property and Development, Heritage and Downtown Development directed the Winnipeg Public Service to:

1. Create a process to consider cell reception as part of planning for new developments.
2. Investigate and report back on implementing and permitting Small Cell Technology in Winnipeg.

and report back to the appropriate Committee.

IMPLICATIONS OF THE RECOMMENDATIONS

There are no implications in receiving the report as information.

HISTORY/DISCUSSION

DIRECTIVE 1: Create a Process to Consider Cell Reception as Part of Planning for New Developments

A similar request was adopted by Council on 21 June 2017. At that time the wording of the disposition was that the Public Service be directed to:

- A. Create a process to include cell reception as part of planning for new developments through the upcoming OurWinnipeg review; and,
- B. Include direction for the placement of cellphone towers that may have to be located near residential development in the Residential Infill Strategy.

The City of Winnipeg is not the approving authority for radiocommunication facilities. Innovation, Science and Economic Development (“ISED”) Canada is the approval and licensing authority for radiocommunication facilities and encourages municipalities to develop protocols or policies to seek meaningful local input on antenna and tower siting as part of the federal licensing process. Regulation of radiocommunication facilities in local area plans or zoning by-laws is not within the legislative authority of the City.

The Winnipeg Antenna System Policy establishes guidelines for local public consultation by the proponent and sets out siting, development and design guidelines for the City to consider in commenting on land use compatibility of proposed antenna system facilities. The City provides a response to ISED on whether it concurs or does not concur with a proposed facility based on a land use review and results of the consultation process. ISED has the final say on licensing and approval of proposed facilities.

While the City is not the regulatory authority for telecommunications and radiocommunications infrastructure, collaboration with carriers and other stakeholders on Small Cell trials would provide the City with an excellent opportunity to explore collaborative planning with the industry and determine how cellular service could best be integrated in a seamless manner in new

developments and existing neighbourhoods. The City intends to test its existing administrative systems, procedures and approval processes and look at ways to introduce facilities on rights-of-way through detailed guidelines and comprehensive municipal access agreements similar to approaches in other Canadian jurisdictions.

DIRECTIVE 2: Investigate and Report Back on Implementing and Permitting Small Cell Technology in Winnipeg

A. Introduction

Small Cell technology represents a paradigm shift in the way cellular service is provided to wireless customers in urban areas. Rather than relying solely on traditional Macro Cell towers (which may be ground-based or installed on rooftops and other structures) that serve large areas, replete with issues of size, aesthetics and land use compatibility, Small Cells are similar to Wi-Fi hotspots in their deployment methods and other characteristics. Typically, they manifest as a small box attached to the inside or outside of a building, or may be seen in the street right-of-way atop a pole. A Small Cell may be assumed to be a public Wi-Fi hotspot, though it provides mobile voice and data service. This service may start as the established 4G LTE service, migrating to 5G service as the new standard is deployed across Canada (to date no production 5G service is available in Canada, while the more competitive USA market has seen rollouts in several cities and towns with nationwide coverage planned for 2020).

Compared with 4G cellular service, 5G service enabled through Small Cell adoption is expected to provide the following advantages:

- Significantly (potentially 100x) faster data speeds;
- More reliable and stable connectivity (e.g. for self-driving cars, remote surgery, and other future innovations);
- Providing a viable alternative to traditional home Internet plans for those who would prefer a single service at home and on the go; and
- Lower power requirements (e.g. for battery-powered sensors used to detect traffic patterns, river levels and myriad other “Internet of Things” innovations).

With proper planning Small Cells can transparently blend into any neighborhood, augmenting existing Macro Cell service with enhanced coverage and performance. However, benefits including small size and ease of installation are balanced by the need for Small Cell sites to be deployed in large quantities in close proximity. Each of these sites must then connect through fibre optic cable to the wireless carriers’ networks. This presents new challenges for permitting, municipal rights-of-way management, infrastructure usage and rental agreements, and various other aspects of land use planning.

The potential benefits to the City of addressing these challenges and supporting the implementation of Small Cell sites in Winnipeg are numerous:

- The competitive advantage afforded to the geographic region by maintaining a strong foundation of wireless communication upon which to build business and innovation, including Smart City synergies;
- Benefits for citizens from increased performance, coverage, availability and aesthetics, in keeping with the Winnipeg Antenna System Policy’s (WASP’s) objective to “...contribute to the orderly development and efficient operation of a reliable, strong radiocommunication network in the City”;
- Monetization of City infrastructure at intersections, physical buildings, and elsewhere with a fair and consistent rate structure;

- Ensuring that the City is prepared for, and addressing to the best of our authority:
 - o Our potential roles as an active provider of civil services related to 5G, and/or as a passive governor of the municipal rights-of-ways and public property;
 - o The need for technical and procedural standards across all carriers;
 - o Our role in assisting with the planning of deployments by combining the City's urban planning knowledge with carriers' knowledge of customer needs, to a) manage supply and demand; b) manage deployment within existing built-up areas; and c) address policy gaps that may inhibit success;
 - o Leveraging opportunities to improve public safety through higher-performance, higher-availability communication services wherever possible; and
 - o Determining during trials which future decisions related to Small Cell and 5G service may be influenced by public feedback.

B. History

Over the past year, interest by carriers in trialing Small Cell within Winnipeg has grown. All carriers currently serving Manitoba (TELUS, Bell Mobility / BellMTS, and Rogers) and some not yet licensed for operating in Manitoba (Shaw) are now interested in pursuing agreements with the City.

Each carrier has approached the City differently, sharing varying levels of information based on their business objectives. Carriers are often not sure which City department to approach, which is to be expected since responsibility for the various elements of Small Cell governance is distributed amongst several City departments. Furthermore, some carriers' plans are more advanced than others. To ensure all carriers receive consistent, thorough information from the City, and respond in a likewise consistent and thorough manner, a Request for Expression of Interest (REOI) was released in 2018.

REOI 194-2018 (available for reference from the Bid Opportunity website at https://winnipeg.ca/MatMgt/FolderContents.asp?FOLDER_NAME=194-2018&YEAR=2018) was developed by a cross-departmental working group with members from Innovation, Transformation & Technology (INV), Planning, Property & Development (PPD), Legal Services, Materials Management, and Public Works (PWD). PPD involvement included Urban Planning, Asset Management and Portfolio Management, while PWD involvement included Underground Structures, Streets and the Transportation Management Centre.

The REOI was responded to by several interested carriers and consulting firms. Follow-up meetings were held to discuss each response. The information gathered through the REOI process met stakeholder expectations and has resulted in several key findings.

C. Key REOI Findings

i) Service Delivery

1. Carriers are generally interested in leveraging City infrastructure assets, such as traffic signal poles, light/lamp poles (those not owned by Manitoba Hydro), municipal buildings and green spaces. A summary of assets on offer is found within the REOI and detailed within attachments located on the Bid Opportunity site.

2. Carriers expect to install, operate, repair, replace, upgrade and maintain Small Cell sites in compliance with all governing protocols and regulations, and be solely responsible for all associated costs.

ii) Business Plan

1. Understanding that streetlights and wooden hydro poles must be negotiated with Manitoba Hydro, with respect to City infrastructure, carriers are generally most interested in leveraging traffic signal poles and other dense collections of pole structures, followed by City buildings, for implementation of Small Cells.
2. Carriers are generally averse to the notion of rental fees, though all are willing to negotiate a fee that considers the potential benefits the City and our residents will realize. Value-added services like Public Wi-Fi hotspots and Smart City partnerships may be a consideration when setting rental fees. Augmentation of Small Cell sites to support band 14 (dedicated Public Safety cellular spectrum) may likewise prove valuable.
3. While the City expressed an expectation that carriers would, "...seek every opportunity through mutual collaboration to design cohesive, compatible technologies and consistent practices," carriers largely responded affirming their ability to efficiently work around each other though not necessarily with each other.
4. Carriers' plans for Small Cell deployment varied greatly. Each carrier has specific localized gaps in coverage areas they are trying to address.
5. All carriers are interested in long-term (10+ year) Master License Agreements, implying Council approval.

iii) Technical and Security Specifications

1. Carriers claim that Small Cell technology can meet or exceed metrics for traditional Macro Cell towers such as scalability, health and safety, security, performance and availability, depending on certain conditions. They maintain that Small Cells are particularly suited for serving high-traffic areas as they are physically closer to the endpoints. In addition, the lower power output of each Small Cell complies with Health Canada's Safety Code 6 guideline.

The City of Winnipeg acknowledges that certain members of the public may have concerns regarding the electric and magnetic fields ("EMFs") produced by the use of electricity and electric devices. The City takes its obligations in this area seriously, and monitors its regulatory requirements related to EMF in order to ensure that it conducts its operations in accordance with such regulatory requirements.

The City is not responsible for the regulation of radio communications. Canada's Radiofrequency Exposure Guidelines are developed by Health Canada and regulated by Innovation, Science and Economic Development ("ISED") Canada.

2. It is estimated that 16 to 25 4G Small Cells are required to equal the coverage of one Macro Cell tower. In Winnipeg, there are approximately 70 Macro Cell towers per carrier. This translates to roughly 1,120 to 1,750 Small Cell Attachments per carrier, each with its own fibre and power requirement. This density may have significant land use implications and impacts on the management of the municipal rights-of-way.
3. Respondents report that most Small Cell radios rely on passive cooling, avoiding issues of noise pollution and higher maintenance associated with fans and compressors.

Technology is described as low-power, noise-free, small and lightweight, and free from unsightly cables. This must be demonstrated, along with backup power requirements, through trials.

4. Carriers with interest in pursuing trials as soon as possible with current 4G technologies will aspire to 5G migrations within two years. 5G will result in a greater density of lower-powered devices, providing lower latency and triple the performance of 4G and becoming a viable option for residential Internet service and Smart City operations. However, these benefits come with a cost: a given geographic area will require a greater number of 5G Small Cells sites for coverage and potentially more components at each site, increasing land use issues, infrastructure availability and municipal rights-of-way management.

iv) Addressing the Needs of Carriers

Carriers have expressed specific requirements that must be met by the City for success. These include:

- a. Flexibility to deploy trials rapidly;
- b. Long-term (10+ year) Master License Agreements covering all Small Cell installations;
- c. Municipal Access Agreements covering all applicable infrastructure;
- d. Collaboration on repeatable design guidelines endorsed by the City;
- e. A streamlined process for review, including priority service for expedited permit approvals within the municipal rights-of-way;
- f. A fair, modest and straightforward rental fee structure; and
- g. Provision for temporary deployment of Small Cells where/as required (e.g. major outdoor concerts, whiteout parties and other “Cell On Wheels” (COW) deployments).

D. The Value of Independent Consultants

As noted above, independent firms (non-carriers) also responded to the REOI. While the questions asked in the REOI were not wholly applicable to these respondents, they provided thorough perspectives on technologies, considerations, and carrier relations.

The firms provided responses highlighting their potential value to the City in key areas such as project and contract management, technical advisory and vendor-neutral consultation services, and Quality Assurance. These opportunities will be considered as the City’s Small Cell Strategy is advanced.

E. Key Issues

Several issues must be addressed with respect to the City’s Small Cell strategy:

1. Balancing the needs for innovation, collaboration and governance for the betterment of the health, safety and productivity of citizens;
2. Ensuring minimal addition and disruption to City infrastructure by having carriers consolidate strategies and equipment to the highest degree possible;
3. Growing Small Cell strategic capability within the City by investing in, forming and maintaining a group of diverse subject matter experts from several departments including Innovation, Planning Property & Development, Legal and Public Works, and augmenting that capability through third party consultation opportunities (as needed);

4. Reviewing, prioritizing and executing necessary changes to policies, procedures, standards and practices impacting Small Cell adoption; and
5. Synergizing City plans with those of other stakeholders, including: the public; private property owners; carriers; land developers; utilities; ISED Canada; the Canadian Radio-television and Telecommunications Commission (“CRTC”); the Federation of Canadian Municipalities (“FCM”); and other Canadian municipalities.

F. Next Steps

1. Formalize and maintain an internal cross-departmental working group: Q1’20 onward.

- a. The REOI process demonstrates the value of a multidisciplinary group within the City to address Small Cell and related technology advancements. The group will:
 - Address Small Cell issues in collaboration with internal and external stakeholders (e.g. Federation of Canadian Municipalities, Manitoba Hydro, CRTC, ISED and carriers);
 - Maintain an active role in the determination of use of City infrastructure, public places and municipal rights-of-way, not unduly deferring its authority to 3rd parties, in order to uphold the tenets of OurWinnipeg, the Winnipeg Antenna System Policy (WASP) and Smart City initiatives;
 - Review existing By-laws, policies, municipal protocols, permitting procedures, access agreements and other practices, prioritizing and addressing gaps related to Small Cell adoption (with an early focus on the WASP);
 - Investigate and potentially execute a 3rd party consulting assignment to assist with Small Cell readiness and provide ongoing advisory services, as well as to investigate gaps in knowledge, resourcing and funding in order to draft proposals to finance the above actions; and
 - Pursue tactical opportunities related to Small Cell (e.g. promoting fibre networks to be run to/near/between intersections, buildings and other City-owned infrastructure for future City and community needs).

2. Form a joint internal/external/industry stakeholder interest group to openly collaborate on future activities: Q1’20 onward

- a. Open collaboration is necessary for success, and will be reliant on a strong governance structure, effective planning, resource and cost commitment, and effective Terms of Reference by all stakeholders.

3. Planning and execution of controlled Small Cell trials within Winnipeg: Q1’20 onward

- a. A significant first step for a joint stakeholder interest group will be to conduct trials throughout Winnipeg. Trials must be comprehensively designed and well-orchestrated to provide the confidence and data necessary to consider production deployment. Scope must include not only the Small Cell technology itself, but the practices, policies, and controls that will ensure long-term success for all stakeholders.

FINANCIAL IMPACT

There is no financial impact in receiving the report as information.

Financial Impact Statement Date: [February 21, 2020](#)

Project Name:

Cell Reception and Small Cell Technology Implementation

COMMENTS:

There is no financial implication to receiving this report as information.

Original Signed By

Tanis Yanchishyn
Manager of Finance & Administration (Campus)
Corporate Finance Department

CONSULTATION

This Report has been prepared in consultation with: N/A

OURWINNIPEG POLICY ALIGNMENT

01-3 Prosperity- Direction 1: Provide Efficient and Focused Civic Administration and Governance

- Make investments in technology strategically, based on sound business decisions and promoting integration and data-sharing where appropriate.

WINNIPEG CLIMATE ACTION PLAN ALIGNMENT

Strategic Opportunity #4: Facilitate Compact, Complete Development and Increase Density

- 4.2: Ensure New Areas of Growth are Designed According to the Principles of Complete Communities.

SUBMITTED BY

Department: Innovation, Transformation & Technology
Division: Business Technology Solutions
Prepared by: Doug Hamm
Date: February 21, 2020