



THE CITY OF WINNIPEG

REQUEST FOR PROPOSAL

RFP NO. 635-2014

REQUEST FOR PROPOSAL FOR THE PURCHASE OF P25 RADIO SYSTEM AND SERVICES

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 REQUEST FOR PROPOSAL FOR THE PURCHASE OF P25 RADIO SYSTEM AND SERVICES

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, December 5, 2014.

B2.2 Proposals determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.

B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. BIDDER'S CONFERENCE

B3.1 The Contract Administrator will hold a Bidders' Conference at 510 Main Street, 2nd Floor Conference Room from 9:00 a.m. to noon on October 8, 2014.

B3.1.1 The Bidder is advised that those wishing to participate via conference call should register, for the Bidders Conference, 24 hours or more in advance with the Contract Administrator and a telephone bridge number will be forwarded to them.

B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Bidders' conference unless that information or interpretation is provided by the Contract Administrator in writing.

B4. SITE INVESTIGATION

B4.1 Further to C3, the Contract Administrator or an authorized representative will be available at the Site at 9:00 a.m. sharp, on October 15, 2014 to begin the Site Investigation tour.

B4.1.1 The Bidder is advised that interested parties should register with the Contract Administrator by 4:00 p.m. October 10, 2014. A meeting location will be sent to the Bidders who register.

B4.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4.3 The Bidder is responsible for determining:

- (a) the location of any utility which can be determined from the records or other information available at the offices of any public authority or person, including a municipal corporation and any board or commission thereof, having jurisdiction or control over the utility;
- (b) the nature of the surface and subsurface conditions at the Site;
- (c) the location, nature, quality or quantity of the materials to be removed or to be employed in the performance of the Work;
- (d) the nature, quality or quantity of the Plant needed to perform the Work;
- (e) all matters concerning access to the Site, power supplies, location of existing services, utilities or materials necessary for the completion of the Work; and
- (f) all other matters which could in any way affect his/her Proposal or the performance of the Work.

B5. ENQUIRIES

- B5.1 All enquiries shall be directed to the Contract Administrator identified in D4.1.
- B5.2 If the Bidder finds errors, discrepancies or omissions in the Request for Proposal, or is unsure of the meaning or intent of any provision therein, the Bidder shall promptly notify the Contract Administrator of the error, discrepancy or omission at least five (5) Business Days prior to the Submission Deadline.
- B5.3 If the Bidder is unsure of the meaning or intent of any provision therein, the Bidder should request clarification as to the meaning or intent prior to the Submission Deadline.
- B5.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Request for Proposal will be provided by the Contract Administrator to all Bidders by issuing an addendum.
- B5.5 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Request for Proposal will be provided by the Contract Administrator only to the Bidder who made the enquiry.
- B5.6 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B6. CONFIDENTIALITY

- B6.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:
- (a) was known to the Bidder before receipt hereof; or
 - (b) becomes publicly known other than through the Bidder; or
 - (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.
- B6.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Bid Opportunity to the media or any member of the public without the prior written authorization of the Contract Administrator.

B7. ADDENDA

- B7.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Request for Proposal, or clarifying the meaning or intent of any provision therein.
- B7.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B7.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B7.2.2 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B7.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 9 of Form A: Proposal. Failure to acknowledge receipt of an addendum may render a Proposal non-responsive.

B8. SUBSTITUTES

- B8.1 The Work is based on the materials, equipment, methods and products specified in the Request for Proposal.
- B8.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B8.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least seven (7) Business Days prior to the Submission Deadline.
- B8.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the material, equipment, method or product as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract.
- B8.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B8.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.
- B8.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.
- B8.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B8.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B19.
- B8.9 No later claim by the Contractor for an addition to the price(s) because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.
- B8.10 Notwithstanding B8.2 to B8.9 and in accordance with B9.9, deviations inconsistent with the Request for Proposal document shall be evaluated in accordance with B19.1(a).

B9. PROPOSAL SUBMISSION

- B9.1 The Proposal shall consist of the following components:

- (a) Form A: Proposal;
 - (b) Form B: Prices.
- B9.2 The Proposal should also consist of the following components:
- (a) Bidder Response.
- B9.3 Further to B9.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B8.
- B9.4 Further to B9.1, all components of the Proposal shall be fully completed or provided in the order indicated, and submitted by the Proponent no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Proposal.
- B9.5 Further to B9.2, all components of the Proposal should be fully completed or provided in the order indicated, and submitted by the Proponent no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Proposal.
- B9.6 Bidders should submit one (1) unbound original (marked "original") and five (5) copies
- B9.7 The Proposal Submission shall be submitted enclosed and sealed in an envelope clearly marked with the RFP number and the Bidder's name and address.
- B9.7.1 Samples or other components of the Proposal Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the RFP number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Proposal Submission.
- B9.8 Bidders are advised not to include any information/literature except as requested in accordance with B9.1.
- B9.9 Bidders are advised that inclusion of terms and conditions inconsistent with the Request for Proposal document, including the General Conditions, will be evaluated in accordance with B19.1(a).
- B9.10 Proposals submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B9.11 Proposals shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B10. PROPOSAL

- B10.1 The Bidder shall complete Form A: Proposal, making all required entries.
- B10.2 Paragraph 2 of Form A: Proposal shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

- B10.2.1 If a Proposal is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B10.2.
- B10.3 In Paragraph 3 of Form A: Proposal, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Proposal.
- B10.4 Paragraph 11 of Form A: Proposal shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;
 - (d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B10.4.1 The name and official capacity of all individuals signing Form A: Proposal should be printed below such signatures.
- B10.5 If a Proposal is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Proposal and the Contract, when awarded, shall be both joint and several.

B11. PRICES

- B11.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B11.1.1 Prices on Form B: Prices shall include:
- (a) duty;
 - (b) freight and cartage;
 - (c) Provincial and Federal taxes [except the Goods and Services Tax (GST) and Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable] and all charges governmental or otherwise paid;
 - (d) profit and all compensation which shall be due to the Contractor for the Work and all risks and contingencies connected therewith.
- B11.1.2 Prices on Form B: Prices shall not include Environmental Handling Charges (EHC) or fees, which shall be extra where applicable.
- B11.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Proposals.
- B11.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.
- B11.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B12. QUALIFICATION

- B12.1 The Bidder shall:
- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly

registered, licensed or permitted by law to carry on business in Manitoba, or if the Bidder does not carry on business in Manitoba, in the jurisdiction where the Bidder does carry on business; and

- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B12.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/debar.stm>

B12.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) have successfully carried out work similar in nature, scope and value to the Work; and
- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
- (c) have a written workplace safety and health program, if required, pursuant to The Workplace Safety and Health Act (Manitoba);
- (d) provide proof satisfactory to the Contract Administrator the Security Clearances as identified in PART F - .

B12.4 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B12.5 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B13. BIDDER RESPONSE

GENERAL SPECIFICATIONS

B13.1 Please refer to Section E for the technical specifications and requirements.

B13.2 Bidders responding to Sections A and or B should provide responses to B13.3 – B13.46 inclusive.

B13.3 Bidder should provide a general description of the proposed network. Description should include the manufacture, platform marketing designation and revision.

B13.4 Bidder should describe how their proposed network will interoperate with neighboring municipalities and their radio systems. In particular, Bidder should describe the additional functional and financial benefits gained by the creation of a wide area regional network.

B13.5 Bidder should provide a complete high level block diagram for the entire proposed system showing the multicast cells, simulcast cells, wide area controller(s), dispatch consoles, and any other major system components (such as system administration and management computer(s), etc.).

B13.6 Bidder should describe the core of the network. Details should include the following:

- (a) Physical location of primary and any secondary cores

- (b) Provisions for redundant power and a minimum 4 hour run time capacity to withstand loss of primary Hydro power distribution.
 - (c) How resiliency is achieved including details on how redundancies are achieved.
- B13.7 The Bidder should provide a block diagram for the simulcast control point and a typical Project 25 trunked repeater site within the simulcast cell.
- B13.8 The Bidder should specify the simulcast configuration, showing all major components at the control point (or master site) and the quantity and type of communication circuits required to connect the control point to the wide area controller.
- B13.9 Bidder should specify the simulcast transmit/receive (TX/RX) site configuration, showing all major components at the TX/RX site and the quantity and type of communication circuits required to connect the TX/RX site to the simulcast control point.
- B13.10 Bidder should provide coverage maps clearly indicating the talkout coverage from each radio site, areas of overlapping coverage, and areas of potential Time Delay Interference.(TDI). Bidder should stipulate the criteria used to estimate areas of TDI, including the time delay used as the benchmark value and reasons for selecting that time delay.
- B13.11 Bidder should provide a detailed analysis comparing multicast and simulcast solutions that would meet the City of Winnipeg's coverage requirements. The Bidder should recommend either multicast or simulcast and provide the justifications for the recommendations.
- B13.12 Bidder should provide a block diagram for the equipment at each dispatch center location, showing all major components and the quantity and type of communication circuits required to connect the dispatch center equipment to the wide area controller. Bidder should provide a list of all power and air conditioning requirements for the dispatch center equipment.
- B13.13 Bidder should identify the locations of the master control site and the secondary or backup control sites.
- B13.14 Bidder should provide a block diagram and floor plan for each proposed wide area controller location, showing all major components and the quantity and type of communication circuits required to connect the wide area controller to repeater sites, remote consoles, conventional repeaters, etc.
- B13.15 Bidder should identify the time required to switch from the primary controller to the secondary controller should the primary controller encounter a failure.
- B13.16 Bidder should identify the power sources used at each repeater site. Information that must be included are, nominal input requirements for the site; redundant power sources and their capacities; operational time in absence of AC Mains; time to switch from AC Mains to redundant source(s).
- B13.17 Bidder should identify the required maintenance for the repeater site including routine servicing and preventative maintenance.
- B13.18 The model used for the purposes of the RF coverage prediction shall be identified and the rationale for system losses (e.g., power, gain, and loss information used in the model for each site) should be described in the Bidder's proposal
- B13.19 Bidder should relate the voice quality as per TIA standard TSB-88.1 to a signal level and BER for acceptance testing purposes. Note that the Bidder should specify the proposed radio subscriber unit for testing acceptance purposes for both voice and BER signal strength testing
- B13.20 Bidder should indicate what percentage of the City of Winnipeg, as defined by the map in Appendix C, is predicted to have a 95% probability of reliable coverage at DAQ 3.4 for a mobile radio with a 0 dBi antenna mounted at 1.5m above ground and a transmit power of 15 watts.

- B13.21 Bidder should provide detailed RF propagation coverage prediction analysis for both talk-out and talk-back for mobiles. Bidder should provide all parameters and assumptions used to generate the coverage maps.
- B13.22 Bidder should indicate what percentage of the City of Winnipeg, as defined by the map in Appendix C, is predicted to have a 95% probability of reliable coverage at DAQ 3.4 for a portable radio worn on the hip 1 m above ground level.
- B13.23 Bidder should provide detailed RF propagation coverage prediction analysis for both talk-out and talk-back for portables outdoors. Bidder should provide a statement of talk-out to talk-back system balance. Areas that may experience degraded audio quality or performance due to simulcast interference must be accounted for in the maps. Bidder should provide all parameters and assumptions used to generate the coverage maps.
- B13.24 Bidder should indicate if tower top amplifiers are employed at each receiver site. Bidder should provide evidence substantiating the decision to employ, or not employ tower top amplifiers. Bidder should indicate what protection circuits and redundancies are used and if faults can be detected via remote alarms or monitoring.
- B13.25 Bidder should indicate to what extent the proposed system is capable of preventing a stolen radio from accessing the system.
- B13.26 The Bidder should indicate how unauthorized devices are denied access to the network. Describe whether this is accomplished through unit and group validation at the repeater controller, or through a unit authorization/registration procedure, or both.
- B13.27 Bidder should describe what measures are available that would prevent unauthorized users from creating illegitimate copies (cloning) of City of Winnipeg radios.
- B13.28 If the Bidder proposes the use of microwave links to connect the simulcast master site to each of the repeater sites, the Bidder should provide the path reliability for each microwave link proposed.
- B13.29 Bidder should indicate how an individual call is established in the proposed system.
- B13.30 Bidder should indicate if the "confirmed Call" feature is available and if so, how it is implemented.
- B13.31 Bidder should describe how the proposed P25 Phase 2 Trunked system will interface with a P25 Conventional system, including the steps the users have to take to initiate an inter-system group call.
- B13.32 Bidder should provide a block diagram of the network-level interoperability subsystem, including how it ties into the P25 Phase 2 trunked radio system. The block diagram shall show all major components and the quantity and type of communication circuits required, including bandwidth requirements, to tie the legacy radio systems into the P25 trunked radio network.
- B13.33 Bidder should describe in detail all measures taken to ensure reliable operation of the system including, as a minimum, the Project 25 trunked repeaters, channel controllers, and wide area controllers.
- B13.34 Bidder should indicate the impact on system operation of each of the following system element failures, how the system responds, and what features, if any, are lost:
- (a) Working Channel Failure;
 - (b) Control Channel Failure;
 - (c) Site Controller Failure;
 - (d) Simulcast Control Point or Master Site Failure;
 - (e) Dispatch Console Failure;

- (f) Wide Area Controller Failure;
- (g) System Management Computer Failure;
- (h) Backhaul Link Failure.

- B13.35 Bidder should provide detailed explanations on how Specification E12.8 will be satisfied.
- B13.36 Bidders should identify and define their capabilities of designing, supplying, installing commissioning and operating a public safety grade P25 land mobile radio system. The Bidder should include details such as where they have expertise and what their track record is with such programs. Bidder should indicate whether they have the personnel on staff to implement and carry on support or if this support is out-sourced.
- B13.37 Bidders should provide at least 3 references that can substantiate and verify the Bidder's previous experience in the integration, design and construction of critical Public Safety Grade land mobile radio communications systems that require a very high level of survivability and reliability.
- B13.38 Bidder should explain how their network accomplishes the goals of Section E12.8(c).
- B13.39 Bidder should use their risk management framework to identify those high-risk areas requiring two-factor authentication and explain how their network accomplishes the goals of Section E12.6.
- B13.40 Bidder should include how their proposed backbone IP network will respond to the needs and be a part of a centralized log management system along with having secure long-term data retention capable of NAS, SAN and WORM storage connectivity.
- B13.41 Bidder should describe whether their network administration backup solution is easily administered and maintained, For disaster recovery purposes, describe if the system is capable of bare metal restore, and is cost effective across the entire life cycle of the system.
- B13.42 The Bidder should indicate the extent to which repeater parameters can be configured remotely, and whether this programming is restricted to repeater parameters or also includes repeater software.
- B13.43 Bidder should identify whether the IP network equipment used to link radio sites or console locations is commercially available off the shelf. Bidder should identify if the network equipment requires hardware or software modification for use in their proposed radio system.
- B13.44 The trunked simulcast system architecture shall be described in detail, with written descriptions of all major system components and their functions. System and site block diagrams should be provided to show the interconnection and the detailed audio/logic signal flow between system elements.
- B13.45 Bidder should provide a detailed description of the logging recorder interface. Information provided shall include a diagram indicating the interface locations and relationship to other system infrastructure. Bidder should identify all of the logging recorder vendors that have had products tested and found to be compatible with the Bidder's proposed P25 System.
- B13.46 Bidder should specify which consoles have been demonstrated to be compliant with their proposed radio network. Bidder should clearly identify which CSSI specifications each console is compliant with and any features or functions that are available but not included in the CSSI specifications.

SECTION A – LEASED SERVICES

- B13.47 Bidders responding to Sections A should provide responses to B13.3 – B13.46 and B13.48 – B13.65 inclusive.

- B13.48 Bidder should provide details on how long the network being proposed for the City of Winnipeg has been in operation; or a schedule for completion if the network has not yet been constructed.
- B13.49 Bidder should provide details on each current and proposed radio site on the network. Details should include the following:
- (a) Total number of sites in Network;
 - (b) List each tower site by name and geographical coordinates;
 - (c) List the current or proposed number of RF channels at each site;
 - (d) The frequency band(s) used at each site;
 - (e) Connectivity used to attach site to core. (Fibre, microwave, satellite...);
 - (f) Provisions for redundant power and the run time capacity to withstand loss of primary Hydro power distribution.
- B13.50 Bidder should provide a list of all power and air conditioning requirements for all sites owned by the City of Winnipeg or to be constructed specifically to support the City of Winnipeg Network. These details are not required for existing sites owned by a service provider.
- B13.51 Bidder should provide a clear description on how their proposed network solution meets the Public Safety Grade standards as outlined in the NPSTC May 22 report, "Defining Public Safety Grade Systems and Facilities".
- B13.52 If the Bidder's proposal involves the use of a shared network, where non-City of Winnipeg radios would be allowed to utilize the same repeater channels as City of Winnipeg radios, the Bidder should identify the nature of the other users business (commercial, government, public safety,) and approximate number of radios in each area.
- B13.53 The Bidder should identify if a transmit priority level can or will be assigned to individual radios or talkgroups. A priority level is defined as any ranking mechanism that would grant channel access to one radio before another when both radios attempts to transmit simultaneously. If a priority level will be used, the Bidder should identify the priority levels available and what agencies would be assigned a level equal to or greater than the City of Winnipeg.
- B13.54 The Bidder should describe how they will maintain the security of the IP backbone network. Specifically addressing how they will meet the requirements of specifications E12.8.
- B13.55 The Bidder should identify which radios (brand, model) will be capable of over the air programming (OTAP) on the proposed network. Bidder should include details on how OTAP for radios from multiple manufacturers can be accommodated on the same network.
- B13.56 Bidder should describe their proposed OTAP system including hardware, software, how the process is administered, security features and any limitations.
- B13.57 The Bidder should identify which radios (brand, model) will be capable of over the air re-keying (OTAR) on the proposed network.
- B13.58 Bidder should describe their proposed OTAR system including hardware, software, how the process is administered, security features and any limitations.
- B13.59 Bidder should describe their connectivity service available to connect the proposed radio network to the City of Winnipeg dispatch centers. Bidder should include details on bandwidth, security, redundancy and reliability. Bidder should indicate if the connectivity services are available via Fibre, copper, microwave etc. If only one connectivity option is being recommended, Bidder should provide details on why alternative technologies are not being considered.
- B13.60 Bidder should describe how they would meet the Repeater site to System Management site connectivity as specified in E13.7, E13.8, E13.9, and E13.10. Details should include technologies available, security, reliability and redundancies.

- B13.61 Bidder should describe the system test procedure that will be used to demonstrate compliance with Specifications E3 to E12 inclusive.
- B13.62 Bidder should describe the ISSI available to interface their wide area network to another P25 Phase 2 network. Details must include the capabilities and limitations compared with TIA-102.BACA-A and its addendums. Bidder should include a table or matrix to indicate which features or capabilities of the ISS interface are available when:
- (a) Interfacing with a network from the same vendor;
 - (b) Interfacing with a different vendor(s) network.
- B13.63 Bidder should identify which manufactures and which products have been successfully tested and found to be compatible with their proposed ISSI.
- B13.64 Bidder should provide evidence of ISSI CAP testing including the complete results of the conformance and interoperability testing.
- B13.65 Bidder should provide a block diagram of the logging recorder interface that could be used to interface a long term audio recorder to the P25 radio system. Bidder should identify all of the logging recorder vendors that are supported.
- B13.66 Bidder should describe if the services as described in Specification E17 would be available as part of their offering for Items No 1, 2, 4 and 5. If the service is available the Bidder should provide responses to B13.99 – B13.101. If the service is available, the Bidder should indicate if the price is included in the base cost of Items 1, 2, 4 and 5 or if it is priced separately in Item No.9.

SECTION B P25 INFRASTRUCTURE

- B13.67 Bidders responding to Section B should provide responses to B13.3 – B13.46 and B13.68 – B13.80 inclusive.
- B13.68 Bidder should identify the proposed radio sites with clearly defined reasons on why each site was selected.
- B13.69 The Bidder should include a block diagram of each proposed radio site, clearly identifying each channel, antenna, feedline, grounding point, amplifier, power source, data connections to the site, or major system component.
- B13.70 The Bidder should provide coverage maps clearly indicating mobile and portable talk-in and talk-out. The coverage maps shall also identify any areas of Simulcast interference.
- B13.71 Bidder should provide a block diagram and written explanation of the Network core facility and requirements. Bidder shall indicate where this facility should be located and reasons for that site selection.
- B13.72 Bidder should describe the proposed redundant power sources for the Network core site.
- B13.73 Bidder should describe the proposed facilities used to connect the Network Core equipment to each of the radio sites. Information on redundancies and reliability shall be included.
- B13.74 Bidder should describe the system test procedure that will be used to demonstrate compliance with Specifications E3 to E12 inclusive
- B13.75 Bidder should describe their proposed coverage testing and verification process. Details should include how the Bidder will determine and verify that the requirements of Specification E10 will be satisfied.
- B13.76 Bidder should provide a block diagram of the logging recorder interface that could be used to interface a long term audio recorder to the P25 radio system. Bidder should identify all of the logging recorder vendors that are supported.

- B13.77 Bidder should provide an estimate of the number of full time employees (FTE) required to administer and support the proposed solution. The Bidder should describe the calculations and assumptions used to arrive at this estimate of required man power.
- B13.78 Bidder should identify the recommended training programs that would be required to allow the City of Winnipeg Radio shop staff to administer, control and maintain the proposed network. Information that must be provided include: duration and location options for each course; target audience; and pre-requisites for each course. Bidder should provide a complete training plan with timelines.
- B13.79 Bidder should describe the maintenance and support options available for the complete Radio Network.
- B13.80 Bidder should identify any items required to construct or operate the proposed network not previously included in responses B13.68 – B13.79 above or included in pricing submissions on Form B, Items No. 10 to 18. Bidder should identify each item, indicate if it is optional or mandatory, and whether it is a single capital expenditure or an ongoing operational expense. The costs associated with these items or activities comprise Item No. 17 (spec Ref E14.13) and Item No. 18 (spec Ref E14.14)

SECTION C MOBILE & PORTABLE RADIOS

- B13.81 Bidders responding to Section C should provide responses to B13.82 – B13.88.
- B13.82 Bidder should provide specification sheets for each radio product they are proposing. The specifications shall include as a minimum the published operational and mechanical specifications for each model.
- B13.83 Bidder should include specification sheets on recommended options and accessories for each radio model proposed.
- B13.84 Bidders should state whether each of their proposed radios include an adaptive noise cancellation technology. Details should indicate if this feature is programmable, variable and the type of noise characteristics it is effective with.
- B13.85 Bidder should provide details on extended warranties available for each of the proposed radio models. Details shall include; length of coverage, what is covered, what is excluded, and how warranty support would be obtained.
- B13.86 The City of Winnipeg would prefer to perform first level troubleshooting and maintenance on all mobile and portable radios. Bidder should describe if factory service training is available. Bidder should describe how the servicing of radios would impact warranty claims. Bidder should indicate if factory spare parts or modules will be made available for purchase by the City of Winnipeg.
- B13.87 Bidder should indicate how the GPS feature is implemented on each model of proposed radio. Details that shall be included are:
- (a) Where are the GPS receivers and antennas?;
 - (b) When will the GPS information be sent, what triggers a transmission?;
 - (c) Can this feature be disabled by the User;
 - (d) How is this data collected and viewed by the dispatchers.
- B13.88 Bidder should describe the mobile repeater system proposed for Item No. 33 (see E15.17). Details should include basic operation block diagram and description, interfaces to other onboard electronics within the vehicle; A list of compatible portable and mobile radios; antenna and filtering requirements; and a list of P25 features/functions that can be passed through the repeater system.

SECTION D DISPATCH CONSOLES

- B13.89 Bidders responding to Sections D should provide responses to B13.90 – B13.97.
- B13.90 Bidder should provide a detailed description of their proposed dispatch console offerings including :
- (a) Available features;
 - (b) Hardware configuration;
 - (c) Detailed specifications of any items that would be supplied by the City of Winnipeg;
 - (d) Detailed specification of interfaces to P25 network;
 - (e) Complete Network diagrams showing the IP connectivity including all switches, routers, servers, firewalls, etc.;
 - (f) Detailed differences and common components between Supervisor, Dispatch and Remote consoles.
- B13.91 Bidder should provide a description of their CSSI compliance and the verification testing that has been completed. A list indicating which P25 networks have been found to be compatible with the proposed Dispatch consoles shall be provided. The list should indicate the P25 Manufacturer, the tested platform version, and which CSSI specifications have been found to be compliant.
- B13.92 The Bidder should indicate if there are any proprietary features available with the proposed console system that are not part of the CSSI specification.
- B13.93 Bidder should provide a block diagram of the logging recorder interface that could be used to interface a long term audio recorder to the P25 radio system. Bidder should identify all of the logging recorder vendors that are supported.
- B13.94 Bidder should describe their maintenance and warranty program and features. As a minimum, the following details should be included:
- (a) Inclusions of Warranty and Support agreements;
 - (b) Warranty claim procedure;
 - (c) Locations of warranty and repair depots;
 - (d) Items or components that can be self-maintained by the City of Winnipeg technical or IT staff.
- B13.95 Bidder should describe the Console test plan that would be used to commission the installed consoles and demonstrate the compliance with the specification E16.
- B13.96 Bidder should describe their proposed end user training.
- B13.97 Bidder should describe their proposed Administrator training.
- B13.98 Bidder should describe their technical support staff training.

SECTION E PTT VIA CELLULAR DATA

- B13.99 Bidders responding to Sections E should provide responses to B13.100 – B13.102.
- B13.100 Bidder should provide a detailed description of their proposed PTT over cellular data service. As a minimum, the following information shall be provided:
- (a) How does this system interface to a P25 radio network?;
 - (b) What P25 Radio networks are compatible with this system?;
 - (c) What features are available via the cellular device?;
 - (d) What are the wireless data network requirements to support this service?;
 - (e) Total number of cellular users supported?;

- (f) Call types supported (Group Call – Confirmed / Un confirmed, I-Call)?;
- (g) Encryption modes supported?;
- (h) Emergency Calls supported?;
- (i) Call Priority Supported?;
- (j) Call Pre-emption Supported?;
- (k) Late Entry Supported?;
- (l) Patch / Simulselect Supported?;
- (m) Are any additional features such as data, GPS, status or text messaging supported?

B13.101 Bidder should provide a block diagram of the proposed system clearly indicating the interfaces to the P25 and cellular/wireless networks.

B13.102 Bidder should describe the cellular device requirements to support this service. As a minimum, the following information shall be provided:

- (a) Supported operating systems;
- (b) Support hardware platforms;
- (c) Hardware requirements;
- (d) Support for accessories such as Bluetooth speakers and microphones.

B14. OPENING OF PROPOSALS AND RELEASE OF INFORMATION

B14.1 Proposals will not be opened publicly.

B14.2 After award of Contract, the names of the Bidders and the Contract amount of the successful Bidder will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>

B14.3 To the extent permitted, the City shall treat all Proposal Submissions as confidential, however the Bidder is advised that any information contained in any Proposal may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B15. IRREVOCABLE OFFER

B15.1 The Proposal(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 10 of Form A: Proposal.

B15.2 The acceptance by the City of any Proposal shall not release the Proposals of the other responsive Bidders and these Bidders shall be bound by their offers on such Work for the time period specified in Paragraph 10 of Form A: Proposal.

B16. WITHDRAWAL OF OFFERS

B16.1 A Bidder may withdraw his/her Proposal without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B16.1.1 Notwithstanding C21, the time and date of receipt of any notice withdrawing a Proposal shall be the time and date of receipt as determined by the Manager of Materials.

B16.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Proposal or the Bidder's authorized representatives named in Paragraph 11 of Form A: Proposal, and only such person, has authority to give notice of withdrawal.

B16.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

- (a) retain the Proposal until after the Submission Deadline has elapsed;
- (b) open the Proposal to identify the contact person named in Paragraph 3 of Form A: Proposal and the Bidder's authorized representatives named in Paragraph 11 of Form A: Proposal; and
- (c) if the notice has been given by any one of the persons specified in B16.1.3(b), declare the Proposal withdrawn.

B16.2 A Bidder who withdraws his/her Proposal after the Submission Deadline but before his/her offer has been released or has lapsed as provided for in B15.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law.

B17. INTERVIEWS

B17.1 The Contract Administrator may, in his/her sole discretion, interview Bidders during the evaluation process.

B18. NEGOTIATIONS

B18.1 The City reserves the right to negotiate details of the Contract with any Bidder. Bidders are advised to present their best offer, not a starting point for negotiations in their Proposal Submission.

B18.2 The City may negotiate with the Bidders submitting, in the City's opinion, the most advantageous Proposals. The City may enter into negotiations with one or more Bidders without being obligated to offer the same opportunity to any other Bidders. Negotiations may be concurrent and will involve each Bidder individually. The City shall incur no liability to any Bidder as a result of such negotiations.

B18.3 If, in the course of negotiations pursuant to B18.2 or otherwise, the Bidder amends or modifies a Proposal after the Submission Deadline, the City may consider the amended Proposal as an alternative to the Proposal already submitted without releasing the Bidder from the Proposal as originally submitted.

B19. EVALUATION OF PROPOSALS

B19.1 Award of the Contract shall be based on the following evaluation criteria:

- (a) compliance by the Bidder with the requirements of the Request for Proposal, or acceptable deviation therefrom: (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12: (pass/fail);
- (c) 15 Year Total Cost of Ownership (40%);
- (d) Bidder Response (60%);
- (e) economic analysis of any approved alternative pursuant to B8;
- (f) costs to the City of administering multiple contracts.

B19.2 Further to B19.1(a), the Award Authority may reject a Proposal as being non-responsive if the Proposal Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Proposal, or waive technical requirements or minor informalities or irregularities if the interests of the City so require.

B19.3 Further to B19.1(b), the Award Authority shall reject any Proposal submitted by a Bidder who does not demonstrate, in his/her Proposal, in other information required to be submitted, during interviews or in the course of reference checks, that he/she is responsible and qualified.

- B19.4 Further to B19.1(c), the Total Cost of Ownership shall be evaluated using the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices and the following:
- (a) Calculated cost of annual maintenance over 15 years;
 - (b) Cost of Radio licenses over 15 years;
 - (c) Network connectivity costs over 15 years;
 - (d) Calculated costs of Network upgrades.
- B19.4.1 Further to B19.1(a), in the event that a unit price is not provided on Form B: Prices, the City may determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.
- B19.5 Further to B19.1(d), Bidder response shall be evaluated considering the information submitted in response to B13 and the following:
- (a) Interoperability with other systems (CAP testing reports);
 - (b) Features and functions provided;
 - (c) Fault tolerant design & System redundancy.
- B19.6 This Contract may be awarded on the basis of:
- (a) Section A – Leased Services which may consist of one of the following:
 - (i) Services 1 – Leased Services – Full Provision; or
 - (ii) Services 2 – Leased Services – Partial Services; or
 - (iii) Services 3 – Leased Services – ISSI only or
 - (iv) Services 4 – Leased Services - PTT over Cellular Data services in conjunction with either Service 1 or Service 2 above;
 - (b) Section B – P25 Infrastructure;
 - (c) Section C – P25 Mobile/Portable Radios and Accessories (Award by Item);
 - (d) Section D – P25 Dispatch Consoles;
 - (e) Section E - PTT VIA Cellular Data;
- as identified on Form B: Prices. Each alternative will be evaluated in accordance with the specified evaluation criteria.
- B19.6.1 Notwithstanding B11.1, the Bidder may, but is not required to, bid on all sections or on all items in each section.
- B19.6.2 Notwithstanding B20.3, the City shall have the right to choose the alternative that is in its best interests. If the Bidder has not bid on all alternatives, he/she shall have no claim against the City if his/her partial offer is rejected in favour of an award of the Contract on the basis of an alternative upon which he/she has not bid.
- B19.7 If, in the sole opinion of the City, a Proposal does not achieve a pass rating for B19.1(a) and B19.1(b), the Proposal will be determined to be non-responsive and will not be further evaluated.
- B19.8 Notwithstanding B19.1(d), where Bidders fail to provide a response to B9.2(a), the score of zero may be assigned to the incomplete part of the response

B20. AWARD OF CONTRACT

- B20.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B20.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Proposals are determined to be responsive.

- B20.2.1 Without limiting the generality of B20.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Proposal is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B20.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the most advantageous offer, in accordance with B19.
- B20.4 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Proposal upon written request to the Contract Administrator.
- B20.5 Notwithstanding C4 and Paragraph 6 of Form A: Proposal, the City will issue a purchase order to the successful Bidder in lieu of the execution of a Contract.
- B20.6 The Contract Documents, as defined in C1.1(n) (ii), in their entirety shall be deemed to be incorporated in and to form a part of the purchase order notwithstanding that they are not necessarily attached to or accompany said purchase order.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for the Supply of Goods* (Revision 2008 05 26) are applicable to the Work of the Contract.

C0.1.1 The *General Conditions for the Supply of Goods* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm

C0.2 A reference in the proposal to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Supply of Goods*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

D1.1 In addition to the *General Conditions for the Supply of Goods*, these Supplemental Conditions are applicable to the Work of the Contract.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of the purchase of P25 Radio System and Services for the periods as stated below:

- (a) Section A or B – fifteen (15) years;
- (b) Sections C, D and E – five (5) years with the option of two (2) mutually agreed upon five (5) year extensions.

D2.1.1 The City may negotiate the extension option with the Contractor within sixty (60) Calendar Days prior to the expiry date of the Contract. The City shall incur no liability to the Contractor as a result of such negotiations.

D2.1.2 Changes resulting from such negotiations shall become effective on anniversary of start date for Section C, D and E of the respective year. Changes to the Contract shall not be implemented by the Contractor without written approval by the Contract Administrator.

D2.2 The Work shall be done on an "as required" basis during the term of the Contract.

D2.2.1 The type and quantity of Work to be performed under this Contract shall be as authorized from time to time by the Contract Administrator and/or Users.

D2.2.2 Subject to C7, the City shall have no obligation under the Contract to purchase any quantity of any item in excess of its actual operational requirements.

D2.3 Notwithstanding D2.2, in the event that operational changes result in substantial changes to the requirements for Work, the City reserves the right to alter the type or quantity of work performed under this Contract, or to terminate the Contract, upon thirty (30) Calendar Days written notice by the Contract Administrator. In such an event, no claim may be made for damages on the ground of loss of anticipated profit on Work.

D3. DEFINITIONS

D3.1 When used in this Request for Proposal:

- (a) "**Public Safety Grade or PSG**" means network hardening or network sustainability as defined in the NPSTC report issued 5/22/2014 "Defining Public Safety Grade Systems and Facilities" available from http://www.npstc.org/download.jsp?tableId=37&column=217&id=3066&file=Public_Safety_Grade_Report_140522.pdf

D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is:

Ed Richardson
Communication Systems Engineer
Telephone No.: 204 986-6002
Facsimile No.: 204 986-2666
E-mail: erichardson@winnipeg.ca

D4.2 Bids Submissions must be submitted to the address in B9.11.

D5. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

- D5.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.
- D5.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.
- D5.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;
- (a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;
 - (b) the Contract, all deliverables produced or developed; and
 - (c) any statement of fact or opinion regarding any aspect of the Contract.
- D5.4 A Contractor who violates any provision of D5 may be determined to be in breach of Contract.

D6. NOTICES

- D6.1 Notwithstanding C21.3, all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following facsimile number:
- The City of Winnipeg
Chief Financial Officer
Facsimile No.: 204 949-1174

SUBMISSIONS

D7. AUTHORITY TO CARRY ON BUSINESS

- D7.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D8. INSURANCE

- D8.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured; such liability policy to also contain a cross-liability clause, contractual liability clause, non-owned automobile liability and products and completed operations cover, to remain in place at all times during the performance of the Work;
 - (b) Automobile Liability Insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than \$2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence.
- D8.2 Deductibles shall be borne by the Contractor.
- D8.3 The Contractor shall provide the Contract Administrator with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4 for the return of the executed Contract.

D8.4 The Contractor shall not cancel, materially alter, or cause the policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D8.5 The City shall have the right to alter the limits and/or coverages as reasonably required from time to time during the continuance of this agreement.

D9. PERFORMANCE SECURITY FOR SECTIONS A AND B ONLY

D9.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:

- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
- (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
- (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

D9.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.

D9.2 The Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of and prior to the commencement of any Work on the Site.

SCHEDULE OF WORK

D10. COMMENCEMENT

D10.1 The Contractor shall not commence any Work until he/she is in receipt of a notice of award from the City authorizing the commencement of the Work.

D10.2 The Contractor shall not commence any Work until:

- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D7;
 - (ii) evidence of the workers compensation coverage specified in C6.16;
 - (iii) evidence of the insurance specified in D8;
 - (iv) the performance security specified in D9.
- (b) the Contractor has attended a meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a meeting.

D11. DELIVERY

D11.1 Section A and B work should be completed by December 31, 2015.

D11.2 Goods, for Sections C, D and E shall be delivered within eight (8) weeks of order, f.o.b. destination, freight prepaid to:

Ed Richardson
Radio Shop
421 Osborne Street

D11.3 The Contractor shall confirm each delivery with the Contract Administrator or his/her/her designate, at least two (2) Business Days before delivery.

D11.4 Goods shall be delivered between 8:00 a.m. and 3:00 p.m. on Business Days.

D11.5 The Contractor shall off-load goods as directed at the delivery location.

D12. ORDERS

D12.1 The Contractor shall provide a local Winnipeg telephone number or a toll-free telephone number at which orders for delivery may be placed.

D13. RECORDS

D13.1 The Contractor shall keep detailed records of the goods supplied under the Contract.

D13.2 The Contractor shall record, as a minimum, for each item listed on Form B: Prices:

- (a) user name(s) and addresses;
- (b) order date(s);
- (c) delivery date(s); and
- (d) description and quantity of goods supplied.

D13.3 The Contractor shall provide the Contract Administrator with a copy of the records for each quarter year within fifteen (15) Calendar Days of a request of the Contract Administrator.

D14. LIQUIDATED DAMAGES

D14.1 If the Contractor fails to achieve delivery of the goods within the time specified in D11.1 Delivery the Contractor shall pay the City one thousand five hundred dollars (\$1500) per Calendar Day for each and every Calendar Day until the goods have been delivered.

D14.2 The amount specified for liquidated damages in D14.1 is based on a genuine pre-estimate of the City's damages in the event that the Contractor does not achieve Delivery by the day fixed herein for same.

D14.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

MEASUREMENT AND PAYMENT

D15. INVOICES

D15.1 Further to C10, the Contractor shall submit an invoice for each order delivered to:

The City of Winnipeg
Corporate Finance - Accounts Payable
4th Floor, Administration Building, 510 Main Street
Winnipeg MB R3B 1B9

Facsimile No.: 204 949-0864
Email: CityWpgAP@winnipeg.ca

D15.2 Invoices must clearly indicate, as a minimum:

- (a) the City's purchase order number;
- (b) date of delivery;
- (c) delivery address;
- (d) type and quantity of goods delivered;

- (e) the amount payable with GST, MRST, and any applicable environmental handling charges/fees identified and shown as separate amounts; and
- (f) the Contractor's GST registration number.

D15.3 The City will bear no responsibility for delays in approval of invoices which are improperly submitted.

D15.4 Bids Submissions must be submitted to the address in B9.11.

D16. PAYMENT

D16.1 Further to C10, payment for Section A, B and E shall be in accordance with the following payment schedule:

- (a) Section A:
 - (i) Monthly payments for services received. Payments commence after system acceptance.
- (b) Section B:
 - (i) 15% - On Receipt of Purchase order;
 - (ii) 25% - Upon delivery of goods;
 - (iii) 25% - Upon Installation;
 - (iv) 20% - Upon successful system acceptance;
 - (v) 15% - Upon training completion;
- (c) Section C:
 - (i) shall be net thirty (30) Calendar Days after receipt and approval of the Contractor's invoice;
- (d) Section D:
 - (i) 35% - Upon Installation;
 - (ii) 50% - Upon successful system acceptance;
 - (iii) 15% - Upon training completion;
- (e) Section E:
 - (i) 35% - Upon Installation'
 - (ii) 50% - Upon successful system acceptance'
 - (iii) 15% - Upon training completion.

D16.2 Further to C10, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

D17. PURCHASING CARD

D17.1 The Contractor shall allow Users to charge items to their purchasing cards at no extra cost.

D17.2 The Contractor's credit card website/gateway shall have appropriate current Payment Card Industry Data Security standards (PCI DSS) certification, (<https://www.pcisecuritystandards.org/index.shtml>). The credit card gateway shall meet the credit card data security requirements outlined by the Payment Card Industry Security Standards Council (PCI SSC) for service providers and/or software vendors.

WARRANTY

D18. WARRANTY

D18.1 Further to C11, if a defect or deficiency prevents the full and normal use or operation of the Work or any portion thereof, for purposes of calculating the warranty period, time shall be

deemed to cease to elapse for the defective or deficient portion, and for any portion of the Work whose use or operation is prevented by such defect or deficiency, as of the date on which the defect or deficiency is observed or the use or operation is prevented and shall begin to run again when the defect or deficiency has been corrected or the Work may be used or operated to the satisfaction of the Contract Administrator.

FORM H1: PERFORMANCE BOND
(See D9)

KNOW ALL MEN BY THESE PRESENTS THAT

_____ ,
(hereinafter called the "Principal"), and

_____ ,
(hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), in the sum of

_____ dollars (\$_____)

of lawful money of Canada to be paid to the Obligee, or its successors or assigns, for the payment of which sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee for

RFP NO. 635-2014

REQUEST FOR PROPOSAL FOR THE PURCHASE OF P25 RADIO SYSTEM AND SERVICES

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall:

- (a) carry out and perform the Contract and every part thereof in the manner and within the times set forth in the Contract and in accordance with the terms and conditions specified in the Contract;
- (b) perform the Work in a good, proper, workmanlike manner;
- (c) make all the payments whether to the Obligee or to others as therein provided;
- (d) in every other respect comply with the conditions and perform the covenants contained in the Contract; and
- (e) indemnify and save harmless the Obligee against and from all loss, costs, damages, claims, and demands of every description as set forth in the Contract, and from all penalties, assessments, claims, actions for loss, damages or compensation whether arising under "The Workers Compensation Act", or any other Act or otherwise arising out of or in any way connected with the performance or non-performance of the Contract or any part thereof during the term of the Contract and the warranty period provided for therein;

THEN THIS OBLIGATION SHALL BE VOID, but otherwise shall remain in full force and effect. The Surety shall not, however, be liable for a greater sum than the sum specified above.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal, and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

IN WITNESS WHEREOF the Principal and Surety have signed and sealed this bond the

_____ day of _____, 20____ .

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

By: _____ (Seal)
(Attorney-in-Fact)

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)
(See D9)**

(Date)

The City of Winnipeg
Legal Services Department
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

RE: PERFORMANCE SECURITY – RFP NO. 635-2014

REQUEST FOR PROPOSAL FOR THE PURCHASE OF P25 RADIO SYSTEM AND SERVICES

Pursuant to the request of and for the account of our customer,

(Name of Contractor)

(Address of Contractor)

WE HEREBY ESTABLISH in your favour our irrevocable Standby Letter of Credit for a sum not exceeding in the aggregate

_____ Canadian dollars.

This Standby Letter of Credit may be drawn on by you at any time and from time to time upon written demand for payment made upon us by you. It is understood that we are obligated under this Standby Letter of Credit for the payment of monies only and we hereby agree that we shall honour your demand for payment without inquiring whether you have a right as between yourself and our customer to make such demand and without recognizing any claim of our customer or objection by the customer to payment by us.

The amount of this Standby Letter of Credit may be reduced from time to time only by amounts drawn upon it by you or by formal notice in writing given to us by you if you desire such reduction or are willing that it be made.

Partial drawings are permitted.

We engage with you that all demands for payment made within the terms and currency of this Standby Letter of Credit will be duly honoured if presented to us at:

(Address)

and we confirm and hereby undertake to ensure that all demands for payment will be duly honoured by us.

All demands for payment shall specifically state that they are drawn under this Standby Letter of Credit.

Subject to the condition hereinafter set forth, this Standby Letter of Credit will expire on

(Date)

It is a condition of this Standby Letter of Credit that it shall be deemed to be automatically extended from year to year without amendment from the present or any future expiry date, unless at least 30 days prior to the present or any future expiry date, we notify you in writing that we elect not to consider this Standby Letter of Credit to be renewable for any additional period.

This Standby Letter of Credit may not be revoked or amended without your prior written approval.

This credit is subject to the Uniform Customs and Practice for Documentary Credit (2007 Revision), International Chamber of Commerce Publication Number 600.

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS

E1.1 These Specifications shall apply to the Work.

E1.2 The following are applicable to the Work:

Appendix A	Current City of Winnipeg Radio Sites
Appendix B	Potential City of Winnipeg Radio Sites
Appendix C	Mandatory Coverage Area

E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B8.

E2. GENERAL RADIO SYSTEM SPECIFICATION

E2.1 Unless specified elsewhere, the City of Winnipeg requires a P25 radio network that meets or exceeds the general radio network specifications contained in sections E3 to E12 inclusive.

E2.2 Specifications E3 to E12 inclusive shall apply to both Section A - Leased Services and Section B – P25 Infrastructure.

E3. OVERVIEW

E3.1 The City of Winnipeg requires access to a P25 two-way radio network to support the operations of the Winnipeg Police Service, Winnipeg Fire Paramedic Service and potentially other City of Winnipeg departments. The City intends to either lease access to such a service from a network provider with an existing or soon to be completed network or alternatively, the City of Winnipeg will consider the purchase of the necessary infrastructure with the intention of operating our own P25 network and will consider interfacing to other local or regional networks.

E3.2 The P25 Radio Network shall be a modern and integrated voice and data, state-of-the-art wide area network for use throughout the City of Winnipeg region and potentially interfacing to any adjoining regional network(s).

E3.3 The system shall utilize Project 25 Phase 2 trunked technology. The integrated network should be a highly reliable, fault tolerant system which will meet current needs and provide a growth path for future expansion. Since the system is expected to serve the communication needs of the City of Winnipeg for the next 15 years, it must have the flexibility of adapting to changing system requirements and new technology without the need to replace major equipment elements.

E3.4 The system should be designed and built as a Public Safety Grade network as defined by the NPSTC. Attention to network hardening and survivability are critical elements.

E3.5 The City of Winnipeg intends to implement future data applications and add additional users beyond the initial identified requirements, and requires that this network allow for future growth of the network. The network must also allow for the addition of RF sites to increase coverage should the need arise.

E3.6 The system shall be proposed as a complete network with firm prices for all of the equipment, software and services required by these specifications.

E4. NETWORK CONFIGURATION

- E4.1 The City of Winnipeg requires a Project 25 Phase 2 trunked land mobile radio communications system with wide area communication capabilities for all City of Winnipeg two-way radio users throughout the City of Winnipeg and surrounding area. The City of Winnipeg has been allotted thirty (30) 866 MHz duplex channels in the Winnipeg region by Industry Canada. The City would like to consider acquiring 700 MHz channels, If shown to be advantageous the City of Winnipeg would prefer to implement a simulcast radio system consisting of at least 3 radio sites. The Contractor will be required to provide coverage maps and engineering studies to validate the feasibility of a simulcast system compared to a multicast solution. It will be the responsibility of the Contractor to meet the coverage requirements and propose additional or alternative radio sites if necessary to meet these requirements.

E5. NETWORK INTERFACE TO ADJOINING NETWORKS

- E5.1 The City of Winnipeg currently has interoperability arrangements with the Royal Canadian Mounted Police (RCMP), Manitoba Health, Manitoba Emergency Measures, Manitoba Office of the Fire Commissioner (OFC), Municipality of Springfield Police, Canadian National Railways Police (CNR), Canadian Pacific Railway Police (CPR), the Winnipeg Airport Authority (WAA), National Microbiology Laboratory (NML) and the Department of National Defense (DND), These agencies all currently use the MTS FleetNet APCO 16a Trunked radio network. These agencies anticipate migrating to a proposed new P25 provincial radio network. To maintain interoperability, the City of Winnipeg will consider the following options:
- (a) Operation on the same radio Network
 - (b) Implement an Inter RF Subsystem Interface (ISSI) between a City of Winnipeg Network and the provincial network,
 - (c) Allow non-City of Winnipeg agencies to roam onto the City radio network.
 - (d) Allow City of Winnipeg radios to roam onto the adjoining networks
 - (e) Provide a PTT service over IP to interface the selected radio Network with Cellular devices

E6. DISPATCH CENTERS

- E6.1 The City of Winnipeg currently operates 4 dispatch centers to support policing, fire and Emergency Medical Services (EMS) operations. These are located as follows:
- (a) Police Primary – 145 Smith Street, 10 positions;
 - (b) Police Secondary – 700 Assiniboine Park Drive, 6 positions;
 - (c) Fire/EMS Primary - 700 Assiniboine Park Drive, 6 positions;
 - (d) Fire/EMS Secondary – 185 King Street, 6 positions.
- E6.2 Dispatch consoles based upon the latest dispatch console and digital switching technology shall be utilized at the dispatch centers sites. LCD-based dispatch consoles shall provide the dispatcher with all the features and capabilities of a large traditional panel mounted console in a compact unit. To provide the best value and flexibility to the City of Winnipeg, the Contractor shall maximize the use of commercial, off-the-shelf (cots) internet protocol (IP) networking technologies for dispatch console interconnectivity.

E7. P25 PHASE 2 SYSTEM ARCHITECTURE

- E7.1 The backbone of the system shall consist of multiple repeater sites connected to a wide area controller, or interconnected in such a manner, to provide reliable wide area voice and data communications to and from mobile and portable units throughout the desired area of coverage.
- E7.2 The network communications architecture shall provide the radio user transparent radio communications across the entire area of coverage.

E7.3 The proposed Project 25 phase 2 trunked radio system shall permit the radio user to roam across the entire area of coverage without requiring manual switching or changing of site information.

E7.4 The Project 25 phase 2 trunked radio system shall provide automatic interoperability with existing trunked or conventional radio systems from the same or different manufacturers. Interoperability with other P25 systems shall be supported through an optional P25 ISSI (inter sub system interface).

E8. SIMULCAST

E8.1 The City of Winnipeg desires to implement a P25 Phase 2 simulcast system at multiple tower sites. Only sites located within the City of Winnipeg and intended to provide primary communications for the City of Winnipeg need be simulcast. All other sites on any wide area network could be multicast.

E8.2 The City will consider a multicast solution if the Bidder can demonstrate significant advantages of multicast solutions compared to a simulcast solution.

E9. WIDE AREA OR NETWORK CONTROLLER

E9.1 The entire wide area network shall be controlled by a geographically diverse redundant control system. At least two control circuits must manage all switching and routing of calls. These control points must be constructed such that the failure of one control site will result in the remaining control site assuming control over the network operation.

E10. RADIO COVERAGE REQUIREMENTS

E10.1 Contractor will be responsible for demonstrating mobile and portable radio coverage performance in accordance with the test plan defined later in these specifications.

E10.2 Radio system coverage shall be predicted through use of a radio wave propagation model that has been developed on the basis of theoretical and empirical data, which will take into account terrain irregularity, foliage, urban clutter, noise and long and short term signal variations.

E10.3 Simulcast composite coverage plots shall be presented on an appropriate scale, and include areas of degraded audio quality due to simulcast interference effects.

E10.4 Voice quality - coverage is defined as the minimum signal required to provide delivered audio quality 3.4 (DAQ 3.4) voice quality, defined as "speech understandable with repetition only rarely required", as defined by TSB-88.1.

E10.5 Mobile Coverage - mobile voice coverage shall be provided with 95% reliability. The Bidder's percentage value will become the guarantee for pass/fail criteria for coverage acceptance testing. This requirement must account for simulcast interference effects. The boundary of the mobile service area shall be clearly indicated on the Bidder's coverage maps provided with their proposal. Areas that may experience degraded audio quality or performance due to simulcast interference must be accounted for in the maps.

E10.6 Portable Coverage - Portable outdoor voice coverage shall be provided with 95% reliability. The Bidder's percentage value will become the guarantee for pass/fail criteria for coverage acceptance testing. This requirement must account for simulcast interference effects. Bidders must assume that the User is outdoors and is wearing the portable (with antenna) on their hip and with a speaker microphone (no antenna) at shoulder height. The boundary of the portable service area shall be clearly indicated on the Bidder's coverage maps provided with their proposal. Areas that may experience degraded audio quality or performance due to simulcast interference must be accounted for in the maps.

E11. TOWER TOP RECEIVE AMPLIFIERS

- E11.1 It is desirable that tower top receive amplifiers be used to compensate for coaxial cable loss in order to provide the level of portable talk-back coverage specified. It is also desired that the tower top amplifier shall incorporate lightning and excess power protection circuits. It is desirable to be able to remotely monitor the health of all tower top receive amplifiers.

E12. SYSTEM FUNCTIONAL REQUIREMENTS

- E12.1 The basic operational mode of the system will be Project 25 Phase 2 trunked per TIA/EIA 102 standards, with the field units monitoring an assigned 9600 bit per second control channel. Most of the communications will use this mode with communications taking place over trunked repeater sites located throughout the served territory. The mobile and portable radios will also enable users to manually select communication modes such as the use of conventional channels or talk-around mode when out of range of the repeater site.

E12.2 Wide Area Communications

- (a) The system shall provide the ability to place and receive calls to and from any point in the network covered by the Project 25 trunked radio sites.
- (b) The Contractor must include connectivity between the RF sites and the Master control Site. All sites shall be linked to the wide area radio network by means of microwave, leased lines, fiber optic cable, or a combination thereof. Bidder must indicate the amount of bandwidth required to support its proposed system design.
- (c) The use of 4.9 GHz links to interconnect simulcast RF sites with the simulcast control point is not permitted, due to the high path reliability requirements for proper simulcast timing and the "unprotected" nature of 4.9 GHz licensing. To increase survivability and reduce maintenance costs of microwave systems, Bidder may not propose microwave radios that are tower mounted. Microwave radios must be installed inside the shelter. A minimum of "five nines" reliability is required;
- (d) Network connectivity between sites or between sites and a master control facility must be designed to meet a minimum 99.9999% (six "9's") path reliability.

E12.3 Roaming and Handoff

- (a) If the proposed system consists of a simulcast cell and one or multiple wide area trunked sites, the system shall permit the radio user to roam across the entire area of coverage without requiring manual switching or changing of site information.
- (b) As a user roams through the system, the system shall automatically provide handoff from one site to the next, ensuring that it will always select a high quality signal. Bidder shall indicate whether the handoff is based on the "best server" or some other algorithm, and explain the parameters (RSSI, bit error rate) used to determine handoff. The system shall track users as they roam through the network and direct voice calls to the site at which the subscriber is located.

E12.4 General Features

- (a) Voice and Control – The City of Winnipeg desires to utilize standards-based protocols for the life of the radio system. The system shall provide a minimum of two voice calls per 12.5 kHz of radio channel spectrum. Non-standard, proprietary TDMA solutions will not be accepted. The system must comply with the Project 25 Phase 2 standards, as described by the following published documents:
 - (i) TIA-102.BBAA, Two-Slot TDMA Overview
 - (ii) TIA-102.BABA-1, Project 25 Half-Rate Vocoder Annex
 - (iii) TIA-102.BBAB, Project 25 Phase 2 Two-Slot Time Division Multiple Access Physical Layer Protocol Specification
 - (iv) TIA-102.BBAC, Project 25 Phase 2 Two-Slot TDMA Media Access Control Layer Description

- (v) TIA-102.CCAA, Two-Slot Time Division Multiple Access Transceiver Measurement Methods
 - (vi) TIA-102.CCAB, Two-Slot Time Division Multiple Access CAI Performance Recommendations
 - (vii) TIA-102.BCAD, Project 25 Trunked Radio System Two-Slot Time Division Multiple Access Voice Services Common Air Interface Conformance Specification
 - (viii) TIA-102.BCAE, Phase 2 Two-Slot Time Division Multiple Access Trunked Voice Services Message and Procedures Conformance Specification
 - (ix) TIA-102.CBBB, Two-Slot TDMA Messages and Procedures Conformance
 - (x) TIA-102.CABC-B-1, Interoperability Testing for Voice Operation in Trunked Systems Addendum – TDMA Mode
 - (xi) TIA-102.AABC-C-1, Additions to the Phase 1 Trunking Standards for Phase 2 TDMA
 - (xii) TIA-102.AAAD-A, Additions to the Phase 1 Encryption Standards for Phase 2, Encryption Protocol Addendum For Half Rate Vocoder
- (b) Proprietary encryption protocols are not acceptable.
 - (c) The system must be able to support a mix of legacy Phase 1-only and Phase 2 radios on the Phase 2 system, and to allow for interoperability with neighboring Project 25 Phase 1 systems. The Phase 2 system shall allow legacy Phase 1-only radios to register and affiliate on interoperability groups. In addition, the registration of a Phase 1 radio on any P25 site shall not reduce the Grade of Service (GOS) on Phase 2 sites that do not have Phase 1 radios registered on the same group.
 - (d) Radio Disable - The purpose of this feature is to prevent a lost or stolen radio from being used to transmit and receive on the system. The system shall have the ability to selectively enable or disable an individual radio from the system management computer.
 - (e) Caller Identification - The radio ID shall be included in each transmission. The system shall display this ID on its associated group module in the console at the dispatch center. Suitably equipped mobile and portable radios shall be able to display the calling unit ID for both individual and group calls. Each mobile radio, portable radio, control station, and dispatch console shall be capable of displaying an alphanumeric alias corresponding to the unit ID, if available from the transmitting device.
 - (f) System Access by Unauthorized Devices - The system shall prevent access by unauthorized devices.
 - (g) Over-The-Air Programming - The system shall provide the ability to provision radio parameters to the mobile and portable radios over the air (without the need to physically connect the radio programmer to the radio). Provisioning shall include the supply of system information such as available radio channels, and user specific information such as talk group lists, scan priorities and user privileges.
 - (h) Encryption and OTAR - Encryption on the system shall be standards-based; proprietary encryption protocols are not allowed. The system shall support over-the-air-rekeying (OTAR) of mobile and portable radios using Project 25 OTAR.
 - (i) Radio to Radio Interoperability – The City of Winnipeg is also interested in radios that operate on the 700/800 MHz frequency bands. The radios must operate in both analog conventional mode as well as P25 Trunked mode.

E12.5 Project 25 Trunked Features

- (a) Basic Project 25 Trunked Operation - The system shall support voice group operation, where a voice group consists of a number of operational users distributed through the radio network. The radio user manually selects the voice group he wishes to communicate with, and then presses PTT on the radio. If resources are available the system shall respond by establishing a voice call to the selected group. Once the group call has been established, voice from the source radio is transmitted to all members of the group, which may involve multiple repeater sites. The system shall track voice group members as they roam through the network and ensure that each multi-site call is routed to all available repeater sites containing members of that voice group. The system shall support Project 25-defined

“announcement group calls” (allowing a dispatcher or authorized user to communicate to a number of individual groups) and “all calls” (allowing a dispatcher or authorized user to communicate to all users on the network.

- (b) Call Queuing - If resources are not immediately available for a call originating from the network side, the system shall queue the channel request to the base station until the radio channel is available.
- (c) Voice Group Priority - The base station shall queue calls originating from the network side based on voice group priority, with a minimum of eight priority levels. Calls will be positioned in the queue based on priority, with calls of highest priority (such as emergency calls) being serviced first. Calls of equal priority shall be processed on a first in, first out basis.
- (d) Group Busy Lockout - This feature prevents other voice group members from interrupting a user who is actively transmitting on a voice group. If a member of a currently active voice group presses PTT to initiate a call on the same voice group, the system shall refuse to repeat the call. This is independent of the “Busy Channel Lockout” capability of the subscriber unit. Exceptions to group busy lockout include network originated emergency calls, dispatcher override, and supervisor override.
- (e) Dispatcher Override - This feature ensures that calls originating from a dispatch console cannot be blocked by normal members of the same voice group. The system shall permit a call originating from a dispatch console to interrupt a call by a normal member of the same voice group, overriding the call so that other members of the voice group only hear the dispatcher. The exception is the transmitting mobile, which may not hear the dispatcher until after he releases the PTT button.
- (f) Individual (Private) Call - The system shall support individual call mode, where a suitably equipped radio or console user can establish a private call to any other radio user in the network. In individual call mode the group membership is limited to the source and destination radios and the call will not be overheard by other mobile or portable units.
- (g) Confirmed Call - This is an optional feature where a voice group call is not enabled until most or all of the required system resources are available.
- (h) Priority Scan - The system shall provide individual radios with the capability of scanning multiple voice groups.
- (i) Scan Talkback - The system shall provide individual radios with the capability of talking back on a scanned talkgroup that has become active.
- (j) Emergency Alert and Emergency Call - The system shall support emergency notification in the mobile and portable radios. When the emergency button is pressed on a mobile or portable radio, the radio shall immediately transmit an emergency alert message to all dispatch consoles programmed to operate on the talkgroup where the radio generating the emergency is affiliated.. The emergency alert message should include at a minimum the radio ID talkgroup of the originating unit. Upon receipt of an emergency alert message the system shall immediately establish an emergency voice call. All emergency calls shall have the highest priority in the system.
- (k) Late Call Entry - The system shall permit a user who has just re-entered radio coverage or was engaged in another call to late enter into a talkgroup call in progress.

E12.6 Phase 2 Interoperability with Legacy Systems

- (a) Project 25 Conventional Systems - The Phase 2 system shall provide automatic interoperability with existing Project 25 conventional radio systems from the same or different manufacturers.
 - (i) Automatic is defined as taking place without operator (user or dispatcher) intervention. It is acceptable for an operator to be required to set up the initial connection. However, all subsequent inter-system communications should occur without human intervention.
 - (ii) Interoperability is defined as the capability to connect to Project 25 conventional voice groups on the Phase 2 radio system through the wide area controller.

It is preferred that a user registered on a P25 Conventional channel would use the same talk group as a user on a P25 Trunked site.

(b) Project 25 Legacy Phase 1 Trunked Systems - The system shall provide automatic interoperability with existing Project 25 Phase 1 trunked radio systems from the same or different manufacturers. Interoperability is defined as the capability to connect or patch Project 25 trunked voice groups on the Phase 2 radio system through the wide area controller with Project 25 trunked voice groups on an existing radio system. This interoperability may be established using network-level connectivity compliant with the P25 Inter-Subsystem-Interface.

(c) Conventional FM Systems - The system shall provide automatic interoperability with existing conventional FM radio channels, where a voice group on the new system is connected through the wide area controller to a conventional FM radio channel, or alternatively to a CTCSS defined voice group on a conventional FM radio channel. Automatic is defined as taking place without operator (user or dispatcher) intervention. It is acceptable for an operator to be required to set up the initial connection. However, all subsequent inter-system communications should occur without human intervention.

E12.6.1 The existing conventional FM radio systems to be interfaced may operate in the VHF, UHF, or 800 MHz frequency bands. The conventional FM station interface shall accommodate any one or all of these. Interoperability is not required at the air interface.

E12.6.2 The system should support statically defined interfaces between CTCSS talkgroups on conventional channels and talkgroups on the new system, where once the interface is configured it is not changed.

E12.6.3 The system should support dynamically defined dispatch console patch style interfaces between conventional channels and talkgroups on the Phase 2 system, where the interface can be configured by the dispatcher.

E12.7 System Reliability and Fault Tolerance

(a) System reliability and fault tolerance shall be major objectives in the design of the system. The system shall be designed to operate reliably, so that if a problem develops it will not affect the basic trunking operation and will not propagate to another part of the system.

(b) Wide Areas - The system shall be designed such that there are no situations where a single failure in the Contractor supplied equipment will disable wide area operation. No single point failure within the wide area controller shall prevent the system from normal operation.

(c) Bidders are required to provide hot standby redundancy for the wide area controller. The hot standby equipment shall be placed at a geographically separate location for redundancy. Upon a failure of the primary network controller, the redundant controller shall automatically take over with no user intervention required.

(d) If the Bidder's solution consists of a simulcast cell and wide area multisites, should one or more site elements or site links fail, the rest of the system shall continue wide area communication, and the isolated sites shall continue standalone Project 25 trunked operation. The system shall be reliable such that a failed link to any site will not affect the rest of the wide area communications.

(e) If the Bidder's solution consists of a single simulcast cell, the system must incorporate redundancy and fault tolerance such that the user will not revert to conventional mode due to single and multiple points of failure.

(f) If the Bidder's solution consists of multiple multicast cells, the system must incorporate redundancy and fault tolerance such that the user will not revert to conventional mode due to single and multiple points of failure.

(g) The P25 trunked repeater site shall not be dependent upon the wide area controller for operation. If a Phase 2 trunked site loses its communication to the wide area controller it shall continue to operate on a single site basis. Wide area communications will continue except for the site that lost its link.

- (h) Should a radio channel fail at a multi-channel site, there shall be no functional impact on the operation of the system other than reduced site capacity.
- (i) If the proposed architecture consists of a single system management computer, a redundant configuration shall be available as an option. It should be possible to locate the redundant computer at a site several miles from the primary system management computer.
- (j) In case of failure of one console position, no other console position shall fail as a result of that failed console.
- (k) If the proposed system requires a separate console switch, the console switch shall have redundant operation such that no single failure within the console switch shall prevent the unit from normal operation.
- (l) If an entire repeater site leaves wide area mode or fails, the mobiles and portables using that site shall automatically, as coverage allows, roam to adjacent sites.

E12.8 Network Security and Information Assurance

- (a) While IP-based radio solutions provide benefits such as a common backbone and infrastructure, commercially available standard products, common support and maintenance, and flexibility for newer technologies, the trade-off is to ensure that network security is established and maintained. The proposed Radio Network must have a backbone communication network that provides data integrity, data security with a high reliability.
- (b) The main goal of any information system is to restrict access to those who are authorized to and have a need to know, including the ability to audit the information system to ensure that the policies and regulations are being implemented appropriately and to provide accountability for the actions of those with the responsibility of using and administering the system.
- (c) Access control requirements should seek to ensure that the system maintains not only confidentiality of information but also ensures the integrity of that information with role-based access control. Access control should involve the implementation of least privileges, authentication, authorization, and accountability; a vendor should meet the following Access Control requirements:
 - (i) Centralized Authentication, Authorization, and Accountability of Users,
 - (ii) Role-based management of users and machines,
 - (iii) Provide the capability to audit the information system to ensure that the policies and regulations are being implemented appropriately,
 - (iv) Provide accountability for the actions of those with the responsibility of using and administering the system.
- (d) A key component within Cyber Security and Access Control is the concept and methods of Identity Assurance that addresses minimizing business risk associated with identity impersonation and inappropriate account usage. Access in high-risk situations (e.g. Remote Access) should be performed with the use of two-factor (or strong) authentication by which the user must provide their account name, account password (something they know), and either a token ID (something they have) or biometric information (something they are).
- (e) Bidders proposed network need to integrate security into the operations. A wireless information system, integrated into the overall information system of an organization, needs to take some key aspects into consideration such as
 - (i) Centralized Log Management,
 - (ii) Security Event and Information Monitoring, and
 - (iii) Business Continuity and Disaster Recovery.
- (f) To minimize duplication of administration, equipment, and time, it is becoming common to interconnect the LMR system with the enterprise network through a highly restricted

firewall and/or intrusion prevention system (IPS). Bidder shall describe how their Authentication and Authorization Server (AAS) could integrate with the City of Winnipeg's existing Active Directory authentication to allow for the sharing of users identifications and passwords, preferably one-way.

- (g) A log management solution should be capable of monitoring and recording system and event logs from a large number of the devices on the network, including (but not limited to)
 - (i) Operating System Event Logs,
 - (ii) Application Logs
 - (iii) Network device logs
- (h) During critical operations, the system shall be able to quickly recover devices to bring the users and the system functionality back to full operational status. An enterprise backup solution should also have the capability of creating offline backups that can be stored off site.
- (i) The supporting computer network shall include a patch management solution capable of providing the following minimum functionality:
 - (i) Centralized role-based Administration,
 - (ii) Integration with Authentication and Authorization Server,
 - (iii) Patch scheduling,
 - (iv) Air-gap patch capability that requires the updating of the Patch Management Server with Mobile Media (e.g. DVD or Thumb Drive) without connectivity to the internet being required,
 - (v) Standard capabilities available from commercially available Patch Management Systems,
 - (vi) The ability to express-test critical vulnerabilities out-of-cycle when the need arises to keep critical systems going.
- (j) The Contractor shall provide antivirus for all systems capable of supporting such an application, and will provide host-based security software (HBSS) for all Servers and high-risk machines, and a centralized server responsible for management, updating, and monitoring of the host security
- (k) The Contractor shall provide multiple network security capabilities to address the risk associated with routed networks including Access Control Lists on Routers, Firewalls, Network Intrusion Detection, and Link Encryption.
- (l) The Contractor shall include firewall protection to deliver strong network- and application-layer security, user-based access control, worm mitigation, malware protection,.
- (m) The Contractor shall include Network Intrusion and Detection Systems (NIDS) to allow for a combination of vulnerability- and anomaly-based inspection methods to analyze network traffic and prevent threats from damaging the network by alerting system administrators or preventing suspicious behavior. The vendor shall also provide a NIDS management console that is capable of correlating attacks with real-time network and user intelligence and centrally manages network security and operational functions, including event monitoring, incident prioritization, forensic analysis, alerting, and reporting.
- (n) The Contractor shall provide link encryption for all backhaul connections or connections that traverse public or insecure zones.

E12.9 System Performance Requirements

- (a) The system shall support a fleet of at least 5000 registered portable and mobile radio voice users.
- (b) The system shall support a minimum of 2000 voice groups or talkgroups.
- (c) The simulcast system shall be capable of expansion to support a minimum of 17 sites.
- (d) The system shall be capable of expansion to support a minimum of 100 dispatch consoles.

- (e) Each simulcast repeater site shall be capable of expansion to support a minimum of 24 radio channels.
- (f) A hot standby wide area controller shall take full control within 60 seconds after sensing that the primary unit has failed. Any loss of voice communications shall be limited to the interval from the failure of the primary unit to the time the standby unit takes full control.
- (g) The system should support at least 10 statically defined interfaces between conventional channels and talkgroups on the new system.

E12.10 Project 25 trunked Repeater Station Equipment Requirements

- (a) The Project 25 trunked repeater station is considered to include the station channel controller.
- (b) All repeaters shall be capable of being configured to provide Project 25 trunked voice and data transmission to user radios. All repeaters shall be capable of being configured as either a Project 25 control channel or working channel, and any working channel repeater shall be capable of automatically assuming the role of the control channel in the case of a failure of the control channel repeater.
- (c) Repeaters shall provide automatic call sign identification that meets Industry Canada requirements for identifying Project 25 trunked repeater sites.
- (d) The system shall provide the ability to reconfigure individual repeaters through the network backhaul interface.
- (e) The Project 25 trunked repeater station shall be controlled and managed through the system management computer, which shall be capable of remotely controlling the following functions:
 - (i) taking a repeater off-line
 - (ii) retrieving and setting repeater operating parameters
- (f) The Project 25 trunked repeater stations, including repeater and station channel controller, shall be housed in standard 19 inch EIA rack mount free standing cabinets, with three channels (or more) per cabinet to conserve space.
- (g) All hardware and software necessary for the stations to meet the system requirements shall be provided.
- (h) The equipment shall operate over a minimum temperature range of -30 degrees to +60 degrees Celsius. All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- (i) All components within the repeater shall be of solid state design.
- (j) The repeaters shall meet or exceed all applicable Industry Canada requirements and fully comply with EIA standards as they apply to measurement of specifications.
- (k) Transmitter combiners and receiver multicouplers shall be installed in cabinets with space available to expand to at least 24 channels.
- (l) All repeater antenna configurations shall be designed to provide the specified coverage.
- (m) The transmitter combiner shall be the expandable type supplied with the least number of ports specified by the Bidder in the initial deployment of the network.
- (n) The receiver multicoupler shall be the expandable type supplied with a minimum of 12 ports and all unused ports terminated with 50 ohms. A bandpass cavity filter shall be supplied with the multicoupler to reject out-of-band RF signals.
- (o) The proposed repeater sites must be provided with a secondary power source capable of keeping the entire site operational for a minimum of 12 hours in the absence of the AC mains supply. This can take the form of batteries and a generator or another design of the Bidder's choice.
- (p) The system shall be capable of detecting the failure of all major equipment items at the repeater site, including at a minimum:

- (i) repeater operation
 - (ii) channel controller operation
 - (iii) status of leased landline or microwave links
 - (iv) status of antenna system (VSWR)
 - (v) status of tower top amplifier
 - (vi) failure of AC power
 - (vii) failure of DC power
 - (viii) site intrusion alarm
- (q) If network equipment is included at the site for IP connectivity, Bidder shall use commercial-off-the-shelf components.

E12.11 Simulcast System

- (a) The basic Phase 2 simulcast system design shall be a GPS synchronized digital simulcast system with a minimum of three base station sites.
- (b) The system shall be capable of automatically adjusting the path delay of any one or all interconnection paths utilized in the system to compensate for any change.
- (c) It is preferred that the interconnection between each transmit site and the control point (or master site) be IP-based.

E12.12 Wide Area Controller

- (a) The wide area controller shall provide intelligent interconnection of the Project 25 trunked radio sites and dispatch consoles to form a fully integrated radio system supporting wide area voice communications.
- (b) The wide area controller shall track each Project 25 trunked radio and its affiliated talk group as it roams throughout the coverage area of the multisite network. The wide area controller shall route calls to individuals or groups at the appropriate sites.
- (c) A mobile or portable radio shall be de-registered from a site when it logs onto a new site, or after a programmable period of inactivity.
- (d) The wide area controller shall be capable of interfacing to other wide area controllers.
- (e) The wide area controller shall also interface with, or be expandable to accommodate multiple Project 25 conventional radio sites, multiple conventional radio channels, multiple dispatch consoles, centralized telephone interconnect system, voice logging recorder, and system management computer.
- (f) Complete control over the wide area controller shall be provided to authorized persons through the system management computer.
- (g) The wide area controller shall be powered from 115 VAC 60 Hz.
- (h) The wide area controller shall include a hot standby backup controller that is geographically separated.

E12.13 System Management System

- (a) The system management device shall be a UNIX or Windows™ based computer with a client/server architecture and single-point database for all system management functions.
- (b) The system shall include at least one system management console which provides system management of the entire system.
- (c) The system shall be capable of supporting multiple system management operator consoles operating concurrently at different locations within the wide area network.
- (d) The system management computer and consoles shall be powered from 115 VAC 60 Hz.
- (e) The system management computer shall support polling and alarms.

- (f) System devices which detect that they have changed status or are operating below specification shall automatically transmit an alarm to the system management computer. In a situation where device failure prevents the transmission of an alarm, these situations shall be detected through polling.
- (g) The system management computer shall automatically and routinely poll system devices to determine status. The polling interval should be automatically adjusted by the system management computer to avoid unnecessary polling, for example if the device has just reported a change in status through the alarm mechanism.
- (h) At minimum, detection of the following alarms must be included:
 - (i) RF Power Failure of any repeater;
 - (ii) Excessive VSWR of any transmitter;
 - (iii) Shelter Door Alarms;
 - (iv) Cabinet Door Alarms;
 - (v) AC Mains Power Failure;
 - (vi) UPS Power Failure;
 - (vii) Generator Failure;
 - (viii) Shelter Smoke Detection;
 - (ix) HVAC Failure;
 - (x) Low Generator Fuel;
 - (xi) Low UPS Battery voltage.
- (i) The system management computer shall provide a hierarchical network topology map, showing all managed devices using color coding to represent device status.
- (j) Through the network topology map it shall be possible for the operator to determine the current detailed status of a managed object, by double clicking on the object.
- (k) The system management computer shall provide a scrollable, time sorted list of alarm messages sent by managed objects.
- (l) It should be expected that due to the high reliability of the system, the system management computer console will be unattended most of the time with the operator working in the area on other tasks.
- (m) The system management computer shall provide a programmable audible alert to notify the operator of changes in the system status.
- (n) The system management computer should be capable of SNMP alerting and interfacing. Alert, warning or failure message should be sent via email or SMS.
- (o) The system management function shall be capable of partitioning the database such that different users (e.g. supervisor vs. non-supervisor) have control only over the radios and talkgroups groups for which they have been authorized.
- (p) The system management function shall have multiple levels of security access.
- (q) The system management computer shall support establishing and updating repeater site parameters, and remotely enabling and disabling radios.
- (r) The system management computer shall support the registration of new voice users in the system and assigning voice group membership.
- (s) The system management computer shall collect and save the following statistics for later analysis:
 - (i) voice traffic volume by subscriber unit per hour;
 - (ii) voice traffic volume by repeater per hour;
 - (iii) wide area controller voice traffic volume per hour.

- (t) The system management computer should provide a call activity logging function that could be used to determine the relative traffic loading and geographic distribution for each of the voice groups using the system.
- (u) The system management function shall maintain a record on hard disk of all voice call activity for a period of at least 45 days, with the capability to down load to tape or other storage media when desired.
- (v) The system management function shall be able to continue to log call activity when a report is being run, and when downloading to the supported storage media.
- (w) The following data should be stored as a minimum:
 - (i) Date, time, and duration of call;
 - (ii) Type of call (group, unit-to-unit, emergency);
 - (iii) Unit initiating call and voice group number (group calls only);
 - (iv) Unit initiating call and target unit number (unit-to-unit calls only);
 - (v) Repeaters and/or consoles participating in the call;
 - (vi) Usage time for each repeater at a site;
 - (vii) The number of minutes by site that all of the channels at the site are busy;
- (x) The system management function shall permit the operator to run remote diagnostics on managed devices to isolate and troubleshoot faults.

E12.14 Dispatch Consoles

- (a) The Radio network shall support the connection of at least 100 dispatch consoles.
- (b) The radio network shall support the APCO P25 Console Subsystem Interface (CSSI) standard.

E13. SECTION A LEASED SERVICES SPECIFICATIONS

E13.1 Unless specifically noted, the City of Winnipeg will be considering the purchase of leased two-way radio services that would be compliant with specifications E2 to E12 inclusive. The length of contract shall be 15 years.

E13.2 The Leased services can take three forms as described below:

- (a) Service 1 Full provision – The Contractor will provide all infrastructure, inter-site connectivity, support, management and maintenance of the complete network. The City of Winnipeg will provide subscriber radios, radio programming and Dispatch consoles as per Sections C and D of this document. The City will arrange for connectivity between the dispatch console and the Contractor's network separately.
- (b) Service 2 Partial Provision – Similar to Service 1 above except the City of Winnipeg will own and maintain the radio site equipment that is to be used exclusively for the City of Winnipeg. The Contractor will provide all other infrastructure, support, management and maintenance of the remaining network. The City of Winnipeg will provide subscriber radios, radio programming and Dispatch consoles as per Sections C and D of this document. The City will arrange for connectivity between the dispatch console and the Contractor's network separately. The City will also arrange for connectivity between the City's owned radio sites and the Contractor's radio network, separately.
- (c) Service 3 ISSI only – The Contractor will provide an ISSI interface that allows connecting their network to a City of Winnipeg owned network. The ISSI interface should allow for a full feature connection between the Contractor's core and a City of Winnipeg owned core.

E13.3 Item No. 1 – Leased Monthly Services, (Service 1 Full Provision) shall be the provision of the two way radio services

- (a) Unrestricted transmit and receive time;
- (b) Unrestricted roaming from site to site throughout the network;

- (c) Unlimited Private or individual calling;
- (d) Unlimited telephone interconnect;
- (e) Connection of at least 100 console positions;
- (f) Nominally 1500 subscriber units expandable to 5000;
- (g) Access to a minimum of 2000 talkgroups;
- (h) Public safety users shall be assigned the highest non-emergency call priority available in the system;
- (i) Access to monthly reports or direct access to the system management application or database to allow the City of Winnipeg to determine worst case channel loading statistics;
- (j) A minimum of 3 radio sites within the City of Winnipeg's boundaries that are for the exclusive use of the City of Winnipeg. Additional sites shall be added, if required, to meet the radio coverage specification. The City of Winnipeg will consider allowing non City of Winnipeg public safety agencies access to these sites on a case-by-case basis and would be subject to an approval process by the City of Winnipeg and an executed document outlining the Method of Operation or MOU;
- (k) The system provider will ensure sufficient channel capacity exists at each exclusive City of Winnipeg radio site to ensure average channel access time during the busy hour does not exceed 0.25 seconds. Should this occur, the Contractor will take the necessary steps to increase the system capacity accordingly. There shall be no additional costs to the City of Winnipeg to maintain this level of performance;
- (l) The Contractor will provide the necessary system keys or authorizations to allow the City of Winnipeg to program radios;
- (m) The Contractor will have the ability to initially authorize or provision all City of Winnipeg radios. However once a radio has been enabled by the Contractor, the City will be granted access to disable and re-enable City of Winnipeg radios as required on a 7 x 24 hour basis;
- (n) The Contractor shall provide the City of Winnipeg the ability to inhibit or stun any City of Winnipeg radio on a 7x24 hour basis;
- (o) The proposed radio network must have the ability to program radios over the air (OTAP);
- (p) The proposed radio network must provide over the air rekeying functionality (OTAR);
- (q) The City of Winnipeg must have exclusive access to encryption keys used by the City of Winnipeg. The Contractor's staff or contractors, other network users, must not have the ability to view or modify City of Winnipeg encryption keys;
- (r) The proposed network must provide an uninterrupted path of encrypted audio from the subscriber radios through the infrastructure and terminating at either dispatch consoles or other subscriber radios. At no point in this chain will unencrypted audio be present except at the terminating console or subscriber unit;
- (s) The City of Winnipeg will have the ability to utilize any make or model of P25 subscriber radio that the City can demonstrate to the Contractor is compatible with their proposed network. The Contractor shall not withhold approval of any proposed radio equipment without demonstrating just cause for doing so. The written approval or substantiated denial from the Contractor must be received within 10 business days from the time The City of Winnipeg demonstrates to the Contractor the compatibility of the radio equipment, or delivers a working and programmed radio to the Contractor for their own evaluation. There shall be no cost to the City for this approval process;
- (t) The City of Winnipeg will have the ability to utilize any make or model of Dispatch Console that the City can demonstrate to the Contractor is compatible with their proposed network. The Contractor shall not withhold approval of any proposed console equipment without demonstrating just cause for doing so. The written approval or substantiated denial from the Contractor must be received within 10 business days from the time The City of Winnipeg demonstrates to the Contractor the compatibility of the console equipment, or

delivers a working and configured console to the Contractor for their own evaluation. There shall be no cost to the City for this approval process.

E13.4 Item No. 2 – Leased Monthly Services, (Service 1 Full Provision) fixed monthly flat rate shall be the provision of the two way radio services on the basis of a fixed fee per month regardless of the number of subscriber units. The applicable specifications shall be the same as Item 1 except E13.3(k) will not be applicable. The City of Winnipeg will pay a fixed monthly amount and will have the ability to add or remove radios from service without limit on the basis of a fixed fee per month regardless of the number of subscriber units

E13.5 Service and Support for Item 1 and Item 2 - Leased Monthly Services, Service 1 Full Provision.

E13.5.1 The Contractor shall provide as a minimum, the following levels of support:

- (a) The Contractor shall provide a Telephone number that is answered on a 7 x 24 hour basis. The City must receive a return phone call from a subject matter expert (factory trained and certified individuals) within 30 minutes;
- (b) The health of the network must be monitored 7x24 and all communication affecting failures must be reported to the Contractor's technical staff for service automatically within 30 minutes;
- (c) The Contractor must notify the City of Winnipeg of all P25 Network failures that may impact the City of Winnipeg's operations. Notification of failures or outages shall be reported to the City within 30 minutes of detection;
- (d) For all repeater sites provided by the Contractor within the City of Winnipeg;
 - (i) Repair/replacement of 2 or more failed repeaters - < 4 hours to resolution;
 - (ii) Repair/replacement of 1 failed repeater < 20 hours to resolution;
 - (iii) Repair/replacement of single failed antenna or towertop amplifier < 36 hours to resolution;
 - (iv) Repair or replacement of any failed simulcast component < 20 hours to resolution;
 - (v) Repair/replacement of any single or multiple devices that renders an entire site unavailable < 36 hours to resolution;
- (e) Repair/replacement of single failed wide area controller < 4 hours to resolution;
- (f) Repair/replacement of master simulcast site component < 20 hours to resolution;
- (g) Repair/replacement of system administration components <20 hours to resolution;
- (h) Repair/replacement of any component that renders the OTAP system inoperable < 48 hours to resolution;
- (i) Repair/replacement of any component that renders the OTAR system inoperable <24 hours to resolution;
- (j) All field servicing shall be performed only by factory trained and certified individuals;
- (k) All system programming, maintenance or diagnostics shall be performed only by individuals trained and certified by the equipment manufacture or authorized representative;
- (l) The Contractor shall provide a list of all staff authorized to perform service on the radio network components. The list shall include the staff members name and accredited training received, and the date of the training. This list shall be provided on an annual basis no later than February 28 of each year. Should the Contractor make any additions, deletions or changes to the approved staff, an updated list shall be provided to the City of Winnipeg within two weeks;
- (m) The Contractor shall provide monthly reports to the Contract Administrator that include as a minimum, the following details for the previous month:
 - (i) Average Channel access time during busy hour;
 - (ii) Total number of channel busies per month;

- (iii) Total PTT count per talkgroup;
- (n) The Contractor shall provision all new radios within 48 hours of initial request;
- (o) The Contractor will prepare a separate bill for each City of Winnipeg Department containing only the radio equipment associated with that department;
- (p) The Contractor shall provide monthly detailed billing. Billing shall include as a minimum;
 - (i) list of all radios provisioned and include their last known state as enabled or disabled;
 - (ii) An indication of usage of each radio, either total PTT or accumulated air time;
 - (iii) Cost per radio ID;
 - (iv) Cost per console for connectivity;
 - (v) Total cost per department;
 - (vi) It is desirable to have this bill presented in an electronic format. Formats such as CSV are preferred.

E13.6 Item No. 3 – Connectivity Services – Dispatch Centres to Network Administration shall be IP connection services required to interface the City of Winnipeg Dispatch Centers and administration point to the Radio network. This shall be a cost per month per connection.

- (a) The City anticipates requiring connections between the Contractor's Radio Network and the following locations:
 - (i) 700 Assiniboine Park Drive (Winnipeg Police Service);
 - (ii) 700 Assiniboine Park Drive (Winnipeg Fire Paramedic Service);
 - (iii) 245 Smith Street (Winnipeg Police Service);
 - (iv) 185 King Street (Winnipeg Fire Paramedic Service);
 - (v) 421 Osborne street for administration;
- (b) The connection shall not traverse the public Internet;
- (c) Reliability, or up time, of the network connections shall be greater than 99.999%;
- (d) The Bidder should propose multiple connection technologies wherever possible. These can include copper, fibre or microwave. A separate price for each technology is acceptable.

E13.7 Item No. 4 – Leased Monthly Services (Service 2 Partial Provision) shall be the provision of the two way radio services where the City of Winnipeg provides the infrastructure for exclusive use by City of Winnipeg subscriber units within the City of Winnipeg and the Contractor provides the infrastructure for the remaining network outside the City of Winnipeg. The Contractor will provide the core administration components and the City will connect their radio sites to this central core. This service will be charged on the basis of a fixed fee per month for every mobile or portable radio. The service shall include the following:

- (a) Unrestricted transmit and receive time;
- (b) Unrestricted roaming from site to site throughout the network;
- (c) Unlimited Private or individual calling;
- (d) Unlimited telephone interconnect;
- (e) Connection of at least 100 console positions;
- (f) Nominally 1500 subscriber units expandable to 5000;
- (g) Access to a minimum of 200 talkgroups;
- (h) Public safety users shall be assigned the highest non-emergency call priority available in the system;
- (i) Access to monthly reports or direct access to the system management application or database to allow the City of Winnipeg to determine worst case channel loading statistics;

- (j) The City of Winnipeg will provide a minimum of 3 radio sites within the City of Winnipeg's boundaries that are for the exclusive use of the City of Winnipeg. Additional sites may be added to meet the radio coverage specification. The City of Winnipeg will consider allowing non City of Winnipeg public safety agencies access to these sites on a case-by-case basis and would be subject to an approval process by the City of Winnipeg and an executed document outlining the Method of Operation or MOU;
- (k) The Contractor will provide the necessary system keys or authorizations to allow the City of Winnipeg to program radios;
- (l) The Contractor will have the ability to initially authorize or provision all City of Winnipeg radios. However once a radio has been enabled by the Contractor, the City will be granted access to disable radios and re-enable City of Winnipeg radios as required on a 7 x 24 hour basis;
- (m) The Contractor shall provide the City of Winnipeg the ability to inhibit or stun any City of Winnipeg radio on a 7x24 hour basis;
- (n) The proposed radio network must have the ability to program radios over the air (OTAP);
- (o) The proposed radio network must provide over the air rekeying functionality (OTAR);
- (p) The City of Winnipeg must have exclusive access to encryption keys used by the City of Winnipeg. Contractor's staff or contractors, other network users, must not have the ability to view or modify City of Winnipeg encryption keys;
- (q) The proposed network must provide an uninterrupted path of encrypted audio from the subscriber radios through the infrastructure and terminating at either dispatch consoles or other subscriber radios. At no point in this chain will unencrypted audio be present except at the terminating console or subscriber unit;
- (r) The City of Winnipeg will have the ability to utilize any make or model of P25 subscriber radio that the City can demonstrate to the Contractor is compatible with their proposed network. The Contractor shall not withhold approval of any proposed radio equipment without demonstrating just cause for doing so. The written approval or substantiated denial from the Contractor must be received within 10 business days from the time The City of Winnipeg demonstrates to the Contractor the compatibility of the radio equipment, or delivers a working and programmed radio to the Contractor for their own evaluation. There shall be no cost to the City for this approval process;
- (s) The City of Winnipeg will have the ability to utilize any make or model of Dispatch Console that the City can demonstrate to the Contractor is compatible with their proposed network. The Contractor shall not withhold approval of any proposed console equipment without demonstrating just cause for doing so. The written approval or substantiated denial from the Contractor must be received within 10 business days from the time The City of Winnipeg demonstrates to the Contractor the compatibility of the console equipment, or delivers a working and configured console to the Contractor for their own evaluation. There shall be no cost to the City for this approval process.

E13.8 Item No. 5 – Leased Monthly services (Service 2 Partial Provision) Fixed monthly flat rate shall be the provision of the two way radio services on the basis of a fixed fee per month regardless of the number of subscriber units. The applicable specifications shall be the same as item No. 4 above. The City of Winnipeg will pay a fixed monthly amount and will have the ability to add or remove radios from service without limit.

E13.9 Service and Support for Item 4 and Item 5 - Leased Monthly Services, Service 2 Partial Provision.

E13.9.1 The Contractor shall provide as a minimum, the following levels of support:

- (a) The Contractor shall provide a Telephone number that is answered on a 7 x 24 hour basis. The City must receive a return phone call from a subject matter expert within 30 minutes
- (b) The health of the network must be monitored 7x24 and all communication affecting failures must be reported to the Contractor's technical staff for service automatically.

- (c) For all repeater sites provided by the City of Winnipeg
 - (i) Notify City of Winnipeg of any faults, warnings or service advisories affecting the City of Winnipeg Sites.
 - (ii) Notify the City of any firmware or software updates planned for the network so these can be coordinated for City owned infrastructure in an effort to maintain compatibility.
 - (iii) Notify the City at least five (5) business days in advance of any planned maintenance that would impact the City of Winnipeg sites or subscribers.
- (d) Repair/replacement of single failed wide area controller < 4 hours to resolution.
- (e) Repair/replacement of system administration components <20 hours to resolution.
- (f) Repair/replacement of any component that renders the OTAP system inoperable < 48 hours to resolution.
- (g) Repair/replacement of any component that renders the OTAR system inoperable <24 hours to resolution.
- (h) All system programming, maintenance or diagnostics shall be performed only by individuals trained and certified by the equipment manufacturer or authorized representative.
- (i) The Contractor shall provide a list of all staff authorized to perform service on the radio network components. The list shall include the staff member's name and accredited training received, and the date of the training. This list shall be provided on an annual basis no later than February 28 of each year.
- (j) The Contractor shall provide monthly reports to the Contract Administrator that include as a minimum, the following details for the previous month:
 - (i) Average Channel access time during busy hour
 - (ii) Total number of channel busies per month
 - (iii) Total PTT count per talkgroup
- (k) The Contractor shall provision all new radios within 48 hours of initial request.
- (l) The Contractor will prepare a separate bill for each City of Winnipeg Department containing only the radio equipment associated with that department.
- (m) The Contractor shall provide monthly detailed billing. Billing shall include as a minimum
 - (i) list of all radios provisioned and include their last known state as enabled or disabled.
 - (ii) An indication of usage of each radio, either total PTT or accumulated air time
 - (iii) Cost per radio ID
 - (iv) Cost per console for connectivity
 - (v) Total cost per User department;
 - (vi) It is desirable to have this bill presented in an electronic format. Formats such as CSV are preferred.

E13.10 Item No. 6 – Connectivity Services – Dispatch Centers to Network Administration (10 connections) shall be IP connection services required to interface the City of Winnipeg Dispatch Centers and System Management point to the Radio network. This shall be a cost per month per connection.

- (a) The City anticipates requiring connections between the Contractor's Radio Network and the following locations:
 - (i) 700 Assiniboine Park Drive (Winnipeg Police Service);
 - (ii) 700 Assiniboine Park Drive (Winnipeg Fire Paramedic Service);

- (iii) 245 Smith Street (Winnipeg Police Service);
 - (iv) 185 King Street (Winnipeg Fire Paramedic Service);
 - (v) 421 Osborne street for administration;
 - (b) The connection shall not traverse the public Internet.
 - (c) Reliability or up time, of the network connections shall be greater than 99.999%
 - (d) The Contractor should propose multiple connection technologies wherever possible. These can include copper, fibre or microwave. A separate price for each technology is acceptable.
- E13.11 Item No. 7 – Connectivity Services – Radio Sites to Network Administration (4 connections) shall be connection services required to interface the City of Winnipeg Radio sites to the proposed Radio System Management point. This shall be a cost per month per connection.
- (a) The connection shall not traverse the public Internet.
 - (b) Reliability or up time, of the network connections shall be greater than 99.9999%
 - (c) The Bidder should propose multiple connection technologies wherever possible. These can include copper, fibre or microwave. A separate price for each technology is acceptable.
 - (d) The City anticipates requiring 4 connections, one for each radio site. It may be required to connect a second connection for the Simulcast control.
- E13.12 Item No. 8 – ISSI Interface shall be the monthly costs associated with interfacing the Bidder's proposed wide area network with a future City of Winnipeg P25 Phase 2 trunked radio Network (Section B). This would allow the City network to be connected to a wide area network, to provide a measure of interoperability.
- (a) The ISSI interface must conform with standard TIA-102.BACA-A.
 - (b) The ISSI must allow authorized subscriber units to roam between sites of each network without operator intervention.
 - (c) The ISSI must support as a minimum, the following types of calls:
 - (i) group call;
 - (ii) individual call;
 - (iii) emergency call;
 - (iv) encrypted calls without the need to transcode.
- E13.13 Item No. 9 – Monthly PTT over P25 service. This shall be the provision of services as defined in E17.2 to E17.23. the service may be included in the base cost for Items 1,2,4 and 5 or be provided as an optional price in Item No.9.

E14. SECTION B P25 INFRASTRUCTURE SPECIFICATIONS

- E14.1 In Section B, the City of Winnipeg would acquire a P25 Phase 2 Simulcast radio infrastructure that would cover the entire City of Winnipeg municipal area as specified in Appendix C. This could include radio repeater sites and a system management facility that would connect and control all radio sites..
- E14.2 It is anticipated that 4 radio sites will be required to meet the coverage area specifications.
- E14.3 Currently the City of Winnipeg is using three radio sites for communications. One of the three sites (located in North Winnipeg) will not be available for use after Jan 1 2016 and will not be considered as part of the solution. Details of the two available sites are identified in Appendix A. Indoor portable coverage and street level coverage are marginal to poor in areas in West Winnipeg. A fourth site in this area may be required.

- E14.4 Appendix B provides a list of City of Winnipeg sites that may be suitable locations to install radio sites. It will be the responsibility of the bidder to investigate the suitability of any location on this list. Acceptance of any proposal will be contingent upon the sites being proposed actually being acquired for this use.
- E14.5 Unless specified elsewhere, the P25 Phase 2 Simulcast Radio Network shall conform to specifications E3 to E12 inclusive.
- E14.6 Item No. 10 shall be the Site Capital Costs. This shall be the total capital cost for the Contractor's proposed repeater sites. The costs must include as a minimum the following:
- (a) All repeaters, cabling, cabinets, power supplies;
 - (b) All antennas, feedlines, combiners, multicouplers, filters, grounding;
 - (c) All simulcast components;
 - (d) Shelter, if not using existing radio site;
 - (e) Site improvements (road, hydro, etc.) including permits, sufficient to make the site operational if not using an existing radio site;
 - (f) AC mains power if not using existing radio site;
 - (g) DC or redundant power supply if not using existing site;
 - (h) A Generator and on-site fuel storage. The generator must be capable of delivering a minimum of twice the current required to operate the entire repeater site when operated at maximum output. The on-site fuel storage must be sufficient to supply the generator with a minimum of 48 hours of continuous operation under full load;
 - (i) Sufficient heating, air conditioning and ventilation to maintain the repeater site equipment within the manufacturer's recommended specifications;
 - (j) Construction and installation of all necessary towers or support structures including, engineering, site preparation, purchase of towers, installation and commissioning, lamping and lamp alarms;
 - (k) Shelter intrusion, smoke, temperature, and humidity alarm system;
 - (l) Installation testing and commissioning of entire proposed infrastructure.
- E14.7 Item No.11 shall be the Network Core Capital Costs. This will include all components required to control and administer the proposed radio network. As a minimum, Bidder shall include the following costs:
- (a) All electronic hardware, software and firmware required to administer and control the proposed P25, phase 2 simulcast radio network;
 - (b) Redundant power supply capable of maintaining the network core operational for not less than 12 hours in the absence of AC mains;
 - (c) Generator and fuel storage rated for a minimum of twice the estimated input power load of the proposed site equipment;
 - (d) Sufficient heating, air conditioning and ventilation to maintain the Network Core equipment within the manufacturer's recommended specifications;
 - (e) Intrusion, smoke, temperature, and humidity alarm system.
- E14.8 Item No. 12 shall be the capital costs for the Radio Repeater Site to Network core connections. This connection may take the form of copper plant, fiber or microwave. The costs shall include any terminal electronics such as switches, routers, media converters etc.
- E14.9 Item No. 13 shall be the operational expenses required to support Item 11. These shall include Industry Canada licencing for microwave links, lease charge for copper or fibre service. Bidder shall provide an estimated annual cost for this service for each of the 15 years of planned operation of the network. This estimate will be used in calculating the total cost of ownership and the evaluation.

- E14.10 Item No. 14 shall be Coverage Testing. The Bidder shall provide a cost to complete their proposed coverage test plan and including certification satisfactory to the Contract Administrator. The shall be responsible for all costs incurred for additional testing if deficiencies in coverage are detected and changes to the network are made to correct the deficiencies.
- E14.11 Item No. 15 shall be Administrator training. The Bidder shall provide the cost to train the 12 City of Winnipeg Radio Shop staff to efficiently administer, operate and maintain the proposed network. Training shall be onsite with actual system in operation after installation.
- E14.12 Item No. 16 shall be the maintenance and support agreements recommended to provide the following minimum levels of support:
- (a) 7x 24 hour telephone support;
 - (b) Inclusion of all network software or firmware updates required to keep the network within 3 releases of the most current software release over the 15 year lifecycle of the proposed network;
 - (c) The cost to replace any infrastructure hardware determined to be end of life and support during the 15 year life cycle by the manufacturer;
 - (d) Expedited shipping of replacement components.
- E14.13 Item No. 17 shall be any other capital costs not previously identified. The City of Winnipeg will not be responsible for any capital costs not included in Items 10 to 16 above or not itemized for Item 17. Bidder shall provide an itemized list on Form B indication the nature of the charges.
- E14.14 Item No. 18 shall be any other recurring operating costs not previously identified. The City of Winnipeg will not be responsible for any recurring operating costs not included in Items 10 to 16 above or not itemized for Item 18. Bidder shall provide an itemized list on Form B indication the nature of the charges.

E15. SECTION C MOBILE & PORTABLE RADIO SPECIFICATIONS

- E15.1 All radios shall meet or exceed all applicable Industry Canada (IC) requirements, be IC Certified, and fully comply with EIA standards as they apply to measurement of specifications.
- E15.2 Unless otherwise stated, control stations, mobiles, and portables shall meet the following functional requirements:
- (a) The radio shall support 700/800 MHz Project 25 trunked operation on 12.5 kHz private land mobile channels. All radios shall be capable of placing and receiving group calls in Project 25 Phase 2 trunked, P25 Phase 1 Trunked, P25 conventional and analog conventional modes;
 - (b) The radio shall be capable of placing and receiving analog conventional mode calls. Conventional mode of operation shall use continuous tone coded squelch system (CTCSS) and digital coded squelch (DCS);
 - (c) The radio shall have an emergency button and be capable of placing and receiving emergency calls;
 - (d) The radio shall be capable of conventional analog talkaround;
 - (e) The radio shall be capable of selecting one talkgroup from a system or zone containing up to 16 talkgroups. Multiple systems or zones can be loaded into the radio;
 - (f) The radio shall be capable of scanning all talk groups logged onto the active radio site within the system or zone, with the selected talk group having priority;
 - (g) The radio shall provide the user with separate and discrete audible tones to indicate the status of the call;
 - (h) The radio shall be programmable through a standard Windows-based computer;
 - (i) The radio software shall be flash programmable for adding future software enhancements;

- (j) All components within the radio shall be of solid state design;
- (k) Radios with adaptive noise cancellation technology are desired;
- (l) All radios must have undergone successful CAP testing. Bidders shall provide copies of CAP reports for each model proposed;
- (m) All Mobile radios shall operate within rated specifications at temperatures as low as -30 degrees to at least +60 degrees Celsius. All temperature sensitive specifications shall be referred to +25 degrees Celsius.

E15.3 Item No. 19 shall be a Police High Tier Encrypted dash mounted mobile with accessory options and extended warranty. This full featured mobile radio offers a wide feature set, is ruggedly built and is marketed as a public safety grade radio. The radio shall contain the following features:

- (a) The mobile radios shall be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling shall be supplied;
- (b) A palm-type microphone shall be provided with the radio. Optional microphones and control heads should be listed as options;
- (c) A separate external speaker capable of handling the rated power out of the proposed radio models shall be provided;
- (d) The speaker must be contained in a housing sufficiently durable to prevent damage to the speaker;
- (e) All high tier mobile radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles;
- (f) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call;
 - (ii) display voice talkgroup group ID or Alias;
 - (iii) display the radio ID or the Alias of incoming callers;
 - (iv) Project 25-compliant AES voice encryption;
 - (v) Radios must be equipped with a front panel numeric keypad or optionally a handheld microphone or control head with numeric keypads to allow the user to initiate unrestricted individual calls or telephone interconnects;
 - (vi) Radios must allow reprogramming via the radio network (OTAP);
 - (vii) Radios must allow changing of encryption keys via the radio network (OTAR);
- (g) All temperature sensitive specifications should be referred to +25 degrees Celsius;
- (h) The mobile radio shall be powered from 12 VDC negative ground;
- (i) All environmental specifications should be based on testing conducted using MIL-STD 810G procedures;
- (j) Form B Item Descriptions:
 - (i) Item No. 19(a) shall be the full body dash mount radio;
 - (ii) Item No. 19(b) shall be the microphone option available for both Item No 18(a);
 - (iii) Item No. 19(c) shall be the programming cable used to connect the radio to the windows PC;
 - (iv) Item No. 19(d) shall be the cable used to connect the radio to a handheld encryption loading device;
 - (v) Item No. 19(e) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC;

- (vi) Item No. 19(f) shall be the dual control head option. This option includes the second control head, interconnecting cable of nominally 6m, and all necessary hardware and firmware required to upgrade Item No. 18(a) and 18(b);
- (vii) Item No. 19(g) shall be optional extended warranty options available for the Item No. 19(a).

E15.4 Item No. 20 shall be a Police High Tier Encrypted remote mount mobile with accessory options and extended warranty. This full featured mobile radio offers a wide feature set, is ruggedly built and is marketed as a public safety grade radio. The radio shall contain the following features:

- (a) The mobile radios shall be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling shall be supplied,
- (b) The radio shall be supplied as a two part kit. The main radio body would be mounted separately from the control head.
- (c) A palm-type microphone shall be provided with the radio. Optional microphones and control heads should be listed as options.
- (d) A separate external speaker capable of handling the rated power out of the proposed radio models shall be provided.
- (e) The speaker must be contained in a housing sufficiently durable to prevent damage to the speaker.
- (f) All high tier mobile radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles.
- (g) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call
 - (ii) display voice talkgroup group ID or Alias
 - (iii) display the radio ID or the Alias of incoming callers
 - (iv) Project 25-compliant AES voice encryption
 - (v) Radios must be equipped with a front panel numeric keypad or optionally a handheld microphone or control head with numeric keypads to allow the user to initiate unrestricted individual calls or telephone interconnects.
 - (vi) Radios must allow reprogramming via the radio network (OTAP)
 - (vii) Radios must allow changing of encryption keys via the radio network (OTAR)
- (h) All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- (i) The mobile radio shall be powered from 12 VDC negative ground
- (j) Form B Item Descriptions:
 - (a) Item No. 20(a) shall be the remote mount radio complete with radio, remount head and interconnecting cable of approximately 7m length.
 - (b) Item No. 20(b) shall be the control head option(s) available for Item No 19(a).
 - (c) Item No. 20(c) shall be the microphone option(s) available for Item No 18(a).
 - (d) Item No. 20(d) shall be the optional remote mount cable kits in lengths different than the nominal 7m length.
 - (e) Item No. 20(e) shall be the programming cable used to connect the radio to the windows PC.
 - (f) Item No. 20(f) shall be the cable used to connect the radio to a handheld encryption loading device.
 - (g) Item No. 20(g) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
 - (h) Item No. 20(h) shall be optional extended warranty options available for the Item No. 19(a).

- E15.5 Item No. 21 shall be a Police High Tier Encrypted remote mount mobile with handheld control head, accessory options and extended warranty. This full featured mobile radio is intended to be used in covert applications and offers a wide feature set, is ruggedly built and is marketed as a public safety grade radio. The radio shall contain the following features:
- (a) The mobile radios shall be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling shall be supplied,
 - (b) The radio shall be supplied as a two part kit. The main radio body would be mounted separately from the control head.
 - (c) A hand held control head incorporating a microphone and radio controls shall be provided with the radio. Alternative control heads should be listed as options.
 - (d) A separate external speaker capable of handling the rated power out of the proposed radio models shall be provided.
 - (e) The speaker must be contained in a housing sufficiently durable to prevent damage to the speaker.
 - (f) All high tier mobile radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles.
 - (i) Additional mandatory Features:
 - (ii) Ability to initiate and receive individual call
 - (iii) display voice talkgroup group ID or Alias
 - (iv) display the radio ID or the Alias of incoming callers
 - (v) Project 25-compliant AES voice encryption
 - (vi) Radios must be equipped with a handheld control head with numeric keypads to allow the user to initiate unrestricted individual calls or telephone interconnects.
 - (vii) Radios must allow reprogramming via the radio network (OTAP)
 - (viii) Radios must allow changing of encryption keys via the radio network (OTAR)
 - (g) All temperature sensitive specifications shall be referred to +25 degrees Celsius.
 - (h) The mobile radio shall be powered from 12 VDC negative ground
 - (i) Form B Item Descriptions:
 - (i) Item No. 21(a) shall be the remote mount radio complete with radio, remount head and interconnecting cable of approximately 7m length.
 - (ii) Item No. 21(b) shall be the control head option(s) available for Item No 20(a).
 - (iii) Item No 21(c) shall be the optional remote mount cable kits in lengths different than the nominal 7m length.
 - (iv) Item No. 21(d) shall be the programming cable used to connect the radio to the windows PC.
 - (v) Item No. 21(e) shall be the cable used to connect the radio to a handheld encryption loading device.
 - (vi) Item No. 21(f) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
 - (vii) Item No. 21(g) shall be optional extended warranty options available for the Item No. 21(a).
- E15.6 Item No. 22 shall be a Police High Tier Encrypted portable with accessory options and extended warranty. This full featured portable radio offers a wide feature set, is ruggedly built and is marketed as a public safety grade radio.
- E15.6.1 The Portable radio shall be physically small enough to facilitate easy carrying by the operator. It must be self-contained in a single ruggedized housing. The radio housing shall be constructed of high impact material. It shall protect the internal circuitry from dust and moisture. The housing must meet or exceed EIA drop test requirements.

- E15.6.2 All environmental specifications should be based on testing conducted using MIL-STD 810G procedures.
- E15.6.3 The portable radio shall operate within rated specifications at temperatures as low as –30 degrees to at least +60 degrees Celsius. All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- E15.6.4 All portable radios shall be furnished with a leather swivel type carrying case which attaches to the belt.
- E15.6.5 All portable radios shall be furnished with an emergency button.
- E15.6.6 All portable radios shall be furnished with a battery capable of operating the radio for 10 hours of use using the standard 5-5-90 formula. (5% transmit, 5% receive and 90% standby)
- E15.6.7 All portable radios shall be capable of operating with a remote speaker/microphone.
- E15.6.8 All high tier portable radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles. This feature may be integral to the radio or be a function of the speaker microphone.
- E15.6.9 Additional mandatory Features:
- (a) Ability to initiate and receive individual call
 - (b) display voice talkgroup group ID or Alias
 - (c) display the radio ID or the Alias of incoming callers
 - (d) Project 25-compliant AES voice encryption
 - (e) Radios must be equipped with a front panel numeric keypad to allow the user to initiate unrestricted individual calls or telephone interconnects.
 - (f) Radios must allow reprogramming via the radio network (OTAP)
 - (g) Radios must allow changing of encryption keys via the radio network (OTAR)
- E15.6.10 All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- E15.6.11 Form B Item Descriptions:
- (a) Item No. 22(a) shall be the portable radio complete with battery, and antenna.
 - (b) Item No. 22(b) shall be the replacement batteries for Item No. 19(a). Multiple models and capacities may be offered.
 - (c) Item No. 22(c) shall be the speaker microphone Item No.19(a). The microphone shall be a coiled cord, mount securely to the body of the radio, incorporate a PTT button and emergency button.
 - (d) Item No. 22(d) shall be the single unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. Various models may be proposed. Batteries should be charged in 4 hours or less.
 - (e) Item No. 22(e) shall be multiple unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. The charger should accommodate at least 6 batteries simultaneously. The charge process of each battery pocket shall be independent of all other battery pockets. Various models may be proposed. Batteries should be charged in 4 hours or less.
 - (f) Item No. 22(f) shall be the programming cable used to connect the radio to the windows PC.
 - (g) Item No. 22(g) shall be the cable used to connect the radio to a handheld encryption loading device.
 - (h) Item No. 22(h) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.

- (i) Item No. 22(i) shall be optional extended warranty options available for the Item No. 22(a).

E15.7 Item No. 23 shall be a Fire High Tier full function dash mounted mobile with accessory options and extended warranty. This full featured mobile radio offers a wide feature set, is ruggedly built and is marketed as a public safety grade radio. The radio shall contain the following features:

- (a) The mobile radios shall be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling shall be supplied;
- (b) A palm-type microphone shall be provided with the radio. Optional microphones and control heads should be listed as options;
- (c) A separate external speaker capable of handling the rated power out of the proposed radio models shall be provided;
- (d) The speaker must be contained in a housing sufficiently durable to prevent damage to the speaker;
- (e) All high tier mobile radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles;
- (f) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call;
 - (ii) display voice talkgroup group ID or Alias;
 - (iii) display the radio ID or the Alias of incoming callers;
 - (iv) Project 25-compliant voice encryption available as standard or an option.;
 - (v) Radios must be equipped with a front panel numeric keypad or optionally a handheld microphone or control head with numeric keypads to allow the user to initiate unrestricted individual calls or telephone interconnects;
 - (vi) Radios must allow reprogramming via the radio network (OTAP);
 - (vii) Radios must allow changing of encryption keys via the radio network (OTAR);
- (g) All temperature sensitive specifications should be referred to +25 degrees Celsius;
- (h) The mobile radio shall be powered from 12 VDC negative ground;
- (i) All environmental specifications should be based on testing conducted using MIL-STD 810G procedures;
- (j) Form B Item Descriptions:
 - (i) Item No. 23(a) shall be the full body dash mount radio;
 - (ii) Item No. 23(b) shall be the microphone options available for both Item No 22(a) ;
 - (iii) Item No. 23(c) shall be the programming cable used to connect the radio to the windows PC;
 - (iv) Item No. 23(d) shall be the cable used to connect the radio to a handheld encryption loading device;
 - (v) Item No. 23(e) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC;
 - (vi) Item No. 23(f) shall be the dual control head option. This option includes the second control head, interconnecting cable of nominally 6m, and all necessary hardware and firmware required to upgrade Item No. 23(a));
 - (vii) Item No. 23(g) shall be optional extended warranty options available for the Item No. 23(a).

E15.8 Item No. 24 shall be a Fire High Tier Basic dash mounted mobile with accessory options and extended warranty. This mobile radio offers a reduced feature set compared to Item No. 23. The radio may have a reduced display functionality. This basic feature set equipped mobile radio is ruggedly built and is marketed as a public safety grade radio. The radio shall contain the following features:

- (a) The mobile radios shall be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling shall be supplied;
- (b) A palm-type microphone shall be provided with the radio. Optional microphones and control heads should be listed as options;
- (c) A separate external speaker capable of handling the rated power out of the proposed radio models shall be provided;
- (d) The speaker must be contained in a housing sufficiently durable to prevent damage to the speaker;
- (e) All high tier mobile radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles;
- (f) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call;
 - (ii) display voice talkgroup group ID or Alias;
 - (iii) display the radio ID or the Alias of incoming callers;
 - (iv) Project 25-compliant AES voice encryption available as standard or an option;
 - (v) Radios should allow the user to initiate individual calls or telephone interconnects either form a keypad or from a pre-programmed list.
 - (vi) Radios must allow reprogramming via the radio network (OTAP);
 - (vii) Radios must allow changing of encryption keys via the radio network (OTAR);
- (g) All temperature sensitive specifications should be referred to +25 degrees Celsius;
- (h) The mobile radio shall be powered from 12 VDC negative ground;
- (i) All environmental specifications should be based on testing conducted using MIL-STD 810G procedures;
- (j) Form B Item Descriptions:
 - (i) Item No. 24(a) shall be the full body dash mount radio;
 - (ii) Item No. 24(b) shall be the microphone options available for both Item No 23(a) ;
 - (iii) Item No. 24(c) shall be the programming cable used to connect the radio to the windows PC;
 - (iv) Item No. 24(d) shall be the cable used to connect the radio to a handheld encryption loading device;
 - (v) Item No. 24(e) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC;
 - (vi) Item No. 24(f) shall be the dual control head option. This option includes the second control head, interconnecting cable of nominally 6m, and all necessary hardware and firmware required to upgrade Item No. 24(a);
 - (vii) Item No. 24(g) shall be optional extended warranty options available for the Item No. 24(a).

E15.9 Item No. 25 shall be a Fire High Tier Full Feature Portable. This full featured portable radio offers a wide feature set, is ruggedly built and is marketed as a public safety grade radio. This radio should be available in a high visibility green or orange case. The radio shall contain the following features:

- (a) The Portable radio shall be physically small enough to facilitate easy carrying by the operator. It must be self-contained in a single ruggedized housing. The radio housing shall be constructed of high impact material. It shall protect the internal circuitry from dust and moisture. The housing must meet or exceed EIA drop test requirements.
- (b) The portable radio shall operate within rated specifications at temperatures as low as -30 degrees to at least +60 degrees Celsius. All temperature sensitive specifications shall be referred to +25 degrees Celsius.

- (c) The portable radio must survive NIST thermal class III testing when protected by a turnout coat.
- (d) The portable radio must survive NIST thermal class I testing when unprotected by a turnout coat.
- (e) All portable radios shall be furnished with an emergency button.
- (f) All portable radios shall be furnished with a battery capable of operating the radio for 12 hours of use using the standard 5-5-90 formula. (5% transmit, 5% receive and 90% standby)
- (g) All portable radios shall be capable of operating with a remote speaker/microphone.
- (h) All high tier portable radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles. This feature may be integral to the radio or be a function of the speaker microphone.
- (i) The radio shall be designed to allow the channel to be changed while the operator is wearing gloves.
- (j) The radio must announce all channel changes audibly.
- (k) The radio shall be submersible to 1 meter depth with no damage resulting. The radio must have a water resistance rating of at least IP-67.
- (l) The radio and battery combination must be intrinsically safe.
- (m) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call
 - (ii) display voice talkgroup group ID or Alias
 - (iii) display the radio ID or the Alias of incoming callers
 - (iv) Project 25-compliant AES voice encryption
 - (v) Radios must be equipped with a front panel numeric keypad or optionally a handheld microphone or control head with numeric keypads to allow the user to initiate unrestricted individual calls or telephone interconnects.
 - (vi) Radios must allow reprogramming via the radio network (OTAP)
 - (vii) Radios must allow changing of encryption keys via the radio network (OTAR)
- (n) All temperature sensitive specifications shall be referred to +25 degrees Celsius.

E15.9.1 Form B Item Descriptions:

- (a) Item No. 25(a) shall be the portable radio complete with battery, and antenna.
- (b) Item No. 25(b) shall be the replacement batteries for Item No. 20(a). Multiple models and capacities may be offered.
- (c) Item No. 25(c) shall be the speaker microphone Item No.20(a). The microphone shall be a coiled cord, mount securely to the body of the radio, incorporate a PTT button and emergency button. The speaker microphone and cord should survive NIST thermal class III testing
- (d) Item No 25(d) shall be the single unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. Various models may be proposed. Batteries should be charged in 4 hours or less.
- (e) Item No. 25(e) shall be multiple unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. The charger should accommodate at least 6 batteries simultaneously. The charge process of each battery pocket shall be independent of all other battery pockets. Various models may be proposed. Batteries should be charged in 4 hours or less.
- (f) Item No. 25(f) shall be the programming cable used to connect the radio to the windows PC.
- (g) Item No. 25(g) shall be the cable used to connect the radio to a handheld encryption loading device.

- (h) Item No. 25(h) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
- (i) Item No. 25(i) shall be optional extended warranty options available for the Item No. 25(a)
- (j) Item No. 25(j) shall be the accessories required to allow Item No.25(a) to be operated in conjunction with a firefighters Self-Contained Breathing apparatus (SCBA)

E15.10 Item No. 26 shall be a Fire High Tier Basic portable. This basic featured portable radio offers a wide feature set, is ruggedly built and is marketed as a public safety grade radio. This radio should be available in a high visibility green or orange case. The radio shall contain the following features:

E15.10.1 The Portable radio shall be physically small enough to facilitate easy carrying by the operator. It must be self-contained in a single ruggedized housing. The radio housing shall be constructed of high impact material. It shall protect the internal circuitry from dust and moisture. The housing must meet or exceed EIA drop test requirements.

- (a) The portable radio shall operate within rated specifications at temperatures as low as -30 degrees to at least +60 degrees Celsius. All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- (b) The portable radio must survive NIST thermal class III testing when protected by a turnout coat.
- (c) The portable radio must survive NIST thermal class I testing when unprotected by a turnout coat.
- (d) All portable radios shall be furnished with an emergency button.
- (e) All portable radios shall be furnished with a battery capable of operating the radio for 12 hours of use using the standard 5-5-90 formula. (5% transmit, 5% receive and 90% standby)
- (f) All portable radios shall be capable of operating with a remote speaker/microphone.
- (g) All high tier portable radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles. This feature may be integral to the radio or be a function of the speaker microphone.
- (h) The radio shall be designed to allow the channel to be changed while the operator is wearing gloves.
- (i) The radio must announce all channel changes audibly.
- (j) The radio shall be submersible to 1 meter depth with no damage resulting. The radio must have a water resistance rating of at least IP-67.
- (k) The radio and battery combination must be intrinsically safe.
- (l) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call
 - (ii) display voice talkgroup group ID or Alias
 - (iii) Project 25-compliant AES voice encryption available The Bidder must make it available either as an optional add on feature or included as part of the standard product;
 - (iv) Radios must allow reprogramming via the radio network (OTAP)
 - (v) Radios must allow changing of encryption keys via the radio network (OTAR)
- (a) All temperature sensitive specifications shall be referred to +25 degrees Celsius.

E15.10.2 Form B Item Descriptions:

- (a) Item No. 26(a) shall be the portable radio complete with battery, and antenna.

- (b) Item No. 26(b) shall be the replacement batteries for Item No. 21(a). Multiple models and capacities may be offered.
 - (c) Item No. 26(c) shall be the speaker microphone Item No.21(a). The microphone shall be a coiled cord, mount securely to the body of the radio, incorporate a PTT button and emergency button. The speaker microphone and cord should survive NIST thermal class III testing.
 - (d) Item No 26(d) shall be the single unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. Various models may be proposed. Batteries should be charged in 4 hours or less.
 - (e) Item No. 26(e) shall be multiple unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. The charger should accommodate at least 6 batteries simultaneously. The charge process of each battery pocket shall be independent of all other battery pockets. Various models may be proposed. Batteries should be charged in 4 hours or less.
 - (f) Item No. 26(f) shall be the programming cable used to connect the radio to the windows PC.
 - (g) Item No. 26(g) shall be the cable used to connect the radio to a handheld encryption loading device.
 - (h) Item No. 26(h) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
 - (i) Item No. 26(i) shall be optional extended warranty options available for the Item No. 26(a)
 - (j) Item No. 26(j) shall be the accessories required to allow Item No.26(a) to be operated in conjunction with a firefighters Self-Contained Breathing apparatus (SCBA)
- E15.11 Item No. 27 shall be a Mid-Tier Mobile. This mobile radio offers a reduced feature set compared to Item No. 18. The radio may have a reduced display functionality. This radio is ruggedly built and is marketed as a public safety grade radio. The radio should contain the following features:
- (a) The mobile radios should be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling should be supplied,
 - (b) The radio should be available in both a full body style and a remote mount
 - (c) A palm-type microphone should be provided with the radio. Optional microphones and control heads should be listed as options.
 - (d) A separate external speaker capable of handling the rated power out of the proposed radio models should be provided.
 - (e) The speaker should be contained in a housing sufficiently durable to prevent damage to the speaker.
 - (f) All mid-tier mobile radios should include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles. This feature may be available either as an optional module or included as standard feature.
 - (g) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call
 - (ii) display voice talkgroup group ID or Alias
 - (iii) Project 25-compliant AES voice encryption should be available as standard or as an option.
 - (iv) Radios must be equipped with a front panel numeric keypad or optionally a handheld microphone or control head with numeric keypads to allow the user to initiate unrestricted individual calls or telephone interconnects.
 - (v) Radios must allow reprogramming via the radio network (OTAP)

- (vi) Radios must allow changing of encryption keys via the radio network (OTAR)
- (h) All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- (i) The mobile radio shall be powered from 12 VDC negative ground

E15.11.1 Form B Item Descriptions:

- (a) Item No. 27(a) shall be the full body radio
- (b) Item No. 27(b) shall be the remote mount radio complete with radio, remount head and interconnecting cable of approximately 7m lengthy.
- (c) Item No. 27(c) shall be the control head option available for both Item No's 27(a) and 27(b).
- (d) Item No. 27(d) shall be the microphone option available for both Item No's 27(a) and 27(b).
- (e) Item No 27(e) shall be the optional remote mount cable kits in lengths different than the nominal 7m length.
- (f) Item No. 27(f) shall be the programming cable used to connect the radio to the windows PC.
- (g) Item No. 27(g) shall be the cable used to connect the radio to a handheld encryption loading device.
- (h) Item No. 27(h) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
- (i) Item No. 27(i) shall be optional extended warranty options available for the Item No. 27(a) and 27(b)

E15.12 Item No. 28 shall be a Low Tier Basic Mobile. This radio offers a limited feature set, with basic functionality. The radio shall contain the following features:

- (a) The mobile radios shall be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling shall be supplied,
- (b) The radio shall be available in a full body style
- (c) A palm-type microphone shall be provided with the radio. Optional microphones and control heads should be listed as options.
- (d) A separate external speaker capable of handling the rated power out of the proposed radio models shall be available as an option..
- (e) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call
 - (ii) Ability originate and receive group calls
 - (iii) display voice talkgroup group ID or Alias
- (f) All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- (g) The mobile radio shall be powered from 12 VDC negative ground

E15.12.1 Form B Item Descriptions:

- (a) Item No. 28(a) shall be the full body radio
- (b) Item No. 28(b) shall be the control head option available for Item No 28(a).
- (c) Item No. 28(c) shall be the microphone option available for Item No 28(a).
- (d) Item No. 28(d) shall be the programming cable used to connect the radio to the windows PC.
- (e) Item No. 28(e) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.

- (f) Item No. 28(f) shall be optional extended warranty options available for the Item No. 28(a).

E15.13 Item No. 29 shall be a Low Tier Basic Portable. This portable radio offers a limited feature set,

E15.13.1 The Portable radio shall be physically small enough to facilitate easy carrying by the operator. It must be self-contained in a single ruggedized housing. The radio housing shall be constructed of high impact material. It shall protect the internal circuitry from dust and moisture. The housing must meet or exceed EIA drop test requirements.

E15.13.2 The portable radio shall operate within rated specifications at temperatures as low as -30 degrees to at least +60 degrees Celsius. All temperature sensitive specifications shall be referred to +25 degrees Celsius.

E15.13.3 All portable radios shall be furnished with a case or clip which attaches to the belt.

E15.13.4 All portable radios shall be furnished with an emergency button.

E15.13.5 All portable radios shall be furnished with a battery capable of operating the radio for 8 hours of use using the standard 5-5-90 formula. (5% transmit, 5% receive and 90% standby)

E15.13.6 All portable radios shall be capable of operating with a remote speaker/microphone.

E15.13.7 Additional mandatory Features:

- (a) Ability to initiate and receive individual call
- (b) Ability to initiate and receive group calls
- (c) display voice talkgroup group ID or Alias
- (a) All temperature sensitive specifications shall be referred to +25 degrees Celsius.

E15.13.8 Form B Item Descriptions:

- (a) Item No. 29(a) shall be the portable radio complete with battery, and antenna.
- (b) Item No. 29(b) shall be the replacement batteries for Item No. 23(a). Multiple models and capacities may be offered.
- (c) Item No. 29(c) shall be the speaker microphone Item No. 29(a). The microphone shall be a coiled cord, mount securely to the body of the radio and incorporate a PTT button.
- (d) Item No. 29(d) shall be the single unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. Various models may be proposed. Batteries should be charged in 4 hours or less.
- (e) Item No. 29(e) shall be multiple unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. The charger should accommodate at least 6 batteries simultaneously. The charge process of each battery pocket shall be independent of all other battery pockets. Various models may be proposed. Batteries should be charged in 4 hours or less.
- (f) Item No. 29(f) shall be the programming cable used to connect the radio to the windows PC.
- (g) Item No. 29(g) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
- (h) Item No. 29(h) shall be optional extended warranty options available for the Item No. 29(a).

E15.14 Item No. 30 shall be a Specialty Radio - Marine Mobile. This mobile radio is designed to be mounted on a watercraft and subject to moisture. It will be ruggedly built and is marketed as a public safety grade radio. The radio shall contain the following features:

- (a) The mobile radios shall be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling shall be supplied,
- (b) The radio shall be available in both a full body style and a remote mount with a preference for remote mount configurations.
- (c) A palm-type microphone shall be provided with the radio. Optional microphones and control heads should be listed as options.
- (d) A separate external speaker capable of handling the rated power out of the proposed radio models shall be provided.
- (e) The speaker must be contained in a weather proof housing sufficiently durable to prevent damage to the speaker.
- (f) The radio and or the control head shall be suitable for exposure to the elements. It must be water resistant and submersible to at least IP67 standards.
- (g) All high tier mobile radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles.
- (h) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call
 - (ii) display voice talkgroup group ID or Alias
 - (iii) display the radio ID or the Alias of incoming callers
 - (iv) Project 25-compliant AES voice encryption
 - (v) Radios must allow reprogramming via the radio network (OTAP)
 - (vi) Radios must allow changing of encryption keys via the radio network (OTAR)
- (i) All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- (j) The mobile radio shall be powered from 12 VDC negative ground

E15.14.1 Form B Item Descriptions:

- (a) Item No. 30(a) shall be the full body radio
- (b) Item No. 30(b) shall be the remote mount radio complete with radio, remount head and interconnecting cable of approximately 7m lengthy.
- (c) Item No. 30(c) shall be the control head option available for both Item No's 30(a) and 30(b).
- (d) Item No. 30(d) shall be the microphone option available for both Item No's 30(a) and 30(b).
- (e) Item No. 30(e) shall be the programming cable used to connect the radio to the windows PC.
- (f) Item No. 30(f) shall be the cable used to connect the radio to a handheld encryption loading device.
- (g) Item No. 30(g) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
- (h) Item No. 30(h) shall be optional extended warranty options available for the Item No. 30(a) and 30(b).

E15.15 Item No. 31 shall be a Specialty Radio - Aeronautical mobile. This mobile radio is designed to be mounted in either a fixed wing or helicopter style aircraft. It will be ruggedly built and is marketed as a public safety grade radio. The radio shall contain the following features:

- (a) The mobile radios shall be supplied with all necessary mounting hardware for a complete installation. All radio controls and inter-cabling shall be supplied,

- (b) The radio shall be available in both a full body style and a remote mount with a preference for remote mount configurations.
- (c) The radio must be capable of being interface with the cockpit communication system. Transmit and receive audio along with PTT must be readily available on an external radio interface.
- (d) The radio and any control head shall be certified for use in aircraft.
- (e) All high tier mobile radios must include a GPS feature whereby the latitude and longitude of the radio will be transmitted to the dispatch consoles.
- (f) Additional mandatory Features:
 - (i) Ability to initiate and receive individual call
 - (ii) display voice talkgroup group ID or Alias
 - (iii) display the radio ID or the Alias of incoming callers
 - (iv) Project 25-compliant AES voice encryption
 - (v) Radios must allow reprogramming via the radio network (OTAP)
 - (vi) Radios must allow changing of encryption keys via the radio network (OTAR)
- (g) All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- (h) The mobile radio shall be powered from 12 VDC negative ground

E15.15.1 Form B Item Descriptions:

- (a) Item No. 31(a) shall be the full body radio
- (b) Item No. 31(b) shall be the remote mount radio complete with radio, remount head and interconnecting cable of approximately 7m lengthy.
- (c) Item No. 31(c) shall be the control head option available for both Item No's 31(a) and 31(b).
- (d) Item No. 31(d) shall be the microphone option available for both Item No's 31(a) and 31(b).
- (e) Item No. 31(e) shall be the programming cable used to connect the radio to the windows PC.
- (f) Item No. 31(f) shall be the cable used to connect the radio to a handheld encryption loading device.
- (g) Item No. 31(g) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
- (h) Item No. 31(h) shall be optional extended warranty options available for the Item No. 31(a) and 31(b).

E15.16 Item No. 32 shall be a High Tier covert portable radio. This radio offers a basic feature set, has a minimum number of external controls and is intended to be concealed or disguised when in use. It shall interface to covert ear pieces and PTT devices

E15.16.1 The Portable radio shall be physically small enough to facilitate easy concealment by the operator. It must be self-contained in a single housing. The radio housing shall be constructed of high impact material. It shall protect the internal circuitry from dust and moisture.

E15.16.2 The portable radio shall operate within rated specifications at temperatures as low as -30 degrees to at least +60 degrees Celsius. All temperature sensitive specifications shall be referred to +25 degrees Celsius.

E15.16.3 All portable radios shall be furnished with a battery capable of operating the radio for 8 hours of use using the standard 5-5-90 formula. (5% transmit, 5% receive and 90% standby)

- E15.16.4 All portable radios shall be capable of with a variety of covert earpieces, microphones and PTT devices.
- E15.16.5 All GPS feature is desirable but not a mandatory requirement
- E15.16.6 Additional mandatory Features:
- (a) Visually or audibly indicate selected talkgroups
 - (b) Project 25-compliant AES voice encryption
 - (c) Radios must allow reprogramming via the radio network (OTAP)
 - (d) Radios must allow changing of encryption keys via the radio network (OTAR)
 - (a) All temperature sensitive specifications shall be referred to +25 degrees Celsius.
- E15.16.7 Form B Item Descriptions:
- (a) Item No. 32(a) shall be the portable radio complete with battery, and antenna.
 - (b) Item No. 32(b) shall be the replacement batteries for Item No. 32(a). Multiple models and capacities may be offered.
 - (c) Item No. 32(c) shall be covert earpiece. Magnetic loop, wired and Bluetooth connectivity are acceptable.
 - (d) Item No. 32(d) shall be covert microphones. These may be integrated with Item No. 32(c) or standalone devices.
 - (e) Item No. 32(e) shall be covert PTT switches. These may be integrated with Items No 32(c) and 32(d) or standalone devices.
 - (f) Item No. 32(f) shall be the single unit battery charger compatible with the supplied battery. The charger should allow charging of batteries both on and off the radio. Various models may be proposed. Batteries should be charged in 4 hours or less.
 - (g) Item No. 32(g) shall be the programming cable used to connect the radio to the windows PC.
 - (h) Item No. 32(h) shall be the cable used to connect the radio to a handheld encryption loading device.
 - (i) Item No. 32(i) shall be the radio programming software. The software should allow the technician to program all the radio features. The software must run on a Windows-based PC.
 - (j) Item No. 32(j) shall be optional extended warranty options available for the Item No. 32(a).
- E15.17 Item No. 33 shall be a mobile repeater. This device shall be vehicular mounted and provide extended transmit and receive range for on scene portable radios. Audio signals from the Wide area trunked system shall be rebroadcast by this device within the 700/800 MHz band. Similar, this device will receive the signals from within the local vicinity and rebroadcast these signal on a selected talkgroup in the wide area network. This device shall meet the following requirements
- (a) Shall be powered by a 12 VDC negative ground vehicular power system.
 - (b) Shall be P25 phase 1 compatible and should be upgradable via firmware or software to Phase 2.
 - (c) Shall pass emergency signals from portables to dispatch.
 - (d) Shall pass radio ID numbers of portable radios to dispatch.
 - (e) Shall pass AES encryption without the need to re-code.
- E15.18 Item No 34 shall be a firmware flash kit to upgrade Motorola XTS2500 portable radios, model H46UCH9PW7BN to P25 trunking phase 1.
- E15.19 Item No 35 shall be a firmware flash kit to upgrade Motorola XTL2500 mobile radios, model M21URM9PW1AN to P25 trunking phase 1.

E15.20 Item No 36 shall be a firmware flash kit to upgrade Motorola XTS5000 portable radios, model H18UCH9PW7AN to P25 trunking phase 1.

E15.21 Item No 37 shall be a firmware flash kit to upgrade Motorola XTL5000 mobile radios, model M20URS9PW1AN to P25 trunking phase 1.

E16. SECTION D DISPATCH CONSOLES SPECIFICATIONS

E16.1 Unless otherwise specifically noted, the following specifications E16.2 to E16.43 shall apply to Items No. 38 to 45.

E16.2 The system shall support dispatch console operation on a system wide basis.

E16.3 All dispatch consoles must meet the current P25 CSSI standard.

E16.4 The dispatch consoles are of three types: normal, supervisory, and remote consoles.

E16.5 Console connectivity to the network controller shall use a direct IP interface, allowing consoles to be located wherever IP network connectivity is present.

E16.6 Optional software features for the dispatch console shall be field programmable through changes in firmware or software. Adding or deleting modules and changing module names shall be software programmable.

E16.7 Dispatch console equipment shall be powered from 115 VAC at 60 Hz.

E16.8 The dispatch console shall not be affected by temporary power loss and each console position shall be supplied with an uninterruptible power supply (UPS) that supports approximately two (2) hours of backup operation in case of power failure.

E16.9 The computer for the console shall be supplied with an LCD touch screen monitor of not less than 23" diagonal.

E16.10 A dual headset jack shall be included.

E16.11 A single footswitch made with a high durability material shall be included to provide PTT for the headset. The footswitch shall be heavy-duty and non-skidding.

E16.12 The console shall support at least one select audio speaker and at least one unselect audio speaker. The speakers and necessary cabling shall be included.

E16.13 The supervisory console shall physically be the same as other consoles except that it has been programmed to have supervisory capabilities. The supervisory console shall have the same features as a normal dispatch console, with the following additions:

(a) The supervisory console shall be able to listen to any of a programmed individual entity radio calls.

(b) The supervisory console should be able to display an emergency declared on an unprogrammed talk group.

(c) The supervisory console shall be able to disable a non-supervisory console.

E16.14 The remote console shall be a self-contained device that provides a subset of the Supervisor and Dispatch Console functionality. This device can be deployed at temporary locations, to provide Dispatch console functionality.

E16.15 The console application shall run on the Windows-based operating system, Windows 7, Server 2008 R2, or later versions. The console shall be software driven to allow for access to future features and technologies.

E16.16 The console shall be easy for a properly trained dispatcher to use. It shall enable the dispatcher to perform dispatch tasks efficiently and with minimal confusion due to screen clutter. The

displays on the monitor shall have clearly distinguishable words so that there is no confusion over the operation function of a particular button. The process of maneuvering through functions on the screen shall be possible through the mouse or touch screen.

- E16.17 The Supervisor and Dispatch consoles shall be able to support up to ten user-defined screen set-ups (appearances) to enable each dispatch shift to set its own screen appearance. These screen appearances shall be pre-configurable and selectable by the dispatcher.
- E16.18 The clock shall display in 12-hour format or 24-hour format.
- E16.19 The console should have a dedicated display panel for system related messages. These messages shall include information regarding emergencies, console set-up, patch, and simulselect.
- E16.20 The console shall display in a dedicated panel the individual unit alias with whom the dispatcher is conversing.
- E16.21 The console shall display the console identification number.
- E16.22 The display and operation of the command buttons shall be independent of the display and operation of the page/modules. The console shall allow the flexibility of having operations commands display in combination with any screen. The screen and command button labels shall be displayed with distinguishable text.
- E16.23 The consoles shall support and display audio communications modules, where a module is defined as a visual icon space that includes various controls and indicators relevant to support audio communications.
- E16.24 A module shall be programmable to support communication with one or more entities, which could include:
- (a) a trunking talkgroup
 - (b) an individual call
 - (c) a conventional channel
 - (d) another console
 - (e) status (inbound data messaging)
 - (f) paging (outbound data messaging)
 - (g) auxiliary I/O (bi-directional data messaging)
- E16.25 The Supervisor and Dispatch consoles shall support a minimum of 100 different modules. If a module is in use at one console, a busy indicator shall be displayed at the other consoles in the system.
- E16.26 For received calls, an alias (alpha-numeric representation of the radio terminal) shall be displayed in the appropriate module.
- E16.27 The Supervisor and Dispatch consoles shall permit the operator to monitor call activity using up to four separate speakers, one for select audio and the others for unselect audio. The console shall permit the dispatcher to route any module to the speakers.
- E16.28 Each module shall have its own volume adjustment. The console shall be capable of muting individual modules or all unselected modules.
- E16.29 The console shall be able to display the call history of a particular module. The call history display shall place the most recent call at the top of a scrollable list of up to five entries. The console shall also be able to display a comprehensive call history for each module including up to 64 most recent calls.

- E16.30 The console shall support patches, which involves temporarily combining two or more modules. A patch merges the entities into a super group, such that each member hears every other member.
- E16.31 Each console shall be able to support up to five patches with up to 15 entities (groups and/or channels) each. All entities patched together shall be able to communicate with one another. The console shall support pre-configured patches.
- E16.32 The console shall support simulselect, which involves temporarily combining the receive audio of two or more modules at the console. This feature also allows the console operator to simultaneously transmit on each module included in the Simulselect.
- E16.33 Each Supervisor and Dispatch consoles shall be able to support up to four Simulselects with up to 15 entities or modules each. The dispatcher shall be able to communicate with all entities contained in a single Simulselect. The console shall support pre-configured simulselects in conjunction with the simulselect feature support within the Project 25 conventional/conventional system.
- E16.34 The console shall be capable of selectively muting the transmit audio from other consoles.
- E16.35 For consoles connected to the same switch, two console operators shall be able to communicate with one another through an intercom feature. No RF channel shall be utilized during the inter-console communication.
- E16.36 When a mobile or portable radio activates the emergency button feature, the console shall give both visual and audible alerts. The console module and screen page containing the module with the emergency shall be highlighted so as to distinguish it from other modules.. The module and the call history shall display the alias of the unit declaring the emergency. Further, the emergency shall be displayed in the system information panel.
- E16.37 If an emergency is declared when another emergency already exists:, the response of the console with vary as follows:
- (a) Same group: If the original emergency has not been acknowledged, the console shall display a counter with the emergency message to indicate the number of emergencies for the same group. The declaring alias shall be displayed in the appropriate call history display.
 - (b) Different group: The new emergency shall also be declared and shall exist with the original emergency. Both modules shall be red. The declaring alias shall be displayed in the appropriate call history display. The emergency message shall correspond to the most recently declared emergency.
- E16.38 The console shall be able to interface to equipment to support a telephone patch. Audio shall be routed between a selected module and the selected telephone line. The console operator shall be capable of hearing both the telephone audio and the radio audio. The console shall be able to display whether or not the console is involved in a phone conversation.
- E16.39 The console shall be able to control conventional channels and (in conjunction with a conventional base station that supports these functions) provide the following functions:
- (a) Select the station's transmit/receive frequency pair from a pre-defined list.
 - (b) Enable the base station to repeat radio-originated audio.
 - (c) Enable the base station to be controlled by remote controller.
 - (d) Enable scan of selected channels of a multi-channel base station.
 - (e) Enable toggling between main conventional base stations and standby conventional base stations.
- E16.40 The console operator and the conventional channel shall be able to use a high fidelity PCM vocoder (i.e. ADPCM) that can carry complex paging plans (outbound calls) and preserve voice

quality in marginal RF conditions on the analog channel on inbound calls to the console and logging recorders. The system shall provide a capability to convert these calls into a format that allows the P25 radios to monitor the calls on these interoperability groups.

- E16.41 The console shall provide for the integration of voice logging recorders.
- E16.42 The console shall visually notify the dispatcher of a link failure to the console switch.
- E16.43 The console should have a means to activate an external lamp that would be used to indicate the console is transmitting. Preference will be given to dry relay contacts
- E16.44 Form B Descriptions:
 - (a) Item No. 38 shall be the Supervisor console system.
 - (b) Item No. 39 shall be the Dispatch Console System
 - (c) Item No. 40 shall be the Remote Console System
 - (d) Item No. 41 shall be Annual Maintenance Agreement
 - (e) Item No. 42 shall be Installation Services. This should include, unpacking, installation and setup, and acceptance testing.
 - (f) Item No. 43 shall be end user training
 - (g) Item No. 44 shall be Administrator training
 - (h) Item No. 45 shall be Support Staff training;

E17. SECTION E PTT VIA WIRELESS DATA DEVICE

- E17.1 Unless otherwise specifically noted, the following specifications E17.2 to E17.23 shall apply to Items No. 46 to 54.
- E17.2 The City of Winnipeg is seeking a solution that extends P25 LMR Push-to-Talk (PTT) communication services to users on commercial cellular, Wi-Fi and private LTE broadband networks.
- E17.3 This solution should delivers voice communication services to subscribers as Voice-over-IP data packets using wireless broadband IP data services.
- E17.4 This solution allows users on cellular or Public Safety LTE broadband networks to communicate amongst themselves, or with LMR users.
- E17.5 The Solution should extend LMR functionality by also providing integrated voice, messaging, and location functionality.
- E17.6 The Solution should provide end-to-end encryption if used on the P25 network.
- E17.7 Transmitted voice and text messages are communicated in real-time between the LMR network and the broadband data network. The processing and latency of voice or data messages in either directions shall be less than 1 second.
- E17.8 The Solution should provide the ability to map and provide presence of both cell-phone users and radio users.
- E17.9 The cellular device should use a P25 Native AMBE vocoder resident in the application.
- E17.10 The Solution should be integrated with the P25 LMR switch. This integration allows for superior PTT speed and voice quality.
- E17.11 The cellular device Application should allow users to scan a minimum of 16 P25 Talkgroups with Priority and Pre-emption.
- E17.12 The cellular device application should support Late call entry.

- E17.13 The cellular device should be an off the shelf product with compatibility on Android, iOS, and MS Windows PC platforms. Proprietary devices, or devices built specifically for this application, will be considered but will be evaluated accordingly.
- E17.14 Administration of the cellular devices and P25 radios should be from the same interface. For example, supports Over-Air-Provisioning (Talk Groups and Personality pushed to the application over-the-air by the administrator).
- E17.15 The cellular device should support street maps and satellite views. This device should be location enabled such that the user's current position is made available to the dispatch consoles and to other cellular devices appropriately equipped
- E17.16 The cellular device and application users should be able to switch between the PTT application and other applications on the cellular device with ease.
- E17.17 PTT application does not have to be in the foreground of the phone in order to use PTT, or for incoming audio to be heard.
- E17.18 The cellular device and application should support Blue-tooth accessories including covert microphone (for undercover operations) and shoulder microphone.
- E17.19 The cellular device and application should support Group and individual voice calls.
- E17.20 The cellular device and application should provide Instant call recording on phone
- E17.21 The cellular device and application should allow for the sending and receiving of Text Messaging between other cellular devices and P25 radios
- E17.22 The cellular device and application should provide Emergency distress signalling to and from the P25 system.
- E17.23 The cellular device and application should automatically switch between Wi-Fi networks and cellular networks
- E17.24 Form B Descriptions:
- (a) Item No. 46 shall be Hardware Interface. This would include all necessary hardware, cabling and installation to interface with the P25 Radio core and the cellular/wireless networks..
 - (b) Item No. 47 shall be Software Interface. This would include all necessary applications, and installation as required to interface with the P25 Radio core and the cellular/wireless networks. This would also include all management and administration functions required to support this solution.
 - (c) Item No. 48 shall be the Portable Device Application. This application resides on the cellular device and enables the PTT functionality. Licenses for the application shall be transferable from device to device.
 - (d) Item No. 49 shall be the portable cellular devices. More than one device may be proposed.
 - (e) Item No. 50 shall be Annual Maintenance Agreement. This support shall cover telephone support, software upgrades and availability of spare hardware with priority shipping.
 - (f) Item No. 51 shall be Installation Services. This should include, unpacking, installation and setup, and acceptance testing.
 - (g) Item No. 52 shall be end user training.
 - (h) Item No. 53 shall be Administrator training. This training shall allow all designated City of Winnipeg administrators the ability to provision, suspend and configure the P25 network and cellular devices as required.
 - (i) Item No. 54 shall be Support Staff training. This training shall allow City of Winnipeg technical and IT staff to support and maintain this solution.

PART F - SECURITY CLEARANCE

F1. SECURITY CLEARANCE FOR SECTIONS A, B, D AND E

- F1.1 The City will conduct a Security Clearance Check, for any individual proposed to perform Work under the Contract at Winnipeg Police Service facilities.
- F1.2 The Contractor shall provide the Contract Administrator with a list of individuals proposed to perform Work under the Contract at Winnipeg Police Service facilities:
- (a) within five (5) Business Days of the Award of Contract; or
 - (b) in the case of additional or replacement individuals during the term of the Contract, at least thirty (30) Calendar Days before each individual is proposed to commence Work at Winnipeg Police Service facilities.
- F1.3 Each individual proposed to perform Work under the Contract at Winnipeg Police Service facilities shall provide:
- (a) A list of names (including maiden names), addresses, dates of birth, and telephone numbers and occupations of all immediate family members (including parents) and their spouses/common law. Include your spouse/common law boyfriends, girlfriends and their family members. This includes stepbrothers, stepsisters, half-brothers and half-sisters. This list should be typed in the following format:

John James SMITH	Dob: 45 Aug 24 (father)
123 Anywhere Street	555-555-5555
Winnipeg, Manitoba	
 - (b) A list of names, dates of birth, addresses and telephone numbers and occupations of at least four (4) of your closest friends. This list should be typed in the following format:

John James SMITH	Dob: 45 Aug 24 (father)
123 Anywhere Street	555-555-5555
Winnipeg, Manitoba	
 - (c) The name of the immediate supervisor title or position within their organization, and telephone number, mailing address and email address.
 - (d) A list of all past addresses.
 - (e) Photocopies to two valid pieces of identification:
 - (i) valid photo driver's license,
 - (ii) valid passport or,
 - (iii) birth certificate.
 - (f) A completed Form P-608: Security Clearance Check authorization form. Form P-608 must be signed and dated.
 - (i) Signature of Witness shall be signed by the contact person stated on Paragraph 3 Form A: Bid.
- F1.4 Each individual shall submit the required information and form to the Winnipeg Police Service Division 30 Clerk at Main Floor, 151 Princess Street:
- (a) within five (5) Business Days of the Award of Contract; or
 - (b) in the case of an additional or replacement individual during the term of the Contract, at least thirty (30) Calendar Days before the individual is proposed to commence Work at Winnipeg Police Service facilities.
- F1.5 Any individual for whom a satisfactory Level Two Security Clearance is not obtained will not be permitted to perform any Work within Winnipeg Police Service facilities.
- F1.6 Any satisfactory Security Clearance obtained thereby will be deemed valid for one (1) year from the date of clearance, subject to a repeated Security Clearance Check as hereinafter specified.

(a) Each individual doing Work in a Winnipeg Police Service Facility shall provide photo identification upon entry, in order that their Level Two security clearance can be verified.

F1.7 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require a further Security Clearance Check. Any individual who fails to obtain a satisfactory Security Clearance Check as a result of a repeated Security Clearance Check will not be permitted to continue to perform Work under the Contract at Winnipeg Police Service Facilities.

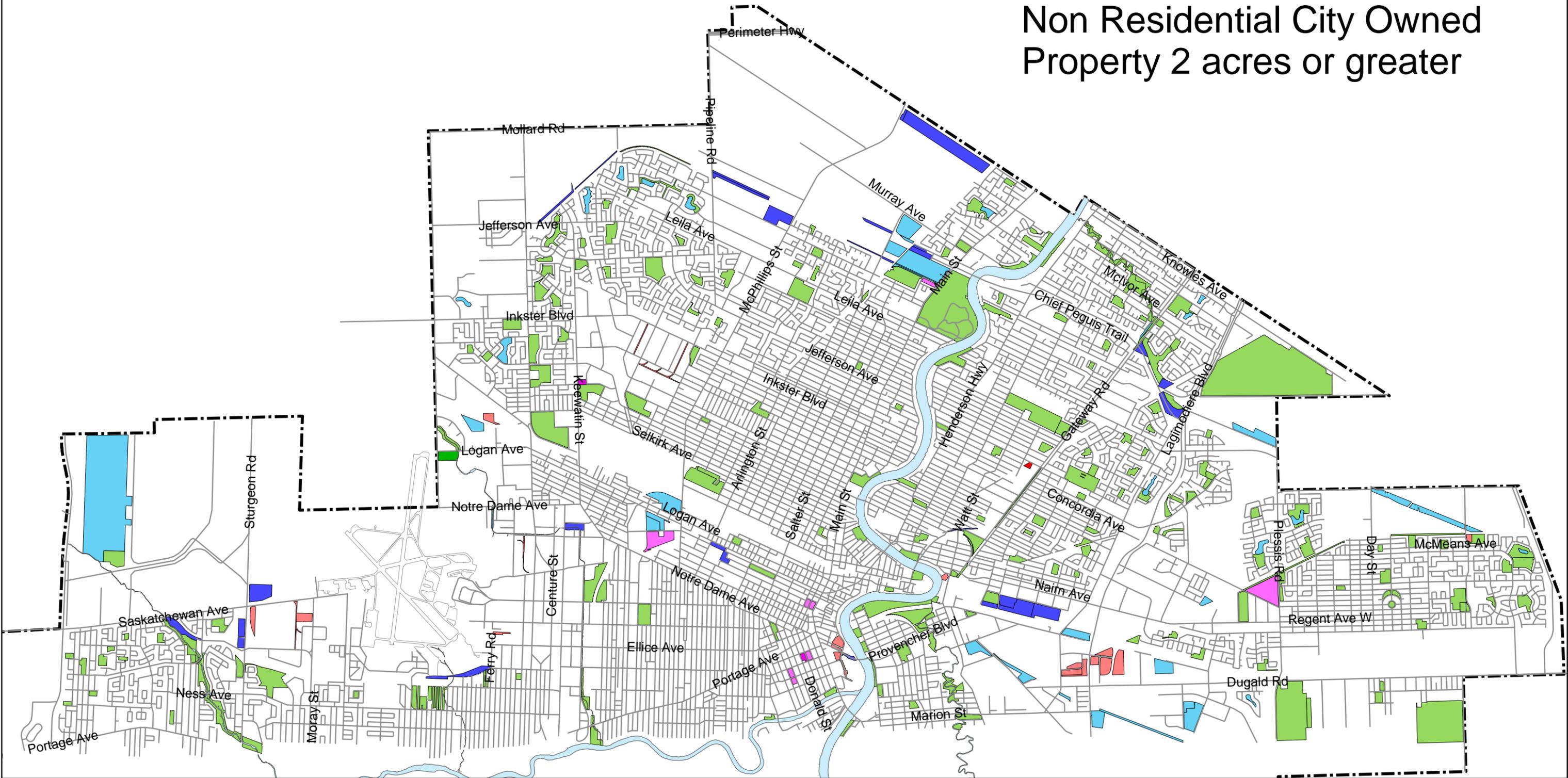
F1.8 Any individual who fails to obtain a satisfactory Security Clearance Check may request reconsideration by writing to:
Winnipeg Police Service
Division 30 Services
Attn: Service Security Officer
151 Princess Street
Winnipeg, Manitoba
R3B 1L1

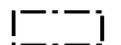
APPENDIX A CURRENT CITY OF WINNIPEG RADIO SITES AVAILABLE FOR USE

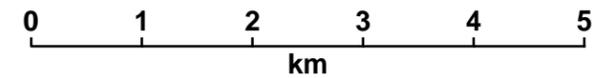
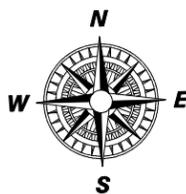
SITE:	1541 WAVERLY
ADDRESS:	1541 WAVERLY ST WINNIPEG MANITOBA
SITE ELEVATION:	228 (M)
LATITUDE:	49-49-14.2 N
LONGITUDE:	97-10-57.4 W
TOWER HEIGHT:	105.7 (M)
WIDTH AT BOTTOM:	0.89 (M)
WIDTH AT TOP:	0.89 (M)
TOWER TYPE:	GUYED MAST, TRIANGULAR
CONNECTIONS:	WELDED
FALL ARREST SYSTEM:	3/8" SOLID CORE CABLE
LIGHTING TYPE:	RED BEACON & DOL
TOWER MANUFACTURER:	LE BLANC & ROYLE
TOWER ERECTOR:	LE BLANC & ROYLE
DATE OF COMPLETION:	1998

SITE:	288 PORTAGE
ADDRESS:	288 PORTAGE AVE WINNIPEG MANITOBA
SITE ELEVATION:	226 (M)
LATITUDE:	49-53-35.0 N
LONGITUDE:	97-8-33.0 W
TOWER HEIGHT:	30.0 (M)
WIDTH AT BOTTOM:	0.52 (M)
WIDTH AT TOP:	0.52 (M)
TOWER TYPE:	ROOFTOP GUYED, TRIANGULAR
CONNECTIONS:	WELDED
FALL ARREST SYSTEM:	NO FALL ARREST ON TOWER
LIGHTING TYPE:	DOL ONLY
TOWER MANUFACTURER:	UNKNOWN
TOWER ERECTOR:	UNKNOWN
DATE OF COMPLETION:	UNKNOWN EARLIER THAN 1978

Non Residential City Owned Property 2 acres or greater



- | | | | |
|---|-------------------|---|---------------|
|  | Cemetery |  | Park |
|  | Civic Office/Yard |  | Streets |
|  | Emergency Service |  | Water & Waste |
|  | Library/Museum |  | City Limit |
|  | PPD | | |



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ZONING	AREA IN ACRES	PARCEL_DESC	LONGITUDE	LATITUDE
M3	2	Water & Waste	-97:04:40.0905	49:53:03.4
PR1	2	Park	-97:18:23.1081	49:53:50.4
PR1	2	Park	-97:04:18.8616	49:55:38.9
PR1	2	Park	-97:03:24.3928	49:56:36.3
M2	2	Streets	-97:06:38.7296	49:57:19.0
PR1	2	Park	-97:04:10.9318	49:56:10.3
PR1	2	Park	-97:05:09.9084	49:54:37.1
PR1	2.1	Park	-97:04:58.7949	49:57:12.3
PR1	2.1	Park	-97:07:28.2886	49:56:52.7
PR1	2.1	Park	-97:08:12.1983	49:57:31.2
M	2.1	Civic Office/Yard	-97:08:38.5593	49:53:16.4
PR1	2.1	Park	-97:01:13.3057	49:54:37.2
PR2	2.1	Park	-97:06:01.9591	49:54:32.4
PR2	2.1	Park	-97:06:00.0385	49:54:30.7
PR1	2.1	Water & Waste	-96:57:56.3265	49:54:19.1
PR1	2.2	Park	-97:06:04.3913	49:54:19.5
PR1	2.2	Park	-97:06:08.0034	49:54:16.9
M1	2.2	Streets	-97:06:09.1990	49:54:39.4
M1	2.2	Streets	-97:06:21.5683	49:54:38.5
PR1	2.2	Park	-97:04:28.2500	49:54:12.8
A	2.2	Water & Waste	-97:06:50.5361	49:57:24.5
PR1	2.2	Park	-97:11:36.1196	49:52:57.2
PR1	2.2	Park	-96:59:52.8371	49:53:51.0
PR1	2.2	Park	-97:00:01.8239	49:54:22.9
PR1	2.2	Park	-97:15:02.9230	49:53:14.7
PR1	2.2	Park	-97:18:37.0431	49:53:43.5
PR2	2.2	Park	-97:12:40.0461	49:53:22.8
PR2	2.3	Park	-97:09:50.7642	49:55:45.1
M1	2.3	Emergency Service	-97:05:09.0413	49:55:14.8
C2	2.3	Streets	-97:06:50.3035	49:58:34.7
M2	2.3	Park	-97:06:33.8346	49:54:00.4
M2	2.3	PPD	-97:10:10.9666	49:56:20.6
M2	2.3	PPD	-97:10:45.7990	49:56:31.8
PR1	2.3	Park	-97:19:16.1518	49:53:13.4
PR1	2.4	Park	-97:04:58.8295	49:57:27.3
PR1	2.4	Water & Waste	-97:03:22.9956	49:56:28.8
C	2.4	Streets	-97:07:58.7923	49:53:32.8
C	2.4	PPD	-97:08:01.0808	49:53:34.5
C3	2.4	Park	-97:06:15.7789	49:54:14.8
C	2.4	Civic Office/Yard	-97:08:25.3086	49:54:00.2
PR1	2.4	Park	-97:18:26.4346	49:53:38.1
M2	2.4	PPD	-97:12:33.3257	49:54:31.7
C3	2.4	PPD	-97:06:24.2926	49:54:13.0

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ZONING	AREA IN ACRES	PARCEL_DESC	LONGITUDE	LATITUDE
PR1	2.4	Park	-97:02:50.0968	49:54:54.6
PR1	2.4	Park	-97:07:00.9498	49:53:49.8
PR2	2.5	Park	-97:13:10.1161	49:53:21.7
PR1	2.5	Water & Waste	-97:02:32.9834	49:56:46.2
PR1	2.5	Park	-97:06:01.8235	49:53:51.9
M2	2.5	Park	-97:07:13.2068	49:54:07.0
PR2	2.5	Park	-97:13:08.7227	49:53:22.2
C	2.5	Civic Office/Yard	-97:08:21.0853	49:53:58.9
PR1	2.5	Park	-97:10:52.7212	49:57:55.1
PR1	2.6	Park	-97:03:25.6695	49:55:21.0
PR1	2.6	Park	-96:59:56.4589	49:53:56.7
PR1	2.6	Park	-96:59:49.3115	49:53:56.7
PR2	2.6	Park	-97:05:51.3121	49:54:45.6
PR1	2.6	Park	-97:03:47.8869	49:54:57.8
M2	2.6	PPD	-97:12:54.0542	49:53:47.4
PR1	2.7	Park	-97:02:29.3859	49:55:30.1
M	2.7	Library/Museum	-97:08:29.8972	49:53:29.7
PR1	2.7	Park	-97:00:37.3717	49:54:01.1
PR3	2.7	Water & Waste	-97:02:44.7594	49:56:37.2
R	2.7	Park	-97:09:00.9078	49:52:56.3
M2	2.7	Water & Waste	-97:12:59.6850	49:54:52.8
PR2	2.7	Park	-97:13:53.6143	49:53:12.2
PR1	2.8	Water & Waste	-97:01:58.6030	49:52:58.7
C	2.8	Streets	-97:07:49.0453	49:53:29.5
PR2	2.8	Park	-97:13:55.3621	49:53:12.1
PR1	2.8	Park	-97:10:34.1762	49:58:01.2
PR3	2.8	Park	-97:18:53.4854	49:53:18.7
PR2	2.9	Park	-97:07:34.7115	49:56:13.5
PR1	2.9	Park	-97:11:56.5758	49:57:41.6
PR1	2.9	Park	-97:06:37.4140	49:53:51.2
PR1	2.9	Park	-97:03:09.8169	49:56:33.2
PR1	2.9	Park	-97:03:17.2618	49:54:36.6
PR1	2.9	Park	-97:03:21.3138	49:55:33.9
PR1	2.9	Park	-97:06:45.2628	49:53:44.1
PR2	2.9	Park	-97:17:25.0624	49:53:37.0
C3	2.9	Library/Museum	-97:11:38.1258	49:56:08.2
PR2	3	Park	-97:13:51.4073	49:53:11.6
M2	3	Park	-97:06:22.7716	49:53:12.9
PR2	3	PPD	-96:58:43.4379	49:54:27.1
M	3	Civic Office/Yard	-97:08:25.0545	49:53:30.6
M	3	Civic Office/Yard	-97:08:41.0455	49:53:21.0
PR2	3	Park	-97:00:03.2407	49:53:05.0
PR2	3	Park	-97:07:02.2459	49:57:09.2
PR2	3	Water & Waste	-97:06:49.1114	49:57:06.7

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ZONING	AREA IN ACRES	PARCEL_DESC	LONGITUDE	LATITUDE
PR1	3	Park	-97:06:21.0877	49:53:04.5
PR2	3	Park	-96:58:23.8005	49:53:50.9
PR1	3	Park	-97:02:59.1457	49:54:53.5
PR1	3.1	Park	-97:01:29.5110	49:53:58.6
PR1	3.1	Park	-97:06:44.9817	49:53:46.2
PR1	3.2	Park	-97:05:29.0484	49:56:49.7
C	3.2	PPD	-97:08:00.1256	49:53:29.8
C	3.2	Streets	-97:07:58.8072	49:53:27.9
PR1	3.2	Park	-97:06:16.1713	49:52:48.6
PR2	3.2	Park	-97:19:13.4645	49:53:40.3
PR1	3.2	Park	-97:07:40.1518	49:53:56.3
PR1	3.4	Park	-97:08:26.5304	49:57:11.7
PR1	3.4	Park	-97:13:15.6114	49:56:28.5
PR2	3.4	Park	-97:14:08.1518	49:53:12.2
PR2	3.4	Park	-97:10:01.8455	49:56:48.0
PR1	3.5	Park	-97:09:37.4902	49:56:40.2
PR1	3.5	Park	-97:11:34.3481	49:57:27.1
PR3	3.5	Park	-97:04:22.6714	49:54:56.7
PR1	3.5	Park	-97:10:08.4291	49:57:27.4
PR1	3.5	Park	-97:07:36.0783	49:53:34.8
PR1	3.5	Park	-97:03:05.0560	49:53:37.0
PR1	3.6	Park	-97:02:31.7517	49:55:02.2
M3	3.6	Water & Waste	-97:06:42.1597	49:57:05.1
PR1	3.6	Park	-97:04:16.0087	49:55:21.4
PR1	3.6	Park	-97:03:10.0048	49:54:35.1
PR2	3.7	Park	-97:06:23.5324	49:55:38.0
A	3.7	Streets	-97:11:21.5963	49:58:07.9
PR2	3.7	Park	-97:13:49.4877	49:53:11.5
PR1	3.7	Park	-97:05:19.1910	49:57:55.2
PR1	3.7	Park	-97:11:44.4374	49:53:18.6
PR2	3.7	Park	-97:08:12.9587	49:54:39.8
PR1	3.7	Park	-97:04:15.5094	49:54:37.5
C	3.8	PPD	-97:07:53.3312	49:53:21.4
PR1	3.8	Park	-97:07:27.9729	49:53:20.1
PR2	3.8	Park	-97:13:58.2512	49:53:14.5
PR1	3.8	Park	-97:03:17.5411	49:56:37.6
M2	3.8	PPD	-97:15:54.2838	49:53:54.8
PR1	3.9	Park	-97:07:23.3868	49:53:09.8
PR1	3.9	Park	-97:06:13.5748	49:53:10.4
PR2	3.9	Park	-97:17:44.9113	49:53:04.3
PR1	3.9	Park	-97:07:53.3516	49:52:49.1
PR1	3.9	Park	-97:10:15.4852	49:58:15.2
PR1	4	Park	-97:02:28.6709	49:55:06.5
PR1	4	Park	-97:11:13.7384	49:57:48.7

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ZONING	AREA IN ACRES	PARCEL_DESC	LONGITUDE	LATITUDE
PR1	4	Park	-97:02:46.5780	49:54:54.4
PR2	4	Park	-97:13:46.4239	49:53:11.4
A	4.1	Water & Waste	-96:58:42.2468	49:54:32.7
M2	4.1	Park	-97:09:25.8134	49:54:36.4
M1	4.1	Civic Office/Yard	-97:06:31.5335	49:56:59.6
PR1	4.2	Park	-97:07:42.0600	49:53:42.9
PR1	4.2	Park	-97:04:46.8764	49:57:22.4
M1	4.2	Park	-97:01:46.8040	49:54:05.8
PR2	4.2	Park	-97:04:18.6507	49:54:30.7
PR1	4.2	Park	-97:03:23.1512	49:56:27.6
PR2	4.2	Park	-96:58:50.4801	49:53:48.5
PR2	4.2	Park	-97:06:54.4972	49:53:01.3
M2	4.2	Streets	-97:07:21.8608	49:57:18.0
PR2	4.3	Park	-97:17:53.5631	49:53:49.3
PR1	4.3	Park	-97:06:15.6696	49:57:16.6
PR1	4.3	Park	-97:03:39.6808	49:53:34.9
M2	4.4	PPD	-97:10:31.8889	49:56:12.7
PR2	4.4	Park	-97:06:44.5315	49:54:55.1
PR2	4.5	Park	-97:13:00.6984	49:56:24.2
PR1	4.5	Park	-97:08:11.4840	49:57:06.5
PR1	4.5	Park	-97:10:33.6317	49:58:00.6
PR1	4.5	Water & Waste	-97:10:35.7862	49:58:00.1
PR1	4.6	Park	-97:10:12.4555	49:57:56.3
C3	4.6	Water & Waste	-97:02:34.7892	49:53:55.7
M3	4.6	PPD	-97:04:31.6000	49:53:20.9
PR1	4.6	Park	-97:03:37.1164	49:55:10.0
PR1	4.7	Park	-97:12:05.7324	49:57:18.5
M2	4.7	Water & Waste	-97:13:18.6813	49:56:55.1
PR2	4.7	Park	-97:04:47.0704	49:54:16.1
D	4.7	Park	-97:08:53.9138	49:53:44.7
PR2	4.8	Park	-97:03:57.0595	49:56:21.6
R	4.8	Park	-97:08:05.9011	49:53:09.5
M1	4.9	Park	-97:05:18.0580	49:54:56.8
M2	5	PPD	-97:04:14.7308	49:53:23.7
A	5	Streets	-97:16:42.7763	49:53:45.6
PR1	5	Park	-97:11:13.3147	49:57:10.1
PR1	5	Water & Waste	-97:10:59.2499	49:58:05.8
PR1	5.2	Park	-97:03:08.7479	49:54:50.4
PR1	5.3	Park	-97:09:57.7290	49:57:47.6
PR1	5.3	Water & Waste	-97:10:01.1362	49:57:50.7
PR1	5.4	Water & Waste	-97:03:22.2898	49:55:01.7
PR3	5.4	Park	-97:04:37.9670	49:56:38.3
M3	5.4	Streets	-97:05:45.5364	49:53:56.7
PR2	5.4	Park	-97:02:57.1117	49:56:21.0

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ZONING	AREA IN ACRES	PARCEL_DESC	LONGITUDE	LATITUDE
PR2	5.4	Park	-96:59:06.2798	49:54:24.1
PR2	5.5	Water & Waste	-97:05:36.9546	49:57:38.7
PR2	5.5	Park	-97:05:38.5264	49:57:35.5
PR3	5.5	Park	-97:05:35.6504	49:55:23.5
A	5.6	Streets	-97:07:15.9358	49:57:32.6
PR2	5.6	Park	-97:03:41.0339	49:55:28.8
PR2	5.6	Park	-97:09:54.5330	49:57:04.5
PR1	5.6	Park	-97:11:41.0276	49:53:06.7
PR1	5.7	Park	-97:03:29.5213	49:54:56.3
PR1	5.7	Park	-97:01:50.6821	49:54:44.7
PR1	5.7	Park	-97:00:06.5350	49:52:58.6
PR1	5.8	Park	-97:09:58.4387	49:57:49.0
PR1	5.8	Water & Waste	-97:10:00.9862	49:57:48.0
PR1	5.8	Park	-97:06:27.2036	49:53:12.9
PR2	5.8	Park	-96:59:33.7319	49:54:26.3
PR2	6	Park	-97:06:44.1743	49:54:35.4
PR1	6	Park	-97:05:21.0850	49:54:22.3
PR3	6	Park	-97:04:11.7922	49:55:11.1
PR1	6	Park	-97:08:09.0756	49:57:18.2
PR2	6.2	Park	-97:04:19.6295	49:54:25.8
PR3	6.2	Park	-96:59:26.8958	49:53:39.3
PR2	6.2	Park	-97:02:45.8247	49:53:25.8
M2	6.3	Water & Waste	-97:02:52.9435	49:52:56.0
PR2	6.3	Park	-97:14:04.2965	49:53:09.1
C	6.3	PPD	-97:07:59.3648	49:53:37.9
PR2	6.3	Park	-97:18:44.4386	49:53:37.4
PR1	6.3	Park	-97:04:52.0113	49:55:24.9
M1	6.5	Park	-97:06:47.8861	49:54:14.4
PR1	6.5	Park	-97:01:48.3355	49:53:18.7
A	6.6	Streets	-97:11:53.2799	49:57:50.0
PR1	6.6	Park	-97:06:53.9136	49:55:06.4
PR1	6.6	Park	-97:04:42.6864	49:57:15.0
PR1	6.7	Park	-97:19:01.1999	49:53:34.2
M2	6.7	PPD	-97:04:03.8927	49:53:28.2
PR1	6.8	Water & Waste	-97:01:46.5850	49:54:25.3
PR2	6.9	Park	-97:11:59.2426	49:56:55.2
PR1	6.9	Park	-97:06:36.0958	49:53:36.5
PR1	6.9	Park	-97:02:35.4623	49:55:10.2
M1	7	PPD	-97:13:00.9297	49:55:48.8
PR2	7	Park	-97:10:00.1399	49:56:21.6
PR1	7.1	Park	-97:12:06.5781	49:57:11.7
PR1	7.2	Park	-97:01:13.6728	49:54:37.8
PR1	7.2	Water & Waste	-97:01:10.0272	49:54:41.5
PR1	7.3	Park	-97:03:16.0912	49:55:45.6

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ZONING	AREA IN ACRES	PARCEL_DESC	LONGITUDE	LATITUDE
PR1	7.3	Park	-97:11:52.3202	49:56:35.3
PR2	7.3	Park	-97:06:00.8480	49:57:19.8
PR1	7.4	Park	-97:03:59.6486	49:57:16.5
PR1	7.4	Park	-97:05:10.0157	49:57:08.2
PR1	7.4	Park	-97:11:36.2848	49:57:14.7
PR2	7.5	Park	-97:03:47.1908	49:56:46.1
PR2	7.5	Park	-97:05:00.4499	49:54:43.5
PR2	7.7	Park	-97:14:12.0037	49:53:12.4
M2	7.7	PPD	-97:04:23.8012	49:53:19.7
A	7.9	Park	-96:59:21.1932	49:54:29.9
M2	8	Streets	-97:06:37.7345	49:57:16.6
A	8	Streets	-97:09:14.5916	49:57:57.8
PR1	8.1	Park	-96:58:11.0292	49:54:11.2
M3	8.2	PPD	-97:04:35.0865	49:53:17.7
PR3	8.3	Park	-97:09:44.0851	49:55:13.5
PR1	8.4	Park	-97:04:08.0657	49:57:26.4
PR1	8.5	Park	-97:03:02.0227	49:55:49.5
PR2	8.6	Park	-97:07:38.5950	49:54:38.7
PR1	8.7	Park	-97:06:53.1241	49:54:26.0
PR2	8.7	Park	-97:16:44.1332	49:53:32.4
A	8.7	Streets	-97:16:42.0025	49:53:54.0
PR2	8.8	Park	-97:09:04.1958	49:54:18.8
M2	8.9	PPD	-97:16:32.0660	49:53:57.4
PR2	9	Park	-97:06:06.6799	49:52:53.7
PR1	9	Water & Waste	-97:11:29.8611	49:57:50.9
M3	9	Streets	-97:11:47.9863	49:54:46.6
PR1	9	Park	-97:01:47.3990	49:54:17.7
M2	9.1	Streets	-97:09:36.4211	49:54:29.9
M2	9.2	Water & Waste	-97:10:32.4967	49:54:49.0
PR2	9.2	Park	-96:58:35.6074	49:54:26.7
A	9.6	Park	-97:01:07.9935	49:52:50.9
PR2	9.7	Park	-97:09:05.6031	49:55:50.1
PR1	9.7	Park	-97:04:59.5996	49:57:20.3
PR3	9.8	Park	-96:59:57.8789	49:54:07.1
M2	10	PPD	-97:15:46.6623	49:53:58.9
PR2	10.1	Park	-97:17:01.0165	49:53:55.7
PR1	10.1	Park	-97:13:38.6059	49:55:38.4
PR2	10.4	Park	-97:09:27.9729	49:57:04.7
M3	10.6	Park	-97:05:44.0744	49:54:00.6
A	10.8	Streets	-97:09:15.5145	49:57:56.8
PR1	10.9	Park	-97:01:12.6880	49:54:15.8
PR2	10.9	Park	-97:04:36.9745	49:55:35.2
PR1	11.1	Park	-97:05:33.7241	49:56:42.6
PR1	11.5	Park	-97:11:35.2968	49:52:48.3

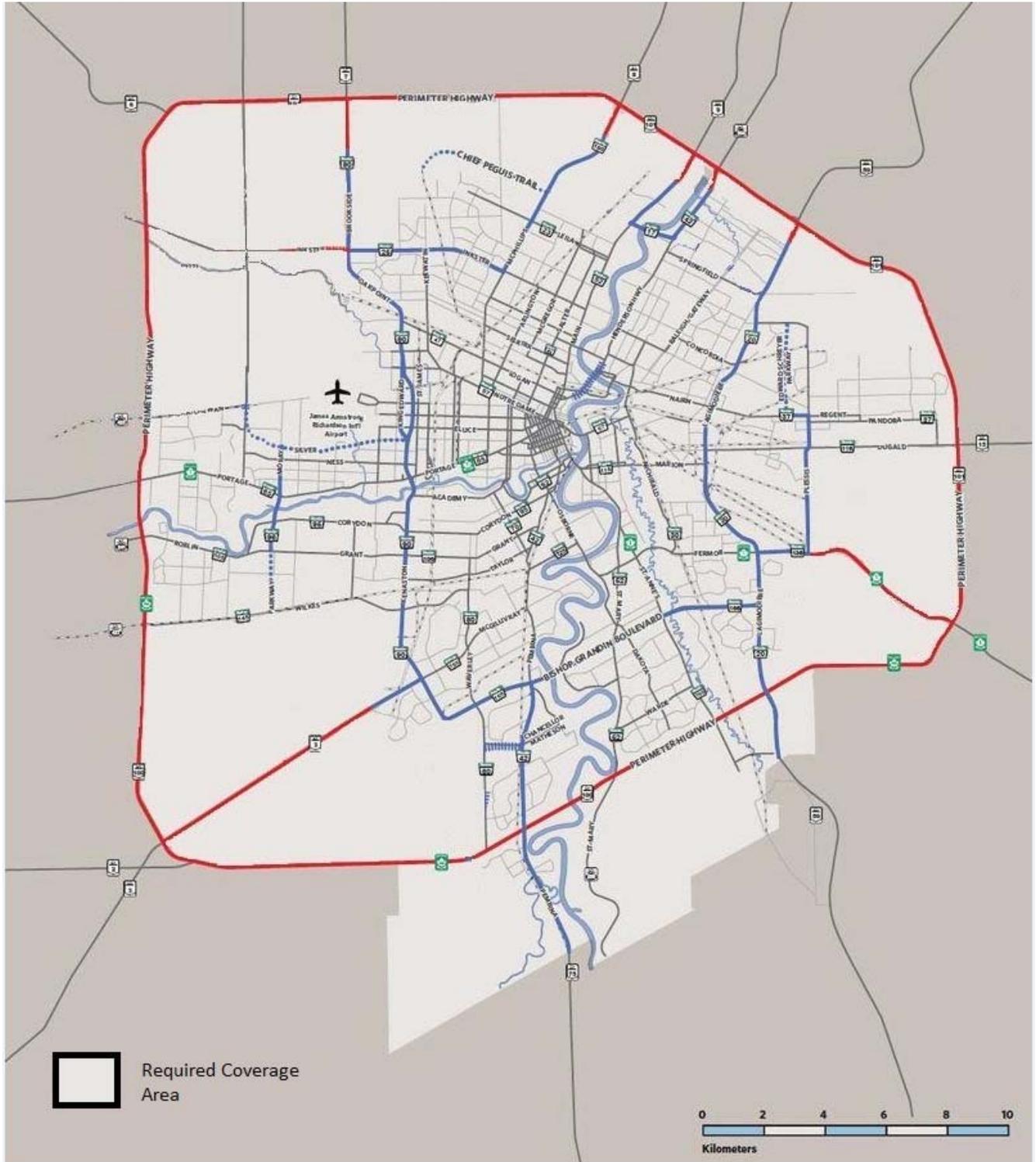
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ZONING	AREA IN ACRES	PARCEL_DESC	LONGITUDE	LATITUDE
PR1	11.6	Park	-97:11:58.1991	49:57:31.7
M2	11.6	Park	-97:11:24.8213	49:54:09.8
M3	11.7	Water & Waste	-97:03:35.2764	49:52:46.2
PR1	11.7	Park	-97:03:47.1296	49:57:08.7
PR1	11.8	Park	-96:57:56.3003	49:53:49.7
M3	11.8	Water & Waste	-97:10:38.8772	49:54:47.6
M3	12	Streets	-97:05:29.4638	49:53:57.8
PR2	12	Park	-97:07:01.2549	49:53:30.9
M3	12.6	Water & Waste	-97:05:25.2412	49:53:20.5
PR2	12.7	Park	-97:01:06.9178	49:54:27.8
PR1	13	Streets	-97:03:05.3827	49:55:59.1
PR2	13.2	Park	-97:05:55.2763	49:54:32.2
PR2	13.2	Park	-97:06:04.9997	49:54:36.3
A	13.4	Cemetery	-97:13:37.1137	49:55:28.3
PR1	13.6	Park	-97:12:12.7349	49:57:01.4
M2	13.6	PPD	-97:04:05.2468	49:53:20.3
PR1	13.7	Water & Waste	-97:12:45.4878	49:56:27.1
PR2	13.9	Park	-97:11:09.4601	49:57:32.1
PR2	14	Park	-97:12:38.4001	49:56:41.9
PR1	14.2	Park	-97:01:16.2300	49:54:44.8
PR2	14.3	Park	-97:05:50.3181	49:57:40.8
PR1	14.3	Water & Waste	-97:13:13.1779	49:55:46.6
M3	14.4	Water & Waste	-97:04:29.8637	49:53:38.7
M3	14.7	Water & Waste	-97:05:59.1402	49:53:32.3
A	14.8	Streets	-97:17:36.1276	49:53:54.2
PR2	14.9	Park	-97:07:36.0965	49:55:09.3
M2	14.9	Water & Waste	-97:06:59.5259	49:57:19.1
M3	15	Water & Waste	-97:04:13.3005	49:52:50.4
PR1	15	Park	-97:17:18.1044	49:53:29.1
PR1	15	Park	-97:16:35.1891	49:52:47.6
M2	15.5	Water & Waste	-96:59:48.0252	49:54:51.3
PR1	15.8	Park	-96:58:03.8282	49:54:19.0
PR2	16.3	Park	-96:57:56.9908	49:54:11.5
M2	17.4	PPD	-97:03:53.3868	49:53:22.4
M2	17.6	Water & Waste	-97:03:14.0088	49:53:19.5
M2	17.7	Streets	-97:13:19.7847	49:53:25.8
M2	17.7	Streets	-97:03:05.2907	49:55:46.9
PR1	18.8	Park	-97:06:13.3085	49:56:17.1
PR2	19.3	Park	-97:10:48.4607	49:53:56.1
PR1	19.5	Park	-97:12:19.8948	49:56:27.8
PR2	19.6	Park	-96:58:54.4428	49:53:52.4
PR2	20	Park	-97:11:37.6997	49:56:02.1
PR1	20.5	Park	-97:02:03.0717	49:53:52.2
A	20.5	Water & Waste	-96:59:09.8639	49:54:40.1

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ZONING	AREA IN ACRES	PARCEL_DESC	LONGITUDE	LATITUDE
PR3	21.3	Park	-97:02:51.4277	49:56:42.8
A	21.6	Park	-97:18:32.5757	49:54:34.5
PR1	23.1	Park	-97:17:28.7713	49:53:47.5
PR1	23.1	Streets	-97:17:26.4398	49:53:48.5
PR3	23.5	Park	-97:10:50.9432	49:55:54.9
PR2	23.8	Park	-97:12:10.8148	49:56:12.0
M2	24.1	Water & Waste	-97:01:46.7135	49:55:29.0
M2	24.5	Streets	-97:04:56.0561	49:53:51.7
PR1	24.6	Park	-97:06:52.1573	49:53:51.2
M2	25.3	Streets	-97:08:42.7191	49:57:39.8
M3	25.4	Streets	-97:05:16.0216	49:53:54.4
PR1	25.9	Water & Waste	-97:02:51.0339	49:52:50.4
A	26.2	Streets	-97:16:24.6736	49:54:13.3
A	26.2	Water & Waste	-97:06:47.6439	49:57:31.4
M3	26.3	Civic Office/Yard	-97:10:35.0571	49:54:37.1
PR3	27.3	Park	-97:10:32.0631	49:57:10.3
PR1	27.3	Park	-97:03:13.7726	49:56:13.1
PR1	27.3	Park	-97:17:02.3016	49:53:03.2
M3	27.8	Park	-97:11:34.3677	49:54:15.1
PR2	28.1	Park	-97:03:26.5320	49:56:52.0
PR3	29.2	Park	-97:08:23.8316	49:56:57.0
M2	29.9	Water & Waste	-97:10:23.8876	49:54:58.7
PR2	31.8	Park	-97:06:51.8460	49:57:02.7
PR3	35	Park	-97:04:21.9011	49:55:06.6
PR3	36.4	Park	-97:09:55.0550	49:55:11.0
PR2	37.7	Park	-97:07:23.5533	49:53:56.0
PR2	38.9	Park	-97:16:16.7330	49:53:23.6
M1	40.1	Civic Office/Yard	-97:01:46.6807	49:54:00.8
PR3	59	Park	-97:04:55.8653	49:55:44.7
M3	61.4	Water & Waste	-97:06:35.9889	49:57:09.0
PR2	61.7	Park	-97:12:06.8250	49:55:41.8
A	83	Streets	-97:06:14.7216	49:58:19.0
PR2	125.3	Park	-97:01:23.2442	49:52:52.3
A	141.3	Park	-96:59:13.5378	49:52:43.9
PR3	197.7	Park	-97:06:16.1734	49:56:46.1
A	379.7	Water & Waste	-97:18:36.2709	49:55:08.8
PR3	406.2	Park	-97:01:36.0138	49:56:07.9

APPENDIX C MANDATORY RADIO COVERAGE AREA



Guaranteed Coverage Area Requirements

- Bordered on the North by the Perimeter Highway PTH 101
- Bordered on the West by the Perimeter Highway PTH 100 and PTH 101
- Bordered on the East by the Perimeter Highway
- Bordered on South by the Perimeter PTH 100 except as follows:
 - From the Perimeter south on Brady Road to 4 Mile Road
 - South on 4 Mile road to Marchand Road Hwy 247
 - East on Marchand Road to the Red River
 - From Junction of St. Mary's Road and Richardson Road East on Richardson Road to Novotny Road.
 - South on Novotny Road to Oak Grove Road
 - East on Oak Grove Road to Arnould Road

North on Arnould Road to Prairie Grove Road.
West on Prairie Grove Road to Highway 59.
North on Highway 59 to the Perimeter Highway PTH100..

Deacon Reservoir area;

TransCanada Highway 1 east to PR 207-Deacons Road
PR 207-Deacons Road north to Centre Line Road 57North
Centre Line Road 57North east to Pineridge Road 24East
Pineridge Road 24East north to Misson Road 58North
Misson Road 58North West to PR207-Deacons Road
PR207-Deacons Road north to PTH 15-Dugald Road
PTH15-Dugald Road West to City Limits