SUBJECT: Trunked Radio System Upgrade (HES08004(a)) (City Wide)

RECOMMENDATION:

(a) That staff be authorized and directed to proceed with the proposal, provided by Motorola Canada Limited (summary attached as Appendix A to Report HES08004(a)), for the upgrades to the Corporate Trunk Radio System, in an amount not to exceed $21.6 million.

Jim Kay
General Manager / Chief
Hamilton Emergency Services

EXECUTIVE SUMMARY:

In October 2008 (Report HES00804), Council authorized and directed the General Manager of Hamilton Emergency Services/Chief or his designate to negotiate a multi-year, single source contract with the incumbent vendor, Motorola Canada Limited (Motorola), for the implementation of the Association of Public-Safety Communications Officials – Project 25 Digital Integrated Voice / Data Radio Infrastructure, and report back with the draft negotiated agreement to the Emergency and Community Services Committee for consideration.

Upon obtaining authorization from Council, staff initiated a series of meetings with internal stakeholders and Motorola in order to further scope out the requirements of the upgrade project. As a result of these meetings, Motorola has responded back with a proposal to meet the City of Hamilton’s (City) current and future needs so that we can
continue to provide uninterrupted, mission critical communications to Police, Fire and other City departments. This proposal provides the City with a solid expandable upgrade path for mission-critical, two-way voice and mobile data communications.

Should Council direct staff to move forward with Motorola’s Upgrade Proposal (attached as Appendix A to Report HES08004(a)), it will provide the City with:

1. An upgrade to the aging Corporate Radio infrastructure and replacement of existing end-user equipment with zero (0) levy impact, as the project will be funded from within current Hamilton Emergency Services Operating Budget funding levels.

2. A reduction to the potential liability for the City, which could be incurred as a result of system failure of mission-critical communications equipment that has reached end-of-life.

3. Improved utilization of Police and Fire resources through the use of an integrated global positioning system / automatic vehicle location GPS/AVL solution(s), which will allow for real-time tracking.

4. Improved portable radio coverage throughout the City, which reduces risks for first responders and deals with areas of growth and existing poor coverage areas in the City since the current system was constructed in 1995.

5. Leverages the City’s investment in the Trunk Radio System by providing an integrated solution for voice and data communications in a mobile environment (GPS/AVL, mobile data terminal operations), which helps reduce monthly operating costs that would otherwise by incurred as a result of having to purchase mobile data services from a third party provider. This solution will also allow Fire access to data communications, which was originally strictly a Police resource. In addition to being utilized by Fire, it sets in place a framework for later expansion to other City Departments should there be a match in business requirements and functionality.

If approved, the proposal would see the construction of the new radio infrastructure occurring in the 3rd and 4th quarters of 2009, with a target of commissioning the new infrastructure in the 1st quarter of 2010. The original timelines have been compressed to three (3) years instead of four (4) to facilitate the accelerated migration of Police and Fire resources on to the new system.

After Police and Fire have been moved off the current system, the equipment at the City Hall location can be decommissioned and removed to allow for the completion of the City Hall renovations in the area currently occupied by the Trunk Radio equipment. This will also allow for the reduction of monthly operating costs related to rental of fibre circuit costs between current sites.

The upgrade project would be funded from a combination of established Corporate Radio Reserves, Hamilton Police Services (approved Capital project for Communications Equipment) and the balance of the funding would be financed over 15 years and repaid
through debt charges. The project timelines and payment schedule have been worked out to allow for the costs of the debt charges to be funded from within the Corporate Radio Operating Budget. This will be accomplished by capturing the surplus funding, as a result of declining lease payments on the current system, and redirecting it to offset debt charges from the financing required to facilitate the upgrade of the Trunk Radio infrastructure. The net result being a zero (0) levy impact.

In 2011, there will be an increased pressure on the Operating Budget to cover off the annual maintenance agreement costs of approximately $450K per year, which are paid out monthly. Annual maintenance charges are due one (1) year after system acceptance.

BACKGROUND:

The City currently operates a Motorola SMARTNET Analogue Trunk Radio Infrastructure. This system is utilized by Police, Fire, the Public Works Department, Municipal By-law Enforcement Division and the John C. Munro Hamilton International Airport (security, operations and fire). Police also operate a dedicated mobile data system (Motorola DATAC), which provides mobile data connectivity that allows for field inquiries, dispatching and messaging. Both systems have been live since 1995 and require upgrading to ensure that mission-critical, two-voice and data communications continues without interruption. Over the last year, the rate of failure of some components of the Trunked Radio System has been increasing. Fortunately, the current system design makes most equipment failures transparent to the end-users due to the level of the redundancy built into the System.

This upgrade project involves building a new Astro P25 Infrastructure along side the current system and transitioning users over from the SMARTNET system to the new ASTRO P25 system. In conjunction with the rebuild of the two-voice system, a data overlay will be built to replace the Police’s DATAC system. The DATAC system allows for dispatching of Police resources to incidents and provides for field inquires to facilitate day-to-day Police operations. As part of the upgrade project, this data system will transition from being a Police resource to a shared City resource, which will be utilized by Fire and other City Departments.

The data overlay will consist of two (2) levels of connectivity. The first level will be provided by Integrated Voice and Data (IV&D) technology, which is also required to facilitate administrative and fault management functions on the system. This will also be utilized to provide AVL/GPS data backhaul from vehicles equipped with mobile radio.

The second level of connectivity will be provided by a High Performance Data (HPD) overlay on the radio network and will be used for mobile data terminal operations. This functionality will require the installation of a dedicated HPD modem in vehicles that require mobile data connectivity. While HPD is not meant to replace the use of cellular connectivity being used throughout the City, it is meant to replace the DATAC system used by Police and allow for seamless connectivity across the City.
As part of this upgrade to the system, the current voice logging systems at Police and Fire will be replaced with an integrated voice logging solution. This is required due to the fact that the current systems used by Police and Fire are no longer a supported platform and as such it is not practical to custom design an interface to the current voice logging systems.

The voice and data infrastructure will be completed and tested at the beginning of the project in 2010. Users will be transitioned over in a multi-year plan to spread out the cost of buying end-user equipment over multiple years.

End-user equipment will be purchased and shipped in blocks as users are transitioned over to the new Astro System. The planned order would be to move Police first, followed by Fire in 2010 and then the balance of users in 2011.

As part of the scoping out the requirements for the upgrade, an analysis of system coverage was conducted in order to validate the expected performance of the Astro system against our current SMARTNET system. During this process, the Police also noted that while overall system coverage is good, there are some areas in the City where portable radio coverage is marginal and that some of these areas are areas of high Police activity. Poor portable radio coverage in these areas is of great concern to Police as it has the potential to impact officer safety.

To mitigate these concerns over coverage and leave the system positioned to deal with increased demands for service, an additional two (2) sites will be required. These sites that are included in the proposal will deal with legacy coverage issues above and below the mountain and take into account development that has occurred since 1995.

**ANALYSIS/RATIONALE:**

The requirements for the infrastructure upgrades are primarily driven by what has been previously outlined. Staff has reviewed both emerging and current technologies. Given the age of the current system and pressures to upgrade, very few options are available that meet the core needs of the public safety communications. The geography of the area in conjunction with the population density and proximity to the US border also limit radio frequencies available for our use. Given these factors there are only a few vendors capable of engineering / implementing such a system.

To meet the needs of the current public safety users, the upgraded infrastructure will also have to be deployed in a simulcast configuration. In a simulcast configuration, the system transmits off of all sites simultaneously, regardless of where the end-users are located. In this configuration, you achieve maximum efficiency as it relates to the use of available frequencies / radio channels.

The current vendor (Motorola) is an industry leader in the engineering / commissioning of simulcast radio infrastructure and offers an APCO P25 technology platform that would provide the necessary functionality. This also lessens the total upgrade cost, by reducing consulting fees, reduces end-user training and maintains end-user confidence in the system. The City has worked with the vendor over the last 50 years and they have
consistently provided a reliable product that our Police Officers and Firefighters have come to rely on.

In addition to staying with a proven vendor for the public safety communications, there are other advantages as well. Most notably, the ability to continue forward with planned replacements of end-user equipment as required that are forward compatible to the upgraded P25 infrastructure. This further spreads out the burden of the upgrade over multiple budget years (pre and post-commissioning of the upgrade infrastructure). Lastly, working with the current vendor also assists in managing risks as the upgrades proceed forward. They are naturally better positioned to work around / in close proximity to this current system. This will also assist during the transitioning of users from the old infrastructure to the new and eventually with the decommissioning of the old infrastructure at the end of the project.

It is expected that by adopting a multi-year approach to the implementation of the upgrades, the life of the current system can be extended closer to 2013 (end of lease) in non-public safety application. End-user equipment and infrastructure hardware freed up as a result of moving public safety users over to the new infrastructure would be used to support the current systems’ operation. It is also worth noting that having both systems operating side-by-side during the upgrade project offers a redundant / backup communications in the event any technical issues arise that impact the infrastructure upgrades.

If an upgrade of the infrastructure was to move forward utilizing another vendor’s technology platform, the City would lose the opportunity of spreading out the cost of the upgrades over a multi-year payment plan as a result of having to purchase all the end-user equipment at the same time. There would also be a great risk born by the City, by having equipment installed in sites, which house the current system, where the technicians on site may not be totally familiar with our current system, which could result in an interruption of service.

**ALTERNATIVES FOR CONSIDERATION:**

A formal request for proposal (RFP) process can be initiated to facilitate obtaining a vendor to upgrade the radio infrastructure. This will most likely result in increased costs as a result of having to hire a consultant to write a formal RFP; and, if the current vendor was not awarded the contract, some additional services would still be needed to be purchased from the current vendor in order to make room for additional equipment while trying to minimize the impact on the current system. In addition, selecting another vendor would affect the ability to phase-in the cost of the upgrade over multiple years as a result of having to scrap all existing infrastructure and end user equipment.

**FINANCIAL/STAFFING/LEGAL IMPLICATIONS:**

**Financial:**
The current radio infrastructure is leased until 2013. While there are provisions to allow for early termination of the lease with MFP, it is more cost effective to keep the system as a backup during the infrastructure upgrades. MFP will be approached to end the
lease early in 2011. For the purposes of this analysis the lease payout costs have been included in the cost of the Capital Project and removed from the operating costs.

The total cost of the upgrade project as outlined in the proposal is $21.6M. The project will be partially funded from existing Hamilton Police Services Capital Project ($3.2M) and the Corporate Radio Reserve ($5.4M). The balance of the funding ($13.0M) will be financed over 15 years and repaid through Debt Charges.

The Table below outlines the changes in the operating cost over the next five (5) years. Given that the current system infrastructure is leased, the finance costs will be covered off from the current Operating Budget for Corporate Radio, which will result in zero (0) impact on the levy in 2010.

Staffing:
There are no staffing implications as a result of this upgrade.

Legal:
Failure of this critical communication infrastructure could lead to the City potentially attracting unnecessary liability as a result of injury / death of public or employees and / or excess property loss.
Policies Affecting Proposal:

Purchasing Policy, Section 4.11 - Policy for Negotiations requires that Council approve all single source negotiation requests that are valued at $250K or greater.

Relevant Consultation:

City Manager’s Office
City Manager’s Office, Human Resources Division
Hamilton Police Services
Corporate Services Department, Financial Services Division, Purchasing Section
Corporate Services Department, Financial Budgets & Finance Division
Corporate Services Department, Information Services
Corporate Services Department, Legal Services Division
Public Works Department, Transit Services Division

City Strategic Commitment:

By evaluating the “Triple Bottom Line”, (community, environment, and economic implications) we can make choices that create value across all three bottom lines, moving us closer to our vision for a sustainable community, and Provincial interests.

Community Well-Being is enhanced. ☑ Yes ☐ No
Public services and programs are delivered in an equitable manner, coordinated, efficient, effective and easily accessible to all citizens.

Environmental Well-Being is enhanced. ☑ Yes ☐ No
Human health and safety are protected.

Economic Well-Being is enhanced. ☑ Yes ☐ No
Investment in Hamilton is enhanced and supported.

Does the option you are recommending create value across all three bottom lines? ☑ Yes ☐ No

Do the options you are recommending make Hamilton a City of choice for high performance public servants? ☑ Yes ☐ No
Summary of Trunked Radio System Upgrade

The Corporate Trunk Radio System supplies mission critical communications to Police, Fire, Public Works and other City Departments. This system has been live since 1995 with virtual zero down-time. To continue to provide this level of service the radio infrastructure requires upgrading.

In October 2008, Council authorized staff to proceed ahead with single source negotiations with the current vendor (Motorola Canada Ltd.) for upgrading the system. This strategy allows for a phased-in approach to the upgrade, minimizes risks, allows for renewal of existing sites versus establishing new and the carrying forward of newer radios used by Police onto the upgraded infrastructure.

Proceeding ahead with the proposal received from Motorola will provide for:

1. An upgrade of to the aging Corporate Radio infrastructure and replacement of existing end-user equipment with zero (0) levy impact, as the project will be funded from within current Hamilton Emergency Services Operating Budget funding levels.

2. A reduction to the potential liability for the City, which could be incurred as a result of system failure of mission-critical communications equipment that have reached end-of-life.

3. Improved utilization of Police and Fire resources through the use of an integrated global positioning system / automatic vehicle location GPS/AVL solution(s), which will allow for real-time tracking.

4. Improved portable radio coverage throughout the City, which reduces risks for first responders and deals with areas of growth and existing poor coverage areas in the City since the current system was constructed in 1995.

5. Leverages the City’s investment in the Trunk Radio System by providing an integrated solution for voice and data communications in a mobile environment (GPS/AVL, mobile data terminal operations), which helps reduce monthly operating costs that would otherwise by incurred as a result of having to purchase mobile data services from a third party provider. This solution will also allow Fire access to data communications, which was originally a Police resource. In addition to being utilized by Fire, it sets in place a framework for later expansion to other City Departments should there be a match in business requirements and functionality.

This upgrade of the Corporate Radio System consists of:

1. Replacement of all transmitter / receive equipment at existing radio sites.

2. Replacement of all backhaul equipment which is used to connect the sites together into one system.
3. Addition of two (2) new radio sites at existing City properties to resolve legacy coverage issues and deal with growth that has occurred since 1995.

4. Replacement of all existing end-user equipment (i.e. portable radios, mobile radios, chargers and accessories).

5. Replacement of Police mobile data system (DATAC) with an integrated voice/data solution that will become a shared resource to be used by Police, Fire and other City Departments if business requirements align with the capabilities of the network.

The total cost of the upgrade project as outlined in the proposal is $21.6M. The project will be partially funded from existing Hamilton Police Services Capital Project ($3.2M) and the Corporate Radio Reserve ($5.4M). The balance of the funding ($13.0M) will be financed over 15 years and repaid through Debt Charges.

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