Adopted by Council at its meeting held November 16, 2015 [M468-2015]
/AC
Windsor, Ontario November 16, 2015

REPORT NO. 310 of the
ENVIRONMENT, TRANSPORTATION & PUBLIC SAFETY STANDING COMMITTEE
of its meeting held October 21, 2015

Present: **Councillor Fred Francis**
Councillor Chris Holt
Councillor Hilary Payne (Vice Chair)
Councillor Paul Borrelli

Regrets: **Councillor Bill Marra**

That the following recommendations of the Environment, Transportation and Public Safety Standing Committee **BE APPROVED:**

Moved by Councillor Francis, seconded by Councillor Holt,

That the report of the City Engineer dated September 30, 2015 entitled "CQ1-2014: Ability to put GPS data for Snow Removal & Street Cleaning equipment on-line for the Public to View" **BE RECEIVED** for information.

Carried.

LiveLink 17662 SW2015

Clerk's Note: The report of the City Engineer dated September 30, 2015 entitled "*CQ1-2014: Ability to put GPS data for Snow Removal & Street Cleaning equipment on-line for the Public to View*" is ***attached*** as background information.

CHAIRPERSON

SUPERVISOR OF COUNCIL SERVICES

NOTIFICATION:	
NAME	CONTACT INFORMATION

Item No. 1

THE CORPORATION OF THE CITY OF WINDSOR
Environment, Transportation & Public Safety Standing Committee - Operations

MISSION STATEMENT:
Our City is built on relationships – between citizens and their government, businesses and public institutions, city and region – all interconnected, mutually supportive, and focused on the brightest future we can create together."

LiveLink REPORT #: 17662 SW2015	**Report Date: September 30, 2015** PW#4068-09./30/15:eb
Author's Name: Phong Nguy	**Date to Standing Committee: October 21, 2015**
Author's Phone: (519) 255-6560 ext. 4253	**Classification #:**
Author's E-mail: pnguy@citywindsor.ca	

To: **Environment, Transportation and Public Safety Standing Committee**

Subject: **CQ1-2014: Ability to put GPS data for Snow Removal & Street Cleaning equipment On-line for the Public to View**

1. RECOMMENDATION:

City Wide: X Ward(s): ____

To Council **FOR INFORMATION.**

EXECUTIVE SUMMARY:

N/A

2. BACKGROUND:

The following Council Question was recorded at the January 6, 2014 Council meeting:

"CQ1-2014 Asks for a report on our ability to put GPS data for snow removal and street cleaning equipment on-line and accessible for the general public."

Live website reporting of winter storm event response activities (i.e. snow plow tracking) allows residents to monitor the City's snow removal service. Currently, live GPS data is only available to City staff. It is used to aid with the supervision of winter control routes in order to determine compliance with the approved service levels. The GPS records are also useful information with respect to claims and litigation against the City with respect to winter control and street sweeping activities.

The City's winter control fleet consists of 17 contractor units (plus 2 spares) and 8 City vehicles plus one loader.

Additional units are hired once winter control operations moves into residential streets (when accumulation of snow is 4" or greater).

The street sweeping fleet totals 4 units.

In total, it is estimated that at least 50 GPS units would be required to provide complete coverage of the City's winter control operations (including hired equipment when performing winter control operations on residential streets) and street sweeping fleet.

This report is provided in response to **CQ1-2014**.

3. DISCUSSION:

With GPS information, the City can monitor, record and track the snow clearing, winter maintenance and street sweeping program in real time.

The GPS units currently installed in the City's Public Works Operations fleet (Winter Control, Street Sweepers, etc.) were installed in 2007 and are approaching the end of their useful lifespan. The current GPS system was not intended to interface with the City's website when originally purchased but remain operationally functional.

The vendor has confirmed that our current agreement does not provide for data transfer services meaning we presently don't have the ability to place GPS data for snow removal and street cleaning equipment on-line and make the information accessible to the general public.

Administration enquired of the current vendor as to what options exist to provide vehicle location information to the public, given our current system. The vendor has provided us with three (3) public visibility options (and corresponding pricing) which would allow us to expose our operational data to the public.

Those options are:

Option 1 – Hosted Solution:
Option 1 is a public facing web site setup hosted by the vendor which can be configured to meet the City's requirements. The setup costs for this option are $18,000 with annual fee of $5,400. This would provide GPS information for the City's main routes only.

With respect to snow clearing, when the City receives enough snow to warrant clearing of residential streets, it hires additional pieces of equipment from contractors. These additional pieces of equipment do not have a City GPS unit installed in them and therefore, GPS data would not be available to update the information on the web-site. This may lead residents looking for information on-line to conclude that their street had been missed when, in fact, it hadn't been.

Should Council wish to provide live data for all streets, approximately 20 additional GPS units would need to be purchased from the current vendor at an approximate cost of $3,000 per unit for an approximate total additional cost of $60,000 plus a $60 fee per month per unit monthly service charge (totalling approximately $14,400 (20 units x $60 x 12 months)). These monthly service charges are additional to the setup and annual fee.

Therefore, the total cost for this option is **$78,000** plus an annual fee of $5,400 and additional monthly service charges totalling approximately $14,400 per year. This cost does not include any City staff time required to implement this option as it is believed to be minimal.

Option 2 – Route Service API:
Option2 is a route service API which exposes pre-processed road segment coverage information which can then be overlaid into a map. The setup costs for this option are $9,900 with an annual fee of $4,455. Like Option 1, this option would also require 20 additional GPS units at approximately $3,000 per unit for a total of $60,000 plus a $60 fee per month per unit monthly service charge or $14,400 in order to provide complete live GPS coverage of winter control operations. These units not only provide GPS data, they are ruggedized for the harsh conditions, capture and send data related to the engagement of plows and salters, and require hardware both inside and outside of the vehicle. City staff time (mainly IT) would be required to implement Option 2. The cost of those City staff resources are estimated at $1,000. The required work would need to be prioritized against other competing corporate and divisional priorities. The total cost of this option is **$70,900** plus an annual fee of $4,455 and additional monthly service charges totalling approximately $14,400 per year.

Option 3 – Data Transfer API:
Option 3 is a data transfer API which will provide raw vehicle location; input and spreader data which can be stored and processed by the City. The setup costs for this option are $5,700 with an annual fee of $1,620. Like Option1 and 2, this option would also require 20 additional GPS units at approximately $3,000 per unit for a total of $60,000 plus a $60 fee per month per unit monthly service charge or $14,400 in order to provide complete live GPS coverage of winter control operations. In addition, City staff time (mainly IT) would be required to implement Option 3. The cost of City staff resources are estimated at $2,000. The required work would need to be prioritized against other competing corporate and divisional priorities. The total cost of this option is **$67,700** plus an annual fee of $1,620 and additional monthly service charges totalling approximately $14,400 per year.

Of the three options provided by our current vendor, Administration's preference would be Option 3. Option 3 would also provide data for the City's Open Data Catalogue. However, given our current system, all of the options would only provide live data for the City's main winter control routes only (the City does not have GPS units installed in the contracted fleet responsible for residential roads which are dispatched in snow events where accumulation of 4" or greater occurs).

Aging Hardware
As the current GPS units age, the units sometimes malfunction. These malfunctions would cause periods of incomplete information. Missing data might lead residents to erroneous conclusions with respect to the level of service actually provided.

The current GPS hardware on the vehicles is approaching end of life and will require replacement soon. Current units will have to be replaced and these replacements will have to remain compatible with our old GPS system. That means that the new units while brand new, would not offer any more functionality than the aging units they replace.

OTHER OPTIONS:

Option 4 – Piggyback on a Recent Corporate GPS Purchase:

The Operations department has been investigating the latest generation of GPS units which have more robust capabilities than the City's current units, including the ability to provide GPS information on the City's website.

Windsor Police Services (WPS) and Transit Windsor have both recently procured GPS systems. Public Works Operations, WPS and Transit Windsor have all done significant work in researching and developing their GPS systems. Preliminary investigations have found that the WPS solution has a relatively low licensing cost, has the flexibility to meet a wide range of needs across the corporation, and provides a significant amount of data that could be used for both internal analysis and the City's Open Data Catalogue. If the system is suitable, a preliminary, high level cost estimate to implement Option 4 for Public Works Operations would be $130,000 for hardware software, installation, etc. on 50 vehicles, and would require approximately 9 months in staff resources to implement depending on other corporate priorities. That is not 9 months of fulltime work; it is staff implementing this project in addition to current responsibilities and other priorities. The WPS solution has the lowest ongoing costs of all the options, and can be expanded to all other areas of the City. This solution appears ideal but the prudent approach would be to pilot the solution on a small number of Winter Control vehicles prior to proceeding with a large scale project.

The Transit GPS functionality is just one component of the larger Transit specific "Smart Bus" (Intelligent Transit System) project that is currently being implemented.

The Purchasing, Fleet and IT departments have discussed that, in the long-term, the ideal situation would be to have only one GPS vendor servicing the needs of the Corporation as this would create efficiency in the management and procurement of various City GPS solutions for the City, and help with Governance. The undertaking to move to a single vendor for GPS units will take some time and will require some of the City's other expiring GPS contracts to be extended to stay operational, but not for a period that prevents them from transitioning to a new system when it is ready.

Option 5 – Procure a New GPS System:

Should the WPS GPS system not meet the operational needs of Public Works, a competitive procurement process could be undertaken. It is estimated that the investigation and subsequent procurement process will take between 9 and 12 months dependant on existing workload and competing priorities. A conservative estimate for an all new GPS system for Public Works Operations (consisting of approximately 50 units) would be similar to the WPS option #4 above which would include hardware (i.e. modem, GPS antenna), GPS tracking software, installation and technical support, and the introduction of another GPS solution into the corporation, which is not ideal and goes against the IT best practice of system standardization.

Recommendation

Given that the current GPS units in Public Works Operations' are approaching end of life, and further, given the significant cost of meeting the goals of the Council Question, Administration recommends Option 4 as it is believed that it will provide the desired functionality and save money when compared to investing in our current, aging infrastructure while gaining no improved system functionality. However, to be certain Administration must further investigate this option.

With any of the five (5) options described above, subject matter experts from Public Works Operations, Fleet Services and IT would be required. The work required would not warrant any additional staff to any of these areas but the work would need to be prioritized against other competing corporate priorities. Of the first three options, Option 1, 2 or 3 could be implemented quite quickly after the appropriated legal agreements agreed upon and the vendor completes their portion of the required work. Option 4 and 5 would take some time as Administration conducts its due diligence.

Limitations of Live GPS Reporting

While live website reporting of all routes will be of use to residents, they are likely to be most interested in when their own street will be cleared or swept. This system is not capable of providing that information. The technology only provides location data of vehicles performing various snow removal duties. It can be foreseen that some residents may consult the live website and then call 311 to enquire when the snow plow or street sweeper might come down their street. The technology does not have the capacity to estimate timeframes for when certain streets will be cleared or swept. Therefore, even if GPS is installed in all contracted fleet vehicles, the information we would compile may not meet the needs of residents.

4. RISK ANALYSIS:

Operational Risk

There is presently a moderate risk with respect to the operations of the City's Winter Control and Street Sweepers fleet if the GPS system is not functioning properly. As the City's units age, malfunctions happen more frequently. GPS is an effective tool for ensuring service delivery and also managing the costs associated with monitoring contractor provided services. Investing in our current GPS system would mitigate this risk. However, along with the risk of our current equipment failing, there is the risk of investing in old technology versus investing in new technology with advanced capability. Technological advances happen rapidly. Our current system is 8 years old and does not have the capabilities of newer systems.

With respect to snow removal, every winter storm presents challenges which impact the delivery of winter control operations. In the future, while allowing for transparency, the placing of GPS data on the City's website may lead to increased questions/criticism of the City's operations such as route changes for operational reasons.

Residents may disagree with the City's snow clearing or street sweeping methods based on examining incomplete information (i.e. not all pieces of equipment having (working) GPS units) and this could lead to erroneous conclusions as to how effectively and efficiently the City operates these services. This represents a moderate risk and will have to be tolerated.

Also, residents are likely most interested in when their own street will be cleared or swept. This system will not provide that information. It can be foreseen that some residents may consult the map and then call 311 to enquire when the snow clearing or street sweeping units will be coming down their street. It is a presently a challenge to keep up with 311 calls during each operation's busy season. (Historically, approximately 2,000 requests for snow clearing or salting and 250 requests for street sweeping are received annually). Should 311 service requests increase significantly, more resources may be needed.

Community Risk
Not having GPS data for snow removal and street sweeping operations readily available on the City's website, while other municipalities do, can lead to questions as to whether the service is being efficiently performed. Access to GPS data would promote transparency in the delivery of our services to the public. This is a moderate risk and will need to be tolerated as our current system does allow for snow removal and street cleaning equipment data to be placed on-line and therefore accessible to the general public. A mitigating strategy would be to institute one of the four options contained in this report. Administration's recommendation is Option 4.

Winter control operations are generally a popular topic for comments or complaints each winter season. Residents sometimes call 311, Councillors, the Mayor's office and/or the media to complain about various winter control situations – i.e. windrows at the end of the driveway, residential road conditions, etc. Most residents are very understanding of the time and effort required to remove snow in a financially responsible manner. Making GPS data available to residents may mitigate these types of calls or it may increase them.

5. FINANCIAL MATTERS:

Below are the options and costs provided by the current vendor. Council should note that presently there isn't an identified budget for any one-time costs that may be related to moving to another system, or improving the functionality of the current system.

Option 1 – Hosted Solution:
The setup costs for this option are $18,000 with annual fee of $5,400. This would provide GPS information for the City's main routes only. Approximately twenty (20) additional units at $3000 each (20 x $3,000=$60,000) plus a $60 fee per month per unit monthly service charge or $14,400) would be required to provide complete live GPS data of the City's entire winter control operations (including hired equipment when performing winter control operations on residential streets). Therefore, the total cost for this option is **$78,000** plus an annual fee of $5,400 and additional monthly service charges totalling $14,400 per year. This cost does not include any City staff time required to implement this Option as it is believed to be minimal.

Option 2 – Route Service API:
The setup costs for this option are $9,900 with an annual fee of $4,455. Like Option 1, this option would also require 20 additional GPS units at approximately $3,000 per unit for a total of $60,000 plus a $60 fee per month per unit monthly service charge or $14,400) in order to provide complete live GPS coverage of winter control operations. These units not only provide GPS data, they are ruggedized for the harsh conditions, capture and send data related the engagement of plows and salters, and require hardware both inside and outside of the vehicle. City staff time (mainly IT) would also be required to implement Option 2. The cost of those City staff resources are estimated at $1,000. The required work would need to be prioritized against other competing corporate and divisional priorities. The total cost of this option is **$70,900** plus an annual fee of $4,455 and additional monthly service charges totalling $14,400 per year.

Option 3 – Data Transfer API:
The setup costs for this option are $5,700 with an annual fee of $1,620. Like Option1 and 2, this option would also require Approximately twenty (20) additional units at $3000 each (20 x $3,000=$60,000) plus a $60 fee per month per unit monthly service charge or $14,400) would be required to provide complete live GPS data of the City's entire winter control operations (including hired equipment when performing winter control operations on residential streets). In

addition, City staff time (mainly IT) would also be required to implement Option 3. The cost of City staff resources are estimated at $2,000. The required work would need to be prioritized against other competing corporate and divisional priorities. The total cost of this option is **$67,700** plus an annual fee of $1,620 and additional monthly service charges totalling $14,400 per year.

OTHER OPTIONS:

Option 4 – Piggyback on a Recent Corporate GPS Purchase:

Currently, there isn't an identified budget for any one-time costs related to moving to another system. However, a preliminary, high level cost estimate to implement Option 4 for Public Works Operations would be $130,000 for hardware software, installation, etc. on 50 vehicles, and would require approximately 9 months in staff resources to implement depending on other corporate priorities. That is not 9 months of fulltime work; it is staff implementing this project in addition to current responsibilities and other priorities. The WPS solution has the lowest ongoing costs of all the options, and can be expanded to all other areas of the City. This solution appears ideal but the prudent approach would be to pilot the solution on a small number of Winter Control vehicles prior to proceeding with a large scale project.

Option 5 – Procure a New GPS System:

Like Option 4, there currently isn't an identified budget for any one-time costs related to moving to another system.

A conservative estimate for an all new GPS system for Public Works Operations (consisting of approximately 50 units) would be similar to the WPS option which would include hardware (i.e. modem, GPS antenna), GPS tracking software, installation and technical support, and the introduction of another GPS solution into the corporation, which is not ideal and goes against the IT best practice of system standardization. It is estimated that the investigation and subsequent procurement process will take between 9 and 12 months dependant on existing workload and competing priorities.

Implementation of any of the above options would require one-time capital budget dollars for the initial purchase and setup of equipment as well as additional annual operating budget dollars for the ongoing monthly fees related to the equipment.

6. CONSULTATIONS:

Matt Caplin, Deputy Chief Information Officer / Manager, Project Management & Applications
Anna Caro, Business Analyst
Angela Marazita, Fleet Manager
Anne-Marie Albidone, Environmental Services Manager
Sean McCorkell, Business Analyst
Robert Price, Technical Support Analyst
Cindy Etmanski, Financial Planning Administrator – PW Operations

7. CONCLUSION:

The current GPS agreement do not have the capability to place "live" data for both snow removal and street cleaning on the City's website for the general public to view. Given the alternatives contained in this report, Administration would recommend Option 4 which would include further

investigation and piloting of the GPS system recently installed by WPS. If this system meets the operational needs of the Operations division, it is recommended that a competitive procurement process then be undertaken.

Implementing live reporting for the City's winter control and street sweeping operations would require further investment as noted within the Financial Matters section of the report. However, it should be noted there aren't any budget dollars currently set aside for an upgrade of the GPS system or for improving the functionality of the current system.

In addition, it is anticipated that having a live website reporting of operations may generate additional comments and inquiries as to the interpretation of equipment movements and projected route completion times, respectively. The resources, if any, required as a result of increased interest in the City's operations have not been included as part of this report.

PHONG NGUY
Manager of Contracts, Field Services & Maintenance

DWAYNE DAWSON
Executive Director Operations

MARK WINTERTON
City Engineer, Corporate Leader, Environmental Protection & Transportation

HARRY TURNBULL
CIO/Executive Director of Information Technology

FOR. **ONORIO COLUCCI**
Chief Financial Officer & City Treasurer/ Corporate Leader Finance and Technology

HELGA REIDEL
Chief Administrative Officer

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APPENDICES:

DEPARTMENTS/OTHERS CONSULTED:
Name:
Phone #: 519 ext.

NOTIFICATION :

Name	Address	Email Address	Telephone	FAX

APPENDIX - Report #17662

CQ1-2014, Ability to put GPS data for snow Removal & Street Cleaing Equipment On-Line for Public to View

	One-Time Setup Costs (Capital)	Additional GPS Units (Capital)	Total Initial Capital Investment Required	Annual Fee (Operating)	Monthly Service Charges - Annualized (Operating)	Total Annual Operating Budget Required
Option 1 - Hosted Solution	$ 18,000.00	$ 60,000.00	**$ 78,000.00**	$ 5,400.00	$ 14,400.00	**$ 19,800.00**
Option 2 - Route Service API	$ 10,900.00	$ 60,000.00	**$ 70,900.00**	$ 4,455.00	$ 14,400.00	**$ 18,855.00**
Option 3 - Data Transfer API	$ 7,700.00	$ 60,000.00	**$ 67,700.00**	$ 1,620.00	$ 14,400.00	**$ 16,020.00**
Option 4 - Piggyback on a Recent Corporate GPS Purchase	Approximate cost of $130,000 for hardware, software, installation etc. on 50 vehicles					
Option 5 - Procure a New GPS System	Similar cost as Option 4 - to be determined					