CITY OF HAMILTON

PUBLIC WORKS DEPARTMENT

Corporate Assets and Strategic Planning Division

TO:	Mayor and Members General Issues Committee
COMMITTEE DATE:	January 29, 2014
SUBJECT/REPORT NO:	2014 Capital Budget requests for a Traffic Management System - Linc; Video Detection and Intelligent Transportation; Traffic Signal Communication System - Capital Budget (PW14013) (City Wide) (Outstanding Business List)
WARD(S) AFFECTED:	City Wide
PREPARED BY:	Martin White, C.E.T., Manager Traffic Operations and Engineering (905) 546-2424 Extension 4345
SUBMITTED BY: **SIGNATURE:**	Gerry Davis, CMA General Manager Public Works Department

RECOMMENDATION

(a) That approval for the 2014 Capital Project Traffic Management System - Linc 4041420110 ($75,000) capital budget request be deferred to the 2015 Capital Budget approval process;

(b) That the 2014 Capital Project Video Detection and Intelligent Transportation - 4041457411 ($600,000) be approved and that the 2.0 FTE's requested in the original Capital Budget submission be deferred to the 2015 approval process;

(c) That the 2014 Capital Project Traffic Signal Communication System - 4041420016 ($1,000,000) be approved and that the 2.0 FTE's requested in the original Capital Budget submission be deferred to the 2015 approval process;

(d) That the Public Works, Corporate Assets and Strategic Planning Division, Traffic Operations and Engineering Section report back in 2014 on staffing resource impacts of Capital projects, Planning and Development projects, and Strategic Safety Initiative projects affecting work load and service delivery;

(e) That Traffic Management System - Linc; Video Detection and Intelligent Transportation; Traffic Signal Communication System - Capital Budget (City

Wide) be noted as completed and removed from the Public Works Committee Outstanding Business List.

EXECUTIVE SUMMARY

At the General Issues Committee December 6, 2013 and subsequently at City Council on December 11, 2013 Report 13-022(a) was approved. The relevant section of the approved report stated:

(i) That the following items be "Parked" pending a report from staff to the Public Works Committee:

(aa) Traffic Management System - Linc - 4041420110 ($75,000)
(bb) Video Detection and Intelligent Transportation - 4041457411 ($600,000)
(cc) Traffic Signal Communication System - 4041420016 ($1,000,000).

The Public Works Department, Corporate Assets and Strategic Planning Division, Traffic Operations and Engineering Section is responsible for these three Intelligent Transportation Systems (I.T.S.) projects. As part of the 2014 Capital Budget process Traffic Operations and Engineering submitted fourteen capital projects for budget consideration. Eleven of these projects were approved at GIC and subsequently at Council on December 11, 2013. After discussion at GIC three projects were parked pending a staff report. Staff provides the following information and recommendations:

Capital Project Traffic Management System - Linc 4041420110 ($75,000)

This project originated several years ago upon a request from Councillor Whitehead to "control" vehicle volumes exiting the Lincoln Alexander into Ward 8 especially during periods of high motor vehicle congestion on the Lincoln Alexander freeway system. The project is divided into two stages, the first being the feasibility/design stage (2014 submission for $75,000) followed by the detailed design and construction phase (2017 to 2022 $2.75 m). Staff views this project and provision of an Intelligent Transportation System (ITS) Freeway Traffic Management System (FTMS) inclusive of the entire Linc and RHVP freeway system from Hwy 403 to the QEW. This is a City wide project to monitor our freeway systems, and to advise motorists of upcoming freeway conditions and minimize delay and impacts to road users. In 2014 the requested $75,000 was to be used to initiate the feasibility study. This is a large scale endeavour and creates a new capital asset for the City. There is insufficient "project management" staffing available within the current Traffic compliment to undertake the project feasibility study in 2014. The Capital submission sheet recommended a capital to current budget impact in 2014 of 2.0 FTE to the Traffic Engineering compliment/operating budget to undertake the project. These staff are required to manage and operate the FTMS upon its construction. Without dedicated staff the project cannot be completed or operated. It is recommended that this project be deferred until 2015 and that the Traffic Operations

and Engineering Section of Public Works provide a report in the summer of 2014 outlining the staffing conditions in the Traffic Operations and Engineering section to carry out current work demands and new projects.

Video Detection and Intelligent Transportation - 4041457411 ($600,000)

This is an asset replacement project and is part of the following initiatives: Accessible Pedestrian System (AODA), Traffic Signal Electrical Infrastructure Improvement Program, Traffic Signal Modernization and Improvement Program, Traffic Controller Replacement Program, Traffic Signal Communication System Modernization Program. These Capital Projects combine to comprise the Traffic Signal Traffic Management System Asset Upgrade Project. These projects will provide a significant upgrading to the City's current antiquated Traffic Management System.

The Video Detection and Intelligent Transportation (VDIT) project enables the City to replace the significantly aged and failing vehicle magnetic loop detection system, obsolete microwave vehicle detection systems and pedestrian actuated push buttons with modern state of the art video detection technology. The systems in use today vary in age from ten to thirty years. The technology itself is twenty years old and is well beyond current life cycle.

The new VDIT technology compared to the City's current technology is favourable in cost and it meets new legislation requirements. This Smart technology will provide the City ability to manage on demand traffic signal timings, bicycles and motorcycle detection, provides emergency traffic flow management, failure detection and correction, preplanned traffic timing plans to meet peak demand and regular traffic flows. This project also includes the purchase and initialization of the required Traffic Management software to operate the two way communications data flow, and video detection between the field and the Operators. In the Capital Budget submission 2.0 FTE's were identified as operating impacts of this project. These staff are identified as high skilled electronic staff to install manage and maintain the fibre optic and RF network and camera infrastructure. Staff are recommending that the FTE request can be deferred to the 2015 budget approval process. Staff also recommend that the 2014 project budget ($600,000) be approved. It is essential that the City continue with this asset replacement program, as the vehicle and pedestrian detection systems currently in place are obsolete and have begun to show systemic failure.

Traffic Signal Communication System - 4041420016 ($1,000,000)

This project has been underway for three years. All research development and testing have been completed, and staff have begun the process of tendering for all contracts and services required to implement the installation of the Communications network. The project is one of the companion projects to the Accessible Pedestrian System (AODA), Traffic Signal Electrical Infrastructure Improvement Program, Traffic Signal Modernization and Improvement Program, Traffic Controller Replacement Program,

Video Detection and Intelligent Transportation Program) comprising the Traffic Signal Traffic Management System.

The City's current Traffic Signal Communication Systems assets require urgent replacement. These assets are as old as 45 years and are failing.

The new state of the art replacement technology to be used, is the City's Information Services operated fibre optic cable network along with the state of the art wireless RF technology. This will connect the signals together with the master Traffic Management System computers. Staff recommend that the 2.0 FTE's identified in the capital budget submission be deferred to the 2015 budget process. These FTE's were identified as Traffic Management System operators and are necessary in managing and maintaining the Traffic Signal timing network and to monitor and operate the system. It is critical that that the asset replacement of the copper wire communication system continue as it has begun to show systemic failure. Therefore, staff recommend that the 2014 project budget ($1,000,000) be approved.

Alternatives for Consideration - See Page 8

FINANCIAL - STAFFING - LEGAL IMPLICATIONS

Financial: The three capital projects; Traffic Management System - Linc - 4041420110 ($75,000), Video Detection and Intelligent Transportation - 4041457411 ($600,000), Traffic Signal Communication System - 4041420016 ($1,000,000) total $1.675 m in 2014. The recommendations are to defer the Traffic Management System - Linc - 4041420110 ($75,000), and to move forward with the remaining two projects for a 2014 Capital Budget commitment of $1.6m in 2014.

Staffing: The three projects each have a Capital to Current Budget impact of 2.0 FTE's. It is recommended that the FTE's identified for these capital projects be deferred to 2015. Deferring the FTE impacts one year results in a savings of $508,000.

Legal: Implementation of these two projects will allow the City to remain in compliance with the Municipal Act (MMS) and the Highway Traffic Act.

HISTORICAL BACKGROUND

Hamilton's Traffic Management System:

A modern Traffic Management System (TMS) is made up of an array of intelligent transportation systems such as advanced traffic signal controllers, central control system software and vehicle video detection cameras that monitor traffic flow on the City's road network. All system components must be connected via a city wide communication network in order to bring the system to life. Traffic Management Systems are typically connected to a central location in order to allow operators to centrally monitor and control the traffic signal assets.

The current plan is to replace Hamilton's failing aged Traffic Management System assets with new technologies which will meet the demands of a modern integrated Traffic Management System. The following components make up Hamilton's planned TMS.

- Field wiring upgrades.
- Advanced Traffic Signal Controllers.
- Local poles and hardware upgrades.
- Vehicle and pedestrian detection asset upgrades.
- High speed and bandwidth communication system asset upgrade.
- Advance central system control software asset upgrade.
- Traffic control room.
- Transit priority software and field components

Today the current signal network is generally unsupervised and no traffic flow performance data is collected to help improve the system's operation. This is a direct result of current technology limitations and the overall condition of our communication system. Signal crews are continuously correcting problems with the existing system with limited success as the system has reached the end of its useful life span. Therefore, the current system does not allow staff to centrally monitor or control the signal network. This limits staff's ability to identify and correct deficiencies in the system and to provide on demand traffic signal timings and system monitoring. Central monitoring and control will empower traffic management system operators to take full advantage of all existing and new traffic control assets. Some of the potential benefits gained through the TMS central monitoring and control are:

- Real time signal network monitoring.
- On demand traffic signal timings
- Emergency Detour Traffic Signal timings
- Special Event timing and traffic control (Tiger Cat games, Copps Coliseum events, Pan Am game events etc.)
- Connection to Metrolinx Software, LRT and BRT
- Connection to MTO freeway traffic management center and software
- EDR routing, connections and route planning with MTO
- Video feed for EOC use during declared emergencies
- Central storage of signal timing database.
- Traffic signal operation status monitored/logged on 24/7 basis.
- Live verification of system health/status.
- Centrally commanded ITS applications.
- Communication and interaction with regional traffic management systems.
- Live verification and response to Councillor/public traffic concerns.
- Prioritizing of traffic signal network repairs based on live data.
- Ongoing monitoring and improvement of signal timings.

- Ability to conduct On-the-fly emergency signal timing changes.
- Signal timing upload/download from traffic management centre.
- Provides a central control hub to deal with City wide traffic emergencies.

History of Hamilton's Traffic Management System:

In the 1970's City of Hamilton staff originally installed a City owned copper communication system and a simple traffic signal master control system. This system allowed staff to provide morning and evening rush hour signal plans and an off-peak signal plan. In the late 1990's some of the fifty pair cable was replaced with newer 24 pair cable in an effort to prolong the life of the system. Nevertheless, a substantial portion of today's communication system still runs on the old 1970's technology cable. Hamilton's existing copper communication lines are between twenty and forty years old and have exceeded the end of their useful life span. The current 1980's era vehicle and pedestrian detection and the central control software is also out of date and does not allow operators to control the signal network in real time. Therefore, on demand signal response is not available, special event timings and emergency signal timings cannot be implemented and the current system does not allow for failure monitoring and system status reporting. The Capital Projects being recommended in this report will allow the City to replace obsolete assets and to operate a modern state of the art Traffic Management System. This will allow the City the necessary control functions to provide Traffic Signal Operations which will optimize traffic flows on the road network in a safe and efficient manner.

Other Area Municipalities.

The following municipalities are some of Ontario's Municipalities currently operating a modern Traffic Management System similar to the system being constructed in Hamilton.

- City of Mississauga
- City of Ottawa
- City of London
- City of Toronto
- City of Brampton
- City of Burlington
- City of Oakville
- City of Windsor
- Region of Niagara
- Region of York
- Region of Waterloo
- Region of Peel

With the approval of the Capital Project Video Detection and Intelligent Transportation - 4041457411 ($600,000) and the Capital Project Traffic Signal Communication System -

4041420016 ($1,000,000) work can continue on the asset replacement programs necessary to build the Hamilton Traffic Management System.

POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS

The City is required to maintain the Traffic Signal System network in compliance with the Municipal Act, Minimum Maintenance Standards; and the Highway Traffic Act (Ontario).

RELEVANT CONSULTATION

Traffic Operations and Engineering staff have consulted with other Municipalities, iTrans and DelCan TMS Consultants.

ANALYSIS AND RATIONALE FOR RECOMMENDATION

The Video Detection and Intelligent Transportation Capital Project and the Traffic Signal Communication System Project are two asset replacement capital projects that form a part of the City's initiative to build and operate a state of the art modern Traffic Signal Traffic Management System along with the Accessible Pedestrian System (AODA), Traffic Signal Electrical Infrastructure Improvement Program, Traffic Signal Modernization and Improvement Program, and Traffic Controller Replacement Program. These projects will provide a significant upgrading to the City's current antiquated Traffic Management System components. The Video Detection and Intelligent Transportation (VDIT) project enables the City to replace the significantly aged and failing vehicle magnetic loop detection system, obsolete microwave vehicle detection systems and pedestrian actuated push buttons with modern state of the art video detection technology. The technology in use today is twenty years old and is well beyond current life cycle. The replacement technology will use intelligent video detection to replace the antiquated detection systems. The City's current Traffic Signal Communication Systems assets require urgent replacement. These assets are as old as 45 years and are failing. The new state of the art replacement technology to be used, is the City's Information Services operated fibre optic cable network along with the state of the art wireless RF technology. This will connect the signals together with the master Traffic Management System computers. These Smart technologies will provide the City the ability to manage on demand traffic signal timings, bicycles and motorcycle detection, special event traffic signal timings (Tiger Cats, Pan Am etc) provide emergency traffic flow management, failure detection and correction, preplanned traffic timing plans to meet peak demand and regular traffic flows. Failure to replace these systems will lead to systemic failure of the existing Traffic Management capabilities in five to eight years. It is recommended that the funds be approved in the 2014 Capital Budget to implement these 2014 Capital Projects.

The Capital Project Traffic Management System - Linc Project is a new initiative which provides for an Intelligent Transportation System (ITS) Freeway Traffic Management

System (FTMS) inclusive of the entire Linc and RHVP freeway system from Hwy 403 to the QEW. This is a City wide project to monitor our freeway systems, and to advise motorists of upcoming freeway conditions and minimize delay and impacts to road users. In 2014 the requested $75,000 was to be used to initiate the feasibility study. This is a large scale endeavour and creates a new capital asset for the City. There is insufficient "project management" staffing available within the current Traffic compliment to undertake the project feasibility study in 2014. It is recommended that this project be deferred to the 2015 Capital Budget process.

These three projects have a Capital to Current Budget impact of 6.0 FTE's in total. It is recommended that the FTE's identified for these capital projects be deferred to the 2015 capital budget submission. Deferring the FTE impacts one year results in a savings of $508,000.

ALTERNATIVES FOR CONSIDERATION

The alternative is to not implement the two recommended Capital Projects. The result will be a Traffic Signal System network system failure projected to occur in approximately five to eight years.

ALIGNMENT TO THE 2012 - 2015 STRATEGIC PLAN

Strategic Priority #2

Valued & Sustainable Services

WE deliver high quality services that meet citizen needs and expectations, in a cost effective and responsible manner.

Strategic Objective

2.1 Implement processes to improve services, leverage technology and validate cost effectiveness and efficiencies across the Corporation.

APPENDICES AND SCHEDULES ATTACHED

None