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## For Information Only

### Timelines and Resources Required for Improved Project Management of Large Capital Infrastructure Projects

#### Resolution

For Information Only

#### Finance Implications

There is no immediate impact on the municipal tax levy as this report is to provide information for consideration of possible additional resources during future deliberations for capital projects.

## Executive Summary

There are many success criteria to judge the results of projects but four major distinct dimensions are widely accepted by the Project Management industry as success criteria:

- Project efficiency (i.e. achieving goals on time and within the budget);
- Impact on the customer;
- Direct business and organizational success; and
- Preparing for the future (i.e. operational readiness).

The “iron triangle” or “triple constraint” (i.e. scope, time and cost) is used to monitor and control projects and deviation from its baseline. Improving data quality and comparing historical information across projects improve forecasts and project performance. Active monitoring increases the chance of project success.

Increased funding and a focus on asset management have resulted in a trend of increasing capital expenditure on the City’s infrastructure. Without corresponding increase in project engineering and management resources in Engineering Services, the capability to successfully deliver capital projects in accordance with project management principles could be jeopardized.

Professional Engineers of Ontario (PEO) and the Project Management Institute (PMI) have published statistics that state that, on average, approximately 15% of project costs are attributable to project engineering (10%) and project management (5%). Project Management resources can be either internal or external; however, internal resources are also required to manage external resources.

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## Background

Engineering Services is responsible for capital project delivery identified in the annual capital budget. For some time, Engineering Services has been adopting improvements in Project Management consistent with industry best practices to design and manage construction contracts. A report on ***"time lines and resources required to facilitate a quicker project management process for large capital infrastructure projects"*** was requested by the Finance and Administration Committee on January 19, 2016 as a "Parking Lot" request.

## Project Management Initiative

As discussed, Engineering Services has implemented some changes to project management processes. The primary objective of this initiative was to deliver defined scopes, at the quality, on schedule, and within budget, during the construction phase of capital projects.

Four (4) Project Managers were appointed with responsibilities consisting of 50% direct duties (i.e. contractor interactions, construction focused) and 50% indirect duties (i.e. administration, documentation, stakeholder management, etc.). Project management processes required 250+ additional pieces of correspondence including minutes of meetings, complaint responses, change orders, dispute resolutions, and other communications. Process requirements to manage the level of capital expenditure in accordance with project management principles exceeded the assigned resources.

The experience gained during this initiative has helped to define and establish the project management resources required to successfully deliver capital projects from concept to close-out.

## Timely Delivery of Projects

Assigned resources are actively involved in projects to ensure the timely delivery of the project; however, situations arise beyond their control that impact project performance. The level of risk (i.e. unspent capital, reduced scope, lesser quality) will only continue to increase as capital investment increases until the required project management framework is established and fully resourced.

## New Needs or Concepts

As needs are required or new concepts are introduced, all the planning and execution of this work is assigned to the Engineering Services Division for engineering, design, drawings, tendering, construction management, and managing external services (i.e. consultants) for engineering and project management. The project management processes used during the construction phase of a project equally applies to the engineering phase of a project.

## Capital Budgets and Engineering Services

The current capital program provides approximately \$70M in capital funding for infrastructure (i.e. roads, W/WW). Currently, approximately 48% (i.e. \$34M) of projects being funded from the capital envelope is engineered and administered by Engineering Services staff. The current budget expenditure for Engineering Services is approximately \$5.5M. About 80% (i.e. \$4.4M) of these expenditures is involved with engineering and project management. This level of CGS engineering and project management services equals approximately 13% of the capital funding projects which is less than the 15% identified by PMI and PEO as best practice level of resourcing for project engineering and management.

It should be noted that not all of the resources allocated to engineering services are directly attributable to specific capital projects. It is also important to note that significant fluctuations in capital projects do not necessarily require a directly proportional change in project management services.

The project complexity and current resource levels in Engineering Services dictate whether internal or external resources are used to deliver capital projects. Prior to 2011 the capital program was approximately \$58M; today it is approximately \$70M. However, the Engineering Services Division has not had the funding to increase the internal resources required to manage the additional \$12M in capital funding.

## **Conclusions**

As capital investment on infrastructure increases, project management resources may need to be increased to ensure the delivery of quality projects on time and within budget to meet the expected outcomes of the work.

Data collection and analysis is continuing to help decide the level of core resources (i.e. roles, responsibilities, and size of project teams) to be capable of successfully delivering a base level of capital projects and manage external consultants that supplement both engineering and contract administration.

## **Recommendations**

It is recommended that an appropriate level of resources necessary to successfully deliver capital projects be considered when deliberating over any capital expenditure, particularly when unanticipated additional funds become available between budget cycles.