Performance Measurement of On-Street Construction

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1. Introduction

The Transportation and Streets Department is responsible for the development and implementation of plans and programs to manage existing and future transportation infrastructure and public transit services that are safe, efficient, and effective.

The Department consists of five branches: Transportation Planning, Streets Engineering, Traffic Operations, Edmonton Transit, and the Transit Implementation Office. The work performed by Transportation Planning, Streets Engineering, and Traffic Operations comprise the City's Roadways Program, in which on-street construction occurs for the building and maintaining of Edmonton's roadway network. On-street construction specifically involves the work of the Streets Engineering and Traffic Operations branches.

The function of the Streets Engineering Branch is to design, construct, and maintain the roadway network, and the function of the Traffic Operations Branch is to provide and maintain street system control to manage traffic on the roadway network.

2. Background

The audit of on-street construction is part of the Office of the City Auditor's (OCA) 2005 Annual Work Plan. After meeting with the General Manager and the Branch Managers for the Roadways Program and conducting a basic risk assessment, it was mutually decided to review the performance measurement system currently used to manage the overall process of on-street construction.

3. Objective

The goal of this audit was to assess the effectiveness of the performance measurements used in the management of on-street construction of the Roadways Program. This was done to provide assurance that the overall process is being adequately measured and is aligned with the department's strategic goals.

3.1. Audit Objective

The OCA's objective was to determine whether effective performance measurements exist to support effective and efficient management of on-street construction in the Roadways Program.

3.1.1. Criteria:

- Performance measurements and operational metrics are aligned with strategic goals and external needs.
- Performance measurements provide adequate coverage of the seven dimensions of performance (efficiency, effectiveness, productivity, quality, innovation, quality-of-work life, and budgetability).
- Process improvement measures are alligned with corporate intiatives, key challenges, service challenges, and operational measures.

4. Scope and Methodology

4.1. Audit Scope

The scope of this audit included a review of all information pertaining to the global measurement of on-street construction and related strategic goals, initiatives, processes, and activities in the Roadways Program.

4.2. Methodology

As part of the planning process, the OCA reviewed the *Transportation Master Plan* as well as the *2005 – 2007 Business Plan, Transportation and Streets Department*. These documents contain the strategy, goals, challenges, initiatives and measurements used by the Department in its operations. The information from these source documents along with interviews and meetings with management determined the audit scope and the subsequent methodology used in assessing the performance measurements used in managing on-street construction.

During the course of the audit, the OCA developed a listing of the inputs, activities, sub-processes, core processes, functions, outputs, quality of output, outcomes, key challenges, service challenges, corporate business plan and department initiatives, and strategic goals for each of the three branches involved in the Roadways Program. The processes that were directly related to the management of on-street construction were highlighted and the existing operational measures were examined in terms of coverage and alignment with departmental goals, strategic measures, and initiatives.

The OCA also conducted an exercise with key people in Transportation and Streets to develop a set of integrated performance measures for on-street construction that directly impact the department's strategic measures. The exercise identified the key outputs of different sections, their relationship to each other, along with the attributes that can be measured and possible indicators. This was done to determine whether an integrated performance measurement system could be developed and to serve as a means to further evaluate the current state of performance measurement.

5. Observations and Analysis

The branch performance measures that exist within the Transportation and Streets Department were mostly developed in isolation of one another. The Department does not have an integrated performance measurement system for the on-street construction process that involves all associated sections in the Roadways Program. The Streets Engineering and Traffic Operations Branches have varying degrees of performance measurement established for their operations.

Traffic Operations has an integrated set of performance measures for the branch that are connected to similar measures in its sections. The performance dimensions covered collectively are effectiveness, quality, productivity, quality-of-work life, innovation, and budgetability. The attributes being measured are on-time delivery, customer satisfaction, task completion, safety, budget variance, and continuous improvement. The measures being used focus on work processes, outputs, and outcomes. Collectively, they align with all of the Department's long-term strategic goals, three strategic measures, and four departmental initiatives. The measures are used by management for both control and improvement of operations.

The Streets Engineering Branch does not have an integrated set of performance measures. Two of its sections have several measures associated with on-street construction, while one section only has a couple of measures. The performance dimensions covered collectively are efficiency, effectiveness, quality, productivity, quality-of-work life, innovation, and budgetability. The attributes being measured are estimating accuracy, cost of engineering service provision, customer satisfaction, project management, and roadway repair and maintenance. The measures focus on inputs, work processes, and outputs. Collectively, the measures align with all of the Department's long-term goals, three strategic measures, and eight departmental initiatives. The measures are primarily used for control with some used for improvement of operations.

The results of the OCA's exercise with branch management resulted in high performance measurement integration across the branches and sections, strong alignment with departmental goals and strategic measures, and strong coverage of the seven dimensions of performance measurement.

Table 1 illustrates the number of performance dimensions currently covered, along with the number of Departmental goals aligned with, and the number of strategic measures and initiatives impacted for the existing measures in each section. The thirteen initiatives and twelve strategic measures selected for the evaluation are directly related to the work performed by Streets Engineering and Traffic Operations. These goals and select initiatives and strategic measures were also used in assessing the alignment and impact of measures developed in the exercise with Roadway Construction. As indicated in Table 1, the coverage and alignment varies for each of the sections, with some being strong and others relatively weak.

Table 1: Performance Measures vs. Department Goals (see legend below)

Branch/ Sections	# of PM	# of PD covered (of 7)	# aligned with Dept Goals (of 7)	# of SM impacted (of 12)	# of Dept. Initiatives impacted (of 13)	Comments
Streets Engineering *(Current Performance Measures)*						
Roadway Design	2	1	2	2	8	Measures are used primarily for control
Roadway Construction	10	6	2	3	8	Measures are used for control and improvement.
Roadway Maintenance	11	3	7	3	0	Measures are used primarily for control
Traffic Operations *(Current Performance Measures)*						
Traffic Control	12 (6/unit)	6	7	2	4	Measures are used for control and improvement.
Signals & Street Lighting	6	6	7	3	0	Measures are used for control and improvement.
On-Street Construction Integrated Performance Measures *(from exercise)*						
*Both Branches**	17	6	7	11	9	Measures are primarily used for control and some for improvement.

** The sections covered were Roadway Design, Roadway Construction, Roadway Maintenance, Traffic Control, and Signals and Street Lighting.*

***Legend**: PM = Performance Measures; PD = Performance Dimensions; SM = Strategic Measures*

6. Conclusion and Recommendation

The branches within the Transportation and Streets Department do not have a consistent approach and methodology to develop integrated performance measures among its branches and sections that would facilitate development of global performance measures for on-street construction. This results in a fragmentation of measurement for the on-street construction process with weak to strong alignment to departmental goals, weak to moderate alignment with departmental strategic measures, and weak to strong coverage of the dimensions of performance measurement.

In contrast, the exercise conducted to develop an example of an integrated performance measurement system resulted in high performance measurement integration across the branches and sections, strong alignment with departmental goals and strategic measures, and strong coverage of the seven dimensions of performance measurement. Given these results, it is the opinion of the OCA that an integrated set of measures could be developed for on-street construction with the involvement of representatives from Streets Engineering and Traffic Operations using techniques demonstrated in the exercise.

Recommendation 1	Management Response and Action Plan
The OCA recommends that the Transportation and Streets Department develop an integrated performance measurement system for on-street construction in the Roadways Program.	**Accepted** *Comments:* The performance measures that have developed over time need to be aligned with the department's strategic objectives. We look forward to working with the OCA in aligning these measures. *Planned Implementation:* June 30, 2006 *Responsible Party:* Joe Kabarchuk, P.Eng., Director of Roadways Construction