Roadways Design, Construction, and Maintenance - Civic Service Review

Recommendation
That the Standing Policy Committee on Environment, Utilities and Corporate Services refer this report to the Standing Policy Committee on Finance recommending:

1. That the information be received in conjunction with the pending audit on Roadway Maintenance and Rehabilitation; and
2. That the report of the General Manager, Corporate Performance Department dated November 9, 2015 be forwarded to City Council for information.

Topic and Purpose

The purpose of this report is to provide a summary of the Roadways Design, Construction and Maintenance Civic Service Review (CSR). Improvements in process and operations identified in this summary will improve service to citizens through increased effectiveness and will improve efficiency in the delivery of civic services.

Report Highlights

1. There are two key components of the CSR Process; efficiencies identified by employees delivering the service, and where warranted, recommending new service levels for activities where public expectations are not being met.
2. The Public Works Division has prepared a Winter Road Maintenance - Level of Service document which outlines recommended levels of service for Winter Road Maintenance that will be considered at the Standing Policy Committee on Transportation.
3. The efficiencies include; improved operational planning and coordination of roadways design/development and coordinated maintenance to reduce costs and avoid duplication of efforts, streamlining of IT for the Public Works Call Centre, updated standards and improved training and education for staff, resulting in increased efficiencies of over $2.1 million.
4. Additional efficiency gains resulting from improvements seen through the Building Better Roads program total over $1 million to date and are expected to result in substantially greater savings in the long-term.

Strategic Goals

This report supports the Strategic Goals of A Culture of Continuous Improvement, Moving Around, and Asset and Financial Sustainability. Process improvements focus on identification of root cause issues and innovative and creative solutions that will provide optimal service improvements. Increasing efficiency and effectiveness in roadways design, construction, and maintenance ensures people and goods can move around the city quickly and easily.

Background

City Council, at its meeting held on December 3 and 4, 2013, approved the Continuous Improvement Strategy which includes the following three components:

- Annual Civic Service Reviews - an operational review process to find ways to control expenditures and to seek efficiencies in the delivery of municipal programs and services.
- Internal Process Reviews - focus on identifying and removing redundancies and waste within existing processes to increase efficiencies in civic operations.
- Building capacity in the corporation through innovation coaches and empowering employees.

See Attachment 1 for the Continuous Improvement Strategy Overview.

Report

The impact on citizens is a key consideration during the planning, design, construction, and maintenance of civic roadways. Citizens expect to be able to move around the city safely and efficiently with limited disruption, on roads that are in good condition. Effective planning, communication, and budgeting in future roadways design and construction will have a positive impact on citizen satisfaction and ensure they are receiving good value for their tax dollars.

On February 10, 2014, City Council approved the recommendation that the design, construction, and maintenance operations of civic roadways undergo an Annual Civic Service Review in 2014. The review took place in 2014 and the teams began implementing the key findings in 2015.

There were a number of recommendations for improvement from short-term, relatively quick solutions to those that will take longer to implement and may require an investment in order to achieve long-term financial gains. This report outlines the key findings as they relate to improved efficiency and increased effectiveness in roadways planning and operations. Attachment 2 provides a summary of the key findings on efficiency and effectiveness.

<u>Review for Efficient and Effective Service</u>

Employees at all levels from frontline staff to directors involved in the design of roads, and the construction and maintenance of roadways came together to review each of their operations and identify opportunities to improve overall efficiency and effectiveness within their service lines and better align our services to citizen expectations.

Processes were reviewed so there was clarity of how we are currently delivering our services. This was followed by identifying what our citizens expect, and opportunities to change or redesign our processes so that we are as efficient as possible and effective in delivering what citizens want.

The following issues were addressed in the CSR:

- Safety
- Communication
- Operational Planning
- Budget
- Standards
- Training and Education
- Levels of Service

Attachment 3 is an overview of the CSR. The following provides some highlights of changes being implemented:

- Optimization Teams established to ensure the impact of design on long-term maintenance is considered at the planning stage for new roadways infrastructure and reflected in the operating budget.
- Prequalification of Contractors resulting in a reduction in the amount of time Inspectors spend following up on contractor issues resulting in potential savings of approximately $225,000.
- Coordinated operational planning resulting in reduced rework; expected increased efficiencies of $1.5 million.
- Streamlining of IT systems for the Public Works Call Centre to reduce the amount of time staff spend searching for information, improving the response time to citizens, and allowing staff to address a greater number of inquiries or complaints within the same timeframe. Combined with a reduction in the number of inquiries to the Transportation and Utilities Department in 2015. The value of staff time is estimated to be over $200,000.
- Improved training and education for staff operating civic vehicles and equipment resulting in reduced damage to equipment caused by motor vehicle collisions, resulting in savings over $170,000.

Service Level Review

By defining and approving service levels for civic services, citizens will know what they can expect for this service. The Administration will be submitting a report on Winter Road Maintenance – Levels of Service to the Standing Policy Committee on Transportation. This report outlines recommended levels of service for Winter Road Maintenance.

The Winter Road Maintenance - Levels of Service document identifies the specific tasks and measures for the following winter activities:

- Snow grading
- Snow removal
- Snow storage site management
- Sidewalk and pathway grading
- Roadway Ice Management

Levels of service will be prepared for City Council's consideration on other services such as maintenance for the following: back lanes, potholes, and utility cuts.

Communication Plan

The CSRs provide an opportunity for the public to learn more about the City's operations, the costs to deliver the services, and to provide feedback and input into how the City can deliver any of its services more efficiently. The approved Service Levels will be communicated through 311/Service Saskatoon so citizens know what services they can expect. Citizens will have the opportunity to provide input into levels of service as well as the budget using the Shaping our Financial Future budget tool.

Results from the Civic Service Reviews will be communicated on the City's website in the 'Latest Strides' and/or 'City Spotlight' sections of the *Our Performance* page at www.saskatoon.ca/strides.

Financial Implications

As part of the Roadways CSR, it was identified that a review of the operating budget estimates was necessary in order to ensure they accurately reflect the 'operating unit cost per lane kilometre' for roadways maintenance. Unit cost will be utilized in the definition of maintenance service levels to ensure operating budgets accurately reflect the total costs required to maintain the current inventory at the approved service level. Additionally, this will provide accurate information for future operating budget requests to maintain and preserve additional lane kilometres coming online as Saskatoon continues to grow.

The financial implications related to efficiency gains will be quantified and will be reallocated to fund other strategic and operational priorities and/or may contribute to a reduction in the base budget.

Other Considerations/Implications

There are no policy, environmental, privacy, or CPTED implications or considerations.

Due Date for Follow-up

The City's Internal Auditor, Pricewaterhouse Coopers, recently completed a Value for Money Audit for Road Maintenance to evaluate the economy, efficiency, and effectiveness of the Roadways Maintenance program. This report will be considered at a future Standing Policy Committee on Finance. The Administration is recommending that the Roadways CSR be considered in conjunction with the Value for Money Audit.

Reports related to key findings implemented by Major Projects, Construction & Design, Public Works and Transportation (i.e. asset and maintenance service levels) will be brought forward to the Standing Policy Committee on Transportation for approval. Action plans and recommendations will be incorporated into the annual business planning and budgeting process for several civic divisions involved in the design, construction, and maintenance of civic roadways.

Public Notice

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Attachments

1. Continuous Improvement Strategy Overview
2. Summary of Key Findings on Efficiency and Effectiveness
3. Roadways Efficiencies and Effective Service Delivery

Report Approval

Written by:	Kim Matheson, Director, Strategic and Business Planning
Reviewed by:	Jeff Jorgenson, General Manager, Transportation and Utilities Department
Approved by:	Catherine Gryba, General Manager, Corporate Performance Department

Continuous Improvement Strategy Overview

In 2014, the Administration began our Civic Service Reviews (CSR). We have made good progress, and have learned much. One of our learnings has been that there are several components to a complete CSR process. To try and bring some clarity, we are recommending a framework to the overall program.

Framework for Civic Service Reviews:

1. Service Level
    a. Asset Service Level
    How the assets and services are preserved, renewed, and funded to ensure the quality of life for citizens is sustained or improved, and include:
    - Inventory of Asset(s)
    - Condition of Asset(s)
    - Costs to Preserve Asset(s)
    - Gap in Funding
    - Funding Plan/Investment Strategy

    b. Maintenance Service Level
    The maximum interval between tasks or activities required to maintain the defined level of service are referred to as Maintenance Service Levels, and include:
    - Description of Service
    - Definition of Service Level
    - Cost to Maintain Asset
    - Timelines to Achieve Service Level
    - Service Level Approval

2. Efficiency
    a. Operational Efficiency
    A review of current processes identifies opportunities to improve efficiency and increase the effectiveness of the service and /or program. Savings resulting from the improvements will be quantified and reported as part of the overall CSR.

Knowledge Base for Service Saskatoon

All of this information can be used to prepare our knowledge base for Service Saskatoon and the 311 Call Centre.

Communication Plan

The CSRs provide an opportunity for the public to learn more about the City's operations, the costs to deliver the services, and to provide feedback and input into how the City can deliver any of its services more efficiently. Citizens will have the opportunity to provide input into levels of service as well as the budget using the Shaping our Financial Future budget tools.

Results from the CSRs will be communicated on the City's website in the 'Latest Strides' and/or 'City Spotlight' sections of the *Our Performance* page at www.saskatoon.ca/strides.

Summary of Key Findings on Efficiency and Effectiveness

Key Finding	Estimated Savings
Prequalification of Contractors resulting in a reduction in the amount of time Inspectors spend following up on contractor issues.	$225,000 Assuming 25% of contracts (potentially 25 contracts a year) require additional time of approximately 300 hours over the course of a difficult contract.
Coordinated planning and scheduling of preservation and maintenance work resulting in reduced rework and reduced maintenance completed on roads that have surpassed their lifespan and require replacement as opposed to repair.	$1.5 million Related to changes in the detailed design and construction phases
Streamlining of IT systems for the Public Works Call Centre will reduce the amount of time staff spend searching for information, improving the response time to citizens and allowing staff to address a greater number of inquiries or complaints within the same timeframe.	Staff time value of approximately $165,000 per year.
Reduction in the number of inquiries to the Transportation and Utilities Department results in a decrease in the amount of time spent following up, allowing the time to be reallocated to programming and service delivery.	Staff time value of approximately $50,000 per year.
Improved Training and Education for staff operating civic vehicles and equipment resulting in reduced damage to equipment caused by motor vehicle accidents	Over $170,000 in costs related to deductibles and vehicle/equipment replacement
A new de-icing product and modified application technique reduced the amount of sand required by 28% and improved winter driving conditions.	$250,000 in aggregate costs
Standardized tender process and tender for all roadways contracts reducing the average contractor cost per snow event by 27%.	Over $715,000 in contract costs

Roadways Efficiencies and Effective Service Delivery

There are many civic divisions involved in planning, design, construction, and maintenance of roadways. The Roadways Civic Service Review (CSR) focused mainly on the processes for new and existing roadways. Processes related to water and sewer, bridges and sidewalks were not included; however, many of the opportunities to improve effectiveness and efficiency outlined in this report are also applicable to those processes.

Background

The civic divisions described in the following sections are responsible for the planning, design, construction, maintenance, and preservation of over 4,000 lane kilometres of roadways of various classifications. The table below summarizes the classifications and total number of lane kilometres for each.

Classification	**Total Kilometres**
Expressway/Ramps	165
Arterial	245
Collector	240
Local	700
Boundary	15
Total Equivalent Lane Kilometres	**4,005**

Roadways Planning, Design, Construction, and Maintenance Functions

Transportation & Utilities - Major Projects Division:

Major Projects is responsible for providing project delivery services for the Corporation for major projects such as the North Commuter Parkway/Traffic Bridge Project.

It is also responsible for stewarding the asset condition status, rehabilitation programs, and funding levels for our roadways, bridges, and water and sewer collection and distribution system.

Construction & Design Division:

Construction & Design delivers municipal infrastructure projects, provides regulatory oversight, maintains infrastructure records, and provides expertise, advice, and guidance on municipal infrastructure. These services allow the City of Saskatoon to provide and maintain a high quality of infrastructure in a safe and cost effective manner to its Citizens.

Construction & Design develops, maintains, and enforces the City's standard construction specifications and drawings for roadway, sidewalk, lane, and water and sewer infrastructure.

Public Works Division - Roadways Section:
Public Works is responsible for the operation, maintenance, and preservation of roads, lanes, sidewalks, water mains, sanitary sewer mains, storm sewer mains, and waste handling and disposal services.

The Roadways section of the Public Works division provides services for the operation and maintenance of all roadway assets, including roads, bridges, sidewalks, lanes, and pathways. The Section manages annual programs for sidewalk maintenance, paved street maintenance, lanes and earth-street maintenance, drainage, snow and ice control, earth dump sites, and street sweeping. As an example, Public Works maintains approximately 4,005 lane km, at an approximate average annual cost of $3,500/km. An approximate average cost is provided as roadways maintenance activities are highly variable and actual costs associated with road maintenance may be affected by weather, age and design of roads, heavy-truck traffic, and deferred maintenance as examples.

The Roadways section also assists Major Projects in defining long term funding needs for asset preservation and setting annual programs for major rehabilitation.

Transportation Division:
Transportation provides planning, design, regulation, and operation of the City's transportation network. The goal of Transportation is to provide for the safe and efficient movement of people, goods, and services within and through the City, in a cost effective manner.

The Transportation Planning Group provides long-range planning and design for the City's transportation facilities to foster Saskatoon's economy and growth while minimizing environmental impact. The Group commissions external consultants to design transportation infrastructure such as bridges and interchanges.

Introduction
The Executive Committee approved the recommendation that the Roadways design, construction and maintenance processes undergo a CSR in 2014. Two main issues were explored during the review: opportunities for operational efficiencies, and the definition of service levels including cost to deliver the service.

During the CSR, the team reviewed the current state of roadways design, construction, and maintenance. They examined what success would look like from the citizen's perspective and finally examined what the processes for design, construction, and maintenance of civic roadways should be.

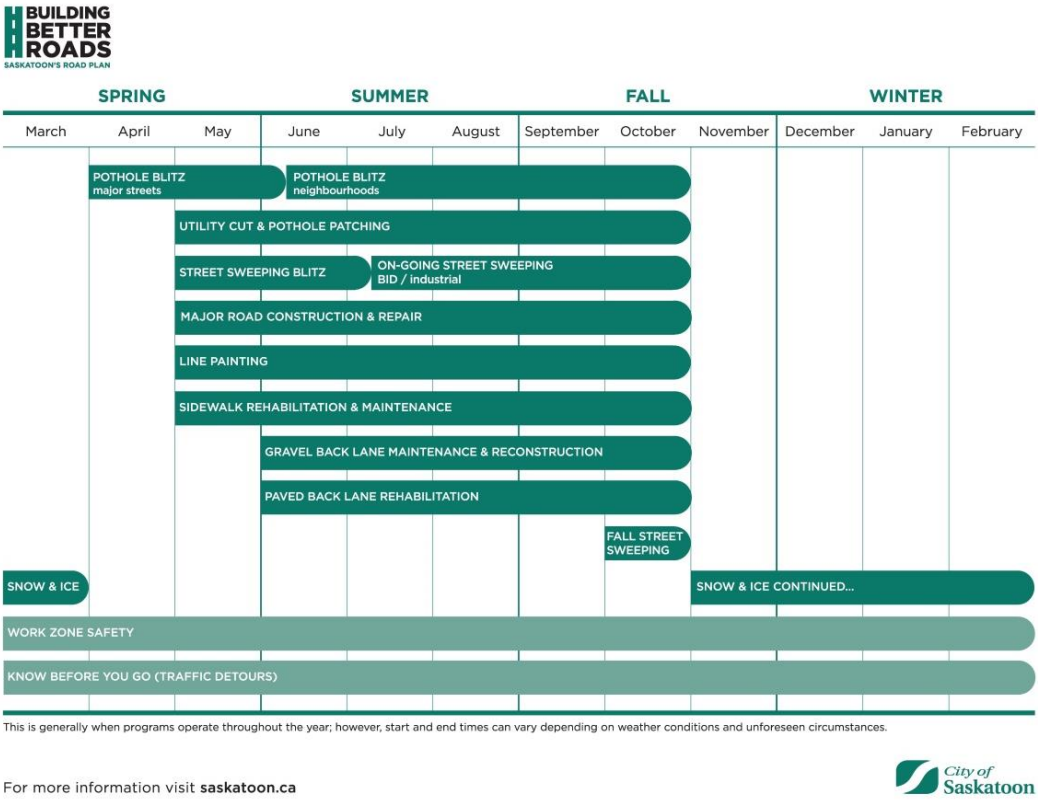
This report focusses on opportunities for operational efficiencies identified in the CSR, many of which have been implemented or are underway in 2015. The Administration will be submitting a report on Winter Road Maintenance – Levels of Service to the Standing Policy Committee on Transportation. Future reports will address other

roadways asset, preservation, and maintenance service levels and will be submitted to Committee for approval.

Report

Safe and durable roadways are essential for the economic health and success of a community. These assets are highly visible, consume a lot of space in every neighbourhood, and are costly to construct and maintain.

The Building Better Roads calendar illustrates the annual schedule for roadways maintenance and preservation activities. The teams involved with roadways have been working on more active planning by evaluating the previous season's productivity and costs and then begin planning for the next season well before the season begins. The planning process continues to make strides in improvement each season. Active planning, combined with the increased investment in roads, is yielding significant productivity gains and service enhancements as highlighted in the 2015 Results at www.saskatoon.ca/betterroads.



During the CSR, the following seven elements were identified as integral to all roadways projects:

1. **Safety** – public and employee safety are a core consideration that impacts roadway design, construction, and maintenance.
2. **Communication** – ensuring internal, public, and stakeholder groups have timely and appropriate information is a central aspect of success.

3. **Operational Planning** – involving all stakeholders early on in the planning and design process assists in accurately planning and budgeting for the entire lifecycle of a road prior to starting construction.
4. **Budget** – improving accuracy in budgeting by defining unit costs and identifying direct operational impacts at the start of a project will ensure funding is available in the appropriate budget year.
5. **Standards** – ensure standards are up to date and consistent with other divisions or sections. All employees working on roadways design, construction, and maintenance are aware of, and understand all relevant corporate standards.
6. **Training and Education -** providing the necessary training creates an overall knowledgeable staff with employees who can take over for one another as needed, work on teams or work independently as needed. Increased focus on training will also help reduce motor vehicle collisions and associated costs.
7. **Levels of Service** – defined and approved levels of service are reviewed and communicated to citizens, stakeholders, and City Council.

Next Steps

Staff involved in all aspects of roadways design, construction, and maintenance (Planning, Transportation, Construction & Design, Major Projects, and Public Works) continue to identify actions required to implement the suggested improvements. Consideration is given to benefit citizens, cost of implementation, and potential efficiencies to be gained following implementation. The teams have been making strides in improving the overall efficiency and effectiveness of roadways design, construction, and maintenance and have also made significant improvements in citizen satisfaction.

A CSR of Fleet Services was conducted on recommendation of the Roadways CSR. Improvements in the efficiency and effectiveness of Fleet Services CSR is also expected to have a resulting improvement in roadway maintenance efficiencies as well as a cost savings to the organization as equipment breakdowns and downtime are expected to be significantly reduced. The report on the Fleet Services CSR will be submitted to the Standing Policy Committee on Environment, Utilities and Corporate Services in December 2015.

The Roadways CSR Summary has highlighted several key findings that will improve efficiency within the design, construction, and maintenance operations of roadways. Many of the proposed findings will also have a positive impact on the citizens of Saskatoon. The action plans will assist in the business planning and budgeting process each year.

Opportunities to Improve Efficiency/Effectiveness and Address Challenges:

1. Safety and Performance

Current Process and Procedure

- An increased number of construction projects - has resulted in an increase in the number of work zone violations (i.e. people disobeying signage and barricades, driving dangerously through active work zones).
- Lack of a formalized process for pre-qualification of contractors - The contracts outline quality, performance, and safety expectations for contractors; however, the inspectors in Construction & Design as well as staff in Roadways, spend a significant amount of time dealing with contractor issues where these expectations are not being met.

Changes for More Efficient and Effective Service

- Collaboration with those involved in all aspects of roadways, including Transportation, Communications and Police Services to ensure that public, employee, and contractor safety are front of mind when working on roadways projects. Increased messaging through the media including personal messages from staff working in the field as well as improved training for staff, more rigorous safety inspection requirements throughout each stage of a job, and improved signage and site-marker tools are helping to improve safety for both the staff and public.
- Prequalification of contractors in the Request for Qualifications will help increase the chances of project success on many levels and is also an effective risk management tool.
- The City of Saskatoon is considering a process for pre-qualifying contractors to ensure contractors with the capabilities, capacity, and expertise to perform required services. The risk level of the contracted work will determine the specifications required to work for the City of Saskatoon.

2. Communication

Current Process and Procedure

- Saskatoon's recent high rate of growth and increased expectations from citizens have added significant pressure to the work within many civic divisions, especially those involved in roadways and resulted in a reduction in planning time and ineffective communication between divisions.
- Centralized communication hub is needed for customer complaints and inquiries, work order completion, and project status reports. The length of time Call Centre staff currently spends on a call varies with the nature and complexity of the call. It is not uncommon for the staff to have to reach out to multiple divisions in order to identify what work may be occurring in an area or to get a status update on a project affecting a roadway.
- The current process for addressing emergency or same-day issues is smooth; the work is dispatched as soon as it is received by Public Works Customer Service and the crews report directly back upon completion, allowing the Customer Service Team to close the call. In the case of non-emergency or routine maintenance, there have been times where multiple crews attend to an area that has been flagged for maintenance and delays in reporting back on completion of work have been experienced, impacting the timeliness of communication in responding to citizens.
- Lack of communication around documented defined levels of service has the potential to result in a lack of confidence in Roadways and promotes a culture of reacting to complaints in an effort to increase citizen satisfaction rather than working within an active plan that the public understands.

Changes for More Efficient and Effective Service

- With the acquisition of Civic Square East, the Major Projects, Neighbourhood Planning and Construction & Design teams were moved into the same building, creating an opportunity for increased communication, formally and informally.
- The CSR team recommended an Optimization Team for every major project involving key stakeholders that would be involved throughout the project; increasing cohesion between all divisions, with a common goal of equal accountability between all divisions in roadways for the entirety of a project's lifespan.
- Optimization Teams ensure the impact of design on long-term maintenance is considered at the planning stage for new roadways infrastructure and reflected in the operating budget. They also act as a clearinghouse for any issues that arise throughout the project and ensure that all pieces of an application for approval are in place before submission, reducing the time delay and rework associated with resubmissions.
- Changes made during later stages of detailed design occur on an estimated 30% of projects resulting in hundreds of hours of additional design technologist time, and engineering time. As this information is not currently tracked, accurate estimates of

loss are difficult to provide but may be as high as 3,000 hours of design time at an estimated cost of approximately $100,000.

- Teams are now meeting monthly to discuss planning, scheduling, and any issues arising pertaining to the maintenance and preservation of roadways infrastructure. These meetings will increase efficiency and improve citizen satisfaction through the coordination of work scheduling. Joint communication strategies such as “Pain in the Asphalt”, “Building Better Roads”, “Report-a-Pothole” and other interactive web-mapping apps, provide information for citizens on all of the construction activity taking place across the city and provide an opportunity for citizens to plan an alternate route to minimize travel delays.
- Scheduling has also been adjusted for the Roadways crews; there are two crews as opposed to four. The change has improved cross-communication between crews; improving accuracy in reporting of work completion and reducing the incidents of multiple crews attending the same issue.

<u>Service Saskatoon</u>

- Work is underway with Service Saskatoon in 2015 to streamline IT systems for the Public Works Call Centre will reduce the amount of time staff spend searching for information, improve the response time to citizens and allow staff to address a greater number of inquiries or complaints within the same timeframe.
- On average staff spend 2.5 minutes per call searching for information; longer if the information is not on their system and they have to reach out to another division. Each staff member takes approximately 85 calls per day which translates into a minimum of 3.5 hours searching for information. The staff time has a value of approximately $165,000.
- Streamlining the IT systems will improve communication between the Public Works Call Centre and field crews, resulting in improved response time and accuracy of issue and location. Moving from manual to online management of work orders in the field will improve the accuracy in reporting delays and/or work completion.
- Process optimization, improved programming and service delivery, and improved communication and engagement with citizens have resulted in a reduction in the number of inquiries for the Transportation and Utilities Department. Using one channel as an example, there has been a 30% reduction in the number of email inquiries in 2015 as compared to the same time in 2014. The reduction in inquiries results in a reduction in staff time spent on follow up and allows staff to focus on programming and service delivery. The staff time has a value of approximately $50,000.
- The increased collaboration and communication along with the increased investment in roadways have increased the effectiveness of project planning and implementation and improved productivity; citizens are noticing the difference.

3. Standards

Current Process and Procedure

- In the last five to ten years, and in an effort to meet the increasing demands of the City's municipal land development division and private sector land developers, there has been less stringent conformity to process and standards from design and construction. This results in inconsistent application of design, construction, and maintenance standards in roadways.
- As an example, the City's current pavement design standards needed to be improved in order to better accommodate existing soil conditions, water table issues and serviceability in the urban environment as Saskatoon expands, and to ensure the most cost-effective product is delivered to its citizens

Changes for More Efficient and Effective Service

- Roadways design specifications have been improved and the City is now designing roads to a higher standard; they are more of an industry standard best practices design methodology that is used throughout North America.
- This new roadway standard will provide higher quality roadways that require less expensive treatments over their lifecycle to maintain their good condition. Investing more up front will result in savings in the future.
- Reviewing and updating corporate design and construction standards regularly will help ensure consistency between crews, private contractors doing work for the City, and inter- departmental work. New staff, especially engineers and planners need to become familiar with the standards and where possible, mentorship opportunities should be created through the pairing of a senior engineer or planner with the new staff members.
- The teams identified the need to create a process and standards manual for project management in all departments and work has begun on this manual. This will help improve consistency across all projects and reduce frustration for new staff that may be unclear or unfamiliar with the City standards.

4. Operational Planning

Current Process and Procedure

- The current design and construction process has not formally considered maintenance impacts until after the roadways have been constructed.
- The current lifecycle of roadways involves at least three divisions with overlap at several phases. This overlap has potential to create inefficiencies through duplication of work and lack of coordination of planning which could result in a road being preserved or maintained that should really be replaced.

Changes for More Efficient and Effective Service

- At the start of a project, the Optimization Team identifies checkpoints for stakeholders throughout the process through the creation of a Project Charter; allowing more time for planning on the front end, reducing the amount of rework required and associated costs.
- Allowing for more lead-time for planning and design on projects will help teams anticipate issues before they arise with more time for geotechnical engineering and consultation with stakeholders early on; ideally changes occur during the front-end design process, reducing the potential for construction delays.
- Using a standard engineering design/construction cost factor, it is estimated that if a problem can be identified and solved for $1 in the planning phase, then it would cost $10 to solve in design, $100 in construction phase, and $1,000 if solved after construction is complete.
- The following example, illustrates the impact of this design/construction cost factor on operational planning for roadways:
    - Changes that are required to be made during construction stages occur on an estimated 25% of projects and can result in hundreds of hours of additional inspection, survey, design technologist and engineering time. As this information is not currently tracked, accurate estimates of loss are difficult to provide but may be as high as 3,750 hours of City of Saskatoon staff time estimated cost of approximately $115,000 plus the incremental contractual costs estimated to cost on average approximately $1.3 million. Total annual estimate for design changes being required during late detailed design and construction phases is $1.5 million.
- Changes on an engineering and construction project can be expected, but will likely impact the cost and could result in schedule delays that should be considered. The earlier changes are made in a project, the less costly the change.
- The Construction and Design Division is developing a rigorous tracking methodology from project inception to completion, similar to a consultant model which will provide a more accurate representation of the impact of changes and true project costs.

5. Budget Process

Current Process and Procedure

- The budgeting process is a complex process that runs concurrently through all phases of roadways design, construction, and maintenance. Capital projects identify the operating impact when they are brought forward for approval; however, it is unclear as to where that operating impact is reflected in the operating budget and if it is adequate to fund the expected level of service.
- Budgets do not account for the entire arterial infrastructure required downstream, such as overpasses at soon-to-be-busy intersections that will have to support increased traffic from new neighbourhoods coming online.
- Lifecycle analysis has not been an upfront consideration in the budgeting process. Maintenance of new roadways or assets is not always factored into the budget for the appropriate year.
- Previous funding levels only allowed for reactive maintenance and rehabilitation, if budgets continue to be maintained at an appropriate level and increases due to network growth and inflation are received the proactive measures required to extend the lifecycle of our roadways can be realized as we continue to move forward.
- The roadways group will continue to report and update on condition and financial requirements of the program to ensure the most sustainable lifecycle methods can be utilized on our roadway infrastructure. While working on the backlog phase of the roadway plan a mix of proactive and reactive work will continue to need to be utilized.

Changes for More Efficient and Effective Service

- As outlined in the Operational Planning section above, key civic stakeholders need to be involved in a project early on so they aware of timing and impact to their work-unit or division and can plan accordingly. Formalizing turnover of finished projects between Construction & Design and Public Works Roadways Maintenance will ensure completed roads are added into inventory and that the operating costs of maintenance are allocated to the appropriate cost centre.
- Funding plans for capital projects (i.e. interchanges) need to be in place in advance of pre-work (including lifecycle cost analysis) and to ensure funding is allocated for appropriate years to ensure the money is available in the year it is needed.
- Determining cost per unit for roadways (design, construction, maintenance, and preservation) will improve accuracy in job costing and future funding requests.
- Overall, the cost per unit on design and construction costs are well defined, as the scope of work recently increased some cost efficiencies have been identified due to economies of scale and an increased number of service providers that deliver roadway work. Although a portion of these costs can be attributed to lower oil pricing, economies of scale is also playing an important role in providing further efficiencies towards the roadway construction programs.

6. Training and Education

Current Process and Procedure

- Traditionally, the City has had the advantage of longer-term employees who typically had several years of experience in design, construction, or operating heavy equipment. Training and education were not as comprehensive as many new hires had previously worked in a similar industry and were generally more experienced or if they were less experienced, they were able to learn on the job under the guidance of long-term employees.
- The economic boom in Saskatoon, competition from the private sector, and an increase in retirements as a result of an aging workforce have contributed to increased turnover among City employees. Therefore, less experienced project management, Construction & Design, and maintenance employees find themselves working under significant pressure to meet the needs of a rapidly growing city with less mentorship than their predecessors, resulting in mistakes and re-dos. Occupational Health and Safety regulations have also evolved during this time, further complicating the situation.
- Equipment operators are younger and less experienced, contributing directly to damaging roadways, breaking equipment, downtime, motor vehicle incidents, and expensive repairs.
- Public and employee safety improves as training and ability of employees increases. Therefore, it is important to invest more into preparing new employees, and improving the knowledge, skills and competency of employees as the City and civic services continue to expand.
- It was identified that training for the operators of heavy maintenance equipment needs to improve. The lack of adequate training for new, inexperienced equipment operators leads to “learning on the job”, where equipment can be damaged as a result of mistakes.

Changes for More Efficient and Effective Service

- New hire orientation should include cross training between divisions and jobs, a combination of field and office experience for future office workers so they understand how operations functions in the field and a mentorship program. Where possible, balance the number of new and experienced employees working on a project to help maintain consistency in process.
- In 2015, the team built a SharePoint site containing this information which has proved beneficial to the employees working in Construction & Design as well as others they work with.
- In 2014, Public Works started to re-vamp their Powered Mobile Equipment training to improve our operator competency and ultimately reduce the number of incidents.
    - Go-Pro cameras were utilized to film the operation of various pieces of equipment; speed plow, grader, sweeper, excavator, ditch witch. These

have been incorporated into the classroom sessions to help the new trainees have a better understanding of the operation of the equipment and the conditions they will be operating in.

- Further, education was given to the field trainers on how to document their observations of the trainees to assist in identifying areas to focus on for each individual. Frequency of evaluations of our operators by the training department has also been increased. This improved training has resulted in a significant reduction in the number of motor vehicle incidents and reduced associated costs.
- Environmental factors must be considered in contributing to the reduction in the number of incidents, but improved training has played a significant part in a 36% reduction in motor vehicle collisions in 2015 as compared to the same time in 2014.
- Based on 2014 statistics, eliminating total loss incidents (where a vehicle is written off) and reducing damage resulting in payment of a deductible to SGI would have saved approximately $171,000 in costs related to deductibles and vehicle/equipment replacement in 2014.

7. Levels of Service

Current Process and Procedure

- While citizen satisfaction implies that expectations have been met, the lack of a documented, defined level of service means that residents do not have a benchmark against which to measure their satisfaction with roadways project management, Construction & Design, and maintenance services.
- The Public Works Roadways Maintenance section is unable to communicate a defined level of service; not knowing the level of service to expect leads to customer complaints based on individual perceptions or expectations.
- Without service levels, individuals come to their own conclusions about what is appropriate roadway service and react according to those perceptions. In an effort to enhance citizen satisfaction without a defined level of service, staff are more reactionary to individual complaints and need to improve on an overall planned approach to achieve approved service levels.

Changes for More Efficient and Effective Service

- The Public Works Roadways section is actively working on defining service levels for roadways activities as well as defining unit costs which will allow them to accurately track and report out on productivity as well as efficiency gains following each season. As these are developed, reports will be submitted to City Council for approval.
- Once the operational costs and tracking systems are defined and finalized, more information will be in place to realize additional life cycle cost savings by making better informed decisions on roadways that can no longer be maintained in a cost effective manner.
- By approving the Service Level, citizens will know what they can expect for this service. Defined levels of service assist in providing a business case to support funding requirements and future investments.
- The Administration will be submitting a report on Levels of Service for Winter Activities in Roadways maintenance to the Standing Policy Committee on Transportation. The Winter Road Maintenance - Level of Service document identifies the specific tasks and measures for the following winter activities:
    - Snow grading
    - Snow removal
    - Snow storage site management
    - Sidewalk and pathway grading
    - Roadway Ice Management

Building Better Roads

The Building Better Roads program started in 2014 after the 2013 Civic Services Survey identified road conditions as the single most important issue affecting our city. In addition to those identified in the Roadways CSR, several other improvements to roadways have been implemented as a result of the increased focus and investment.

Utility Cuts and Road Restoration Improvements

- Public Works and Asset Preservation are working together to develop a consistent process across all applicable divisions and to increase the quality of the utility cut road restoration repair. Increased collaboration, elimination of redundancies in the process and duplication of efforts combined with increasing the longevity of the road infrastructure through proactive planning and restoration has the potential to achieve savings in the millions of dollars and improve the ability for citizens to move around the city with ease.

De-icing Product and Application

- A new de-icing product, Caliber M1000, was tested using two application techniques and determined to be more efficient and cost-effective than previous de-icing programs. When mixed with sand/salt at temperatures below -15˚C, it lowered the working temperature of the salt, helping the sand stick to the road for traction. Using Caliber M1000 as a pre-wetting application technique with sand/salt mixture improved the effectiveness even more. Roadway conditions were significantly improved where these processes were applied.
- A new de-icing product improves the effectiveness of salt at colder temperatures, reducing the amount of sand applied to roads and resulted in an overall reduced cost of $250,000 in de-icing aggregate compared to the previous winter.

Standardized Roadways Contracts

- The Public Works division in conjunction with the Materials Management division standardized the tender process and tender for all roadways contracts. The contracts now all have general conditions and standard layouts in addition to standardized maps and guidelines.
- Additionally, the two former contract maintenance areas were divided into four and tendered separately. This change created a more competitive bidding process. Tighter time requirements, the removal of a retainer fee and an implemented penalty clause, ensured quality and timely response when contractors were activated.
- The new structure for Area Snow Maintenance Contracts, including the removal of a retainer and smaller maintenance areas resulted in reduced costs of over $715,000 when compared to 2014 reducing the average contractor cost per snow event by 27%.

Organizational Structure and Scheduling Changes within the Public Works Division

- In order to alleviate some of the administrative pressures experienced by the Roadways section which resulted in reduced time spent in the field, the Public Works division brought two temporary engineering technicians on board as a resource for the Roadways Superintendents. The focus of the engineering technicians is quality control and program delivery. This has allowed the Roadways Superintendents to spend more time in the field managing the operational staff and ensuring work is being completed as scheduled. The addition of the engineering technicians has also allowed the engineers to spend more time on program review and development as well as definition of service levels for the Roadways programs.
- The organizational changes to date and considerations for future changes, allow the Roadways section to operate on a contractor model which will increase the overall effectiveness and efficiency in the roadways maintenance operations by ensuring the right people are doing the right job at the right time.

Continued Improvement in the Fall Street Sweeping Program

- In preparation for the Fall Sweep Program, the Parks division and Public Works division collaborated on the cleaning of medians. This increased collaboration resulted in a better product, less disruption for citizens and contributed to the overall success of the program.
- Additionally, the Fall Sweep Program saw an over 50% reduction in the number of tickets issued as a result of vehicles parked on sweeping routes. This program continues to improve year over year with improvements resulting in a significant reduction in the number of complaints received by Public Works Customer Service.

Increased Funding will Result in Continued Improvement to Saskatoon's Road Network

- The Building Better Roads program is expected to continue bringing improvements to Saskatoon's road network, by slowly reducing the backlog of work required on poor to failed roadways, and performing enough rehabilitation work that the network does not deteriorate. 2016 is year 3 of the 4 year plan to fully fund it to 2013 levels. The program will rely on being continued fully funded with adjustments for inflation and growth yearly. Increased funding will contribute to improve the condition, safety and longevity of the roads.
- The previous roadways funding level guaranteed that the complete network of streets would reach failure condition and have to be rebuilt. The replacement cost for the total road network is approximately $2.4 billion. The increase in preservation and maintenance activities through the Building Better Roads program with an annual investment of roughly $30 million per year will yield unmeasurable amounts of savings because the roads will be kept in a reasonable state of repair.