

2021

CORPORATE ASSET MANAGEMENT PLAN

Saskatoon Roadways

INTRODUCTION

This Asset Management Plan update outlines the state of the City of Saskatoon's (the City) Roadway Network, including information on inventory, valuation, condition, growth and inflation funding requirements, asset preservation, operations, and maintenance.

The City's roadways are managed through two programs, the asset preservation program and the operation and maintenance program. The current strategy for preserving City roadways is to consider where the road is in its life cycle in relation to the typical design life of that road type. The typical design life of a road is 15 to 25 years before requiring a major restoration such as resurfacing or structural improvement. The asset preservation program creates long term plans for full scale roadway treatments with a target average return cycle for every roadway of 20 years. With the continued growth of the overall network and steady climb in construction costs, inflation and growth adjustments must continue to sustain an average 20-year return cycle for roadways and sidewalks. The operation and maintenance program plans and carries out maintenance activities such as pothole repairs, grading of gravel roads and back lanes along with operational activities such as snow clearing and street sweeping.

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CURRENT INVENTORY

The City's Roadway Network inventory consists of roads within a Neighbourhood Network and Primary Network. Roadways classified as "Local" belong to the neighbourhood network, and roadways classified as "Lanes (Paved), Collector, Arterial, and Expressway" belong to the primary network. Boundary roads, gravel lanes and P3 roadways (e.g. North Commuter Parkway) are considered outside the Neighbourhood or Primary networks.

A summarization of the current inventory can be seen in the following table. The source of information for this inventory is the City's Geographic Information Systems (GIS), asset management database.

Table 1: Inventory and Replacement Value

Asset	Inventory	Replacement Value
Local Roads	2,138.7 Ln-km	\$1,465 M
Lanes (Paved)	116.3 Ln-km	\$78 M
Collector Roads	823.7 Ln-km	\$587 M
Arterial Roads	765.3 Ln-km	\$552 M
Expressway Roads	463.9 Ln-km	\$392 M
Boundary Roads	30.0 Ln-km	\$22 M
P3 Roads	44.1 Ln-km	\$32 M
Gravel Roads	384.0 Ln-km	\$134 M
Total	4,766.0 Ln-km	\$3,262 M

The City's roadway assets are estimated to have a replacement value of \$3.262 billion. This value includes the cost of physical excavation and replacement with new approved materials.



Kenderdine Road: before



Kenderdine Road: after

PERFORMANCE OF THE ASSET

In 2017, the City undertook a full network condition assessment of the paved roadway network. This assessment, based on industry standard methodologies, was used to report on existing condition and aid in setting future roadway preservation programs.

The process of assessing the paved roadway network considered surface pavement condition, ride and roughness, and structural adequacy. The next city-wide condition assessment of the roadway network will be completed in 2021.

Pavement Surface Condition:

The table below shows the average Pavement Condition Index (PCI) that was calculated from the 2017 assessment. This was used to estimate a 2020 PCI Estimate. The current target is an average PCI ranging from 80 to 85 that will indicate the City's roads will be in a "Satisfactory/Good" condition. Comparing only roads assessed in both 2014 and 2017 data sets and adjusting data errors, PCI is improving slowly as per the City's approved expenditure level.

Table 2: Pavement Surface Condition (PCI)

Road Classification	Average PCI 2017	Estimated PCI 2020 [†]	Current Condition	Desired Condition
Lanes (Paved)	68.4	70.2	Fair	Satisfactory
Locals	76.1	75.9	Satisfactory	Satisfactory
Collectors	68.5	72.3	Fair	Satisfactory
Arterials	68.5	72.3	Fair	Satisfactory
Expressways	71.4	72.6	Satisfactory	Satisfactory
Rated Network Average[*]	72.7	74.2	Satisfactory	Satisfactory

The numerical rating is assigned based on the 100-point scale with 0 being the worst or "Failed" condition, to 100 being the best possible or "Good" condition.

**Weighted average based on network percentage in each road class. Note: a percentage of roadways in each class were not rated.*

[†]2020 PCI values are projected based on the 2017 condition assessment and completed surface treatments, estimated network deterioration rates, and additional new roadways. Actual PCI ranges and network improvements will be confirmed during the next City-wide roadway condition assessment in 2021.

ROAD MAINTENANCE

The Road Maintenance program focuses on citizen mobility and safety through repair and maintenance activities. Activities include pothole repairs, grading and gravelling of back lanes and earth streets, large debris removal and surface drainage management.

Potholes are responded to and repaired on a complaint basis. Emergency potholes reported by residents are severe potholes that are repaired within three days.

All gravel back lanes receive at least one maintenance treatment a year and gravel rural roads are graded on a weekly basis.

Dust palliation is applied on rural gravel roads adjacent to residents and along Beef Research Road to minimize dust.

STREET SWEEPING AND CLEANING

The annual Street Cleaning and Sweeping program focuses on preserving air and water quality, maintaining surface drainage integrity, and improving aesthetics of City streets by removing sand and debris. Dust palliation activities focus on managing air quality issues for properties within city limits that are near high traffic gravel roads.

Street sweeping begins in the spring focusing on high traffic streets to pick up the bulk of debris left from the winter. Medians and park frontages are also swept to remove winter debris. All residential streets are swept curb to curb by the end of June.

SNOW AND ICE MANAGEMENT

The Snow and Ice Management program focuses on public safety and ensuring citizen mobility during the winter months. It includes activities such as snow grading and plowing after a snowfall and application of sand and salt to address icy conditions. When a snow event occurs (a snowfall with more than 5 cm accumulation), all priority streets are graded within 72 hours.

PAVEMENT MARKING

The Pavement Marking program focuses on citizen mobility, safety, and roadway aesthetics through the application of painted markings on the roadway. Examples of markings include lane lines, symbols, crosswalks, stop bars, chevrons, bike lanes, and downtown parking stalls.

Pavement marking begins in the spring following the beginning of the Street Sweeping program. Painted markings are applied 1-2 times per year on all roadways. Durable plastic markings are applied to good condition or newly paved road surfaces on arterial class roadways and above.



LaRonge Road: before



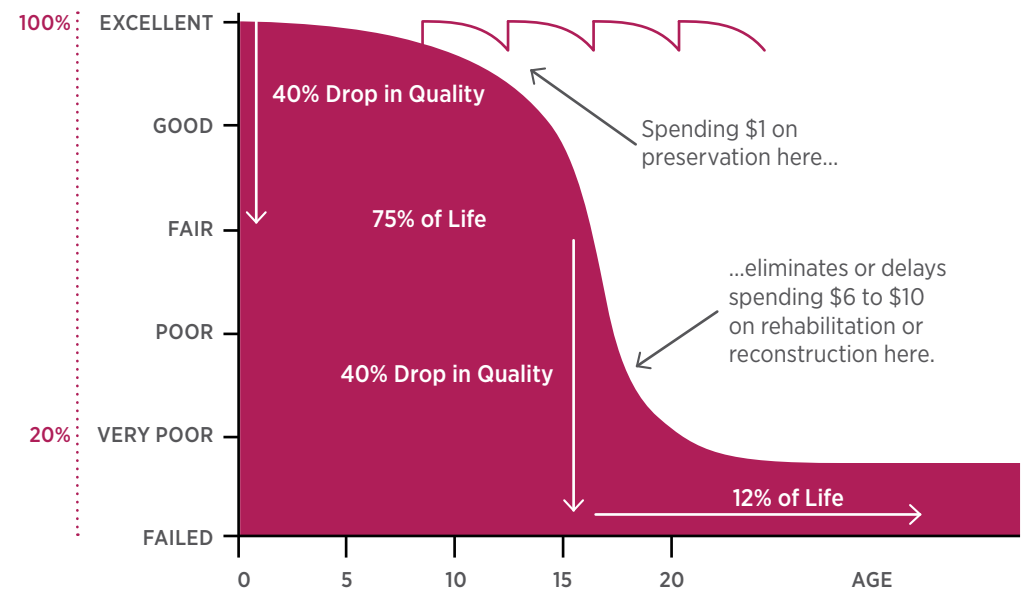
LaRonge Road: after

LIFECYCLE PROGRAMS

The Canadian Infrastructure Report Card (2016) demonstrates that increasing reinvestment rates will save money in the long term. Without an increase in current reinvestment rates, the condition of City roadways will gradually decline, costing more money and risking service disruption.

The graph below demonstrates that when roads are allowed to deteriorate below a “Fair” condition rating, the rate of deterioration and reinvestment costs both increase substantially. Investing in preventative maintenance and regular repair will prolong the asset service life, avoiding premature and costly reconstruction and long-term service disruptions that are associated with the larger scope of work.

Figure 1: Example of Asset Deterioration Curve for Roadways



Source: Canadian Infrastructure Report Card 2016

Asset Preservation Program

The most effective way to achieve an improved roadway network condition is to use a mix of preservation, restoration, and rehabilitation treatments. The target of the City’s roadway asset preservation strategy is to increase the network condition slowly over time by using a combination of these treatments and maintaining a level of service of a 1-in-20-year treatment cycle for roadways.

Preservation treatments are less expensive than the restoration and rehabilitation treatments. Utilizing preservation treatments is important to help maintain the City’s “Fair” to “good” roads so they do not drop into a lower category based on the PCI.

Asset Preservation develops three-year roadway preservation plans in coordination with the water and sewer preservation program that cover full roadway treatments within the Preservation, Restoration, and Rehabilitation Strategies. Specific details and distribution of these treatments vary year-to-year, depending on requirements or possible cost-saving innovations.

Operations and Maintenance (O&M) Plan

Operation and Maintenance plans focus on maintaining the usable life and integrity of streets and the public's safety and mobility needs.

Activities undertaken in the Operation and Maintenance plans include:

- Pothole repairs
- Utility cut maintenance
- Grading back lanes and gravel roads
- Guardrail repair
- Removal of debris from streets
- Street cleaning and sweeping
- Application of dust suppressants
- Pavement markings
- Snow grading and ice management

Service Levels for Road Maintenance, Street Cleaning and Sweeping and Snow and Ice Management were approved in 2017. These service levels detail the services currently provided.

SERVICE EXPENDITURE LEVELS

The Administration evaluates the condition (physical, function and capacity) of the City's assets in order to develop annual programs to maintain the assets at a minimum cost. Condition assessments or evaluations are conducted and used to establish condition levels as well as develop annual capital improvement plans.

The Level of Service for each type of asset is defined; however, as the Level of Service increases for the asset, so does the cost of maintaining the asset. In order to be able to compare the level of investment for all assets corporate-wide, five levels of expenditures are identified in the following table.

It should be noted that expenditure levels are not condition assessments but lead to a change in the asset condition over time.

"A" represents the highest level of expenditure and "F" represents no expenditure.



Rutherford Way: before



Rutherford Way: after

Table 3: Expenditure Levels

Expenditure Level	Asset Performance	Description
A	Getting Better Quickly	Sufficient expenditures to keep asset in top condition and to increase asset condition/value quickly over time.
B	Getting Better	Sufficient expenditures to keep asset in top condition and to increase asset condition/value slowly over time.
C	Maintain Assets in Current Condition	Sufficient expenditures to keep asset in constant condition over time.
D	Getting Worse	Insufficient expenditures to maintain asset condition. Over time asset condition will deteriorate.
F	Getting Worse Quickly	No expenditures. Asset condition/value decreased rapidly.

The following table aligns the desired condition and expenditure level. The City's current average roadway network PCI is at 72.7 and the physical condition desired is an average PCI range of 80 to 85, which is the top of the "Satisfactory" PCI range. The table also shows the required funding to meet a Level "B" expenditure level and associated funding gap.

Table 4: Asset Performance and Expenditure

Asset Program	Current Performance	Desired Performance	Desired Expenditure Level	Required Annual Funding to meet Expenditure Level (2022)	Current Dollars	Difference**
Roadways Preservation	PCI Rating 72.7 (Satisfactory)	PCI target rating 80-85 (Good)	Level B	\$26.6M*	\$26.6M	0
Road Maintenance†	Good	Good	Level C	\$6.4M*	\$6.4M	0
Snow and Ice Management†	Good	Good	Level C	\$14.3M*	\$14.3M	0
Street Cleaning and Sweeping†	Good	Good	Level C	\$4.6M*	\$4.6M	0

*Growth and inflation are not included \$ amount

**Difference assumes that adjustments are made to annual funding to reflect growth in the amount of assets to maintain inflationary pressures.

†The desired expenditure level for Road Maintenance, Snow and Ice Management and Street Cleaning and Sweeping assumes there are no changes to the current service levels.

FUNDING SUMMARY

Asset Preservation Program

Currently there is \$26.6 million of funding in place for the Asset Preservation Program to maintain the City's roadways in satisfactory condition and meet the service expenditure level B (getting better). There is no funding gap identified and no new phase-ins are required for this program.

Growth and inflation is assumed and needs to be a consideration annually to the base funding in future years in order to maintain the 1-in-20 treatment cycle and satisfactory condition target. These will be brought forward as part of future Business Plan and Budgets. Should inflation and growth not be added annually the return cycle will be increased and the program service level will decline.

Operations and Maintenance Program

Over the last two years, funding for the Operations and Maintenance programs has been sufficient to deliver the approved service levels.

The exception to this is the actual cost for Snow and Ice Management has exceeded the budget. Actual costs for winter maintenance fluctuate with the winter weather experienced and the Snow and Ice Reserve has been established to address these fluctuations. Over the winter of 2020-2021, an extreme winter storm occurred, and the Reserve was insufficient to cover the incremental cost. An Emergency Response Plan is currently being developed and will propose solutions to fund future extreme winter storms. Growth and inflation are assumed and needs to be a consideration annually to the base funding in future years in order to maintain the level of service.

The current expenditure level of the Pavement Marking program is not sufficient to maintain the desired level of service. A service level report is underway to develop a defined service level and identify the expenditure level necessary to maintain it.

INFRASTRUCTURE RESILIENCE AND CLIMATE CHANGE ADAPTATION STRATEGY

The Administration understands that road work is weather dependent. During periods of extreme weather, such as a major rain event or early winter, some projects are unable to be completed or started until favorable conditions return. If current year funding for roads are planned but cannot be completed or started due to unfavourable weather conditions or seasonal changes, work on those roads will be carried over to the next construction season.

In addition, recent changes to the roadway design standards have been implemented to require mandatory edge drainage systems to new roadway structures. This will ensure that the road structure can be drained and protected during extreme weather events and high-water tables caused by adverse weather conditions.

THE WAY FORWARD

Our teams will:

- Take an integrated approach to asset management.
- Continue the shift from reactive to preventative maintenance when planning programs.
- Continue with learning initiatives in data analysis and data collection methods.
- Build deterioration curves for roadway network analysis to understand underlying causes of deterioration and enhance predictive program planning.
- Review and improve preservation and maintenance treatment strategies, specifications and standards.
- Implement utility cut repair process improvements.
- Develop Service Levels for pavement marking.
- Develop detailed Asset Management Plan for gravel back lanes.
- Coordinate and plan with other departments and divisions to increase efficiencies across the Corporation.
- Identify median and boulevards as a separate asset from the roadway and sidewalk program and develop an asset management strategy for this asset.

We are committed to maintaining and carefully investing in our roadways. We will use the financial and physical resources under our care to address the needs and expectations of Saskatoon citizens today and for the future.



Victoria Avenue: before



Victoria Avenue: after

A close-up, high-angle photograph of a dark asphalt road surface. A bright yellow painted line runs diagonally from the top right towards the bottom right. The yellow paint is cracked and peeling in several places, revealing the dark asphalt underneath. The texture of the asphalt is very granular and detailed.

*We strive to maintain and fund
our key infrastructure assets to
minimize total life cycle costs.*



City of
Saskatoon