PSD

State of Maturity Report

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RESEARCH | CONSULTING | SOFTWARE

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Introduction

Background and Objective

Asset management is a sophisticated, coordinated, cross-disciplined effort, in which the performance, risks, and costs of an asset over its entire lifecycle are taken into account. It involves the acquisition of infrastructure types, defining their best use, outlining their maintenance and rehabilitation procedures, and scheduling their disposal or replacement, all with the intention of delivering the optimal value and level of service for the community at large.

The Asset Management Roadmap is a multi-year, collaborative strategy designed by the Public Sector Digest Inc. (PSD) to accelerate and facilitate the development and improvement of a municipality's asset management program. Its major components include:

1. State of Maturity Report
2. Corporate Asset Management Policy
3. Condition Assessment Protocols
4. Risk Model Development
5. Lifecycle Activity Model Development
6. Financial Strategies & Budget Scenarios
7. Level of Service Framework Development
8. Robust Strategic Asset Management Plan

Improving your asset management practices requires a coordinated, step-by-step approach to the individual components of an asset management program. As a first step, it is important to gauge the current state of practice related to asset management in the Municipality. This will allow for a thorough gap analysis to determine where to focus efforts in order to build a holistic and robust asset management program. In other words, you need to know where you stand before you can figure out the best way to move forward.

The Municipality of Machin has retained the Public Sector Digest Inc. (PSD) to implement the first three stages of PSD's Asset Management Roadmap: State of Maturity Report, Asset Management Policy and Condition Assessment Protocols.

Methodology

The State of Maturity Report (SMR) provides an audit of the existing asset management capacity at the Municipality within the following key competencies:

1. Organizational Cognisance
2. Data and Information
3. Condition Assessment Protocols
4. Risk and Criticality Models
5. Lifecycle Management
6. The Financial Strategy
7. Levels of Service Framework

The SMR outlines key strategic recommendations to improve performance within the key competencies and achieve a higher level of overall maturity. It will also provide direction to the design, development and implementation of Machin's asset management program.

To facilitate the current state of asset management maturity report, PSD staff have implemented two methodologies:

Asset Management Self-Assessment Tool

The Asset Management Self-Assessment Tool (AMSAT), implemented in a survey format, consists of a series of questions designed to determine an organization's alignment with asset management best practice and international standards. Municipal staff from various departments within The Municipality of Machin, Finance and Water Plant, completed this survey. The results are compiled within the body of this report.

Stakeholder Interviews

In addition to the AMSAT, additional information was gathered through a series of in-depth interviews with Municipality staff who are either directly involved in, or support the delivery of, a particular asset class. The results are used to clarify the features of the organization's asset management program along with who is responsible for managing and delivering the activities that comprise the asset management process.

The following staff from the Municipality of Machin participated:

- **Tammy Rob,** Clerk Treasurer
- **Shawna Alberts,** Operator-in-Charge – Water Plant

Scope

The scope of this State of Maturity Report includes all departments involved with the management or financing of the following asset infrastructure categories:

- Road Network
- Bridges & Culverts
- Water Network
- Buildings & Facilities
- Parks & Recreation
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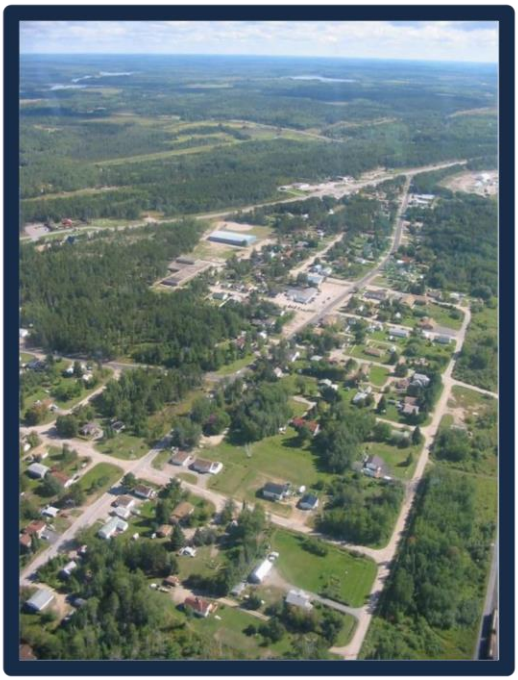
This assessment methodology is not fully consistent with the specifications of ISO 55000, the international standard for asset management, and therefore, would not lead to full ISO compliance. However, the approach and methodology follows and utilizes the key components of asset management assessment as established by ISO 55000 and will supply a solid foundation should the Municipality wish to pursue ISO certification in the future.

Limitations



Name: The Municipality of Machin
District: Kenora
Population (2016): 971
Growth Rate (2011-2016): 3.9%
Area: 292km^2
Number of Households (2017): 597
Average Household Income (2015): $85,077
Key Industries: Public and Educational Services, Construction, Retail and Agriculture

The Municipality of Machin is a picturesque municipality within the Kenora District, west of Dryden. The Municipality of Machin consists of rural communities, with a population of 971 residents. Machin consists of three main communities: Eagle River, Minnitaki, and Vermillion Bay.

Machin located in Northwestern Ontario along the Trans Canada Highway, making it a perfect visitor stop for those on the cross Canadian journey. Surrounded by Eagle Lake and tremendous scenic views, outdoor recreational activities such fishing, hunting, water sports, off road vehicle use, and many more activities are located conveniently in the community's backyard.

Current State of Maturity

In the following table, we summarize The Municipality of Machin's proficiency on the six key components of asset management and provide a comparison against the average of all municipalities that have been surveyed:

ASSET MANAGEMENT COMPONENT	PROFICIENCY LEVEL	NATIONAL AVERAGE
Organizational Cognisance	Advanced	Intermediate
Organizational Capacity	Advanced	Intermediate
Infrastructure Data/Information	Intermediate	Intermediate
Asset Management Strategies	Basic	Basic
Financial Strategies	Basic	Basic
Levels of Service	Basic	Basic

Current State of Practice

Organizational Cognisance

Organizational cognisance, within this report, relates to the degree to which asset management is both understood and prioritised by both senior management and Council. Effective asset management requires strong leadership and a culture of the good stewardship of assets throughout an organization. Securing organizational buy-in to the principles and objectives of asset management is foundational to the creation and implementation of a sustainable asset management program. Without buy-in, an asset management program is unlikely to produce desired outcomes and organizational benefits will be limited.

After the completion of the AMSAT and subsequent staff interviews, the Municipality was found to be at an intermediate level of organizational cognisance among senior management, and an advanced level among elected officials. This indicates a high amount of organizational buy-in within Machin and exceeds average rating of other municipalities under PSD's Roadmap portfolio.

There is broad consensus that infrastructure and asset management should be a significant priority in the community at the senior management level. The level of knowledge and willingness amongst Machin's elected officials to undertake asset management is currently at an advanced level. Council continuously brings forward asset management practices to the Municipality, which is an excellent example of knowledge transfer. While the Municipality has developed a strong culture of good stewardship in asset management among municipal staff, it is critical that any incoming staff and elected officials are educated on the asset management process.

Organizational Capacity

Organizational capacity refers to the ability of an organization to develop and execute upon the key components of an asset management program. High organizational capacity to undertake asset management includes adequate human resources, staff knowledge, and a cross-functional team working together towards a mutual goal. A cross-functional team is vital to a sustainable asset management program, as it promotes constant communication between departments, allowing them to develop recommendations that assist Council in making strategic, well-prioritized infrastructure decisions.

As a result of the AMSAT and staff interviews, it was determined that the Municipality's capacity to develop asset management is currently at an advanced level. It is evident that there is a reasonably high level of knowledge and engagement among internal staff in the development of the Municipality's asset management program. However, there is concern that there are inadequate human resources available to carry out recommended program activities.

There is currently no formal asset management committee in place in the Municipality to provide guidance and oversight to the development of program activities and the implementation of best practices. The development of an asset management committee that contains diverse representation from all departments involved in the asset management process and meets regularly to coordinate asset management activities is encouraged and should be a high priority for the Municipality. The development of a cross-functional team participating in the development of Machin's asset management program is encouraged and staff should take every effort to become trained and educated on asset management best practices. This may include participation in conferences, workshops and webinars provided by leaders and educators in the asset management industry. Developing adequate staff knowledge will also ensure that staff promote the continuous improvement and development of the Municipality's asset management program. This can be particularly challenging for small communities like Machin, but it has the opportunity to positively impact asset management outcomes over the long-term if staff have increased knowledge and capability.

While organizational capacity from a human resources perspective is strong, there is some concern about the financial resources available for staff to carry out required and recommended program activities. This is another key reason why a focus on organizational cognisance, and the education of Council on the principles and objectives of asset management, is critical to the success of any asset management program. When Council better understands the importance and benefits of asset management, they are far more likely to commit adequate resources towards the Municipality's asset management initiatives. The Municipality should take any opportunity to provide learning experiences for Councillors on the benefits of asset management.

Infrastructure Data / Information

Having comprehensive and reliable data is a key component of a strong and sustainable asset management program. As a result, data collection and management processes and procedures should be implemented to ensure that data is accurate and accessible for the purpose of planning, structuring and improving your asset management practices. This could include the development of a data governance policy, and the formal delegation of roles and responsibilities for staff responsible for managing asset data and information. The Municipality has most recently developed an Asset Management Plan (AMP) in 2016.

Moving forward the Municipality will need to ensure that all updates to their AMP align with the dates outlined in the Province's new Asset Management Planning Regulation (O. Reg. 588/17). This regulation requires all municipalities to have an AMP for all core municipal infrastructure assets by July 1, 2021, and for all other municipal infrastructure assets by July 1, 2023. A final, more detailed AMP is required for all municipal infrastructure assets by July 1, 2024, with additional updates required at least every 5 years from that date.

Currently, the Municipality houses much of its inventory data on the CityWide Asset Manager (AM) database. The accuracy and reliability of data and information in AM is high across most asset categories, however there is some room for improvement. Separating pooled assets, collecting additional asset attribute data and minor updates across these sources would enhance the current state of Machin's database. It is essential that all collected asset data – both from internal staff and external consultants are uploaded to the inventory as available.

The Municipality has access to an older GIS inventory, but it is not kept current and is not linked to their asset inventory to enable more advanced analysis. The municipality recognizes

the importance and benefits of moving towards a centralized asset database for Machin's asset registry. This is a critical early step towards developing a robust and manageable asset management system that takes advantage of data from all departments in an effort to maximize analytical capabilities.

The state of the Municipality's data for each asset category is as follows:

Road Network

The Municipality is responsible for managing a road network of approximately 89 km of roadways and 4 km of paths and trails. 77 km of Machin's roads are gravel with an additional 12km of asphalt. Staff stated that they are confident in the accuracy and reliability of the Municipality's road network inventory. The roads housed in the AM inventory have a decent amount of asset attribute data available, including: Length, Replacement Cost, Street From, Street To, Surface Width and Road Surface Material. To further enhance the ability of staff to analyze future needs and prioritize projects based on asset risk it is recommended that additional data be captured and uploaded into the AM database. This includes: Roadside Environment, Design Class and Assessed Condition. Additional data collection on road appurtenances and disaggregation of the street light inventory, would also be beneficial.

There is currently an old GIS inventory of the road network, however it is outdated and requires additional work. There was conversation regarding linking the AM and GIS inventory together, which would require further investigation.

The Municipality does not have condition assessment protocols in place for the Road Network and, as such, does not have documentation of the assessed condition of their roads. The last Road Need Study was conducted in 2002 and is severely outdated. An updated assessment is required to determine the current state of the Road Network. The general condition of their roads is in between a fair to poor state. Currently inspections are done visually by internal staff. Additionally, Council does a yearly road tour to identify what roads to address on an annual basis. Considering the size of the Municipality and their road network, internal staff may be sufficient to conduct formal condition assessments. However, it is critical that this data be collected and documented in a consistent manner to ensure that it is reliable and accurate. Staff discussed wanting to have the ability to perform their condition assessments independently and look forward to PSD's collection assessment tools.

While there are no formal risk management or project prioritization processes in place, there are a number of maintenance and rehabilitation programs in place to manage the road network within the Municipality. Annual capital requirements are determined based on staff knowledge and complaints, displaying a more reactive than proactive approach to lifecycle management. Capital budget for the road network is determined based on current condition and expected asset failure.

Levels of service are not currently being tracked as part of any formal process. Data from the 2012 Road Needs Study, as well as internal inspection data, should be used to develop a formal process for tracking and evaluating the service being provided to the community.

Bridges & Culverts

The Municipality is responsible for the management of approximately 4 bridges and an unknown number of culverts. The bridge inventory is stored in CityWide AM and is considered to be reliable and accurate. The culvert inventory is also stored in CityWide AM, however all culverts are pooled as a single asset and a disaggregated inventory is recommended. Similar to the Road Network there is an old GIS inventory, but it needs to be updated before being integrated into the Municipality's main asset inventory. The first step should be the incorporation of the Municipality's new 2017 OSIM inspection report. Currently there are no culverts captured within their GIS inventory.

OSIM inspections are completed every 2 years and the Municipality's 2017 OSIM inspection report is available in PDF format. This includes a Bridge Condition Index (BCI), estimated replacement cost, and a summary of capital and maintenance requirements. Lifecycle activities (maintenance, rehabilitation and replacement) are driven by the results of the inspection reports. It is recommended that all data from the OSIM inspection reports is uploaded into the Municipality's centralized asset registry and updated regularly. There is no assessment program in place for culverts under a 3-metre span.

There are no formal levels of service framework in place for the municipality's bridges and culverts. However, with the data provided by OSIM inspection reports – including the average BCI – the Municipality should be able to develop key performance indicators to identify the level of service being provided by this asset category. This can then be used to track and evaluate service levels over the short- and long-term.

Water Network

The Municipality's Water Network consists of 7.5 km of water mains, 65 gate valves, 50 hydrants, 154 service connections and one water treatment plant. The inventory is stored within CityWide AM and the Municipality has a high level of confidence in the accuracy and reliability of this data. There are some pooled assets and some additional asset attributes that need to be populated to ensure a fully accurate inventory. Machin has an older GIS dataset that houses their inventory as well. Machin discussed wanting an updated and more current GIS inventory.

Assessed condition data for the water network is not available, and the Municipality relies primarily on age-based predictions of asset condition and internal knowledge. A new water treatment plant was built in 2005 and surrounding supportive water infrastructure was also updated at that time.

The operation of the water treatment plant is governed by provincial regulations that mandate standards for water quality. Ontario Environment and Climate Change is responsible for issuing approvals and regularly check facilities' drinking water quality monitoring results against approved water quality guidelines. The Town regularly meets these standards. While there are no formal levels of service framework in place for the water treatment plan to monitor the service being provided to the public, much of the data collected to meet these provincial standards could be used to develop a more robust performance measurement

program. This data will be integrated into the levels of service framework developed as part of the Roadmap.

There are no internal risk, project prioritization or lifecycle strategies in place. Budgets are developed from internal expertise and historical costs and are then brought forward to Council. Hydrant costs are considered a predetermined budget item. However, operational costs eat up most of the available budget for the Water Network, leaving few available funds for capital projects. Due to the loss of a water treatment plant operator, Machin may be looking at additional funding options as provided from a contracted financial study. There have been no serious boil water advisories in the history of the existing water system, just one precautionary one in the past.

Buildings & Facilities

The Municipality owns and maintains 8 facilities; 2 firehalls, a garage, rec centre, medical clinic, municipal office, arena and senior centre. The inventory is stored in CityWide AM and is considered by staff to be accurate and up to date. While there is no data on the square footage of any facilities in CityWide, this may be listed in an external source. This data should be uploaded as it is made available. There may also be GIS data available, but this would only be used for spatial reference and not for asset management. Currently the water treatment plant is the only facility with component-level data for all major components. Staff should continue to work towards developing a facilities database with a greater degree of facility component breakdown to allow for more accurate condition assessment and replacement forecasts.

There are no formal condition assessment protocols in place for buildings and facilities and no facility condition index data available. Inspections performed are primarily for Health and Safety, and each department conducts their own inspections monthly. The Municipality indicated that some of the older facilities will require additional work in the near future. Both firehalls and the recreation centre are fairly new and are generally in good condition. The Municipality's preventative maintenance is mostly reactive to emerging needs.

There are also no risk management processes in place to help prioritize key capital projects for municipally owned facilities. Capital needs are brought forward in the same manner as other assets. The Municipality could benefit from a more detailed analysis of both the probability and consequence of asset failure.

Levels of service are not formally tracked as part of any comprehensive framework. However, there are some performance measures in place for revenue-driven facilities to assess utilization rate and make plans for future operations and investment decisions.

Parks & Recreation

Machin is responsible for 4 parks and the regular maintenance of one park on crown land. The park inventory is stored within CityWide AM but would benefit from some additional data disaggregation. Playground structures are missing from the asset inventory. Recategorizing and breaking out the park components could assist with advanced forecasting and analysis at an individual asset level.

There are no standardized condition assessment protocols across all park assets. However, the municipality meets all regulatory requirements for playground structures and conducts annual visual inspections. Parks are also visually inspected weekly and on rotation for operational tasks during high volume seasons and occasionally during the winter months.

There is currently no risk management or project prioritization processes for parks & recreation assets, and lifecycle activities are primarily a matter of regular general maintenance and repair events.

There is not a lot of capital budget available for parks and the budget is determined by internal staff bringing forward their proposal to Council. With Machin's new strategic plan, the community asked for more beautification and there are hopes for additional funding towards parks.

While there is no formal level of service framework in place, the Municipality's Strategic Plan could provide some key strategic recommendations for target service levels. These metrics should be integrated into a more comprehensive framework for tracking and evaluating levels of service within the Municipality.

Asset Management Strategies

Asset management strategies should establish a set of planned management activities to prioritize and optimize infrastructure programs, manage risk and ultimately provide the total lowest cost of asset ownership. They include condition assessment protocols, lifecycle management frameworks and project risk management and prioritization techniques.

The Municipality does not have systematic condition assessment protocols in place for all major asset categories. While some condition assessments have been completed, there is still a substantial portion of assets without any assessed condition data. Without comprehensive condition assessment protocols in place, there are concerns about the accuracy and reliability of existing data. Accurate condition data is required to enable advanced forecasting and analysis for risk, lifecycle and financial strategies. It is critical that the Municipality makes every effort to collect condition data on as many assets as possible prior to the design and development of the subsequent phases of the Roadmap.

With regard to project and program prioritization parameters, there are no overriding network-level risk frameworks or risk matrices in place at the Municipality that determine what assets should be prioritized for field intervention. There is also no formal risk framework that factors into the Municipality's long-term budget planning processes. However, there are some plans and studies that have provided guidance in determining which assets are due for maintenance, rehabilitation or replacement and how to prioritize critical projects. This includes the 2002 Road Needs Study, 2017 OSIM Report, Energy Report and 2017 Strategic Plan. In most cases, capital needs are determined based on a combination of asset age and condition data. However, this data is not comprehensive or complete across all asset categories.

The Municipality last completed an Asset Management Plan (AMP) in 2016 and is due for an update in the near future. With the recent update of the Infrastructure for Jobs and Prosperity Act, 2015, the Municipality should revaluate its approach to developing an AMP so that it aligns with all new requirements. A robust and comprehensive AMP uses available asset data to develop financial strategies that consider the lifecycle needs of all municipal infrastructure. Furthermore, it will allow the Municipality to make data-driven decisions to project and optimize long-term funding needs.

Financial Strategies

The development of comprehensive financial strategies and planning will allow the Municipality to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service and all projected asset requirements. It is critical that the available funds are optimized to achieve the greatest benefit for the community.

The development of the Municipality's annual capital budget is a product of collaboration between departmental staff and Council. Staff are responsible for bringing forward capital needs to Council to develop an annual capital budget.

While there has been some analysis of short- and long-term capital and operating/maintenance requirements for capital assets it is premised on an incomplete understanding of overall asset condition. The collection of additional asset attribute data, including assessed condition, will ensure that capital investment decisions are made based on a detailed and strategic analysis of future needs instead of simply staff knowledge and opinion.

As further asset information becomes available (inventory, condition and field requirements), the short- and long-term budgets should be re-visited to address needs and to reassess overall capacity and affordability. In the event that additional financial resources are required to ensure the sustainability of the Municipality's infrastructure, it is critical that this information is communicated to Council to help inform their decision-making. Additionally, further information regarding asset management strategies and level of service options will help to advance and optimize the budget processes within the Municipality.

Levels of Service

To ensure that organizational objectives align with service outcomes, it is necessary to develop a process for the systematic measurement, monitoring and evaluation of the Municipality's provided levels of service. This is one of the more challenging aspects of an asset management system. However, it is also one of the most important. Understanding what your organization is actually providing to the community allows you to identify service gaps and develop strategies to improve service levels or seek cost savings where available and appropriate.

Similar to most municipalities, there is currently no levels of service framework in place at the Municipality across any asset category. During the interview process, it was found that there are some performance measurement programs in place, including the water network. Outside of that, while Municipality staff may have a general idea of how the community perceives provided service levels there is no formal process in place for measuring or tracking levels of service. It would be a beneficial asset management strategy to develop a centralized level of service framework which brings together performance measurement across each asset category.

Recommendations

In the following section, we provide an overview of some key strategic recommendations that have been developed based on the Municipality's current state of maturity. The recommended activities are a combination of activities that would be undertaken as part of PSD's Asset Management Roadmap, in addition to other actions that we suggest should be taken on the initiative of the Municipality.

Continue the practice of bringing asset management advancements and reporting forward to Council on all targets, processes and achievements
Continue to develop the connections between asset management programs and the key strategic planning documents within the Municipality
Continue to promote the need for, and the benefits of, improved asset management practices to all current and future staff and elected officials
Upon completion of the Asset Management Roadmap process, report the results of the comprehensive (all assets) AMP to Council

Organizational Cognisance

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Continue to implement improvements to the Municipality's asset management program based on industry best practice
Continue to advance the Municipality's asset management program through a balance of internal staff and industry consultants
As the Municipality grows, additional human resources may be required to assist with managing the overall assets of the organization, and the creation of new staff positions and departmental structure should be explored as necessary
Develop plans to educate and train key personnel in sustainable asset management practices including database management, condition assessment protocols, and lifecycle activity strategies
Develop an Asset Management Committee that contains diverse representation from all departments involved in the asset management process, and meets regularly to coordinate asset management activities and measure progress
Provide opportunities for key internal staff to attend educational conferences and workshops delivered by leaders in the asset management industry

Organizational Capacity

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Centralize and consolidate all infrastructure related data (inventory, condition, needs, prioritized requirements, financial data and GIS data) into the centralized asset registry database for the Municipality
Load key bridge condition and attribute data from the most recent 2017 OSIM inspections into the CityWide database with matching records
Implement a data management policy that outlines a consistent corporate approach to database maintenance and management including data handling procedures, roles and responsibilities
Provide adequate training to asset management personnel who will be responsible for collecting and entering data on a routine basis into the main asset registry

Infrastructure Data / Information

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Asset Management Strategies

Condition Assessments

- Work towards gathering assessed condition on the Municipality's entire network of infrastructure assets and implementing routine condition assessment protocols
- All future asset condition assessments should be uploaded to the Municipality's centralized asset registry
- The use of zoom camera should be explored as an alternative inspection process for the wastewater mains

Lifecycle Management

- Lifecycle frameworks should be developed for all major infrastructure categories (roads, bridges and culverts, buildings and water) including field intervention activities (replacement, rehabilitation, maintenance) and trigger points (condition or age) whereby certain activities should be performed
- The frameworks should be matched to asset-specific deterioration curves and loaded into the Municipality's centralized asset registry

Risk Management Frameworks

- Develop network-wide risk management frameworks that determine the criticality of infrastructure and quantify the impact of failure against service delivery for all asset categories
- Develop risk matrices based on both the probability of failure and the consequence of failure across all asset categories
- Implement risk management techniques that provide a structured and data-driven approach to project and program prioritization

Asset Management Plan

- Develop an asset management plan that includes an analysis of all infrastructure assets and the annual requirements necessary to sustain existing infrastructure while minimizing cost and risk to the community
- Update the asset management plan on a regular basis to include newly acquired assets and to assess the progress of the Municipality's asset management program
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Ensure that the development of Municipality's asset management plan is consistent with all provincial and federal legislation and regulations

Continue to develop short- and long-term budgets based on the best information available regarding the actual needs and optimized requirements of the Municipality's capital assets

Develop future financial strategies as further lifecycle requirement information and risk management priorities are developed through the Municipality's asset management strategies

Optional financial scenarios should be developed that will coincide with level of service thresholds for the Municipality's capital assets

Financial Strategies

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Develop detailed level of service frameworks for all asset categories, complete with both community-oriented and technical performance measures
Develop key performance indicators that reflect key organizational objectives and allow them to assess whether strategic priorities are being achieved
Continue to measure and evaluate levels of service on an annual basis to gain a better understanding of the current service levels being provided to the community

Levels of Service

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The preparation of this project was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.