ONTARIO CLEAN WATER AGENCY
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BluePlan ENGINEERING

Municipality of Northern Bruce Peninsula Asset Management Plan

Part 1 – Summary Report

SUBMITTED BY

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Executive Summary

Asset Management as a Management System

The integrated series of processes in Northern Bruce Peninsula (NBP) that are used to decide when, why and how to spend money on infrastructure assets represents a corporate (asset) management system. This Asset Management Plan (AMP) is the tactical output of this management system.

OCWA's Asset Stewardship Quality Management System (ASQMS) has been used to guide the development of this AMP. The ASQMS is OCWA's approach to a corporate management system to achieve the goal of AM - to realize value from assets in the achievement of NBP's objectives.

Asset Performance to Asset Spending Relationship

The ASQMS enables NBP to balance asset performance (level of service) expectations of constituents/stakeholders with financial affordability through two ways:

1. Creating a 'cost to asset performance' relationship that forecasts expected changes in asset performance over a future planning horizon against spending levels.
2. Establishing a dynamic and prioritized short/medium term plan to spend money on specific assets/projects that are performing furthest below expectations.

These two mechanisms help to understand where spending plans are inadequate to maintain current asset performance (levels of service) in the future. This understanding is then used to prioritize the allocation of current funds between and within asset groups, or the allocation of net new funding to assets or asset groups. Over time, asset performance expectations will be adjusted to align with changing stakeholder needs or evolving corporate strategic objectives.

Asset Portfolio

The scope of this project included all infrastructure assets owned by NBP. This infrastructure portfolio has an estimated replacement value of approximately $75 million and separated into five (5) service areas and fifteen (15) asset groups as illustrated on the following graphic.

Figure ES-1: Asset Hierarchy

Defining Asset Performance

Asset performance is defined as the ability of an asset to meet the objectives or requirements of the organization (i.e. 'fit for purpose'). The current performance of each asset is established through an analysis of the best available asset information augmented with insight from subject matter experts familiar with the infrastructure portfolio. The rating scale of asset performance is provided below.

Table ES-1: Asset Performance Rating Descriptions

PERFORMANCE CATEGORY	DESCRIPTION
Very Good and Good	Asset performance meets or exceeds its objectives/requirements.
Fair/Poor	Asset performance is nearing the point where it will not meet its objectives/requirements.
Very Poor	Asset performance is not meeting its objectives/requirements.

Current Asset Performance

The distribution of current asset performance in each service area is provided in Figure ES-2. It is apparent that all service areas have assets in the very poor performance category, indicating that spending is required on these assets in the short to medium term to restore them to the good performance category. It is also apparent that there are assets in the very good or good performance categories, highlighting the value of past renewal activities.

The performance rating of all assets will be updated on a continual basis to reflect new asset data and changing objectives/requirements.

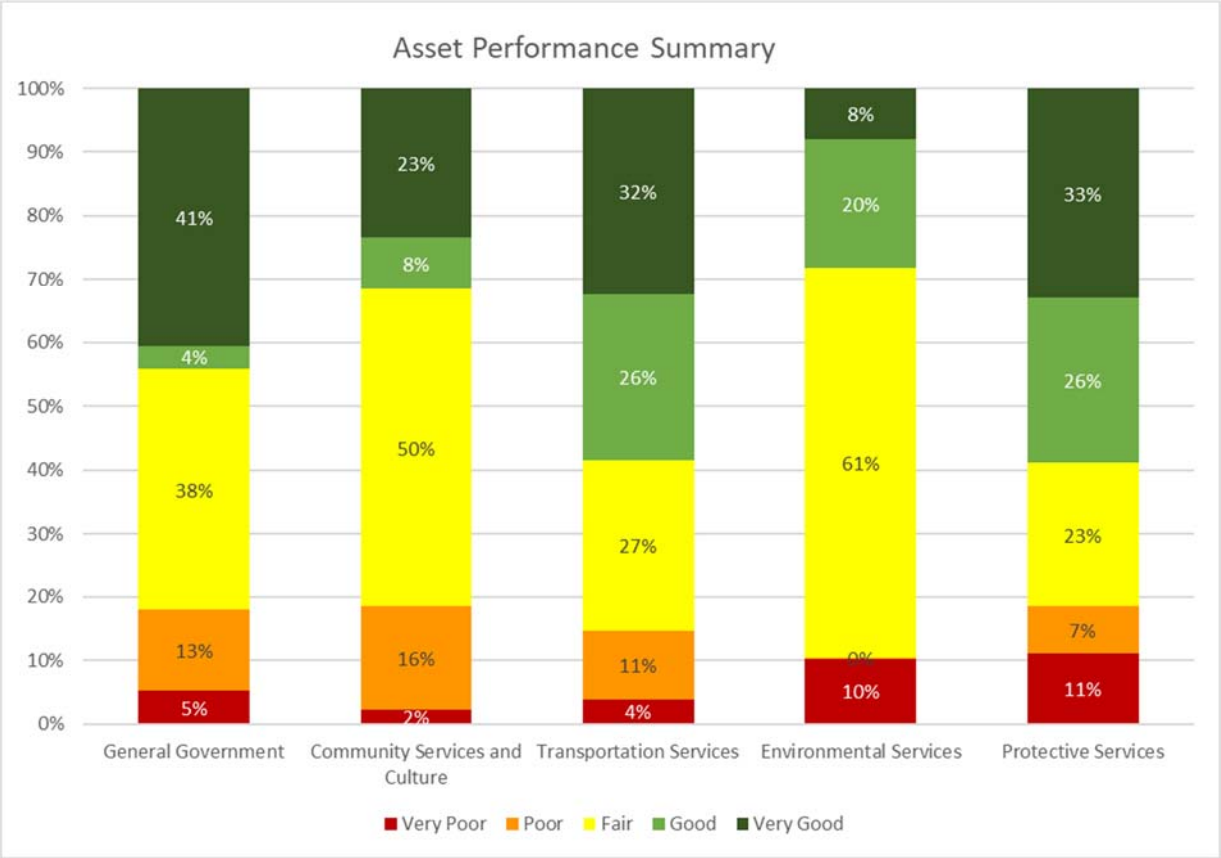

Figure ES-2: Current Asset Performance by Service Area

Asset Performance Forecast

Past and current budgets were analyzed to identify the expenditures to rehabilitate or replace infrastructure assets. Asset performance was then forecasted using appropriate logic on the expected deterioration of asset performance against the improvement to asset performance caused by spending. This provides insight to determine which asset groups have enough funding to sustain current performance levels.

General Government asset performance is expected to decline if recent spending levels are sustained. Additional spending will be required on administrative facilities in the medium to long-term to maintain the current performance of these assets.

Community Services and Culture asset performance is expected to decline if recent spending levels are sustained. Additional spending will be required on recreation and culture facilities in the medium to long-term to maintain the current performance of these assets.

Transportation Services asset performance is expected to remain stable if recent spending levels are sustained. The exception is the airport infrastructure assets which may require additional spending in the long term to maintain performance.

Protective Services asset performance is expected to remain stable if recent spending levels are sustained.

Environmental Services asset performance is generally expected to remain stable in the short to medium term if recent spending levels are sustained. The exception is related to the spending on water treatment facilities, particularly the Little Tub Treatment Plant, where spending increases are required in order to maintain asset performance.

Financial Strategy

The analysis demonstrates a funding gap in two asset groups:

1. A funding gap of approximately $100,000 per year has been identified in the water facilities to complete the required projects to achieve asset performance expectations. This is largely attributed to the investments required at the Little Tub WTP which exceed recent spending levels. A broader water servicing master plan is required to understand the long term expectations of this facility.
2. A funding gap of approximately $165,000 per year has been identified in the in the facilities asset group. A broader facility master plan is required to understand the long term expectations of each facility in order to priorities short and medium term investment.

The financial strategy to address the funding shortfalls is dependent on the outcome of other infrastructure planning activities. There is the potential that some infrastructure investments could be funded through Development Charges. This highlights the importance of establishing the long term expectations of NBP's infrastructure assets through preparing master plans or equivalent strategic documents that will provide direction for future AMP updates.

Pathway Forward

This Asset Management Plan is a living document that is the tactical output of a corporate management system. It should be updated on a periodic basis to reflect new information or changing organizational goals. The following points provide a roadmap to enhance asset management planning processes:

1. Continue to update the inventory of infrastructure assets.
2. Continue to monitor asset-centric performance indicator data that is available to measure the current performance of assets and asset networks.
3. Continue to connect spending to specific assets (or asset networks). This includes the preparation of short to medium term capital plans for each asset group similar to what is prepared for the water and wastewater infrastructure systems.
4. Continue to engage the community to understand their perspective on the performance of assets and asset networks (i.e. how well do the assets fulfill their expectations).
5. Complete appropriate infrastructure planning and financing studies, such as an Official Plan, Master Servicing Plans (transportation, water/wastewater, recreation/parks), Development Charges Study and water/wastewater rate study.

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1 INTRODUCTION

1.1 Overview

The Ontario Clean Water Agency (OCWA) was retained by the Municipality of Northern Bruce Peninsula (NBP) to prepare an Asset Management Plan (AMP). This AMP is a living document for municipal staff to use during decision-making processes, including the annual budgeting process and grant applications for infrastructure funding. Note that the AMP is the tactical output of a corporate management system which is described further in Subsection 1.5.

The approach to develop this AMP aligns with the new landscape of Asset Management (AM) in Ontario. This approach:

1. Ensures compliance with the Provincial AM regulation; and
2. Develops the processes to understand the relationship between infrastructure expenditures and asset performance (i.e. the level of service an asset or asset system provides).

1.2 Asset Management and Municipal Infrastructure

Municipalities in Canada began using the term Asset Management to refer to longer term infrastructure renewal planning around the turn of the 21st century. Early AM efforts focused on answering basic questions related to the inventory and valuation of all tangible capital assets (i.e. fixed infrastructure or equipment assets that are amortized over a period of more than one year). Attention was then turned to determining the future spending needs to ensure the services provided by infrastructure assets can be sustained over the long term.

The traditional approach to forecasting the spending needs uses age-based calculations to identify the year and cost of the asset renewal (rehabilitation or replacement) activities. While helpful to some degree by attempting to quantify the infrastructure spending needs in a municipality, this approach failed to gain traction in municipal organizations across Ontario. The lack of traction was a result of:

1. Municipal Councils being presented with insurmountable funding needs and operational challenges to raise revenue and expand their organization's ability to deliver significantly larger infrastructure renewal programs; and
2. A recognition that the age-based approach to forecasting spending needs did not capture all of the real corporate decision-making factors that go into deciding when, why and how to spend money on infrastructure assets.

Few municipalities accepted the results of the age-based approach verbatim, instead defaulting to the historic approach to AM which focused on understanding the community's infrastructure priorities and allocating scarce resources accordingly.

The new landscape of AM strives to align with this historic approach to AM – while also aligning with the international AM standard (ISO 55 000) – which defines AM as the process to "realize value from assets in the achievement of [the community's] organizational objectives[1]."

The processes necessary to support this approach is to forecast planned infrastructure-related spending against the performance of assets. ISO 55000 defines asset performance as "the ability of an asset to fulfill the organization's objectives or requirements". The performance of an asset, therefore, is directly related to the level of service it provides – an asset with good performance is one which is meeting the expectations of the community (i.e. providing an appropriate level of service). Conversely, an asset with poor performance is one which is not meeting expectations (i.e. not providing an appropriate level of service).

It should be emphasized that the community's performance expectation (i.e. level of service) balances costs and affordability and is therefore unique to each community based on its infrastructure inventory, financial status and community/corporate priorities.

1.3 Supporting Infrastructure-Related Investment Decisions

AM processes will enable NBP to balance performance (level of service) expectations of constituents/stakeholders with financial affordability. A corporate asset management system achieves this through two mechanisms.

First, establishing the processes to create a 'cost to level of service' relationship that forecasts expected changes in asset performance over a future planning horizon. The forecasts are enabled by applying appropriate logic to the best available asset and financial information to predict the deterioration of asset performance over time against the improvement in asset performance caused by infrastructure spending. These processes help to set overall spending levels by asset type.

Second, establishing a ***living management system*** that is used to prioritize the allocation of money to specific asset/projects. This is accomplished through the process to update the current performance of each asset on a periodic basis, and the ability to develop short to medium term (i.e. next 5 years) spending plans that are targeted at the assets that are performing most below the community's expectations. This process implicitly captures *criticality* or *consequence of service disruption* considerations because the performance expectations of a more critical asset will be greater than that for a less critical asset.

These two mechanisms will help Northern Bruce Peninsula understand the service areas where current spending levels are not adequate to maintain current asset performance (levels of service). The municipality can then use this understanding to prioritize:

1. The allocation of current funds between and within asset groups; and
2. The allocation of net new funding to assets or asset groups.

[1] ISO 55000:2014 (E) Asset Management – Overview, Principles and Terminology.

1.4 Provincial Asset Management Planning Requirements

The Province of Ontario developed Regulation 588/17 under the Infrastructure for Jobs and Prosperity Act (2015). The following points summarize the requirements of O.Reg. 588/17:

- An AM policy is required to articulate specific principles and commitments that will guide decisions around when, why and how money is spent on infrastructure assets. The Policy was required by July 1, 2019. Northern Bruce Peninsula successfully adopted their AM Policy in 2019.
- By July 1, 2021 the AMP will be required to document the current levels of service and the costs to sustain the current levels of service provided by the water, wastewater, stormwater, road and bridges infrastructure systems (i.e. 'core' assets per O.Reg. 588/17).
- By July 1, 2023 the AMP will be required to document the current levels of service and the costs to sustain the current levels of service provided by ***all*** infrastructure systems in the Town.
- By July 1, 2024 the AMP will be required to document the current levels of service, the costs to sustain the current levels of service, the proposed levels of service, the costs to achieve the proposed levels of service, and the financial strategy to fund the expenditures necessary to achieve the desired levels of service for all infrastructure systems.

1.5 AMP Development Approach

The approach to develop this AMP has been guided by OCWA's Asset Stewardship Quality Management System (ASQMS) Framework, provided in **Error! Reference source not found.**. The ASQMS Framework shows how technical asset lifecycle strategies are connected to community priorities to develop optimized asset stewardship plans that balance service levels and costs. Note that an AMP is a tactical output of the ASQMS.

The ASQMS has also been developed to align with the Provincial *Building Together – Guide for Municipal Asset Management Plans* that was published by the Ontario government in 2012, *Ontario Regulation 588/17 Asset Management Planning for Municipal Infrastructure,* and *ISO 55000*. It should be noted that O.Reg. 588/17 has some new/different requirements for the content of an AMP, and therefore the content in the enclosed AMP may not explicitly match the 2012 Guide. All amounts presented in this are 2020 Canadian dollars.

Figure 1: ASQMS Framework.

The development of this AMP leverages the best available asset and financial information, staff input, subject matter expert professional judgement, and AM best practices, to complete the following steps:

1. Develop a complete listing of infrastructure assets to be included in the AMP, including attributes such as size/material/type, useful life, age, and current valuation. Current valuations were updated to 2020 dollars, where required, using applicable inflationary indices.
2. Assess current performance (level of service) of the assets based on existing information. This is based on the professional judgement of subject matter experts through interpretation of quantitative and qualitative performance indicators.
3. Prepare an asset management strategy (i.e. long-term spending levels, short term prioritized spending plan) that maintains the current performance distribution of the Municipality's infrastructure assets.
4. Determine a financing strategy to support the asset management strategy, establishing how the expenditure plan to maintain asset performance will be funded.
5. Prepare an Asset Management Plan report.

1.6 Updating the Asset Management Plan

The AMP should be updated on a periodic basis to reflect the latest asset and financial information, as well as to respond to evolving asset performance (level of service) expectations in the community. This can be accomplished annually in conjunction with the budget processes, or more frequently if required to support funding applications.

1.7 Asset Management Plan Scope

This AMP includes all infrastructure assets owned by the Northern Bruce Peninsula. All assets were grouped into defined hierarchies based on the service that they provide to the community. Five (5) service categories and fifteen (15) asset groups were established through consultation with the Municipality. Assets in each service category were then also sub-divided into more granular hierarchies to support practical decision-making considerations. The first two levels of the asset hierarchy are provided in Figure 2.

Figure 2: Asset Hierarchy

1.8 Growth Planning

Northern Bruce Peninsula is in the midst of refreshing their strategic planning processes. This may include the preparation of a growth forecast, Official plan, Development Charges Background Study, Water and Wastewater Master Servicing Plan, or Strategic Plan. These plans will help to plan for the type of growth that will align with the community's vision. This information will be incorporate into future updates of this AMP.

2 OVERVIEW OF ASSET PORTFOLIO

Northern Bruce Peninsula has an infrastructure portfolio with an estimated replacement value of approximately $75 million. The breakdown is provided in Figure 4. It is noted that actual costing values are subject to market forces at the time of infrastructure construction or improvement activity. Values are based on historical averages and industry standards.

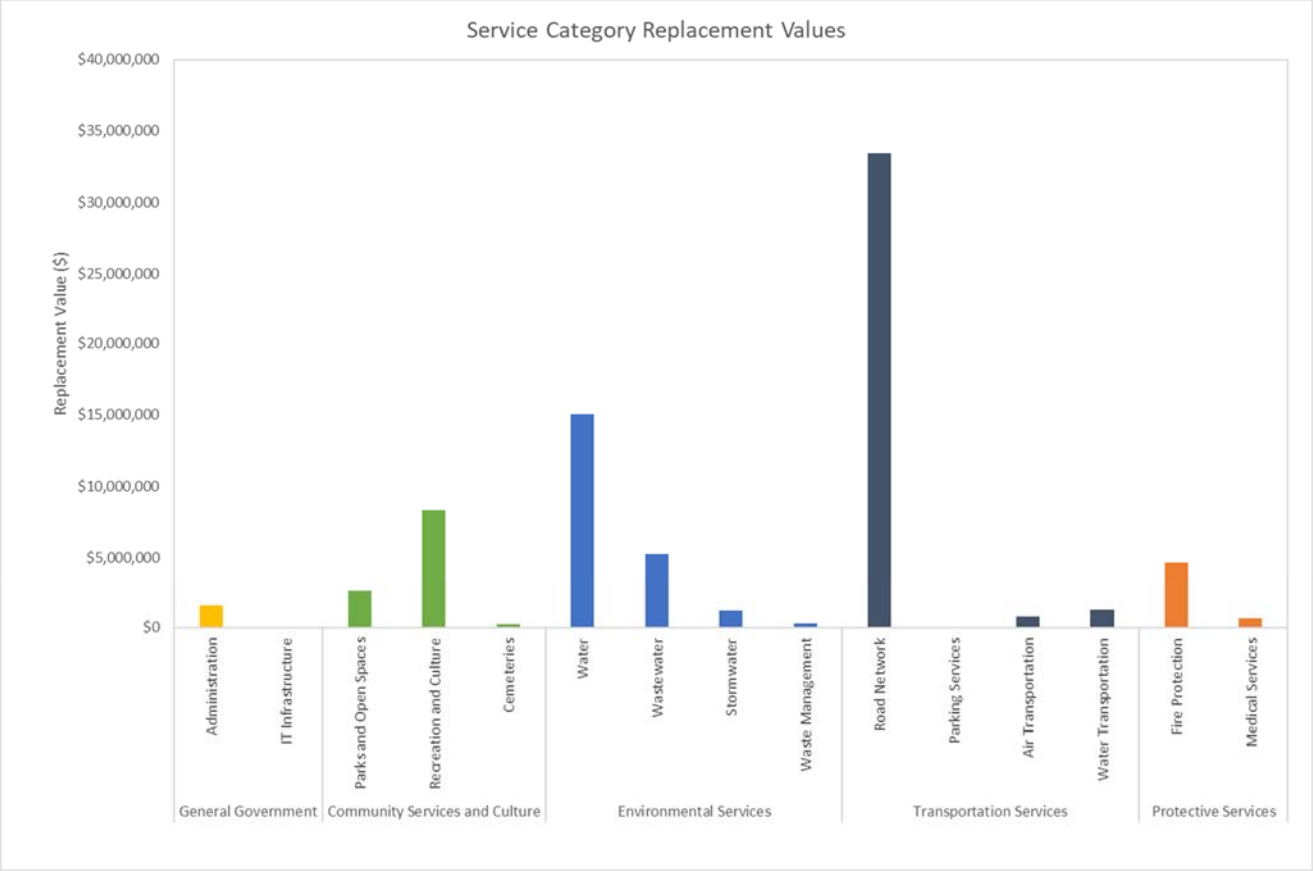

Figure 3: Distribution of Asset Replacement Value by Service Area and Asset Group.

The asset inventory was combined with a review of all available asset and financial information to establish the current performance of individual underlying assets that support each service area. This information is collected from a variety of sources, ranging from sophisticated technologies to collect road condition data to visual observations from qualified professionals. The review of information is used to establish the current performance of each asset as defined in Table 1 below.

Table 1: Asset Performance Rating Descriptions

Performance Category	Description
Very Good and Good	Asset performance meets or exceeds its objectives/requirements.
Fair/Poor	Asset performance is nearing the point where it will not meet its objectives/requirements.
Very Poor	Asset performance is not meeting its objectives/requirements.

The current performance profiles of the five service areas are provided in Figure 4. It is apparent that the all service areas have assets in the very poor performance category. This indicates that spending is required on these assets in the short to medium term to restore them to the good performance category. It is also apparent that there are assets are in the very good or good performance categories, demonstrating the impact of past rehabilitation or replacement projects.

The performance rating of each asset will be updated on a continual basis to reflect new asset data and changing objectives/requirements.

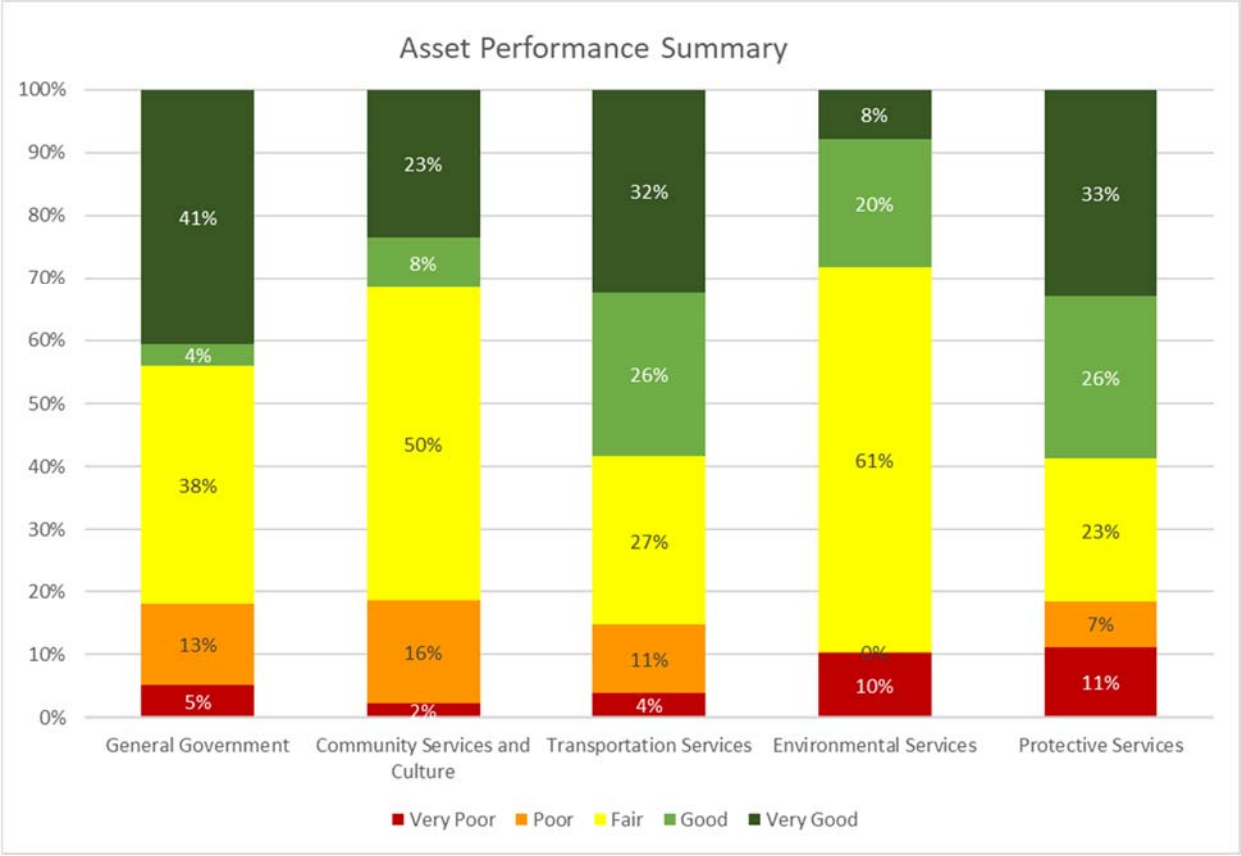

Figure 4: Current Asset Performance by Service Area.

3 ASSET PERFORMANCE (LEVELS OF SERVICE)

As described in Section 1, the new landscape of AM that aligns with ISO 55000 defines asset performance as the ability for an asset to fulfill its objectives or requirements. This means that the performance of an asset is directly proportional to the level of service it provides. Levels of service are also at the core of O.Reg. 588/17 which requires municipalities to understand the cost to achieve higher or lower levels of service.

3.1 Approach to Levels of Service

The approach to developing levels of service aligns with international best practices while also remaining consistent with the requirement of O.Reg. 588/17. The ASQMS aligns technical performance indicators to community values/corporate priorities. These technical performance indicators are then combined with the professional judgement of staff to establish the performance category of each asset.

Over time, NBP will leverage more data-driven performance indicators to understand how well assets are performing. However, it should be emphasized that the professional judgment of staff and external subject matter experts will always be an important lens to determine asset performance (i.e. to establish the degree to which an asset is meeting expectations) based on the available performance indicator data.

3.2 Managing Asset Performance

The **first layer** of asset performance measurement is at the Service Area level of granularity. The following points describe the information in the Asset Performance Measurement table:

1. A service statement that briefly describes the kind of service that is provided to the community. For example, the water service statement is, "Efficiently providing safe, high quality and reliable water services with adequate pressure and flow."
2. The current performance of the assets that support the service area.
3. The Service Attributes that cover all aspects of the service that reflect corporate or community values. Examples of Service Attributes include:
    - Quality
    - Safe
    - Accessible

    The Service Attributes also include statements that provide context for each term.

The **second lay**er manages the technical indicators at the individual asset (or asset system) level of granularity. These types of metrics generally attempt to quantify the severity and extent of an asset's (or asset system's) deficiency. Technical subject matter experts then define the threshold when the deficiency of an asset is not meeting its performance objectives.

Asset performance measurement tables are provided in Appendix A.

3.3 Asset Performance Results

General Government

- Although the facilities are generally meeting current expectations, it is noted that many of the administrative facilities are nearing the point where significant investments will be required to maintain asset performance expectations.
- IT Infrastructure is generally meeting current expectations.

Community Services and Culture

- Parks are generally meeting current expectations.
- Recreation and Culture facilities have a large proportion of assets in the fair and poor performance categories, meaning they are nearing the point where they will no longer meet performance expectations.
- Cemeteries are generally meeting current expectations.

Environmental Services

- Water and Wastewater infrastructure assets are generally meeting expectations. No noteworthy trends of performance indicator issues were identified. The upcoming review of the broader water and wastewater servicing options to support future development will be used to review asset performance expectations.
- Stormwater and Waste Management assets are generally meeting current expectations.

Transportation Services

- The Road Network assets are meeting expectations. Full inventories and high quality performance data was available for the majority of assets in the analysis.
- A large proportion of Public Works facilities are in the fair or poor performance categories, meaning they are nearing the point where they will no longer meet performance expectations.
- Parking Services asset data was not available. An asset performance review will be beneficial for future AMP updates as the inventory is compiled.
- Air Transportation are generally meeting performance expectations with the only major deficiencies related to the runway and rotator.
- The Fleet assets are generally meeting expectations, however a number of vehicles are of an age where their rate of performance deterioration could begin to increase.

Protective Services

- Protective Services facilities are generally meeting expectations. However, it is noted that a broader servicing strategy of fire stations within the community may impact the current performance of the existing facilities.
- Fire Protection fleet were generally meeting expectations.
- Fire Protection equipment had just over a quarter of assets not meeting expectations. An asset performance review will be beneficial for future AMP updates to better understand asset performance expectations.

4 Asset Lifecycle Management

4.1 Asset Lifecycle Activities

An overview of typical asset lifecycle activities that are applied to public infrastructure are provided in Table 2. Lifecycle activities by asset group are included in the Part 2 report.

Table 2 : Typical Asset Lifecyle Activities

Lifecycle Activity	Description	Examples
Operational	Actions or studies that support service delivery	Operational activities, routine preventative maintenance, studies on asset performance
(Major) Maintenance	More significant repairs or routine replacement of small equipment	Sewer spot repairs, road patching, meter replacement.
Rehabilitation	Significant project, typically costing between 30% and 70% of asset replacement value.	Structural lining of sewers, road resurfacing, pump rebuilds
Replacement	Significant project resulting in an asset that meets top industry and community expectations.	Plant refurbishment, process area overhaul, road reconstruction, watermain replacement.
Disposal	Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	Salvage of equipment
New Asset	Construction or purchase of new asset that results in net growth of the net asset inventory	New recreation centre to service growing community

4.2 Planned Expenditures

NBP completes a range of lifecycle activities on infrastructure assets that support each service area. Table 3 summarizes the recent expenditures by lifecycle activity. Table 4 provides rehabilitation or replacement expenditures by asset group. It is expected that recent expenditure levels will be sustained in the short to medium term.

Table 3: Infrastructure Expenditure Summary

Lifecycle Activity	2016 ($000)	2017 ($000)	2018 ($000)	2019 ($000)	2020 ($000)	Average
Operational	$8,037	$8,630	$8,453	$9,127	$9,588	
Maintenance	$158	$177	$162	$205	$219	$175
Rehabilitation or Replacement	$1,719	$1,915	$3,305	$2,075	$3,644	$2,253
New Asset	$97	$91	$150	$80	$205	$105
Reserve Contribution	$54	$75	$47	$73	$73	
Total	**$10,010**	**$10,813**	**$12,071**	**$11,488**	**$13,656**	

4.3 Forecasted Performance Profile base on Planned Expenditures

The planned expenditures to rehabilitate or replace infrastructure assets are combined with the analysis of asset information to forecast the expected change in asset performance. The forecast logic applies industry best practices related to the expected rate of performance deterioration (i.e. the rate of consumption of the asset performance by the community) and the improvement to performance resulting estimated from planned expenditures.

The following conclusions are provided as informed by the analysis.

General Government

The analysis indicates that the performance of General Government assets are expected to decline in the future if current spending levels are sustained, specifically related to administrative facilities. Additional funding is required in the medium to long-term to maintain asset performance expectations. It is also noted that there are functionality concerns with the Municipal Office related to space limitations and the lack of potable water.

Community Services and Culture

The analysis indicates that the performance of Community Services and Culture assets is expected to decline if recent spending levels are sustained, specifically related to recreational and culture facilities.

Although current spending levels may be sufficient to maintain performance in the short term, additional spending will be required on recreation and culture facilities in the medium to long-term to maintain the current performance of these assets. It is noted that many of the facilities will require significant investment to meet evolving performance expectations such as accessibility accommodations and changing community priorities. It is also noted that enhanced public washroom facilities and other summer tourist infrastructure is required to meet the community's expectations.

The expenditure analysis did not identify any recent spending on Cemetery assets. It is assumed that this is because the assets are in the good performance category and have not required any spending. The analysis indicates that funding may be required in the long term (i.e. 2030 and beyond) to address assets that will have declined to the poor performance category.

Environmental Services

The analysis indicates that the performance of Environmental Services assets is expected to decline over the long term if recent spending levels are maintained. This is attributed to water facilities. The average annual spending for the past 5-years on water assets has been $80,000. The latest Capital/Major Maintenance Plan OCWA has prepared suggests that an annual spend of $180,000 is required in the next 6-years to maintain asset performance objectives. Much of this funding gap is related to the Little Tub water treatment plant.

It is recognized that some of the larger projects on OCWA's Major Maintenance Plan may be dependent on the outcome of the upcoming water and wastewater master servicing plan. This analysis will be updated on an annual basis and reflect the outcome of the servicing plan when ready.

The analysis indicates that the performance of the stormwater and waste management asset groups is expected to be maintained in the short to medium-term. The focus of these asset should be to monitor the impact of the changing climate on the performance of the stormwater infrastructure.

Transportation Services

The analysis suggests that Transportation services assets are generally meeting the community's expectations. Recent spending levels are appropriate to maintain asset performance.

The exception is Air Transportation assets which is expected to decline in the long term. Additional funding may be required in the long-term.

The Water Transportation asset performance is expected to be maintained if recent spending levels are sustained.

Protective Services

The performance for Protective Services assets is expected to remain relative stable for the short to medium term if recent spending levels are sustained. However, the proportion of assets in the very poor performance category is expected to increase in the long term. This suggests that additional spending may be required in the medium-term to restore the assets to the very good performance category. The annual spending could then resume to recent levels.

4.4 Required Expenditures to Maintain Current Performance

Table 4 provides a summary of the required expenditures to maintain the current performance distribution of each service area or asset group. A funding gap has been identified in the water and facilities (both Administrative and Recreation and Culture) asset groups.

Table 4: Infrastructure Expenditure and Funding Gap Summary

Asset Category	2020 Planned Spending	Average Annual Past Spending (2015 to 2020)	Avgerage Annual Funding to Maintain Current Asset Perfromance	Avgerage Annual Infrastructure Funding Gap
General Government				
Administration	$ 65,000	$ 10,833	$ 35,000	$ 24,167
IT Infrastructure	$ -	$ 15,000	$ 15,000	$ -
Community Services and Culture				
Parks and Open Spaces	$ 132,500	$ 135,464	$ 135,464	$ -
Recreation and Culture	$ 98,994	$ 110,762	$ 250,000	$ 139,238
Cemeteries	$ -	$ 7,800	$ 7,800	$ -
Transportation Services				
Road Network				
Linear - roads, bridges and sidewalks	$ 2,205,000	$ 1,286,139	$ 1,286,139	$ -
ROW Assets	$ 342,000	$ 12,577	$ 12,577	$ -
Facilities	$ -	$ -	$ -	$ -
Fleet	$ 342,000	$ 293,079	$ 293,079	$ -
Parking	$ -	$ 18,605	$ 18,605	$ -
Air Transportation	$ 7,000	$ 8,726	$ 8,726	$ -
Water Transportation	$ 132,000	$ 114,142	$ 114,142	$ -
Environmental Services				
Water	$ 252,275	$ 81,841	$ 183,000	$ 101,159
Wastewater	$ 189,500	$ 47,369	$ 47,369	$ -
Stormwater	$ -	$ -	$ -	$ -
Waste Management	$ 38,000	$ 38,241	$ 38,241	$ -
Protective Services				
Fire Protection	$ 182,000	$ 213,964	$ 213,964	$ -
Medical Services	$ -	$ 11,894	$ 11,894	$ -
			Total:	**$ 264,564**

4.5 Risk Management

The approach to managing risk in this AMP is to consider the overall criticality of each asset related to the role it plays in providing services to the community. This is completed by understanding the required performance of each asset based on its size, location, function, etc. This understanding of is then used to judge when an asset is not meeting its objectives or requirements based on the available technical performance indicators and subject matter expert judgement. More critical assets have higher performance expectations, while less critical assets have lower performance expectations.

4.6 Managing Climate Change

The expected impacts of climate change have been considered and included throughout the analysis used to inform this AMP. This includes consideration of climate change when establishing the current performance rating of an asset, forecasting the deterioration rate of an asset, or establishing the lifecycle activities completed on an asset.

5 FINANCING STRATEGY

5.1 Introduction

The financing strategy of an AMP sets out the approach to ensuring that the appropriate funds are available to support the delivery of infrastructure services. The financing strategy in this AMP reflects the 2020 financial state of Northern Bruce Peninsula.

This financing strategy starts by providing an overview of the financial situation for context prior to discussing the options for addressing the infrastructure funding gap (if applicable) in each service area.

5.2 Financial Overview

The revenue summary is provided in Table 5. Expenditures summaries have been previously presented in Section 4.

Table 5: Revenue Summary

Item	2016 ($000)	2017 ($000)	2018 ($000)	2019 ($000)	2020 ($000)
Taxation	$5,325	$5,484	$5,824	$6,052	$6,213
Grants in Lieu	$733	$771	$792	$917	$912
Grants	$1,508	$1,766	$2,085	$2,551	$1,825
Penalties, Interest and Investment Income	$348	$354	$418	$455	$420
Water and Sewer Revenue	$676	$681	$685	$695	$686
Departmental Fee	$2,025	$2,589	$2,536	$2,530	$2,340
Transfer from Reserve	$369	$923	$1,311	$889	$1,594
Total	**$10,985**	**$12,568**	**$13,650**	**$14,090**	**$13,990**

5.3 Current Financial Strategies

The following points describe the current Financial Strategy in the Northern Bruce Peninsula:

- There is an annual budget which funds all operating costs, as well as asset rehabilitation or replacement activities.
- Infrastructure is funded in a pay-as-you-go approach where rehabilitation or replacement activities are financed using the available annual in-year funding.
- Spending levels on asset rehabilitation or replacement can vary significantly each year based on available of Provincial or Federal infrastructure grants.

- Reserves and reserve funds are used to save for and fund larger projects that cannot be accommodated within single-year revenues from rates or grants.
- The Municipality has an OSIFA loan with a remaining total balance of $693,000 as of February 2020.

5.4 Infrastructure Funding Shortfall Summary

The technical analysis demonstrates that the current planned spending levels are appropriate to maintain the current performance for most assets. An infrastructure funding shortfall of $100,000 per year has been identified for the water system and a shortfall of $165,000 per year has been identified for facilities assets as shown in Table 5.

5.5 Financial Strategy Options

The first strategy to address the infrastructure funding shortfall is to examine the tradeoffs between the allocation of current funds between and within asset group. The analysis enabled by the asset management planning processes, used to develop this AMP, can be used to analyze the expected impact of transferring spending from one asset group to another.

The analysis did not identify any opportunities to reduce expenditures on other assets to address the funding gap (i.e. no asset groups are currently over-funded).

The next strategy to address the infrastructure funding shortfall is to increase overall net spending to improve the performance of assets. There are several options to consider:

1. Continue to seek funding from the Provincial or Federal government to fund infrastructure.
2. Draw from available reserves. The use of reserves is appropriate to fund large projects where spending is increased for a short time period, after which spending will return to baseline levels.
3. Investigate Development Charges (DC's) to finance infrastructure required to service new growth. This involves the completion of a DC background study and the passing of a municipal bylaw to charge a per-lot fee to fund growth related infrastructure projects.
4. Consider modest above-baseline revenue increases to fund the infrastructure funding shortfall.
    - A property tax increase of approximately 3% (above baseline inflationary increases) would be required to fund the facilities funding shortfall.
    - A water and wastewater rate study would be appropriate to complete when the Master Plan for the water and wastewater systems has been completed to set the appropriate rate to address the water funding gap.
5. Adjust asset performance expectations. The funding shortfall may be reduced by revisiting stakeholder objectives against affordability/willingness to pay.

6 Discussion and Next Steps

This AMP represents the tactical output of a corporate management system. The corporate management system is the series of interconnected processes that work together to realize value from assets. The process in the management system are centred around an asset performance to asset spending relationship.

This AMP has been developed using the best available asset and financial information that support decision-making processes related to spending on infrastructure assets. The AMP is a living document that should be updated on a periodic basis to reflect new information and changing community priorities.

6.1 Trending Performance

Northern Bruce Peninsula must establish proposed asset performance by July 1, 2024 to comply with regulatory requirements. There is also a regulatory requirement to provide annual updates on the progress of the AMP. The practical steps to complete these activities are as follows:

1. Each year, the asset inventory is updated with the best available asset data. This ensures that assets are added/removed as appropriate and any new technical performance indicator data is used to adjust the performance rating of assets.
2. Each year, the Performance Measurement and Technical Performance Indicator tables are updated with the best available information.
3. Each year, the spending analysis is updated to understand what assets money was spent on, and to connect planned spending to assets or asset networks.

These three steps will be used to update the forecast of changing asset performance versus spending levels. Over time, Northern Bruce Peninsula will see connections between the changing asset performance, annual spending levels, and the values of the various technical indicators. This will help to confidently establish proposed asset performance values before the July 1, 2024 regulatory deadline. This annual update process will also help to calibrate the performance forecasts by providing greater insight into how changing spending levels have impacted the known asset performance distributions.

6.2 Roadmap for Enhancing Asset Management Processes

The following points provide a roadmap to enhance asset management planning processes:

1. Continue to update the inventory of infrastructure assets to address the data gaps parking and stormwater asset inventories, as well as capturing ongoing changes to the asset portfolios.
2. Continue to strengthen the quality of asset-centric performance indicator data that is available to measure the current performance of assets and asset networks.
3. Continue to strengthen the connection between actual or planned spending and specific assets (or asset networks). This will provide greater line of sight from the current or planned spending and the resulting performance improvement in an asset or asset network. A multi-year capital plan can be used to achieve this, recognizing that asset performance could change suddenly.
4. Engage the community to understand their current perspective on the performance of assets and asset networks. The service attributes for each service area are the best way to frame this engagement – for example, if a member of the public suggests that a road, (or all roads) are not meeting their expectations, then the service attributes can be used to further investigate if it is due to quality or safety concerns with the asset.
5. Strategic plans such as the Official Plan, and infrastructure master servicing plans (i.e. transportation, water and wastewater, facilities, parks), and DC Background Studies are used to set asset performance expectations. As they are completed, these projects will provide the opportunity for Northern Bruce Peninsula to confirm asset performance expectations.

Appendix A

Asset Performance Measurement Tables

Asset Performance Measurement

Service Area	Service Statement	Current Performance		Service Attribute	Service Attribute Statement
		Performance Measure	Value		
General Government	Efficiently provide high quality, safe, accessible, and energy efficient Administration facilities and IT Infrastructure for the community.	Percentage of General Government assets meeting performance expectations	95%	Quality	Provide administration assets in good condition at the right design standard and IT Infrastructure assets at the appropriate quality.
				Safe	Provide safe administrative facilities and a secure IT network (firewalls, monitoring software, etc.).
				Accessible	Provide administration assets that are AODA compliant and accessible IT Infrastructure.
				Environmental Stewardship	Provide administration assets that are environmentally friendly.
Environmental Services	Efficiently provide safe, clean drinking water of adequate pressure and flow with minimum service interruptions as well as reliable wastewater and stormwater services that are conscious of impacts to private property and natural environment.	Percentage of Environmental Services assets meeting performance expectations	90%	Reliable	Provide a water system with minimal interruptions to consumers. Provide a wastewater and stormwater system that protects against flooding.
				Safe	Provide a water system that supports community fire protection.
				Operational	Provide high quality water to residents.
				Environmental Stewardship	Provide Environmental Services that have minimal impacts on the environment.
Transportation	Efficiently provide operational and accessible road network and traffic services at the appropriate quality that support drivers, cyclists, and pedestrians, as well as vehicles that are safe, reliable, fuel-efficient, and affordable to the client.	Percentage of Transportation assets meeting performance expectations	96%	Quality	Provide Transportation assets at the appropriate condition.
				Safe	Provide an operational road network that is safe for drivers, pedestrians and cyclists.
				Reliable	Provide reliable vehicles and equipment for Transportation services.
				Accessible	Provide accessible Transportation services.
				Environmental Stewardship	Provide Transportation services that are environmentally conscious.
Protective Services	Efficiently provide effective and reliable Protective Services that keep the community safe.	Percentage of Protective Services assets meeting performance expectations	89%	Reliable	Provide the appropriate amount of Protective Services and ensure first responders are well prepared.
				Responsive	Provide responsive fire, medical, hazardous material and rescue services, appropriately equipped and with fully trained firefighters.
Community Services and Culture	Efficiently provide safe and high quality parks and green spaces, as well as recreation and cultural facilities that are accessible to residents and support a livable community.	Percentage of Community Services and Culture assets meeting performance expectations	98%	Quality	Provide Community Services and Culture assets in acceptable condition.
				Safe	Provide safe Community Services and Culture assets.
				Accessible	Provide parks, green spaces, recreation and cultural facilities within a reasonable proximity to every residential household that are in compliance with AODA standards.
				Environmental Stewardship	Provide recreation and cultural facilities that are environmentally friendly.

Technical Asset Performance Indicators

Relevant Service Area or Asset Group	Performance Indicator	2017	2018	2019	Trend	Data Source
WTP & watermains	Number of boil water advisories	0	0	0	Stable	Annual Reports
WTP & watermains	Number of Adverse Water Quality Incidents	3	3	2	Stable	Annual Reports
watermains	Number of Watermain Breaks	1	0	0	Improving	Annual Reports
watermains	Number of Water Service Failures	0	0	0	Stable	Annual Reports
sanitary sewers, wastewater facilities	Taste, Odour, colour complaints	0	0	0	Stable	Annual Reports
sanitary sewers, wastewater facilities	Volume of untreated sewage discharged	0	0	0	Stable	Annual Reports
sanitary sewers, wastewater facilities	Number of Wastewater Treatment Plant Effluent Violations	0	1	1	Stable	Annual Reports
sanitary sewers, wastewater facilities	Number of basement flooding complaints	0	0	0	Stable	Annual Reports
roads	Average Pavement Condition Index			0.81		Road Data
bridges	Average condition index			0.68		Inspection Data
culverts > 3m span	Average condition index			0.75		Inspection Data

Required O.Reg 588/17 Metrics

Service Area	Service Attribute	Community Levels of Service (qualitative descriptions)		Technical Levels of Service (technical metrics)		
		Performance Measure	Current Performance	Performance Measure	Current Performance	Data Source
Roads	Scope	Road network in the municipality and its level of connectivity	Roads of various classifications exist through the Municipality and connect our community.	# of lane-kilometres of arterial roads as a proportion of square kilometres of land area of the municipality.		all roads considered local for O.Reg 588 metrics
				# of lane-kilometres of collector roads and local roads as a proportion of square kilometres of land area of the municipality.		all roads considered local for O.Reg 588 metrics
				# of lane-kilometres of local roads as a proportion of square kilometres of land area of the municipality	54%	868 lane-km of roads, estimate 1,600 km2
	Quality	Description of the different levels of road class pavement condition	Municipality has gravel, surface treated and asphalt roads. Surface condition ranges from like-new to fully distressed.	1. Average pavement condition index for paved roads	81	2019 asset register analysis
				2. Average surface condition (e.g. excellent, good, fair or poor) for unpaved roads	Fair	Asset register analysis
Water	Scope	1. User groups or areas of NBP that are connected to the municipal water system	Most properties within the urban area of the Municipality are connected to the municipal water system.	Percentage of properties connected to the municipal water system	Municipal Water is provided in Lions Head and to some Tobermory properties serviced by the Little Tub treatment plant.	Annual Report and Systema Analysis
		2. User groups or areas of NBP that have fire flow	All properties connected to the municipal water system have fire flow.	2. Percentage of properties where fire flow is available	Fire flow is available at 100% of the properties connected to the Lions Head distribution system.	Annual Report and Systema Analysis
	Quality	Description of boil water advisories and service interruptions	Boil water advisories are made when the water is deemed to be not safe to drink due. Service interruptions are caused by watermain breaks or other equipment failures at water supply facilities.	Number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0	Annual Report
				Number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system	0	Annual Report
Wastewater	Scope	User groups or areas of NBP that are connected to the municipal wastewater system	Most properties within the urban area of the Municipality are connected to the municipal wastewater system.	Percentage of properties connected to the municipal wastewater system	Municipal Wastewater service is provided in Tobermory.	Annual Report and Systema Analysis
	Quality	1. Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place (to prevent backups into homes by allowing overflow during storm events)	The Municipality does not have combined sewers. Stormwater or groundwater enters the sanitary sewers through cracks or other deficiencies in the pipes. Some parts of the sewer systems have overflows to allow discharge into the environment in the event that flow rates are high enough to cause basement flooding. The sewage treatment plant cleans wastewater to within Provincial regulated limits before being discharged.	The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.	0	Annual Report
		2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches		Annual number of events where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system.	N/A	no combiend sewers
		3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes				
		4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid sewage overflow into streets or backup into homes		The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.	There was one effluent violation at the Tobermory Lagoon	Annual Report
		5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system				
Stormwater Management	Scope	User groups or areas of NBP that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system	Some urban areas protected from ROW/infrastructure flooding through urban ditch system or underground storm collection, some with defined outlets. Most rural areas protected from flooding through provision of municipal drains or rural ditch systems, some with defined outlets.	1. Percentage of properties in municipality resilient to a 100-year storm	100%	Resilience is defined as the ability to recover to the pre-event service level.
				2. Percentage of the municipal stormwater management system resilient to a 5-year storm	100%	Resilience is defined as the ability to recover to the pre-event service level.

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

BluePlan ENGINEERING

Municipality of Northern Bruce Peninsula Asset Management Plan

Part 2 – Supplementary Analysis

SUBMITTED BY

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V1	July 7th, 2020	Zachary Francisco, GM BluePlan	Nick Larson, OCWA	Nick Larson, OCWA	Draft Report
V2	August 10th, 2020	Zachary Francisco, GM BluePlan	Nick Larson, OCWA	Nick Larson, OCWA	Final Report

Table of Contents

1 INTRODUCTION

Part 2 of the Asset Management Plan (AMP) is supplementary to Part 1, providing greater detail into the analysis approach and graphs/tables that give more granular insight into the current and forecasted performance of asset networks. This section also contains all of the analysis and content required under O. Reg. 588/17.

1.1 Structure of this Report

The first section of this Part 2 report is an overview of the analysis approach. Subsequent sections contain the results of the analysis for each service area. Each service area has the following sections:

1. State of Local Infrastructure
    1.1. Asset Hierarchy
    1.2. Replacement Costs
    1.3. Age Summary
    1.4. Asset Performance
    1.5. Condition Assessment Approach
2. Asset Lifecycle Management Strategy
    2.1. Asset Lifecycle Activities
    2.2. Planned Expenditure Performance Forecasts
    2.3. Proposed Expenditure Performance Forecasts

1.2 Methodology and Outcomes

1.2.1 Measuring Performance

The best available data and the professional judgement of subject matter experts was used to measure asset performance. The available condition or performance data was converted to a consistent scale for performance scoring analysis. Table 1 illustrates the performance scores and associated performance categories for each asset.

Table 1: Performance Category Scale

Performance Category	Performance Score
Very Good	0.81 to 1.00
Good	0.61 to 0.80
Fair	0.41 to 0.60
Poor	0.21 to 0.40
Very Poor	0.00 to 0.20

1.2.2 Degradation Rates

The current asset performance scores are used as starting points for the long-term analysis. The performance is then forecasted over the next 25 years using degradation rates against the planned spending that improves asset performance. Degradation curves were based on asset management best practices and the professional judgement of subject matter experts.

1.2.3 Example Performance Distribution Forecast Graphs

This section provides an overview of the performance distribution forecast graphs. The complete performance forecasts for each asset category are provided as electronic deliverables.

Figure 1 presents a typical performance distribution forecast graph. It illustrates a 25-year forecast of the percentage of assets in very poor, poor, fair, good, and very good performance weighted by replacement value. This graph is generated by using the asset inventories, current known asset performance ratings, and the annual budget for replacing and rehabilitating assets.

When an asset is replaced (or rehabilitated) its performance is reset to very good and the cost of the activity is subtracted from the available annual budget. This is repeated until the annual budget is fully consumed, and then repeated for future years. The forecasted performance of the network can then be compared against the current performance distribution to understand if the annual spending level is enough to achieve the desired asset performance distribution.

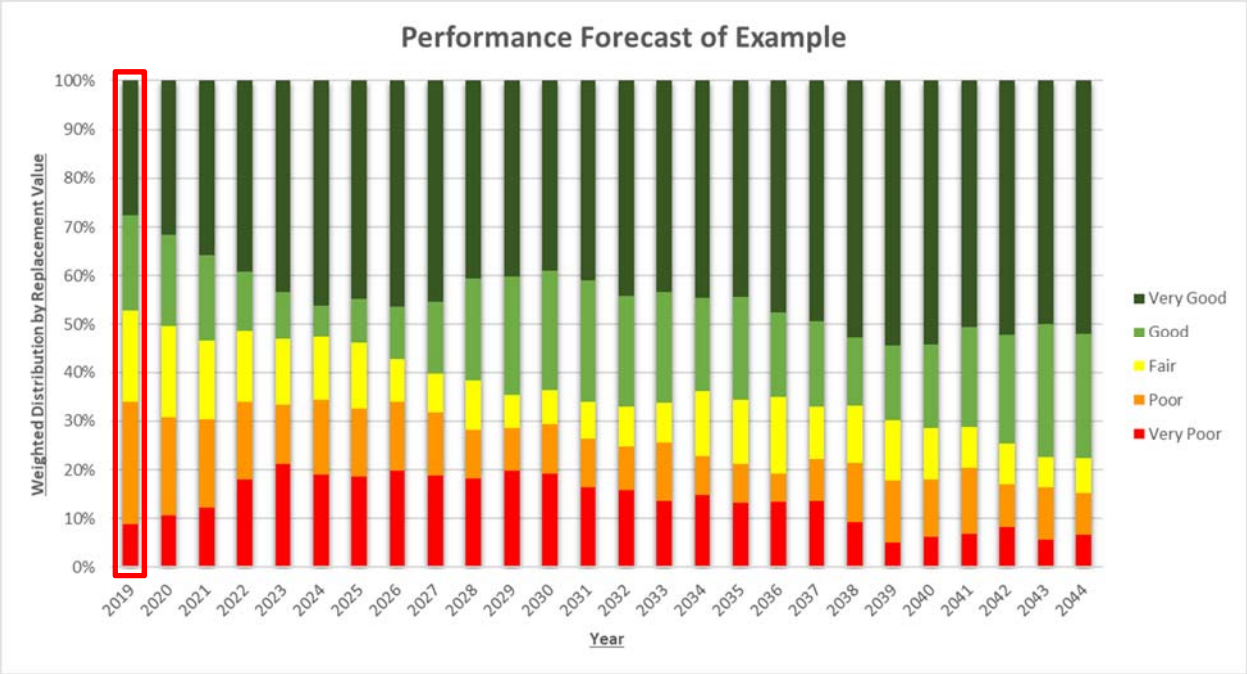

Figure 1: Performance Distribution of All Infrastructure Assets

The 2019 distribution, outlined by the red box in Figure 1, illustrates the current 'state of the infrastructure'. A traditional representation of this distribution is also illustrated in Figure 2.

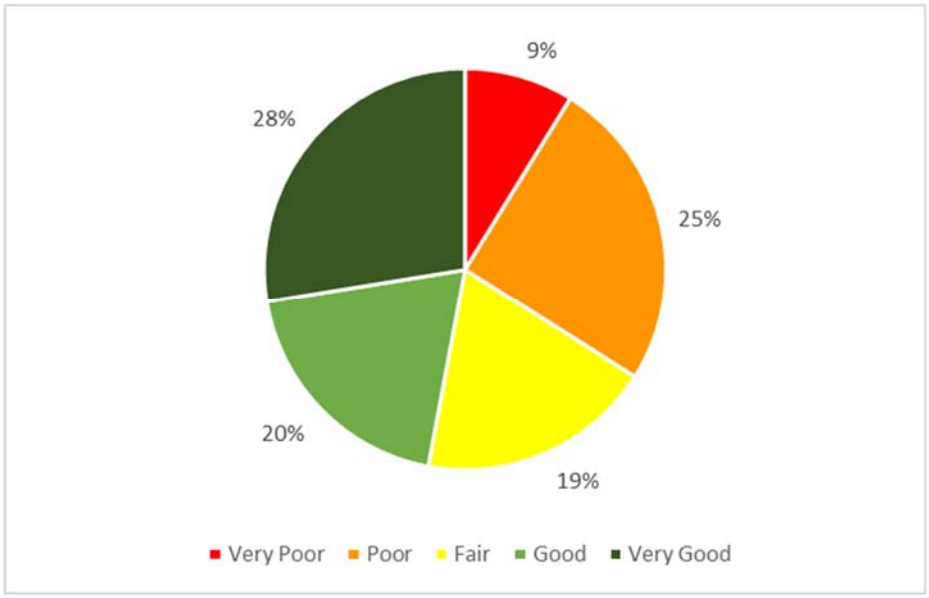

Figure 2: 2019 Performance Distribution of All Infrastructure Assets

Figure 2 illustrates the performance distribution for all infrastructure assets. A graph is created for each service area and can also be subdivided to show the performance distribution for a

specific asset types and scenario for each service area. This is completed by using the data slicer functionality in Microsoft Excel. An example of Environmental Services is provided in Figure 3.

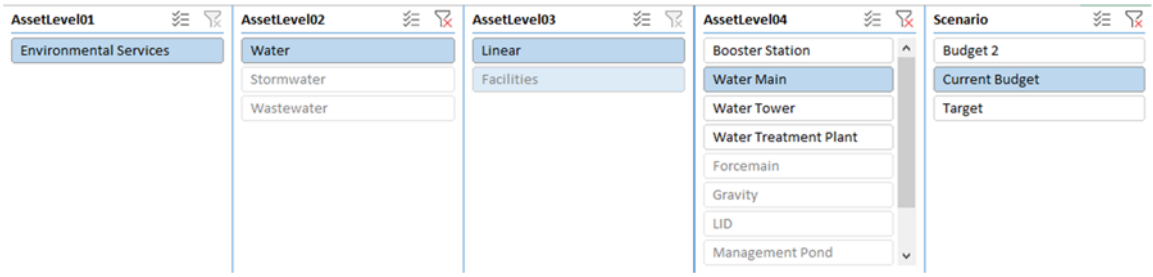

Figure 3: Slicer Functionality for Annual Distribution

The slicer functionality illustrated in Figure 3 is aligned with the water main hierarchy. As illustrated, the user can choose between desired scenarios and asset hierarchy levels. The tool can illustrate the annual performance distribution for four levels in the asset hierarchy.

Figure 4 illustrates an example of an asset hierarchy for Environmental Services water assets and depicts the method of generating performance distribution graphs at all levels of the asset hierarchy.

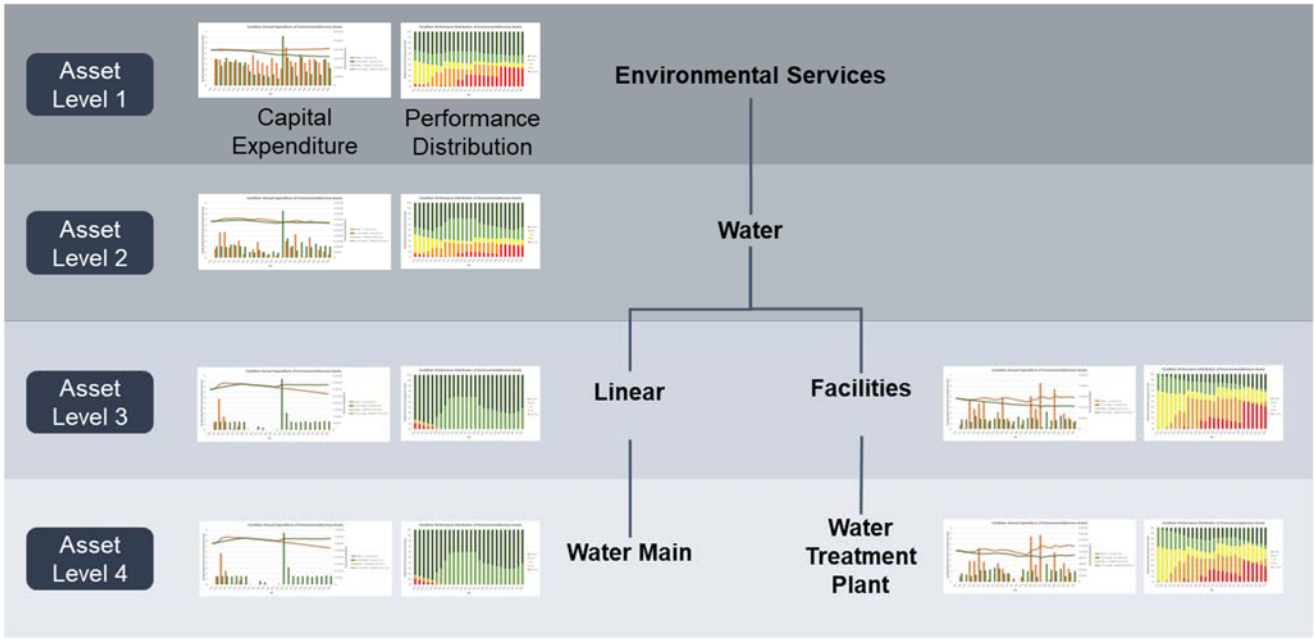

Figure 4: Example Asset Hierarchy

2 GENERAL GOVERNMENT

2.1 State of Local Infrastructure

2.1.1 Asset Hierarchy

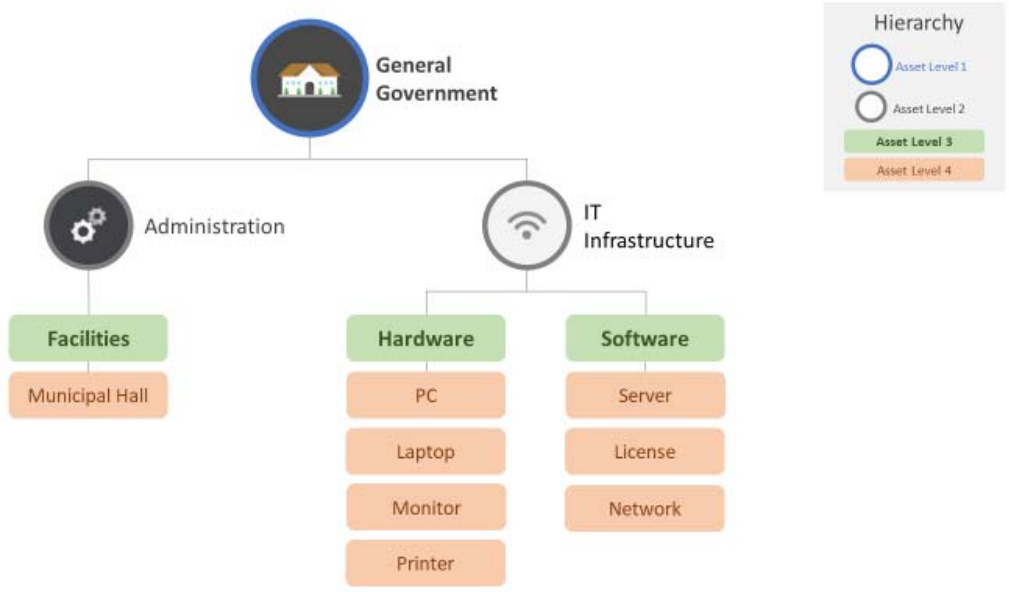

Figure 5: Asset Hierarchy – General Government

2.1.2 Replacement Costs

Table 2: Replacement Costs – General Government

Service Category	Asset Group	Total Replacement Value
General Government	Administration	$1,587,291
	IT Infrastructure	$76,900

2.1.3 Age Summary

The average age of General Government assets was determined to be 36 years. The distribution of assets by age and estimated service life (ESL) remaining are provided in **Error! Reference source not found.**Figure 6 and Figure 7. It should be noted that only 42% of assets had data on installation year.

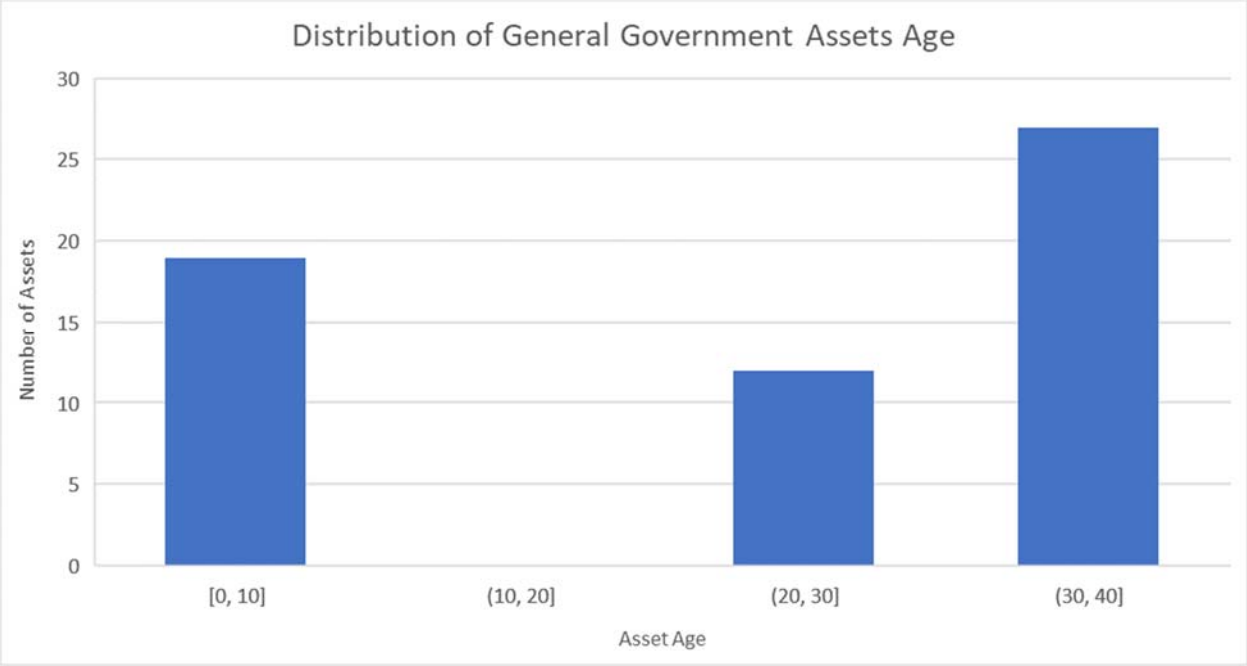

Figure 6: Distribution of assets by age – General Government

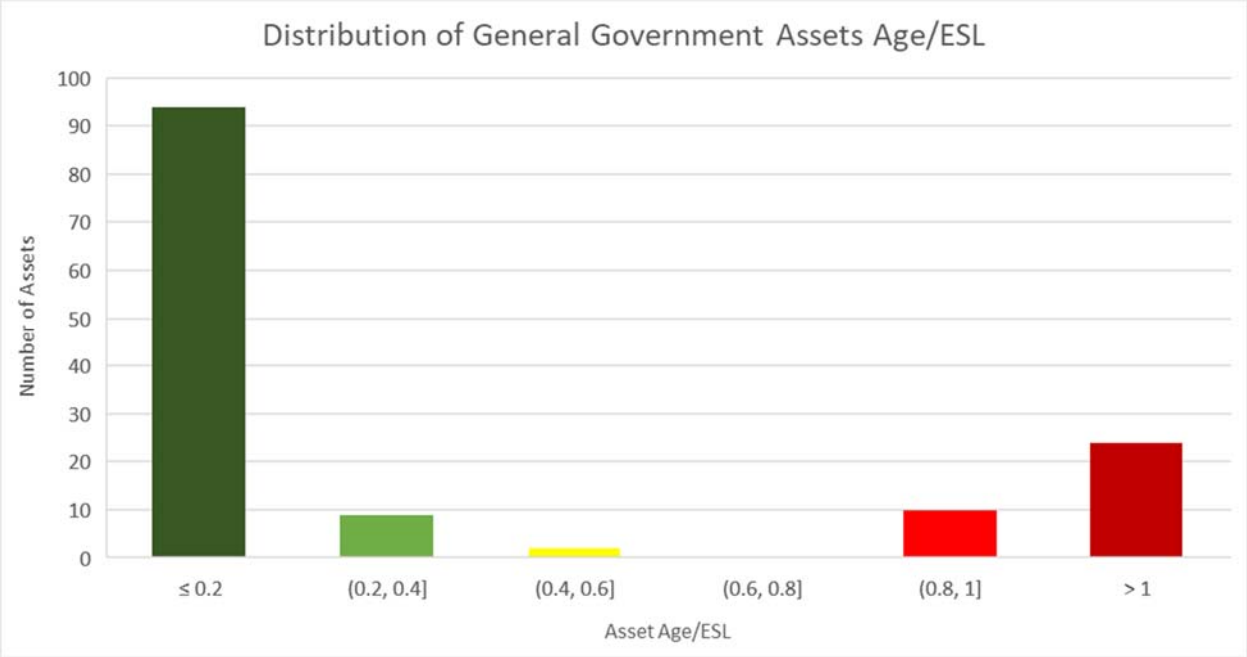

Figure 7: Distribution of assets by age as a proportion of ESL – General Government

2.1.4 Asset Performance

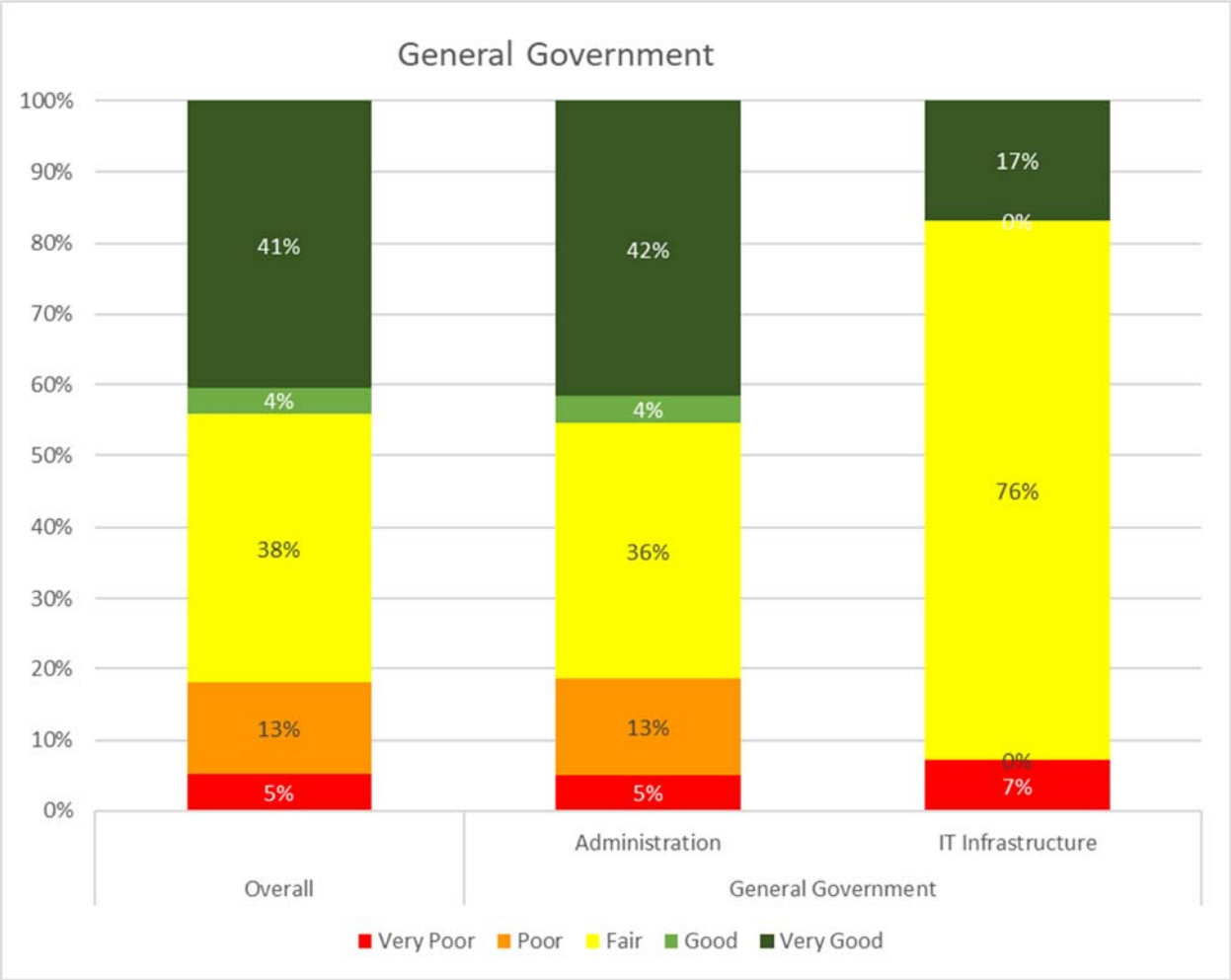

Figure 8: Asset Performance Summary – General Government

2.1.5 Performance Assessment Approach

Administration asset performance was determined through visual assessments by qualified subject matter experts. The assessments are combined with other performance indicators (maintenance history, facility performance data) and the professional judgment of subject matter experts to establish the current performance.

The age and ESL were used to determine the IT Infrastructure performance.

2.2 Asset Lifecycle Management Strategy

2.2.1 Asset Lifecycle Activities

Lifecycle Activity	Description of Activities Practiced by the Municipality
Operational	Improvements in operations as well as employee capabilities, communications training, etc. Coordinating efforts to optimize construction between internal projects and external parties for Administration assets. Monitor and track age and amount of time IT Infrastructure assets are considered a priority for replacement. Mitigate potential malware/cyber-attacks and ensure IT Infrastructure is operating efficiently for individuals using it.
Maintenance	Scheduled preventative maintenance programs for most Administration assets. Reactive maintenance as required for Administration assets. Collect asset concerns from hardware and software assets users.
Rehabilitation	Rehabilitation of various Administration assets as appropriate and determined through regular comprehensive condition assessments. Implement proactive rehabilitation of IT Infrastructure software programs.
Replacement	Replacement of various Administration assets as appropriate and determined through regular comprehensive condition assessments. Replacement of IT Infrastructure assets at the end of useful life or unexpected event occurs. Software and Applications that no longer receive support would be replaced with new software.
Disposal	Appropriate and proper disposal occur when assets are replaced or renewed.
Growth/Service Improvement	New assets are identified through various growth planning activities. Consultation with public and users of Administration would determine service improvement needs. IT Infrastructure needs to service growth is considered on an ongoing basis.

The risks associated with these lifecycle management activities are related to the timing and type of expenditure and the impact on the current and forecasted performance of assets. Northern Bruce Peninsula strives to complete the optimal lifecycle activity at the optimal time to maximize the performance of the asset groups at the lowest lifecycle cost.

2.2.2 Planned Expenditures Performance Forecasts

2.2.2.1 Administration

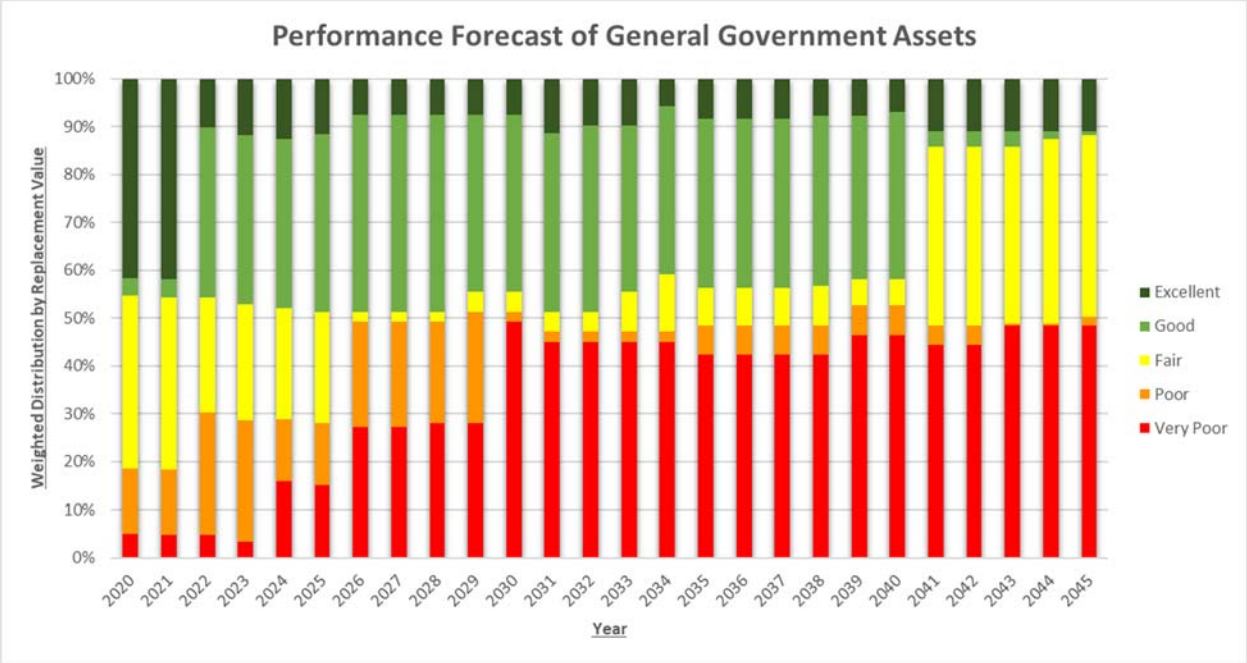

Figure 9: Planned Expenditure Performance Forecast – General Government, Administration

2.2.2.2 IT Infrastructure

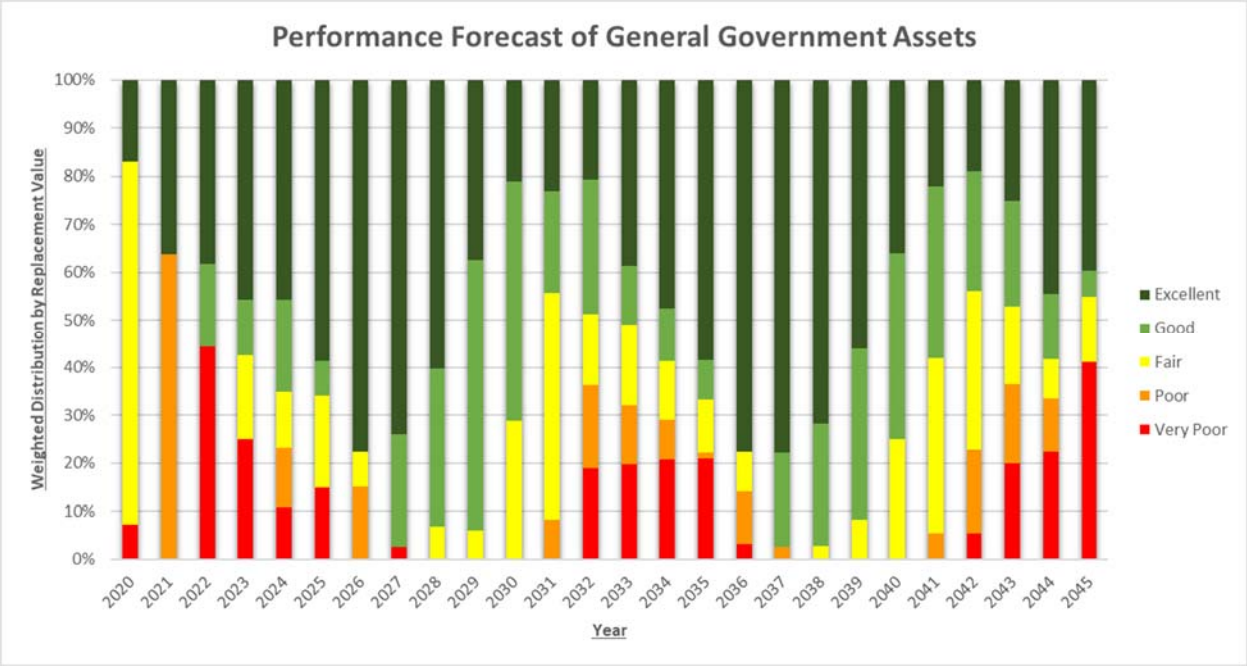

Figure 10: Planned Expenditure Performance Forecast – General Government, IT Infrastructure

2.2.3 Proposed Expenditures Performance Forecasts

2.2.3.1 Administration

An additional expenditure of $25,000 annually was determined to maintain performance over time (Figure 11).

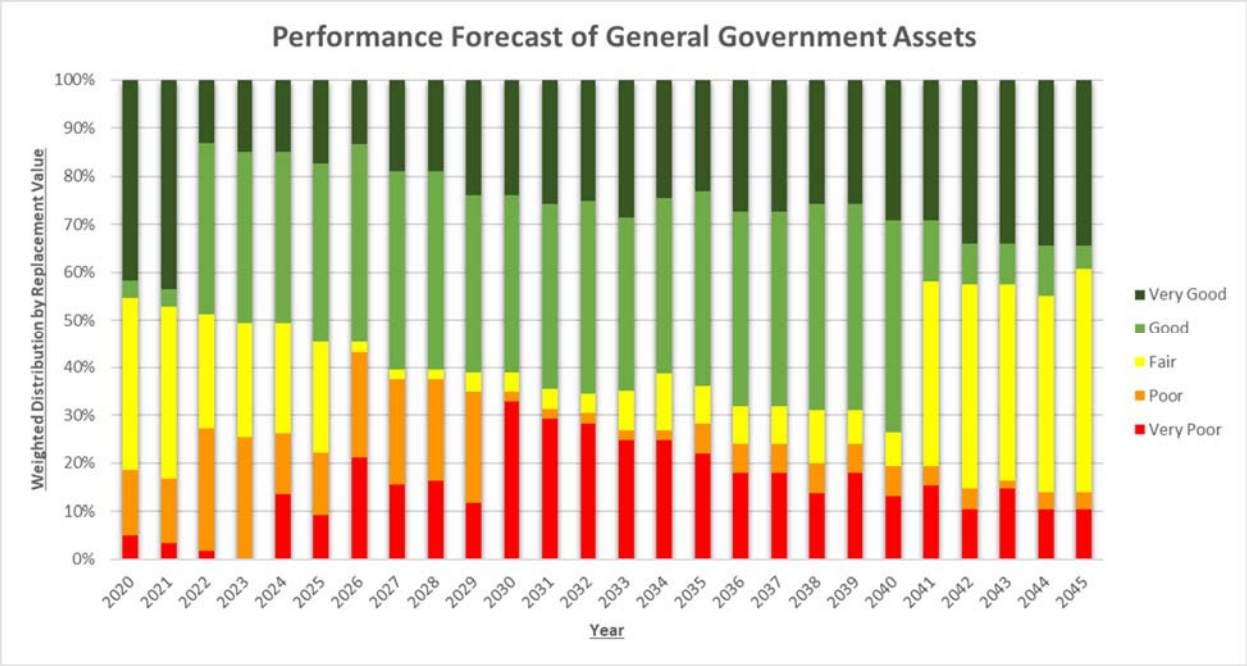

Figure 11: Proposed Expenditure Performance Forecast – General Government, Administration

2.2.3.2 IT Infrastructure

It was assumed that the IT infrastructure is fully funded through the operating budget and therefore required no additional expenditures to maintain performance over time.

3 COMMUNITY SERVICES AND CULTURE

3.1 State of Local Infrastructure

3.1.1 Asset Hierarchy

Figure 12: Asset Hierarchy – Community Services and Culture

3.1.2 Replacement Cost

Table 3: Replacement Cost - Community Services and Culture

Service Category	Asset Group	Total Replacement Value
Community Services and Culture	Parks and Open Spaces	$2,602,500
	Recreation and Culture	$8,305,615
	Cemeteries	$241,625

3.1.3 Age Summary

The average age of Community Services and Culture assets was determined to be 29 years. The distribution of assets by age and ESL remaining are provided in Figure 13 and Figure 14. It should be noted that 76% of assets had data on installation year.

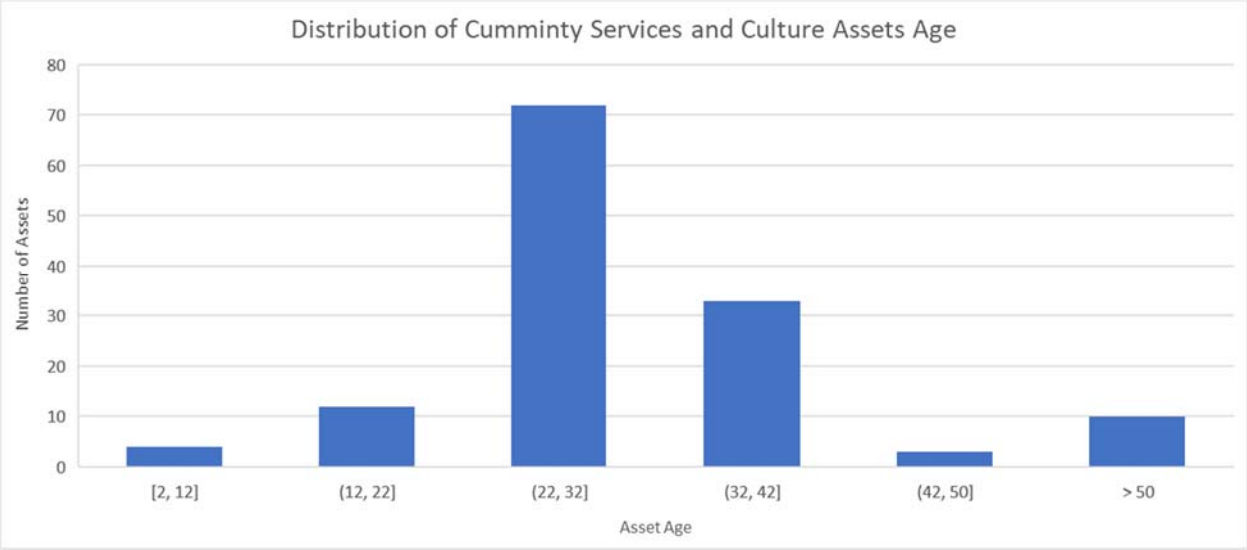

Figure 13: Distribution of Assets by Age – Community Services and Culture

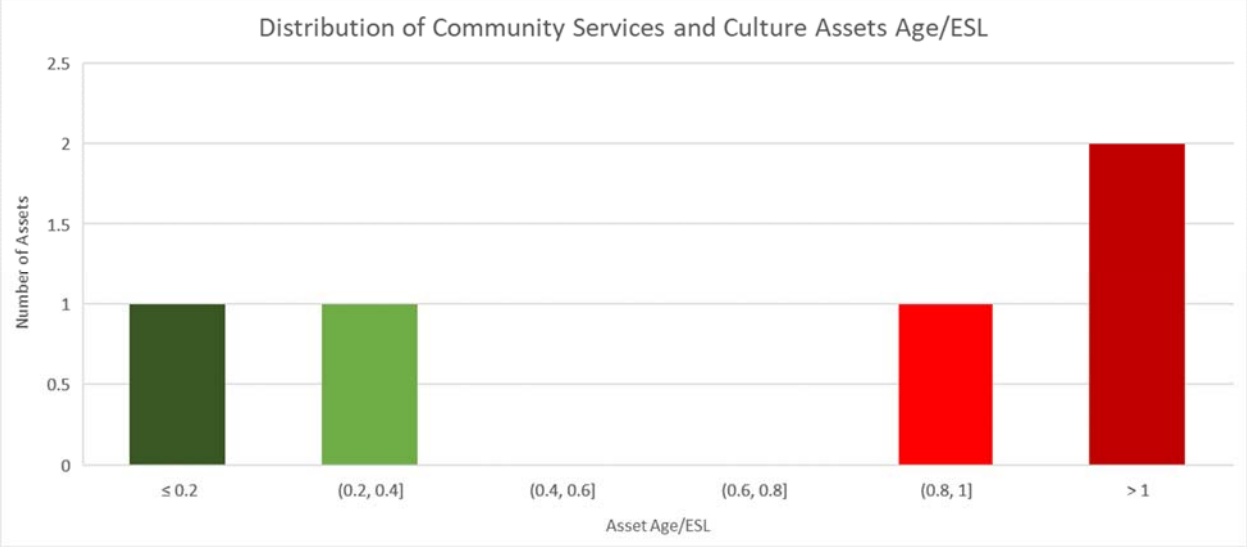

Figure 14: Distribution of assets by age as a proportion of ESL – Community Services and Culture

3.1.4 Asset Performance

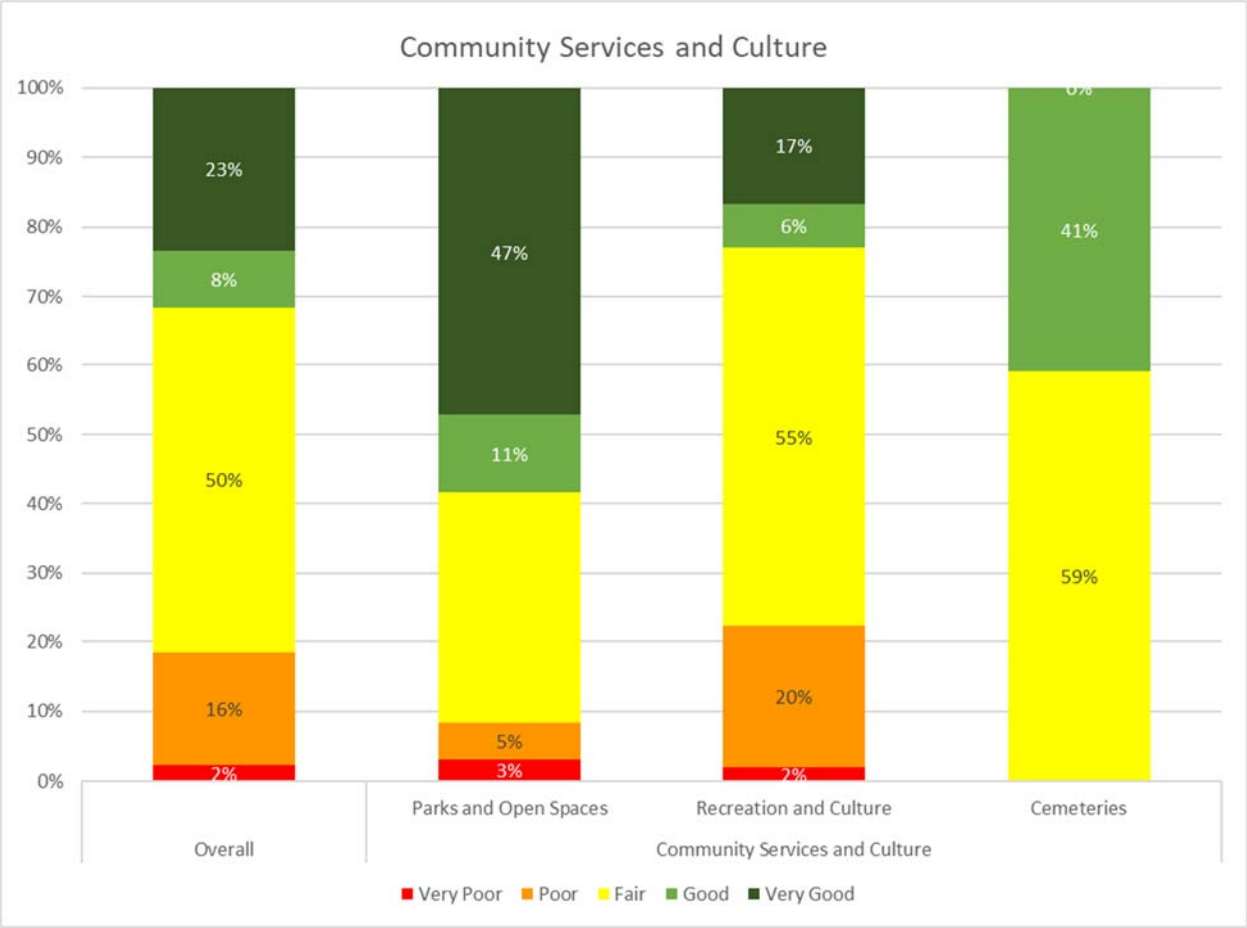

Figure 15: Asset Performance Summary – Community Services and Culture

3.1.5 Performance Assessment Approach

The performance of road parks, open spaces, recreation and culture assets were determined through visual assessments by qualified subject matter experts. The assessments are combined with other performance indicators (maintenance history, facility performance data) and the professional judgment of subject matter experts to establish the current performance.

The age and ESL were used to approximate fleet performance.

3.2 Asset Lifecycle Management Strategy

3.2.1 Asset Lifecycle Activities

Lifecycle Activity	Description of Activities Practiced by the Municipality
Operational	Encouragement of conservation of Parks/Recreation and Culture associated infrastructures assets through policy, procedures, public outreach, etc. Continue researching and implementing Parks/Recreation and Culture infrastructure in conformance with Provincial, Federal and Municipal policies.
Maintenance	Scheduled preventative maintenance programs for most assets Reactive maintenance as required
Rehabilitation	Rehabilitation of various assets as appropriate and determined through regular comprehensive condition assessments.
Replacement	Replacement of various assets as appropriate and determined through regular comprehensive condition assessments.
Disposal	Appropriate and proper disposal occur when assets are replaced or renewed.
Growth/Service Improvement	New assets are identified through the Parks and Recreation Master Plan

The risks associated with these lifecycle management activities are related to the timing and type of expenditure and the impact on the current and forecasted performance of assets. Northern Bruce Peninsula strives to complete the optimal lifecycle activity at the optimal time to maximize the performance of the asset groups at the lowest lifecycle cost.

3.2.2 Planned Expenditure Performance Forecasts

3.2.2.1 Parks and Open Spaces

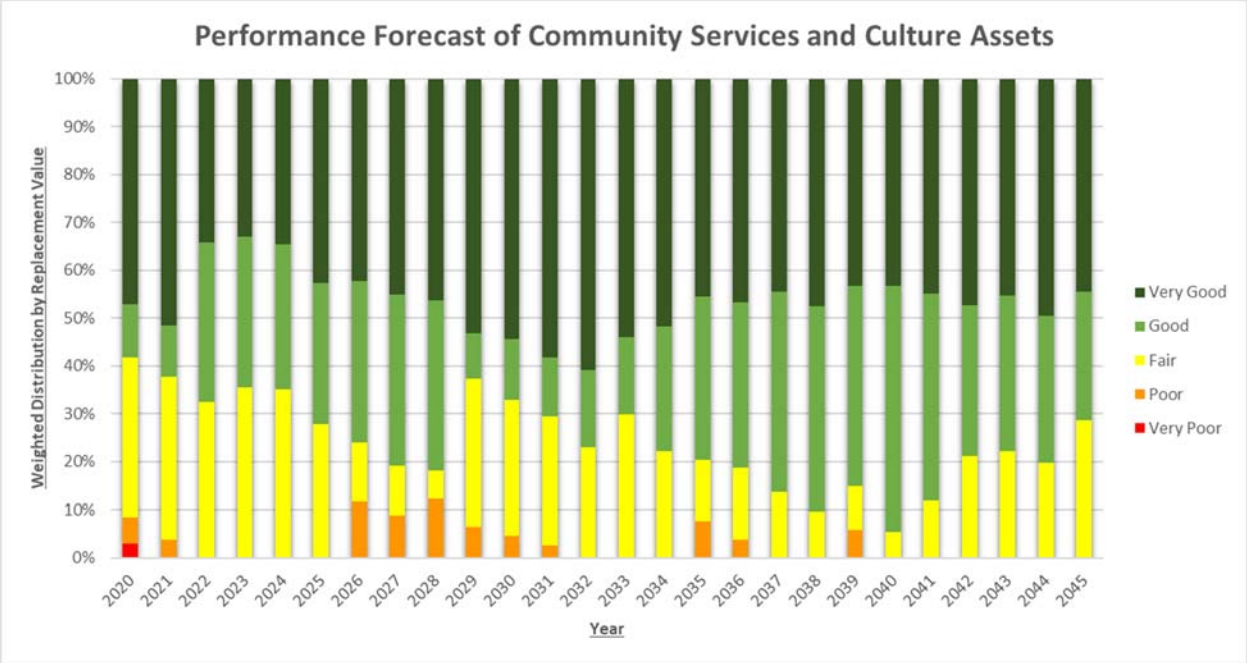

Figure 16: Planned Expenditure Performance Forecast – Community Services and Culture, Parks and Open Spaces

3.2.2.2 Recreation and Culture

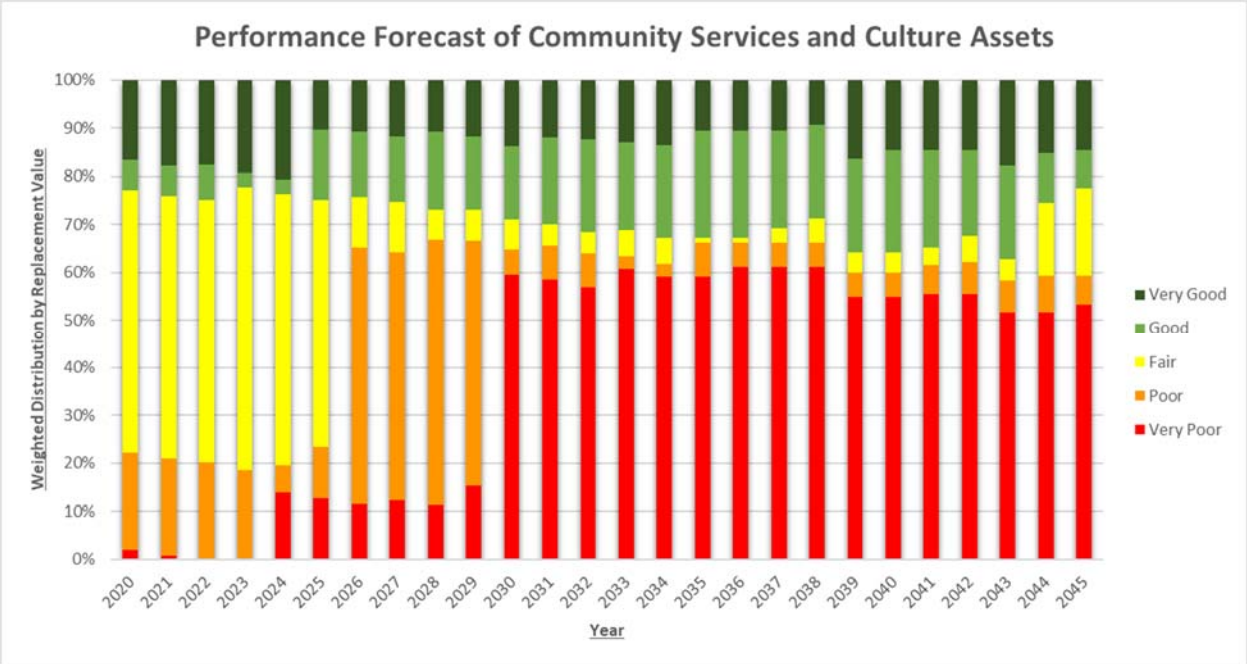

Figure 17: Planned Expenditure Performance Forecast – Community Services and Culture, Recreation and Culture

3.2.2.3 Cemeteries

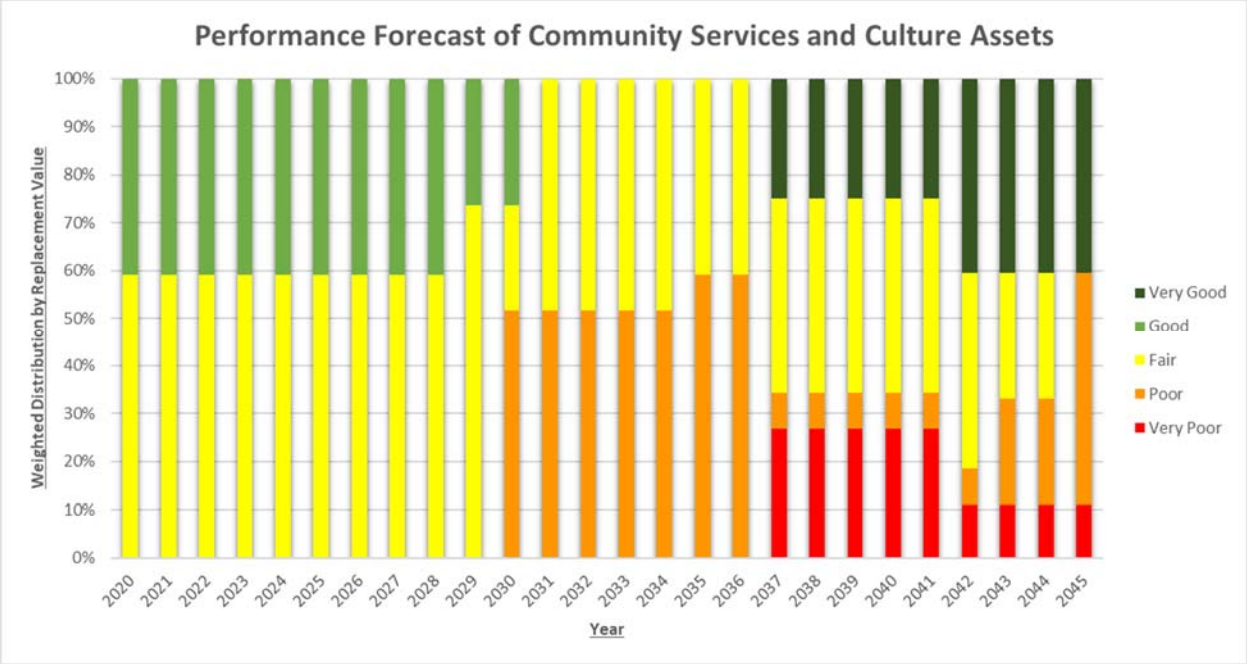

Figure 18: Planned Expenditure Performance Forecast – Community Services and Culture, Cemeteries

3.2.3 Proposed Expenditure Performance Forecasts

3.2.3.1 Cemeteries, Parks and Open Spaces

The cemeteries, park and open spaces performance is maintained over time and therefore suggest no need for additional expenditures.

3.2.3.2 Recreation and Culture

Additional annual expenditures of $140,000 was determined to maintain performance over time (Figure 19).

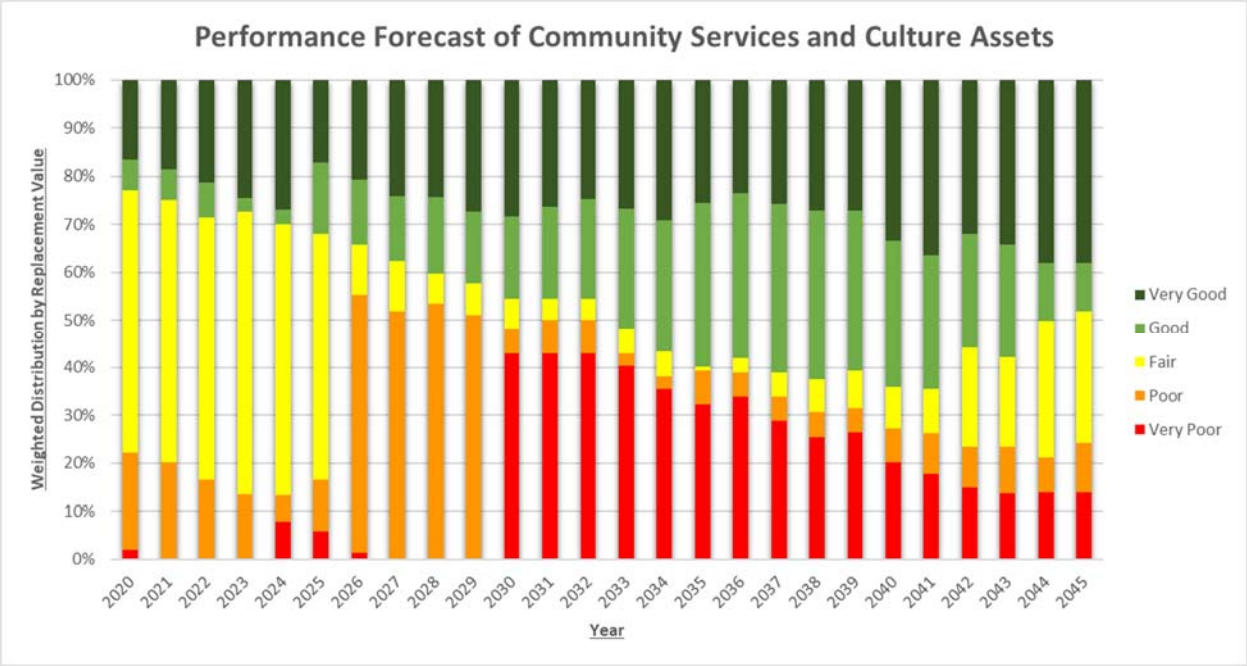

Figure 19: Proposed Expenditure Performance Forecast – Community Services and Culture, Recreation and Culture

4 TRANSPORTATION SERVICES

4.1 State of Local Infrastructure

4.1.1 Asset Hierarchy

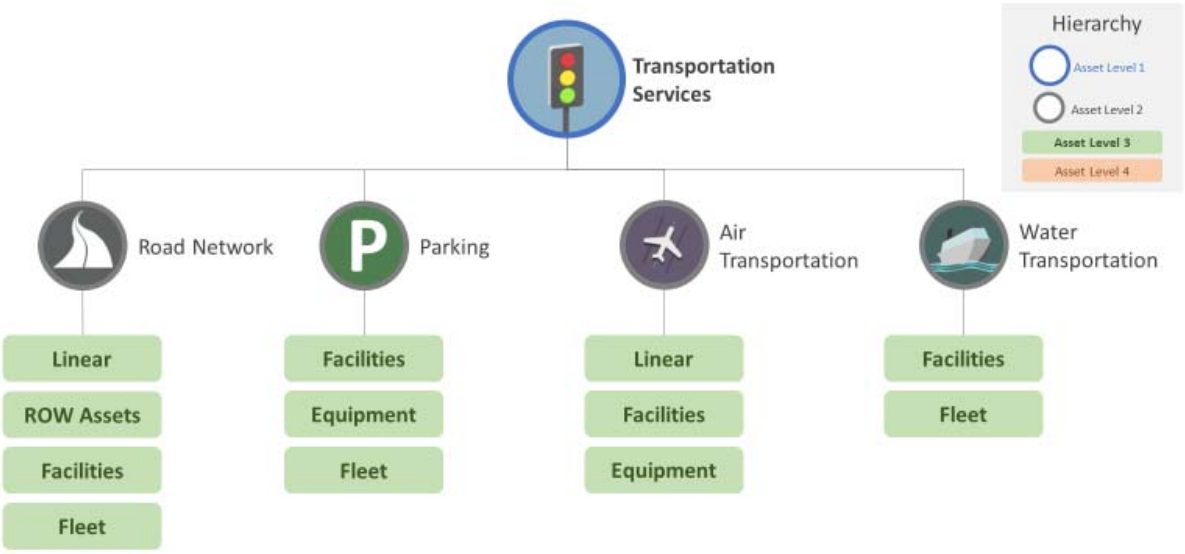

Figure 20: Asset Hierarchy – Transportation

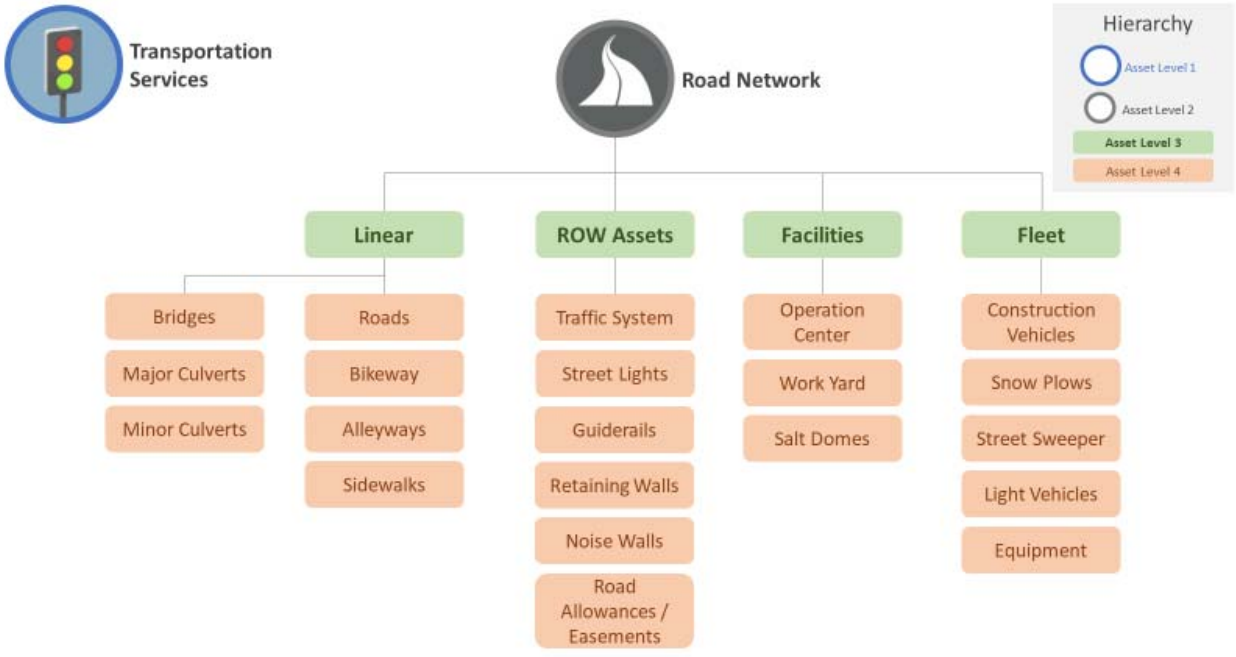

Figure 21: Asset Hierarchy – Transportation, Road Network

4.1.2 Replacement Cost

Table 4: Replacement Cost – Transportation

Service Category	Asset Group	Total Replacement Value
Transportation Services	Road Network	$33,488,055
	Parking Services	$0
	Air Transportation	$805,000
	Water Transportation	$1,248,937

It should be noted that no inventory for parking services was available.

4.1.3 Age Summary

The average age of Transportation assets was determined to be 14 years. The distribution of assets by age and ESL remaining are provided in Figure 22 and 23. It should be noted that only 11% of assets had data on installation year.

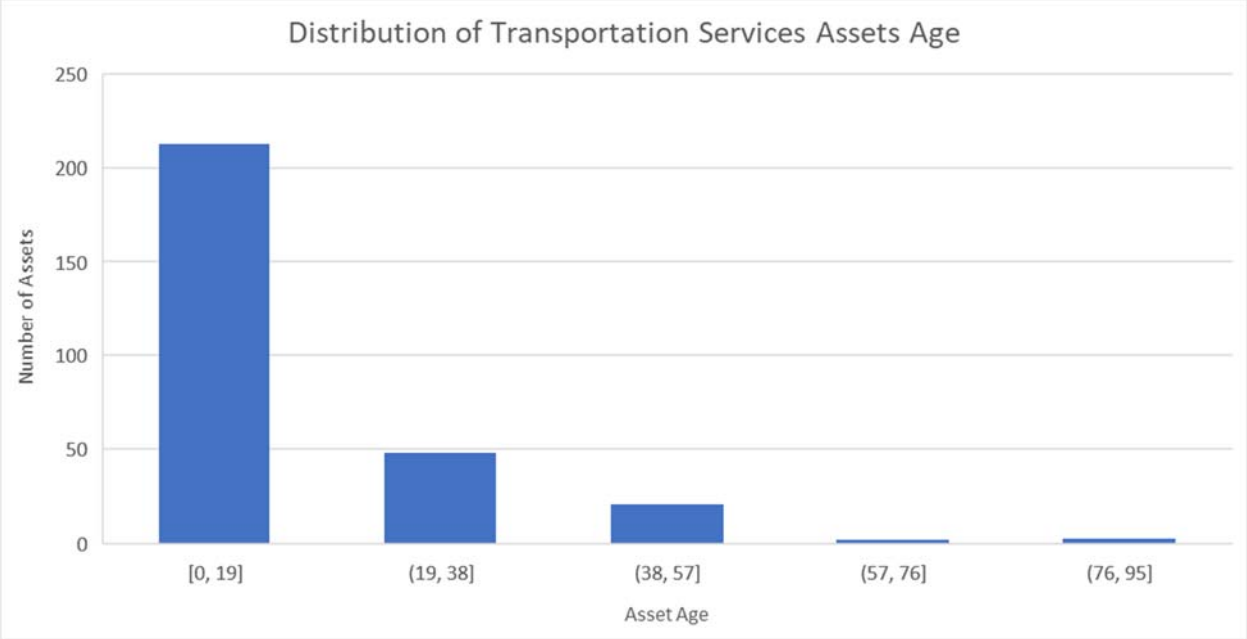

Figure 22: Distribution of assets by Age – Transportation Services

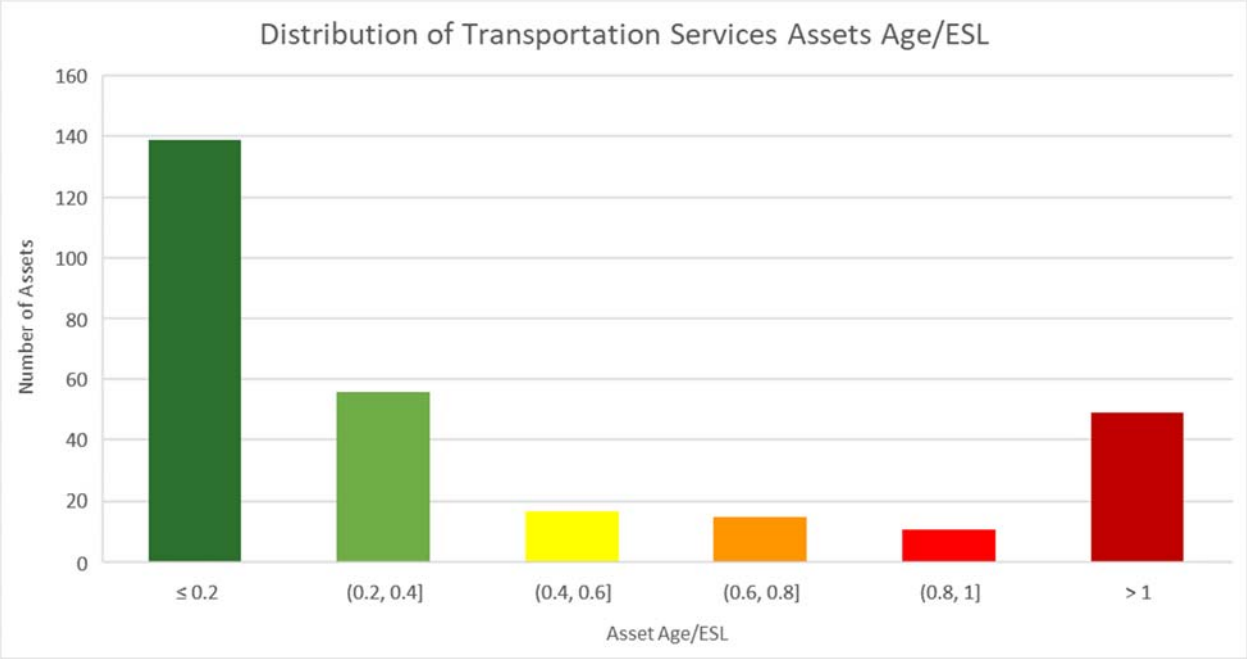

Figure 23: Distribution of assets by age as a proportion of ESL – Transportation Services

4.1.4 Asset Performance

Figure 24: Asset Performance Summary – Transportation

4.1.5 Performance Assessment Approach

The performance of roads was determined through laser scanning of the road surface to establish a pavement quality index score.

The performance of sidewalks was determined through visual assessments by qualified subject matter experts to identify deficiencies.

The performance of street signs is determined through automated camera inspections.

Age and ESL were used to approximate the performance of fleet assets.

The performance of road network, air transportation and water transportation assets were determined through visual assessments by qualified subject matter experts. The assessments are combined with other performance indicators (maintenance history, facility performance data) and the professional judgment of subject matter experts to establish the current performance.

4.2 Asset Lifecycle Management Strategy

4.2.1 Asset Lifecycle Activities

Lifecycle Activity	Description of Activities Practiced by the Municipality
Operational	Load restrictions are used to reduce wear on some roads Improvements in operations as well as employee capabilities, communications training, etc.
Maintenance	Routine maintenance such as street sweeping, pothole patching, utility cut repairs, sidewalk levelling, etc. as well as snow and ice removal. Carrying out regular fleet preventive maintenance of all vehicles, as well as reactive maintenance for circumstances that cannot be easily mitigated. Maintenance of Lighting and Signals infrastructure. The nature and frequency of re-lamping and pole maintenance are based on best practices.
Rehabilitation	Roads rehabilitation is based on their current condition and projected deterioration. Treatments range from patching and crack sealing, to resurfacing, to total reconstruction. Regular fleet preventative maintenance programs assist in determining renewals/rehabilitations required.

Lifecycle Activity	Description of Activities Practiced by the Municipality
	Traffic assets rehabilitation is based on age and assumed life spans.
Replacement	Replacement activities are selected to minimize the lifecycle cost of operating each asset. Roads to be replaced are listed according to priority and constructed pending budget availability. Assessments of fleet asset lifecycle to determine timing of replacement that minimizes maintenance/repair work and maximize salvage value. Traffic asset replacement is based on age and assumed life spans.
Disposal	Roadway disposals are infrequent and generally related to rerouting. Fleet can be sold through auctions/resale market. Traffic asset disposal at end of useful life.
Growth/Service Improvement	May include technologies such as pavement material alternatives and new and improved materials and pavement design processes. Extended warranties and service agreements as well as improved procurement practices to acquire higher quality assets with longer life cycles. Expansions to the transportation systems are identified through technical analysis as part of servicing plans complete to service new development.

The risks associated with these lifecycle management activities are related to the timing and type of expenditure and the impact on the current and forecasted performance of assets. Northern Bruce Peninsula strives to complete the optimal lifecycle activity at the optimal time to maximize the performance of the asset groups at the lowest lifecycle cost.

4.2.2 Planned Expenditure Performance Forecasts

4.2.2.1 Road Network – Linear

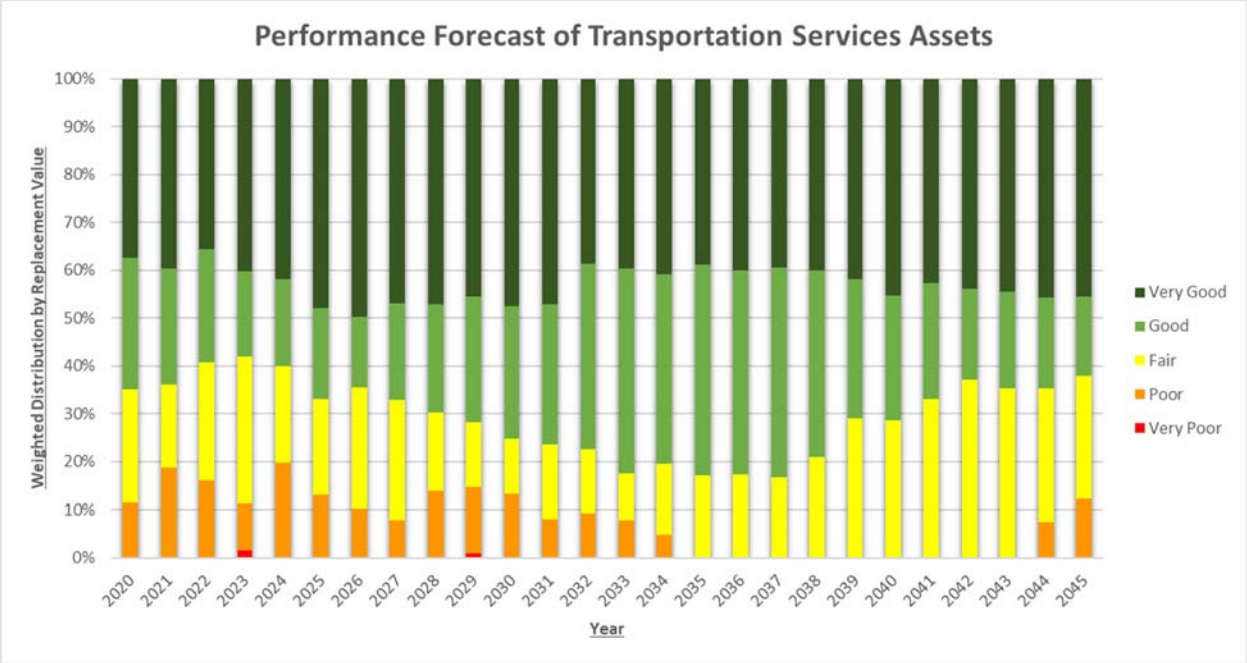

Figure 25: Planned Expenditure Performance Forecast – Transportation, Road Network, Linear

4.2.2.2 Road Network – ROW Assets

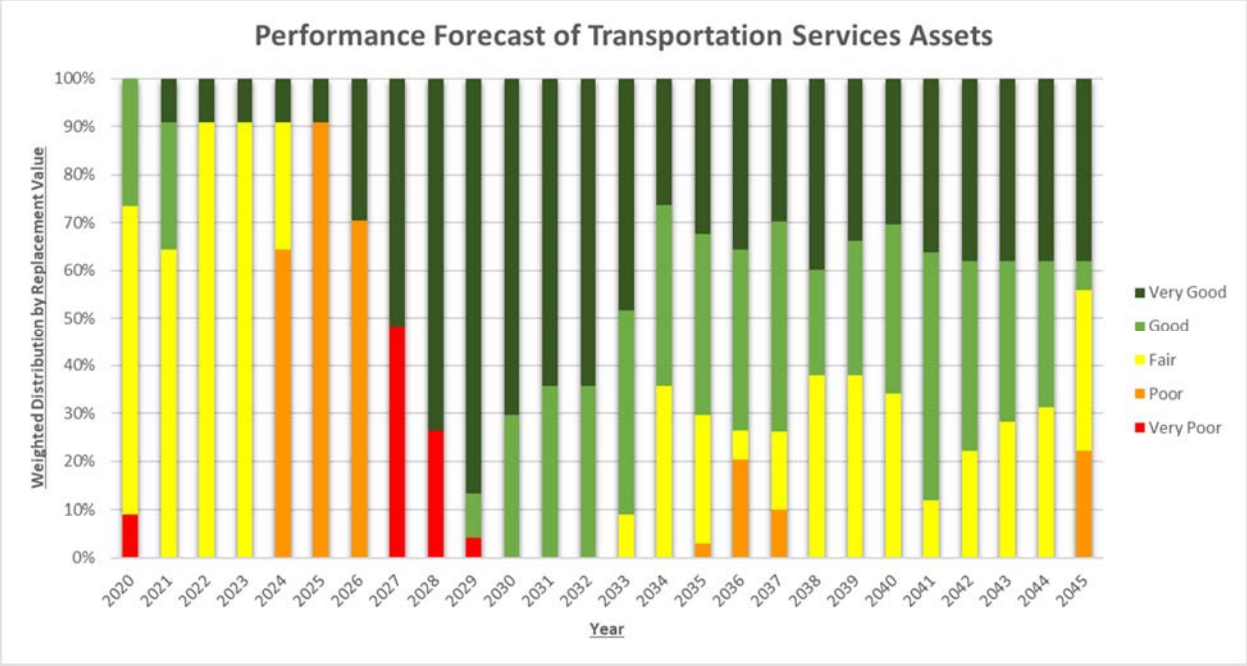

Figure 26: Planned Expenditure Performance Forecast – Transportation, Road Network, ROW Assets

4.2.2.3 Road Network – Facilities

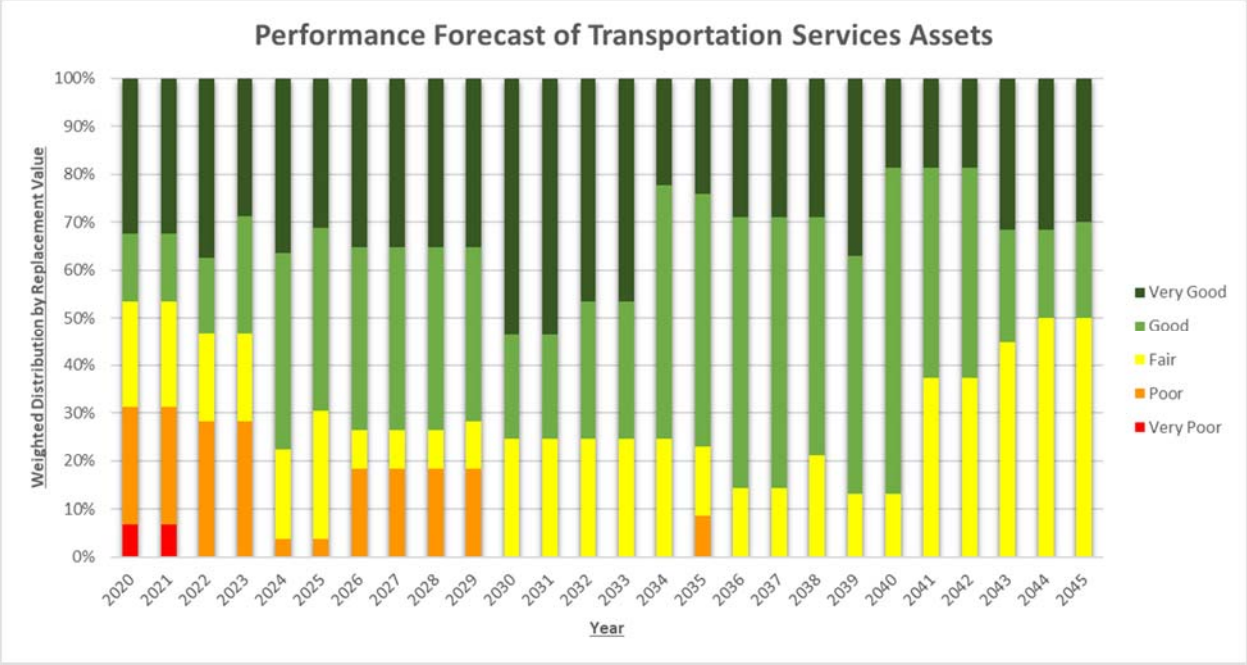

Figure 27: Planned Expenditure Performance Forecast – Transportation, Road Network, Facilities

4.2.2.4 Road Network – Fleet

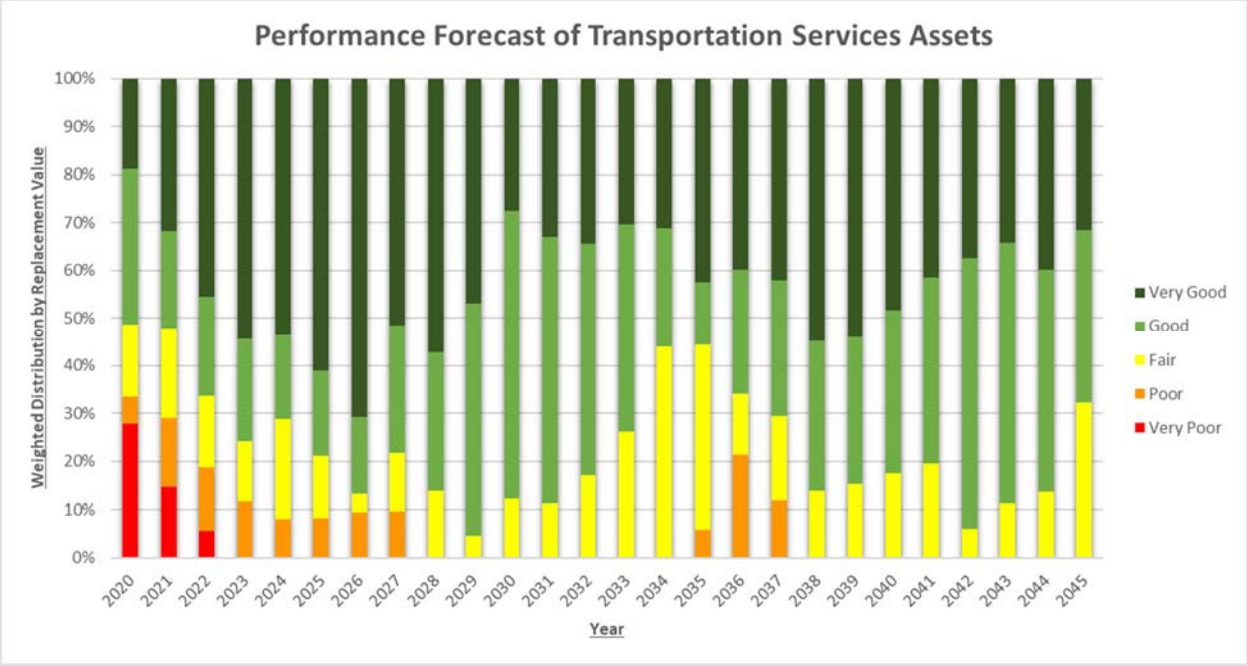

Figure 28: Planned Expenditure Performance Forecast – Transportation, Road Network, Fleet

4.2.2.5 Air Transportation

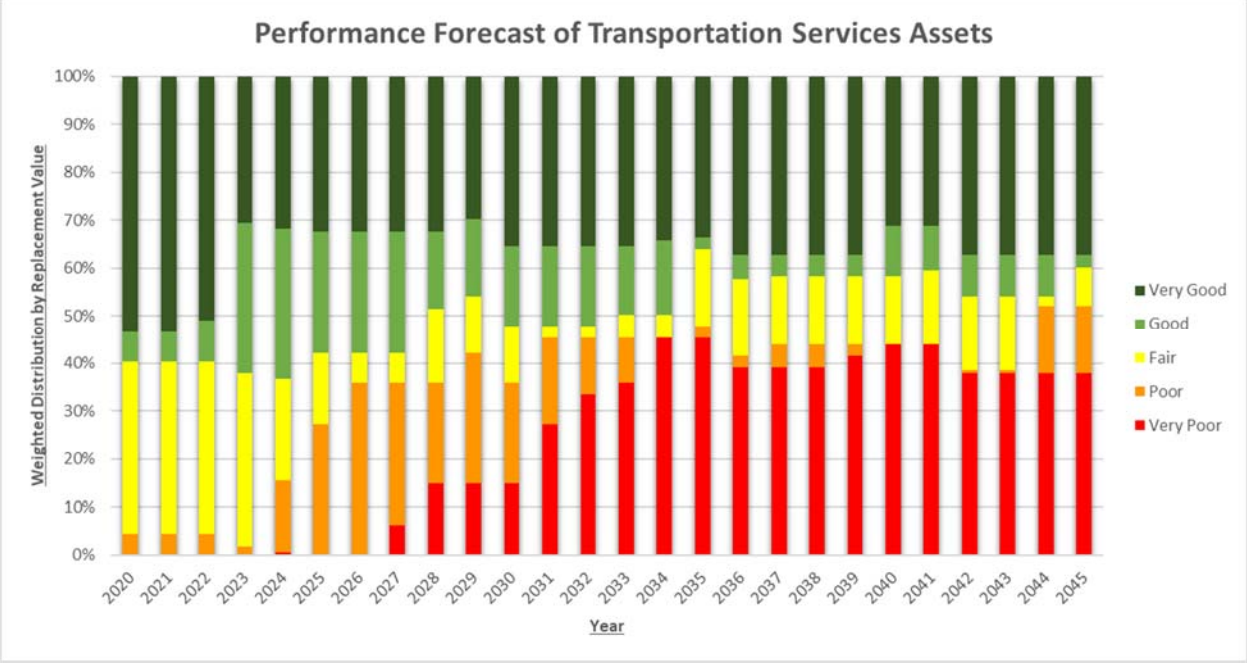

Figure 29: Planned Expenditure Performance Forecast – Transportation, Road Network, Air Transportation

4.2.2.6 Water Transportation

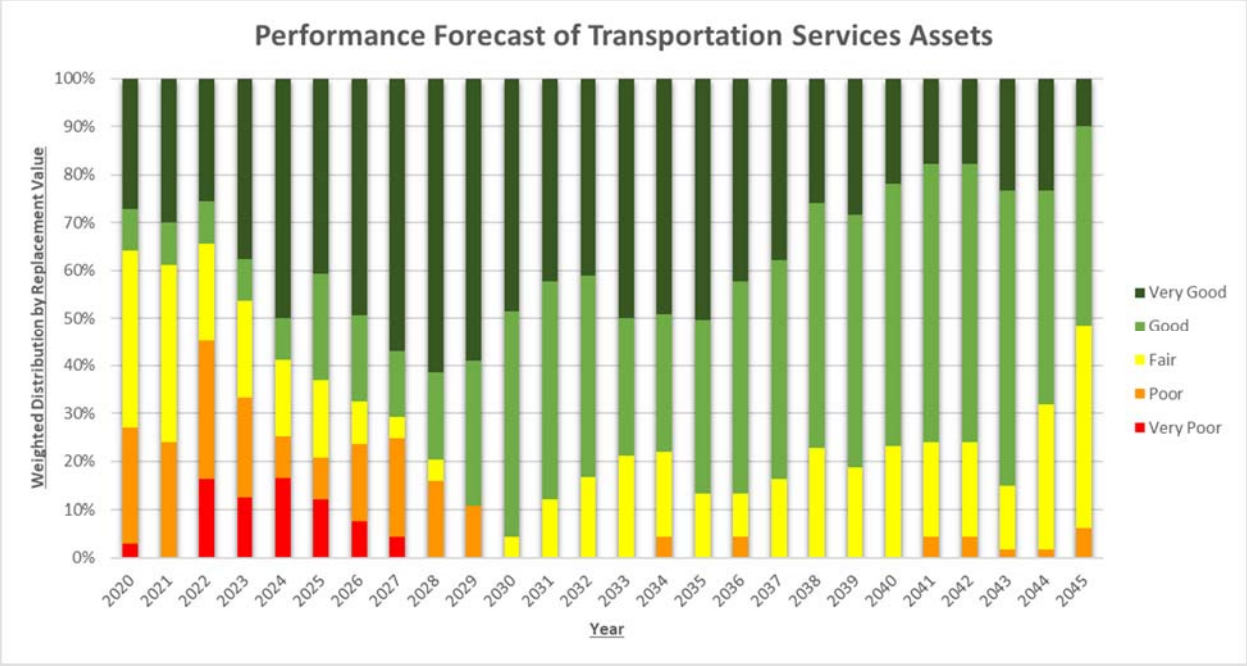

Figure 30: Planned Expenditure Performance Forecast – Transportation, Road Network, Water Transportation

4.2.3 Proposed Expenditure Performance Forecasts

The road network and water transportation performance are maintained over time and therefore suggest no need for additional expenditures.

Air transportation assets appear to decline in the long term and may suggest future expenditure gap. Staff should monitor asset performance over the short to medium-term.

5 ENVIRONMENTAL SERVICES

5.1 State of Local Infrastructure

5.1.1 Asset Hierarchy

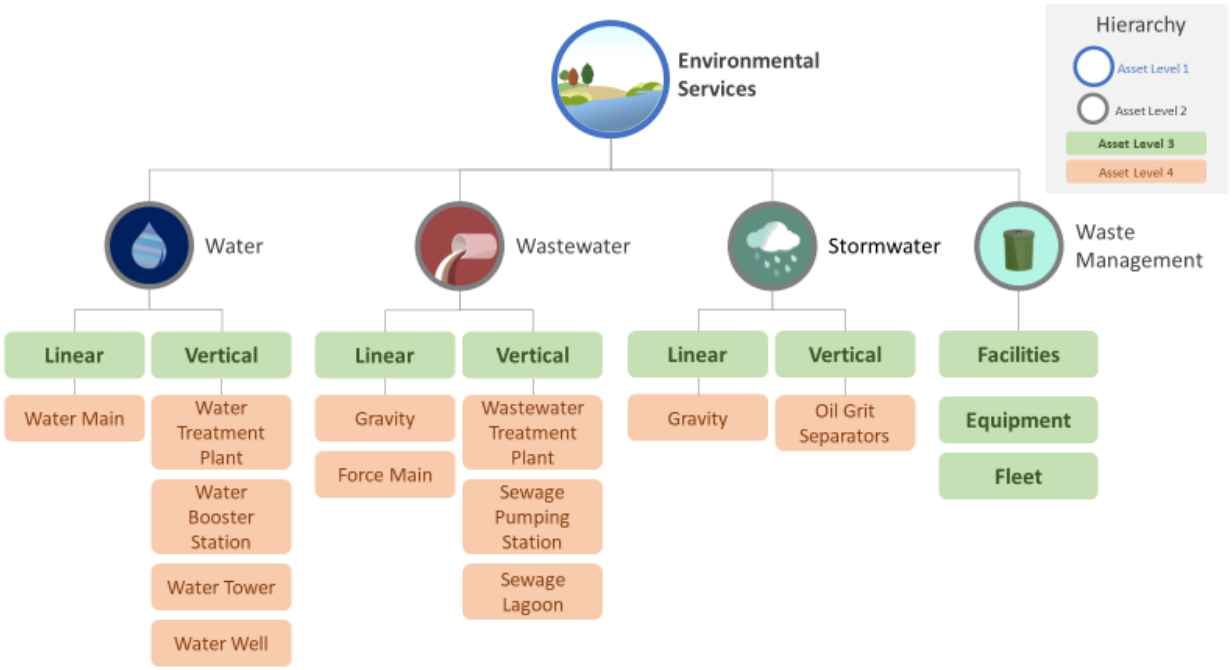

Figure 31: Asset Hierarchy – Environmental Services

5.1.2 Replacement Costs

Table 5: Replacement Costs - Environmental Services

Service Category	Asset Group	Total Replacement Value
Environmental Services	Water	$15,016,169
	Wastewater	$5,266,234
	Stormwater	$1,173,575
	Waste Management	$296,000

5.1.3 Age Summary

The average age of Environmental Services assets was determined to be 18 years. The distribution of assets by age and ESL remaining are provided in Figure 32 and 33. It should be noted that 84% of assets had data on installation year.

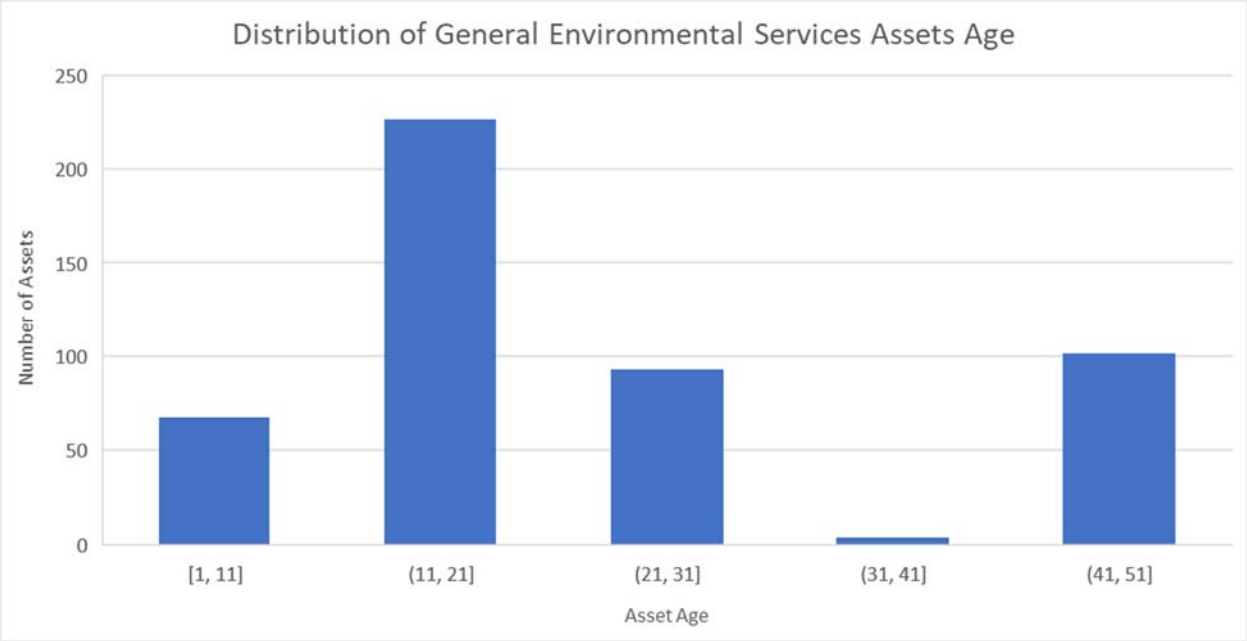

Figure 32: Distribution of Assets by Age – Environmental Services

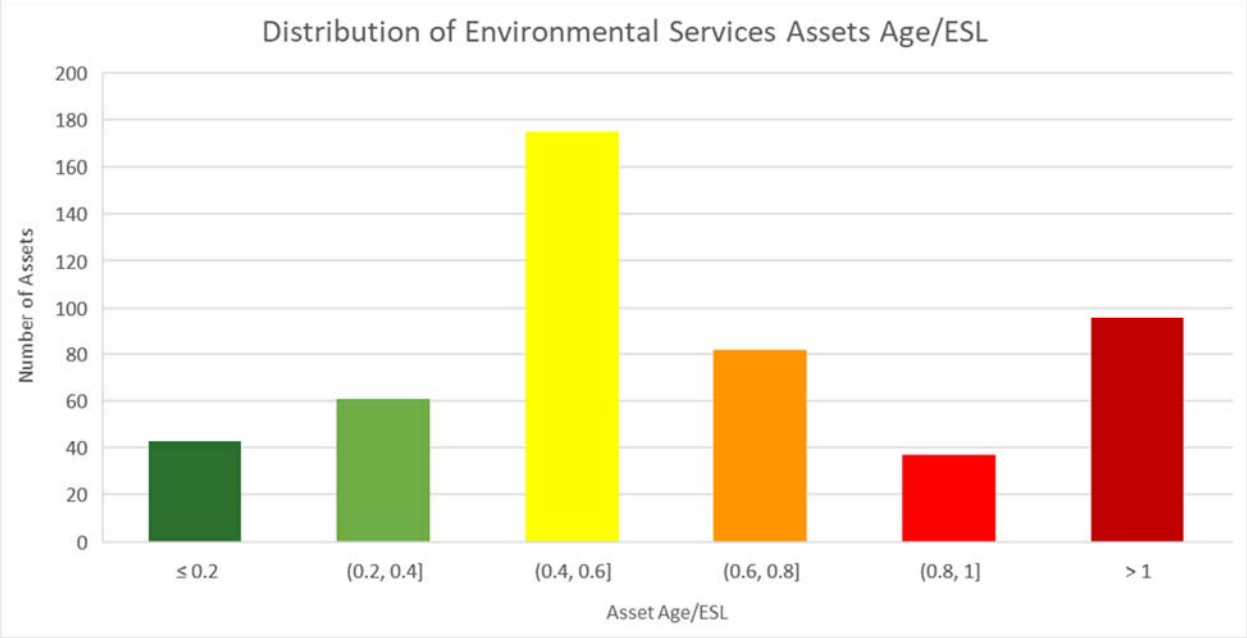

Figure 33: Distribution of assets by age as a proportion of ESL – Environmental Services

5.1.4 Asset Performance

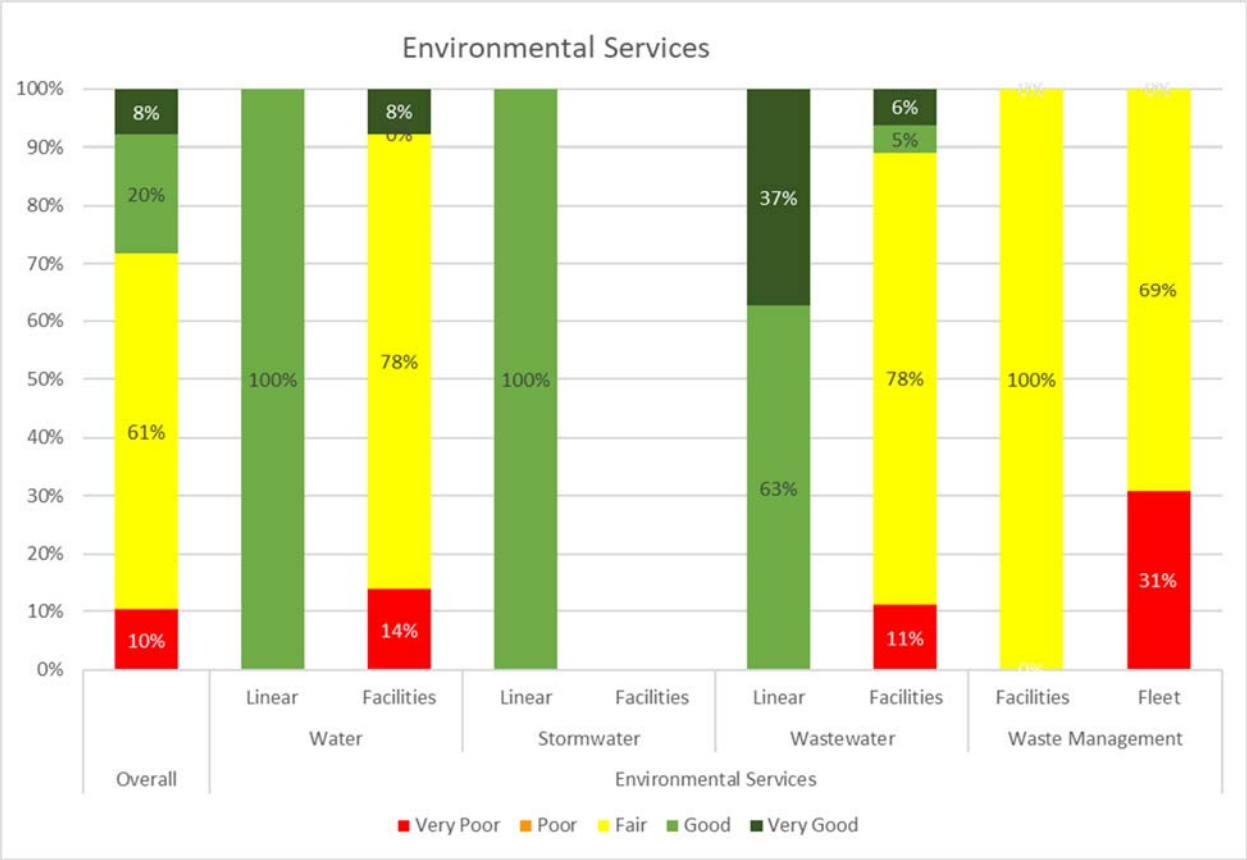

Figure 34: Asset Performance Summary – Environmental Services

5.1.5 Performance Assessment Approach

The condition of water and wastewater facilities are determined through visual assessments by qualified subject matter experts. The assessments are combined with other performance indicators (maintenance history, facility performance data) and the professional judgment of subject matter experts to establish the current performance of the assets.

The condition performance data for water linear, wastewater linear, stormwater linear and waste management assets was not available. Therefore, assets were assumed to be meeting community expectations.

5.2 Asset Lifecycle Management Strategy

5.2.1 Asset Lifecycle Activities

Lifecycle Activity	Description of Activities Practiced by the Municipality
Operational	Encourage the conservation of water and energy through policies, procedures, public outreach, etc. for Water assets. Perform studies such as: I&I, headworks optimization and operational efficiency for Wastewater assets. Increase street sweeping and erosion controls for new construction to reduce sediment loads to SWM ponds.
Maintenance	OCWA completes ongoing maintenance activities as necessary. Capability of response in case of emergency repairs for linear and vertical infrastructure. Flushing and CCTV inspections of sewers as necessary. Prepare scheduled CCTV inspections and clean out programs for catch basins, stormwater facilities inlet/outlets cleaning, etc.
Rehabilitation	Perform rehabilitation of water assets based on the condition of assets and facility inspection reports. Sanitary sewer and facilities rehabilitation are based on the current condition of the pipe and facility inspection reports.
Replacement	Perform replacement of Environmental Services assets based on the condition of assets and facility inspection reports. Renewal of the stormwater system may offer opportunities to improve the flood/erosion controls.
Disposal	Watermains are either removed during construction or are disconnected and abandoned in place depending on the construction circumstances. Abandoned mains are capped and/or grouted to protect other infrastructure. Equipment in facilities is removed and disposed or inventoried as spare parts. Equipment disposed or inventoried as spare parts and pipes removed, usually no cost recovery.
Growth/Service Improvement	New or larger assets are identified through technical analysis as part of servicing plans completed to service new development.

The risks associated with these lifecycle management activities are related to the timing and type of expenditure and the impact on the current and forecasted performance of assets. Northern Bruce Peninsula strives to complete the optimal lifecycle activity at the optimal time to maximize the performance of the asset groups at the lowest lifecycle cost.

5.2.2 Planned Expenditure Performance Forecasts

5.2.2.1 Water

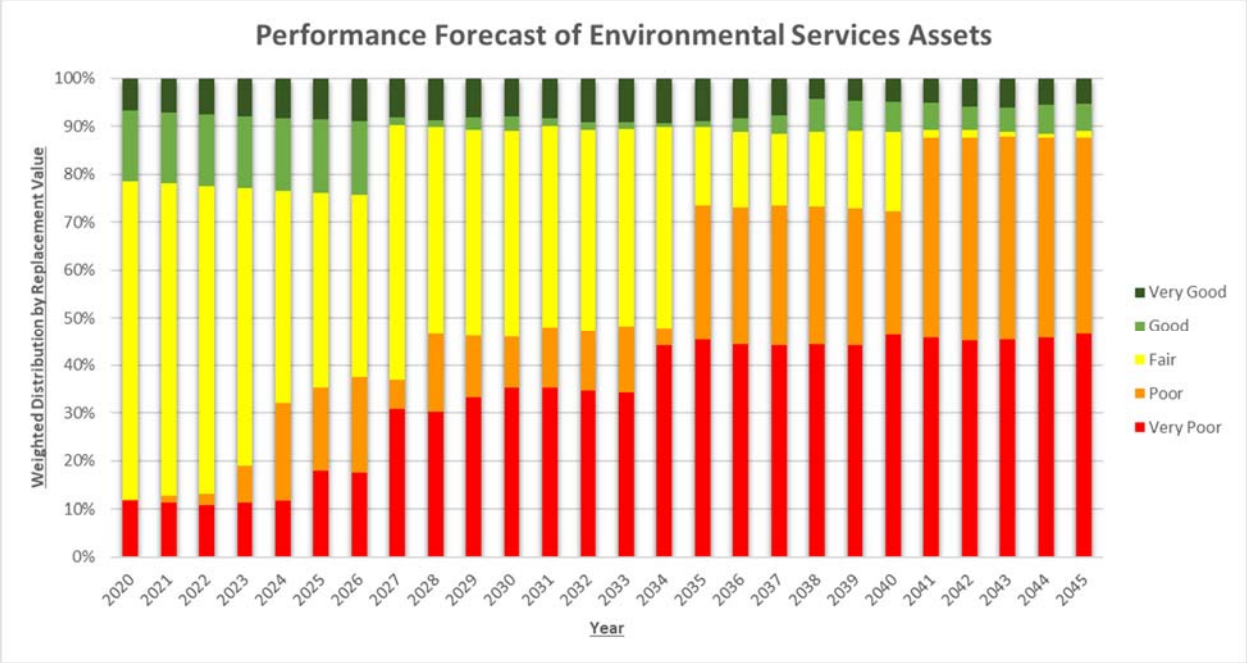

Figure 35: Planned Expenditure Performance Forecast – Environmental Services, Water

5.2.2.2 Wastewater

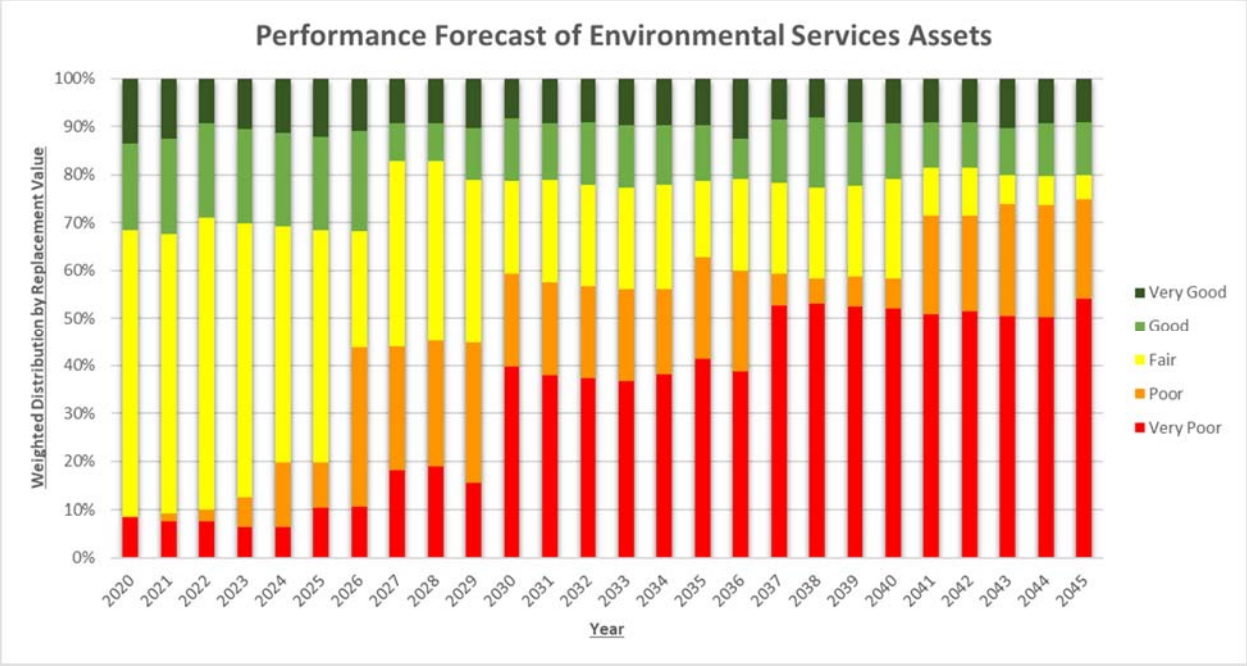

Figure 36: Planned Expenditure Performance Forecast – Environmental Services, Wastewater

5.2.2.3 Stormwater

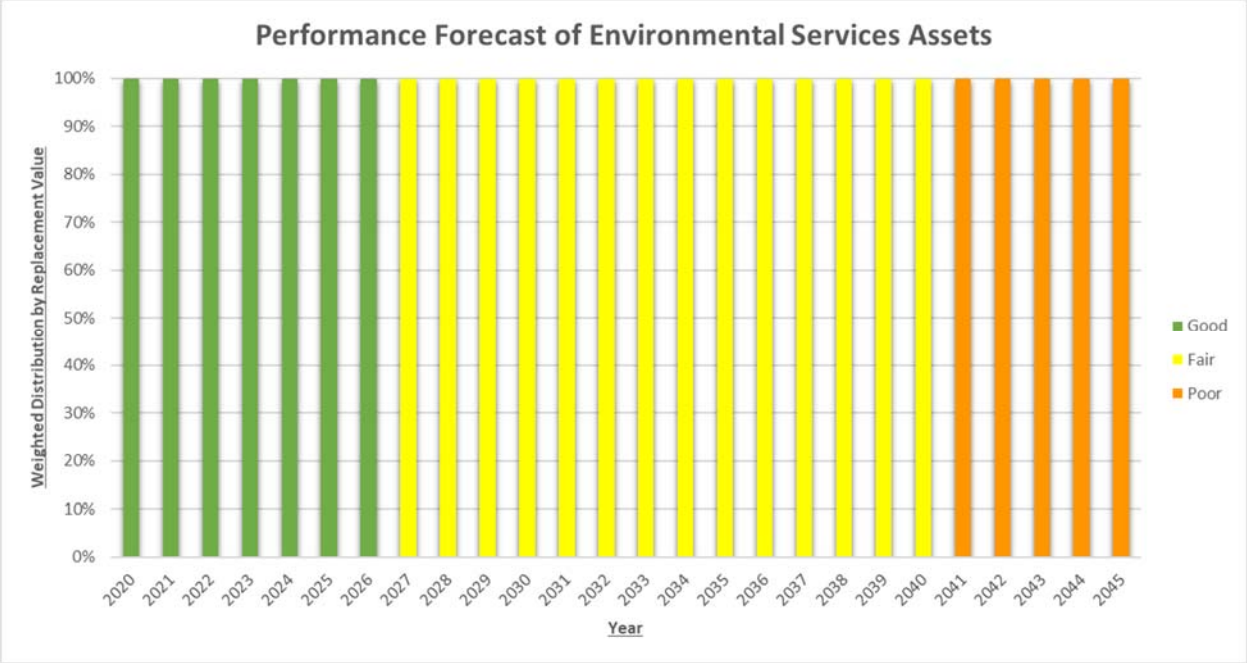

Figure 37: Planned Expenditure Performance Forecast – Environmental Services, Stormwater

5.2.2.4 Waste Management

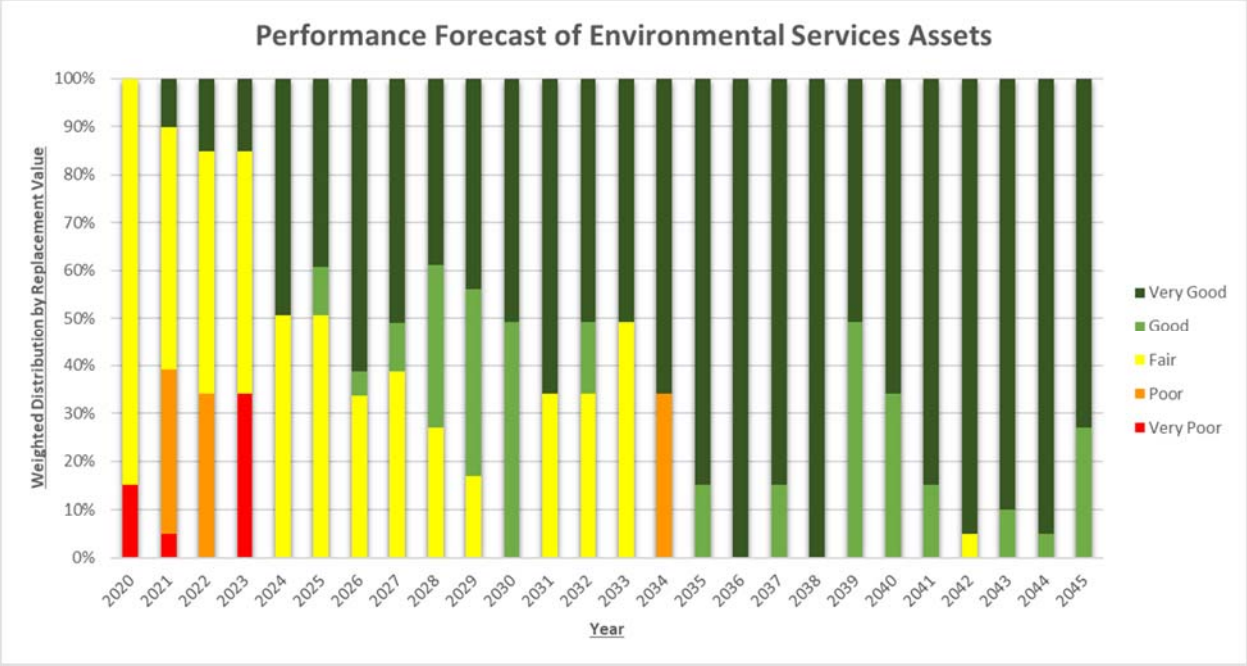

Figure 38: Planned Expenditure Performance Forecast – Environmental Services, Waste Management

5.2.3 Proposed Expenditure Performance Forecasts

5.2.3.1 Water

An additional expenditure of $100,000 annually was determined to maintain performance over the short-term (Figure 39).

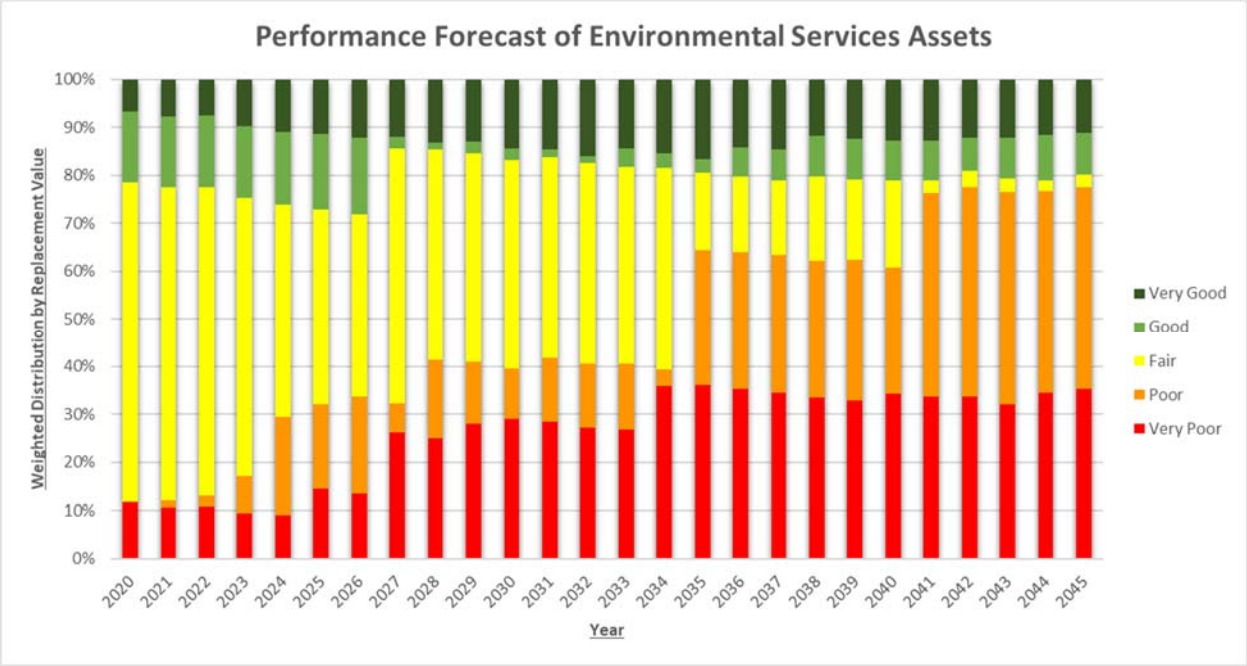

Figure 39: Proposed Expenditure Performance Forecast – Environmental Services, Water

5.2.3.2 Wastewater, Stormwater and Waste Management

The road network and water transportation performance are maintained over time and therefore suggest no need for additional expenditures.

Air transportation assets appear to decline in the long term and may suggest future expenditure gap. Staff should monitor asset performance over the short to medium-term.

6 PROTECTIVE SERVICES

6.1 State of Local Infrastructure

6.1.1 Asset Hierarchy

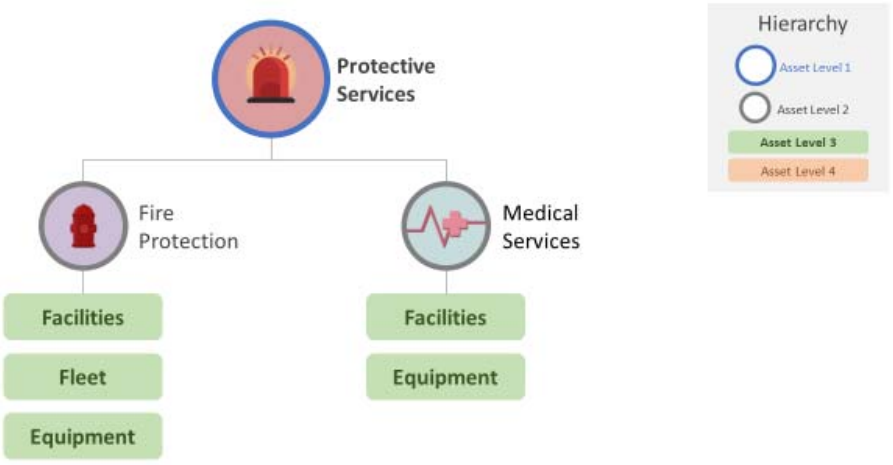

Figure 40: Asset Hierarchy – Protective Services

6.1.2 Replacement Cost

Table 6: Replacement Cost – Protective Services

Service Category	Asset Group	Total Replacement Value
Protective Services	Fire Protection	$4,643,976
	Medical Services	$681,985

6.1.3 Age Summary

The average age of Protective Services assets was determined to be 16 years. The distribution of assets by age and ESL remaining are provided in Figure 41 and 42. It should be noted that 68% of assets had data on installation year.

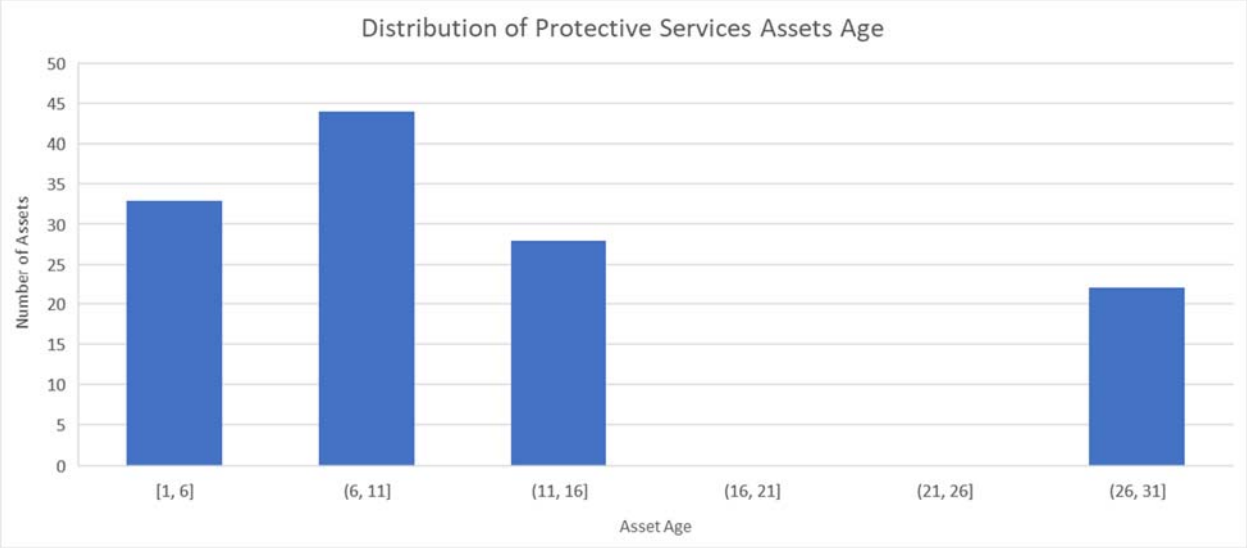

Figure 41: Distribution of Assets by Age – Protective Services

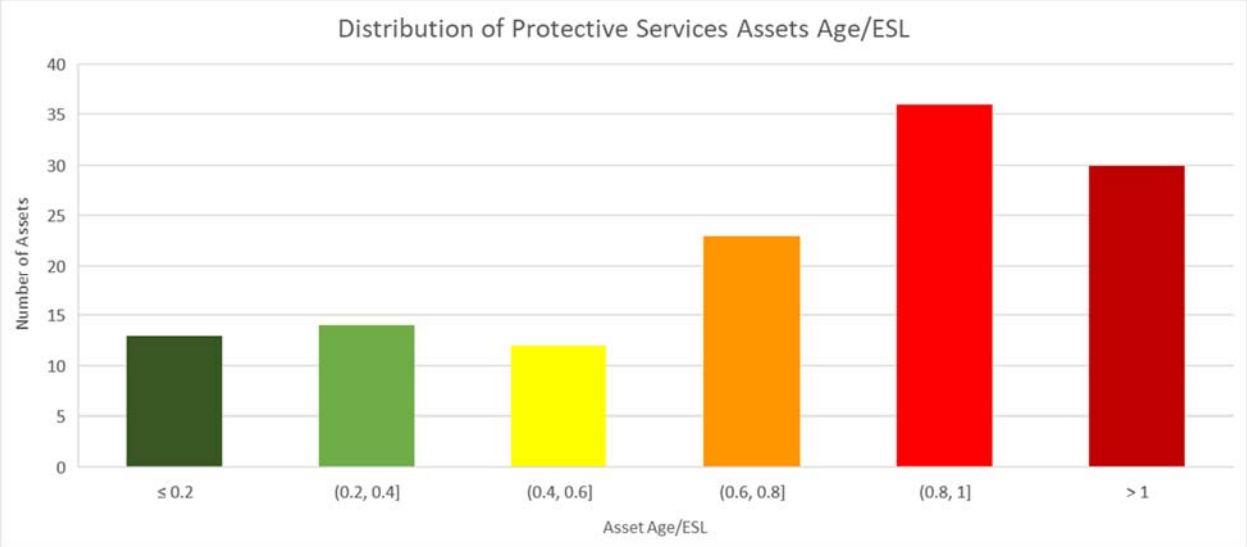

Figure 42: Distribution of assets by age as a proportion of ESL – Protective Services

6.1.4 Asset Performance

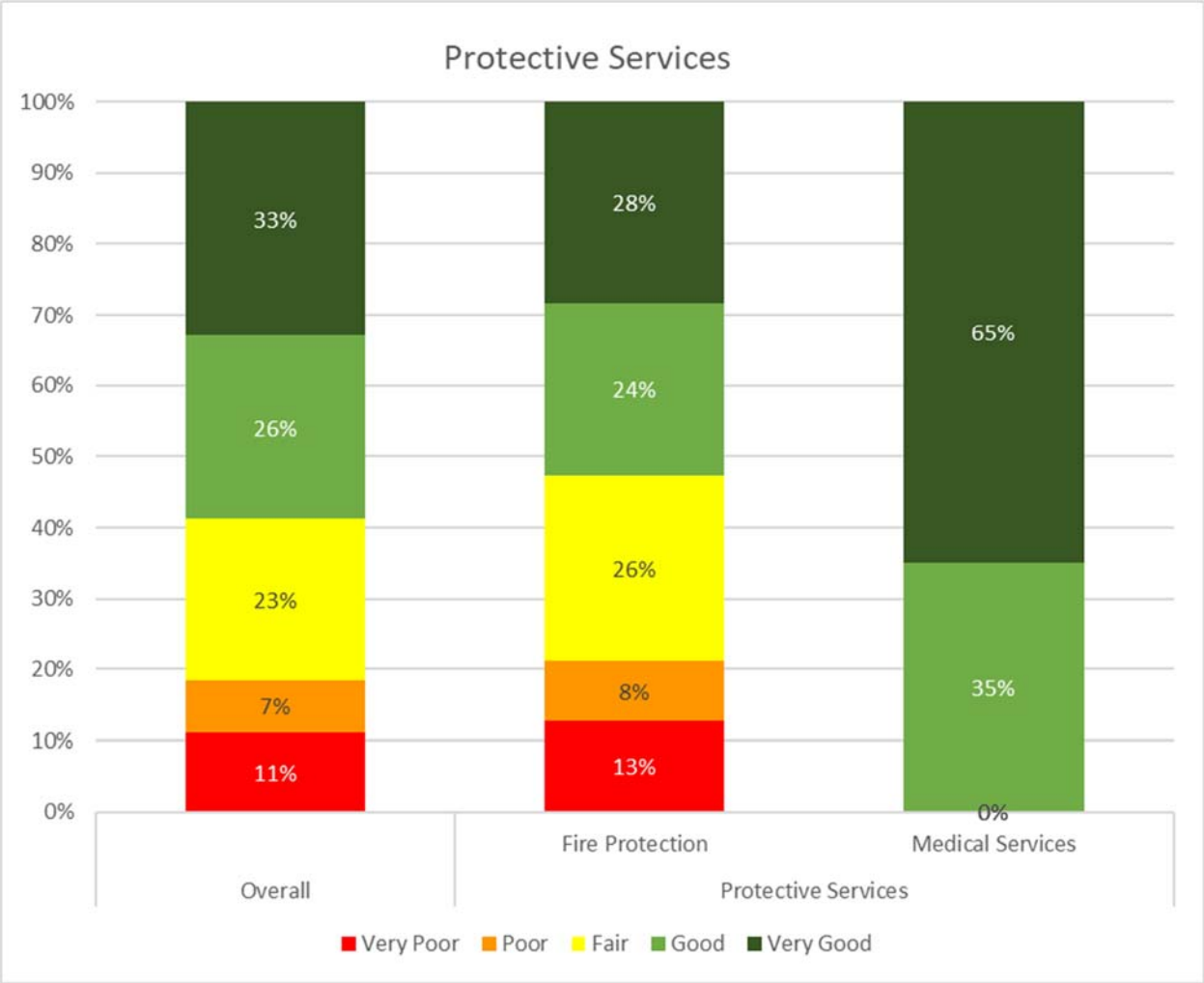

Figure 43: Asset Performance Summary – Protective Services

6.1.5 Performance Assessment Approach

The performance of facilities was determined through visual assessments by qualified subject matter experts. The assessments are combined with other performance indicators (maintenance history, facility performance data) and the professional judgment of subject matter experts to establish the current performance.

The condition of fleet and equipment assets is determined by age and ESL.

6.2 Asset Lifecycle Management Strategy

6.2.1 Asset Lifecycle Activities

Lifecycle Activity	Description of Activities Practiced by the Municipality
Operational	Fleet usage is monitored to extend service life.
Maintenance	Scheduled preventative maintenance programs for most assets. Reactive maintenance as required.
Rehabilitation	Rehabilitation of various assets as appropriate and determined through regular comprehensive condition assessments.
Replacement	Replacement of various assets as appropriate and determined through regular comprehensive condition assessments.
Disposal	Appropriate and proper disposal occur when assets are replaced or renewed.
Growth/Service Improvement	New assets are identified through the Fire master plan.

The risks associated with these lifecycle management activities are related to the timing and type of expenditure and the impact on the current and forecasted performance of assets. Northern Bruce Peninsula strives to complete the optimal lifecycle activity at the optimal time to maximize the performance of the asset groups at the lowest lifecycle cost.

6.2.2 Planned Expenditure Performance Forecasts

6.2.2.1 Fire Protection

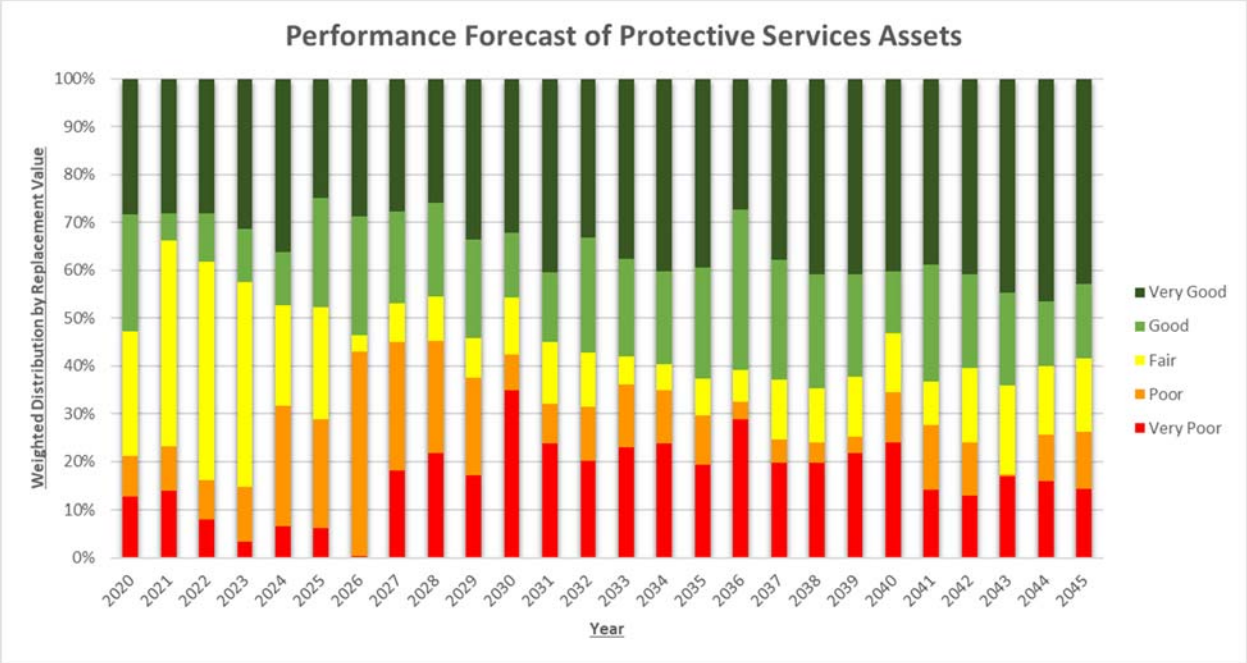

Figure 44: Planned Expenditure Performance Forecast – Protective Services, Fire Protection

6.2.2.2 Medical Services

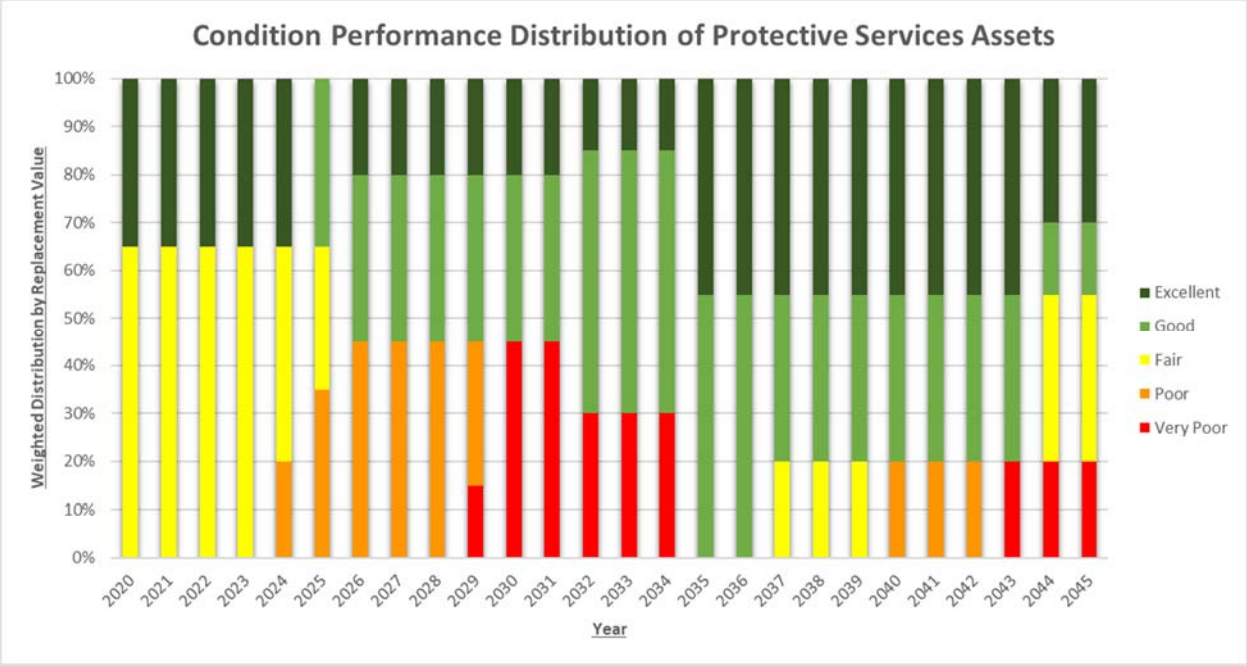

Figure 45: Planned Expenditure Performance Forecast – Protective Services, Medical Services

6.2.3 Proposed Expenditure Performance Forecasts

It was assumed that the IT infrastructure is fully funded through the operating budget and therefore required no additional expenditures to maintain performance over time.

Asset Performance Measurement

Service Area	Service Statement	Current Performance		Service Attribute	Service Attribute Statement
		Performance Measure	Value		
General Government	Efficiently provide high quality, safe, accessible, and energy efficient Administration facilities and IT Infrastructure for the community.	Percentage of General Government assets meeting performance expectations	95%	Quality	Provide administration assets in good condition at the right design standard and IT Infrastructure assets at the appropriate quality.
				Safe	Provide safe administrative facilities and a secure IT network (firewalls, monitoring software, etc.).
				Accessible	Provide administration assets that are AODA compliant and accessible IT Infrastructure.
				Environmental Stewardship	Provide administration assets that are environmentally friendly.
Environmental Services	Efficiently provide safe, clean drinking water of adequate pressure and flow with minimum service interruptions as well as reliable wastewater and stormwater services that are conscious of impacts to private property and natural environment.	Percentage of Environmental Services assets meeting performance expectations	90%	Reliable	Provide a water system with minimal interruptions to consumers. Provide a wastewater and stormwater system that protects against flooding.
				Safe	Provide a water system that supports community fire protection.
				Operational	Provide high quality water to residents.
				Environmental Stewardship	Provide Environmental Services that have minimal impacts on the environment.
Transportation	Efficiently provide operational and accessible road network and traffic services at the appropriate quality that support drivers, cyclists, and pedestrians, as well as vehicles that are safe, reliable, fuel-efficient, and affordable to the client.	Percentage of Transportation assets meeting performance expectations	96%	Quality	Provide Transportation assets at the appropriate condition.
				Safe	Provide an operational road network that is safe for drivers, pedestrians and cyclists.
				Reliable	Provide reliable vehicles and equipment for Transportation services.
				Accessible	Provide accessible Transportation services.
				Environmental Stewardship	Provide Transportation services that are environmentally conscious.
Protective Services	Efficiently provide effective and reliable Protective Services that keep the community safe.	Percentage of Protective Services assets meeting performance expectations	89%	Reliable	Provide the appropriate amount of Protective Services and ensure first responders are well prepared.
				Responsive	Provide responsive fire, medical, hazardous material and rescue services, appropriately equipped and with fully trained firefighters.
Community Services and Culture	Efficiently provide safe and high quality parks and green spaces, as well as recreation and cultural facilities that are accessible to residents and support a livable community.	Percentage of Community Services and Culture assets meeting performance expectations	98%	Quality	Provide Community Services and Culture assets in acceptable condition.
				Safe	Provide safe Community Services and Culture assets.
				Accessible	Provide parks, green spaces, recreation and cultural facilities within a reasonable proximity to every residential household that are in compliance with AODA standards.
				Environmental Stewardship	Provide recreation and cultural facilities that are environmentally friendly.

Technical Asset Performance Indicators

Relevant Service Area or Asset Group	Performance Indicator	2017	2018	2019	Trend	Data Source
WTP & watermains	Number of boil water advisories	0	0	0	Stable	Annual Reports
WTP & watermains	Number of Adverse Water Quality Incidents	3	3	2	Stable	Annual Reports
watermains	Number of Watermain Breaks	1	0	0	Improving	Annual Reports
watermains	Number of Water Service Failures	0	0	0	Stable	Annual Reports
sanitary sewers, wastewater facilities	Taste, Odour, colour complaints	0	0	0	Stable	Annual Reports
sanitary sewers, wastewater facilities	Volume of untreated sewage discharged	0	0	0	Stable	Annual Reports
sanitary sewers, wastewater facilities	Number of Wastewater Treatment Plant Effluent Violations	0	1	1	Stable	Annual Reports
sanitary sewers, wastewater facilities	Number of basement flooding complaints	0	0	0	Stable	Annual Reports
roads	Average Pavement Condition Index			0.81		Road Data
bridges	Average condition index			0.68		Inspection Data
culverts > 3m span	Average condition index			0.75		Inspection Data

Required O.Reg 588/17 Metrics

Service Area	Service Attribute	Community Levels of Service (qualitative descriptions)		Technical Levels of Service (technical metrics)		
		Performance Measure	Current Performance	Performance Measure	Current Performance	Data Source
Roads	Scope	Road network in the municipality and its level of connectivity	Roads of various classifications exist through the Municipality and connect our community.	# of lane-kilometres of arterial roads as a proportion of square kilometres of land area of the municipality.		all roads considered local for O.Reg 588 metrics
				# of lane-kilometres of collector roads and local roads as a proportion of square kilometres of land area of the municipality.		all roads considered local for O.Reg 588 metrics
				# of lane-kilometres of local roads as a proportion of square kilometres of land area of the municipality	54%	868 lane-km of roads, estimate 1,600 km2
	Quality	Description of the different levels of road class pavement condition	Municipality has gravel, surface treated and asphalt roads. Surface condition ranges from like-new to fully distressed.	1. Average pavement condition index for paved roads	81	2019 asset register analysis
				2. Average surface condition (e.g. excellent, good, fair or poor) for unpaved roads	Fair	Asset register analysis
Water	Scope	1. User groups or areas of Petawawa that are connected to the municipal water system	Most properties within the urban area of the Municipality are connected to the municipal water system.	Percentage of properties connected to the municipal water system	Municipal Water is provided in Lions Head and to some Tobermory properties serviced by the Little Tub treatment plant.	Annual Report and Systema Analysis
		2. User groups or areas of Petawawa that have fire flow	All properties connected to the municipal water system have fire flow.	2. Percentage of properties where fire flow is available	Fire flow is available at 100% of the properties connected to the Lions Head distribution system.	Annual Report and Systema Analysis
	Quality	Description of boil water advisories and service interruptions	Boil water advisories are made when the water is deemed to be not safe to drink due. Service interruptions are caused by watermain breaks or other equipment failures at water supply facilities.	Number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0	Annual Report
				Number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system	0	Annual Report
Wastewater	Scope	User groups or areas of Petawawa that are connected to the municipal wastewater system	Most properties within the urban area of the Municipality are connected to the municipal wastewater system.	Percentage of properties connected to the municipal wastewater system	Municipal Wastewater service is provided in Tobermory.	Annual Report and Systema Analysis
	Quality	1. Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place (to prevent backups into homes by allowing overflow during storm events)	The Municipality does not have combined sewers. Stormwater or groundwater enters the sanitary sewers through cracks or other deficiencies in the pipes. Some parts of the sewer systems have overflows to allow discharge into the environment in the event that flow rates are high enough to cause basement flooding. The sewage treatment plant cleans wastewater to within Provincial regulated limits before being discharged.	The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.	0	Annual Report
		2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches		Annual number of events where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system.	N/A	no combiend sewers
		3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes				
		4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid sewage overflow into streets or backup into homes		The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.	There was one effluent violation at the Tobermory Lagoon	Annual Report
		5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system				
Stormwater Management	Scope	User groups or areas of Petawawa that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system	Some urban areas protected from ROW/infrastructure flooding through urban ditch system or underground storm collection, some with defined outlets. Most rural areas protected from flooding through provision of municipal drains or rural ditch systems, some with defined outlets.	1. Percentage of properties in municipality resilient to a 100-year storm	100%	Resilience is defined as the ability to recover to the pre-event service level.
				2. Percentage of the municipal stormwater management system resilient to a 5-year storm	100%	Resilience is defined as the ability to recover to the pre-event service level.