OxfordCounty
growing stronger...together

# Asset Management Plan





**October 2017**

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# 1.0 Executive Summary

## 1.1 Background

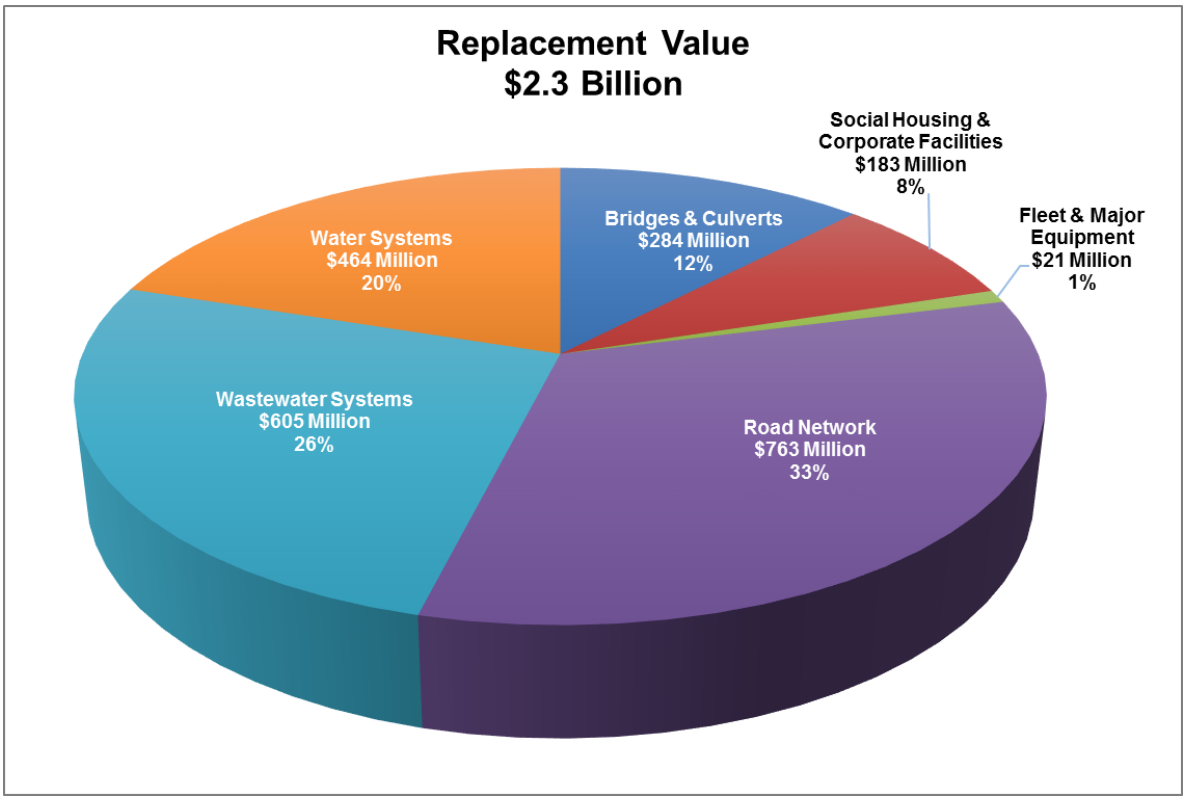
The state of the County's infrastructure can be an economic development driver and is a determinant in the quality of life of our communities. This Asset Management Plan (AMP) supports the County's Strategic Plan as well as the Official Plan as it relates to "strategically growing our economy and our community". This plan sets out a strategic framework that will guide future investments that support economic growth and respond to changing needs in a fiscally responsible manner. Also, complementing the County's Long Term Financial Sustainability Plan the AMP forms a strong foundation for sound asset management financial planning well into the future.

The Province is seeking to achieve standardization and consistency in the management of municipal infrastructure. To be eligible for capital grants, municipalities must have an Asset Management Plan (AMP) and demonstrate the particular need of a project to the social, economic or environmental priorities of the community.

The Infrastructure for Jobs and Prosperity Act, 2015, was proclaimed on May 1, 2016 and was created to establish mechanisms to encourage principled, evidence-based and strategic long-term planning. The Act sets out principles for asset management planning for the broader public sector, including municipalities. Paragraph 12(1)(d) of the Act confers regulatory authority for the government to prescribe how asset management plans should be prepared including regulations related to the "form, content and timing" of asset management plans. This regulation aims to help municipalities more clearly identify what their infrastructure needs are, and establish a sustainable position for funding infrastructure.

The County of Oxford owns and operates over $2.3 billion (replacement value, not including land value) of County infrastructure that supports the needs of area municipalities, residents, and local businesses and industry. These water; wastewater; roads; bridges and culverts; social housing and corporate facilities; and fleet and equipment assets also advance the collective interests of our communities, residents and businesses through customer/client-focused services that improve quality of life.

Table 1 – Replacement Value by Asset Category




In addition to meeting the requirements of the Provincial mandated AMP requirements, the County of Oxford's AMP establishes a strategic framework for managing these assets, aligning infrastructure with service objectives, documenting core practices and procedures, and guiding the action and investment needed to meet key business goals. The AMP clearly aligns with and supports the County's Strategic Plan, Official Plan, By-laws, Policies, Master Plans and Business Plans.

This AMP is based on current information available with a goal to identify plans to address gaps in data and procedures and implement opportunities for improvement.

The County plans to update the asset management plan at least every four years. However, the AMP is designed to be a living document that will be reviewed annually and revised in response to changing environmental, social and economic needs within our communities.

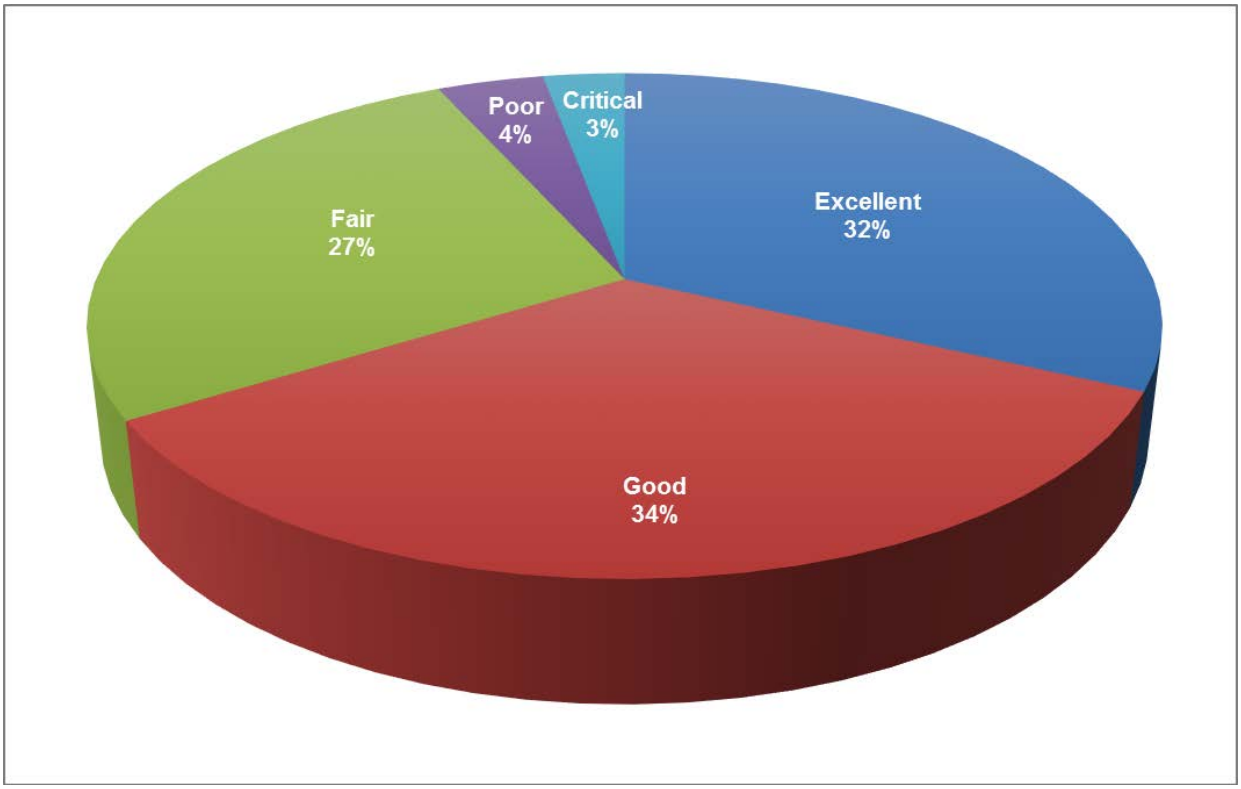
## 1.2 State of Infrastructure

The County's asset inventory is made up of six major asset categories:

1. Road network
2. Bridges and culverts
3. Water systems
4. Wastewater systems
5. Social housing and corporate facilities
6. Fleet and equipment

Over 90% of the County's asset inventory has conditions ratings of fair or better with approximately 30% in each of the excellent, good and fair condition ratings.

Table 2 – Consolidated Asset Condition Assessment

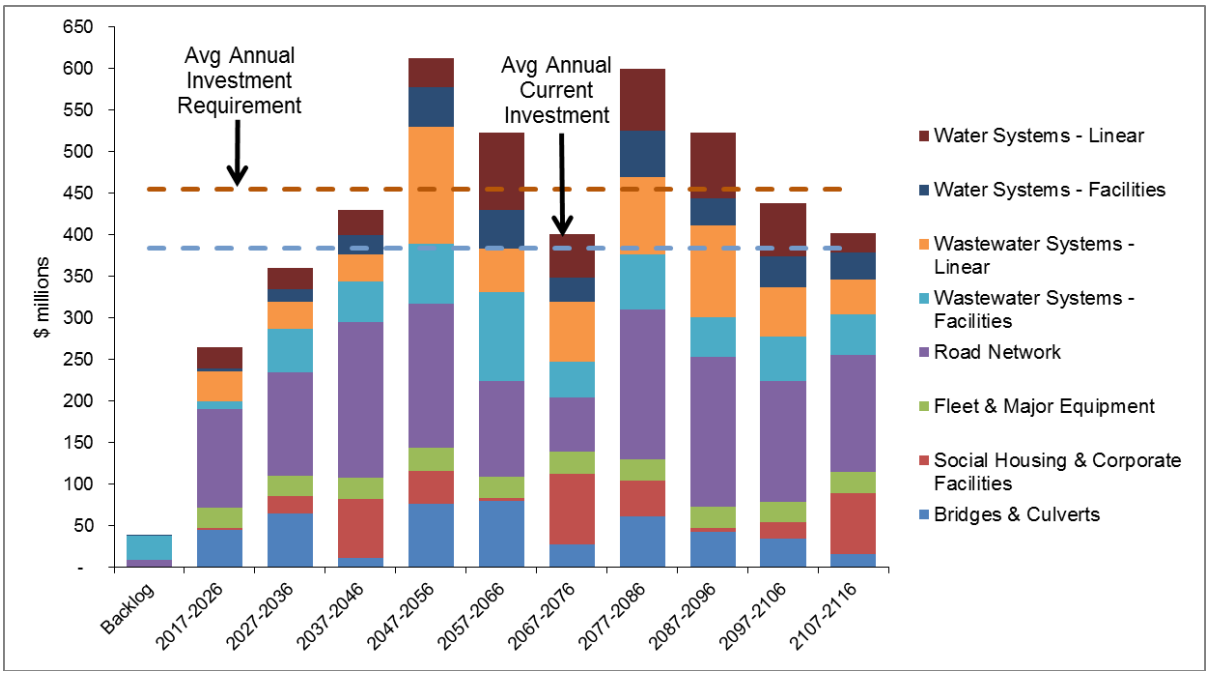



## 1.3 Financial Strategy

Based on the asset management strategies identified in the appendices to this plan, the financial requirements over the next 100 years are determined in today's dollars, and summarized for all asset categories in Table 3. These estimates assume that all work is able to be completed as indicated and does not take into account future changes due to environmental factors, new maintenance techniques, and additional growth. These estimates use a whole building approach and do not include new water and wastewater linear that the County has not yet assumed.

The average annual current investment of $38.3 million is comprised of funding sources including debenture repayments, tax levy, user fees, reserves, Federal Gas Tax, grants and external revenues. Based on replacement values in today's dollars, the average annual investment requirement is $45.5 million, resulting in a funding gap of $7.2 million. The investment requirements for each of the asset categories are set out in detail in the appendices to this plan.

Table 3 – Overall Capital Investment Requirements




In response to the capital investment requirements on an asset category basis, the following provides a summary of some recommendations formulated to ensure sustainable management of the County's core infrastructure. More detailed recommendations are provided within each infrastructure category report card.

Table 4 – Recommendations

| Asset Category | Recommendations |
|---|---|
| Road Network | Align roads segments to where they are on their lifecycle and recalculate funding requirements. |
| Bridge and Culverts | Continue to monitor new technologies as they emerge to determine when cost effective to be implemented, in order to extend useful lives of structures. |
| Water System | Implement condition assessments for all water facility components (including processes) and linear infrastructure. Establish a plan to update and assess infrastructure condition. |
| Wastewater System | Implement condition assessments for all wastewater facility components (including processes) and linear infrastructure. Establish a plan to update and assess infrastructure condition. |
| Social Housing & Corporate Facilities | As debenture repayments decline, maintain current investment by allocating these funds to reserves. |
| Fleet and Major Equipment | Improve processes to ensure systems are updated and available to produce the vehicle replacement ratings. |
| | |

The County's AMP is a key component of the framework from which future asset management decisions will be made. It will be used to communicate progress in asset management effectiveness and the County's performance in meeting its service objectives and goals. This AMP is designed to be a living document that will be reviewed annually and revised in response to changing environmental, social and economic needs within our communities, and any changes to provincial regulations.

# STATE OF INFRASTRUCTURE

## IN OXFORD COUNTY

LEGEND

- Excellent
- Good
- Fair
- Poor
- Critical

# 2.0 Introduction

## 2.1 Importance of Infrastructure

Asset Management strives to continually improve the management of infrastructure. The following is a list of goals that asset management programs and processes aim to achieve:

- ***Reduced life cycle cost*** (i.e. total operating, maintenance and capital resources) of providing services to residents.
- ***Reduced risk exposure*** to the County by ensuring that assets are managed in a manner that matches the risk that their failure represents to the delivery of services.
- ***An informed and transparent decision making process*** that provides Council with the knowledge that they need to make decisions regarding capital expenditures, operating costs and revenue requirements (i.e. rate and tax levels).
- A mechanism to ensure that the services that are delivered through infrastructure can be provided at a ***sustainable*** level at a cost that is affordable to residents.

## 2.2 Relationship to Other Strategies, Plans & Documents

### 2.2.1 Alignment to Strategic Plan

The goals of this Asset Management Plan (AMP) are clearly aligned with the County of Oxford's strategic priorities. The initiatives contained within this AMP support the values and strategic directions as set out in the Strategic Plan as it pertains to the following Strategic Directions:

Table 2.2.1.1 Alignment of the Asset Management Plan to the Strategic Plan

| Strategic Plan Statement | Asset Management Plan Alignment |
|---|---|
| **Vision:** Vibrant communities, working well and growing stronger…together!<br><br>**Mission Statement:** To serve the needs and advance the collective interests of our communities, residents and businesses through customer/client-focused services that improve quality of life. | As the state of the County's infrastructure can be an economic development driver and is a determinant in the quality of life of our communities. |
| **Strategic Direction 1.i:** *A County that Works Together* - Enhance the quality of life for all of our citizens by maintaining and strengthening core infrastructure. | This AMP will ensure infrastructure will be sustained at the required level that enhances the quality of life for all of our citizens by maintaining and strengthening core infrastructure.<br><br>A key element of this plan is to ensure good stewardship through proper asset management – |

| Strategic Plan Statement | Asset Management Plan Alignment |
|---|---|
| | well-planned, well-built and well-maintained infrastructure. |
| **Strategic Direction 3.iii:** *A County that Thinks Ahead and Wisely Shapes the Future* - Apply social, financial and environmental sustainability lenses to significant decisions by assessing options in regard to life cycle costs and benefit/costs - including debt, tax and reserve levels and implications. | This plan sets out a strategic framework that will guide future investments that support economic growth and respond to changing needs in a fiscally responsible manner.<br><br>Regular review of the AMP aligns to the County's Strategic Plan. In addition, this AMP meets the provincial government directives as set out in the Ministry of Infrastructure's "*Building Together* Guide for Municipal Asset Management Plans". |

### 2.2.2 Alignment to Other County Plans and Policies

The guiding principles used in the development of this AMP were established consistent with the goals set out in the following County plans and policy:

| County Plan and Policies | Asset Management Plan Alignment |
|---|---|
| Long Term Financial Sustainability Plan | The AMP is a key component of the Long Term Financial Sustainability Plan, serving the purpose of "the management of infrastructure assets that combines multi-disciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost effective manner to provide a specific level of service." |
| Official Plan | Provides the criteria and direction for growth surrounding asset decision-making processes. |
| Business Plans | The service level and budget set out in the Asset Management Plan are incorporated into department business plans as budgets, goals and performance measures. |
| Capital Plan | The capital plan consists of a capital budget and capital implementation program over a 10 year horizon. The plan identifies capital projects and equipment purchases, provides a planning schedule and identifies financing sources for the plan. |
| Infrastructure Master Plans | The AMP utlizes and incorporates various infrasturture master plans, in turn the asset management plan may influence future plans and recommendations. |
| By-Laws, Policies, and Procedures | The AMP will utilize various infrastructure related by-laws, policies and procedures. |
| Regulations | Abide by senior level government regulations. |

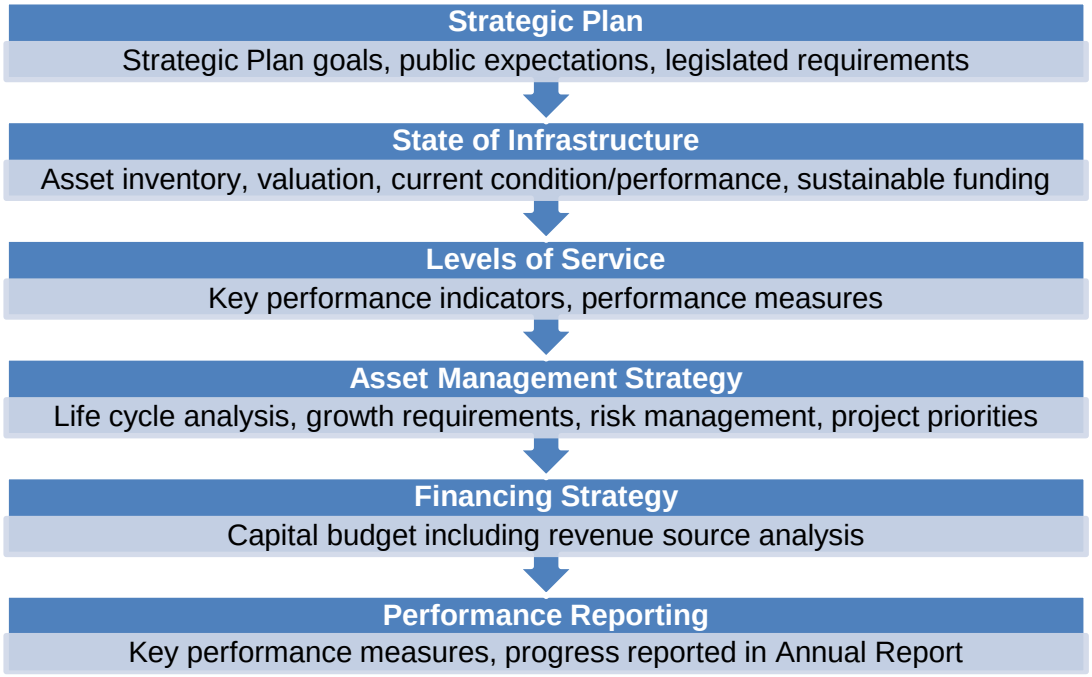
## 2.3 Purpose and Development Methodology

The purpose of the County's AMP is to set out how the County's infrastructure will be managed in accordance with the County's Strategic Plan; various plans and policies; and legislation, to ensure that the County is capable of providing the levels of service required to support the public's needs.

The output from the AMP serves as a framework for the County's long term capital plan, including reconstruction and rehabilitation strategies; maintenance, operations and repair activities; and financial planning.

### 2.3.1 Review Methodology

The methodology employed to develop and review the AMP is based on the following key components:




As illustrated above, the County's infrastructure planning process begins with the County's Strategic Plan, aligned with the public's expectations and government regulations.

The process evaluates the state of infrastructure which is determined by current conditions and performance assessment for each asset class. This assists in forecasting a sustainable funding level and identifies if a funding surplus or deficit exists. Report cards are used to assess and report the state of the infrastructure categories.

Performance measures are established and tracked to provide an understanding of the current levels of service. This framework guides the development of desired levels of service and performance measures are used to evaluate progress in achieving the desired levels of service.

The asset management strategy component of the planning process provides a detailed analysis for each infrastructure class. This analysis is based on best practices and industry standards employed to manage the assets. This component includes a comprehensive conditions assessment based on clearly identified rehabilitation strategies that trigger specific life cycle events. The specified life cycle event is dependent upon return on investment, risk assessment and prioritization of projects.

The next step in the planning cycle is developing the financing strategy. This is an integral component of the 10 year capital plan (budget). All possible revenue sources are considered for each capital project such as, grants, reserves, gas tax, development charges, debt, user fees (rates), and tax levy. This stage of the process is reviewed and developed concurrently with the County's annual operating and capital budget to ensure the overall budget is achievable and manageable, both technically and financially.

The final component of the infrastructure planning process is performance reporting and evaluating against key performance measures established to assess progress towards achieving the desired levels of service. This exercise will also identify weaknesses in performance that will trigger re-assessment of the desired service levels or rehabilitation strategies.

### 2.3.2 Plan Content

This AMP complies with the provincial government directives as set out in the Ministry of Infrastructure's "Building Together - Guide for Municipal Asset Management Plans". Based on this Guide, qualifying AMPs must include the following information:

Table 2.3.2.1 – Asset Management Plan Content

| Section | Content |
|---|---|
| Executive Summary | Succinct overview of the Asset Management Plan highlighting major points. |
| Introduction | Overview of asset management within the County and sets out the overall context and expectation for the report. |
| State of Local Infrastructure | Information on the asset portfolio including inventory, condition, cost, etc. accompanied by information on supporting data. |
| Expected levels of Service | How service is linked to infrastructure investment and defined how service is measured and how performance goals and expectations are identified and set. |
| Asset Management Strategy | Sets planned actions that will enable assets to provide the desired levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost (i.e. through preventative action). |

| | |
|---|---|
| Financing Strategy | Identifies lifecycle investment requirements and appropriate funding strategies for completing the work. |

### 2.3.3 Resources

At the organizational level, the County's enterprise asset management process involves collaboration among various departments and programs – roads, water, wastewater, waste management, fleet, facilities, information systems, customer service and finance.

For the 2017 update of the AMP, a software application (Citywide Solutions) was implemented for capital asset long term financial planning and analysis. The components of Citywide include:

- Comprehensive asset inventory including condition ratings;
- Replacement costs for the asset inventory items;
- Asset maintenance management system developed in order to assess maintenance, operation and replacement activities of existing asset infrastructure;
- Asset accounting for PSAB purposes in accordance with PSAB 3150;
- Asset service levels and expected useful lives have been developed and regularly monitored for updating as new information becomes available;
- Modeling and master planning based on condition assessment; data of existing and planned future replacements; and, growth related asset infrastructure.

### 2.3.4 Limitations of the plan

- Condition assessment of water and wastewater linear infrastructure
- Coordinating asset improvements and/or replacements among the various groups – area and neighbouring municipalities, and within the County
- Aligning financial planning and asset management planning. Continuous improvement is sought to enable the asset management planning process to better inform the County's budget preparation process and facilitate an evidence-based discussion around service levels, funding and affordability of service.

## 2.4 Plan Scope and Time Frame

The first version of the County's Asset Management Plan was issued in 2014. The 2014 plan focused on core County infrastructure assets. The 2017 plan update has focused on increasing data integrity and laying the foundation for lifecycle analysis by establishing asset profiles.

The 2017 Asset Management Plan includes the following assets:

- Roads Network
- Bridges and Culverts
- Water systems
- Wastewater systems
- Social housing and Corporate Facilities
- Fleet and Equipment

The AMP utilizes a long-term strategic planning window of 100 years. Having a long-term strategic planning window allows the plan to model the exceptionally long service lives of some infrastructure assets (i.e. buried infrastructure of water and wastewater, road bases, etc…). Although the accuracy of a long-term planning window is highly subject to assumptions and estimates, it allows decision makers to better assess the asset funding requirements, and sustainably fund the County's infrastructure.

The County plans to update the asset management plan at least every four years. However, the AMP is designed to be a living document that will be reviewed annually and revised in response to changing environmental, social and economic needs within our communities.

## 2.5 Improvement Plan

Improved asset management planning is vital to the long-term sustainability of infrastructure throughout the province. The Ministry of Infrastructure has proposed a municipal asset management planning regulation[1] anticipated to come into effect on January 1, 2018. The regulation is intended to aid municipalities in developing more standardization and consistency to municipal asset management planning in order to address infrastructure challenges.

The province is proposing a phased implementation of the regulation with requirements to be included and adopted by January 1 of each of 2019 through 2022. The proposed regulation includes the need to develop a Strategic Asset Management Policy, with adoption anticipated by January 1, 2019, including the need to address risks and vulnerabilities to infrastructure assets as a result of climate change. It is also important to ensure that climate change and environmental factors are considered when designing, constructing and operating assets. The County has a solid foundation for meeting this requirement through our commitment to 100% renewable energy by 2050.

Throughout this plan, areas of improvement are identified in more detail as they relate to this proposed regulation. Highlighted here are a few key improvements identified by the County:

- Develop a plan for tracking storm water infrastructure assets
- Develop a forest management plan
- Develop a plan for tracking waste disposal infrastructure assets
- Coordinate and support asset management planning County-wide
- Developing a level of service framework
- Further track lifecycle renewal projects as maintenance, renewal/rehabilitation and replacement activities to coincide with activities listed in the Building Together Guide
- How to effectively plan for expansion projects using current tools
- Complete asset profiles for all asset types to aid in completing lifecycle analysis and financial planning

[1] http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTMyNTkw&statusId=MjAxMzgx&language=en&language=en

# 3.0 State of County Infrastructure

## 3.1 Inventory

Infrastructure assets are detailed within section 2.1 of each asset class report card by component and quantity. Included is a comparison of inventory levels to the 2014 AMP and explanations of significant changes.

## 3.2 Valuation

Replacement cost valuation is forward-looking and accounts for expected inflation, changes in technology and other factors. Valuation techniques used are detailed in section 2.2 of each report card. The replacement cost as it relates to each household within the County is also identified.

## 3.3 Asset Condition Assessment

The current condition of the County's assets are detailed by component within section 2.3 of each report card. This section also compares the condition to the 2014 AMP in order to review trends.

Condition and Performance - Present condition of the asset and an assessment as to how well it currently performs.

| Condition | Description |
|---|---|
| Excellent | no noticeable defects |
| Good | minor deterioration |
| Fair | deterioration evident, function is affected |
| Poor | serious deterioration, function is inadequate |
| Critical | no longer functional, general or complete failure |

## 3.4 Assessment Approach

As each asset type is unique, the County undertakes a variety of formal and informal condition assessments. These approaches are detailed within section 2.4 of each report card.

## 3.5 Useful Life

Asset useful lives are detailed within section 2.5 of each report card. This includes the assets anticipated life from new build, and the anticipated added life of each maintenance strategy,

which are used for PSAB purposes. Infrastructure assets undergo a continual process of repair, rehabilitation and refurbishment in order to maintain their intended purpose. By using the lifecycle analysis, as completed in section 4.3 of each report card, the anticipated lifecycle life is also provided. The County is investigating how best to visually display asset age distribution and asset age as a proportion of expected useful life.

It should be noted that estimated useful lives, based purely on age, can provide a misleading view on the asset replacement requirements. In many cases assets that are properly constructed and maintained may outlive their estimated useful life and continue providing service. In other cases, due to poor workmanship and lack of proactive maintenance, assets may fail before they fulfill their anticipated useful life.

# 4.0 Expected Levels of Service

## 4.1 Level of Service Context

Level of Service is a methodology used to consider affordability of assets against customer needs and expectations.

Identifying levels of service ensures that asset management decisions are:

- Based on impact to customers, the community and the environment;
- Focused to deliver the required level of service; and
- Aligned with the strategic goals of the County.

It is important to define and quantify the levels of service within each service area as key indicators of asset needs and the basis for investment decisions. Service levels communicate to Council and the residents the state and trend of the County's infrastructure. Funding scenarios can be created based on different service levels, which allows Council to set priorities on the targeted service level for each asset type.

Levels of service take into consideration:

1. **Legislative and regulatory requirements:** These requirements prevent levels of service from declining below a certain standard. (i.e. Minimum Maintenance Standards for municipal highways, building codes and the Accessibility for Ontarians with Disabilities Act)
2. **Corporate goals and objectives:** These goals and objectives define the County's priorities, and guide future spending.
3. **Customer needs:** The expectations of the general public have a direct impact on the level of service demanded from infrastructure.

## 4.2 Performance Measures

Currently, the County measures performance of assets as part of the Key Performance Indicators (KPIs) included in business plans and those reported in the Municipal Performance Measurement Program.

Phase 1 of the proposed asset management planning regulation, with implementation anticipated by January 1, 2020, will require a plain language explanation of the current levels of service being provided by each category of infrastructure asset. Also required would be relevant performance measures that address service delivery and asset operation, such as energy usage and cost.

Phase 3 of the proposed regulation, with implementation anticipated by January 1, 2022, would require a plain language explanation of the proposed levels of service for each category of infrastructure asset. To assist with this reporting and consistency across municipalities the proposed regulation also includes a proposed levels of service table. Although the County is not

currently tracking some of these metrics, they are included in the performance measures table 3.0.1 in each report card in order to recognize the need to start monitoring.

In 2014, a service delivery review program began at the County where there was a systematic review of all services over a three year period intended to identify efficiencies, effectiveness and community impact of existing services, and identified service improvement opportunities to explore for employing:

- Innovation
- Coordination and integration
- Alternative service delivery
- Best practices
- Appropriate benchmark strategies

The evaluation mapped out how specific County activities are used to deliver services to accomplish programs and strategic goals. The responsibility for asset management key performance indicators and goals are found across many services. The development of more well defined service goals for each asset class will become better defined in future updates of the AMP.

Table 4.2.1: Key Services from Service Delivery Review

| Service Name | Service Description | Value Proposition | Asset Management Output |
|---|---|---|---|
| Road Maintenance and Traffic Management | An external service that provides a Km of roadway to road users. | People and Goods are able to move safely and efficiently throughout the County. | Road Network, Bridges, Culverts and Storm Sewers |
| Drinking Water Supply, Treatment, and Distribution | An external service that supplies drinking water from source to tap to water customers. | To directly impact the quality of life of customers by reducing the potential for water-borne disease, allowing for economic development, fire protection, and providing opportunities for recreational activities. | Water |
| Wastewater Collection and Treatment | An external service that collects and treats wastewater from wastewater customers. | Ensure protection of the environment and public health of residents and visitors to Oxford County | Wastewater |

| Service Name | Service Description | Value Proposition | Asset Management Output |
|---|---|---|---|
| | | and partners in the watershed. | |
| Property, Facility, and Energy Management | An internal service that manages a properties and facilities for the County of Oxford. | To provide well maintained buildings and property appropriate to the services delivered. | Corporate Facilities and Social Housing |
| Fleet and Equipment | An internal service that supplies vehicles and equipment to the County of Oxford to support service delivery. | To efficiently provide safe and environmentally appropriate vehicles and equipment to the County of Oxford. | Fleet and Major Equipment |
| Information Technology Infrastructure | An internal service that provides and maintains technology and infrastructure management for the County of Oxford and area municipalities. | To provide technical service to County of Oxford departments and staff, and to area municipality departments and staff. | IT Equipment |

## 4.3 External Trends and Issues

There are always external factors that are beyond the control of the County that can influence the level of service of assets. Performing an analysis of this will ensure that the performance targets are well-aligned with the environment which the County operates in.

The following are known external trends/issues impacting levels of service:

- **Aging infrastructure**: old infrastructure will continue to burden the County and will require a higher funding investment to maintain safety and reliability.
- **Declines in water consumption**: ongoing conservation efforts lead to a decline in revenue generated from rates.
- **Enhanced environment stewardship**: an increased demand of accessible alternative fuels requiring new funding; the County's requirement to look at environmental sustainability with each capital project could increase timelines and costs.
- **Inflation index for construction projects**: inflation rates that increase at a rate greater than expected could result in a shortage of funding to complete projects.
- **Environmental factors**: unusual weather events can significantly impact the condition of assets, changing the timeframe that maintenance is required.

- **Changes in senior level government funding:** changes in funding levels or priorities will require the County to take another look at our ability to fund capital programs.
- **Uncertainty of growth forecasts**: can result in increased deterioration, the need for additional infrastructure and growth upgrades quicker than expected.
- **Active transportation**: increases in the use of alternative transportation results in increased pressure to maintain a safe and reliable transportation network.

## 4.4 Current Performance

The current performance outputs for key performance indicators have been reported as part of Table 3.0.1 in each section for the report card appendices. Tables include measures that show the efficiency, effectiveness, quantity, quality, condition, and dedication to the County's level of service. Even though an overall grade is helpful to get a snap shot of the service, the performance measures in each section provide a more detailed view. They are meant to breakdown the service level into smaller, more meaningful metrics that help to explain how a service, or the County as a whole, is performing.

The County is currently looking at key asset performance measures to capture the service level of each asset type appropriately. The County has identified new measures that are not currently tracked (NCT) but will provide important information in the future and help meet the requirements of the proposed regulation. Some of these indicators may replace existing measures used by the County, others will work together to show a different facet of already reported information, and some will report on new information. Methods of calculation for all NCT measures are currently being discussed, with the expectation that data will exist for the next iteration of the AMP.

# 5.0 Asset Management Strategy

This asset management strategy will result in a set of planned actions to enable a sustainable level of service, while managing risk at the lowest life cycle costs. The detailed asset management strategies have been reported as part of section 4.0 in each of the report card appendices.

## 5.1 Procurement Methods

The County's Purchasing Policy (Policy No. 6.7) sets out guidelines for the County to ensure that all purchases of materials, supplies and services provide the lowest costs, including where appropriate life cycle costs, consistent with the required quality and levels of service.

The key objectives of the purchasing policy are to:

- Ensure an open and honest process that is fair and impartial;
- Provide clear direction and accountabilities;
- Define the types of procurement processes that shall be used;
- Ensure objectivity and integrity of the procurement process;
- Ensure fairness between bidders; and
- Maximize savings for the taxpayers.

Procurement can include joint contracts with internal divisions and external municipalities/agencies through capital planning or development-related infrastructure planning.

To ensure the most efficient allocation of resources and funds, the County will consider bundling projects when issuing tenders, to realize cost-benefits of economy of scale.

## 5.2 Lifecycle Activities and Planned Actions

The set of planned actions are referred to as strategies – which are identified in table 4.1.1 of each of the appendicies to this report. Each infrastructure class will have a unique trigger – which are also identified in table 4.1.1 of each report card.

| Activities | Planned Actions |
|---|---|
| Non-infrastructure Solutions | Actions or policies that can lower costs or extend life (includes traffic calming, studies, renewable energy projects). |
| Maintenance | Regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events. |
| Renewal/Rehabilitation | Significant repairs designed to extend the life of the asset. |

| Activities | Planned Actions |
|---|---|
| Replacement | Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option. |
| Disposal | Activites associated with disposing of an asset once it has reached its useful life, or is otherwise no longer needed by the municipality. |
| Expansion | Planned activities required to extend services to previously unserviced areas – or expand services to meet growth demands (includes road urbanization projects). |

## 5.3 Risks Associated with the Strategy

The County is continuing to develop a better understanding and risk profile for each asset type. Within the asset profiles several factors can be used to determine the probability of failure along with the consequence of failure. When using multiple factors a weighting can be assigned to each factor.

The consequence of failure is specific to each asset class and is provided in more detail within section 4.2 of each report card appendices.

**Risk = probability of failure X consequence of failure**

Table 5.3.1 Probability of Failure

| Scoring | Likelihood | Asset Rating |
|---|---|---|
| 1 | Very low | Excellent |
| 2 | Low | Good |
| 3 | Medium | Fair |
| 4 | High | Poor |
| 5 | Very high | Critical |

The County's Risk Management Plan (Policy No. 6.17) describes how risk and exposure to loss will be managed by the County. The document describes processes that will be used to identify, record, analyze and respond to risks, and the roles and responsibilities of the people involved in projects and services provided by the County. The Risk profiles developed for each asset type align with the requirements of this policy.

Table 4.2.2 of each report card shows a summary of assets relative to their probability of failure and consequence of failure. Those assets highlighted in red pose the highest risk and consequence to the County where those assets highlighted in green are low risk.

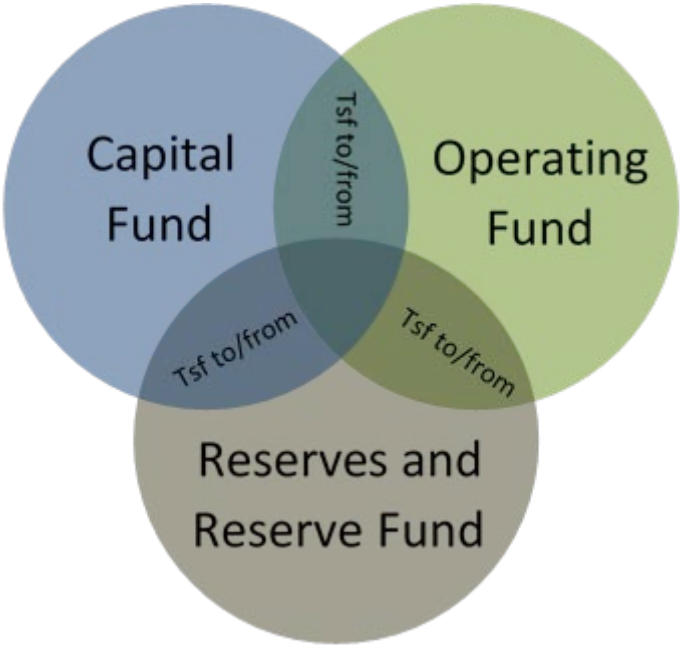
## 5.4 Lifecycle Analysis

Undertaking a lifecycle analysis is necessary when developing a strategy for managing the County's assets. The analysis reviews the actions required that would enable assets to provide the desired levels of service.

# 6.0 Financing Strategy

## 6.1 Financing Strategies

A financial plan is a critical component of the AMP, and brings the plan into action. A sound financial plan demonstrates that the County has integrated the asset management plan into financial planning and budgets, and that it has utilized all available funding tools. The diagram below illustrates how the different funds work together to help achieve the optimum funding strategy.




The Asset Management Plan is a key component of the County's Long Term Financial Sustainability Plan (Policy No. 6.16), designed to combine multi-disciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost effective manner to maintain specific levels of service.

A key component of the Asset Management Strategy is a financial planning tool that will assist in achieving the guidelines as set out in the County's Long Term Financial Sustainability Plan, Risk Management Plan (Policy No. 6.17), Reserve Policy (Policy No. 6.20) and Debt Management Policy (Policy No. 6.19). The financial planning tool will provide a comprehensive asset registry for all asset types and will enable dynamic lifecycle planning, condition assessment, risk analysis, levels of service and project prioritization.

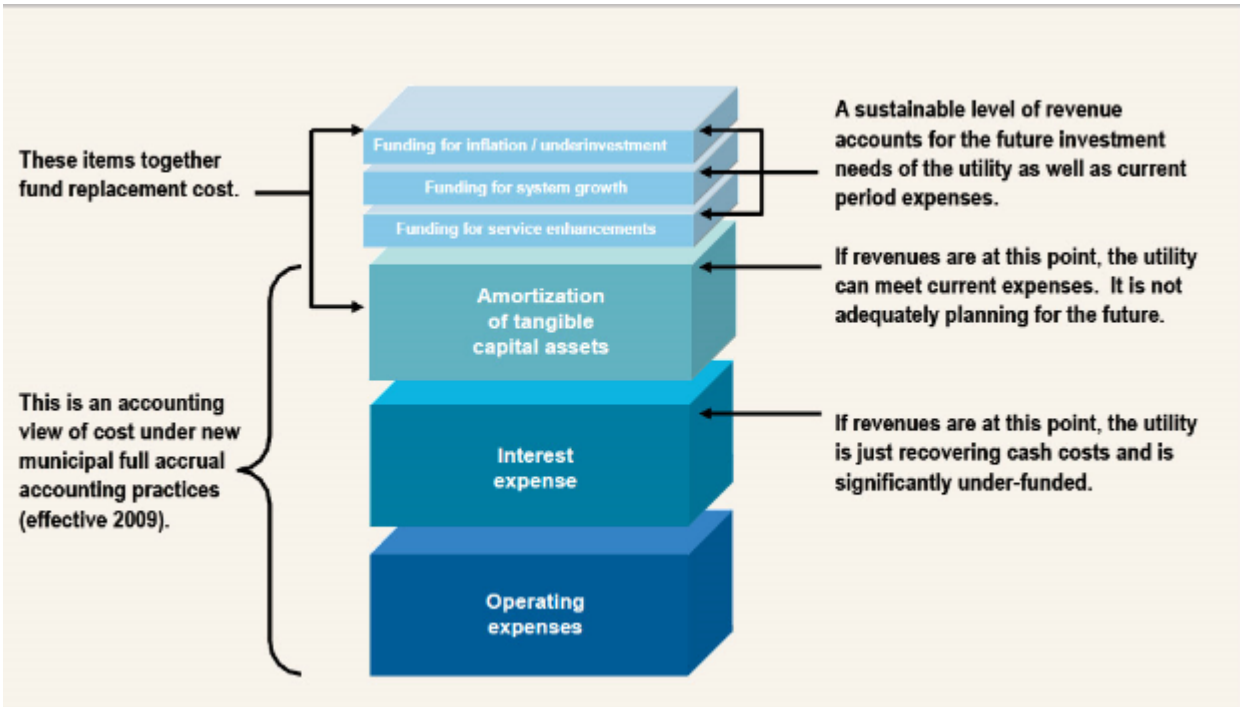
In the event that this AMP identifies funding shortfalls in any of the asset categories, the Building Together Guide indicates that the impacts of the shortfall and how the impact will be managed are to be included in the plan. The action plan may include any of the following approaches:

1. Reduce levels of service which will effectively reduce the funding requirement; and
2. Employ asset management and financial strategies, such as:
    a. use of debt; and
    b. increase or introduce user fees.

When evaluating asset funding requirements and shortfalls, it is important to consider intergenerational equity which refers to the fairness between generations. From an asset perspective this speaks to who should pay for assets that have long term benefits. For assets such as fleet and equipment with short lives, 10 years or less, the current generation receives the full benefit of the asset and should be responsible for the asset's financing. For assets with longer lives such as water and wastewater infrastructure with a 90 year life, multiple generations will receive the benefit and establishing fairness for the asset financing is more difficult.

The Building Together Guide speaks to a building blocks approach to financial planning for capital assets. Some of the costs related to maintaining infrastructure are classified as operating expenses while others are considered capital costs. The ideal funding level is at the top of the building blocks where the infrastructure is fully funded and a sustainable level of funding for service enhancements and future investment needs is achieved. The illustration in Figure 6.1.1 was designed specifically for water and wastewater systems, however the concept applies to all asset types. The closer to the bottom of the building blocks a municipality is, the greater the funding gap will be.

Figure 6.1.1: A Building Blocks Approach to Determining Cost[2]




[2] https://www.ontario.ca/page/building-together-guide-municipal-asset-management-plans#section-2 Adapted from Toward Financially Sustainable Drinking Water and Wastewater Systems, Ministry of the Environment, August 2007.

## 6.2 Expenditure History and Forecasts

Each asset report card shows the yearly expenditure forecast and previous two year actuals spent on asset lifecycle activities (Appendix Tables - Table 5.2.1).

## 6.3 Capital Revenues

Each asset report card shows the yearly revenues forecast and previous two year actuals revenue by revenue type (Appendix Tables - Table 5.3.1).

## 6.4 Financial Requirements and Strategies

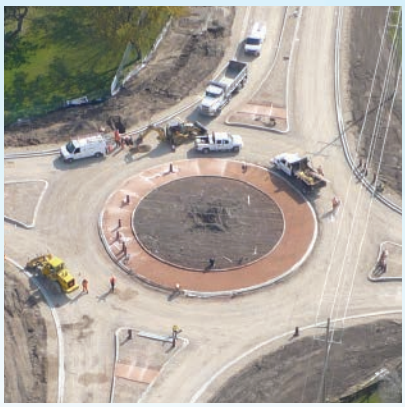
Each asset report card contains an analysis of the financial requirements to adequately fund the asset lifecycle. The report identifies any funding shortfalls based on current asset management strategies. The recommendations consider the impact of the shortfall and how the impact will be managed.

Phase 1 and Phase 2 of the proposed regulation, with implementation January 1, 2020 and 2021 respectively, require significant operating costs to be captured, including energy costs for a ten year period in order to maintain current levels of service over the long term. The requirement for operating costs to be included for a ten year period is a significant requirement. The County currently has a long-term capital plan with a ten year term and a five year projection of our operating plan. In order to meet this requirement a change to the County's budget process would be necessary. The County will review the final regulation once posted in order to determine the changes that would be required to meet this section of the regulation.

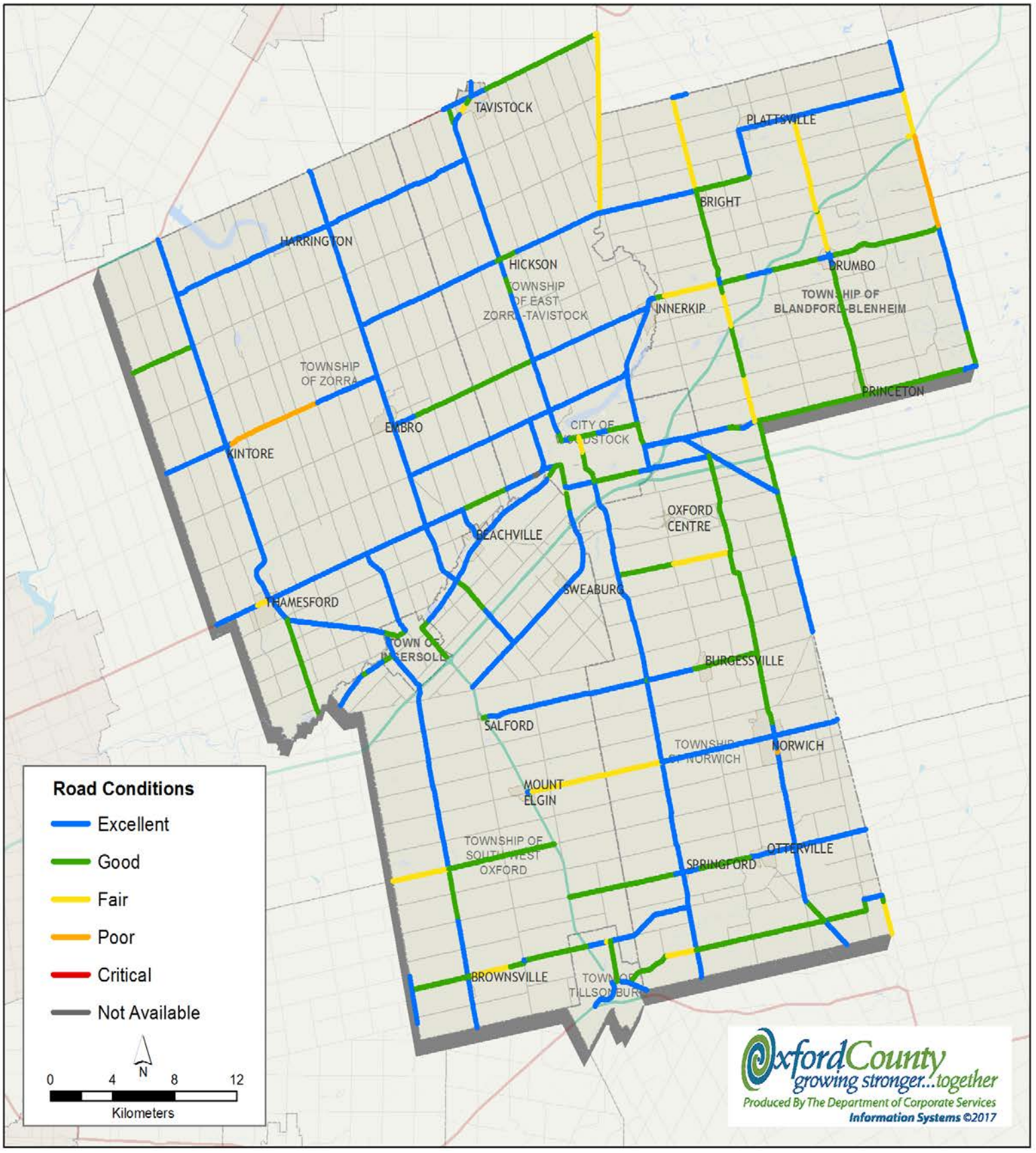
Phase 3 of the regulation, with implementation January 1, 2022, would require the financial strategy to include, for a ten year period, estimated capital expenditures and significant operating costs, including energy costs related to lifecycle activities, revenue dedicated to capital financing, estimated capital reserve contributions and withdrawals and estimated debt service payments. With the exception of significant operating costs and energy costs the County already reviews this information as part of the financing strategy (section 5) of each report card.

Forming part of the 'significant operating costs' are the adminstrative costs directly related to generating the framework and maintaining the AMP, however without the commitment and expertise afforded to this work, the lifecycles costs and service levels would not be controllable.

# Road Network



STATUS:
**Excellent**


TAVISTOCK
PLATTSVILLE
BRIGHT
HARRINGTON
HICKSON
DRUMBO
INNERKIP
TOWNSHIP OF BLANDFORD-BLENHEIM
TOWNSHIP OF ZORRA
PRINCETON
EMBRO
KINTORE
OXFORD CENTRE
BEACHVILLE
SWEABURG
THAMESFORD
BURGESSVILLE
SALFORD
NORWICH
MOUNT ELGIN
OTTERVILLE
SPRINGFORD
BROWNSVILLE
Road Conditions
Excellent
Good
Fair
Poor
Critical
Not Available
N
0
4
8
12
Kilometers
OxfordCounty
growing stronger...together
Produced By The Department of Corporate Services
Information Systems ©2017

## 1.0 Introduction

The County's road network can be categorized into five components. They are rural roads, semi-urban roads, urban roads, guide rails and traffic signals. County roads are primarily transportation corridors and are designed to provide continuous efficient movement of traffic as part of the overall transportation network.

### 1.1 Improvement Plan

The overall condition of the County's road network is rated excellent with an overall score of 80. It is anticipated that the condition rating will remain relatively steady in the short-term (next five years), as a result of the County's plan to continue with the annual taxation increase.

| | Positive Impacts on Rating |
|---|---|
| 1. | Continued increase in annual taxation funding to help close the gap. |
| 2. | Update the 2009 Transportation Master Plan (TMP) in 2017/2018 to identify the transportation needs of the community as it continues to grow and evolve. |
| 3. | Allocation of interest to capital reserves. |
| 4. | Annual allotment of Federal Gas Tax funding. |
| | **Negative Impacts on Rating** |
| 1. | Reliance on Federal Gas Tax funding to support the capital program. |
| 2. | Demand for corridor space to accommodate active transportation and utilities. |
| 3. | Whole asset approach that includes underground infrastructure needs when planning annual maintenance. |
| 4. | Increased public expectations for higher levels of service. |

The following recommendations are based on the review of current management practices; and, inventory, valuation and condition analysis.

| | Recommendations |
|---|---|
| 1. | Establish and monitor appropriate and measurable levels of service and performance measures. |
| 2. | Continue annual taxation increase of at least $500,000 for road upgrades. |

| | |
|---|---|
| 3. | Collaborate with neighbouring municipalities to gain efficiencies by optimizing investment priorities of shared linear assets. |
| 4. | Review and update condition information and replacement costs on an annual basis to help inform the budget process. |
| 5. | Embrace emerging technologies and techniques to extend pavement surface life. |
| 6. | Embrace emerging technologies and techniques for obtaining updated Pavement Condition Index (PCI) information on an ongoing / annual basis. |
| 7. | Align roads segments to where they are on their lifecycle and recalculate funding requirements. |
| 8. | Evaluate condition assessment methods for traffic signals and guide rails. |
| 9. | Establish target PCI level of service. |
| 10. | Update the 2009 Transportation Master Plan in 2017/2018 to identify the transportation needs of the community as it continues to grow and evolve. |

The road segments rated as poor are listed below along with the maintenance strategy for each.

| Street | Location | Condition | Maintenance Strategy |
|---|---|---|---|
| Stover St S, Norwich | Robson St to Jerdon St | 30.1 | Under construction at the end of 2016 with completion in 2017 |
| Trussler Road | Road 29 to the 401 | 38.9 | Construction planned for 2017 |
| Road 84 | East Limit of Kintore to 31st Line | 38.8 | Construction planned for 2018/2019 |

## 2.0 State of Infrastructure

### 2.1 Inventory

In the 2014 Asset Management Plan, the replacement costs for traffic signals were included as part of the road segment. As the lifecycle and maintenance requirements for traffic signals are different from that of road segments they are now being shown as a separate component of the County's road network.

Starting in 2016, guide rails are listed as a separate component as they also have a different useful life and maintenance strategy. These are the guide rails along the roads where there is no bridge or culvert present. As previously installed guide rails are replaced, they will be added as separate components so that they can be planned for accordingly.

Table 2.1.1 – Road Network Inventory

| Asset Type | Asset Component | Current Inventory[3] | 2014 Inventory |
|---|---|---|---|
| **Road Network** | Rural | 548.35 km | 545.77 km |
| | Semi-Urban | 31.21 km | 27.06 km |
| | Urban | 64.20 km | 67.84 km |
| | Guide Rails | 808.00 m | N/A |
| | Traffic Signals[4] | 37 Intersections | 35 Intersections |

### 2.2 Valuation

#### Replacement Cost Valuation

In order to take into account the varying road surface and base widths, the 2016 replacement costs were determined based on square meter. This results in a more accurate estimate of the total replacement cost of the road network. The estimated replacement cost of the County's entire road network in 2016 dollars is $763.6 million. This results in an estimated replacement cost per household of $16,656 which is greater than the 2014 estimated replacement cost per household of $5,760.

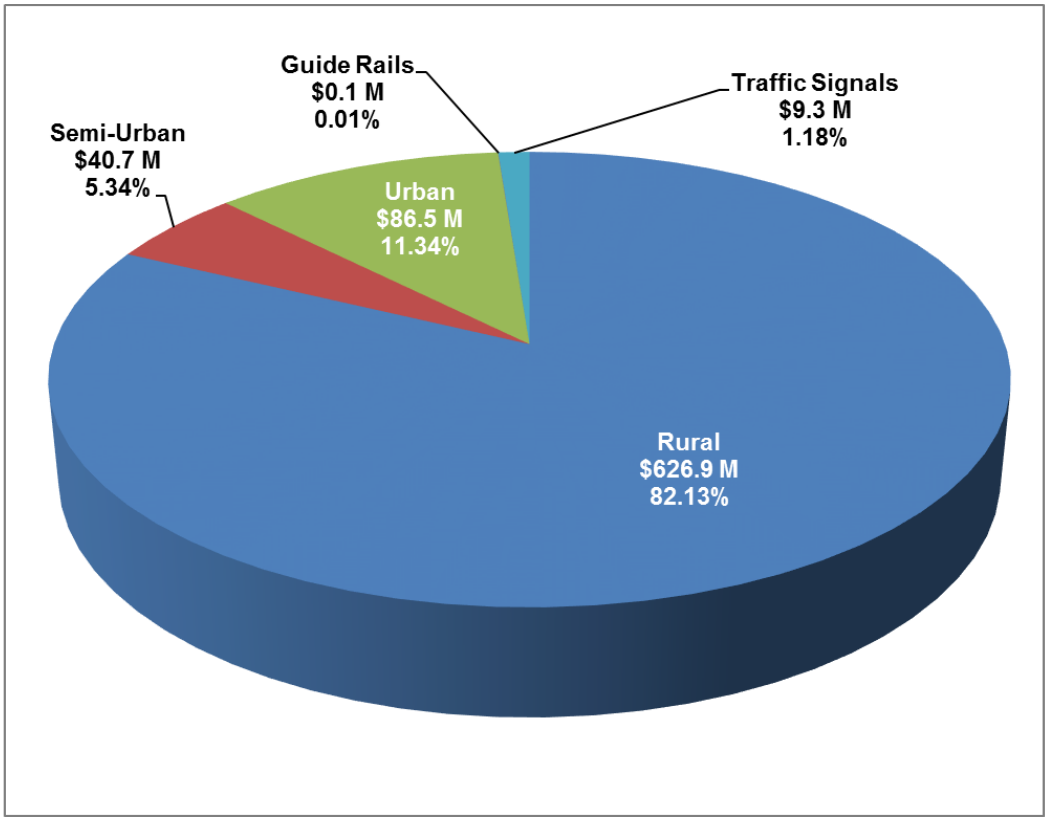
Table 2.2.1 – Road Network Replacement Valuation

| Asset Component | Sub-component | Unit Replacement Cost | Replacement Cost | % of Total Value |
|---|---|---|---|---|
| Rural | HCB and LCB | $82/m$^2$ | $626,948,900 | 82.11% |
| Semi-Urban | HCB | $98/m$^2$ | $40,744,600 | 5.34% |
| Urban | HCB | $107/m$^2$ | $86,546,300 | 11.33% |
| Guide Rails | Beam | $325/m | $87,100 | 0.01% |

[3] Source: 2015 Road needs Study, authored by R.J. Burnside & Associates Limited, August 2016 and the County's Capital Asset Inventory.
[4] Traffic Signals and Guide Rails were not assessed separately in the 2014 AMP.

| Asset Component | Sub-component | Unit Replacement Cost | Replacement Cost | % of Total Value |
|---|---|---|---|---|
| | Cable | $100/m | | |
| Traffic Signals | Intersection | $250,000 each | $9,250,000 | 1.21% |
| **Total Replacement Cost** | | | **$763,576,900** | **100%** |

| | |
|---|---|
| **Replacement Cost Per Household** | **$16,656** |

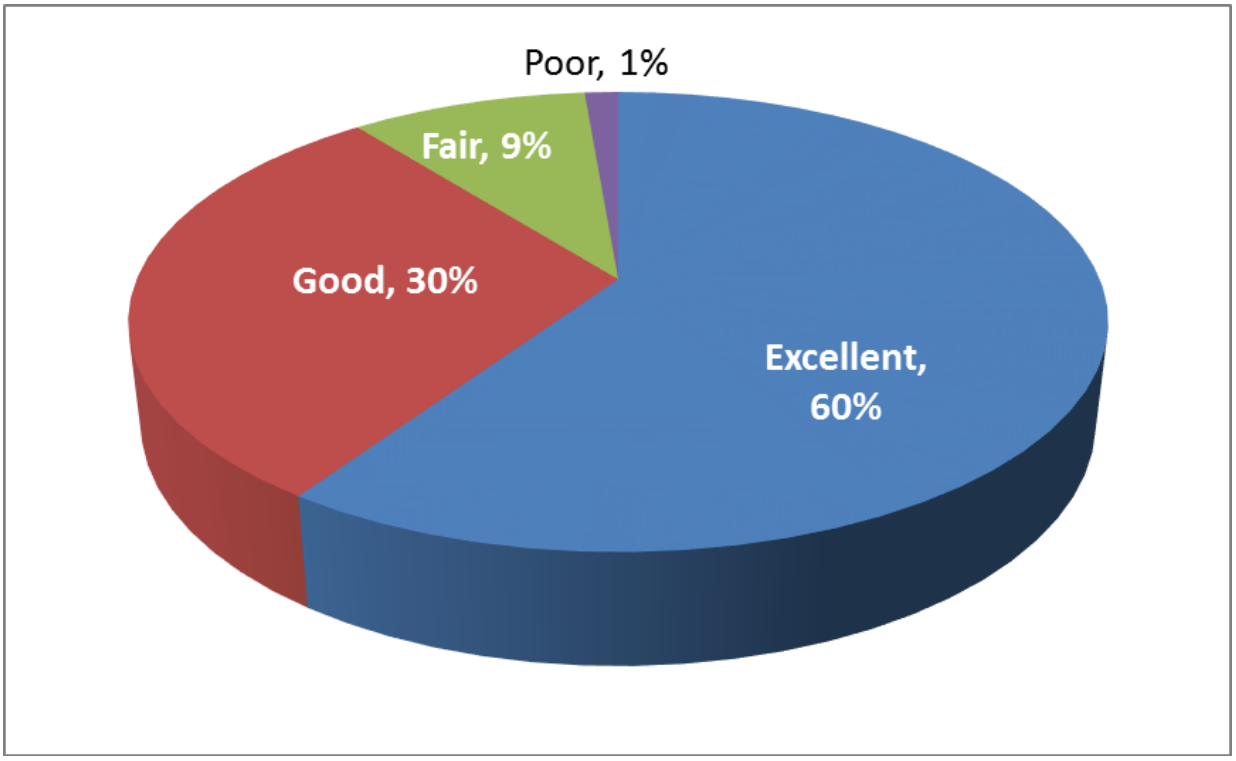



## 2.3 Asset Condition Assessment

The chart below compares the status of our road network as identified in our 2014 AMP to the status at the end of 2016. The trend shows that the overall condition of the road network is steady (➔) to increasing (🡅).

Table 2.3.1 Road Network Condition Assessment

| Asset Component | 2014 Condition Rating | 2016 Condition Rating | Trend |
|---|---|---|---|
| Rural | Good | Good | ➔ |
| Semi-Urban | Good | Excellent | 🡅 |
| Urban | Good | Excellent | 🡅 |
| Guide Rails | N/A | Excellent | N/A |
| Traffic Signals | N/A | Good | N/A |




### 2.4 Assessment Approach

The state of the urban, semi-urban and rural roads infrastructure is determined based on the Pavement Condition Index (PCI). The PCI is calculated from the Ride Comfort Rating (RCR) and the Distress Manifestation Index (DMI).

The Ministry of Transportation developed a formula to determine the cumulative impacts of the various surface distresses, in order to determine the DMI for each road section. The higher the calculated DMI the better overall condition of the road surface.

The Ride Comfort Rating is a qualitative visual assessment with values based on the below chart:

| Ride Condition | RCR Rating | Description |
|---|---|---|
| Excellent | 8 to 10 | Smooth and pleasant |
| Good | 6 to 8 | Comfortable |
| Fair | 4 to 6 | Uncomfortable |
| Poor | 2 to 4 | Very rough and bumpy |
| Very Poor | 0 to 2 | Dangerous at 80km/h |

The PCI tells us what the current condition of the road segment is and can help determine the rate of deterioration of that segment by comparing PCI values over time. It helps to identify immediate maintenance and rehabilitation requirements as well as provide a base for establishing a long term maintenance strategy. The chart below summarizes the PCI values and how they relate to the overall quality of the road segment.

| PCI Value | Rating |
|---|---|
| 80-100 | Excellent |
| 60-79 | Good |
| 40-59 | Fair |
| 20-39 | Poor |
| 0-19 | Critical |

The County conducts a Roads Needs Study every five years to provide an overview of the condition of the various road sections. The condition information utilized for the road segments is based on the 2015 Roads Needs Study by R.J. Burnside & Associates Limited, finalized December 2016. Conditions have been adjusted for road sections that have had work completed since being evaluated in the 2015 study. The 2015 Roads Needs Study assessed the condition of the road surface only. The road base was assumed to have a similar structural condition. The 2020 Roads Needs Study is expected to assess separately the surface condition and the structural integrity of the base.

The state of traffic signals was determined based on visual inspection by County Public Works staff. The County will investigate the potential of having the traffic signal maintenance contractor complete a condition worksheet during their annual maintenance inspections. The County will also reach out to comparable municipalities on how they evaluate the condition of their traffic signals.

As 2016 is the first year the County is showing the guide rails as a separate component, the approach to assessing their condition has not yet been determined. The County will investigate what the best method is, however it is anticipated that a similar evaluation process will occur as with the guide rails on bridge structures.

### 2.5 Useful Life

The useful life of the road network will vary by component and the overall life is significantly impacted by the maintenance strategies. The County has developed various maintenance strategies depending on the asset component and type of surface (High-Class Bituminous [HCB] or Low-Class Bituminous [LCB]). These strategies align with the Roads Needs Study and Transportation Master Plan (TMP) and are maintained within an asset profile which informs the annual requirements for the capital plan.

Table 2.5.1 outlines the anticipated useful life for each new build/replacement, along with the anticipated added life for each type of maintenance strategy. These lives are used for PSAB purposes and align with the County's capital asset policy.

While the Mill + 1 HMA and Mill + 2 HMA maintenance strategies carry the same anticipated added life, the Mill + 2 HMA strategy is only anticipated to be applied when the cracks in the asphalt base would just reflect up through the 1HMA. Updating conditions prior to budget process will help determine what strategy would be most effective.

Based on the anticipated lives and maintenance strategies above, Table 2.5.1 also indicates the anticipated useful life over the lifecycle of each component. Full replacement is anticipated at the end of the life defined. Weather factors and actual traffic flow will also have an effect on the actual life achieved. It is possible to have segments exceed the lives defined as well as segments that require replacement prior to the end of their anticipated life.

Table 2.5.1 Useful Life

| Roads Network | Anticipated Useful Life (years) | Anticipated Lifecycle Life (years) |
|---|---|---|
| New Build / Replacement | | |
| Guide Rails - Beam | 30 | 30 |
| Guide Rails - Cable | 30 | 30 |
| Traffic Signals - Controller & Detection | 15 | 15 |
| Traffic Signals - Signal | 30 | 30 |
| Rural - HCB Surface | 25 | 130 |
| Rural - HCB Base | 75 | 130 |
| Rural - LCB Surface | 25 | 45 |
| Rural - LCB Base | 75 | 150 |
| Semi-Urban - Surface | 25 | 95 |
| Semi-Urban - Base | 75 | 130 |
| Urban - Surface | 25 | 90 |
| Urban - Base | 90 | 90 |
| Maintenance Strategy | | |
| Crack Sealing | 3 | N/A |
| Bonded Wearing Course | 7 | N/A |
| Fibremat Reinforced Chip Seal | 7 | N/A |
| Full Depth Reclamation + 1 HMA | 20 | N/A |
| Mill + 1 HMA | 20 | N/A |
| Mill + 2 HMA | 20 | N/A |
| Full Depth Reclamation + 2 HMA | 20 | N/A |

## 3.0 Level of Service

County roads are primarily transportation corridors and are designed to provide continuous efficient movement of traffic as part of the overall transportation network. Determining the correct service level is influenced by traffic volume, including volume of large transportation vehicles, preferences for maintenance routes to achieve plow efficiency, and resident preferences (their belief that the road network meets their needs and expected condition). The Transportation Master Plan (TMP) is based on the principal that County roads should provide relatively good connectivity and a good level of roadway service through the County. The County will determine the target PCI for the next AMP update.

### Corporate Objective

The corporate objective of the road maintenance and traffic management service is to ensure people and goods are able to move safely and efficiently throughout Oxford County. The roads inventory includes a number of border roads with other municipalities, where Oxford County and the bordering municipality share in the maintenance of these roads. Service Agreements are in place to ensure that service levels are maintained.

### Legislative Requirements

Ontario Regulation 239/02[5] specifies the Maintenance Standards for Municipal Highways. It covers such items as, but not limited to, patrolling frequency, snow accumulation, potholes, and regulatory/warning signs and traffic signals. The level of service provided by Oxford County for winter maintenance meets the level required by Ontario Regulation 239/02. Oxford County has also elected to maintain Class 3 and below roads at a level that is equal to the requirements for Class 3 roads.

### Performance Measures

Table 3.0.1 lists performance measures that the County is currently recording and reporting on. It is important to note that metrics based on operating costs can be highly variable as a result of the number and severity of winter events in a year. For this reason, the County chooses to report the portion of operating expenses used on winter maintenance activities.

#### Table 3.0.1 Performance Measures

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Paved (hard top) road maintenance costs | Operating costs for roads per lane kilometre | Efficient paved road maintenance services | $7,096 | $7,994 | $7,746 |

[5] https://www.ontario.ca/laws/regulation/020239

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Winter maintenance costs | Percentage of winter maintenance costs of overall operating costs | Efficient winter maintenance services | 23.5% | 16.1% | 17.7% |
| Adequacy of paved roads (as a %) | Percentage of paved lane kilometres where the condition is rated as good to excellent | Effective paved road maintenance services | 79.6% | 79.5% | 79.5% |
| Total paved lane km | Total number of paved lane kilometres maintained | Quantity of paved roads | 1,273 | 1,271 | 1,271 |
| Restored road capital | Kilometres of repaved or new roadway | Quantity of road revitalized | 32.9 | 42.3 | 71.4 |

The below images provide illustrations on how the road conditions relate to their PCI.

Image 4.0.1 Rural Road with a PCI of 92.9 (Excellent)

Image 4.0.2 Rural Road with a PCI of 73.7 (Good)

Image 4.0.3 Urban Road with a PCI of 49.5 (Fair)

## 4.0 Asset Management Strategy

### 4.1 Lifecycle Activities and Planned Actions

To cost effectively maintain the road network at the established service levels they require the appropriate maintenance or rehabilitation strategy applied throughout an asset's lifecycle. There are five maintenance strategies considered in the overall sustainable management of road segments, described in Table 4.1.1 below. While guide rails have an established useful life their maintenance strategy is largely dependent on if they have received damage from vehicular incidents. The maintenance strategy for traffic signals includes minor maintenance followed by end of life replacement.

Table 4.1.1 Lifecycle Activities

| Strategy | Lifecycle Activity | Trigger |
|---|---|---|
| Minor maintenance | Regularly scheduled maintenance and inspection programs including conditions assessments, pothole repairs and cleaning catch basins. These activities do not increase the overall condition of the road segment, nor increase its useful service life. | Ongoing |
| Routine Maintenance | Planned routine maintenance includes crack seal, slurry seal or micro-surface activities which increase the condition of the road segment and extend its useful service life. | PCI => 85 |
| Preventive maintenance | Planned activities such as patching sections of road (mill and re-pave a portion of the surface) and repairing major damage/defects caused by traffic mishaps or environmental impacts. These activities increase the condition of the road segment and extend the useful service life. | PCI = 65-85 |
| Rehabilitation | Events that increase the condition of and extend the life of the asset, including surface grinding and full depth asphalt removal/repaving. | PCI = 45-65 |
| Replacement | Occurs at the end of the useful service life – complete replacement of road base, curbs, culverts, gutters and surface. This treatment activity is also required if there have been changes to the expectations of a road segment, including increased traffic volumes (heavy equipment), or road widening. | PCI <= 45 |

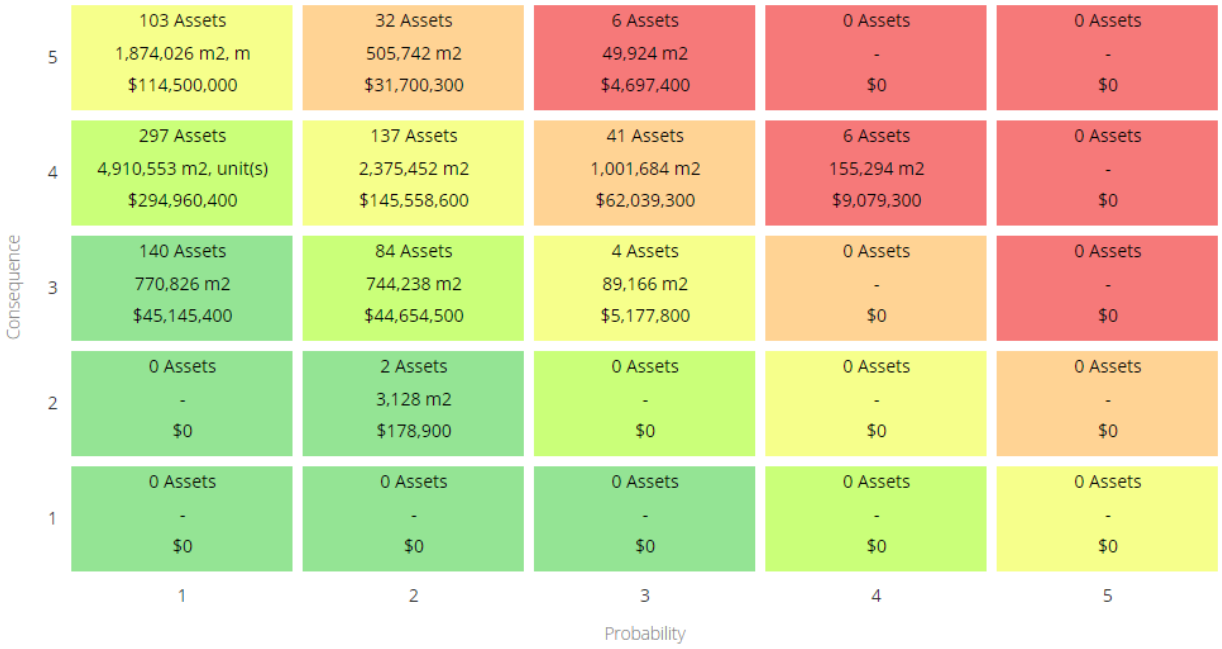
### 4.2 Risks Associated with the Strategy

The County uses the highway classification to determine the consequence of failure. The higher the classification, the greater the consequence if the road segment deteriorates to the point where it is no longer drivable. The highway classification is used as it takes into account the speed limit on the road segment and the average daily traffic volume.

Table 4.2.1 Consequence of failure

| Scoring | Consequence | Highway Classification |
|---|---|---|
| 1 | Minimal | 6 |
| 2 | Marginal | 5 |
| 3 | Serious | 4 |
| 4 | Critical | 3 |
| 5 | Catastrophic | 1,2 |

Table 4.2.2 Asset risk profile




As the County's roadways are generally transportation hubs they carry a higher consequence of failure as illustrated in Table 4.2.2. Focus will be given to those assets with high consequence and high probability throughout the annual budget process.

## 4.3 Lifecycle Analysis

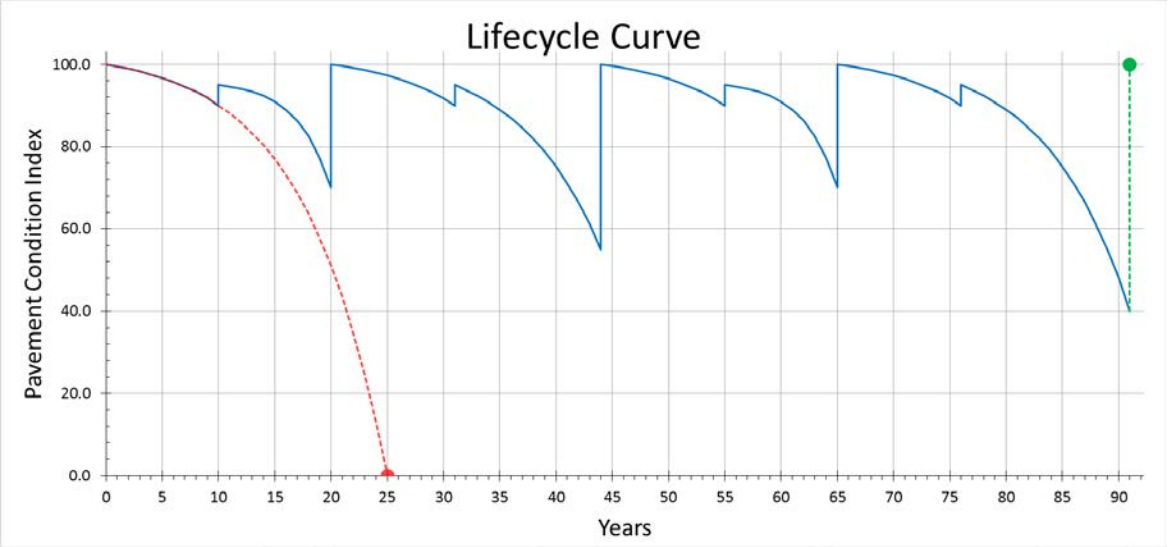
The County's Transportation Master Plan (TMP) has developed strategies and guidelines for managing the County's transportation network. The TMP recognizes existing and future mobility and development issues confronting County residents in order to preserve the quality of life supported by an effective transportation network.

Determining if a road segment should be rural, semi-urban or urban can have significant impacts to the lifecycle costs associated with maintaining the assets at those levels. The County determines the desired asset component based on the MTO defined characteristics (outlined in the TMP).

There are a number of factors that will also influence when maintenance is completed. These include the maintenance requirements of any below ground infrastructure such as water and wastewater infrastructure. A failure of these below ground assets could require rehabilitation or replacement of the road regardless of the roads current state. The County reviews all infrastructure within the vicinity prior to planning construction projects. This review also includes working with area and neighbouring municipalities, as appropriate. This helps to minimize the disruption to Oxford County residents along with minimizing the overall costs for completing the asset updates, regardless of whether the asset is County owned.

Referring to the maintenance strategies in section 2.5, table 4.3.1 illustrates the anticipated lifecycle for urban surface segments. As you can see, if no maintenance strategies were applied to an urban surface, it is anticipated it would reach complete failure around 25 years. By applying several crack sealing and resurfacing strategies, the life of the urban surface is extended to approximately 90 years, which aligns with the lifespan of underground infrastructure.

Table 4.3.1 Lifecycle Curve




The average annual requirement for urban road segments using a straight replacement strategy is approximately $2.03 million. When taking the maintenance strategies into consideration the average annual requirement for urban road segments is reduced to approximately $1.7 million.

## 5.0 Financing Strategy

### 5.1 Financing Strategy

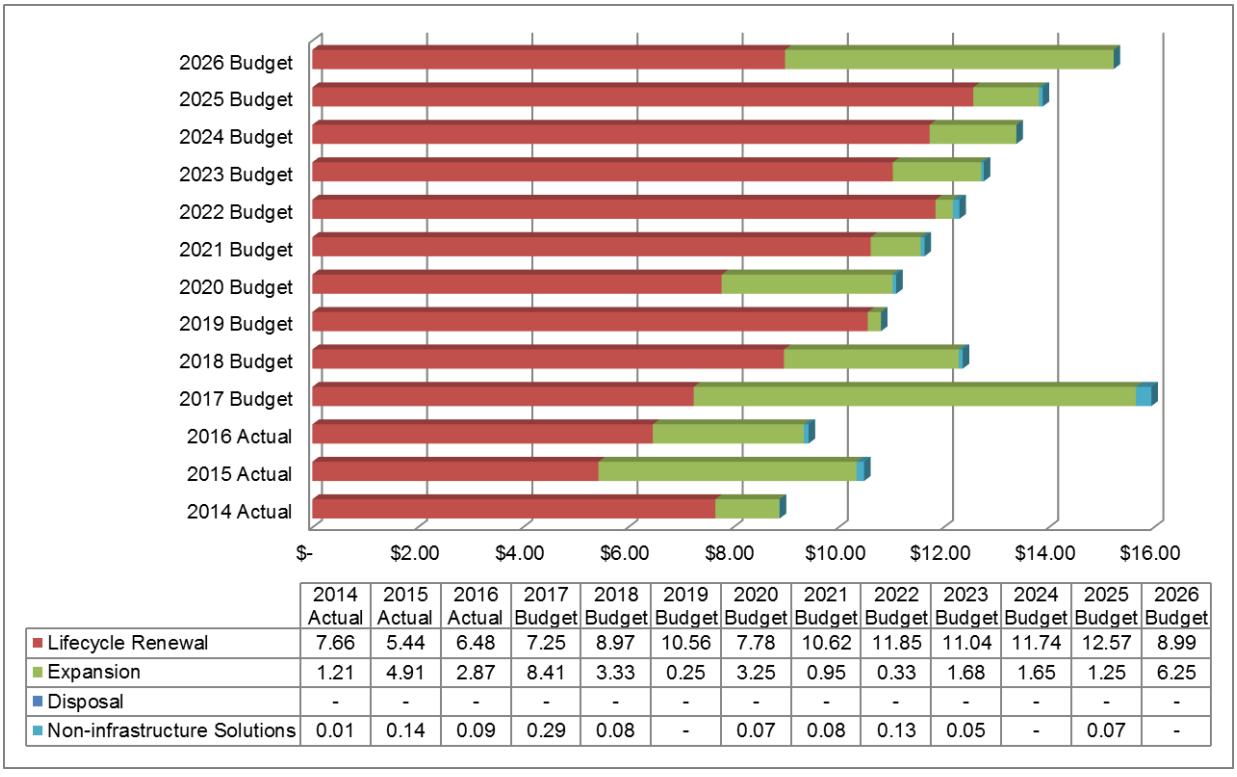
Of the five maintenance strategies considered, minor maintenance is part of the operating budget, while all other activities are considered part of the capital budget.

Where possible replacement activities for the roads network are planned in conjunction with the replacement needs for water and wastewater infrastructure in order to minimize the construction impact on residents, and to provide a cost effective approach to maintaining the County's assets.

Capital investments for the roads network are currently funded by levy supported dedicated reserves, Federal Gas Tax, development charges (for growth projects) and levy contributions. While debentures are not currently used to fund roads projects, the funding option is available in times of high replacement requirements and low reserve balances. The Ontario Community Infrastructure Fund (OCIF), a provincial funding program, also provides funds available for roads projects, although to date, the County has invested all of its OCIF funds in bridge and culvert replacement needs.

### 5.2 Expenditure History and Forecasts

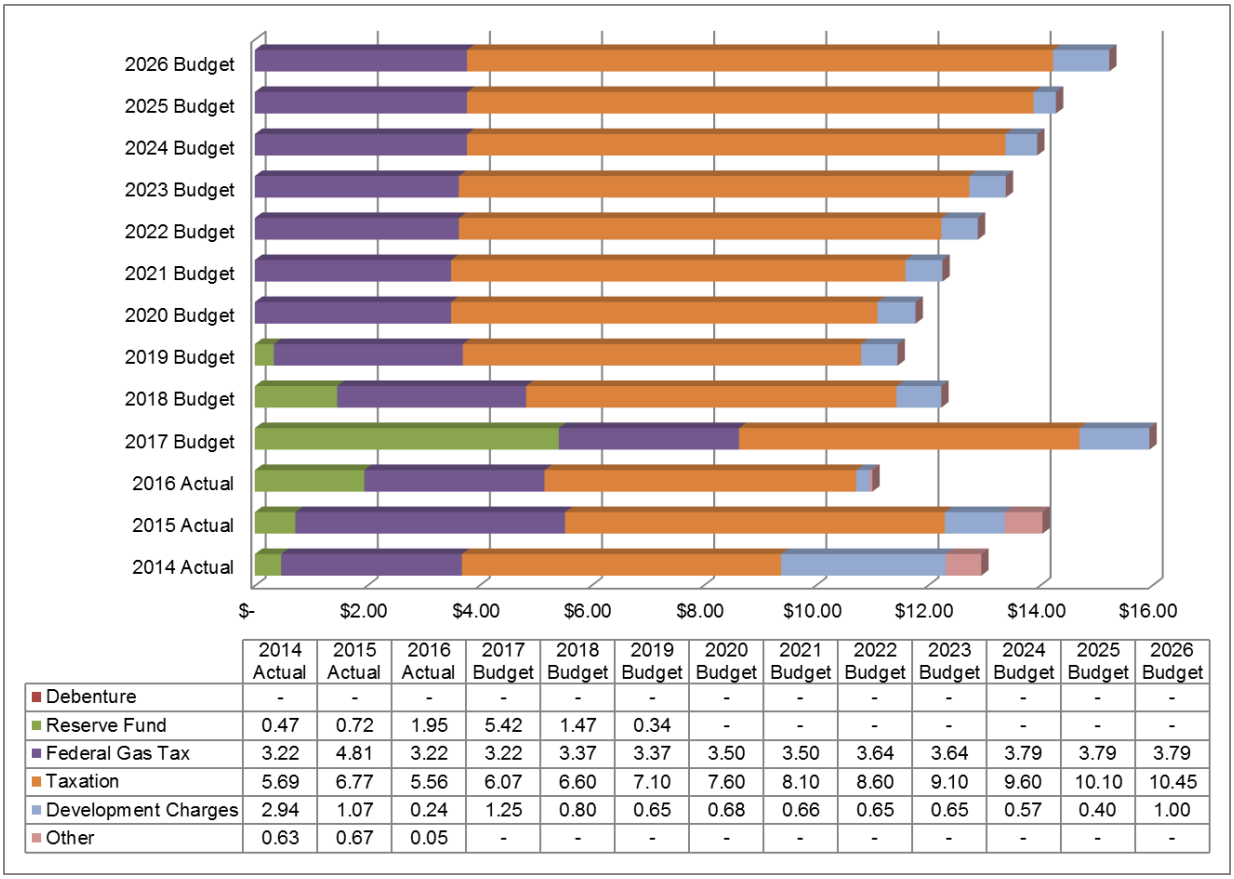
Chart 5.2.1 Expenditures (millions)




| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lifecycle Renewal | 7.66 | 5.44 | 6.48 | 7.25 | 8.97 | 10.56 | 7.78 | 10.62 | 11.85 | 11.04 | 11.74 | 12.57 | 8.99 |
| Expansion | 1.21 | 4.91 | 2.87 | 8.41 | 3.33 | 0.25 | 3.25 | 0.95 | 0.33 | 1.68 | 1.65 | 1.25 | 6.25 |
| Disposal | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Non-infrastructure Solutions | 0.01 | 0.14 | 0.09 | 0.29 | 0.08 | - | 0.07 | 0.08 | 0.13 | 0.05 | - | 0.07 | - |

## 5.3 Capital Revenues

Chart 5.3.1 Sources of Capital Revenues 2014-2026 (millions)

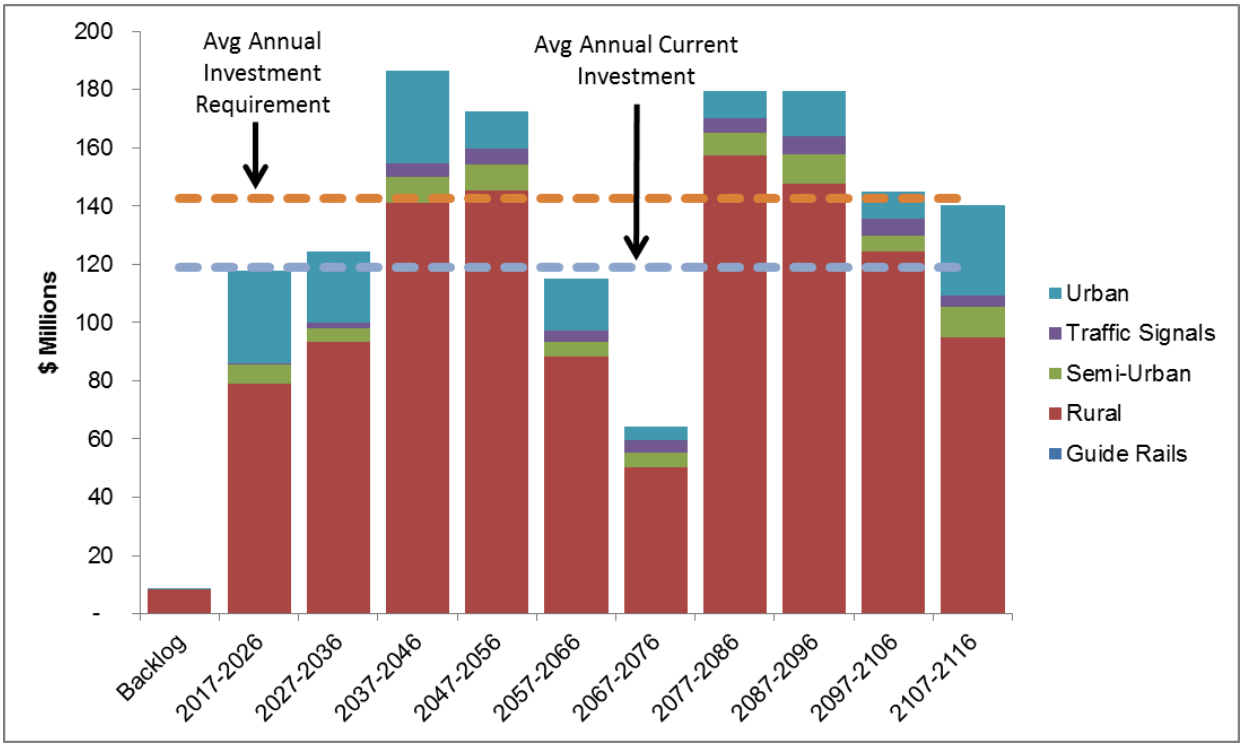



| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Debenture | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Reserve Fund | 0.47 | 0.72 | 1.95 | 5.42 | 1.47 | 0.34 | - | - | - | - | - | - | - |
| Federal Gas Tax | 3.22 | 4.81 | 3.22 | 3.22 | 3.37 | 3.37 | 3.50 | 3.50 | 3.64 | 3.64 | 3.79 | 3.79 | 3.79 |
| Taxation | 5.69 | 6.77 | 5.56 | 6.07 | 6.60 | 7.10 | 7.60 | 8.10 | 8.60 | 9.10 | 9.60 | 10.10 | 10.45 |
| Development Charges | 2.94 | 1.07 | 0.24 | 1.25 | 0.80 | 0.65 | 0.68 | 0.66 | 0.65 | 0.65 | 0.57 | 0.40 | 1.00 |
| Other | 0.63 | 0.67 | 0.05 | - | - | - | - | - | - | - | - | - | - |

## 5.4 Capital Investment

Using the asset profiles established, the asset's financial requirements are determined. As we have not reconciled each segment to their position on the lifecycle, the financial requirements are currently based on the default strategy. The default strategy assumes the next scheduled activity is replacement with subsequent iterations based on the established lifecycle. As mentioned in section 4.3, the County will be reviewing individual assets to confirm their position on the strategy timeline which will establish more refined financial requirements.

The financial requirements presented below are in 2016 dollars. These estimates assume that all work will be completed as indicated and does not take into account future changes due to environmental factors, new maintenance techniques, and additional growth.




The average annual investment requirement represents the amount of funding sources that should be received on an annual basis to smooth out the taxation impacts to the taxpayer. Where the funding sources are greater than the work planned for the year the amount is contributed to the roads reserve, and where the capital expenditures exceed the annual funding the roads reserve is used. As the current modeling does not include growth related projects, development charges are not included.

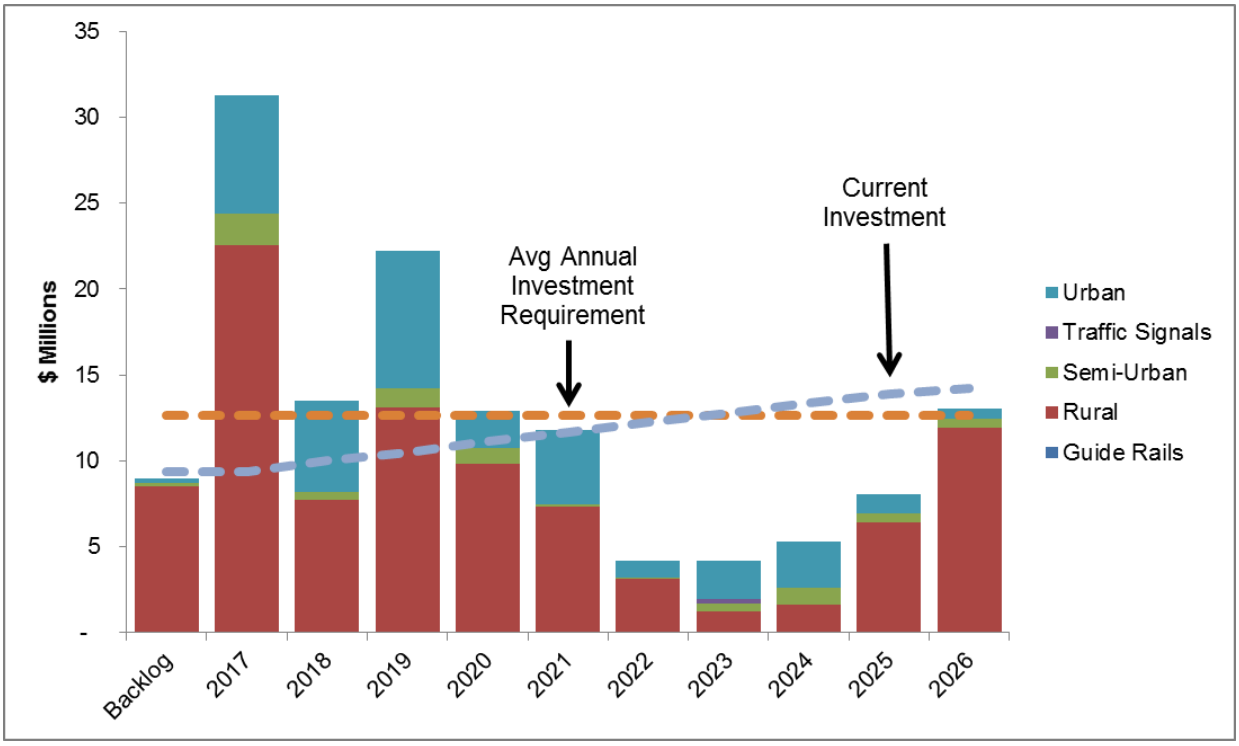
The chart below illustrates actual funding received for 2014 through 2016 as well as the budgeted funding from 2017 and projected funding expected through 2021 as per the 2017 approved budget.

| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget |
|---|---|---|---|---|---|---|---|---|
| **Funding Sources** | | | | | | | | |
| Gas Tax | 3,145,349 | 3,061,137 | 3,214,194 | 3,215,000 | 3,370,000 | 3,370,000 | 3,500,000 | 3,500,000 |
| Gas Tax Interest | 24,526 | 20,464 | 684 | 687 | 678 | 650 | 640 | 649 |
| Reserve Interest | | | 109,453 | 65,229 | 21,191 | 12,466 | 14,264 | 23,255 |
| Taxation | 5,692,000 | 6,774,000 | 5,562,000 | 6,074,000 | 6,604,000 | 7,104,000 | 7,604,000 | 8,104,000 |
| | **8,861,875** | **9,855,601** | **8,886,331** | **9,354,916** | **9,995,869** | **10,487,116** | **11,118,904** | **11,627,904** |
| Avg Annual Investment Required | **10,350,000** | **10,350,000** | **10,350,000** | **14,300,000** | **14,300,000** | **14,300,000** | **14,300,000** | **14,300,000** |
| *Surplus (Deficit)* | *(1,488,125)* | *(494,399)* | *(1,463,669)* | *(4,945,084)* | *(4,304,131)* | *(3,812,884)* | *(3,181,096)* | *(2,672,096)* |
| Roads Reserve Balance | 5,775,767 | 8,613,198 | 7,711,520 | 2,214,475 | 1,343,329 | 918,494 | 1,616,948 | 2,264,975 |

As illustrated, the funding is currently in a deficit position, however that deficit is shrinking as the County continues to bolster its capital investments through taxation increases over the next several years. The deficit also puts pressure on the County's ability to complete the maintenance activities outlined in the asset management strategy. The County is also highly dependent on the receipt of Federal Gas Tax funds in order to complete the lifecycle activities

on the road network. Significant changes to the funding level could have a serious impact on the County's management strategy.

If we look at the next 10 year period, using a 1.5% inflation rate we can see from the requirements chart below that there is a significant amount of capital work to be completed within the next 5 years.




The 10 year outlook has a sustainable funding level of 12.6 million, which is below the 100 year outlook of 14.3 million suggesting that the lifecycle activity requirements are greater beyond the 10 year period. The County will continue to review the balance between needs as determined based on the asset management strategy, and available funding with each budget cycle.

# Bridges & Culverts

STATUS:
**Good**

## 1.0 Introduction

Similar to County roads, the bridges and culverts network helps provide continuous efficient movement of traffic as part of the overall transportation network.

The bridges and culverts network is categorized into three components, as a result of differing life spans and maintenance strategies. They are bridges, culverts with a span of 3 meters or greater (culverts with spans less than 3 meters are included in the cost of the road base), and guide rails related to the bridge or culvert structure, or to the approach.

### 1.1 Improvement Plan

The overall condition of the County's bridges and culverts is rated as good. Based on current management practices, and the uncertainty regarding continued OCIF funding, it is anticipated that the condition rating will decline due to calculated investment requirements, capacity deficiencies to deliver the required work and the inability to fund those requirements in the short-term (next five to ten years).

| | Positive Impacts on Rating |
|---|---|
| 1. | Receipt of OCIF funds in 2015 through 2019 to help complete maintenance activities. |
| 2. | Allocation of interest to capital reserves. |
| | **Negative Impacts on Rating** |
| 1. | Reliance on OCIF funding to support the capital program. |
| 2. | Increased public expectations for higher levels of service. |
| 3. | Increasing environmental impacts on conditions assessment and seasonal maintenance. |

The following recommendations are based on a review of current management practices; and, inventory, valuation and condition analysis.

| | Recommendations |
|---|---|
| 1. | Continue to monitor new technologies as they emerge to determine when cost effective to be implemented, in order to extend useful lives of structures. |
| 2. | Establish and monitor appropriate and measurable levels of service and performance measures. |

| | |
|---|---|
| 3. | Bi-annually review and update condition information and replacement costs to help inform the budget process. |
| 4. | Collaborate with neighbouring municipalities to align asset management plans to gain efficiencies by optimizing investment priorities of linear assets. |
| 5. | Update the 2009 Transportation Master Plan in 2017/2018 to identify the transportation needs of the community as it continues to grow and evolve. |
| 6. | Establish target Bridge Condition Index (BCI) level of service. |

The structures rated as poor are listed below along with the maintenance strategy for each. As indicated, the BCI value is not an indication of the safety of the structure; further evaluation is completed by the County to determine the structure's safety.

| Component | Location | Condition | Maintenance Strategy |
|---|---|---|---|
| Culvert | 37th Line<br>2.00 km N of 28 - Road 96 | 42.67 | Replacement anticipated within 5 years |
| Culvert | Highway 59<br>1.85 km E of 46 - Salford Road | 48.02 | Replacement anticipated within 5 years |
| Bridge | Highway 59<br>1.25 km N of 40 - Curries Road | 41.82 | Replacement anticipated within 5 years |
| Culvert | Highway 2<br>4.35 km E of 25 - Middle Townline | 48.84 | Replacement anticipated within 5 years |
| Culvert | Road 84<br>0.01 km W of 35th Line | 46.82 | Replacement anticipated within 5 years |
| Culvert | Oxford Road 3<br>6.5 km N of 2 - Highway 2, Princeton | 42.55 | Replacement anticipated within 5 years |

## 2.0 State of Infrastructure:

### 2.1 Inventory

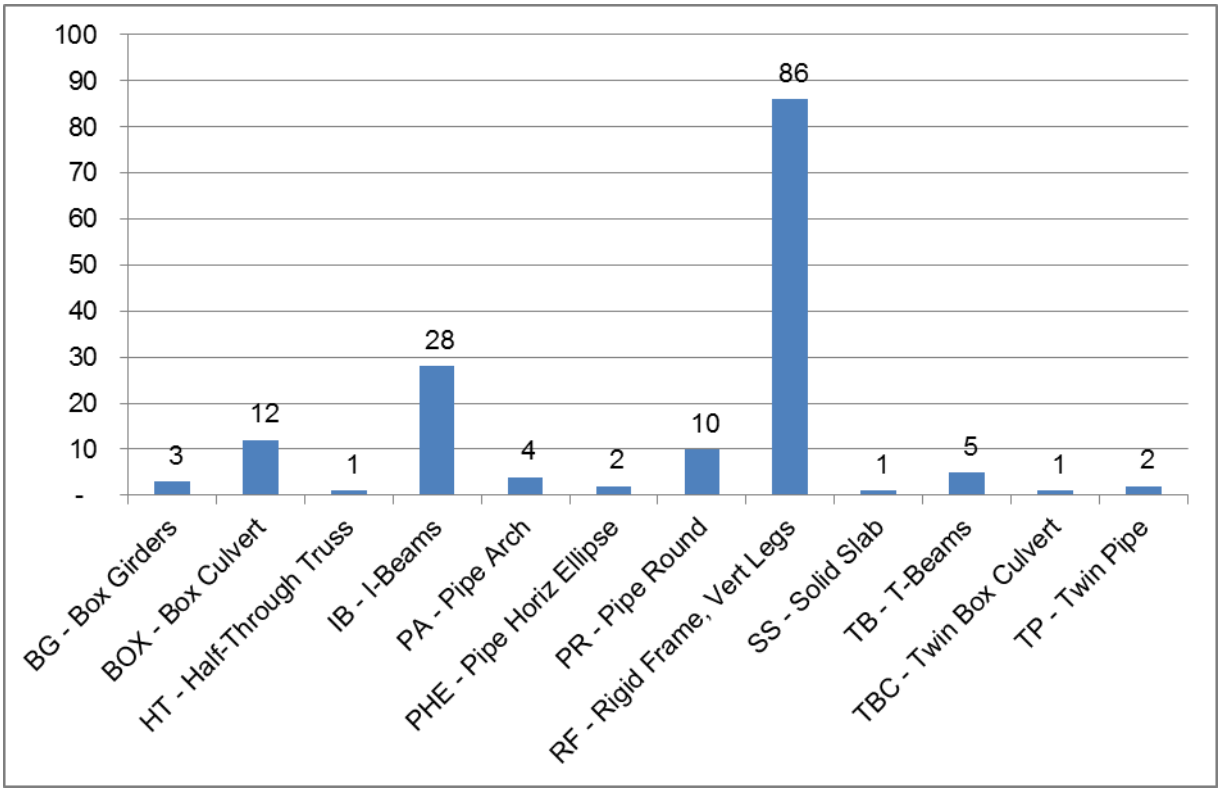
In the 2014 Asset Management Plan guide rails were not listed as a separate component, however given that they have a different lifecycle and maintenance strategy, guide rails are now a separate component. As previously installed guide rails are replaced they will be added as separate components so that they can be planned for accordingly.

Table 2.1.1 – Bridges & Culverts Inventory

| Asset Type | Asset Component | Current Inventory | 2014 Inventory |
|---|---|---|---|
| **Bridges & Culverts** | Bridges | 94 Structures | 94 Structures |
| | Culverts | 61 Structures | 61 Structures |
| | Guide Rails | 1742 m | N/A |

There are several different types of structures that the County has in its inventory. The chart below summarizes the number and types of structures.

Chart 2.1.2 – Types of Bridge & Culvert Structures



## 2.2 Valuation

### Replacement Cost Valuation

Due to the varying structure types and material, the replacement costs are not easily defined as a value per square meter. As a result, replacement costs were provided within the Bridge Needs Study. For guide rails, the cost of end treatments can have a significant impact on the overall cost per meter. As a result the County has defined two cost groups for guide rails in order to achieve more accurate replacement costs.

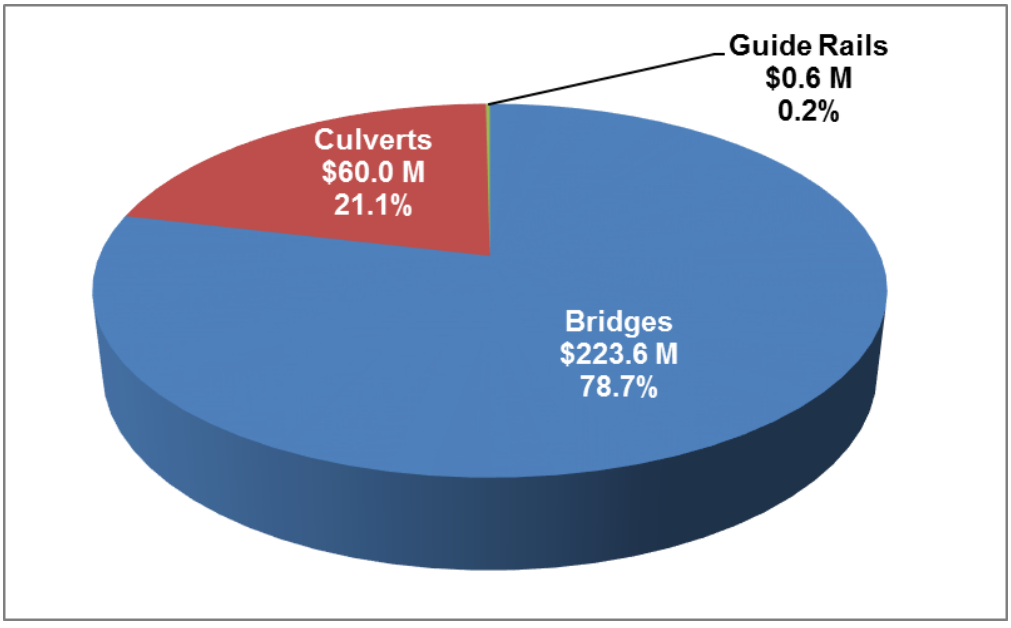
Table 2.2.1 – Bridges and Culverts Replacement Valuation

| Profile | Unit | Cost |
|---|---|---|
| Bridges | As identified in Bridge Needs Study | |
| Culverts | As identified in Bridge Needs Study | |
| Guide Rails - Beam < 100m | m | $400 |
| Guide Rails - Beam > 100m | m | $250 |

The estimated replacement cost of the County's bridges and culverts network in 2016 dollars is $284.2 million. This results in an estimated replacement cost per household of $6,199 which is greater than the 2014 estimated replacement cost per household of $5,658.

| Asset Component | Replacement Cost | % of Total Value |
|---|---|---|
| Bridges | $223,644,000 | 78.7% |
| Culverts | $60,006,000 | 21.1% |
| Guide Rails | $553,552 | 0.2% |
| **Total Replacement Cost** | **$284,203,552** | **100%** |

| | |
|---|---|
| **Replacement Cost Per Household** | **$6,199** |

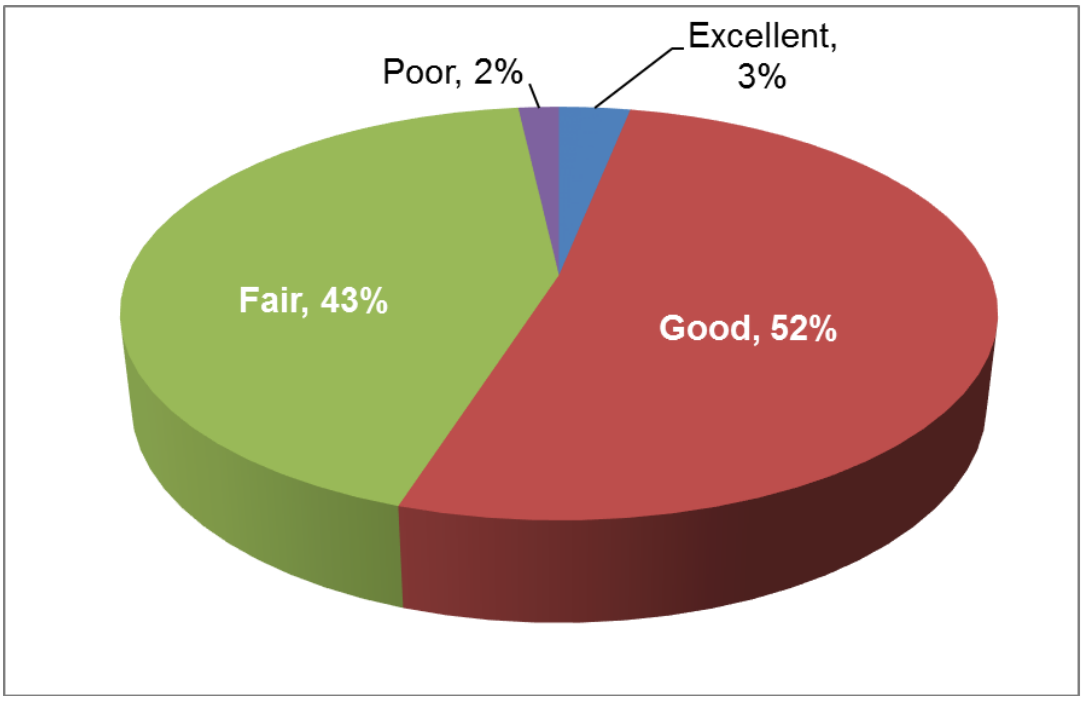


### 2.3 Asset Condition Assessment

The chart below compares the status of our bridges and culverts network as identified in our 2014 Asset Management Plan to their status at the end of 2016. Conditions have been adjusted for bridges and culverts that have had work completed since being evaluated in the 2016 study.

Table 2.3.1 Bridges and Culverts Condition Assessment

| Asset Component | 2014 Condition Rating[6] | 2016 Condition Rating[7] | Trend |
|---|---|---|---|
| Bridges | Good | Good | ➔ |
| Culverts | Good | Good | ➔ |
| Guide Rails | N/A | Excellent | N/A |




### 2.4 Assessment Approach

The Bridge Needs Study is required to be carried out every two years to comply with the Public Transportation and Highway Improvement Act and the Ontario Regulation 104/97, amended to Ontario Regulation 160/02. The structure inspections are to be performed under the direction of a professional engineer. The study evaluates the structural and serviceability of individual elements and recommends required improvements. The Ministry of Transportation has developed an Ontario Structure Inspection Manual (OSIM), which is used to complete the inspections.

The OSIM has specified condition states for each material type and where required, for specialized elements. However, the general philosophy is outlined in the table below:

[6] 2012 Municipal Bridge Inspection Report, R.J. Burnside & Associates Limited, March 2013
[7] 2016 Municipal Bridge Inspection Report, R.J. Burnside & Associates Limited, March 2017

| Condition[8] | Characteristics |
|---|---|
| Excellent | This refers to an element (or part of an element) that is in "new" (as constructed) condition. No visible deterioration type defects are present and remedial action is not required.<br><br>Examples:<br>• "bug holes" in concrete barrier walls<br>• well-formed patina in atmospheric corrosion resistant (ACR) steel girders |
| Good | This refers to an element (or part of an element) where the first sign of "Light" (minor) defects are visible. This usually occurs after the structure has been in service for a number of years. These types of defects would not normally trigger any remedial action since the overall performance of the element is not affected.<br><br>Examples:<br>• Light corrosion (no section loss)<br>• Light scaling<br>• Narrow cracks in concrete<br>• Light decay in wood |
| Fair | This refers to an element (or part of an element) where medium defects are visible. These types of defects may trigger a "preventative maintenance" type of remedial action (e.g. sealing, coating, etc.) where it is economical to do so.<br><br>Examples:<br>• Medium corrosion (up to 10% section loss)<br>• Medium cracks in concrete |
| Poor | This refers to an element (or part of an element) where severe and very severe defects are visible. In concrete, any type of spalling or delamination would be considered "poor" since these defects usually indicate more serious underlying problems in the material (e.g. corroding reinforcing steel). These types of defects would normally trigger rehabilitation or replacement if the extent and location affect the overall performance of that element.<br><br>Examples:<br>• Severe corrosion (Greater than 10% section loss)<br>• Spalling, delaminations, etc. |

[8] Ontario Structure Inspection Manual Part 2 Section 4

Once inspections have been completed, the Bridge Condition Index (BCI) for each structure is determined based on the MTO Methodology. The BCI determined helps to schedule maintenance and rehabilitation work and is not an indication of the safety of the bridge. The BCI is related to the condition states defined within the MTO Methodology, with poor being split into poor and critical, as outlined below.

| BCI Value | Rating |
|---|---|
| 90-100 | Excellent |
| 70-89 | Good |
| 50-69 | Fair |
| 40-49 | Poor |
| 0-39 | Critical |

## 2.5 Useful Life

Table 2.5.1 outlines the anticipated useful life for each new build/replacement, along with the anticipated added life when a structure undergoes rehabilitation. These lives are used for PSAB purposes and align with the County's capital asset policy.

Based on the anticipated lives and maintenance strategies, anticipated useful life over the lifecycle of each structure is determined and is also represented in Table 2.5.1. Full replacement is anticipated at the end of the defined lifecycle. It is possible to have structures exceed the anticipated lives as well as require replacement prior to the end of their anticipated life.

Table 2.5.1 Useful Life

| Bridges and Culverts | Anticipated Useful Life (years) | Anticipated Lifecycle Life (years) |
|---|---|---|
| New Build / Replacement | | |
| Guide Rails - Beam | 30 | 30 |
| Guide Rails - Cable | 30 | 30 |
| Culverts - Concrete | 65 | 65 |
| Culverts - Steel | 50 | 50 |
| Bridge - Span < 6m | 60 | 60 |
| Bridge - Span 6-20m | 60 | 90 |
| Bridge - Span > 20m | 60 | 120 |
| Maintenance Strategy | | |
| Bridge Rehabilitation | 30 | N/A |

## 3.0 Level of Service

County roads including associated structures are primarily transportation corridors and are designed to provide continuous efficient movement of traffic as part of the overall transportation network. Bridges and culverts help to achieve this. Determining the correct service level is influenced by traffic volume, including volume of large transportation vehicles, preferences for maintenance routes to achieve plow efficiency, and resident preferences; their belief that the bridge and culvert structures meets their needs and expected condition. The Transportation Master Plan (TMP) is based on the principal that County roads should provide relatively good connectivity and a good level of transportation service throughout the County. The County will determine the target BCI for the next AMP update.

### Corporate Objective

The corporate objective of the road maintenance and traffic management service, which includes the maintenance of the County's bridge and culvert structures, is to ensure people and goods are able to move safely and efficiently throughout Oxford County. The bridge and culverts inventory includes a number of structures located on border roads with neighbouring municipalities in which the County and the neighbouring municipality share in the maintenance activities and their costs. Service agreements are in place to ensure that service levels are maintained.

### Legislative Requirements

In addition to Ontario Regulation 104/97, amended to Ontario Regulation 160/02 specifying the requirements for a biennial Bridge Needs Study, Ontario Regulation 239/02 specifies the Maintenance Standards for Bridge Decks. The maintenance requirement is based on what highway class the bridge is located on.

### Performance Measures

Table 3.0.1 lists performance measures that the County is currently managing and/or is reporting on.

#### Table 3.0.1 Performance Measures

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Bridges and culverts maintenance costs | Operating costs for bridges and culverts per sq. metre of surface area | Efficient bridge and culvert maintenance services | $7 | $8 | $14 |
| Rating of bridges and culverts | Number of structures where condition of primary components rated good to excellent | Condition of bridges and culverts | 88 | 90 | 90 |

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Bridges and culvert total area | Total sq. metres of surface area on bridges and culverts | Quantity of bridges and culverts | 32,621 | 32,621 | 32,621 |
| Reworked or new bridge and culvert capital | Number of structures where primary components received work | Quantity of bridges and culverts revitalized | 4 | 2 | 1 |

The images below provide illustrations on how the bridge and culvert conditions relate to their BCI.

Image 4.0.1 Concrete Culvert with a BCI of 99.41 (Excellent)

Image 4.0.2 Precast Concrete I-Beam Bridge with a BCI of 72.14 (Good)

Image 4.0.3 Steel I-Beam Bridge with a BCI of 56.72 (Fair)

Image 4.0.4 Concrete Culvert with a BCI of 48.02 (Poor)

## 4.0 Asset Management Strategy

### 4.1 Lifecycle Activities and Planned Actions

The County's Transportation Master Plan (TMP) has developed strategies and guidelines for managing the County's transportation network, which includes the County's structures.

Routine maintenance requires minimal effort to maintain the service life of the structure, provided maintenance is completed within 1-2 years as identified in the Bridge Needs Study. The County is not currently completing all the routine work as identified, and will be investigating ways to incorporate this into its asset lifecycle strategy. Safety critical elements are identified during the inspection process if in immediate need for repair. All safety concerns are addressed in a timely manner.

The most effective improvement in a structure's service life can be achieved by completing repairs while the structure is in the fair range. As outlined in the chart below, this falls into the rehabilitation strategy for structures with a BCI between 50 and 69.

Table 4.1.1 Lifecycle Activities

| Strategy | Lifecycle Activity | Trigger |
|---|---|---|
| Routine Maintenance | Activities such as inspections, monitoring, sweeping, winter control, cleaning clogged drains, etc. | Ongoing |
| Preventive maintenance | Activities such as repairs to cracked or spalled concrete, damaged expansion joints, bent or damaged railings, etc. | BCI = 70-95 |
| Rehabilitation | Events such as structural reinforcement of structural elements, deck replacement, etc. | BCI = 50-69 |
| Replacement | Occurs at the end of the useful service life – complete replacement of structure. This treatment activity is also required if there have been changes to the expectations of a road segment, including increased traffic volumes (heavy equipment), or road widening. | BCI < 50 |

Although BCI is a measure of overall condition of the structure, other factors are considered when prioritizing maintenance. These include but are not limited to:

- Traffic Volume
- Load Capacity restrictions
- Accident History
- History of flooding or ice problems
- Growth
- Funding availability from other municipalities for shared structures
- Planned maintenance on the road network (to minimize overall cost and disruption to residents)

The rehabilitation strategy is not cost effective for all structures. Depending on the span size of bridge structures they may undergo one or two rehabilitations. This information is maintained within asset profiles and aligns with OSIM curves from MTO. The 2016 Bridge Needs study specified the maintenance strategy pertaining to each structure.

### 4.2 Risks Associated with the Strategy

The County uses the highway classification to determine the consequence of failure. The higher the classification, the greater the consequence if the structure deteriorates to the point where it is no longer safe for travel. A structure located on a road segment with a highway classification of 1 would have the greatest consequence of failure as these roads have the higher traffic counts and speed limits.

Table 4.2.1 Consequence of failure

| Scoring | Consequence | Highway Classification |
|---|---|---|
| 1 | Minimal | 6 |
| 2 | Marginal | 5 |
| 3 | Serious | 4 |
| 4 | Critical | 3 |
| 5 | Catastrophic | 1,2 |

Table 4.2.2 Asset risk profile

| Consequence | Probability 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 5 | 4 Assets<br>1,070 m2, m, unit(s)<br>$1,145,500 | 16 Assets<br>4,557 m2, m<br>$47,130,000 | 9 Assets<br>643 m2, m<br>$10,740,000 | 1 Assets<br>75 m2<br>$780,000 | 0 Assets<br>-<br>$0 |
| 4 | 16 Assets<br>1,187 m2, m<br>$6,914,052 | 53 Assets<br>8,334 m2, m<br>$80,340,000 | 48 Assets<br>9,131 m2, m<br>$107,454,000 | 5 Assets<br>142 m<br>$4,296,000 | 0 Assets<br>-<br>$0 |
| 3 | 2 Assets<br>162 m2, m<br>$858,000 | 11 Assets<br>2,013 m2, m<br>$19,806,000 | 4 Assets<br>457 m2, m<br>$4,740,000 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 |
| 2 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 |
| 1 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 | 0 Assets<br>-<br>$0 |

The County's structures lie on roadways which are generally transportation hubs. Area municipalities also rely on the County's roads to be passable during times of construction. All

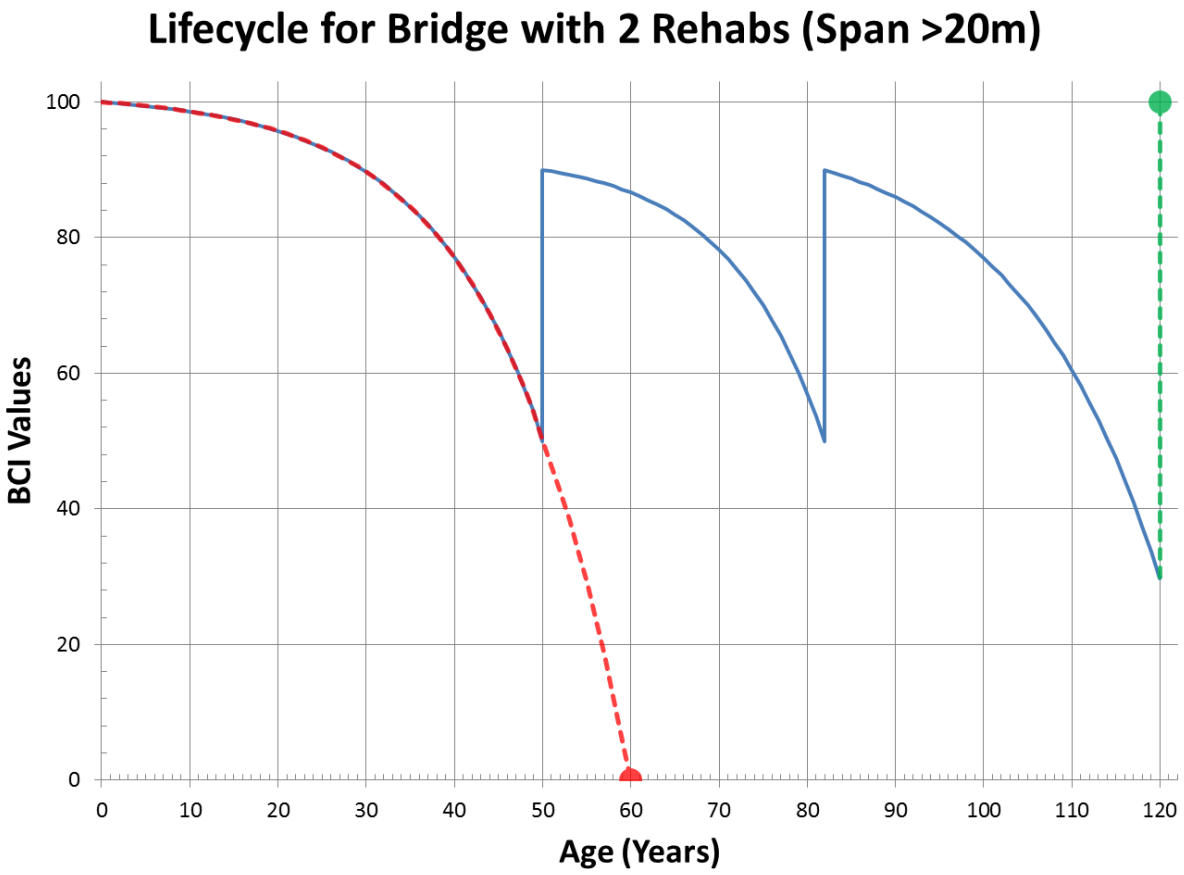
structures are located on class 4 or higher roadways and as a result come with a serious or greater consequence if the structure is shut down.

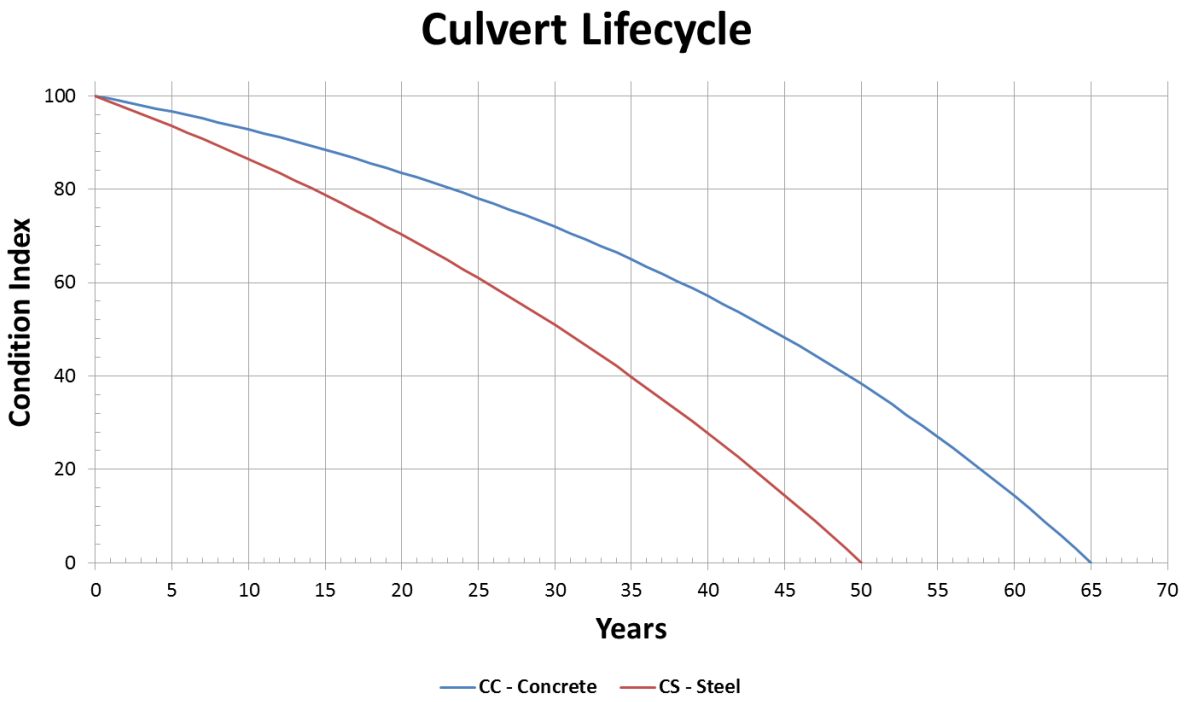
### 4.3 Lifecycle Analysis

There are a number of factors that will also influence when maintenance is completed. The County reviews all infrastructure within the vicinity prior to planning construction projects. This review also includes working with area and neighbouring municipalities, as appropriate. This helps to minimize the disruption to Oxford County residents along with minimizing the overall costs for completing the asset updates, regardless of whether the asset is County owned.

Referring to the maintenance strategies in section 2.5, Table 4.3.1 illustrates the anticipated lifecycle for bridges with spans greater than 20m. As you can see if no maintenance strategies were applied to a bridge it is anticipated it would reach complete failure around 60 years. By applying 2 rehabilitation strategies to these bridges the useful life is extended to 120 years.

Table 4.3.1 Lifecycle Curve






The average annual requirement for bridges and culverts using a replacement only strategy is approximately $4.7 million. When taking the maintenance strategies into consideration the average annual requirement for bridges and culverts is reduced to approximately $4.4 million. Applying the right maintenance strategy at the right point in time can have significant savings on the overall lifecycle cost.

## 5.0 Financing Strategy

### 5.1 Financing Strategy

Of the maintenance strategies identified, routine maintenance is part of the operating budget, while all other activities are considered part of the capital budget.

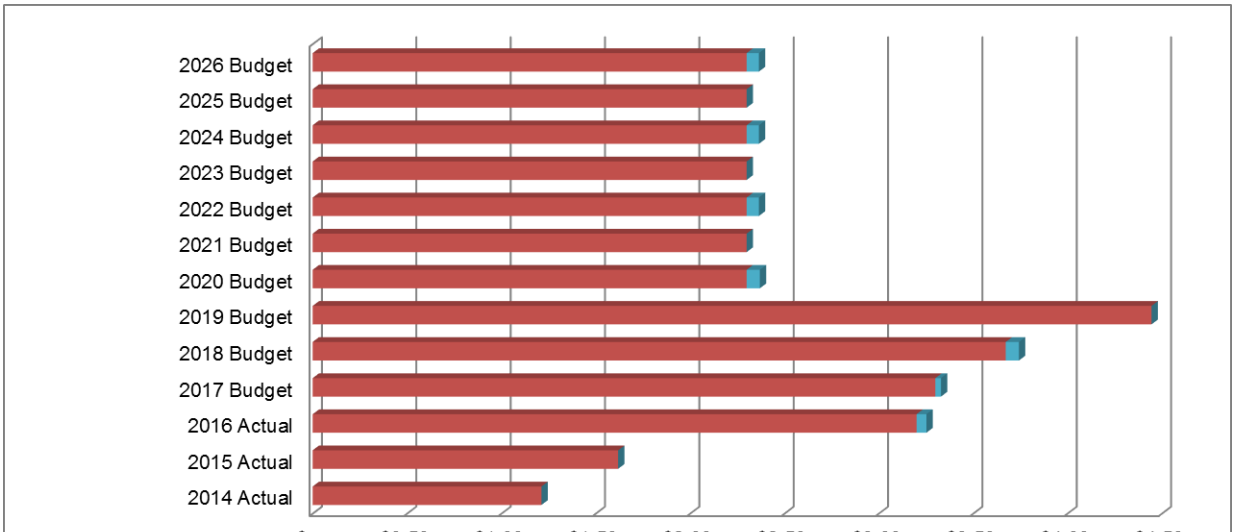
Where possible, rehabilitation and replacement activities for the structures are planned in collaboration with the rehabilitation and replacement activities of the road network to minimize disruption and for cost efficiencies. The availability of funding by other municipalities for shared structures will also have an impact on the timing of rehabilitation and replacement projects.

Capital investments for the bridges and culverts are currently funded by levy supported dedicated reserves, OCIF Funds, development charges (for growth projects) and levy contributions. While debentures are not currently used to fund bridge and culvert projects, the funding option is available in times of high replacement requirements and low reserve balances. Gas Tax Funds are also available for bridge and culvert projects, although currently the County uses all Gas Tax Funds towards replacement needs of the roads network.

### 5.2 Expenditure History and Forecasts

The County will review the results of the 2016 Bridge Needs Study and through the 2018 budget process will adjust the long-term expenditure plan accordingly.

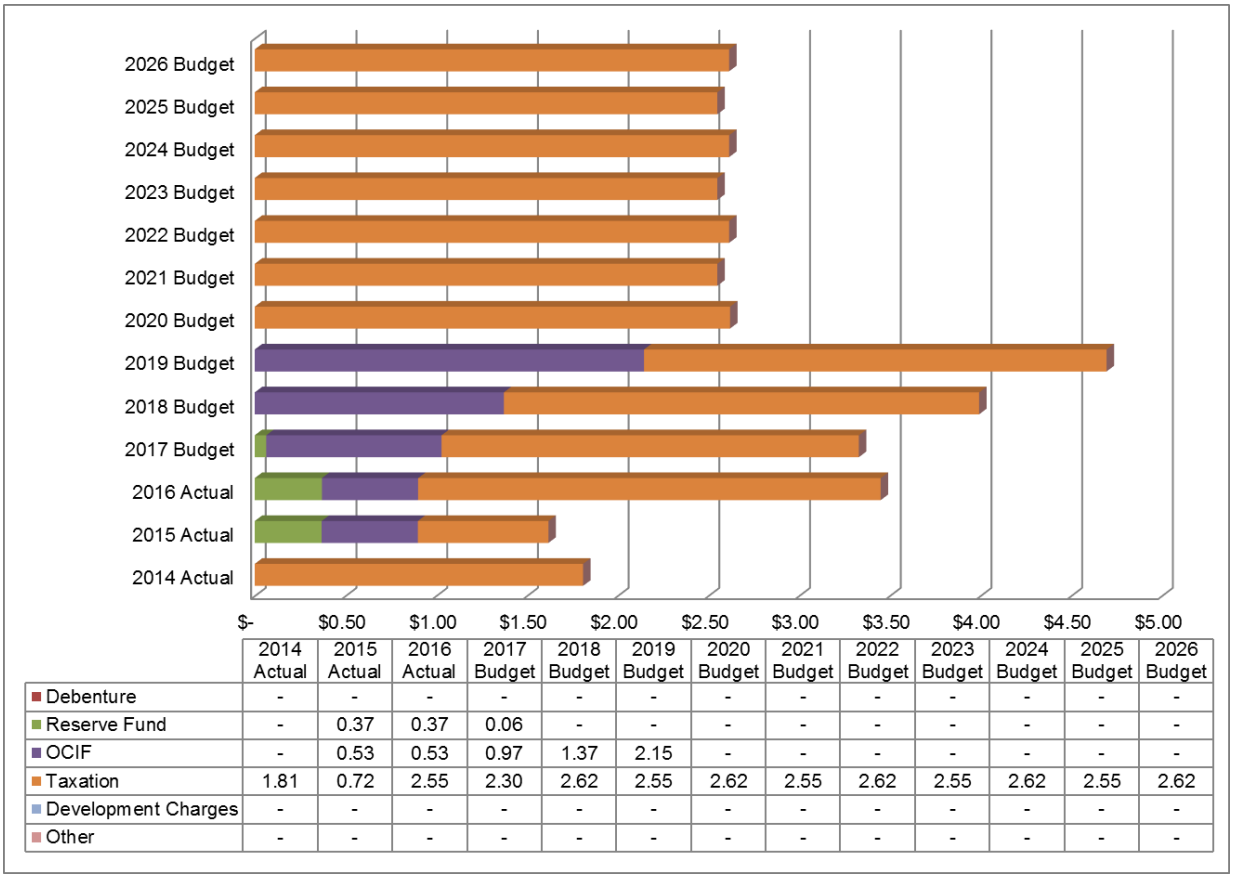
Chart 5.2.1 Expenditures (millions)




| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lifecycle Renewal | 1.21 | 1.62 | 3.20 | 3.30 | 3.67 | 4.45 | 2.30 | 2.30 | 2.30 | 2.30 | 2.30 | 2.30 | 2.30 |
| Expansion | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Disposal | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Non-infrastructure Solutions | - | - | 0.05 | 0.03 | 0.07 | - | 0.07 | - | 0.07 | - | 0.07 | - | 0.07 |

## 5.3 Capital Revenues

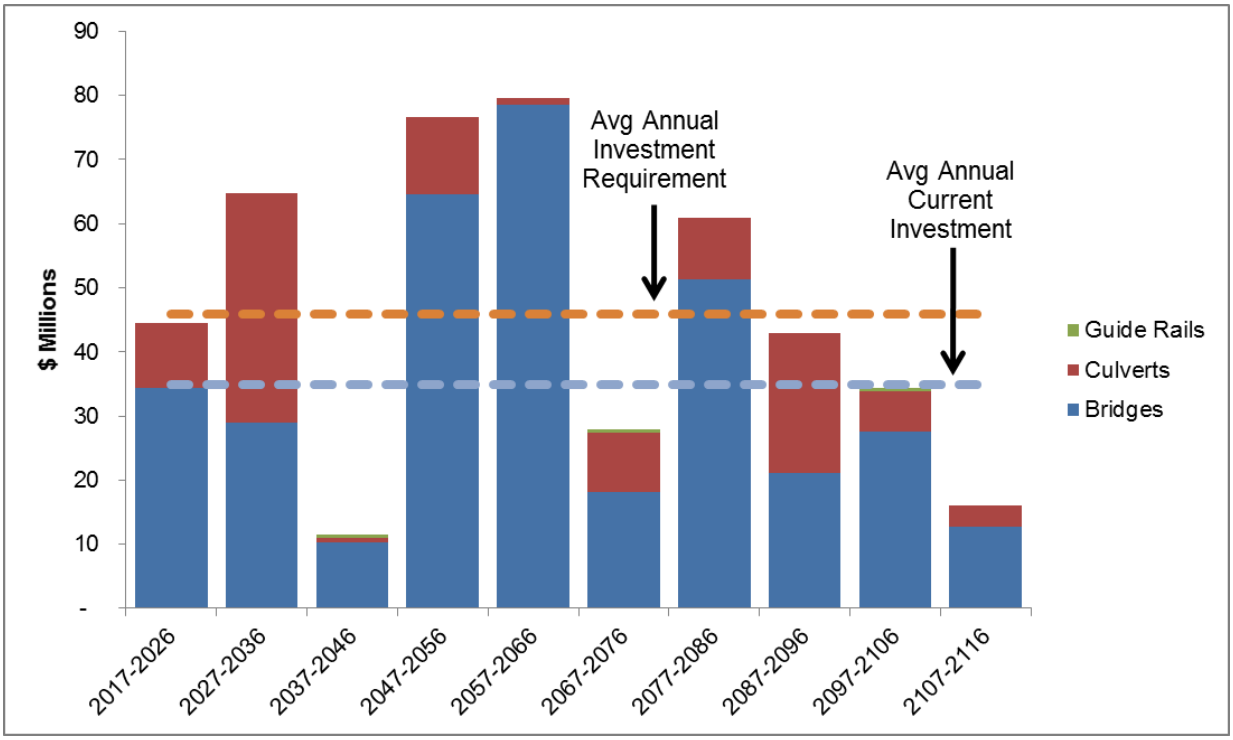
Chart 5.3.1 Sources of Capital Revenues 2014-2026 (millions)




| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Debenture | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Reserve Fund | - | 0.37 | 0.37 | 0.06 | - | - | - | - | - | - | - | - | - |
| OCIF | - | 0.53 | 0.53 | 0.97 | 1.37 | 2.15 | - | - | - | - | - | - | - |
| Taxation | 1.81 | 0.72 | 2.55 | 2.30 | 2.62 | 2.55 | 2.62 | 2.55 | 2.62 | 2.55 | 2.62 | 2.55 | 2.62 |
| Development Charges | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Other | - | - | - | - | - | - | - | - | - | - | - | - | - |

## 5.4 Capital Investment

Based on the asset management strategy, the financial requirements over the next 100 years are estimated using 2016 dollars. These estimates assume that all work is able to be completed as needed and do not take into account future changes due to environmental factors, new maintenance techniques, and additional growth. In 2014, the financial requirements were determined based on anticipated replacement only, as the County did not have an analytical tool in place to aid in predicting the requirements for rehabilitation of structures. The chart below accounts for rehabilitation and replacement costs.




The average annual investment requirement represents the amount of annual funding requirements to smooth out the taxation requirements. Where the funding sources are greater than the work planned for the year, the amount is contributed to the bridges reserve, conversely where the capital expenditures exceed the annual funding the bridges reserve is used. As the current modeling does not include growth related projects, development charges are not included.

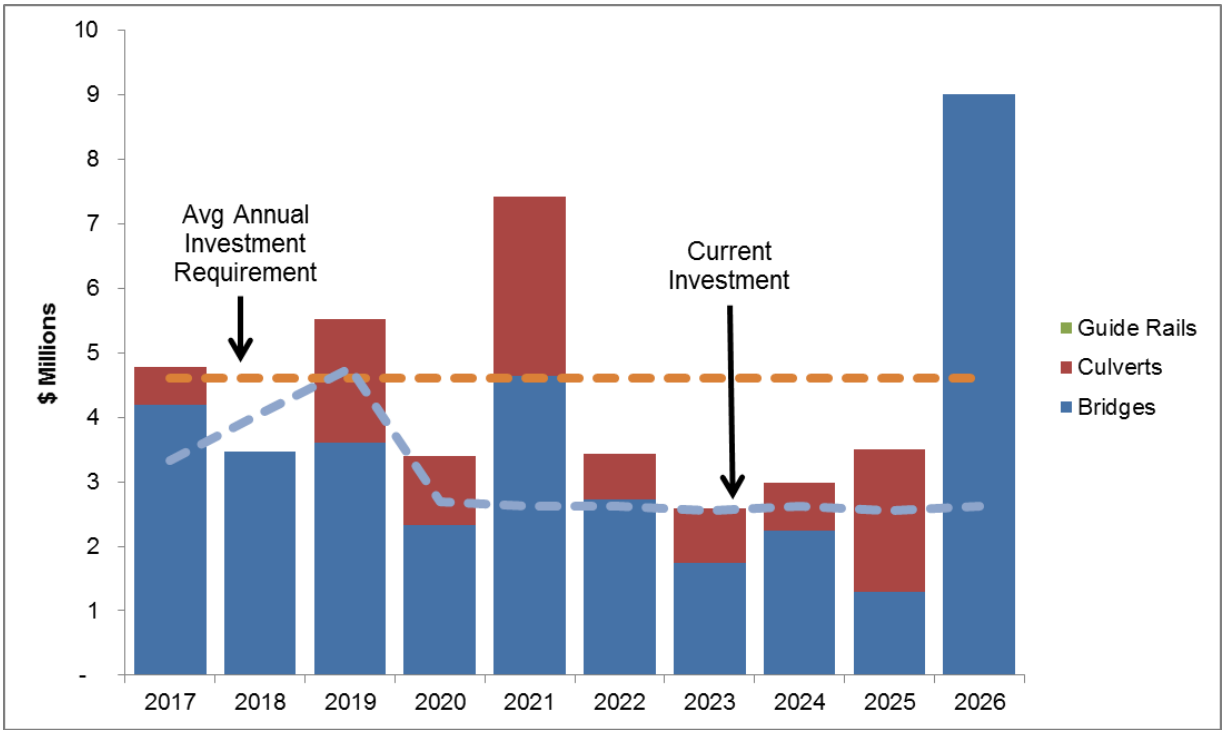
The chart below illustrates actual funding received for 2014 through 2016 as well as the budgeted funding from 2017 and projected funding expected through 2021 as per the 2017 approved budget.[9] OCIF funding has been approved through 2019. It is unclear if the County will be eligible for funding beyond 2019.[10] The sustainable investment is estimated to be $4.6 million annually.

| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget |
|---|---|---|---|---|---|---|---|---|
| **Funding Sources** | | | | | | | | |
| OCIF | | 530,194 | 530,194 | 966,441 | 1,373,162 | 2,145,702 | | |
| Reserve Interest | | | 32,678 | 61,387 | 65,162 | 69,416 | 73,729 | 78,099 |
| Taxation | 1,810,000 | 720,000 | 2,550,000 | 2,300,000 | 2,620,000 | 2,550,000 | 2,620,000 | 2,550,000 |
| | **1,810,000** | **1,250,194** | **3,112,872** | **3,327,828** | **4,058,324** | **4,765,118** | **2,693,729** | **2,628,099** |
| Avg Annual Investment Required | **3,240,000** | **3,240,000** | **3,240,000** | **4,600,000** | **4,600,000** | **4,600,000** | **4,600,000** | **4,600,000** |
| *Surplus (Deficit)* | *(1,430,000)* | *(1,989,806)* | *(127,128)* | *(1,272,172)* | *(541,676)* | *165,118* | *(1,906,271)* | *(1,971,901)* |
| Bridges Reserve Balance | 597,326 | 758,625 | 4,115,286 | 4,231,796 | 4,546,958 | 4,866,374 | 5,190,103 | 5,518,202 |

[9] Realignment of reserves completed in 2016 resulting in the increased funding available in the Bridges Reserve.
[10] https://www.ontario.ca/page/how-receive-ontario-community-infrastructure-fund-formula#section-2

Funding is currently in a deficit position and is anticipated to be on target with the enhanced OCIF funding in 2019. The ability to fund the structure maintenance needs is largely dependent on the amount of funds received under the OCIF program. The County will need to investigate other funding methods if the County is no longer eligible for OCIF beyond 2019, or if there are any significant changes to the amount of funding received.

The chart below represents the requirements over the next 10 year period, using a 1.5% inflation rate. Through the 2018 budget process the County will be reviewing the work identified for completion in the bridge needs study and determining the plan for the next 10 year period.




Similar to the 100 year outlook, the 10 year outlook has a sustainable funding level of $4.6 million which reaches target in 2019 based on the current funding level. The County will continue to review the balance between asset lifecycle requirements, and available funding within each budget cycle.

# Water Systems

STATUS:
**Good**

## 1.0 Introduction

Oxford County owns and operates 17 drinking water systems, serving 19 communities.

The Sustainable Water and Sewage Systems Act, 2002[11] indicates that regulated entities are required to prepare and approve a report concerning the provision of water services and wastewater services. The report must include an inventory of and management plan for the infrastructure needed to provide the services, certified by a professional engineer and an assessment of the full cost of providing the services and the revenue obtained to provide them. The Act specifies that the full cost of providing services includes source water protection costs, operating costs, financing costs, renewal and replacement costs and improvement costs.

### 1.1 Improvement Plan

The overall condition of the County's water systems is rated good. It is anticipated that the condition rating will remain steady as the County's water rates are set using a full cost recovery approach.

| | Positive Impacts on Rating |
|---|---|
| 1. | The water and wastewater rate setting for 2017-2020 was completed in January 2017 to ensure full cost recovery through user rates. |
| 2. | Installation of residential water metering for the township systems in 2016/2017. |
| | **Negative Impacts on Rating** |
| 1. | Aging cast iron watermains in several systems continue to require significant investments. |
| 2. | Challenges with aesthetic water quality parameters such as iron and hydrogen sulphide in some systems may require treatment facility upgrades to improve quality. |

The following recommendations are based on the review of current management practices; and, inventory, valuation and condition analysis.

| | Recommendations |
|---|---|
| 1. | Establish and monitor appropriate and measurable levels of service and performance measures. |
| 2. | Collaborate with area municipalities to align asset management plans to gain efficiencies by optimizing investment priorities of linear assets. Also the use of |

[11] https://www.ontario.ca/laws/statute/s02029

| | |
|---|---|
| | technologies for in-situ replacement/rehabilitation so that road work and watermain work do not necessarily need to coincide. |
| 3. | Ensure all watermain breaks are recorded against specific pipes. |
| 4. | Determine asset components and maintenance strategies for facilities and associated processes. |
| 5. | Incorporate work-in-process data into annual replacement requirements. |
| 6. | Implement condition assessments for all water facility components (including processes) and linear infrastructure. Establish a plan to update and assess infrastructure condition. |
| 7. | Refine risk assessment to assign appropriate risk level to each asset based on different factors. |
| 8. | Work with operating authorities to ensure that data related to new infrastructure within subdivisions is gathered in a timely manner. |
| 9. | Work with operational authorities to continue to fill infrastructure data gaps. |

## 2.0 State of Infrastructure

### 2.1 Inventory

The County continues to make improvements to increase the integrity of the water data. As a result of this work hydrants and valves are now being captured as separate components to represent the different maintenance strategies and costs.

The County is currently undergoing a large project to ensure all water usage is measured by a meter. In the interim, we are unable to reconcile the asset meter's data with a list provided by our service provider. The current inventory includes the 2014 inventory plus installations from 2016. This reconciliation with be completed with a future update of the asset management plan.

The inventory figures below also capture inventory within new subdivisions constructed to the end of 2016, that the County is aware of, where the County has not yet assumed ownership. The County will continue to work with operating authorities to ensure that this data is updated in a timely manner. The County generally assumes ownership approximately two years after full operation. It is important to include this new linear infrastructure to ensure that lifecycle activities are planned and funded accordingly.

Table 2.1.1 – Water Systems Inventory

| Asset Type | Asset Component | | Current Inventory | 2014 Inventory |
|---|---|---|---|---|
| Linear | Local Main (<400mm) | m | 644,594 | 635,088 |
| | Transmission Main (>400mm) | m | 48,809 | 48,625 |
| | Services | each | 34,168 | 31,650 |
| | Meters | each | 30,969 | 26,370 |
| | Hydrants | each | 3,131 | N/A |
| | Valves | each | 6,351 | N/A |
| Facilities | Pumping Station | each | 27 | 24 |
| | Storage (Reservoir & Tower) | each | 26 | 21 |
| | Water Treatment Facility | each | 32 | 32 |
| | Well | each | 61 | 62 |
| | Other | each | 13 | 10 |

### 2.2 Valuation

#### Replacement Cost Valuation

The replacement cost valuation for water linear is based on costs for replacement with PVC pipes using our 2016 tender prices, where available. While the County has installed some high pressure concrete pipes recently, it is anticipated that technologies will have improved enough to replace these pipes at the end of their useful life with PVC. Hydrants, valves and services

replacement costs are also based on 2016 tender prices. Meter replacement costs are based on the values identified in the fees and charges by-law for those less than 1". Meters greater than 1" are based on last available tender prices.

The facilities replacement costs are largely based on the 2014 replacement values. Some changes were made where work has been completed or the County has received updated information. Further investigations in this area is recommended to ensure the correct values are assigned to the building and the processes within the building.

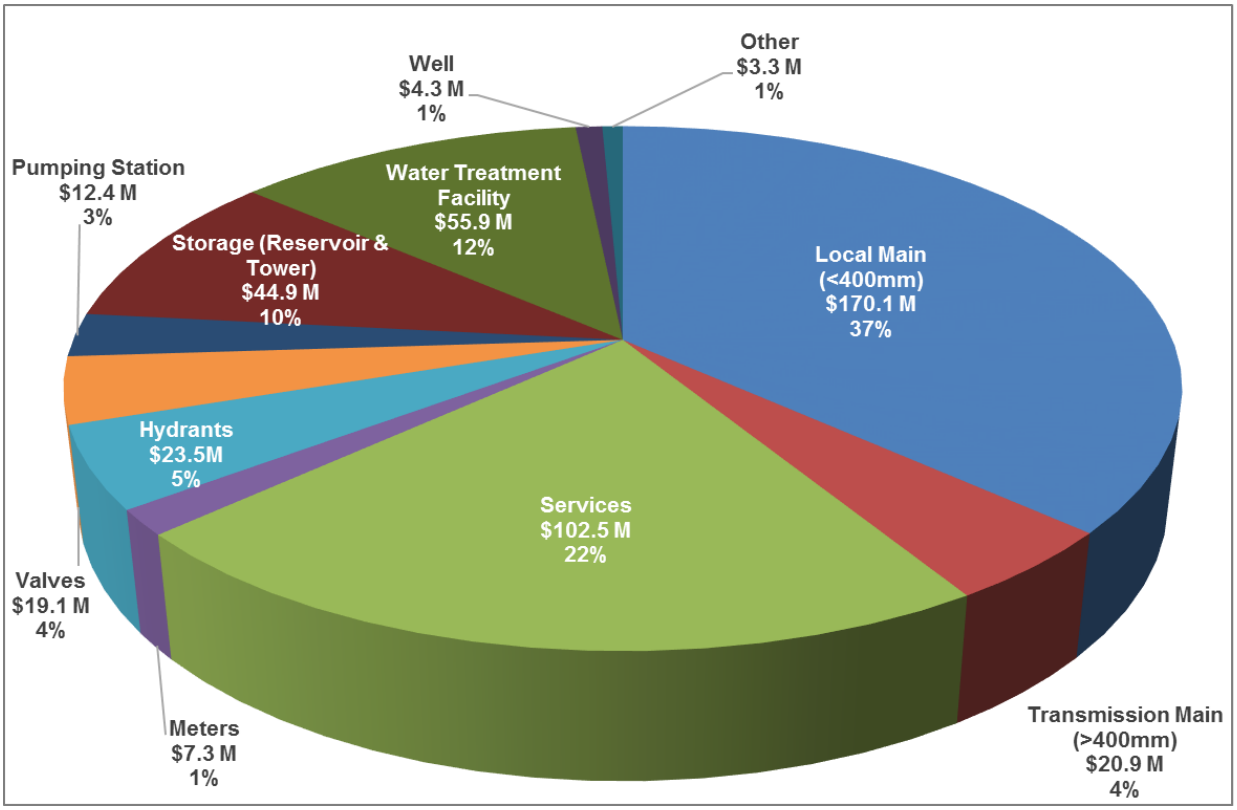
Table 2.2.1 – Water Systems Replacement Valuation

| Material | Unit | Cost |
|---|---|---|
| Connections | each | $3,000 |
| Water Valves | each | $3,000 |
| Water Hydrants | each | $7,500 |
| Meters - 1" | each | $230 |
| Meters - 1.5" | each | $560 |
| Meters - 2" | each | $670 |
| Meters - 3" | each | $770 |
| Meters - 4" | each | $870 |
| Meters - 6" | each | $970 |
| Meters - 12" | each | $4,000 |
| PVC 100 – 150mm | m | $250 |
| PVC 200 – 250mm | m | $275 |
| PVC 300 – 375mm | m | $300 |
| PVC 400 – 450mm | m | $400 |
| PVC 500 – 525mm | m | $500 |
| PVC 600 – 750mm | m | $600 |

| Asset Component | Replacement Cost | % of Total Value |
|---|---|---|
| Local Main (<400mm) | $170,089,627 | 36.65% |
| Transmission Main (>400mm) | $20,905,376 | 4.50% |
| Services | $102,504,000 | 22.09% |
| Meters | $7,281,360 | 1.57% |
| Hydrants | $23,482,500 | 5.06% |
| Valves | $19,053,000 | 4.11% |
| Pumping Station | $12,438,818 | 2.68% |
| Storage (Reservoir & Tower) | $44,899,100 | 9.68% |
| Water Treatment Facility | $55,864,495 | 12.04% |
| Well[12] | $4,260,600 | 0.92% |
| Other | $3,282,807 | 0.71% |
| **Total Replacement Cost** | **$464,061,684** | **100%** |

[12] Based on the 2008 Genivar Infrastructure Needs and Valuation Report

| Replacement Cost Per Household | $14,668 |
|---|---|



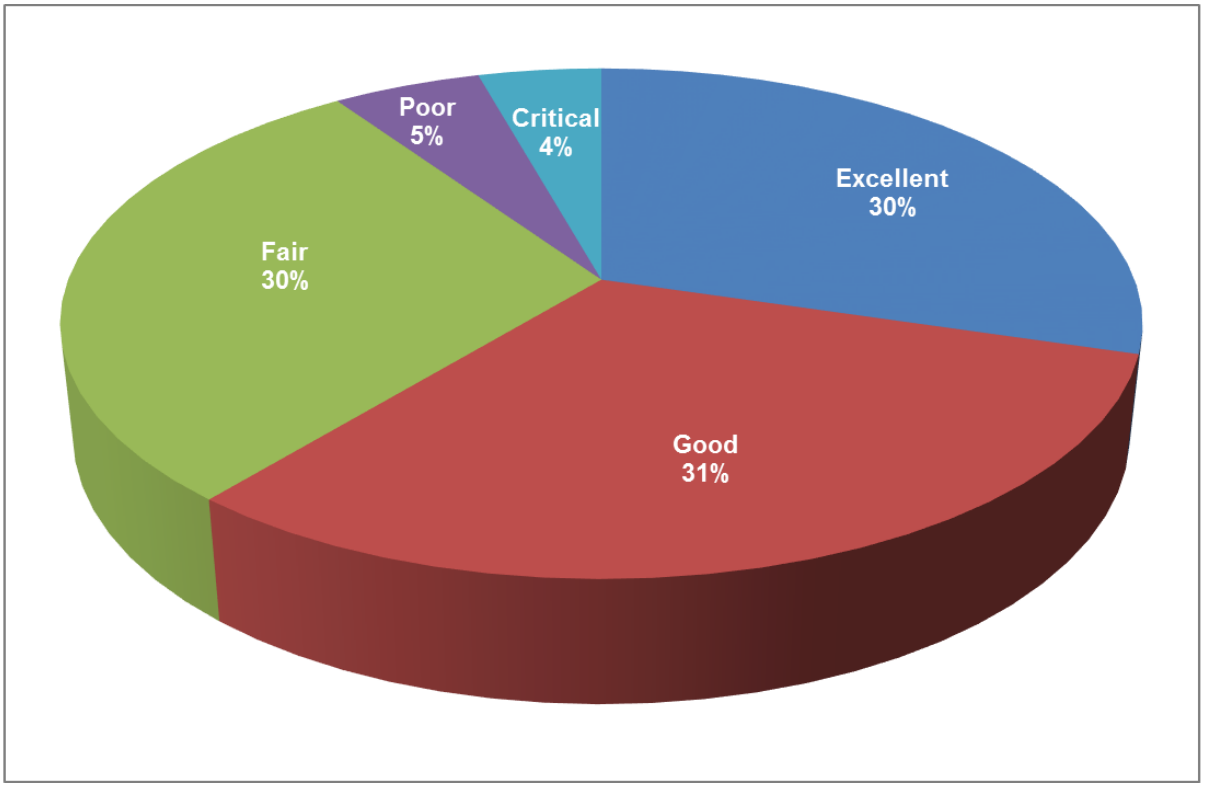

## 2.3 Asset Condition Assessment

The below chart compares the status of our water systems as identified in our 2014 Asset Management Plan to their status at the end of 2016. This information does not take into consideration any work-in-process assets, including those from new subdivisions where the County has not yet assumed ownership. The current asset software does not allow the work in progress data to be included in the condition reports; it is anticipated that this will be included in future updates of the AMP.

The trend shows the overall condition of the water systems is steady. However, early plastic fittings and thin-walled cast iron pipe installed in the 1960's and 1970's are showing an increased risk of failure. The County will continue to monitor these pipes and plan for replacement accordingly. Infrastructure data gaps exist where the installation date of linear is unknown and results in a critical condition rating. The County will continue to work on filling the data gaps for the next AMP.

Table 2.3.1 Water Systems Condition Assessment

| Asset Component | 2014 Condition Rating | 2016 Condition Rating | Trend |
|---|---|---|---|
| Local Main (<400mm) | Good | Good | → |
| Transmission Main (>400mm) | Good | Good | → |
| Services | Good | Excellent | ↑ |
| Meters | Good | Good | → |
| Hydrants | Good | Excellent | ↑ |
| Valves | Good | Good | → |
| | | | |
| Pumping Station | Good | Good | → |
| Storage (Reservoir & Tower) | Good | Good | → |
| Water Treatment Facility | Good | Good | → |
| Well | Good | Good | → |
| Other | Good | Good | → |




## 2.4 Assessment Approach

Watermains are difficult to inspect due to the high pressure flow of water constantly underway within the pipes. Completing physical inspections would require disruptions in service and are time consuming and costly to complete. Operations staff will perform physical inspections on the inside of pipes only on high risk, large diameter pipes, on an as needed basis. There are a number of high tech inspection techniques present in the industry that the County will continue to monitor.

Watermain breaks are helpful in determining the condition of a pipe segment as they help to predict pipe failure. The County has historically tracked watermain breaks, however they were not attached to specific pipes. Moving forward, watermain breaks are recorded with the specific pipes identified to inform future condition updates.

Hydrant flow tests are regularly performed for fire flow prevention purposes. The readings from these tests can help signal if there is a potential problem with watermains that feed the hydrant. This will focus further investigations in areas of potential need.

The assessed conditions of water linear for the purposes of this AMP release are therefore based solely on the age of the pipe.

| Age | Rating |
|---|---|
| 0-20 | Excellent |
| 21-40 | Good |
| 41-60 | Fair |
| 61-80 | Poor |
| 81+ | Critical |

The assessment approach for facilities is identified in Section 2.4 of the Social Housing and Corporate Facilities Report Card, where available. Where conditions on facilities are not available, the age based condition is used. The assessment approach for machinery and equipment used to deliver the water service is yet to be determined; as a result their condition is based on age.

### 2.5 Useful Life

Table 2.5.1 outlines the anticipated useful life for each new build/replacement, along with the anticipated added life when a structure undergoes rehabilitation. These lives are used for PSAB purposes and align with the County's capital asset policy.

Further refinement of the asset management strategies between the component breakdown for facilities and processes is required. The most effective and efficient maintenance schedule and the overall lifecycle of each asset will be determined.

Watermain lining is a maintenance strategy that is not available in all instances. This strategy is utilized where it is cost effective to do so. Full replacement is anticipated at the end of the lifecycle life defined, however it is possible to have components exceed the lives defined as well as components that require replacement prior to the end of their anticipated life.

Table 2.5.1 Useful Life

| Water Systems | Anticipated Useful Life (years) | Anticipated Lifecycle Life (years) |
|---|---|---|
| New Build / Replacement | | |
| Water Meter and Radio Transmitter | 20 | 20 |
| Valves | 40 | 40 |
| Hydrant | 90 | 90 |
| Local Main | 90 | 90 |
| Transmission Main | 90 | 90 |
| Services | 90 | 90 |
| Maintenance Strategy | | |
| Relining | 50 | N/A |

## 3.0 Level of Service

The County defines the water service as an external service that supplies drinking water from source to tap to water customers.

The County publishes annual reports on its website summarizing test results and operating conditions for each of the municipal drinking water systems within Oxford County.

Fire flow protection is determined when a system is designed based on discussions with area municipalities. The minimum pipe size to allow for fire flow protection is 6", as such it is very difficult to implement fire flow once a system has been constructed. Systems that were not designed for fire flow coverage include, Beachville, Bright, Brownsville, Dereham Center, Drumbo/Princeton, Embro, Innerkip, Hickson, Lakeside, Mt Elgin, Springford, and Sweaburg.

### Corporate Objective

The County is committed to providing the appropriate quantity of water and quality water as it directly impacts the quality of life of customers by reducing the potential for water-borne disease, allowing for economic development and fire protection, and providing opportunities for recreational activities.

### Legislative Requirements

The purpose of the *Safe Drinking Water Act, 2002*[13] is to recognize that the people of Ontario are entitled to expect their drinking water to be safe and to provide for the protection of human health and the prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing. Ontario Regulation 170/03[14] provides specifications and reporting requirements regarding drinking water systems. Ontario Regulation 169/03[15] specifies the Ontario Drinking Water Quality Standards. The DWQMS[16] requires an operating authority to document a quality management system for each municipal, year-round, residential drinking water system that it operates in an operational plan which must be accepted by the Ministry of the Environment and Climate Change.

### Performance Measures

Table 3.0.1 lists performance measures that the County is currently tracking and reporting on. Also listed in the table are the metrics contained within the draft regulation. The County is investigating these measures further in order to determine how best to capture and report on the metrics for the 17 systems the County operates. Although the new measures may report on similar objectives, in order to keep cost and preformance metrics aligned, the County will continue to track the measures it currently uses where units differ. It is important to note that the

[13] https://www.ontario.ca/laws/statute/02s32
[14] https://www.ontario.ca/laws/regulation/030170#BK26
[15] https://www.ontario.ca/laws/regulation/030169
[16] https://www.ontario.ca/page/ontarios-drinking-water-quality-management-standard-pocket-guide

rural nature of the County will cause the new measures regarding percent served to be very low compared to more urban municiaplities.

Table 3.0.1 Performance Measures

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Treatment of drinking water | Operating costs per megalitre of drinking quality water | Efficient and safe drinking water | $782 | $785 | $715 |
| Boil water advisories (in days) | Weighted number of days when a boil water advisory issued by the Medical Officer of Health, applicable to a municipal water supply, was in effect | Effective and safe drinking water | 0.0033 | 0.0098 | 0.0000 |
| Distribution of drinking water | Operating costs per kilometre of water distribution pipe | Efficient distribution of drinking water | $4,372 | $4,342 | $4,349 |
| Treatment & distribution of drinking water | Integrated operating costs per megalitre of drinking quality water | Efficient treatment and distribution of drinking water | $1,036 | $1,038 | $961 |
| Watermain breaks (per 100km) | Number of watermain breaks per 100 kilometres of water distribution pipe in a year | Effective distribution | 3.66 | 6.51 | 11.23 |
| Populations serviced | Percentage of properties serviced by the public potable water network | Scope of drinking water service | NCT | NCT | NCT |
| Fire flow protection | Percentage of properties serviced by fire flow | Scope of fire flow protection service | NCT | NCT | NCT |
| Boil water advisories (in days) | Number of connection-days where a boil water advisory notice is in place per year | Reliable drinking water quality | NCT | NCT | NCT |
| Watermain breaks (in days) | Number of connection-days where service is interrupted due to watermain breaks | Reliable distribution of drinking water | NCT | NCT | NCT |

## 4.0 Asset Management Strategy

### 4.1 Lifecycle Activities and Planned Actions

Water rehab technologies still require some digging (known as low dig technologies, due to lack of access) and are more expensive on a lifecycle basis when considered in insolation. However, if the road above is in good condition, lining avoids the cost of road reconstruction, resulting in a cost effective total asset strategy.

There are four maintenance categories considered in the overall sustainable management of water assets, described as follows:

Table 4.1.1 Lifecycle Activities

| Strategy | Lifecycle Activity | Trigger |
|---|---|---|
| Minor maintenance | Regularly scheduled maintenance and inspection programs including cleaning and flushing, hydrant flushing, pressure testing, visual inspections, lubricating and minor repairs. Activities such as repairing or replacing broken mains. | Ongoing |
| Major maintenance | Replacing components such as motors or pumps, and similar unscheduled or unplanned emergency activities. | Good |
| Rehabilitation | One time events that extend the life of the asset including watermain lining. | Fair/Poor |
| Replacement | Occurs at the end of the useful service life – can vary among systems due to construction material and environmental factors that impact the degree of deterioration and performance. | Critical |

### 4.2 Risks Associated with the Strategy

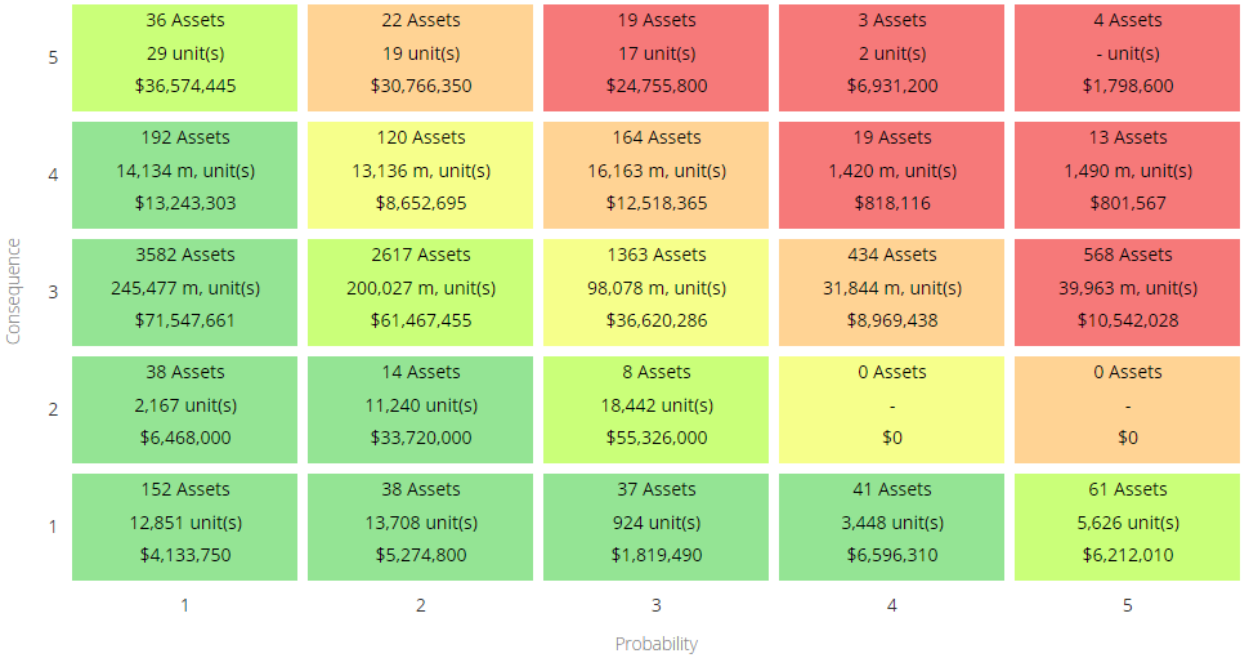
The DWQMS requires the assessment of risks to the Drinking Water Systems. For the purposes of this version of the AMP, the County has used the asset component to determine the consequence of failure as outlined in Table 4.2.1. Assessing risks for the drinking water systems is a complex endeavour and further refinement is required to assign the appropriate risk to each water asset. One such factor is pipe location as a pipe failure near the main line railroad tracks would have catastrophic consequence, while a pipe of the same diameter on a residential street may only have a marginal consequence.

Table 4.2.1 Consequence of failure

| Scoring | Consequence | Asset Component |
|---|---|---|
| 1 | Minimal | Valves, Meters |
| 2 | Marginal | Services |
| 3 | Serious | Hydrants, Local Mains, Other |

| Scoring | Consequence | Asset Component |
|---|---|---|
| 4 | Critical | Wells, Pumping Stations, Transmission Mains |
| 5 | Catastrophic | Water Treatment Facility, Storage (Reservoir and Tower) |

Table 4.2.2 Asset risk profile




## 4.3 Lifecycle Analysis

Additional work is required to determine the lifecycle requirements of the facilities and their associated processes. It is anticipated that this will include a detailed component breakdown to allow for strategies to be developed. This will prioritize projects and aid in the development of future capital budgets.

## 5.0 Financing Strategy

### 5.1 Financing Strategy

In 2007, the Ministry of the Environment (MOE) issued Ontario Regulation 453/07[17] under the Safe Drinking Water Act which requires all municipalities with Drinking Water Systems to complete Financial Plans as part of their licensing. The intent of the regulation is to ensure municipalities plan for the long-term financial sustainability of their drinking water systems.

Financial plans must cover a period of at least six years and must be approved by a resolution passed by County Council. The Water System Financial Plan 2014-2019 was approved by Council on September 10, 2014.

The County worked with Hemson Consulting Ltd. to set water and wastewater rates for 2017-2020. The rates were established to ensure full cost recovery as required under the regulation. The new rates, effective April 1, 2017, were approved by County Council on January 25, 2017.

Where possible, replacement activities are planned in conjunction with the replacement needs for the road network and wastewater linear. This requires a co-ordinated effort with area municipalities as the majority of the County owned water and wastewater linear falls under the area municipalities' roads infrastructure. This collaboration is essential for ensuring a cost effective approach to maintaining assets within the County regardless of ownership.

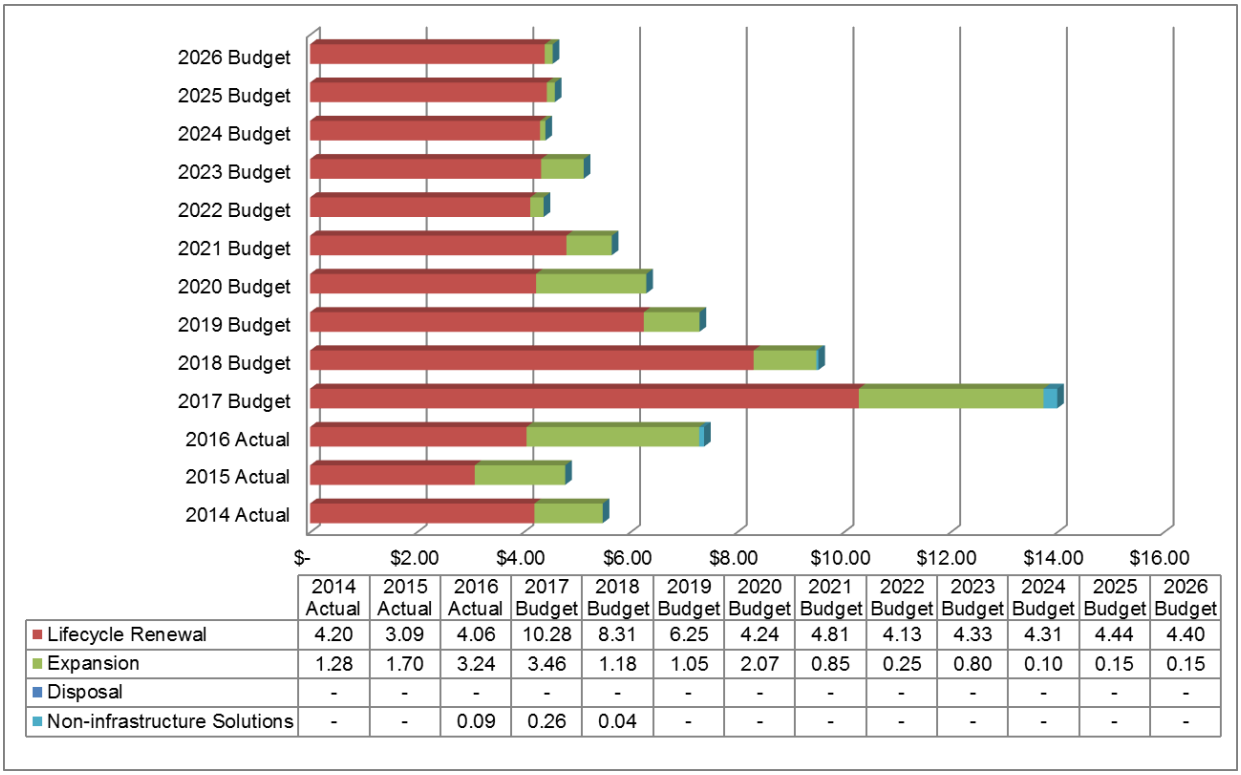
Capital investments for the water systems are currently funded by user rates, rate supported dedicated reserves, development charges (for growth projects) and grant funding when available. The water reserves are funded by user rates. As a result these funds are allocated to reserves and capital work is funded from the reserves.

The County received Clean Water and Wastewater Grant funding towards projects to be completed in 2017, which resulted in the significant increase over average expenditures and revenues.

[17] https://www.ontario.ca/laws/regulation/070453

## 5.2 Expenditure History and Forecasts

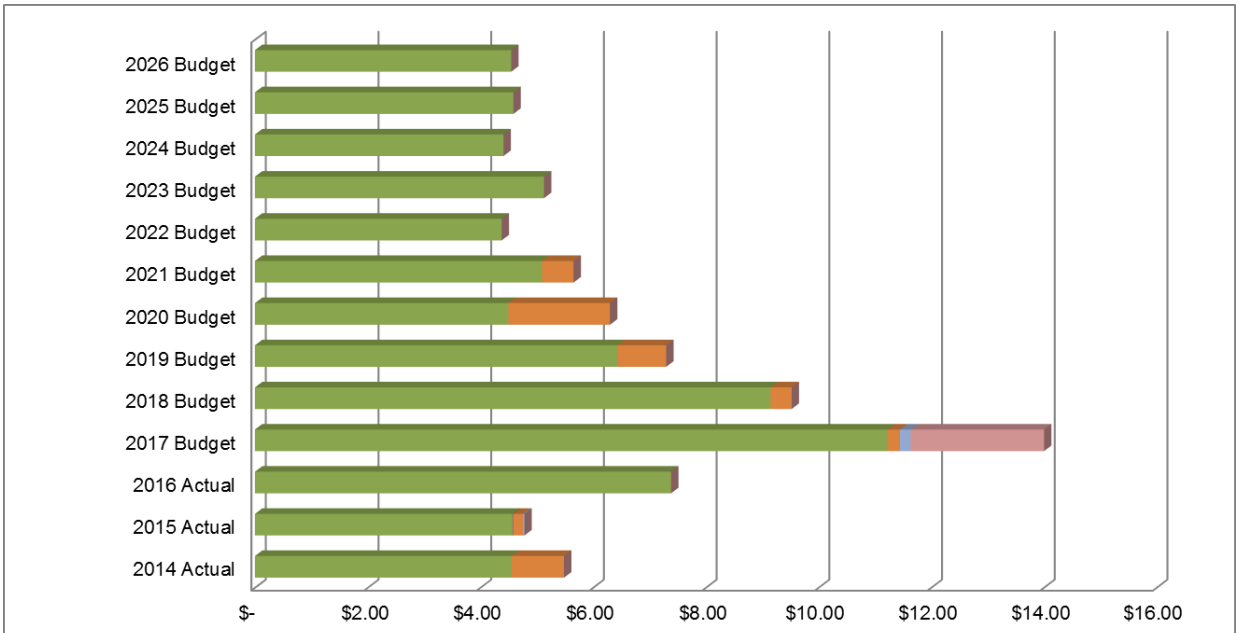
### Chart 5.2.1 Expenditures (millions)




| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lifecycle Renewal | 4.20 | 3.09 | 4.06 | 10.28 | 8.31 | 6.25 | 4.24 | 4.81 | 4.13 | 4.33 | 4.31 | 4.44 | 4.40 |
| Expansion | 1.28 | 1.70 | 3.24 | 3.46 | 1.18 | 1.05 | 2.07 | 0.85 | 0.25 | 0.80 | 0.10 | 0.15 | 0.15 |
| Disposal | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Non-infrastructure Solutions | - | - | 0.09 | 0.26 | 0.04 | - | - | - | - | - | - | - | - |

## 5.3 Capital Revenues

Chart 5.3.1 Sources of Capital Revenues 2014-2026 (millions)

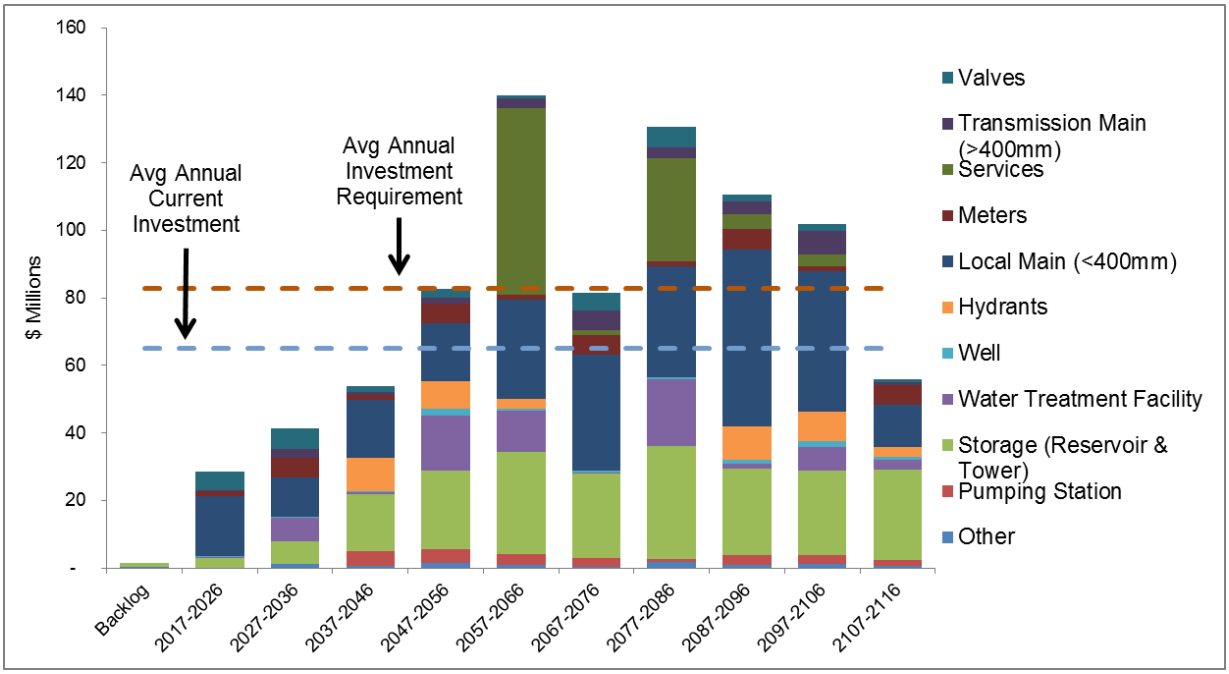



| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Debenture | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Reserves | 4.55 | 4.57 | 7.38 | 11.22 | 9.15 | 6.43 | 4.50 | 5.09 | 4.38 | 5.13 | 4.41 | 4.59 | 4.55 |
| CSAP | - | 0.01 | - | - | - | - | - | - | - | - | - | - | - |
| Development Charges | 0.93 | 0.18 | 0.00 | 0.22 | 0.38 | 0.87 | 1.81 | 0.56 | - | - | - | - | - |
| Other | - | 0.02 | - | 0.19 | - | - | - | - | - | - | - | - | - |
| Grant | - | - | - | 2.37 | - | - | - | - | - | - | - | - | - |

## 5.4 Capital Investment

Based on the asset management strategy identified above the financial requirements over the next 100 years are determined in 2016 dollars. These estimates assume that all work is able to be completed as indicated and does not take into account future changes due to environmental factors, new maintenance techniques, and additional growth.

Further component refinement is required for water facilities as the replacement is based on a full building end-of-life approach. It is anticipated that the annual replacement requirements will be updated as part of the next rates study.




The average annual investment requirement represents the amount of funding sources that should be received on an annual basis to fund the long-term replacement of assets. As the current modeling does not include growth related projects, development charges are not included.

The chart below illustrates actual funding received for 2014 through 2016 as well as the projected funding expected from 2017 through 2021 as per the 2017 approved budget. This chart looks at the systems on a consolidated approach. This information is reviewed by system with each rates study as it helps determine the required rates to achieve full cost recovery.

| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget |
|---|---|---|---|---|---|---|---|---|
| **Funding Sources** | | | | | | | | |
| Debenture P&I | 1,256,707 | 1,226,141 | 806,248 | 408,619 | 399,017 | 389,416 | 380,178 | 370,213 |
| Reserve Interest | 254,972 | 283,246 | 374,099 | 317,991 | 260,795 | 242,693 | 249,803 | 262,526 |
| User Fees | 6,167,193 | 6,827,095 | 7,910,464 | 5,621,600 | 5,975,604 | 5,926,635 | 5,887,266 | 5,852,186 |
| | **7,678,872** | **8,336,482** | **9,090,811** | **6,348,210** | **6,635,416** | **6,558,744** | **6,517,247** | **6,484,925** |
| Avg Annual Investment Required | **3,950,000** | **3,950,000** | **3,950,000** | **8,300,000** | **8,300,000** | **8,300,000** | **8,300,000** | **8,300,000** |
| *Surplus (Deficit)* | *3,728,872* | *4,386,482* | *5,140,811* | *(1,951,790)* | *(1,664,584)* | *(1,741,256)* | *(1,782,753)* | *(1,815,075)* |

Funding is currently in a deficit position, due to increasing linear infrastructure costs and addition of valve and hydrant replacement costs. Future enhancement to asset profiles will change the average annual investment required. This revised figure will be used to inform the next water and wastewater rates study.

# Wastewater Systems

STATUS:
**Good**

## 1.0 Introduction

Oxford County owns and operates 9 wastewater treatment plants and 11 wastewater collection systems serving 11 communities. All collection systems are operated by Oxford County staff, with the exception of the systems in Woodstock and Tillsonburg, which are operated by the City of Woodstock and the Town of Tillsonburg, respectively.

### 1.1 Improvement Plan

The overall condition of the County's wastewater systems is rated good. It is anticipated that the condition rating will remain steady as the County's wastewater rates are set using a full cost recovery approach.

| | Positive Impacts on Rating |
|---|---|
| 1. | Ingersoll wastewater treatment plant upgrades are nearing completion. |
| 2. | Newer wastewater systems; Embro, Innerkip, Mount Elgin and Thamesford. |
| 3. | The water and wastewater rate setting for 2017-2020 was completed in January 2017 to ensure full cost recovery through user rates. |
| | **Negative Impacts on Rating** |
| 1. | Aging linear in several systems continue to require significant investments. |

The following recommendations are based on the review of current management practices; and, inventory, valuation and condition analysis.

| | Recommendations |
|---|---|
| 1. | Work with operational authorities to continue to fill infrastructure data gaps. |
| 2. | Review 2007 through 2017 Closed Circuit Television (CCTV) Inspection reports and update wastewater linear with condition information accordingly. |
| 3. | Investigate zoom camera technologies. |
| 4. | Collaborate with area municipalities to align asset management plans to gain efficiencies by optimizing investment priorities of linear assets. |
| 5. | Determine asset components and maintenance strategies for facilities and associated processes. |
| 6. | Incorporate work in process data into annual replacement requirements. |

| | |
|---|---|
| 7. | Implement condition assessments for all wastewater facility components (including processes) and linear infrastructure. Establish a plan to update and assess infrastructure condition. |
| 8. | Refine the risk assessment to assign appropriate risk level to each asset based on different factors. |
| 9. | Work with operating authorities to ensure that data related to new infrastructure within subdivisions is gathered in a timely manner. |
| 10. | Establish and monitor appropriate and measurable levels of service and performance measures. |

## 2.0 State of Infrastructure

### 2.1 Inventory

The County continues to make improvements to increase the integrity of the wastewater data. The inventory figures below also capture inventory within new subdivisions constructed to the end of 2016, that the County is aware of, where the County has not yet assumed ownership. The County generally assumes ownership approximately two years after full operation. It is important to include this new linear infrastructure to ensure that lifecycle activities are planned and funded accordingly.

Table 2.1.1 – Wastewater Systems Inventory

| Asset Type | Asset Component | | Current Inventory | 2014 Inventory |
|---|---|---|---|---|
| Linear | Local Sewer (<450mm) | m | 462,055 | 443,122 |
| | Trunk Sewer (>450mm) | m | 62,385 | 61,608 |
| | Force main | m | 56,384 | 53,779 |
| | Sanitary Lateral | each | 31,382 | 29,237 |
| | STEP/STEG units & Grinder Pumps | each | 222 | 141 |
| Facilities | Pumping Station | each | 28 | 30 |
| | Wastewater Treatment Plant | each | 9 | 9 |
| | Odour Control Facilities | each | 2 | 2 |
| | Biosolids Centralized Storage Facility | each | 1 | 1 |

### 2.2 Valuation

#### Replacement Cost Valuation

The County maintains a sanitary sewer design and installation guide to aid in the location and design of sanitary infrastructure while meeting provincial standards. PVC pipes are used for pipe sizes up to 600mm in diameter and concrete is generally used for pipe sizes in excess of 600mm. Concrete, PVC and other pipe material may also be used in other instances depending on design parameters including depth and flow. For establishing replacement cost, pipes with a diameter of 600mm or below will be replaced with PVC, and pipes with a diameter in excess of 600mm will be replaced with concrete, regardless of current material.

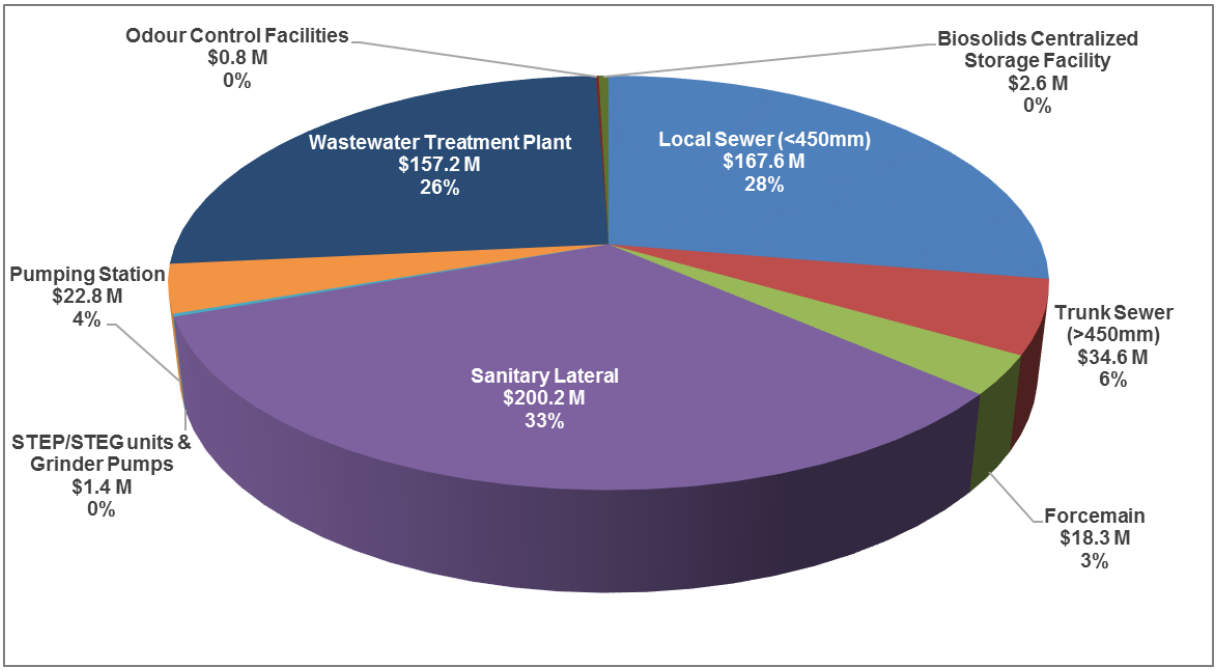
The replacement cost valuation for wastewater linear is based on 2016 tender prices, where available. The facilities replacement costs are largely based on the 2014 replacement values. Some changes were made where work has been completed or the County has received updated information. The County plans to complete further investigations in this area to ensure the correct values are assigned to the building and processes.

Table 2.2.1 – Wastewater Systems Replacement Valuation

| Material | Unit | Cost |
|---|---|---|
| Laterals | each | $6,500 |
| Storage Tank | each | $5,000 |
| Grinder Pump | each | $8,200 |
| PVC 50 – 150mm | m | $250 |
| PVC 200 – 250mm | m | $350 |
| PVC 300 – 375mm | m | $450 |
| PVC 400 – 600mm | m | $500 |
| CONCRETE 675 – 825mm | m | $600 |
| CONCRETE 900 – 1500mm | m | $800 |

| Asset Component | Replacement Cost | % of Total Value |
|---|---|---|
| Local Sewer (<450mm) | $167,610,674 | 27.68% |
| Trunk Sewer (>450mm) | $34,582,376 | 5.71% |
| Force main | $18,325,541 | 3.03% |
| Sanitary Lateral | $200,151,781 | 33.06% |
| STEP/STEG units & Grinder Pumps | $1,362,800 | 0.23% |
| Pumping Station | $22,837,871 | 3.77% |
| Wastewater Treatment Plant | $157,170,794 | 25.96% |
| Odour Control Facilities | $811,600 | 0.13% |
| Biosolids Centralized Storage Facility | $2,600,000 | 0.43% |
| **Total Replacement Cost** | **$605,453,437** | **100%** |

| Replacement Cost Per Household | $20,516 |
|---|---|



### 2.3 Asset Condition Assessment

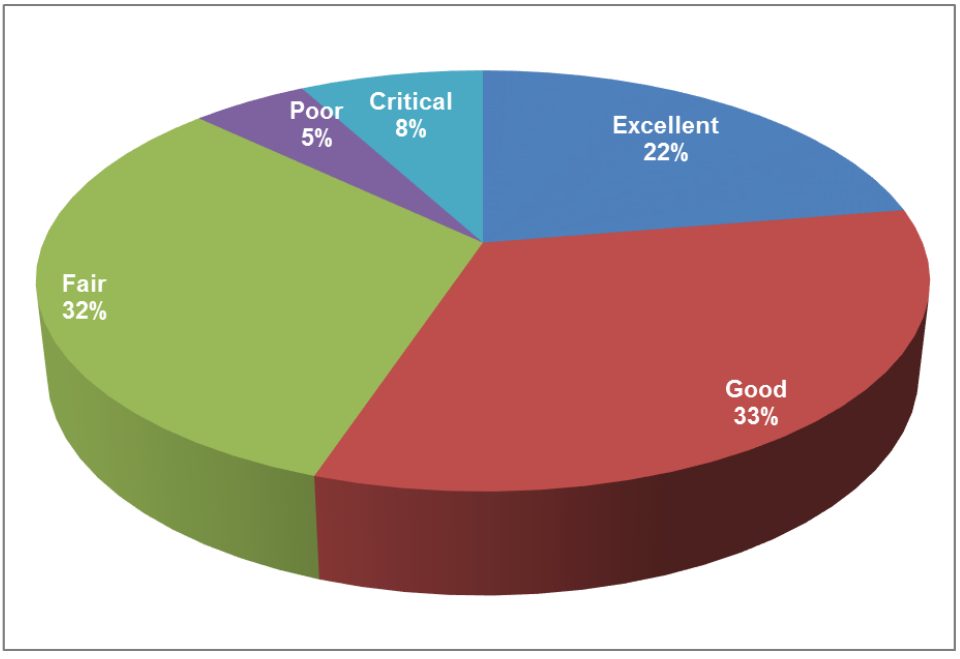
The chart below compares the status of our wastewater systems as identified in our 2014 Asset Management Plan to the status at the end of 2016.

This information does not take into consideration any work in process assets, including those from new subdivisions where the County has not yet assumed ownership. The current asset software does not allow the work in process data to be included in the condition reports; it is anticipated that this will be included in future updates of the AMP.

The trend shows that the status of wastewater assets is relatively steady. Infrastructure data gaps exist where the installation date of linear assets is unknown and results in a critical condition rating. The County will continue to work on filling the data gaps for the next AMP.

Table 2.3.1 Wastewater Systems Condition Assessment

| Asset Component | 2014 Condition Rating | 2016 Condition Rating | Trend |
|---|---|---|---|
| Local Sewer (<450mm) | Good | Good | → |
| Trunk Sewer (>450mm) | Good | Fair | ↓ |
| Force main | Excellent | Excellent | → |
| Sanitary Lateral | Good | Excellent | ↑ |
| STEP/STEG units & Grinder Pumps | Excellent | Excellent | → |
| Pumping Station | Excellent | Good | ↓ |
| Wastewater Treatment Plant | Good | Good | → |
| Odour Control Facilities | Excellent | Excellent | → |
| Biosolids Centralized Storage Facility | Excellent | Excellent | → |



### 2.4 Assessment Approach

The Pipeline Assessment Certificate Program is the North American Standard for pipeline defect identification and assessment[18]. CCTV is the principal method of inspecting drains and sewers. Having an excellent quality image will help ensure the assessment is completed accurately. In this process, a small robotic crawler vehicle with the CCTV camera attached is lowered into the pipe to complete the inspections. A technician records information regarding the pipe, including the number and type of defects. A structural rating, on a scale of 1-5, is then assigned using standardized sewer condition assessment standards, with 0 representing an asset with minimal structural deficiencies and 5 representing assets on the verge of failure.

While the County has the results of its CCTV inspection information from 2007 to current available, the overall rating is not in a format readily available to be applied to the assets. With future asset management plan updates, this information will be captured and assigned to the individual asset is a format readily available.

The assessed conditions of wastewater linear for this AMP are based on the age of the pipe.

| Age | Rating |
|---|---|
| 0-20 | Excellent |
| 21-40 | Good |
| 41-60 | Fair |
| 61-80 | Poor |
| 81+ | Critical |

The County's target for completing CCTV on each pipe segment is 15 years, which aligns with industry practice. The County may perform more frequent inspections on pipes with lower ratings as required.

Zoom camera technology is another option within the industry for determining the condition of pipe segments. The County has not used this technology to this point, but will investigate the benefits of using this technology within each system as it is a lower cost alternative. Any cost impacts will be incorporated into future budgets for each system.

The assessment approach for facilities is identified in section 2.4 of the Social Housing and Corporate Facilities Report Card, where available. Where conditions on facilities are not available the age based condition is used. The assessment approach for machinery and equipment used to deliver the wastewater service is yet to be determined; as a result their condition is based on age.

[18] https://www.nassco.org/content/pipeline-assessment-pacp

### 2.5 Useful Life

Table 2.5.1 outlines the anticipated useful life for each new build/replacement, along with the anticipated added life when a structure undergoes rehabilitation. These lives are used for PSAB purposes and align with the County's capital asset policy.

Further refinement of the asset management strategies between the component breakdown for facilities and processes is required. The most effective and efficient maintenance schedule and the overall lifecycle of each asset will be determined.

Full replacement is anticipated at the end of the defined lifecycle, however it is possible to have components exceed the lives defined as well as components that require replacement prior to the end of their anticipated life.

Table 2.5.1 Useful Life

| Wastewater Systems | Anticipated Useful Life (years) | Anticipated Lifecycle Life (years) |
|---|---|---|
| New Build / Replacement | | |
| Force main | 90 | 90 |
| Laterals | 90 | 90 |
| Local Sewer | 90 | 90 |
| STEP/STEG units & Grinder Pumps | 30 | 30 |
| Trunk Sewer | 90 | 90 |
| Maintenance Strategy | | |
| Relining | 50 | N/A |

## 3.0 Level of Service

The County defines the wastewater service as an external service that collects and treats a cubic metre of wastewater from a wastewater customer. Service blockage from fats, oils, grease and root intrusion are the primary cause of service interruptions to customers

### Corporate Objective

The wastewater collection and treatment service ensures protection of the environment and public health of residents and visitors to Oxford County and partners in the watershed.

### Legislative Requirements

Each of the County's wastewater treatment plants are regulated under the Ontario Water Resources Act[19] and operated in accordance with Certificates of Approval issued by the Ontario Ministry of the Environment.

The Environmental Certificates of Approval for the County's wastewater treatment plants require annual reporting of operational and treated effluent discharge parameters into the receiving streams. The reports are available on the County's website.

### Performance Measures

Table 3.0.1 lists performance measures that the County is currently tracking and reporting on. Also listed in the table are the metrics contained within the draft regulation. The County is investigating these measures further in order to determine how best to capture and report on the metrics for the systems the County operates. Although the new measures may report on similar objectives, in order to keep cost and preformance metrics aligned, the County will continue to track the measures it currently uses where units differ. It is important to note that the rural nature of the County will cause the new measures regarding percent served to be very low compared to more urban municiaplities.

Table 3.0.1 Performance Measures

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Wastewater collection | Operating costs per kilometre of wastewater main | Efficient collection of wastewater | $4,670 | $3,463 | $5,774 |
| Wastewater treatment & disposal | Operating costs per megalitre for treatment and disposal | Efficient treatment and disposal of wastewater | $506 | $567 | $436 |
| Wastewater collection, | Integrated operating costs per megalitre of wastewater treated | Efficient collection, treatment and | $699 | $728 | $668 |

[19] https://www.ontario.ca/laws/statute/90o40

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| treatment & disposal | | disposal of wastewater | | | |
| Wastewater main backups (in KMs) | Number of wastewater main backups per 100 kilometres of wastewater main in a year | Effective wastewater collection system | 0.35 | 1.06 | 1.60 |
| Wastewater bypasses treatment | Percentage of wastewater estimated to have by-passed treatment | Effective wastewater system | 0.001% | 0.000% | 0.002% |
| Population served | Percentage of properties serviced by the wastewater system | Scope of wastewater system | NCT | NCT | NCT |
| Wastewater treatment procedures | Number of MOECC effluent violations per year due to wastewater discharge | Reliability of wastewater system | NCT | NCT | NCT |
| Wastewater main backups (in days) | Number of connection-days of backups per year | Reliability of wastewater collection system | NCT | NCT | NCT |

## 4.0 Asset Management Strategy

### 4.1 Lifecycle Activities and Planned Actions

There are four maintenance categories considered in the overall sustainable management of wastewater assets, described as follows:

Table 4.1.1 Lifecycle Activities

| Strategy | Lifecycle Activity | Trigger |
|---|---|---|
| Minor maintenance | Regularly scheduled maintenance and inspection programs including cleaning and flushing, manhole repairs, CCTV inspections, exercising diesel gen-sets and minor repairs. These activities do not increase the overall condition of the asset, nor increase its useful service life. Activities such as repairing or replacing broken sewers. | Ongoing |
| Preventive maintenance | Replacing components such as motors or pumps, and similar unscheduled or unplanned emergency activities. These activities increase the condition of the asset and extend the useful service life. | Good |
| Rehabilitation | One time events that extend the life of the asset including sewer lining and seal and grout programs. | Fair/Poor |
| Replacement | Occurs at the end of the useful service life – can vary among systems due to construction material and environmental factors that impact the degree of deterioration and performance. | Critical |

### 4.2 Risks Associated with the Strategy

For the purposes of this version of the AMP the County has used the asset component to determine the consequence of failure as outlined in Table 4.2.1. Assessing risks is a complex endeavour and further refinement is required to assign the appropriate risk to each wastewater asset. One such factor is pipe location as a pipe failure near the main line railroad tracks would have catastrophic consequence, while a pipe the same diameter on a residential street may only have a marginal consequence.

Table 4.2.1 Consequence of failure

| Scoring | Consequence | |
|---|---|---|
| 1 | Minimal | Sanitary Lateral, STEP/STEG units & Grinder Pumps |
| 2 | Marginal | Biosolids Centralized Storage Facility |
| 3 | Serious | Odour Control Facilities, Local Main |

| Scoring | Consequence | |
|---|---|---|
| 4 | Critical | Pumping Station, Trunk Sewer, Force main |
| 5 | Catastrophic | Wastewater Treatment Plant |

Table 4.2.2 Asset risk profile


## 4.3 Lifecycle Analysis

Additional work is required to determine the lifecycle requirements of the facilities and their processes. It is anticipated that this will include a detailed component breakdown to allow for strategies to be developed. This will prioritize projects and aid in the development of future capital budgets.

## 5.0 Financing Strategy

### 5.1 Financing Strategy

The County worked with Hemson Consulting Ltd. to set water and wastewater rates for 2017-2020. The rates were established to ensure full cost recovery as required under the regulation. The new rates, effective April 1, 2017, were approved by County Council on January 25, 2017.

Where possible, replacement activities are planned in conjunction with the replacement needs for the road network and water linear. This requires a co-ordinated effort with area municipalities as the majority of the County owned water and wastewater linear falls under the area municipalities' roads infrastructure. This collaboration is essential for ensuring a cost effective approach to maintaining assets within the County regardless of ownership.

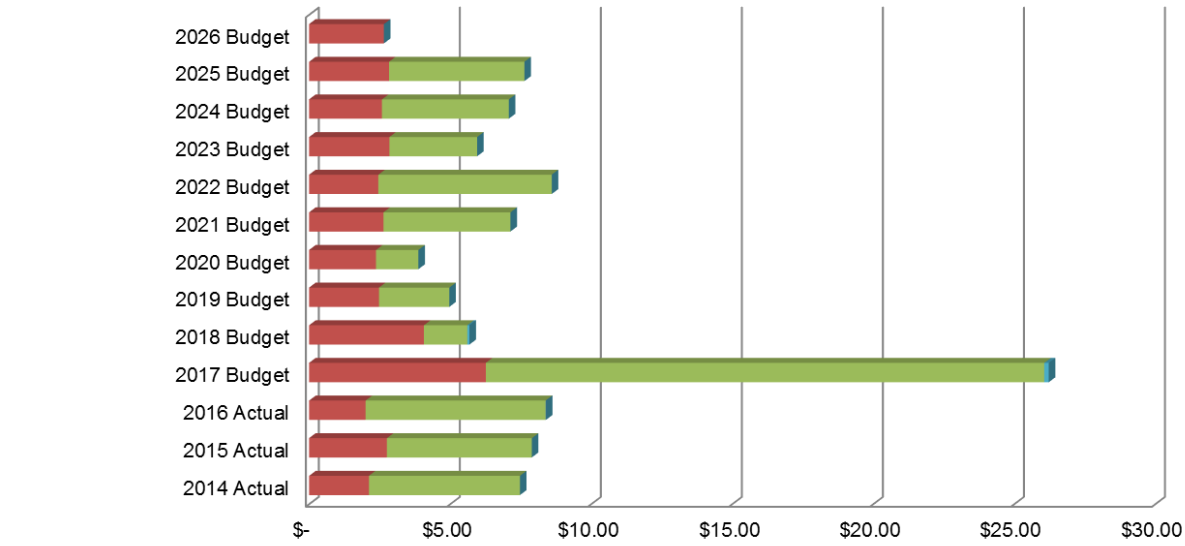
Capital investments for the wastewater systems are currently funded by user rates, rate supported dedicated reserves, development charges (for growth projects) and grant funding when available. The wastewater reserves are funded by user rates. As a result these funds are allocated to reserves and capital work is funded from the reserves.

The County received Clean Water and Wastewater Grant funding towards projects to be completed in 2017, which resulted in the significant increase over average expenditures and revenues.

## 5.2 Expenditure History and Forecasts

Construction of the new Ingersoll wastewater treatment plant began in 2014 and is expected to be completed in 2018. This multi-million dollar project resulted in an increase in expenditures over this period.

### Chart 5.2.1 Expenditures (millions)

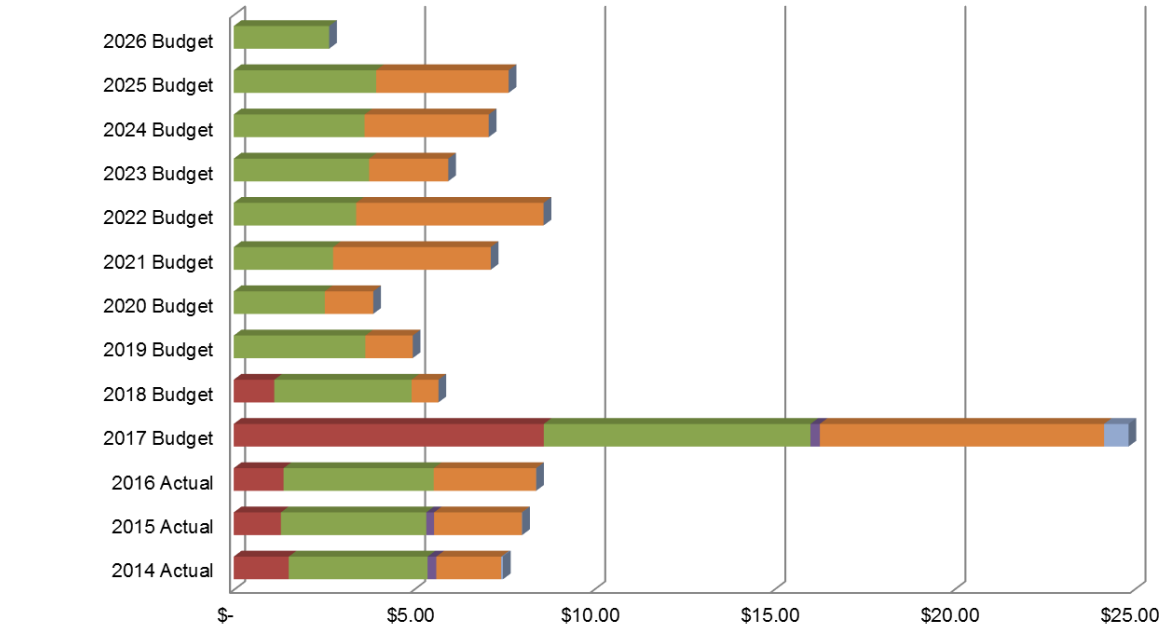



| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lifecycle Renewal | 2.12 | 2.76 | 2.00 | 6.27 | 4.07 | 2.48 | 2.37 | 2.64 | 2.45 | 2.85 | 2.58 | 2.83 | 2.65 |
| Expansion | 5.36 | 5.14 | 6.38 | 19.80 | 1.54 | 2.49 | 1.50 | 4.50 | 6.15 | 3.11 | 4.50 | 4.80 | - |
| Disposal | - | - | 0.01 | - | - | - | - | - | - | - | - | - | - |
| Non-infrastructure Solutions | - | - | - | 0.16 | 0.08 | - | - | - | - | - | - | - | - |

## 5.3 Capital Revenues

The Ingersoll wastewater treatment plant required a significant amount of funding to complete. The Ingersoll wastewater reserve did not have a balance sufficient to fund the non-growth related share of the project resulting in a significant debenture requirement budgeted for 2017.

Chart 5.3.1 Sources of Capital Revenues 2014-2026 (millions)

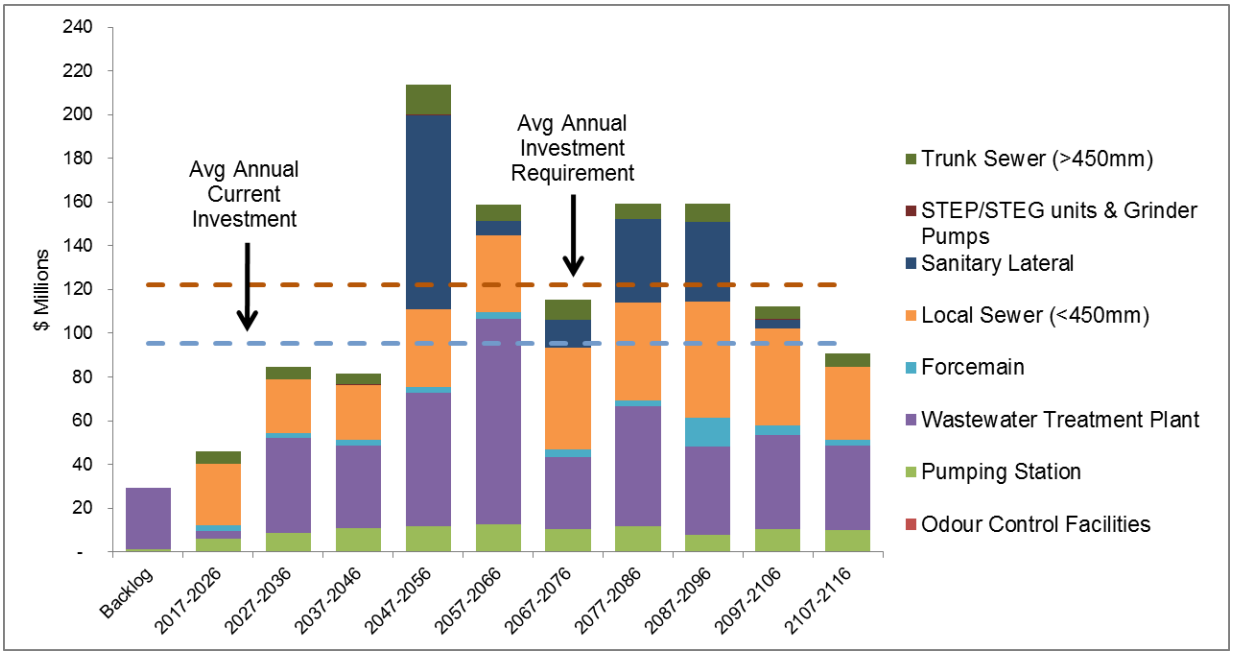



| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Debenture | 1.53 | 1.31 | 1.38 | 8.61 | 1.13 | - | - | - | - | - | - | - | - |
| Reserves | 3.85 | 4.04 | 4.17 | 7.40 | 3.81 | 3.66 | 2.53 | 2.76 | 3.40 | 3.76 | 3.63 | 3.96 | 2.65 |
| CSAP | 0.24 | 0.22 | - | 0.26 | - | - | - | - | - | - | - | - | - |
| Development Charges | 1.80 | 2.44 | 2.84 | 7.89 | 0.75 | 1.31 | 1.34 | 4.38 | 5.21 | 2.20 | 3.45 | 3.68 | - |
| Other | 0.05 | 0.01 | 0.00 | 0.68 | - | - | - | - | - | - | - | - | - |

## 5.4 Capital Investment

Based on the asset management strategy identified, the financial requirements over the next 100 years are determined in 2016 dollars. These estimates assume that all work is able to be completed as indicated and does not take into account future changes due to environmental factors, new maintenance techniques, and additional growth.

Further component refinement is required for wastewater facilities as the replacement is based on a full building end of life approach. It is anticipated that the annual replacement requirements will be updated.as part of the next rates study.




The average annual investment requirement represents the amount of funding sources that should be received on an annual basis to fund the long-term replacement of assets. As the current modeling does not include growth related projects, development charges are not included.

The chart below illustrates actual funding received for 2014 through 2016 as well as the budgeted funding from 2017 and projected funding expected through 2021 as per the 2017 approved budget. This chart looks at the systems on a consolidated approach. This information is reviewed by system with each rates study as it helps determine the required rates to achieve full cost recovery.

| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget |
|---|---|---|---|---|---|---|---|---|
| **Funding Sources** | | | | | | | | |
| Debenture P&I | 2,056,165 | 2,053,606 | 1,832,303 | 1,599,526 | 1,574,725 | 1,555,120 | 1,536,276 | 1,515,910 |
| Reserve Interest | 271,117 | 299,809 | 432,845 | 440,376 | 488,367 | 540,652 | 603,127 | 659,703 |
| User Fees | 5,367,937 | 6,537,594 | 8,043,598 | 9,450,501 | 6,734,383 | 6,765,527 | 7,111,454 | 7,226,875 |
| | **7,695,219** | **8,891,008** | **10,308,747** | **11,490,403** | **8,797,475** | **8,861,299** | **9,250,857** | **9,402,488** |
| Avg Annual Investment Required | **5,770,000** | **5,770,000** | **5,770,000** | **12,200,000** | **12,200,000** | **12,200,000** | **12,200,000** | **12,200,000** |
| *Surplus (Deficit)* | *1,925,219* | *3,121,008* | *4,538,747* | *(709,597)* | *(3,402,525)* | *(3,338,701)* | *(2,949,143)* | *(2,797,512)* |

Funding is currently in a deficit position, due to increasing linear infrastructure costs. Future enhancement to asset profiles will change the average annual investment required. This revised figure will be used to inform the next water and wastewater rates study.

# Social Housing & Corporate Facilities


**STATUS:**
**Fair**

## 1.0 Introduction

Property management is an internal service with the purpose of providing well maintained buildings and property to aid in the delivery of County services.

### 1.1 Improvement Plan

The overall condition of the County's social housing and corporate facilities is rated as fair. It is anticipated that the condition rating will decline due to calculated investment requirements, capacity deficiencies to deliver the required work and the inability to fund those requirements in the short-term (next five to ten years).

| | Positive Impacts on Rating |
|---|---|
| 1. | Continued energy efficiencies upgrades (lighting, boilers, windows, doors, insulation, roofs) |
| 2. | Allocation of interest to capital reserves. |
| | **Negative Impacts on Rating** |
| 1. | Stability and availability of sufficient long term funding by Provincial agencies for social housing. |
| 2. | Existing facilities funding being used towards debenture repayments for previous projects. |

The following recommendations are based on the review of current management practices; and, inventory, valuation and condition analysis.

| | Recommendations |
|---|---|
| 1. | Determine asset components and maintenance strategies. |
| 2. | Establish and monitor appropriate and measurable levels of service and performance measures. |
| 3. | Refine risk assessment to assign appropriate risk level to each asset based on different factors. |
| 4. | As debenture repayments decline, maintain current investment by allocating these funds to reserves. |

Facilities with an overall rating of poor or critical are listed below along with the current maintenance strategy.

| Name | Location | Condition | Maintenance Strategy |
|---|---|---|---|
| Social Housing Facility | 57 Rolph St., Tillsonburg | Poor | Investigating options |
| Landfill Administration Building | 384088 County Rd. #46, Salford | Poor | Construction to start in 2017 with expected completion in 2018 |
| Landfill – Quonset | 384088 County Rd. #46, Salford | Poor | To be replaced when no longer safe for operation. |
| Former Archives Building | 12 Vine Street, Beachville | Critical | Sold on condition of sale report |

## 2.0 State of Infrastructure

### 2.1 Inventory

For the 2014 Asset Management Plan the County recorded its buildings into major components under the headings of structure, exterior, interior and site elements. The County is further investigating how best to show the breakdown to aid in completing asset changes and complete lifecycle costing analysis.

Table 2.1.1 – Social Housing and Corporate Facilities Inventory

| Asset Type | Asset Component | | Current Inventory | 2014 Inventory |
|---|---|---|---|---|
| Social Housing | Apartment | units/bldg | 493 / 14 | 493 / 14 |
| | Townhouse / semi-detaches | units/bldg | 135 / 48 | 135 / 48 |
| Corporate Facilities | Paramedic Stations[20] | bldg | 5 | 5 |
| | Libraries[21] | bldg | 4 | 4 |
| | Long Term Care Facilities | beds/bldg | 228 / 3 | 228 / 3 |
| | Works Yard | yard/bldg | 4 / 20 | 4 / 17 |
| | Administration | bldg | 9 | 10 |
| | Waste Management | site/bldg | 1 / 11 | 1 / 9 |
| | Shared Area Municipal Network Towers | tower | 18 | 18 |

### 2.2 Valuation

#### Replacement Cost Valuation

Replacement costs were determined by Building Condition Assessments (BCA) completed by Entuitive throughout 2015 and 2016. For sites where a BCA was not completed, those with construction dates within the last 10 years, replacement costs were estimated using historical construction costs and inflation rates, and adjusted to include additional cost estimates to meet the County's renewable energy targets.

The estimated replacement cost of the County's Social Housing and Corporate Facilities in 2016 dollars is $180.7 million. This results in an estimated replacement cost per household of $3,986 which is greater than the 2014 estimated replacement cost per household of $3,393.

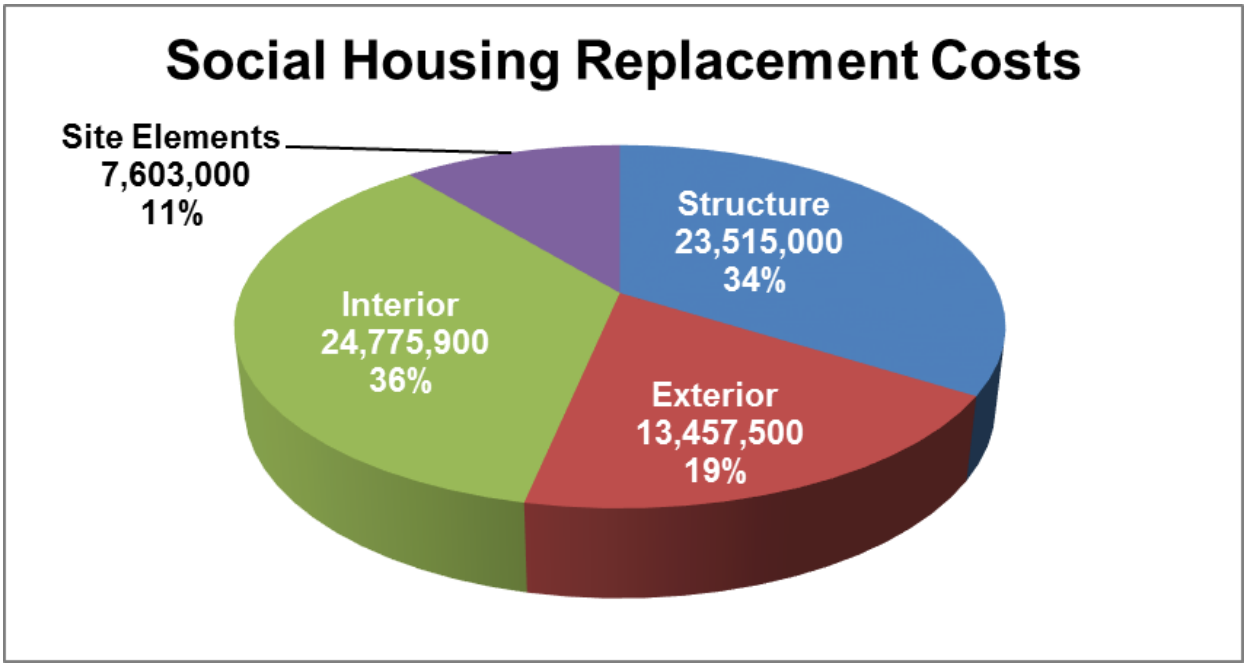
Table 2.2.1 – Social Housing and Corporate Facilities Replacement Valuation

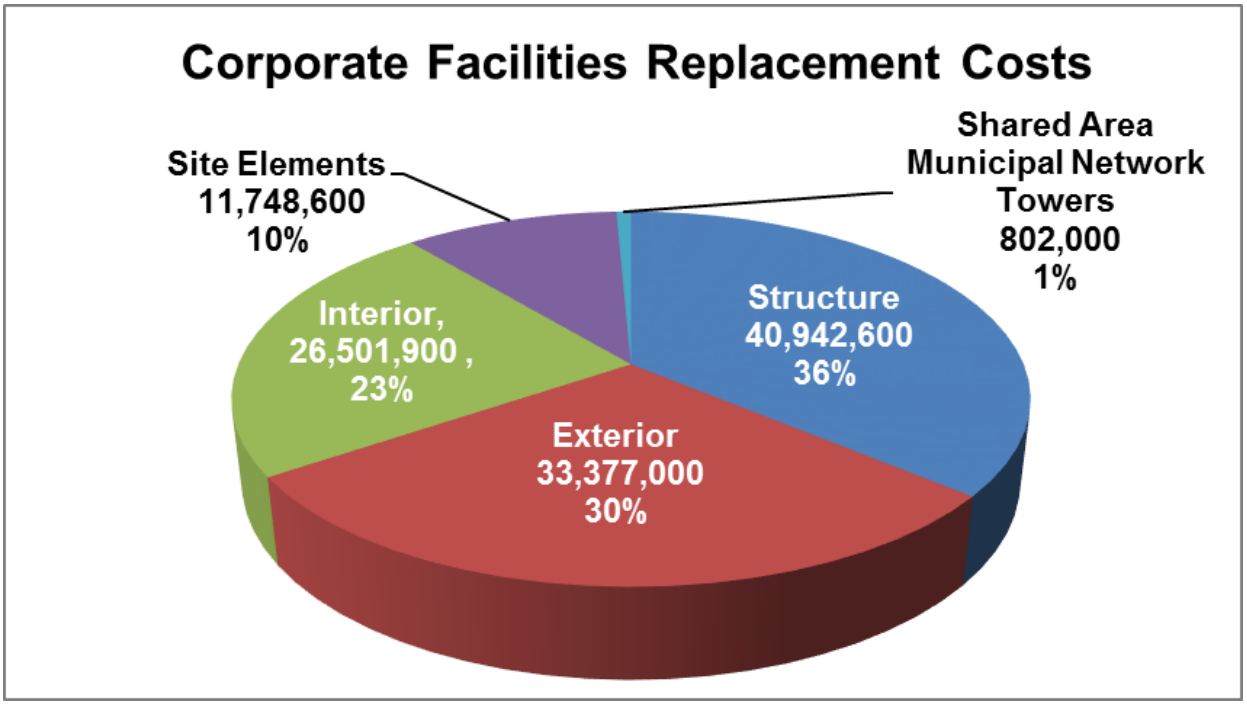
| Asset Type | Asset Component | Replacement Cost | % of Total Value |
|---|---|---|---|
| | Structure | $23,515,000 | 33.91% |

[20] Embro and Drumbo paramedic stations are co-located with Public Works Yards.
[21] Libraries represent the number of owned buildings and not the number of libraries that Oxford County operates.

| Asset Type | Asset Component | Replacement Cost | % of Total Value |
|---|---|---|---|
| Social Housing | Exterior | $13,457,500 | 19.40% |
| | Interior | $24,775,900 | 35.73% |
| | Site Elements | $7,603,000 | 10.96% |
| **Total Replacement Cost** | | **$69,351,400** | **100%** |
| Corporate Facilities | Structure | $40,942,600 | 36.11% |
| | Exterior | $33,377,000 | 29.44% |
| | Interior | $26,501,900 | 23.38% |
| | Site Elements | $11,748,600 | 10.36% |
| | Shared Area Municipal Network Towers | $802,000 | 0.71% |
| **Total Replacement Cost** | | **$113,372,100** | **100%** |

| | |
|---|---|
| **Social Housing Replacement Cost Per Household** | **$1,513** |
| **Corporate Facilities Replacement Cost Per Household** | **$2,473** |



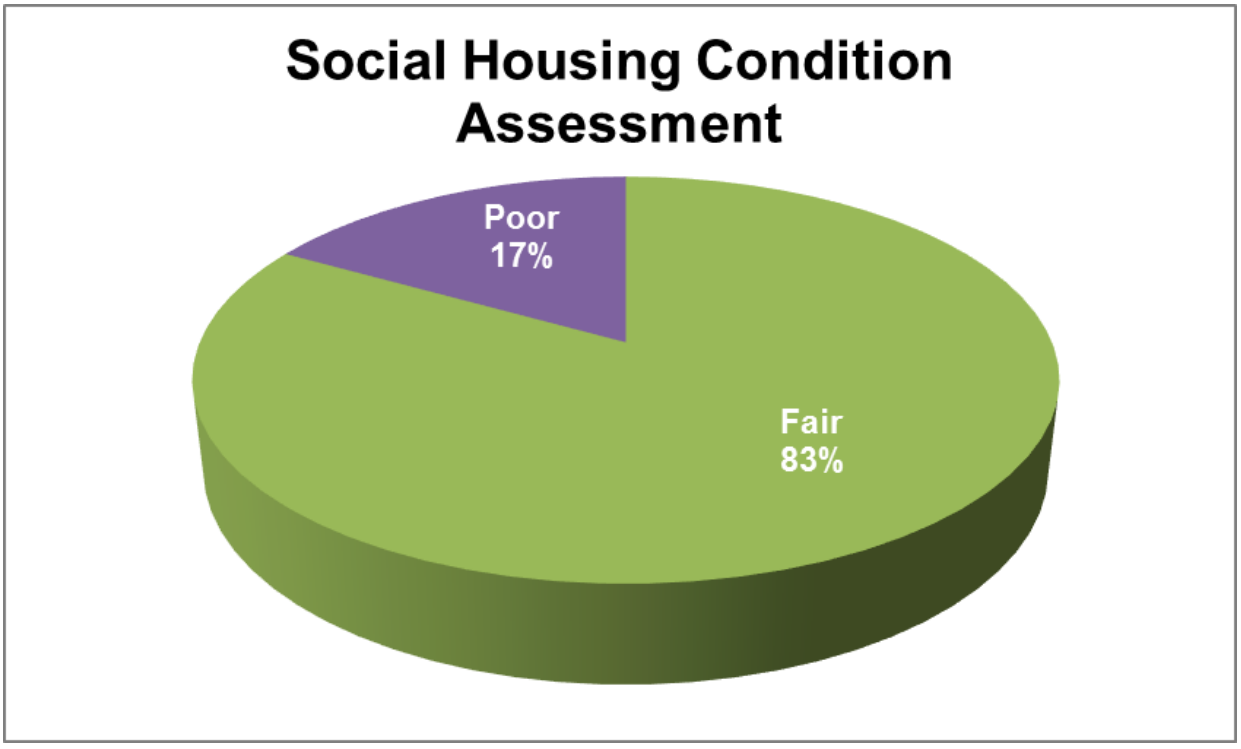


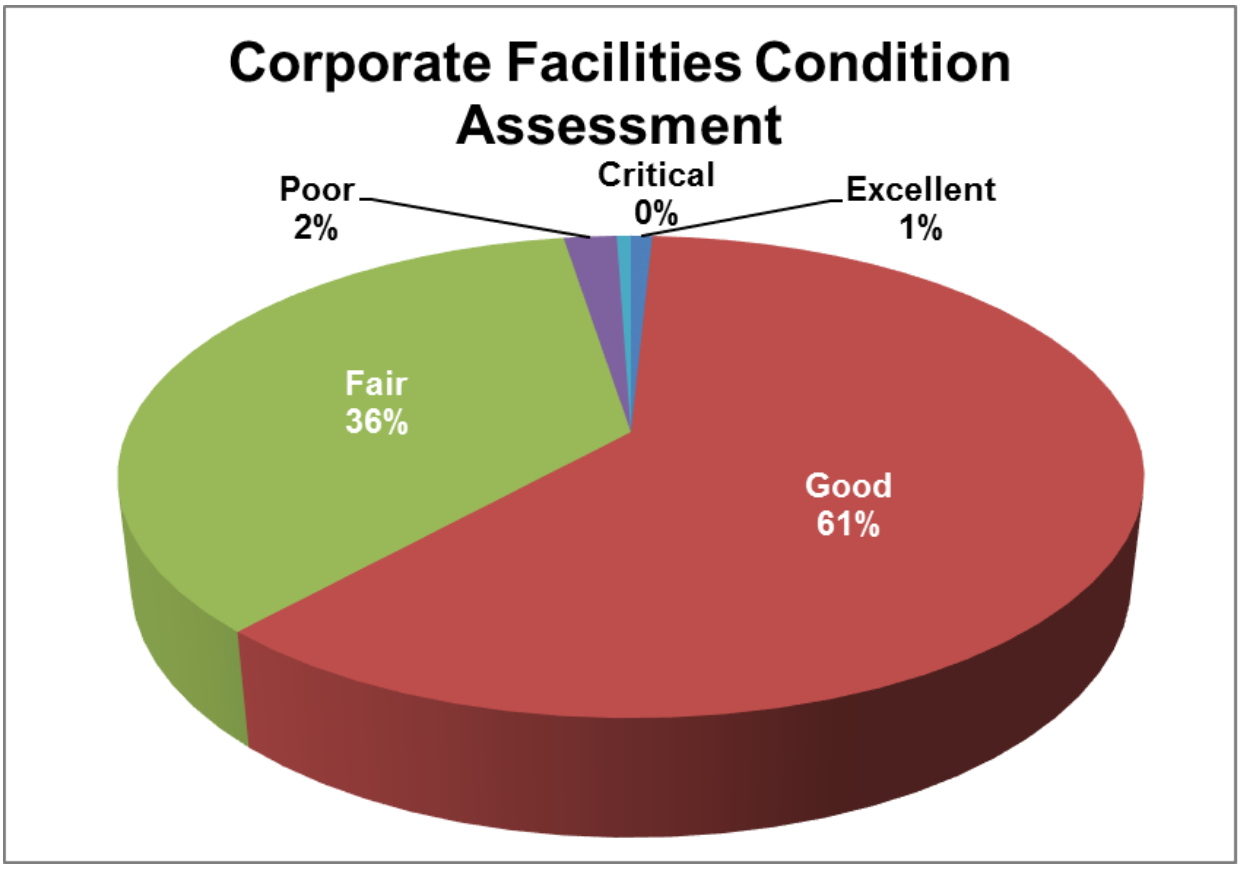

## 2.3 Asset Condition Assessment

The chart below compares the status of social housing and corporate facilities as identified in our 2014 Asset Management Plan to the status at the end of 2016. The trend shows that the overall condition of social housing and corporate facilities is declining. However, it should be noted that the condition assessments for 2014 were largely completed in house by public works staff using an informal approach, where the 2016 conditions were largely based on detailed results from the BCAs.

Table 2.3.1 Social Housing and Corporate Facilities Condition Assessment

| Asset Type | Asset Component | 2014 Condition Rating | 2016 Condition Rating | Trend |
|---|---|---|---|---|
| Social Housing | Structure | Good | Fair | ↓ |
| | Exterior | Good | Fair | ↓ |
| | Interior | Good | Fair | ↓ |
| | Site Elements | Fair | Fair | → |
| Corporate Facilities | Structure | Good | Good | → |
| | Exterior | Good | Fair | ↓ |
| | Interior | Good | Good | → |
| | Site Elements | Good | Good | → |
| | Shared Area Municipal Network Towers | Good | Fair | ↓ |
| **Overall Rating** | | **Good** | **Fair** | |


Social Housing Condition Assessment
Poor 17%
Fair 83%


Corporate Facilities Condition Assessment
Poor 2%
Critical 0%
Excellent 1%
Fair 36%
Good 61%

The BCAs completed included Facilities Condition Index (FCI) information for the buildings. Table 2.3.2 illustrates the average FCI for each facility type and the percentage of facilities where a rating was calculated.

Table 2.3.2 Social Housing and Corporate Facilities – Facilities Condition Index

| Asset Type | Asset Component | % Reviewed | Average FCI |
|---|---|---|---|
| Social Housing | Apartment | 86% | 0.0101 |
| | Townhouse / semi-detached | 60% | 0.0204 |
| Corporate Facilities | Paramedic Stations | 57% | 0.0007 |
| | Libraries | 50% | 0.0709 |
| | Long Term Care Facilities | 0% | N/A |
| | Works Yard | 25% | 0.0529 |
| | Administration | 33% | 0.0277 |
| | Waste Management | 73% | 0.0844 |
| | Shared Area Municipal Network Towers | 0% | N/A |

## 2.4 Assessment Approach

Throughout 2015 and 2016 Entuitive completed building condition assessments (BCA) and accessibility audits on all Oxford County owned facilities older than 10 years. The BCAs assessed and documented the current condition of facilities to identify capital repairs and replacements which may affect the continued operation and marketability of the property over the next ten (10) years, and to provide an assessment as to the level of accessibility for each property. The BCAs also provided an estimated replacement cost of each element. Due to the cost of completing BCAs, it is anticipated that the County will use a 10 year cycle for updates.

Currently, a 5-point scale for determining condition is used, with characteristics as outlined in the chart below. However, the BCAs provided condition ratings, by component, using a 3-point scale of good, fair or poor. In the future, condition assessments completed will use the 5-point scale to ensure alignment with our AMP.

| Condition | Characteristics |
|---|---|
| Excellent | No defects, as-new condition and appearance, some minor superficial wear and tear in paint and finishes, not requiring capital expenditure. |
| Good | An item in good condition is functioning better than expected given its known or estimated age and usage. This includes minor defects, superficial wear and tear, some deterioration to finishes, minor maintenance required such as caulking and re-painting |
| Fair | An item in fair condition is in a condition commensurate with its known or estimated age or usage. This includes significant defects evident, worn finishes requiring maintenance, services are functional but need attention, likely to become ‘poor’ within 5-10 years if not addressed. |

| Condition | Characteristics |
|---|---|
| Poor | An item in poor condition is functioning worse than expected given its age and usage. Examples include badly deteriorated, potential structural problems, inferior appearance, major defects, components fail frequently, observable deterioration requiring capital repair or the component failing, likely to become 'critical' in less than 5 years if not addressed. |
| Critical | At this stage the building or a component thereof has failed making it not operational, not viable, and unfit for occupancy or normal use, or environmental/contamination/pollution issues exist. |

The Facilities Condition Index (FCI) is used as a benchmark to compare the relative condition of facilities. FCI is calculated as the ratio of deferred maintenance, repair and replacement dollars to the current replacement value of the facility. An Extended Facilities Condition Index (EFCI) can also be used as this takes into consideration upcoming maintenance requirements on a facility. The BCAs calculated the FCI on a whole building approach.

Ratings are generally categorized into good/fair/poor, however the ratings have been realigned as per below:

| Value | Rating |
|---|---|
| 0.00 to 0.02 | Excellent |
| 0.02 to 0.05 | Good |
| 0.05 to 0.10 | Fair |
| 0.10 to 0.30 | Poor |
| 0.30 + | Critical |

### 2.5 Useful Life

The useful life will vary significantly by component and the overall life is significantly impacted by the maintenance strategy.

The chart below outlines the anticipated useful life for each new build/replacement. These lives are used for PSAB purposes and align with the County's capital asset policy. Once the County has determined the component breakdown, effective asset management strategies can be developed. This will determine the maintenance schedule along with the overall lifecycle of each component.

Table 2.5.1 Useful Life

| Social Housing and Corporate Facilities | Anticipated Useful Life (years) |
|---|---|
| New Build / Replacement | |
| Foundation | 50 |
| Super Structure | 50 |
| Exterior Enclosure | 20-40 |
| Roofing | 20-50 |
| Interior Construction | 25 |
| Interior Finishes | 20-25 |
| Elevators | 20 |
| Plumbing | 30 |
| HVAC | 20 |
| Fire Protection & Life Safety | 15 |
| Electrical | 25 |
| Furnishings | 15 |
| Site Improvements | 15-20 |
| Site Electrical | 10 |
| Other Site Construction | 10-20 |

## 3.0 Level of Service

Maintaining Social Housing and Corporate Facilities is part of the property management service provided by the Public Works department. Service level targets have not yet been defined, and are expected to be available for a future release of the AMP.

### Corporate Objective

The objective of the service is to provide well maintained buildings and property appropriate to the services delivered.

The County strives to ensure that all social housing units and long term care homes are safe, well maintained and provide an amenable living environment for residents.

The County has committed to 100% renewable energy by 2050. The Community Sustainability Plan includes targets to reduce greenhouse gas emissions and actions to promote green construction and low-carbon transportation which, as efficiency and conservation measures, are considered first steps towards realizing a 100% renewable energy target. The County is currently developing constructions standards that will be used to aid in meeting this target.

### Legislative Requirements

The Accessibility for Ontarians with Disabilities Act, 2005[22] was developed with the purpose of ensuring that accessibility for Ontarians with disabilities is achieved on or before January 1, 2025. The County ensures that each new build / renovation complies with the standards developed under this Act.

The fundamental principle of the Long-Term Care Homes Act[23] indicates that a long-term care home is primarily the home of its residents and is to be operated so that it is a place where they may live with dignity and in security, safety and comfort. Part V of the Act provides further information on the operation of homes. The County undergoes ministry driven Resident Quality Inspections (RQI) on an annual basis, which includes an in-depth inspection of targeted care areas.

The Tenant Protection Act, 1997[24] includes information regarding the landlord's responsibility towards maintaining facilities. These standards apply to the entire Social Housing facilities and some of the Corporate Facilities.

The County also has some facilities within the courthouse square designated as having historical significance and are therefore subject to the requirements within the Ontario Heritage Act. Section 33 of the Ontario Heritage Act[25] addresses the alteration process to ensure that the heritage attributes of a designated property are conserved.

[22] https://www.ontario.ca/laws/statute/05a11
[23] https://www.ontario.ca/laws/statute/07l08
[24] https://www.ontario.ca/laws/statute/97t24#BK28
[25] https://www.ontario.ca/laws/statute/90o18

The County is also required to maintain minimum standards based on other governing directives. These include, but are not limited to, Technical Standards & Safety Authority (TSSA), Electrical Safety Authority (ESA), National Plumbing Code of Canada (NPC), Fire Code, Ontario Building Code, Designated Substance List (DSL) and additional Ministry of Labour (MOL) requirements.

### Performance Measures

Table 3.0.1 lists the performance measures that the County believes best reflect our ability to deliver this service. The need for additional performance measures will be investigated with future AMP updates. The separation of property and buildings is meant to breakdown the total expenditure, and can be used to better model the expected expenses when estimating for new facilities. The comparison of energy consumed to generated, demonstrates our progress toward our target of 100% Renewable Energy by 2050, a goal established in 2015.

Table 3.0.1 Performance Measures

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Sq. metre of property managed ('000s) | Total area of managed properties | Quantity managed | 3754.18 | 3754.18 | 3754.18 |
| Sq. foot of building managed ('000s) | Total area of managed buildings | Quantity managed | 716.89 | 716.89 | 716.89 |
| Operating cost per sq. metre of property | Amount spent to maintain property over total property area | Efficient grounds management | NCT | NCT | NCT |
| Operating cost per sq. foot of building | Amount spent to maintain buildings over total building area | Efficient facilities management | NCT | NCT | NCT |
| Percentage of buildings rated good or excellent | Percentage of facilities where condition is rated as good to excellent | Effective facilities management | 37.0% | N/A | N/A |
| Kilowatts consumed | Amount of energy used by all assets | Quantity energy required | NCT | NCT | NCT |
| Kilowatts generated | Amount of energy produced by all assets to offset cost | Efficient energy system | NCT | NCT | NCT |

## 4.0 Asset Management Strategy

### 4.1 Lifecycle Activities and Planned Actions

To cost effectively maintain social housing and corporate facilities at the established service levels the right maintenance or rehabilitation activity needs to be completed at the ideal time throughout the assets life cycle. Effectively implementing these lifecycle activities ensures that the facilities are maintained in a cost efficient manner. There are four maintenance strategies considered in the overall sustainable management of facilities, described as follows:

Table 4.1.1 Lifecycle Activities

| Strategy | Lifecycle Activity | Trigger |
|---|---|---|
| Minor Maintenance | Planned regularly scheduled maintenance and inspection programs, monitoring, etc. | Ongoing/Excellent |
| Major maintenance | Maintenance and repair activities, generally unplanned, however, anticipated activities that are included in the annual operating budget. | Good |
| Rehabilitation | Major activities such as upgrade or replacement of smaller individual facility components (i.e. windows), renovations completed during unit vacancies, and other activities as recommended through the BCAs. | Fair |
| Replacement | Complete replacement of asset components. Replacement of the entire facility is considered when it is no longer financially and technically sustainable to continue with other lifecycle activities. | Poor/Critical |

### 4.2 Risks Associated with the Strategy

Assessing risks is a complex endeavour and further refinement is required to assign the appropriate risk to each facility asset. Completion of the asset profiles is required in order to produce the asset risk profile. Future updates to the plan will review the use of the facility and how a critical event effects operations.

### 4.3 Lifecycle Analysis

The use of a facility can also play a role in when maintenance is completed. For example, in order to avoid disruption to tenants in housing facilities, maintenance is generally completed during unit vacancies. Additional work is required to determine the lifecycle requirements of the facilities. It is anticipated that this will include a detailed component breakdown to allow for strategies to be developed. This will prioritize projects and aid in the development of future capital budgets.

## 5.0 Financing Strategy

### 5.1 Financing Strategy

Of the maintenance strategies considered, minor and major maintenance are part of the operating budget, while rehabilitation and replacement are considered part of the capital budget.

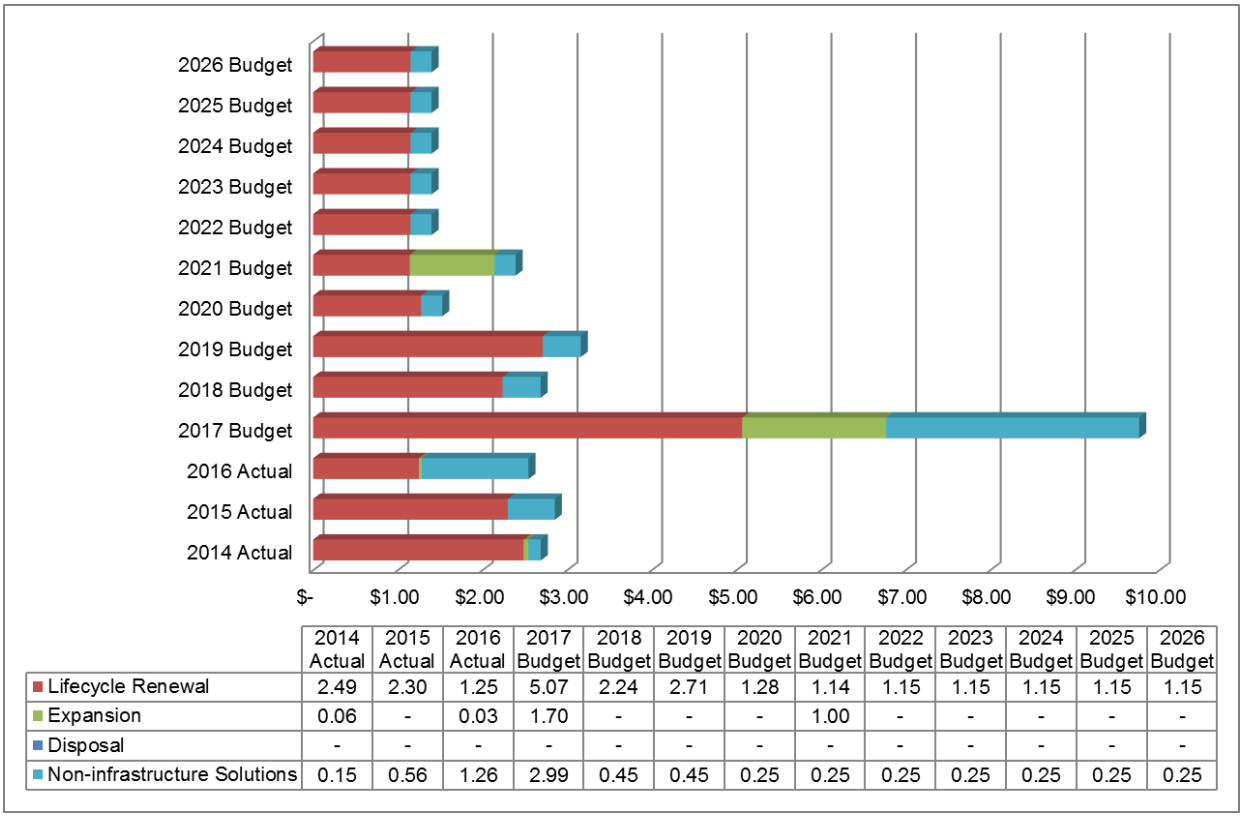
BCAs form a basis for the development of the financing strategy contained in the capital budget. The BCA provides an overall life cycle costing analysis for each facility. The County then evaluates projects on a priority and funding availability basis.

Capital investments are currently funded by levy supported dedicated reserves, debentures and levy contributions. There were no social housing and corporate facility growth projects, funded by development charges, identified in the 2014 DC Study covering the 2014 to 2023 planning horizon. However, the EMS facility on Mill Street, constructed in 2013, was a growth related project.

### 5.2 Expenditure History and Forecasts

The 2017 projects budgeted include the landfill administration building, solar projects and the sustainability cluster. Not all BCAs were completed when the 2017 budget was finalized. The County will review all the results through the 2018 budget process and adjust the long-term expenditure plan accordingly.

Chart 5.2.1 Expenditures (millions)

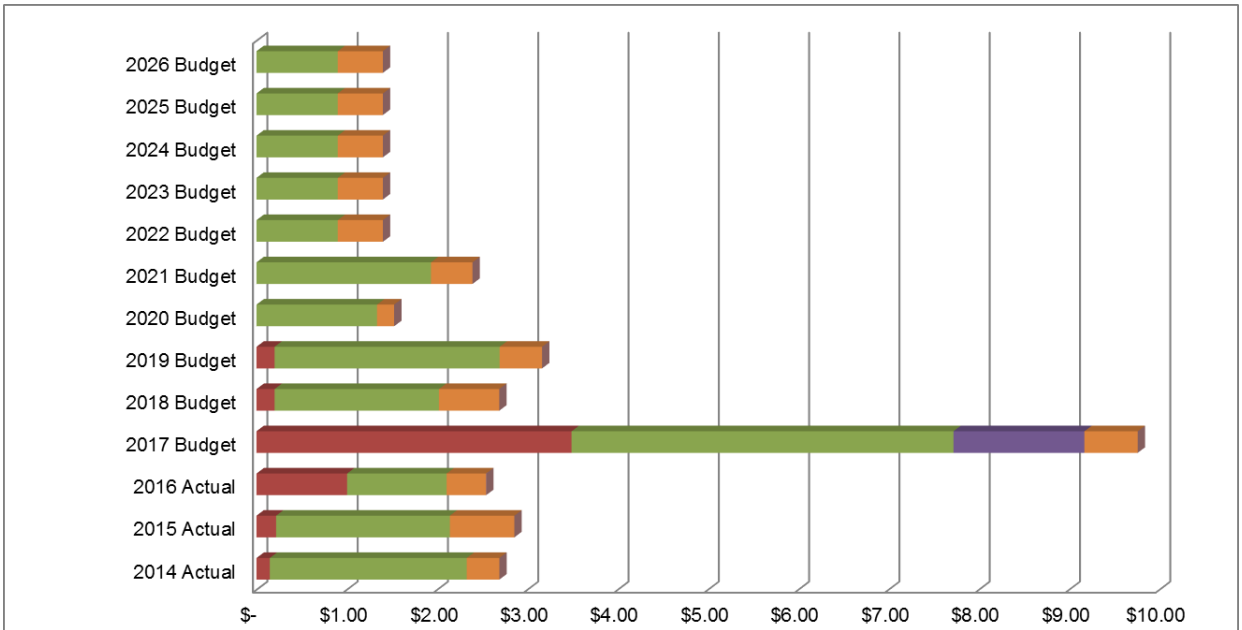



| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lifecycle Renewal | 2.49 | 2.30 | 1.25 | 5.07 | 2.24 | 2.71 | 1.28 | 1.14 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| Expansion | 0.06 | - | 0.03 | 1.70 | - | - | - | 1.00 | - | - | - | - | - |
| Disposal | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Non-infrastructure Solutions | 0.15 | 0.56 | 1.26 | 2.99 | 0.45 | 0.45 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |

## 5.3 Capital Revenues

The spike in revenue in 2017 corresponds to the additional capital projects being completed in 2017 as identified in Chart 5.2.1.

Chart 5.3.1 Sources of Capital Revenues 2014-2026 (millions)




| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Debenture | 0.15 | 0.22 | 1.00 | 3.49 | 0.20 | 0.20 | - | - | - | - | - | - | - |
| Reserve Fund | 2.18 | 1.92 | 1.10 | 4.23 | 1.82 | 2.49 | 1.34 | 1.93 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Grants | - | - | - | 1.45 | - | - | - | - | - | - | - | - | - |
| Taxation | 0.36 | 0.71 | 0.44 | 0.59 | 0.67 | 0.47 | 0.19 | 0.46 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| Development Charges | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Other | - | - | 0.00 | - | - | - | - | - | - | - | - | - | - |

## 5.4 Capital Investment

Further component refinement is required for facilities as the replacement is based on a full building end of life approach. The replacement profile generated by the County's software is therefore not reflective of current lifecycle needs, and the County will continue to use the results of the BCA's to inform capital project needs. The annual replacement requirements will be updated, and it is anticipated that this will be completed for the next AMP update. Using the average annual investment requirement, developed with the 2014 AMP, the County is able to complete a preliminary review of the current funding level.

| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget |
|---|---|---|---|---|---|---|---|---|
| **Funding Sources** | | | | | | | | |
| Debenture P&I | 3,171,914 | 3,274,925 | 3,316,013 | 3,393,113 | 3,266,223 | 3,181,631 | 3,098,314 | 2,943,013 |
| Reserve Interest | - | - | 74,106 | 85,289 | 73,637 | 64,398 | 60,410 | 62,408 |
| Taxation | 1,519,333 | 1,538,992 | 1,279,642 | 1,004,396 | 1,457,824 | 1,244,707 | 1,582,410 | 1,740,039 |
| | **4,691,247** | **4,813,917** | **4,669,761** | **4,482,798** | **4,797,684** | **4,490,736** | **4,741,134** | **4,745,460** |
| Avg Annual Investment Required | **4,790,000** | **4,790,000** | **4,790,000** | **4,790,000** | **4,790,000** | **4,790,000** | **4,790,000** | **4,790,000** |
| *Surplus (Deficit)* | *(98,753)* | *23,917* | *(120,239)* | *(307,202)* | *7,684* | *(299,264)* | *(48,866)* | *(44,540)* |
| Facilities Reserve Balance | 4,066,782 | 3,589,695 | 6,266,685 | 3,960,018 | 2,987,576 | 2,290,372 | 2,286,736 | 2,560,298 |
| Library Facilities Reserve Balance | 194,400 | 219,400 | 280,753 | 44,489 | 84,353 | 121,735 | 190,831 | 104,813 |
| EMS Facilities Reserve Balance | 527,197 | 368,775 | 327,579 | 268,522 | 209,829 | 167,696 | 144,649 | 148,668 |

Based on the information contained within the chart it appears that the funding gap is relatively small when it comes to the social housing and corporate facilities portfolio. However, a significant portion of the funding is currently being used for debenture repayments, leaving little funding available to complete current projects. This is further evident by the significant decline in all facilities reserve balances from 2016 to 2018. It is recommended that as debenture repayments decline, the funds be allocated to reserves to fund capital lifecycle requirements.

# Fleet & Equipment


**STATUS:**
**Fair**

## 1.0 Introduction

Cost effectiveness, efficiency, functionality and reliability are key elements to all programs that rely on County fleet or large equipment in their operations.

### 1.1 Improvement Plan

The overall condition of the County's Fleet and Major Equipment is rated as fair. It is anticipated that the condition rating will continue to be relatively steady. The County will be looking at a phased approach for implementing the cost increases due to energy efficient vehicles to aid in keeping this rating steady.

| | Positive Impacts on Rating |
|---|---|
| 1. | The replacement cycle for current fleet vehicles is optimized based on usage and maintenance requirements. |
| | **Negative Impacts on Rating** |
| 1. | Availability of alternative fuel vehicle solutions. |
| 2. | Cost to replace vehicles with alternative fuel solutions. |

The following recommendations are based on the review of current management practices; and, inventory, valuation and condition analysis.

| | Recommendations |
|---|---|
| 1. | Continue to explore fleet integration and the potential need for dedicated staff to complete fleet maintenance, asset management and procurement functions. |
| 2. | Establish and monitor appropriate and measurable levels of service and performance measures. |
| 3. | Continually evaluate the fleet for overall efficiency and effectiveness in accordance with the Energy Management Plan. |
| 4. | Improve processes to ensure systems are updated and available to produce the vehicle replacement ratings. |
| 5. | Develop all asset profiles and maintenance strategies. |
| 6. | Establish phased funding increase to account for increase in replacement costs due to purchase of energy efficient vehicles. |
| 7. | Include other equipment in the asset management plan inventory. |

## 2.0 State of Infrastructure

### 2.1 Inventory

The 2014 Asset Management Plan did not include IT equipment, library books, furniture and fixtures and other equipment. All assets should be included in the AMP and the County will be working over the next couple years to include the other equipment components as listed below, along with their maintenance and financing strategies.

The increase in inventory in light equipment is a result of an audit of all equipment including trailers and updating the County inventory to include all items.

Table 2.1.1 – Fleet and Equipment Inventory

| Asset Type | Asset Component | Current Inventory | 2014 Inventory |
|---|---|---|---|
| Fleet and Major Equipment | Light | 86 | 59 |
| | Medium | 5 | 9 |
| | Heavy | 42 | 38 |
| | Ambulance and ERU | 18 | 18 |
| | Major Equipment | 33 | 32 |
| Other Equipment | IT | 768 | N/A |
| | Books | 139,479 | N/A |
| | Furniture | TBD | N/A |
| | Other Equipment | TBD | N/A |

### 2.2 Valuation

#### Replacement Cost Valuation

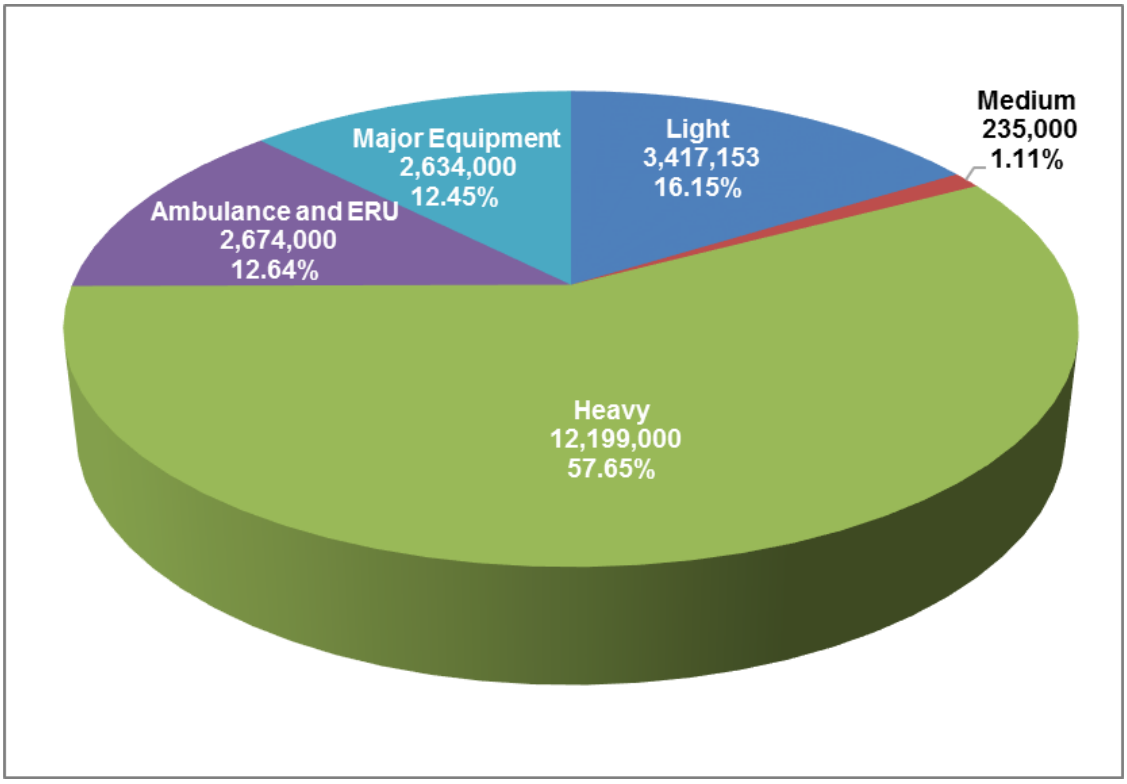
As fleet are due for replacement, they will be converted to lower carbon emissions through alternative fuels and energy efficiency in order to help the County meet its 100% renewable goal. As such, the replacement costs are based on cost of replacement with a more eco-friendly model. These vehicle types are still relatively new to the industry and replacement costs will continue to fluctuate over the next several years. Continual review and updates to the replacement cost information is required to ensure the most accurate costing is available for decision making purposes.

The estimated replacement cost of the County's Fleet and Major Equipment in 2016 dollars is $21.2 million. This results in an estimated replacement cost per household of $462 which is higher than the 2014 estimated replacement cost per household of $382. The increased cost per household is reflective of the County's transition to alternative fuels.

Table 2.2.1 – Fleet and Major Equipment Replacement Valuation

| Asset Component | Vehicle Type | Unit Replacement Cost | Replacement Cost | % of Total Value |
|---|---|---|---|---|
| Light | CNG Pickup | 45,000 | 2,250,000 | 10.63% |
| Light | Electric Car | 45,000 | 90,000 | 0.43% |
| Light | CNG Passenger Vehicle | 25,000 | 140,000 | 0.66% |
| Light | Cargo Van | 30,000 | 300,000 | 1.42% |
| Light | Trailers | Varies | 637,153 | 3.01% |
| Medium | Other Units | Varies | 235,000 | 1.11% |
| Heavy | Tandems | 280,000 | 6,160,000 | 29.11% |
| Heavy | CNG Tandems | 300,000 | 2,010,000 | 9.50% |
| Heavy | Other Units | Varies | 4,029,000 | 19.04% |
| Major Equipment | | Varies | 2,634,000 | 12.45% |
| Ambulance and ERU | Hybrid Ambulance | 175,000 | 2,275,000 | 10.75% |
| Ambulance and ERU | Other Units | Varies | 399,000 | 1.89% |
| **Total Replacement Cost** | | | **$21,091,153** | **100%** |

| **Replacement Cost Per Household** | **$462** |
|---|---|

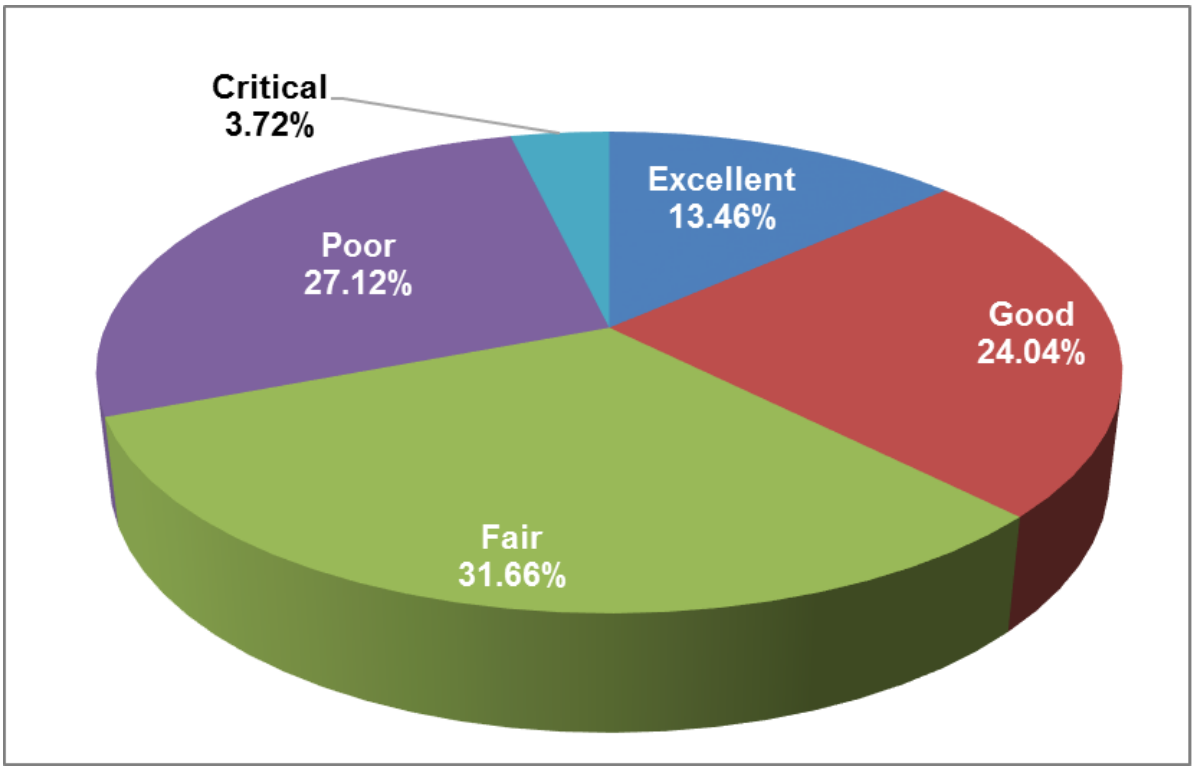


### 2.3 Asset Condition Assessment

The below chart compares the status of fleet and equipment in our 2014 AMP to their status as of 2016. The trend shows that the overall condition of the fleet and major equipment is steady to decreasing. This is largely due to delays in receiving vehicles ordered during 2016. A total of 24 vehicles were replaced in the first half of 2017, which included all medium vehicles, having a significant impact on the overall condition rating.

Table 2.3.1 Fleet and Major Equipment Condition Assessment

| Asset Type | Asset Component | 2014 Condition | 2016 Condition | Trend |
|---|---|---|---|---|
| Fleet and Major Equipment | Light | Good | Fair | ↓ |
| | Medium | Fair | Critical | ↓ |
| | Heavy | Fair | Fair | → |
| | Ambulance and ERU | Good | Good | → |
| | Major Equipment | Fair | Fair | → |




### 2.4 Assessment Approach

The County utilizes a methodology referred to as Vehicle Replacement Rating (VRR) to assess the condition of fleet and major equipment. It is based on four indicators: age; distance travelled or hours of operation; repair and maintenance; and reliability. Each indicator is assigned a numerical value from 0 to 5 with 5 being the worst case. The table below elaborates on the criteria for each indicator.

| Indicator | Point Criteria |
|---|---|
| Age | Heavy & major equipment asset components are assigned a value of 5 for any age equal to or greater than 9 years<br><br>All other asset components are assigned a value of 5 for any age equal to or greater than 6 years<br><br>If asset is less than the assigned maximum age then:<br><br>$\left(\frac{5}{\text{Maximum Age}}\right)$ X (current age) |
| Distance Travelled<br>or<br>Hours of Operation | One point per 40,000 km traveled; up to 5<br>OR<br>One point per 1,000 hours of operation; up to 5 |
| Repair and Maintenance costs | If repairs and maintenance (R&M) costs are less than total purchase price then:<br><br>$\left(\frac{\text{Total R\&M costs}}{\text{Total Vehicle Purchase Price}}\right)$ X 5<br><br>If R&M is greater than the total purchase price then the value is 5 |
| Reliability | If unit is serviced on average 5 times or less per 90 days of service then:<br><br>$\left(\frac{\text{Number of service times}}{\text{90 days of Service}}\right)$ X 5<br><br>If average service time is greater than 5 then the value is 5 |

Once each indicator value is determined, they are then added together to make the VRR for an individual unit. The table below displays the condition and characteristics to the corresponding VRR value.

| Condition | VRR Range | Characteristics |
|---|---|---|
| Excellent | 0-4 | No noticeable defects |
| Good | 5-8 | Minor deterioration |
| Fair | 9-12 | Deterioration evident, function is affected |
| Poor | 13-16 | Serious deterioration, function is inadequate |
| Critical | 17-20 | No longer functional, general or complete failure |

Currently the condition information is calculated manually by Public Works staff using the above methodology. The County will investigate processes required to ensure systems are updated and available to produce the vehicle replacement ratings.

### 2.5 Useful Life

Factors in determining useful life of fleet include usage, maintenance requirements and energy efficiency. The lifecycle replacement lives took into account the ownership and maintenance costs as well as driver productivity during downtime, fuel efficiency and impact of inflation on all cost elements. For the most part the County strategy currently consists of ongoing maintenance followed by unit replacement. Useful life for some units and major equipment continues to be standardized as they are not frequently purchased.

| Fleet and Major Equipment | Anticipated Useful Life (years) | Anticipated Lifecycle Life (years) |
|---|---|---|
| New Purchase / Replacement | | |
| Pickup Truck | 5 | 5 |
| Pickup Truck - High KM | 4 | 4 |
| Cargo Van | 6 | 6 |
| Ambulance | 6 | 6 |
| Tandem Truck | 9 | 9 |
| Other | TBD | TBD |

## 3.0 Level of Service

The Fleet Service is an internal service that supplies vehicles and equipment to the County to support service delivery. The County has not yet established a vehicle replacement rating target for the various components, and will do so in accordance with the timelines identified in the final asset management planning regulation.

### Corporate Objective

The County of Oxford Green Fleet Plan sets out to:

- Reduce greenhouse gas emissions by 10% of 2016's carbon baseline by 2019 while significantly reducing operating costs as an initial step towards the commitment towards 100% Renewable Energy using energy conservation; and
- Promote an image of a region that is economical, innovative and resourceful in its approach to the environment and in keeping with the overall provincial policy developments on climate change.

With completion of the Green Energy Fleet Plan, staff has explored alternative vehicle types, alternative fuels, and technology solutions with the goal of reducing the CO2 emitted from County vehicles. With changes in Automatic Vehicle Location (AVL) providers used by the County's fleet in recent years, the CO2 emissions will now be calculated on a continuous basis.

### Legislative Requirements

Every three years our paramedic operation must undergo an Ambulance Service Review to qualify for a renewal of our certificate of operation as required under the Ambulance Act[26]. This review verifies that all aspects of our ambulance services meet legislated certification standards that include provincial equipment standards, including vehicle and supplies. Our most recent Ambulance Service Review was successfully completed in January 2017.

Based on the vehicles contained within the County's fleet we are required to carry a Commercial Vehicle Operator's Registration (CVOR) certificate[27]. Operator responsibilities include the mechanical safety condition of the vehicle. Commercial Vehicle Safety Alliance (CVSA) safety inspections are completed annually and are included as part of the CVOR record.

### Performance Measures

Table 3.0.1 lists the performance measures that best reflect our ability to deliver this service. The need for additional performance measures will be investigated and the table updated accordingly. The measures selected for fleet have yet to be formally tracked, but will provide valuable insight. Values are planned to be available for the next iteration of the AMP.

[26] https://www.ontario.ca/laws/statute/90a19
[27] http://www.mto.gov.on.ca/english/trucks/commercial-vehicle-operators-registration.shtml

Table 3.0.1 Performance Measures

| Measure | Description | Objective | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Total litres of fuel consumed per 100km | Corporate average fuel efficiency by asset component | Efficient fuel usage | NCT | NCT | NCT |
| Preventative maintenance schedule | Number of preventative maintenance events per year by asset component | Effective fleet vehicles | NCT | NCT | NCT |
| Fleet maintenance costs | Operating cost per vehicle by asset component | Efficient fleet vehicles | NCT | NCT | NCT |
| Proactive maintenance measures | Ratio of preventative maintenance to direct maintenance | Reliable fleet vehicles | NCT | NCT | NCT |

## 4.0 Asset Management Strategy

### 4.1 Lifecycle Activities and Planned Actions

Fleet and equipment encompasses many different types of assets with varying uses and asset useful lives. For fleet where a strategy has been reviewed, the County is currently employing minor maintenance and replacement activities only. The County will continue to review all components that fall into this asset class to determine their effective maintenance strategy.

Table 4.1.1 Lifecycle Activities

| Strategy | Lifecycle Activity | Trigger |
|---|---|---|
| Minor Maintenance | Regularly scheduled maintenance and inspection programs including all routine activities performed on a vehicle or major equipment. | Ongoing |
| Replacement | Occurs at the end of the useful service life. This treatment activity is also required if units are not meeting emissions expectations. | Poor / Critical VRR ≥ 13 |

### 4.2 Risks Associated with the Strategy

The type of vehicle can aid the County in determining the consequence of risk. The County is working on further developing the asset risk profile, and plans to have this available for the next AMP update. Outlined below are a few vehicle types and the associated consequence of failure. Not having ambulances and snow plows in good working order can have life or death implications and so they carry a high consequence, where a pickup truck would result in a very low impact on the County's ability to deliver a service.

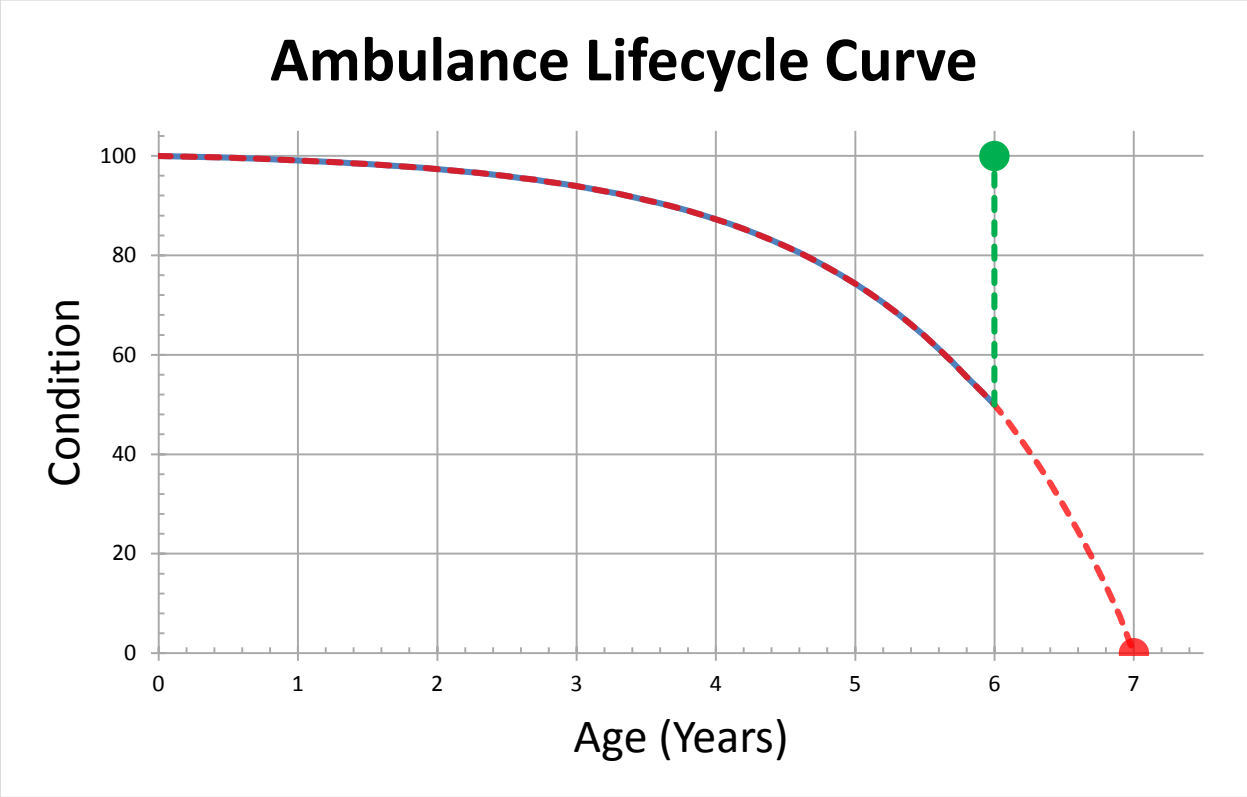
Table 4.2.1 Consequence of failure

| Scoring | Consequence | Vehicle Type |
|---|---|---|
| 1 | Minimal | Pick-up |
| 2 | Marginal | |
| 3 | Serious | Compactor |
| 4 | Critical | |
| 5 | Catastrophic | Ambulance, Snow Plow |

### 4.3 Lifecycle Analysis

The use of a vehicle can also play a role in when maintenance is completed. For example, most snow plow maintenance is completed in the off season in order to ensure minimal downtime during times of high need. The County will be able to analyze lifecycles further once the asset profiles are developed.

The ambulance strategy is shown below as an example. The County replaces ambulances on a 6 year cycle in order to ensure units are reliable and the County is able to provide a high level of service. The strategy shows that the overall life of the units exceed 6 years, however replacement is completed while the unit is in fair condition.



## 5.0 Financing Strategy

### 5.1 Financing Strategy

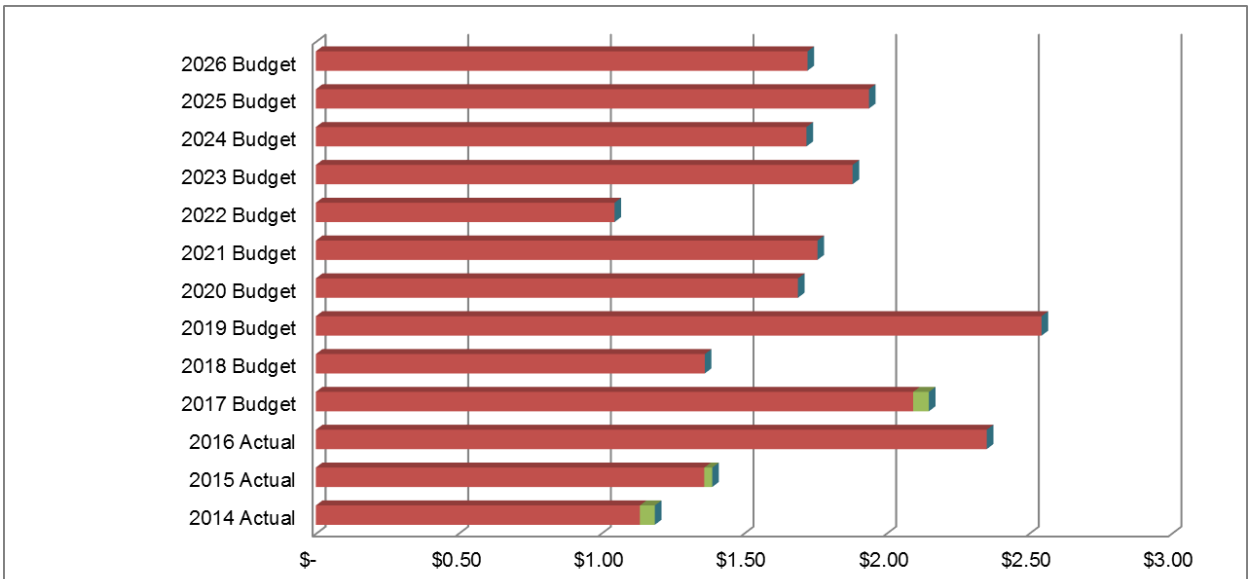
Of the maintenance strategies considered, minor maintenance is part of the operating budget, while replacement is considered part of the capital budget.

Capital investments for the fleet and major equipment is currently funded by dedicated reserves, user fees (for units used to deliver the water and wastewater services) and levy contributions.

The County currently distinguishes between lifecycle renewal and expansion (growth of the fleet) only. We will review this practice in order to further distinguish between the various types of activities.

### 5.2 Expenditure History and Forecasts

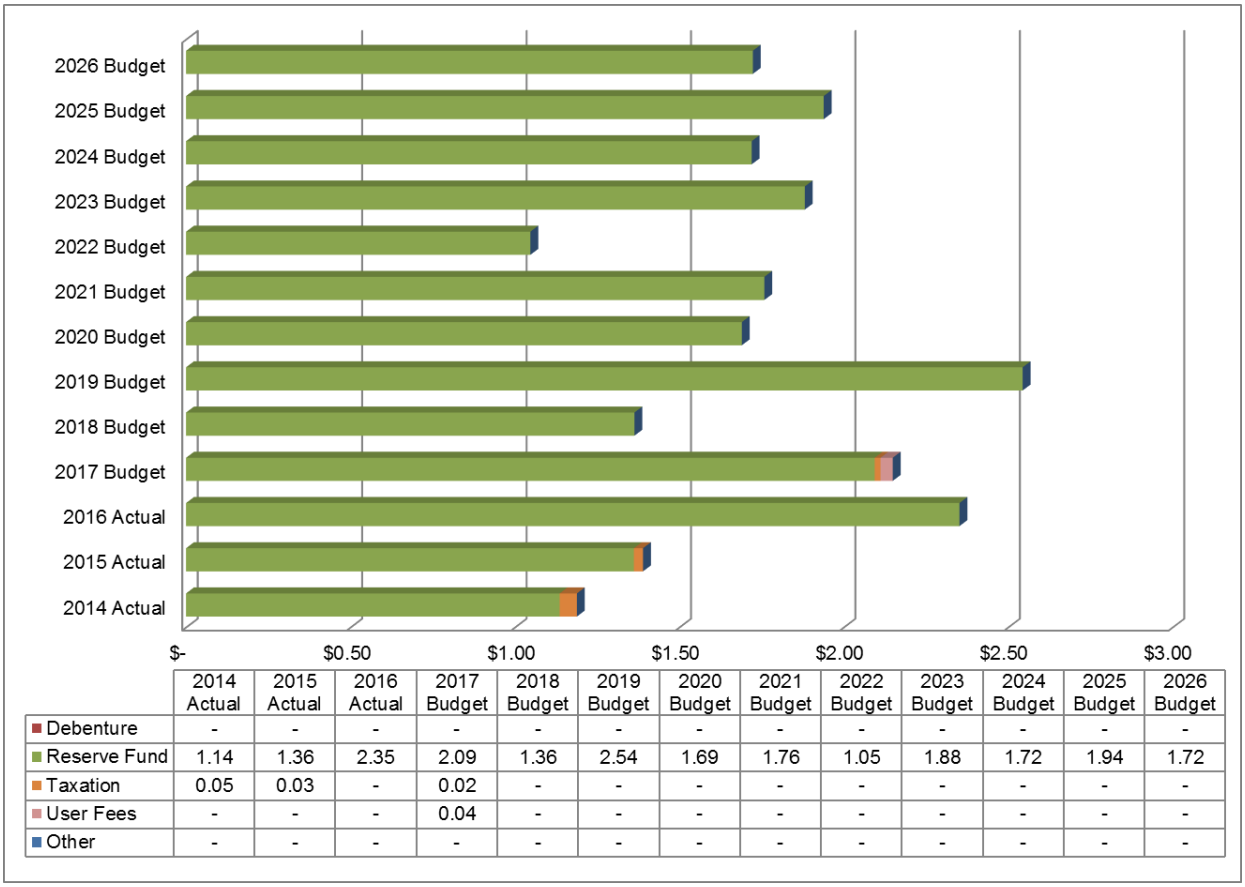
Chart 5.2.1 Expenditures (millions)




| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lifecycle Renewal | 1.14 | 1.36 | 2.35 | 2.09 | 1.36 | 2.54 | 1.69 | 1.76 | 1.05 | 1.88 | 1.72 | 1.94 | 1.72 |
| Expansion | 0.05 | 0.03 | - | 0.06 | - | - | - | - | - | - | - | - | - |
| Disposal | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Non-infrastructure Solutions | - | - | - | - | - | - | - | - | - | - | - | - | - |

## 5.3 Capital Revenues

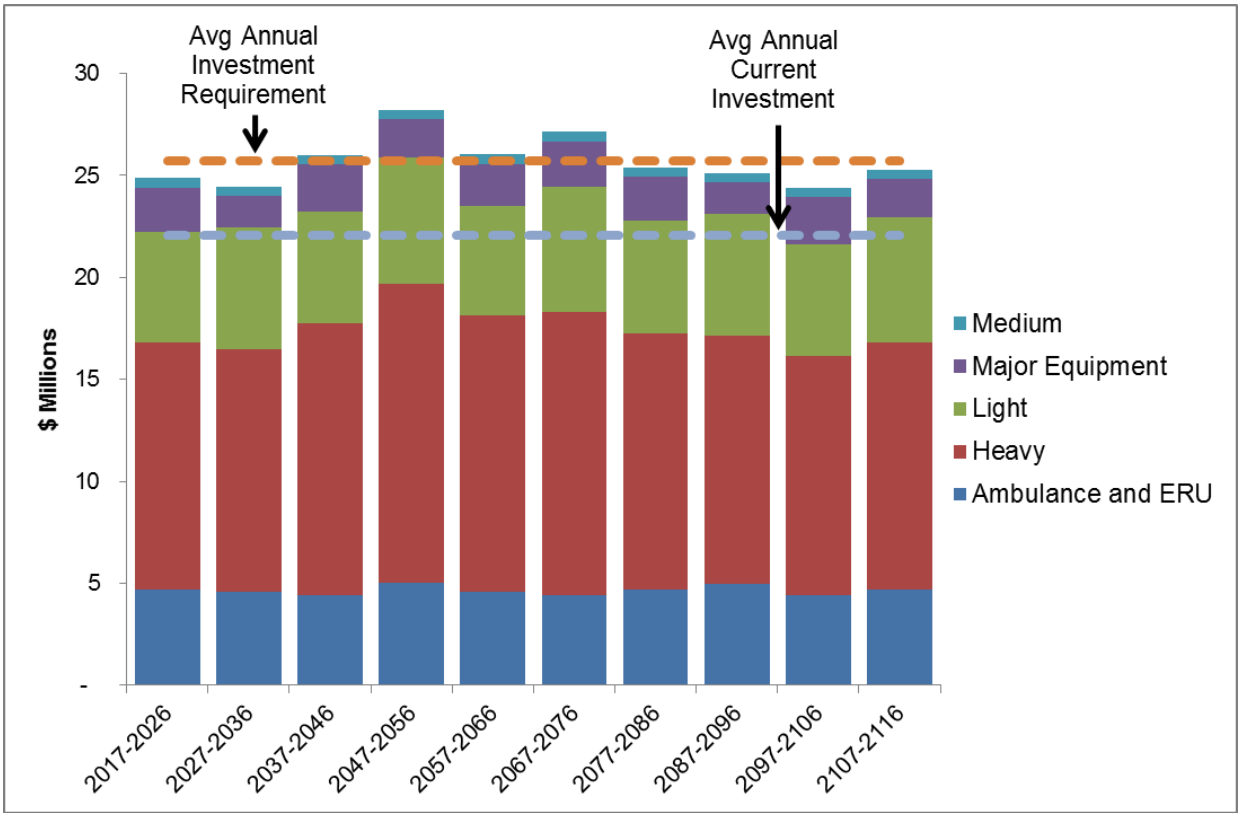
### Chart 5.3.1 Sources of Capital Revenues 2014-2026 (millions)




| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget | 2022 Budget | 2023 Budget | 2024 Budget | 2025 Budget | 2026 Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Debenture | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Reserve Fund | 1.14 | 1.36 | 2.35 | 2.09 | 1.36 | 2.54 | 1.69 | 1.76 | 1.05 | 1.88 | 1.72 | 1.94 | 1.72 |
| Taxation | 0.05 | 0.03 | - | 0.02 | - | - | - | - | - | - | - | - | - |
| User Fees | - | - | - | 0.04 | - | - | - | - | - | - | - | - | - |
| Other | - | - | - | - | - | - | - | - | - | - | - | - | - |

## 5.4 Capital Investment

Based on an end of life replacement approach the financial requirements over the next 100 years are determined, using 2016 dollars. As strategies have not yet been developed, these estimates assume that asset replacement is completed at end of life and do not take into account future changes due to environmental factors, new maintenance techniques, and additional growth.




The average annual investment requirement represents the amount of funding sources that should be received on an annual basis to fund the long-term replacement of assets. The County's current funding practice is to take the replacement cost of the unit and divide by its useful life.

The chart below illustrates actual funding received for 2014 through 2016 as well as the budgeted funding from 2017 and projected funding expected through 2021 as per the 2017 approved budget. This chart looks at fleet and major equipment only and does not account for the replacement costs of other equipment. The land ambulance reserve and associated taxation funding includes funds for Paramedic Services related other equipment.

| | 2014 Actual | 2015 Actual | 2016 Actual | 2017 Budget | 2018 Budget | 2019 Budget | 2020 Budget | 2021 Budget |
|---|---|---|---|---|---|---|---|---|
| **Funding Sources** | | | | | | | | |
| Reserve Interest | | | 53,781 | 16,450 | 19,177 | 18,399 | 19,340 | 26,150 |
| User Fees | 325,900 | 352,900 | 348,600 | 348,250 | 349,800 | 349,800 | 349,800 | 349,800 |
| Taxation | 1,274,900 | 1,657,500 | 1,800,000 | 1,837,425 | 1,838,325 | 1,838,325 | 1,838,325 | 1,838,325 |
| | **1,600,800** | **2,010,400** | **2,202,381** | **2,202,125** | **2,207,302** | **2,206,524** | **2,207,465** | **2,214,275** |
| Avg Annual Investment Required | **2,200,000** | **2,200,000** | **2,200,000** | **2,600,000** | **2,600,000** | **2,600,000** | **2,600,000** | **2,600,000** |
| *Surplus (Deficit)* | *(599,200)* | *(189,600)* | *2,381* | *(397,875)* | *(392,698)* | *(393,476)* | *(392,535)* | *(385,725)* |
| Fleet Reserve Balance | 5,596,488 | 6,110,815 | 734,718 | 904,184 | 1,622,005 | 1,169,446 | 1,415,847 | 1,596,956 |
| Land Ambulance Reserve Balance | 562,617 | 728,641 | 447,037 | 513,398 | 85,596 | 78,629 | 378,476 | 613,560 |

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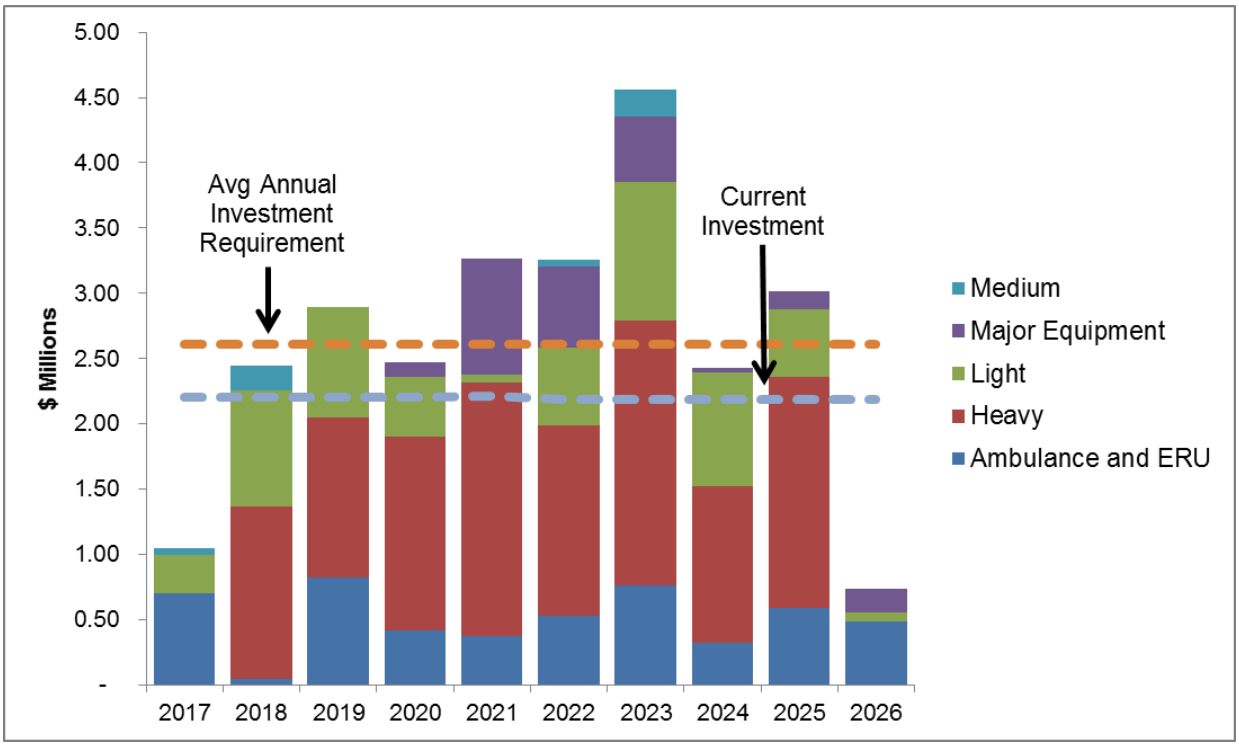
[28] Realignment of reserves completed in 2016 resulting in the reduced balance of the Fleet Reserve.

As illustrated you can see that the funding is currently in a deficit position as the 2017 budgeted funding for replacement costs was not based on the alternative fuel vehicle costs. Through the 2018 budget process, further alignment of replacement costs with alternative fuel solutions will be completed

The chart below looks at the next 10 year period using a 1.5% inflation rate. It illustrates that the short term and the long term requirements are in alignment. This is due to the relatively short useful lives of the units.



# Appendix G - Glossary of Terms

**Area Municipalities:** Refers to the lower-tier municipalities within Oxford County. This includes Blandford Blenheim, East Zorra-Tavistock, Ingersoll, Norwich, South-West Oxford, Tillsonburg, Woodstock and Zorra.

**Asset Profile:** An asset profile is a template for a group of assets that possess similar characteristics. The asset profile aids in ensuring assets of a specified type contain the same classifications, valuations and attributes, and lifecycle information including, condition, risk and maintenance strategy.

**Clean Water and Wastewater Fund (CWWF):** The Clean Water and Wastewater Fund (CWWF) provides short-term funding. The program targets projects that will contribute to the rehabilitation of both water treatment and distribution infrastructure and existing wastewater and storm water treatment systems; collection and conveyance infrastructure; and initiatives that improve asset management, system optimization, and planning for future upgrades to water and wastewater systems.

**Commercial Vehicle Operator's Registration (CVOR):** Commercial vehicle operators in Ontario must have a valid CVOR certificate and carry a copy. The CVOR system monitors commercial carrier safety to improve road safety for all road users.

**Drinking Water Quality Management Standard (DWQMS)**: The Safe Drinking Water Act, 2002 (SDWA) requires Owners and Operating Authorities of municipal residential drinking water systems to be an accredited Operating Authority. In order to become accredited, an Operating Authority must establish and maintain a Quality Management System (QMS). Minimum requirements for the QMS are specified in this Standard, the Drinking Water Quality Management Standard (DWQMS).

**Federal Gas Tax Fund (GTF):** Is a permanent source of funding provided up front, twice-a-year, to provinces and territories, who in turn flow this funding to their municipalities to support local infrastructure priorities. Municipalities can pool, bank and borrow against this funding, providing significant financial flexibility. Municipalities select how best to direct the funds with the flexibility to make strategic investments across 18 different project categories.

**High-Class Bituminous (HCB):** Is hot mix asphalt pavement that is typically placed as a surface for rural, semi-urban, and urban roads with higher traffic volumes, and is placed at thicknesses ranging from 50mm (2 inches) to 200mm (8 inches).

**Hot Mix Asphalt (HMA):** Is a combination of approximately 95% stone, sand, or gravel bound together by asphalt cement, a product of crude oil. A lift of HMA can vary in thickness and is subject to the grade of HMA/nominal aggregate size and the compaction equipment rating. Typical lifts of HMA range from 1.5 inches to 3 inches in thickness.

**Low-Class Bituminous (LCB)**: Is a thin protective wearing surface applied to existing pavement or gravel surface that acts as a seal from water and fills in cracks and uneven surfaces. LCB is typically placed on rural roads with low traffic volumes and consists of asphalt emulsion and aggregate.

**Neighbouring Municipalities:** Refers to the municipalities that border Oxford County. (e.g. Brant County, Middlesex County, Norfolk County, and Region of Waterloo)

**Not Currently Tracked (NCT):** Refers to performance metrics that have not been previously tracked.

**Ontario Community Infrastructure Fund (OCIF):** Provides steady, long-term funding for small, rural and northern communities to develop and renew their infrastructure.

**Pavement Milling:** Pavement milling (cold planing, asphalt milling, or profiling) is the process of removing at least part of the surface of a paved area such as a road, bridge, or parking lot. Milling removes anywhere from just enough thickness to level and smooth the surface to a full depth removal.

**PSAB:** The Public Sector Accounting Board (PSAB) of the Canadian Institute of Chartered Accountants (CICA) issues recommendations and guidance with respect to matters of accounting in the public sector. The Ontario government follows PSAB financial accounting and reporting standards and local municipalities adopted PSAB standards in 2000.

**Rural:** Refers to the predominant characteristics of the adjacent land use; rural being agricultural, light commercial and vacant/undeveloped properties.

**Semi-Urban:** Refers to the predominant characteristics of the adjacent land use; semi-urban being settlement clusters with low-density residential and light commercial/industrial properties.

**Urban:** Refers to the predominant characteristics of the adjacent land use; urban being a mix of dense residential and commercial/industrial/institutional properties