Asset Management Plan

Norfolk County – October 2023

Content

Norfolk at a Glance

Norfolk County (the County or Norfolk) operates as a largely rural, single-tier municipality which was restructured in 2001 to encompass a number of smaller communities. These communities include various Townships and 6 urban centres: Courtland, Delhi, Port Dover, Port Rowan, Simcoe and Waterford.

Norfolk is a vast community, encompassing over 1,600 km^2 of land and 142 km of Lake Erie shoreline. This land is shared by the roughly 64,000 residents that call Norfolk home. Our population is roughly split between rural and urban, which is an important factor in determining how the County delivers services. In rural areas, services are provided under ever increasing demands for accountability, improved delivery and cost management.

Managing Our Assets

Norfolk provides essential services for our communities which enable us to deliver upon our Vision, Mission and Strategic Priorities. The sustainable delivery of these services is dependent on a wide range of assets that must be managed effectively and maintained in a good state of repair in order to meet expectations. The management of these assets is influenced by a range of factors that impact the cost-of-service delivery and requires the County to proactively coordinate its planning to balance expenditures, services, and risk across its diversified portfolio of assets – a process referred to as Asset Management.

Introduction

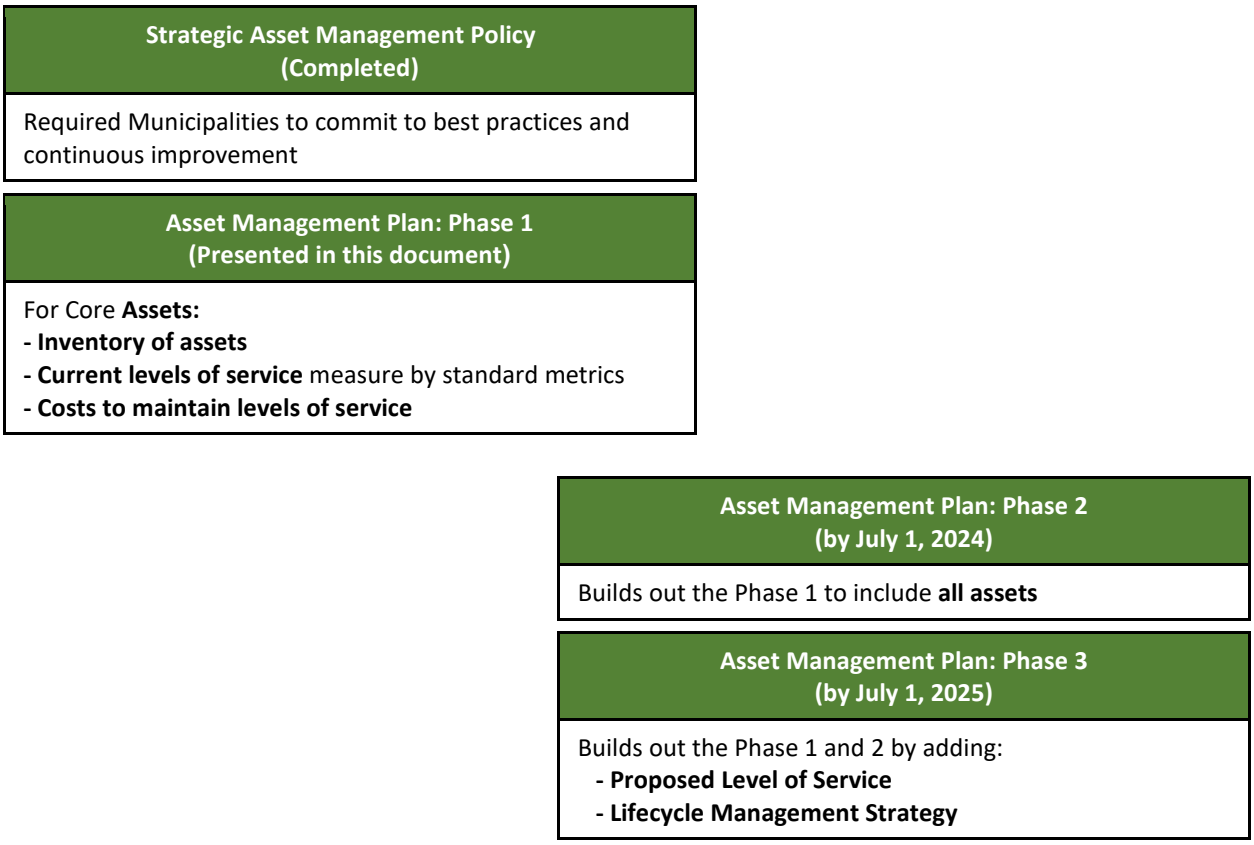
This Asset Management Plan ("AMP") describes our approach to effectively plan for our assets to secure our stated strategic outcomes and deliver expected services in compliance with the requirements set out in the newly introduced regulation. This plan replaces the various County AMP's which were developed in 2014 and 2016.

Overview of Ontario Asset Management Regulation

Under the *Infrastructure for Jobs and Prosperity Act, 2015*, the province published *Regulation 588/17 'Asset Management Planning for Municipal Infrastructure'* (O. Reg 588/17) in December 2017. This regulation requires every municipality to prepare a Strategic Asset Management Policy (AM Policy) and an Asset Management Plan linked to their strategic objectives with the expectation that outputs of the asset management planning process inform financial long-term and budgetary planning processes.

The regulation outlines specific requirements and content to be featured in each of these documents over a phased period until 2025 as illustrated in *Figure 1.*

Figure 1 - O. Reg 588/17 Requirements



The *Norfolk County Council Strategic Priorities 2019 – 2022* (Strategic Plan) has been used to shape the development of a fully compliant AM Policy, adopted in June 2019 and this Asset Management Plan.

Purpose of the Asset Management Plan

This Asset Management Plan has been drafted in compliance with O. Reg. 588/17. It is a comprehensive, strategic document outlining how our assets are to be managed over a 10-year planning horizon to maintain service delivery. The process of developing an AMP fosters a long-term perspective that enables capital and operational sustainability and efficiency. It seeks to achieve the following outcomes:

Commitment and Consistency: Committing the County to support the implementation of asset management methods that are consistent with the organization in order to Implement the goals and objectives of our organization.

Transparency and Accountability: Provide transparency and accountability to stakeholders regarding our decision-making processes, which combine strategic plans, budgets, service levels and risk.

Stakeholder Communication: Communicate the endorsed management principles and approach to stakeholders.

Service Sustainability & Affordability: Embed asset management principles for a sustainable approach to service delivery that delivers optimal value for our stakeholders while maintaining affordability.

Scope of the Asset Management Plan

This plan focuses on the approaches adopted for effective management of infrastructure, facilities and assets directly owned and/or managed by Norfolk County to deliver levels of service (LoS) and support future growth. This AMP focuses on the core services provided by the County.

Future revisions of the plan will see improved planning and processes for non-core assets as improvement initiatives currently underway are realized and incorporated. *Table 1* presents a summary of the assets and service areas classified as core and non-core. The comprehensive list of assets in each area is located in Appendix E: Asset Summary**.**

Table 1 - Core & Non-Core Assets

	Service Area	Asset Class	Infrastructure Summary
Core Assets	Drinking Water	Treatment & Distribution	The assets that treat & deliver drinking water services to the community, via pipe network, service connections, and metering infrastructure including treatment plants, booster stations and storage facilities.
	Wastewater	Treatment & Collection	The assets which convey &treat wastewater services to the community, via pipe network and pumping stations including wastewater treatment plants.
	Stormwater	Treatment / Storage & Collection	The infrastructure that conveys and manages stormwater services to the community via pipe network, culverts and stormwater management facilities.
	Transportation	Roads	The road assets that are used by both local and transient users to allow people to travel through and around Norfolk. Assets include the road surface, road base, retaining walls, streetlights & traffic signals.
		Structures	The structures on road assets that are used by both local and transient users to allow people to travel through and around Norfolk. Assets include the bridges and major culverts.
Non-Core Assets	Transportation	Active Transportation	Assets that enable active travel around Norfolk County. Assets include sidewalks, walkways, trails and pedestrian bridges.
	Emergency Services	Fire Protection	Fire stations and feet used to respond to and deal with emergencies when they occur.
		EMS	EMS stations and feet used to respond to and deal with emergencies when they occur.
	Parks	Cemeteries	Assets to provide the community with methods to inter human remains in a dignified way.
		Parks	Assets that provide natural areas and green spaces for leisure pursuits and outdoor activities.
		Forestry	Tree assets that provide natural areas that benefit the community and the environment
		Outdoor Recreation	Assets that provide space for outdoor activities for the community including bike and skateboard parks, sports Fields, playgrounds, etc.
	Recreation & Culture	Indoor Recreation	Assets serving the purposes of indoor recreational pursuits. Assets include arenas, pools, libraries, community/senior centres, etc.
		Cultural Facilities	Assets serving the purposes of cultural pursuits. Assets include museums, heritage items, etc.
	Resource Management	Corporate Facilities	The assets that enable Norfolk County to provide amenities and services. Assets include corporate facilities and leased buildings.
		Fleet & Equipment	The assets that support the County in delivering amenities and services. Assets include vehicles and equipment.
		Information & Communication Technology	The assets that provide communications and connectivity to enable the County to deliver services. Assets include IT equipment.
		Parking	Parking lots or street parking to provide drivers a place to park their vehicles around Norfolk.

The following sections of this document describe the processes used to determine and manage the infrastructure needs for the County's assets.

Alignment within the Organization

We are engaged in a wide range of planning processes designed to meet regulations, strategic objectives and communicate our approach to planning for successful outcomes on multiple initiatives. As many of these planning processes have implications for the County's assets, it is important that the commitments made with these plans are fully integrated within the AMP. The AM Policy we have adopted encompasses the goals that have been identified in existing strategic documents. This AMP will further integrate those commitments through assessing the impacts and requirements on assets that should be considered in future financial planning for assets.

Table 2 highlights the strategic documents in place at the County with a linkage to the AMP.

Table 2 - Norfolk County Strategic Documents

Norfolk County Council Strategic Priorities 2022-2026	Norfolk County Official Plan	Integrated Sustainable Master Plan (ISMP)
Parks, Facilities and Recreation Master Plan	Multi-Year Accessibility Plan	Economic Development Strategy
Trails Master Plan	Rural Community Improvement Plan	Norfolk Community Improvement Plan.

State of the Infrastructure

This section is intended to provide insight into the condition and details regarding the County's municipal infrastructure, providing a greater level of awareness into the service areas that are performing well and those that will require greater investment. An understanding of important infrastructure metrics, such as replacement value or condition, is critical as it serves as a basis for lifecycle management strategies and long-term financial planning. O. Reg. 588/17 requires that the County outline the following information for each asset category:

- A summary of the assets in the category.
- The replacement costs of the assets.
- The average age of the assets, determined by assessing the average age of the components of the assets.
- The information available on the condition of the assets; and
- A description of the County's approach to assessing the condition of assets in the category, based on recognized and generally accepted good engineering practices where appropriate.

In compliance with the Regulation, this section contains summaries of asset categories and condition assessment approaches, as well as quantitative outputs, such as asset replacement costs, average age, and condition information. Details on the state of infrastructure can be found in the Asset Specific Appendices that follow.

Asset Data Management

The effective management of assets relies on the processing of large volumes of data and information related to our assets such as their condition, costs, and operational and maintenance activity. This information plays a critical role by supporting decision-making and allowing us to target investment where it is most needed to meet our community priorities. In recognition of this importance, the County is planning to implement asset information management processes describing the objectives, standards, definitions and expectations relating to information management for assets.

Asset Attributes

To support consistency across asset classes, Norfolk maintains a database of key attributes for each asset.

- Basic Information (Asset ID, Description, Status, Ownership, Size, Material, etc.)
- Location Information (based on Address, Road Section, Coordinates, Geospatial, etc.)
- Asset Source and Rehabilitation History (Construction Year, Construction Costs, Project ID, Last Treatment Type, Last Treatment Year)
- Asset Valuation (Current Replacement Cost and Replacement Cost Year)
- Condition (Asset Condition, Last Inspection Date, Remaining Service Life)

- Risk Profile (Consequence of Failure, Asset Risk Score)
- Lifecycle Information (Replacement Year Life, Replacement Year Condition, Next Replacement Year)

Identification
Each asset has a unique identifier consisting of an Asset Code (e.g., ‘S-‘for Structures or ‘WW-‘ for Wastewater) followed by an alpha-numerical Asset ID. The information stored within our various systems is integrated using this unique identifier.

Status
All assets within the system have a ‘Status’ to record existing servicing status. Once an asset has been recorded in the system, it shall never be deleted, unless it was added due to a recording error. When an asset is removed or decommissioned, the status of the asset is changed to ‘Retired or ‘Abandoned’. The following are valid system status values:

In-Progress: The asset is planned to be installed, constructed, acquired, or currently under construction

Active: The asset is currently providing its intended service to the end user(s)

Decommissioned: The asset is taken out of service but may be put back in service at some point in the future

Abandoned: The asset is abandoned and there is no plan to use it for providing any future service(s)

Retired/Removed: The asset is permanently removed from its service location and disposed.

Data Administration and Management Controls
The County understands that maintaining data and continuously improving accuracy results in improved decision-making for assets and service delivery investments. As such, the IT policies and procedures at the County safeguard access to the systems maintaining asset data to ensure access is extended solely to valid users and prohibits invalid users.

In most cases, the Asset Management team is responsible for asset creation and changes such as updates or removal of the asset. All other users are typically granted access to view and report on information only.

Inventory Overview
Norfolk routinely monitors the condition and state of its assets through well-defined processes for the collection and management of asset information. *Table 3* provides further information about the condition, average age and replacement value for the asset types within each service area.

Table 3 - Asset Portfolio Summary

Service Area	Asset Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Drinking Water	Treatment & Distribution	308 km of watermain 5 Treatment Plants 14 Wells 4 Boosters/Reservoirs 6 Water Towers 10 Other Facilities	32 Years	$557,659	Fair
Wastewater	Treatment & Collection	213 km of sewer main 13 km Forcemains 21 Pumping Stations 5 Treatment Plants	28 Years	$749,410	Fair - Good
Stormwater	Treatment / Storage & Collection	170 km of storm main 24 Management Facilities	29 Years	$231,322	Good
Transportation	Roads	186 km urban asphalt 529 km rural asphalt 1,292 km surface treated 68 km gravel/earth		$2,018,128	Fair
	Structures	108 Bridges 129 Major Culverts	48 Years	$379,227	Good
Total				**$3,935,746**	

A more detailed breakdown of the state of infrastructure for each of these asset types can be found in Asset Specific Appendices of the AMP.

Ownership

Although only County owned assets are required to be recorded in our registry, due to our internal business needs, assets owned by other public and private authorities are also recorded in the system. The asset repository also needs to include all assets being maintained by the County irrespective of the ownership and locations of these assets.

The following are possible ownership options.

Norfolk: The asset is owned by Norfolk County

Province: The asset is owned by the province

GRCA or LPRCA: The asset is owned by a Conservation Authority

Shared: The Asset is shared between Norfolk County and another entity

Other Municipalities: The Asset is owned by an adjacent Municipality

Private: The asset is owned by a private resident or business

Unknown: Asset ownership is unknown

The asset owners are responsible for condition assessment, operational maintenance, capital renewal plans and other lifecycle planning activities.

Replacement Cost

The current replacement costs for each asset and/or asset components are required to forecast future capital replacement costs and financial needs for Norfolk to continue providing our current services. The replacement cost can be calculated / estimated based on asset parameters like asset size (diameter, depth and width) and material.

There are a range of methods to determine the replacement cost of an asset, and some are more accurate and reliable than others. This AMP relies on two methodologies:

- User-Defined Cost: This valuation is achieved by utilizing information from recent procurement contracts for the similar works; data from engineering reports and assessments; as well as estimates based on knowledge and experience.
- Cost Inflation: This valuation is achieved by utilizing the historical cost of the asset and inflating it based on the Consumer Price Index or Non- Residential Building Construction Price Index

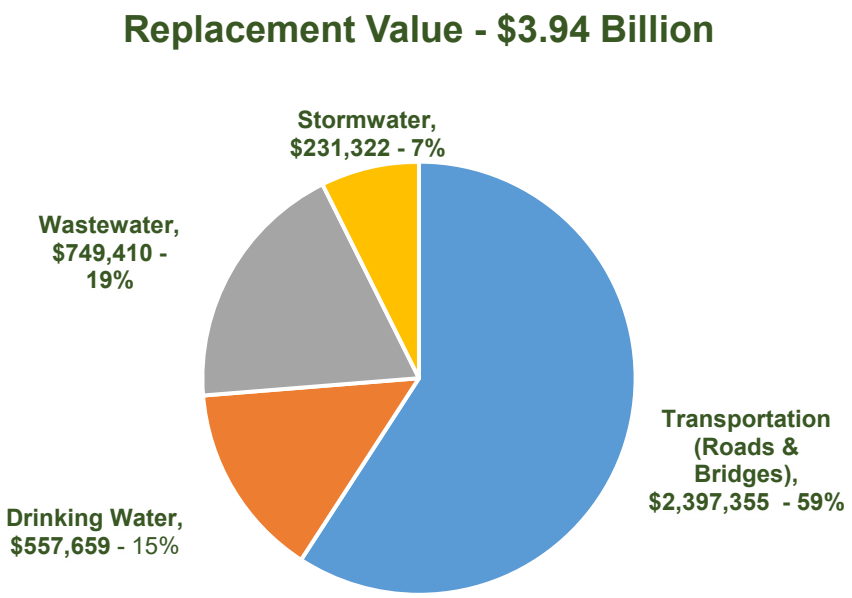
User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that the municipality incurred. As assets age, and new products and technologies become available, cost inflation becomes a less reliable method. The municipality should aim to continuously improve the accuracy and reliability of replacement cost data based on the best available costing.

Other factors which can affect replacement costs include:

- Replacement costs can be dependent on asset locations and proximity to environmentally sensitive features and/or major transportation features
- The replacement cost calculations need to account for future enhancements to assets; either due to legislative changes and/or service improvements. (i.e., replacing Vitrified Clay pipe with PVC pipe).

Table 4 provides a summary of assets owned by Norfolk County based on the replacement cost of each Service Area. The graph shows that the largest replacement value of assets is our transportation which accounts for more than our drinking water, wastewater, and stormwater combined. It is important to note that Drinking Water and Wastewater assets are fully funded assets.

Table 4 - Asset Portfolio Replacement Value ($'000's)



Condition Assessment Practices

Asset condition is defined as a measure of the physical state of an asset. An incomplete or limited understanding of asset condition can mislead long-term planning and decision-making. Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life. A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the County's asset portfolio. *Table 5* below outlines the condition rating system to determine asset condition. When field condition data is not available, service life remaining is used to approximate asset condition.

Table 5 - Condition Assessment Practices

Condition	Criteria	Source
Very Good	- Well-maintained with no deficiencies - New or recently rehabilitated asset	- Condition assessment - Asset has 85-100% service life remaining
Good	- Superficial wear and tear - May require minor operational maintenance	- Condition assessment - Asset has 60-85% service life remaining
Fair	- May show slight signs of deterioration and require maintenance - Asset is in mid-stage of its useful life	- Condition assessment - Asset has 30-60% service life remaining
Poor	- Observable deterioration requiring repairs - Frequent component failures - May require monitoring and maintenance or rehabilitation - Has a history of asset failures causing service interruptions	- Condition assessment - Asset has 10-30% service life remaining

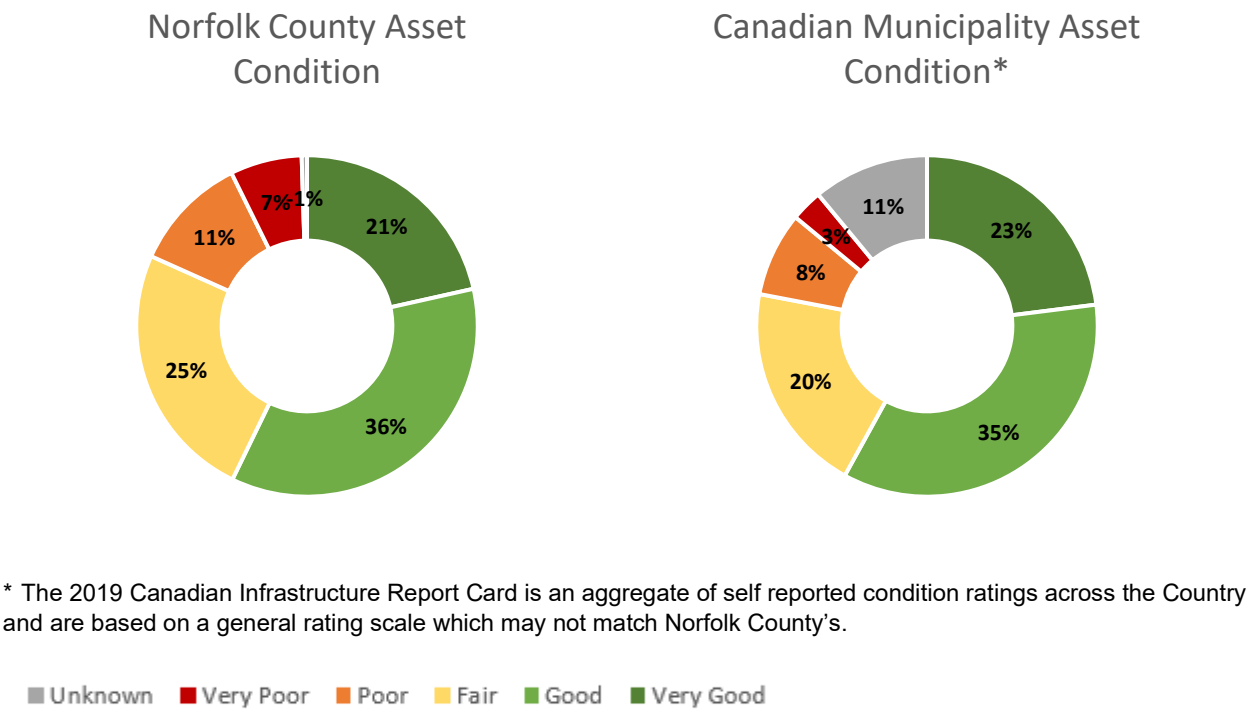
Condition	Criteria	Source
	- Asset is in later stage of useful life	
Very Poor	- Shows major signs of deterioration and requires ongoing monitoring to prevent service interruptions - Potential to become unfit for providing service - Asset is in last stage of useful life	- Condition assessment - Asset has 0-10% service life remaining
Unknown	- Not enough data exists to assign a condition	-N/A

The analysis in this AMP is based on assessed condition data, as available. The value of assessed condition data cannot be overstated as it provides a more accurate representation of the state of infrastructure than does an age-based indicator. Age-based condition tends to understate asset condition, leading to premature treatments.

The County employs a combination of both formal and informal condition assessment programs for municipal assets. The road network was assessed by an external consultant in 2018 as part of a Road Needs Study, all bridges & structural culverts are assessed every two years as per provincial regulations (Ontario Structure Inspection Manual) and sanitary mains are inspected through a CCTV program.

This AMP relies on assessed condition data for 68% of assets by replacement value; for the remaining portfolio, age is used as an approximation of condition. Asset Specific inspection and condition assessment approaches are described in their associated Appendices (A-D).

Figure 2 - Asset Condition of Norfolk & Canadian Municipalities



* The 2019 Canadian Infrastructure Report Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

Background Information Access

The County is dedicated to maintaining a transparent and engaged relationship with our communities and stakeholders. We actively support requests for dialogue and information through inclusion of transparency and communication.

Our primary mechanism for maintaining transparency of our asset management plans and approaches is through the Norfolk County website. In addition, we provide access to an online Geospatial Information System (GIS) via our website which enables our stakeholders to view our assets along with relevant information.

This document, along with the AM Policy, will be made publicly available on the County's website as required by O. Reg 588/17 and other regulations pertaining to planning documents. The County will also respond to and facilitate information requests from stakeholders via the Clerk's Office. The Clerk is responsible for establishing and implementing policies and procedures related to access and privacy.

Levels of Service

A key objective of the organization and the Asset Management Program is to align service delivery or service provisions with asset life cycle decisions. Asset management translates the organization's objectives into asset related decisions, plans and activities. A Level of Service (LoS) is a measure of what the municipality is providing to the community and the nature and quality of that service.

The province requires that the AMP include for each asset class, the current LoS being provided and the LoS that the municipality proposes to provide for each of the 10 years following the publication of the AMP in 2025. The LoS must be determined in accordance with the qualitative descriptions and technical metrics documented in O. Reg. 588/17 for core assets in addition to performance measures identified by the County as worth measuring and evaluating for both core and non-core assets.

Norfolk County measures level of service at two levels:

Community LoS (Qualitative Description) - Community levels of service provide a simple, plain language description or measure of how the community receives or experiences the services that Norfolk provides.

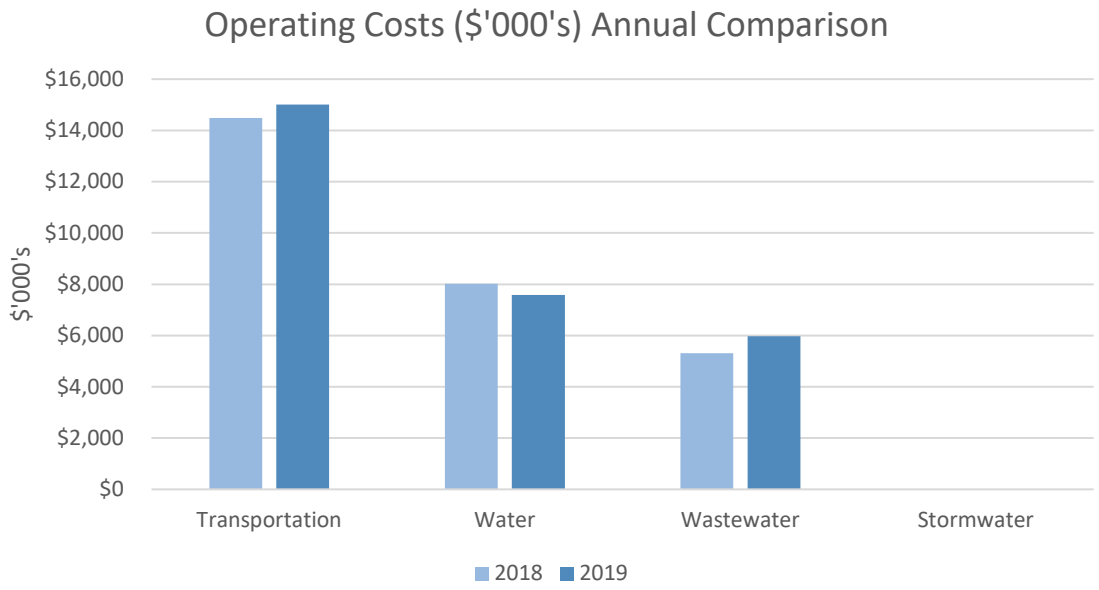
Technical LoS (Technical Metric) - Technical levels of service provide a quantitative measure of key technical attributes of the service being provided to the community. These include mostly quantitative measures.

Within each asset class in this AMP, technical metrics and qualitative descriptions are used to measure LoS.

Current Levels of Service

This AMP focuses on measuring the current level of service provided to the community. In accordance with the regulation, we have reported the current LoS for the prescribed measures in core assets in the Levels of Service sections of the relevant Asset Specific Appendices for the last two years. In addition, the operating costs associated with the core assets are shown in Figure 3. Operating costs for our stormwater network are currently not tracked separately. The costs to deliver these current LoS for our stormwater assets are therefor included in other areas, primarily in Transportation for linear stormwater and Recreation for stormwater management facilities.

Figure 3 - Current LoS costs associated with service delivery



Proposed Levels of Service

Once current levels of service have been measured, the County plans to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17. Proposed levels of service should be realistic and achievable within the timeframes outlined. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals and long-term sustainability. Once proposed levels of service have been established, prior to July 2025, the County must identify a lifecycle management and financial strategy which allows these targets to be achieved. This AMP will be expanded prior to 2025 to include proposed LoS.

Asset Lifecycle Management Strategy

Lifecycle management of assets refers to the series of activities undertaken to ensure optimum value and service delivery is obtained from assets through all stages of the asset life. The activities within these stages are determined by the outputs of a range of planning processes, such as this AMP, master planning, and strategic plans which consider the internal and external drivers for defining the outcomes required by assets.

The province requires that the AMP include the lifecycle activities that would need to be undertaken to maintain the current LoS for each asset category. The province also requires that the AMP include the estimated capital expenditures and significant operating costs related to the lifecycle activities required to maintain the current LoS in order to accommodate projected increases in demand caused by growth. The County strives to progressively improve our approaches to lifecycle management to secure outcomes for sustainable service delivery, as well as deliver value for money investments in our assets.

This section of the AMP describes our approach to the management of assets in each stage of the lifecycle, along with the associated capital and major operational expenditures associated with these phases.

Creation / Acquisition Plan

Norfolk County is committed to managing our portfolio of assets to continue to provide existing services along with supporting future residential, commercial and industrial growth. We strive to invest and develop our infrastructure to maintain service delivery as our County grows and changes. We also know that infrastructure creation and acquisition is vital to attracting business and commercial opportunities to support the economic health of our area. Our growth and master plans outline objectives for the County's asset portfolios to manage growth. These plans help to identify our infrastructure needs to ensure our assets support us in meeting and executing those objectives. Typically, these infrastructure needs are then included in a needs assessment that is conducted for specific asset types, and/or identified within the County's Development Charges Background Study.

Operations and Maintenance Plan

Assets spend the majority of their life in this stage of the lifecycle, generating significant costs in inspection, planned maintenance and requiring response to unplanned events influenced by a wide variety of factors. Effective operational and maintenance practices present opportunities to enhance value in this stage and minimize risks to service delivery.

As such, we are investing in industry standard techniques to inform us of asset condition that will allow us to adopt a more proactive approach to repairs and capital renewals of our infrastructure to reduce instances of unplanned maintenance events and failures impacting our residents.

As part of this proactive approach, we strive to maintain high levels of compliance with our planned maintenance, the requirements of the minimum maintenance standards and condition assessment programs to enhance our knowledge and responsiveness to our assets. As a result of this efficient and value adding strategy, we invest annually in the activities required for operation and maintenance of our assets. This section outlines our general approach to operations and maintenance of our assets. Specific operation and maintenance activities for each of our service areas is detailed within the Asset Specific Appendices.

Operations

The County endeavours to operate our assets according to the operation and maintenance requirements specified during the design, by utilizing industry best practices and/or as set by the manufacturer to ensure proper function, prevent damage, minimize risk and comply with regulations. The County continues efforts to ensure that; operational procedures for our assets are clearly communicated to operators; access to manuals and operating procedural is provided; and those personnel have the appropriate training and credentials needed to operate assets effectively.

Maintenance

Condition Assessment and Inspection: We inspect our assets using industry standard practices and technology to identify any risks to asset condition and subsequent service delivery. This approach supports early identification and resolution of risks to asset operation. In addition, inspections inform the asset condition and provide valuable information for assessing risk, targeting asset renewal, and identifying investment requirements. Each asset type follows its own inspection schedule, ranging from visual inspection to data-led techniques.

Inspection programs are largely maintained within the County's work management system. Assets without prescribed or industry standard inspection approaches follow a general condition assessment process based on estimated remaining service life. Additional details are included in the Asset Specific Appendices.

Planned Maintenance: Our major maintenance needs are identified through prescribed maintenance of the assets, and through inspection programs. These needs are resolved through operational maintenance activities if the cost can be borne by the operational budget. Otherwise, the major maintenance needs can be considered through the asset renewal process in consultation with Asset Management, Engineering, Operations and Financial teams on a risk-to-service delivery basis

Unplanned Maintenance: Our unplanned maintenance consists largely of reactive repairs identified through various means including:

- inspection programs
- planned maintenance activities
- the operation of an asset

- notification by our stakeholders and the public

In the event an asset defect is identified, a corresponding report is prepared, and a work order is created. The inspection report is reviewed to prioritize defects, and then the work order is distributed to contractors or internal teams for repair as appropriate to the asset. Once the repair has been performed, the repairs are inspected to ensure completeness.

Prioritization of Response

Our assets provide a wide range of services to our communities. Some of these are essential to daily life, for example, the provision of clean drinking water and waste removal. We therefore ensure that any repairs or operational responses to known asset deficiencies are prioritized based on customer priorities and essential service delivery.

Rehabilitation and Renewal Plan

As our infrastructure assets decline with age or with the influence of multiple factors, we periodically require rehabilitation and renewal to ensure their capability to maintain service delivery. Our teams engage in comprehensive, risk-based planning processes aligned to leading practices to identify the condition of our assets through inspection programs which inform investment planning and decision making. We use data driven decision-support software for the infrastructure renewal needs assessment and planning of core linear infrastructure. System identified renewal needs are reviewed for capital investment planning with respective business units and stake holders which includes public works, finance and utilities (Hydro, Gas, Telecommunication).

Other core and non-core infrastructure renewal needs planning is supported through ongoing condition, risk assessment processes and capacity assessment through various master plans. Corporate strategic priorities, community priorities, corporate and community stewardship (such as heritage preservation, greenhouse gas reductions) and changing Regulatory requirements are also considered during the infrastructure renewal planning process.

The process for targeting rehabilitation and renewal of our assets consists of assessing asset needs on an annual basis. We perform an annual needs assessment to determine the assets that require renewal or replacement. Our needs assessment process considers a range of options to target the most effective solution and value for money, this includes the consideration of non-infrastructure solutions such as process or policy changes that can mitigate risk or extend asset life. Based on the assets classified for renewal or replacement, the project scopes are established along with a preliminary estimate for the projects that are included in the Ten-Year Capital Budget Forecast and are provided to Council for approval. Following approval, the County performs pre-engineering surveys, develops detailed design drawings, and refines the project estimates to be included in the capital and operating budgets. After construction of the asset, commissioning and inspection activities are conducted and approval is provided to operate the asset. The asset is then deemed operational by the County. Ongoing

maintenance activities are conducted on an ongoing basis, and information is filtered back to the needs-based assessment annually.

Demand Management & Disposal Plan

Demand Management provides a process of evaluating alternatives to respond to growth or a decline in demand for services and infrastructure. In some cases, when an asset has reached its end of life and demand illustrates diminished need, it may be possible to dispose of it, rather than replace or renew the asset. The determination as to whether the asset can be renewed or must be replaced is informed by the inspection process and consideration of demand. In the event disposal of the asset is required, the County works to ensure safe removal of the asset or associated hazardous materials in accordance with regulations and environmental policies. Disposal costs for most assets are integrated into the capital costs of the project to replace the asset. In the event the asset will not be replaced, the decommissioning costs will be determined via the capital planning process and prioritized for inclusion in the budget.

Climate Change

Climate Change manifests through the need to mitigate and or adapt. As part of a comprehensive asset management approach consideration of climate change is necessary to ensure that the real impacts of mitigation and or adaptation are understood, and effective planning is used to address those impacts. Service delivery, asset renewal and financial planning must all consider how and when the changing climate will affect the County in order to ensure service delivery and sustainability over the long term.

Financial Strategy

One of the key objectives of Norfolk's asset management planning process is to determine the level of financing required to fund the eventual replacement of County assets ensuring that:

- Service delivery standards are maintained at the predetermined level
- Strategic objectives are achieved
- Service capacity exists to accommodate future growth

Like most municipalities, the amount of spending required to maintain, rehabilitate and replace assets typically exceeds Norfolk's fiscal capacity, creating an infrastructure deficit, commonly referred to as an infrastructure gap. In order for Norfolk to achieve full infrastructure funding, a financial strategy must be developed that aims to close this gap over several years to avoid placing too great a burden on current tax and rate payers.

In accordance with the regulation, as outlined in this AMP, current levels of service have been identified for Norfolk's core assets. As this AMP is refined and developed over time projected levels of service will be determined for both core and non-core assets. In order

to ensure that these assets continue to function and deliver services reliably, Norfolk will continue to analyze asset data to determine the aggregate annual lifecycle cost requirements and will work toward having a financial strategy in place for core assets in 2024 and non-core assets in 2025 as prescribed by the legislation.

In this section we will briefly describe our approach to the funding strategies applied to meet the identified funding gaps in this AMP but will provide additional detail in 2025 as required by the regulation.

Asset Investment Needs

Our investment needs are identified through a range of mandated and industry standard planning processes supported by detailed analysis to ensure we identify our needs for investment to maintain service delivery, meet future demand growth and achieve our strategic objectives. The needs identified through these various planning processes are then prioritized to determine the most important needs and initiatives to be funded.

The outputs of this analysis are used to inform financial, budgetary and performance discussions across the County. The following sections describe our capital and operational investment needs to maintain existing infrastructure and associated service delivery along with the requirements for additional infrastructure to meet the growing needs and demands of our communities.

Current Funding Levels

Norfolk County has annual capital requirements for each infrastructure category including Roads, Water, Wastewater, Fleet, Facilities, etc. The next steps of the asset management planning process will include verifying the replacement cost of Norfolk's core assets, identifying the non-core assets and determining their replacement value, and finally using established levels of service to determine the annual life cycle cost requirement (LCC). The eventual LCC will be compared to Norfolk's current funding levels considering capital replacement reserve/reserve fund balances and forecasted contributions to determine our infrastructure deficit and provide strategies to make up the deficit.

Funding Strategies (Current & Future)

The Financial Management and Planning team at Norfolk continues to identify and assess all available opportunities for additional funding options and revenue streams to address our funding gaps. Funding strategies used by municipalities to address infrastructure gaps can vary. The following strategies are either in place or being evaluated for implementation at Norfolk County.

Reserve / Reserve Fund Transfers

Reserves and Reserve Funds are the primary, and preferred funding sources for asset renewal at Norfolk County. Contributions to Reserve/Reserve Funds are made from the levy and rate budgets respectively in order to fund future infrastructure replacement

needs. Using this model ensures that funds exist to replace assets as they age and shares the burden of funding asset replacement across all users who benefit from the asset. Historically reserves and reserve funds have not been funded at a level that is adequate to replace Norfolk's existing asset base, nor are they currently at sufficient levels. As noted above, one of the key objectives of asset management planning is to identify the annual replacement cost for each asset and ensure that adequate funds are set aside to cover the eventual expenditure. As Norfolk updates and expands the corporation's asset management plan more analysis will be completed on identifying and closing the reserve/reserve fund gap.

Debt Financing

The Approved 2023-2032 Capital Plan included just over $380 million in debt financing (including DC debt), and that total is expected to increase in the coming years. Typically, debt financing is recommended for new/incremental capital projects, however a significant portion of the projected debt financing in the most recent capital plan is for asset management projects. Given the County's insufficient reserve balances, debt has been proposed for some key asset management projects as no other viable funding sources are available. The funding gap would be even greater if it were not for the use of debt financing as many projects would then require deferral. Debt financing allows projects to move forward and pay for them over time as the debt is repaid.

The amount of debt that any municipality can carry is regulated by the Ministry of Municipal Affairs and Housing by setting an annual repayment limit (ARL) of 25% of the municipalities net own source revenues. In an effort to ensure financial sustainability and minimize overall risk, Norfolk's debt policy limits this amount to 15% of own source revenues.

For the first time, in the 2023-2032 Capital Plan, it is projected that the County will exceed its debt capacity limit of 15%. Increasing this limit and issuing more debt to finance projects could lower the County's infrastructure gap but brings more risk. To ensure Norfolk County continues to work toward a strong financial position, staff will review the internal ARL and overall debt strategy, review growth-funded debt needs relative to development charges revenue forecasts, and review the timing of debt funded capital projects. Debt can be an effective financing tool when used responsibly, however it can also be a damaging force when over used and not effectively managed. Increasing the use of debt to fund asset replacement needs exacerbates Norfolk's challenges with respect to closing its infrastructure gap as the County will be forced to pay interest costs on the replacement value while at the same time increasing reserve transfers to fund a future replacement.

Federal and Provincial Funding

The Canada Community Building Fund (CCBF), formerly Federal Gas Tax Fund, is a federal funding stream received by Norfolk County annually to address infrastructure needs. In recent years this funding has primarily been allocated to Roads projects to

supplement the lack of sufficient reserve funding for these projects, however the program allows for these funds to be utilized for various infrastructure projects.

The Ontario Community Infrastructure Fund (OCIF) is an annual funding source received from the Province to be used for infrastructure repair, renewal and replacement. Like CCBF, the majority of this funding has been allocated toward Roads projects.

While infrastructure programs from upper levels of government can change with evolving policy, the CCBF and OCIF programs remain predictable and have been considered permanent. It should be noted that if either of these sources of funding were removed, Norfolk's existing funding issues would compound, exacerbating current concerns surrounding debt and household affordability.

Special Infrastructure Levy / Capital Levy

With a focus on asset management, there will be greater visibility on the financial challenges facing Norfolk County as the corporation grapples with the amount of funding required to meet capital plan and service level requirement needs. Many municipalities across the Province are considering or implementing a special levy devoted to infrastructure funding. As the asset management planning cycle matures at Norfolk, this may also be a consideration that is brought forward at a future date.

Development Charges

Development charges are designed to recover the capital costs associated with the residential and non-residential growth within the municipality. Typically, asset replacement costs are not eligible for funding through development charges. However, if an asset needed to be expanded or reconstructed to accommodate population growth then the portion of costs related to the growth or the higher service level would be eligible for DC funding. DC's are applied to capital projects as appropriate through Norfolk's budget process, and background studies.

Additional Strategies to be Considered

As the AMP evolves and more information is brought to light regarding the required funding level to maintain service level expectations, more investigation will be completed on the following options with any recommendations brought forward to Council as appropriate.

- Stormwater Rates
- Sponsorship Policy
- Private/Public Partnerships

Asset Renewal

The County has undertaken a comprehensive analysis to determine the capital needs of its assets over a 10-year planning horizon to deliver the services expected by its communities and stakeholders. This analysis has been undertaken for core assets and

was completed using an industry standard decision support for identification of capital renewal needs for our core asset areas featuring an integrated risk-based analysis

Through continued delivery of our proactive maintenance programs and ongoing inspections of these core assets, we will continue to monitor their condition and respond effectively to any identified risks through operational intervention. The needs of our core assets have been identified through data-driven analytics based on condition and associated service delivery risks.

Growth Needs

In addition to targeting and prioritizing the investment needed to maintain existing assets, there are also planning processes in place to determine the additional assets needed to meet growing demand for service through population increases and the demand for new services. The projects targeted to meet growth come from various plans such as the Integrated Sustainable Master Plan (ISMP) and Development Charge Study. Many of these growth-related projects are funded through Development Charges - the mechanism that enables recovery of growth-related capital expenditures from new development. These charges are governed by the Development Charges Act and are collected in accordance with our Development Charges By-law. In most cases, growth related projects will be funded through a combination of development charges and other municipal financial sources such as tax levies, rates, fees and reserves to recognize the benefits these projects create for existing residents and to the wider community beyond the new development. Our most recent Development Charges Background Study was conducted in 2018.

A portion of growth-related projects will need to be undertaken in advance of new development construction, resulting in collection of the development charge post construction. In these cases, the growth-related project will need to be financed through debenture and fulfilled through the subsequent development charges collected post construction. Any interest costs incurred during financing are also eligible for collection through development charges and are included in development charge calculations.

Asset Management Gap

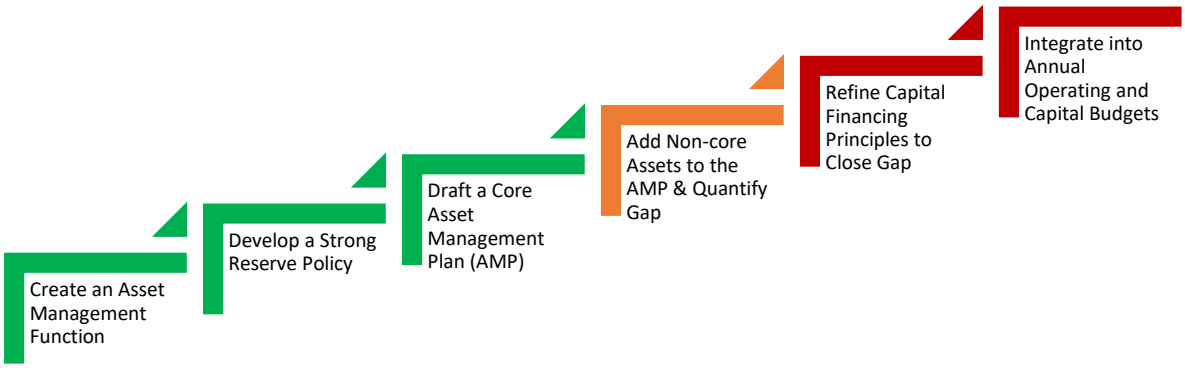
As noted in Table 4 of the AMP, Norfolk's core asset replacement values have been preliminarily assessed at a total of $3.94 billion dollars. As a baseline, very high-level estimate that would translate to approximately $100M in annual life cycle costs compared with Norfolk's budgeted contribution to capital reserves in 2023 of roughly $30M. This annual funding deficit has been accumulating for some time and is currently being offset by deferred replacements, debt financing, and the application of CCBF, OCIF, and Legacy Fund interest as well as other grant programs as appropriate. With inflation rates, construction prices, and interest rates all remaining higher than they have been in years it stands to reason that replacement costs today will be much higher than they were anticipated to be a few years ago. It is also important to note that this does not include

the non-core assets which will be added in phase two of the asset management planning process.

The next steps in the financing of asset management will be to further define and analyze the funding gap and to review the impacts of service level adjustments on the amount of funding required to maintain Norfolk's asset base. Eliminating the annual deficit in asset management funding is a very challenging and long term process for municipalities. After further analysis of the asset data has taken place and more refined funding gap amounts are known for each asset category, strategies, like those noted above, will be put in place to close the gap and it is anticipated that this process will take several years.

Roadmap to Financial Sustainability:

The below graphic illustrates, at a high level, Norfolk's progress toward financial sustainability and was designed to demonstrate the complicated nature of the process and how progress is being made.



Risks & Levels of Service

It may be recommended that certain capital projects be delayed, or phased in, to maintain a capital plan that is more affordable. This process effectively extends the useful life of the asset in question and spreads the life cycle costs out over a higher number of years which reduces the annual cost as well as delaying the capital replacement cost. However it is important to note that this process also increases financial risk for the County. Attempts to extend the useful life of assets based on cost alone will increase risk of asset failure, may reduce Norfolk's ability to deliver services at the level that residents expect, and may increase annual maintenance or operating costs.

Next Steps – Identifying comprehensive Strategy Linkages between AMP & Capital

Future phases of asset management, in addition to refining the funding gap, will also seek to answer the following questions:

- How will the AMP feed into the capital plan?

- Will the AMP and capital plan be different? If so, how and why?
- Distinguish and define the capitalization threshold for tangible capital assets and compare to the inventory used to develop the AMP. Are they different? If so, why?
- How will future reviews of the AMP and capital budget take place? How do we ensure that asset management remains a high priority into the future?
- Does the current budgeting process need to change to accommodate AMP? How can we improve?

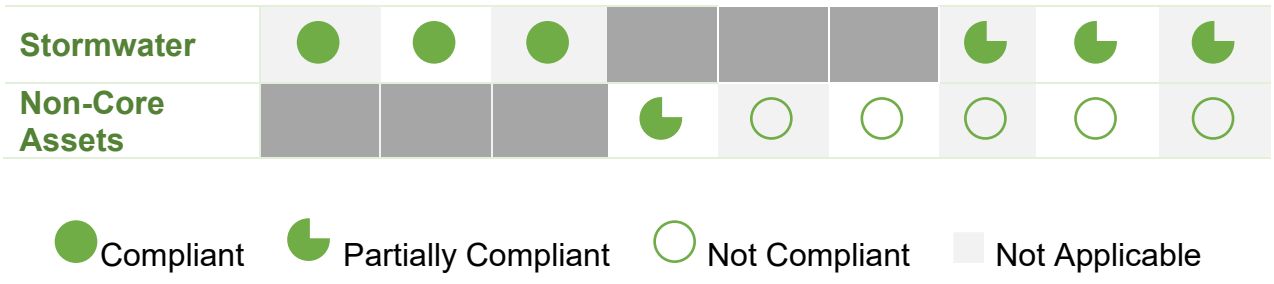
Ongoing O.Reg.588/17 Journey

Norfolk County recognizes the benefits of adopting asset management approaches that support sustainable service delivery while managing risks. With the introduction of O.Reg.588/17 for Asset Management, as demonstrated in this AMP we have advanced our approaches to develop an AMP that is fully compliant in order to meet the first phase. We recognize that this is only the first step in improving our asset management practices and meeting O.Reg.588/17 and so we remain committed to continuing on this journey to meet the future phases for the specified service areas by July 1, 2024 for Phase 2 and July 1, 2025 for Phase 3. Our approach to the development of this AMP included an assessment of our asset management capabilities to determine improvement opportunities to support our strategic objectives and comply with all regulation requirements in advance of the milestone dates. This approach has enabled us to achieve early compliance with many areas of the regulation and identify areas for improvement in the coming years to improve service delivery and regulation compliance.

Table 7 highlights our progress and opportunity areas to achieve regulation compliance across our service areas. Further information on the regulatory compliance of the assets within each service area is included in the Scope section of each Asset Specific Appendix.

Table 6 - Compliance with O. Reg. 588/17

	Phase 1			Phase 2 – 2024			Phase 3 – 2025		
	Asset Inventory	Current LoS	Costs to Maintain LoS	Asset Inventory	Current LoS	Costs to Maintain LoS	Proposed LoS	Lifecycle Management Strategy	Financial Strategy
Transportation	●	●	●	◔	○	○	◔	◔	◔
Drinking Water	●	●	●				◔	◔	◔
Wastewater	●	●	●				◔	◔	◔



Stakeholder Engagement

Stakeholder engagement is a key component of Norfolk's planning processes and supports us in developing plans and strategies that meet the needs of our communities and stakeholders. Our engagement with stakeholders directly informs our organizational goals and creates the basis of effective strategy development. This section describes our efforts to engage our stakeholders.

Service Users

The County has identified user groups based on the key services we deliver. These users are formed largely of those in our communities who receive and access the range of services we offer, along with more transient stakeholders who access the services in our area on a more temporary basis, such as visitors. We engage our service users through a range of methods, both formal and informal, to inform operational improvements and strategic planning, including:

Formal stakeholder consultation: We host a number of events aligned to our planning processes and service delivery areas designed to engage with stakeholders on topics of interest. Examples include public consultation sessions for master planning and growth and our strategic plan.

Surveys: Various services offer their users the opportunity to provide dedicated feedback on occasion through the completion of a survey. These surveys are valuable to support us in assessing their priorities and planning to meet their expectations.

Feedback: Our users serve as a primary source of information with regards to the quality of our service delivery. We invite stakeholders to access a range of mechanisms to provide feedback on any number of items and raise any concerns regarding their services. We maintain open channels of communication accessible by phone, email, website, social media and mail.

Notifications: We have processes in place to ensure our users are notified in cases where their services will be disrupted for execution of planned improvement work on assets that will result in temporary disruption of services.

Through all of these interactions and dedicated stakeholder engagement methods, we are able to assess stakeholder views on the delivery of services facilitated by our assets and will be able to identify areas of concern and priority by 2025. This feedback is used

to inform our planning process, support the prioritization of asset improvements and improve decision-making. In addition, this AMP has been informed by our Strategic Priorities – the basis of which was a public consultation exercise. We have also incorporated information and feedback from our service area teams who interact with our communities on a daily basis during service delivery and response to community raised service concerns.

We will continue to utilize these opportunities for engagement with our stakeholders and communities, and future revisions of our asset management plans will incorporate the outputs of these exercise and demonstrate how the outputs have informed our LoS.

Service Delivery Partners

Our partnerships and relationships with external parties are important to maintaining service delivery. We rely on partnerships to aid in the delivery of services and improvements to our assets. We highly value our partnerships and recognize the benefits of working with them to secure safe and effective delivery, incorporate leading practices and techniques, and achieve efficiencies in delivery. Examples of our service delivery partners include:

Contracted Parties

We maintain partnerships with and contract external parties to undertake work on our behalf. We manage our relationships through well-defined procurement processes, governed by regulation and best practices in supply chain management.

Local Government Authorities

Our assets and the services we deliver are integrated with other local government entities such as conservation authorities, other levels of government and neighbouring municipalities. We have established formal forums and means of engagement with these parties. As valued partners in government, we also actively consider impacts on these parties in undertaking any service-related initiative and ensure careful coordination.

We maintain close relationships with these partners and have established processes for engagement when required to ensure collaborative and transparent ways of working for the betterment of our collective communities and stakeholders.

Local Private Utilities Coordination

Local private utilities (e.g., electricity, natural gas, and telecommunications) are a critical component to the overall service delivery model provided for residents and businesses of Norfolk. Coordination has been established among the utility providers and County staff. Specifically, staff from Norfolk's Engineering Department meet with the representatives from local private utility companies on a regular basis. The schedule for these meetings is tied to Capital Budget Planning forecasts which is sent to utility providers so that the companies are aware of upcoming reconstruction plans

Plan Governance

This AMP presents our approach to effective management of our assets, incorporating leading practice approaches to demonstrate compliance with the requirements of O.Reg.588/17. It is intended to continuously communicate our approaches and plans for development with our communities and stakeholders. It serves as a mechanism to communicate our investment needs to our stakeholders, and further develop a culture of service-focused asset management.

We intend to build on these efforts and the development of this AMP to further our asset management objectives and secure full regulatory compliance in advance of the required milestones. This section outlines our commitment to a continuous improvement approach for asset management at the County, along with our plan to monitor and govern future updates for full compliance with regulatory milestones.

AMP Monitoring & Review

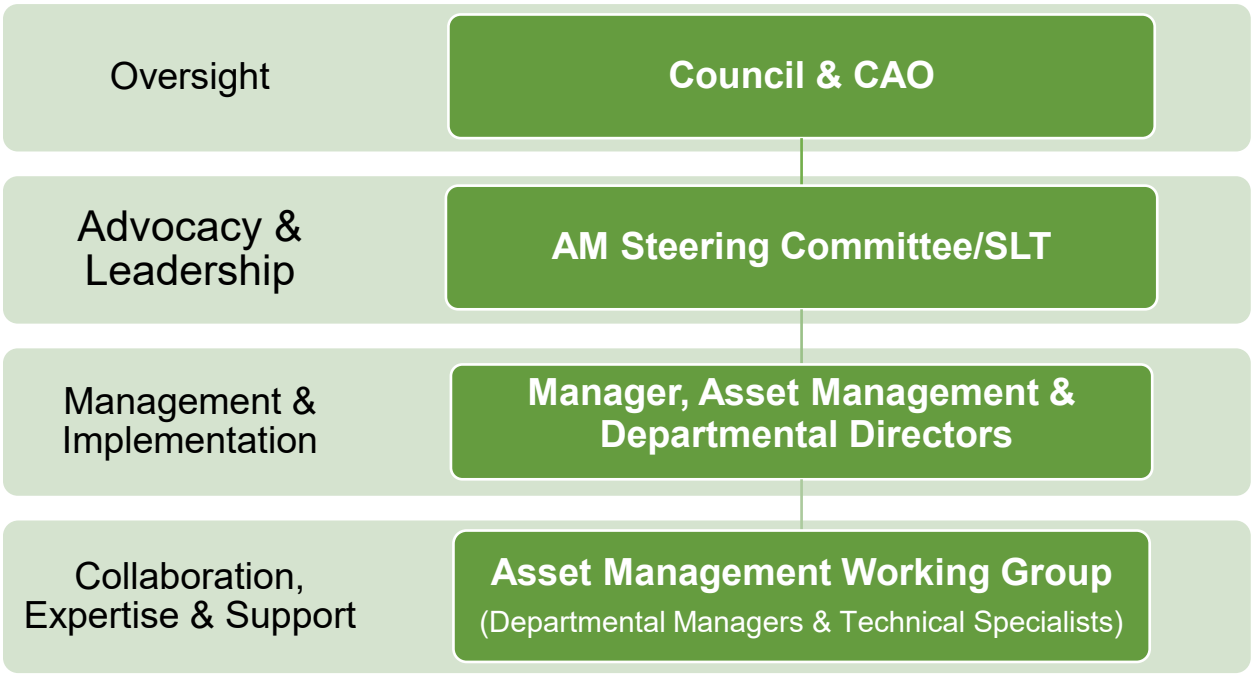
In order to maintain our continuous improvement approach and achieve regulatory compliance, we will implement monitoring controls and governance for ongoing review of our asset management plan and continuous improvement opportunities to advance our capabilities.

This asset management plan will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of budget decisions. The AM Plan has a maximum life of 5 years and is due for complete revision and updating within 2 years of each Council election.

AMP Governance

The future development of the AMP and associated improvement initiatives will be governed by the stakeholders actively involved in the advancement of asset management in the County. *Figure 4* illustrates the governance structure of our AMP. Further details on roles and responsibilities can be found in the AM Policy & Strategy.

Figure 4 - Asset Management Governance Structure



The application of this governance structure will provide multiple benefits to enhancing our asset management approaches, including:

- Maintaining focus and priority of the asset management plan in supporting our service delivery and strategic objectives
- Continuously identifying and reviewing opportunities and progress of implementation to ensure efficiencies and improvements are realized
- Increased communication and awareness of asset management requirements and priorities to advance the culture of asset management
- Alignment with related County initiatives and strategic objectives.

Our plan will be reviewed annually by our Asset Management Department and Asset Management Steering Committee, working in conjunction with our service areas and Senior Leadership Team. Updates to the plan will be published externally with council approval ahead of all required regulatory timelines. A review of the governance structure will also be undertaken as part of the annual review to ensure participation of appropriate stakeholder groups as processes advance.

Appendix A: Transportation

A.1 Introduction

The County maintains a diverse portfolio of transportation assets to provide safe and effective means to keep our communities moving. Our transportation system consists of an interconnected network of roadways, structures and active transportation assets. We have three different asset classes within transportation designed to facilitate safe and efficient movement across our area.

Table 7 - Transportation Assets

Service Area:	**Transportation**		
Asset Class:	**Roads**	**Structures**	**Active Transportation**
Asset Type:	• Urban Asphalt • Rural Asphalt • Surface Treated Roads • Gravel Roads • **Roadside Assets* **Traffic Signals* **Retaining Walls* **Streetlights*	• Bridges • Major Culverts	• Pedestrian Bridges • **Sidewalks* • **Streetlights* • **Trails* • **Walkways*

**Denotes Phase 2 Asset Types (not currently included)*

This collection of assets is critical to our County. Enabling the safe movement of people and goods to support the economic prosperity of the community and to provide access to recreational activities helps us to realize our vision of a connected County. Like many of our assets, transportation assets currently face increased challenges as a result of aging infrastructure, climate change, and increasing demand. Our investment in these assets must therefore be carefully considered to ensure optimal investment for renewal, while investing to meet the growing needs of our community. Given the intricacies of our asset base, it is important to distinguish between the services provided by the County and the Province. The Province provides road services on Provincial Highways within the County outside of the urban boundaries, as such, these assets are not included as part of this AMP. This appendix provides information regarding our approach to the management of our transportation assets over the next 10 years, demonstrating our commitment to assessing and meeting the LoS valued by our residents.

A.1.1 Scope

This section identifies the requirements for each Phase of O.Reg.588/17 applicable to the assets within this service area. Our compliance with these requirements for the asset classes within this service area are presented in *Table 9* to highlight areas of future development in advance of regulation phases. The following sections of this appendix will present further detailed information to meet the requirements for each

section of the regulation. *Table 7* of the main body of our AMP provides a summary of compliance for all service areas.

Table 8 - Transportation Compliance with O. Reg. 588/17

Core Assets		Phase 1						Phase 3 – July 1, 2025						
Service Area	Asset Class	Asset Inventory	Weighted Average	Replacement Value	Average Age	Current LoS	Costs to Maintain LoS	Proposed LoS	Creation/ Acquisition Plan	Operations & Maintenance Plan	Rehab & Renewal Plan	Disposal Plan	Investment Needs	Financial Strategy
Transportation	Roads	●	●	●	●	●	●	◔	○	◔	◔	○	◔	◔
	Structures	●	●	●	●	●	●	◔	○	◔	◔	○	◔	◔
	Active Transportation	◔	◔	◔	◔	◔	◔	○	○	○	○	○	○	○

● Compliant ◔ Partially Compliant ○ Not Compliant

Note: Active Transportation and some Roads assets are required for Phase 2

Table 9 demonstrates that our assets within the transportation service area are fully compliant with the regulation requirements for Phase 1. In addition, we have achieved some of the requirements for Phase 3. We will continue to develop proposed measures in consultation with stakeholders in advance of the 2025 milestone.

A.1.2 Strategic Connections

The strategic and master plans summarized in this section are all related to our transportation assets and have been considered while developing this AMP.

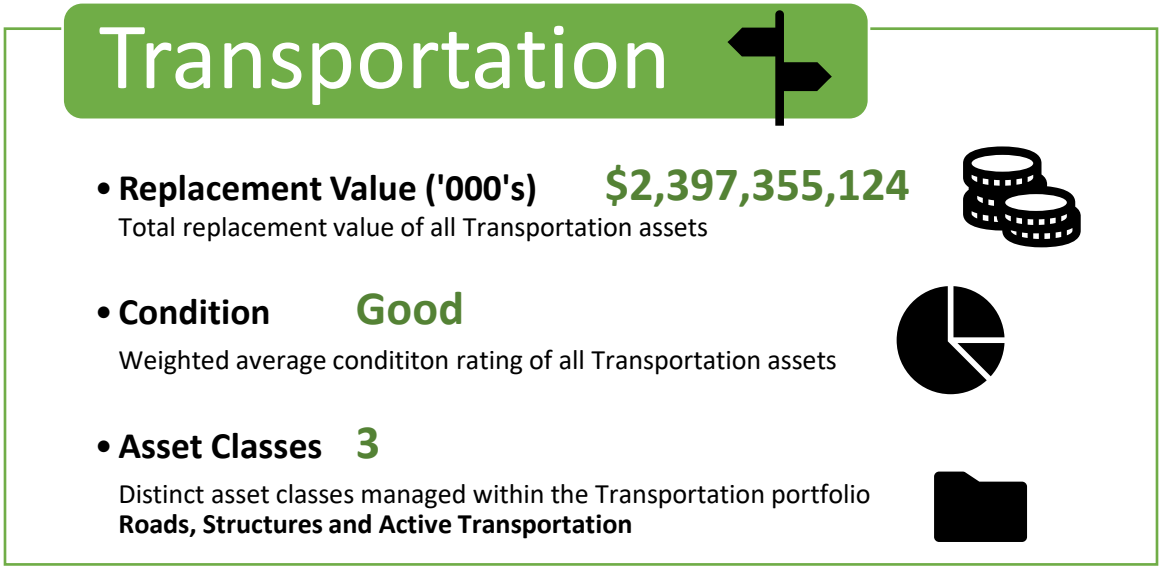
Table 9 - Transportation: Strategic Documents

Strategic Document	Linkage(s) to AMP
Current Documents	
Norfolk County Council Strategic Priorities 2022-2026	The Strategic Plan sets the stage for decision-making, prioritization, and ongoing performance management. The Strategic Plan contemplates “Our Future Norfolk”, and specifically emphasizes that Norfolk County will strive to be a well-run organization, with financial sustainability and asset management as the cornerstone of the County’s future success. More specific to Transportation, the Strategic Plan sets a priority to “Building Norfolk” by demonstrating meaningful progress on projects that matter to residents and businesses and uses proactive infrastructure management strategies. This AMP assists the County in relating decision-making, prioritization, and performance management, ultimately enabling us to maintain our infrastructure.
Integrated Sustainable Master Plan (ISMP) (2016)	The Integrated Sustainable Master Plan (ISMP) is a comprehensive Master Plan which addresses the long-term planning and visioning for water, wastewater, transportation and active transportation infrastructure needs County-wide. More specific to Transportation, the ISMP identifies individual transportation and active transportation infrastructure improvements, and opportunities to strategically integrate those improvements in order to minimize impacts and costs. This AMP utilizes the ISMP to ensure that service delivery and asset condition goals and objectives for the County are aligned.
Parks, Facilities and Recreation Master Plan (2015)	The Parks, Facilities and Recreation Master Plan will be referenced in future versions of this AMP when the Active Transportation assets are broadened to include non-core assets.
Development Charges (DC) Background Study (2018)	DC by-law 2019-100 that imposes certain Development Charges in the Corporation of Norfolk County pursuant to the Development Charges Act, S.O., 1997, c. 27, as amended. The growth plans and infrastructure investment proposed within the AMP must consider whether development charges will be incurred pursuant to the County’s bylaws. The Development Charges Background Study is essential to this AMP as it supports the County in identifying its funding gap included in the Financial Strategy.

A.2 State of Infrastructure

Transportation Overview

Transportation assets are those that enable us to get to where we need to go throughout our County. Our transportation assets are some of our most highly utilized and visible assets within Norfolk. They include everything from the vehicular and pedestrian bridges throughout the County to our vast road networks. We recognize that the efficiency and value we can derive from our transportation assets extends into all other portfolios, which is what makes transportation particularly important.



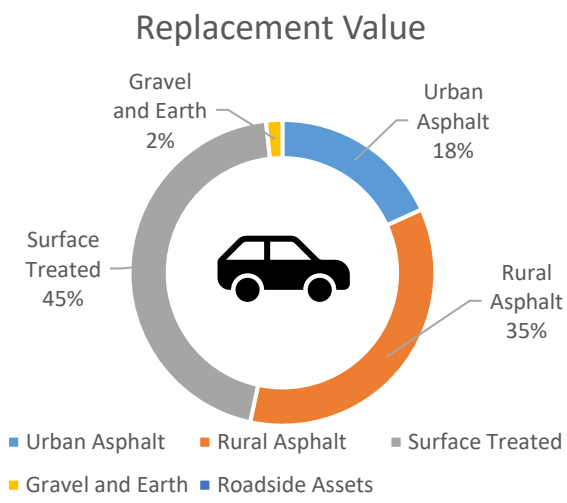
Roads

Replacement Value ('000's)

$2,018,128

Average Condition

Fair



Structures

Replacement Value ('000's)

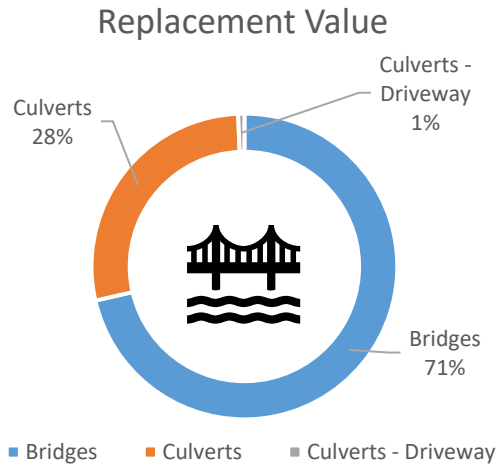
$379,227

Average Condition (2020 OSIM)

Good (76 BCI)

Average Age

48 years



Roads Overview

The table below includes the quantity, condition and total replacement cost of each asset segment in our Roads inventory. Gravel and Earth roads have been included as well, however the lifecycle management strategies for these assets consists of perpetual maintenance activities and do not require capital costs for rehabilitation activities or end-of-life replacement unless they are being upgraded to a different road type.

Table 10 - Roads State of Infrastructure

Asset Class	Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Urban Asphalt	Local	121 km	22 Years	$214,102,226	Good / 68.1 PCI
	Collectors	24 km	18 Years	$49,830,166	Good / 72.6 PCI
	Arterial	41 km	14 Years	$103,670,817	Good / 73.0 PCI
Rural Asphalt	Local	99 km	18 Years	$118,281,943	Good / 68.2 PCI
	Collectors	20 km	13 Years	$25,571,574	Good / 68.0 PCI
	Arterial	410 km	13 Years	$566,014,887	Good / 73.7 PCI
Surface Treated	Local	1,187 km	21 Years	$830,105,089	Fair / 63.7 PCI
	Collectors	9 km	N/A	$6,920,506	Good / 68.3 PCI
	Arterial	96 km	19 Years	$68,883,124	Fair / 66.1 PCI
Gravel	Gravel	37 km	N/A	$19,225,497	Fair / 60.6 PCI*
Earth	Earth	31 km	N/A	$15,522,217	N/A

*Gravel resurfacing not recorded; condition will be higher than reported & updated during next RNS

The condition of our Roads by PCI is shown in Figure 5. These conditions are based on our 2018 RNS and have been deteriorated to 2021 values.

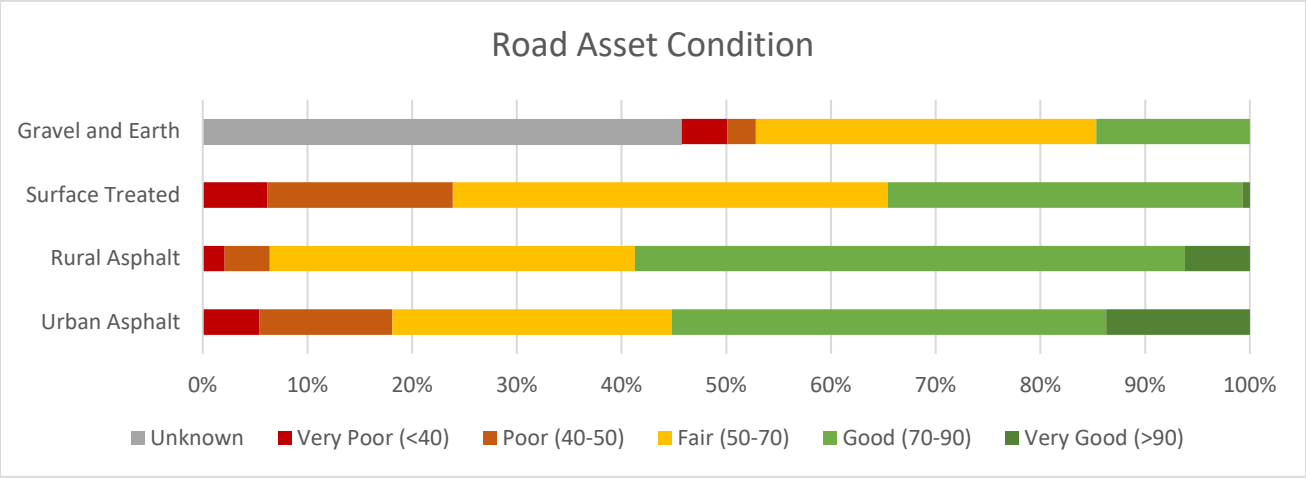


Figure 4 - Road Condition Profile

For our road's assets, 19% of our roads are in poor or very poor condition, and 43% in good or very good condition in comparison to 17% and 51% respectively for Canadian municipalities reported on the 2019 Canadian Infrastructure Report Card. The 2019

Canadian Infratsructure Report Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

Assessment Approach

The County has a Road Needs Study (RNS) completed every 5 years. The purpose of the RNS is to provide a visual condition survey in accordance with the Ministry of Transportation of Ontario's current practices. Condition ratings are provided as Pavement Condition Index's (PCI's) for each road section in our network. PCI values are internally updated on an as needed bases between RNS's such as when work is completed or when severe deterioration is noted.

Structures Overview

The table below includes the quantity, condition and total replacement cost of each asset segment in our Structures inventory.

Table 11 - Structures State of Infrastructure

Asset Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Bridges	108	49 Years	$270,234,962	Good / 74 PCI
Culverts	129	47 Years	$108,992,116	Good / 81 PCI

The condition of our Structures by age is shown in Figure 6. The quantities are based on replacement costs as opposed to number of structures.

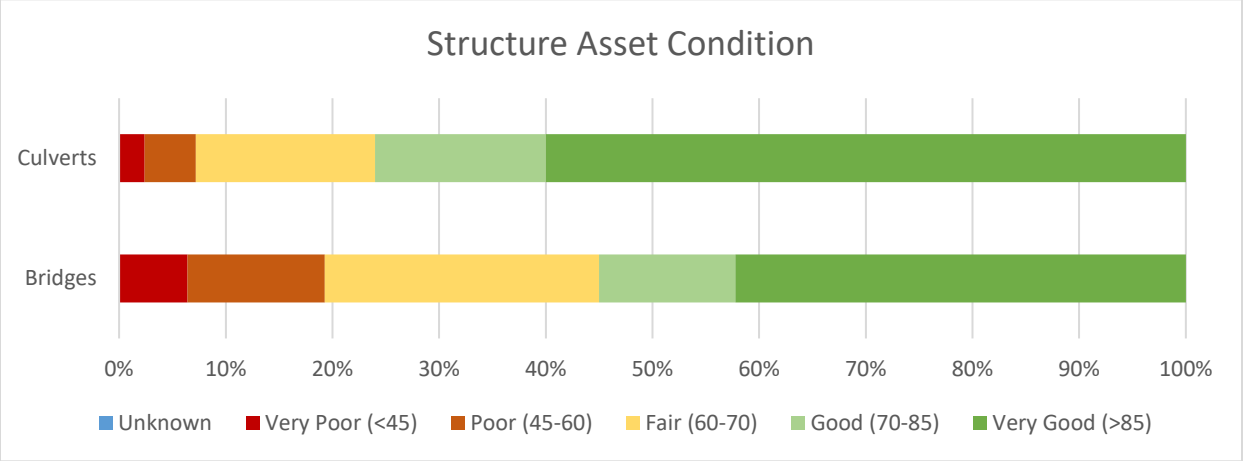


Figure 6 - Structure Condition Profile

For our structure assets, 13% of our bridges and culverts are in poor or very poor condition, and 66% in good or very good condition in comparison to 12% and 60% respectively for Canadian municipalities reported on the 2019 Canadian Infrastructure Report Card. As such, it is evident that our assets may be in an overall slightly better condition than other Canadian municipalities. The 2019 Canadian Infratsructure Report

Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

To better understand our Structures, Figure 7 summarizes the age profile of our bridges and culverts by decade.

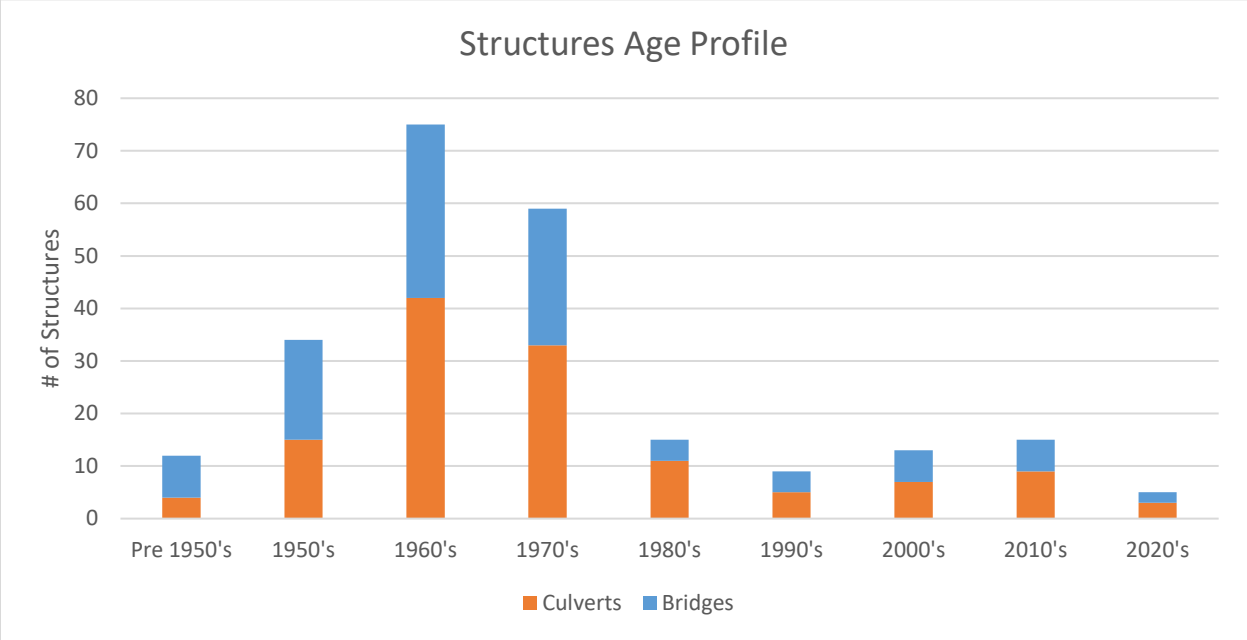


Figure 7 - Structures Age Profile

Assessment Approach

Biennial inspections are performed in accordance with the Ontario Structure Inspection Manual (OSIM). The purpose of these inspections is to update the structures inventory and to complete full OSIM reports for each bridge and culvert structure having a span of 3.0 m or greater owned by the County. The inspections are required by provincial law (O.Reg.104/97 as amended by O.Reg.472/10).

To assist in prioritizing the recommended work, the MTO Bridge Condition Index (BCI) is calculated and utilized for condition ratings above. The BCI values are used for planning purposes for repair work and do not represent the relative safety of the bridge. In general, for a bridge with a BCI value:

- Greater than 70 - Repair work is not usually required within the next five years.
- Between 60 and 70 - Repair work is usually scheduled within the next five years.
- Less than 60 - Repair work is usually scheduled within the next year.

A.3 Levels of Service

A.3.1 Current Levels of Service

Under O.Reg.588/17, for our core assets, we are required to report the qualitative descriptions and technical metrics for our current Levels of Service (LoS). As such, we have reported the prescribed metrics from the regulation for our roads and structures (bridges and culverts) within our LoS framework in the tables below.

Table 12 – Transportation: Prescribed Levels of Service - Roads

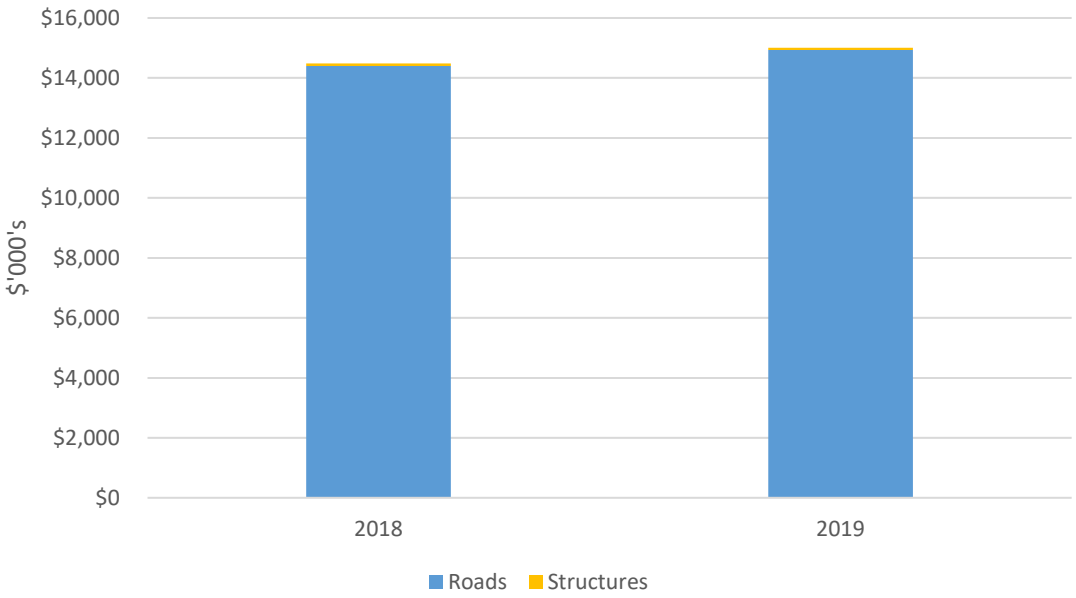
Description		The existing road network in Norfolk County includes provincial and municipal roads. Provincial roads (not included) consist of three major highways: Highway 24, Highway 3, and Highway 6. Municipal roads in Norfolk are divided into three roadside environments: urban, semi-urban and rural. These are further classified as either arterial roads, collector roads, or local roads, in decreasing order of size and capacity.		
Asset	**Service Attribute**	**Levels of Service**		
Roads	**Scope**	**Community Levels of Service (Qualitative Descriptions)**		
		The County has outlined maps of its road network in Appendix F. The County has arterial, collector and local roads that it operates and maintains to ensure high connectivity for the community.		
		Technical Levels of Service (Technical Metrics)	**2019**	**2020**
		Number of lane-kilometres of each of arterial km roads as a proportion of square kilometres of land area of the municipality *(Excludes Provincial roads)*	0.68 lane km per square km of land area	0.68 lane km per square km of land area
		Number of lane-kilometres of collector roads as a proportion of square kilometres of land area of the municipality	0.07 lane km per square km of land area	0.07 lane km per square km of land area
		Number of lane-kilometres of local roads as a proportion of square kilometres of land area of the municipality	1.76 lane km per square km of land area	1.76 lane km per square km of land area
	Quality	**Community Levels of Service (Qualitative Descriptions)**		
		The County has outlined different levels of road class pavement condition in Appendix H. The County seeks to maintain the average condition of the road pavement as good to very good to ensure that a high-level of service is retained and that safety of the community is maintained. The County aims to provide a balanced approach to service delivery with inspection focusing on those assets that are in poor condition by leveraging a risk-based approach to prioritize renewal or rehabilitation of roads. The County ensures full compliance with Ontario Minimum Maintenance Standards.		
		Technical Levels of Service (Technical Metrics)	**2018**	**2020**
		Average pavement condition index Paved Roads *(Note: equivalent to PCI measured by Norfolk)*	65.3	66.7
		Average surface condition (e.g., very good, good, fair, poor or very poor) index Unpaved Roads	68.6 / Fair	60.6 Fair

Table 13 – Transportation: Prescribed Levels of Service - Structures

Asset	Service Attribute	Levels of Service		
Structures	Scope	**Community Levels of Service (Qualitative Descriptions)**		
		The County's municipal bridges and major culverts are used by all types of vehicles on the road, including heavy transport vehicles, motor vehicles, farm equipment, emergency vehicles, pedestrians and cyclists. There are 108 bridges and 129 major culverts across the County.		
		Technical Levels of Service (Technical Metrics)	**2018**	**2020**
		Percentage of bridges/major culverts in the municipality with loading or dimensional restrictions.	4.6%	4.6%
	Quality	**Community Levels of Service (Qualitative Descriptions)**		
		The County has outlined different levels of structure condition in Appendix G. The majority of the County's bridges are in Good condition; therefore, there are no major concerns regarding how the bridge condition could affect the use of the bridges. We inspect our bridges every 2 years in line with the Ontario Structure Inspection Manual.		
		Technical Levels of Service (Technical Metrics)	**2018**	**2020**
		Average bridge condition index value for Bridges.	73.3	74.0
		Average bridge condition index value for Culverts.	81.2	80.8

Additionally, we are pleased to report other current measures for the active transportation assets. These are outlined in Appendix F.

Figure 8 - Transportation: Operating Costs Annual Comparison ($'000's)



A.3.2 LoS Maps
The maps cited in the Prescribed LoS for the County are shown in Appendix F.

A.3.3 Proposed Levels of Service
Proposed LoS are not required for reporting by the Regulation until 2025, we will be proactively developing proposed measures for review and consultation as part of the exercise to develop a LoS framework for all assets across our portfolio.

A.4 Asset Lifecycle Management Strategy
A.4.1 Creation / Acquisition Plan
Master planning documentation supports the County in identifying the objectives around the specific asset services that are necessary to meet the needs and growth of Norfolk. We have developed various master plans and strategic plans over the years, including the Integrated Sustainable Master Plan (ISMP), which includes transportation as a core element. The ISMP is a framework that guides our investment in various services, including transportation, to support growth and help shape Norfolk County for the future.

Creation and acquisition activities within our municipal boundaries are made in alignment with the objectives, stakeholder input, and long-term strategic plans set forth in the ISMP. It is clear that transportation is a critical element in the activities necessary to meet the demands associated with population growth and economic development, as transportation as a service area directly affects the efficiency and capacity associated with how we move in and around Norfolk. Documents such as these help the County in developing creation and acquisition plans, as these priorities and plans are taken into consideration.

The most common method of acquiring Transportation assets for Norfolk County is through the assumption of Development assets. These assets are typically funded and built by a developer and then handed over to the County upon completion. We would then be responsible for the assets remaining lifecycle activities.

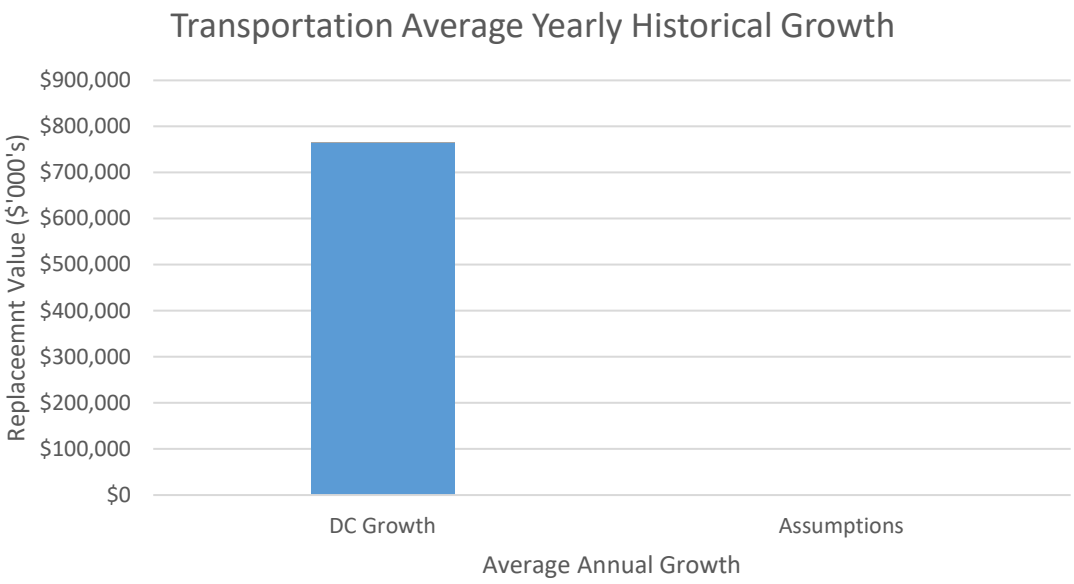
To ensure the County is assuming assets which were installed properly and functioning as intended, the County has detailed design requirements which Developers are required to follow. Before assuming assets, County staff inspect the assets against the requirements and any deficiencies are to be rectified prior to assumption to ensure we get the expected life out of the assets.

The second major contribution to the Creation/Acquisition plan would be the expansion of existing assets. Examples of these projects in Transportation could include the widening of a roadway or structure, the addition of sidewalks or the urbanization of a rural road. These projects would typically be funded entirely or partially through Development Charges.

It is important to look at our past growth via assumptions and DCs to ensure we plan for future growth properly. Our growth for Transportation assets is primarily through our Roads, as Structure and Pedestrian Structures are not common growth drivers.

Looking at the growth we have had in the past, between 2016-2019, there has been growth of our roads assets as presented in *Figure 9*.

Figure 9 - Transportation Growth by Year



More specifically, we are pleased to demonstrate in *Table 15*, the growth our road network has experienced, where we have added 18.64 lane-km between 2014-2019.

Table 14 - Road Growth by Year

Year	Road (km)
2014	6.36
2015	4.56
2016	3.86
2017	0
2018	2.4
2019	1.46

A.4.2 Operations and Maintenance Plan

This stage of the asset lifecycle generates significant costs over time; therefore, we have implemented practices that enhance value through cost reduction and investment optimization. A successful operations and maintenance plan will ensure that our assets also meet the level of service commitments and expectations from those in our community.

Condition Assessment and Inspection

Norfolk County follows the requirements outlined in the Ontario Structure Inspection Manual (OSIM) when performing condition assessments and inspections for bridges, large culverts and pedestrian structures, as well as the Ontario Minimum Maintenance Standards for Highways (O. Reg. 239/02) for our road assets. Based on standard condition assessment processes, maintenance of transportation assets begins with routine inspection to identify defects that could result in risks or higher costs in the future. This practice of early identification, through visual inspection and quantitative assessment, allows for overall higher LoS and extended asset lifespans, as the outputs from the condition assessments are used in planning.

Asset types each have varying condition assessment and inspection procedures as shown in *Table 16*.

Table 15 - Transportation: Condition Assessment & Inspection Procedures

Asset Class	Condition Assessment & Inspection Procedure
Roads	Our entire road network undergoes a detailed condition assessment every 5 years which includes the calculation of a Pavement Condition index (PCI). This is performed by a consultant. Routine road patrols are also performed on an ongoing basis.
Structures (including Pedestrian)	Bridges and large culverts with a span of more than three metres undergo a formal inspection every two years as per Provincial Requirements using the Ontario Structure Inspection Manual (OSIM). These are performed by a consultant.
Sidewalks	An annual safety inspection program is performed for our sidewalks and walkways between May and September. The inspections are performed by County staff. Defects are recorded according to provincial requirements and are categorized according to various defect types and three severity levels.
Bike Lanes	Inspection of bike lanes are performed as part of the road's inspection program.
Retaining Walls	Retaining walls undergo a formal inspection every four years. These are performed by a consultant.

If a defect is uncovered during inspection, the next step is determining whether the defect will require minor or major maintenance.

Planned Operations and Maintenance

Norfolk County is committed to maintaining our assets in a state of good repair in order to ensure that we deliver on our levels of service for our customers

Typically, in the case of minor maintenance, it is incorporated into planned operations and maintenance programs in order to make repairs based on condition assessments. A work order is created and distributed to Operations staff and/or contractors for repair, followed by an inspection to ensure completeness and payment once complete.

Currently, there are several planned operations and maintenance activities that are performed on the County's transportation assets, outlined in *Table 17*.

Table 16 - Transportation: Planned Operations & Maintenance Activities

Asset Class	Activity	Performed By
Roads	Crack Sealing	Contracted Out
	Tree Trimming/Brush Control	County Staff
	Shouldering	County Staff
	Ditch Maintenance	County Staff
	Catchbasin Cleaning	County Staff/Contracted Out
	Pothole Maintenance	County Staff
	Sign Maintenance & Replacement	County Staff
	Grass Cutting	County Staff/Contracted Out
	Street Sweeping	County Staff
	Winter Maintenance	County Staff/Contracted Out
	Winter Road Inspections	County Staff
	Road Patrols and Inspections	County Staff
	Road Condition Assessments	Contracted Out
	Pavement Markings	Contracted Out
	Micro surfacing	Contracted Out
	Surface Treatment	County Staff
	Streetlight Repairs	Contracted Out
Structures	Structure Inspections	Contracted Out
	Grass Cutting	County Staff/Contracted Out
	Sign Maintenance & Replacement	County Staff
	Street Sweeping	County Staff
	Regular Maintenance	Contracted Out
Active Transportation	Sidewalk Inspections	County Staff
	Sidewalk Repairs	County Staff/Contracted Out
	Structure Inspections	Contracted Out
	Structure Maintenance	Contracted Out
	Grass Cutting	County Staff/Contracted Out
	Trail Inspection	County Staff
	Sign Maintenance & Replacement	County Staff

If the inspection reveals that major maintenance is required, the County typically implements a rehabilitation and renewal plan.

Unplanned Operations and Maintenance

Our major maintenance needs are identified through a number of sources, including activities prescribed through the maintenance of assets. However, unexpected situations may occur which can result in unplanned maintenance activities. If major maintenance costs are significant, a more thorough review process becomes necessary and often involves consultation with various internal functions, such as our Asset Management, Finance, as well as our Engineering and Operations service areas to decide if the repair meets the capital budget criteria. Generally, this service area relies

on outside contractors for investigation and suggested repairs when the scope of the maintenance is not easily determined.

Despite the fact that minor maintenance is incorporated into planned operations and maintenance programs, there are cases where it is unplanned. *Table 18* outlines some of the common unplanned maintenance activities that occur in the County and who typically performs them.

Table 17 - Transportation: Unplanned Operations & Maintenance Activities

Asset Class	Activity	Performed By
Roads	Pothole Patching	County Staff
	Guiderail Repairs	County Staff
	Utility Cut Restorations	County Staff/Contracted Out
	Traffic Signal Repairs	Contracted Out
	Streetlight Repairs	Contracted Out
	Pavement Edge Repairs	County Staff
	Retaining Wall Repair	Contracted Out
	Emergency Response (Accident Cleanups, spills, etc.)	County Staff
Structures	Pothole Patching	County Staff
	Guiderail Repairs	County Staff
Active Transportation	Sidewalk Repairs	County Staff/Contracted Out
	Walkway Maintenance	County Staff
	Utility Cut Restoration	County Staff/Contracted Out
	Trail Maintenance	County Staff

A.4.3 Rehabilitation and Renewal Plan

We employ an asset renewal process, using supporting software and consultation among multiple internal functions. The supporting software works as a decision support tool which allows us to utilize our asset State of Infrastructure data, operations and capital budget information in order to target efficient rehabilitation and renewal of transportation assets.

The rehabilitation and renewal plan begins with a needs assessment on an annual basis, followed by a review of the operational impacts of potential investments. If the need for rehabilitation or renewal is significant enough, the item moves to a more detailed level of scope including budget definition, financial forecasting, and finally Council approval. In some cases, for assets which will affect a significant number of people, public consultation is necessary to make sure that our decisions align with the expectations and needs of the people we serve.

Most renewal projects require construction and project management, particularly as the projects increase in scale. Following the renewal, commissioning and inspection activities are performed to ensure that our personnel have the understanding of the

materials and processes recommended to maintain the asset at a cost-effective, and optimal level.

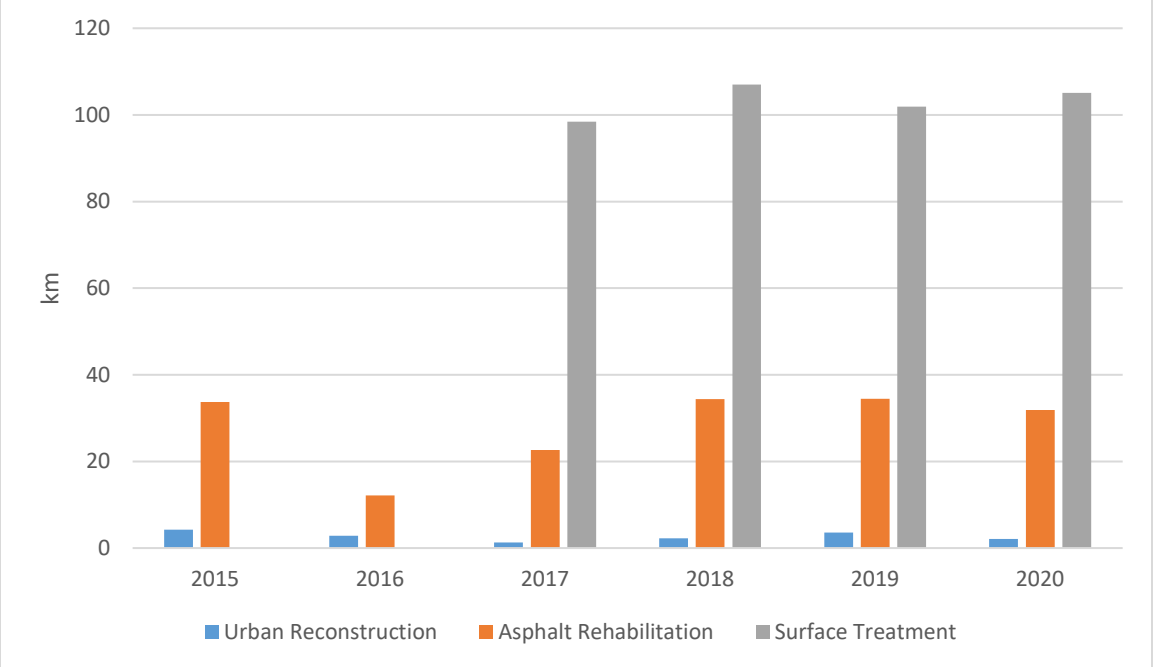
Roads

The rehabilitation and renewal process for our roads is fully integrated with the renewal needs of all underground infrastructure such as drinking water, wastewater and stormwater. This integrated approach ensures our renewal projects for these service areas are delivered with optimal timing to increase value and minimize disruption to our communities. For example, if a road is targeted for renewal, coordination between service areas will determine whether the underlying stormwater, drinking water or wastewater infrastructure is also of an age or condition that requires renewal to ensure these projects are delivered together to reduce disruption for our communities and deliver enhanced value.

In order to ensure a state of good repair and service delivery, we have urban, rural and surface treated road resurfacing programs. The urban program is for those roads that only need surface condition improvements and that do not require renewal of underground infrastructure within the life of the treatment. The rural and surface treatment programs are designed to maintain the surface conditions of these roads perpetually utilizing various rehabilitation methods as it is not common practise to completely reconstruct a rural roadway.

To demonstrate this ongoing commitment to our road network, *Figure 10* presents that during 2015 – 2020, we have reconstructed 16.3 km and rehabilitated 169.2 km of County owned asphalt roads. From 2017-2020 we have rehabilitated 412.4 km of surface treated roads.

Figure 5 - Road Network Renewal Summary



Rehabilitation activities are determined based on a combination of both external expertise (Road Needs Study) and internal expertise (knowledge of evolving road condition, organizational priorities, and available budget).

Lifecycle strategies have been developed as a proactive approach to managing the lifecycle of surface treated and asphalt roads. Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is utilized to extend the service life of roads at a lower total cost. Lifecycle strategies are driven by the Pavement Condition Index (PCI) of the roadway, which is calculated through the Roads Needs Study. The PCI values of our roads are analyzed through our asset management system where they are compared to the appropriate lifecycle strategies to determine rehabilitation/renewal options.

Lifecycle strategies vary by our Road Asset Classes, which group our roads by type, class and environment. Table 19 shows the various Asset Classes utilized for our roads network along with typical renewal/rehabilitation activities. The timing and extent of these activities are driven by the lifecycle strategies. Figure 11 and Figure 12 display example lifecycle strategies for a rural and urban hot mix asphalt (HMA) road. The complete listing of our Lifecycle Strategies is contained in our asset management software.

Surface treated roads are managed proactively and are subject to regular re-surfacing activities (single and double lift) to maintain a suitable driving surface.

Table 18 - Roads Asset Classes

Asset Class	Typical Rehabilitation/Renewal Activities
Earth - Rural - Local	Maintain only
Earth - Semi-Urban - Local	
Gravel - Rural - Local	Gravel Resurfacing, Conversion to Surface Treatment
Gravel - Semi-Urban - Local	
HMA - Rural - Collector	Crack Sealing, Microsurfacing, Mill & Pave, Cold-in-Place Recycling, Pulverize and Resurface, Overlays.
HMA - Rural - Local	
HMA - Rural - Arterial	
HMA - Semi-Urban - Collector	
HMA - Semi-Urban - Local	
HMA - Semi-Urban - Arterial	
HMA - Urban - Collector	Crack Sealing, Mill and Pave, Full Depth Asphalt Removal, Full Road Reconstruction
HMA - Urban - Local	
HMA - Urban - Arterial	
ST - Rural - Collector	Surface Treatment (single or double), Pulverize and Surface Treatment, Conversion to HMA
ST - Rural - Local	
ST - Rural - Arterial	
ST - Semi-Urban - Collector	
ST - Semi-Urban - Local	
ST - Semi-Urban - Arterial	

ST - Urban - Collector
ST - Urban - Local
ST - Urban - Arterial

Figure 11 - HMA Rural Collector Lifecycle

Activity	Activity Type	Trigger
Crack Sealing	Maintenance	3-5 years post rehab.
Mill and Pave – Single Lift	**Rehabilitation**	**PCI: 65-71, Year: 12-15**
Crack Sealing	Maintenance	2-5 years post rehab.
CIPR - 2 Lifts/Pulverize – 2 Lifts	**Rehabilitation**	**PCI: 40-65, Year: 25-30**
Crack Sealing	Maintenance	3-5 years post rehab.
Mill and Pave – Single Lift	**Rehabilitation**	**PCI: 65-71, Year: 40-55**
Crack Sealing	Maintenance	2-5 years post rehab.
Reconstruction/Pulverize - 2 Lifts	**Replacement**	**PCI: 30-50, Year: 70-80**

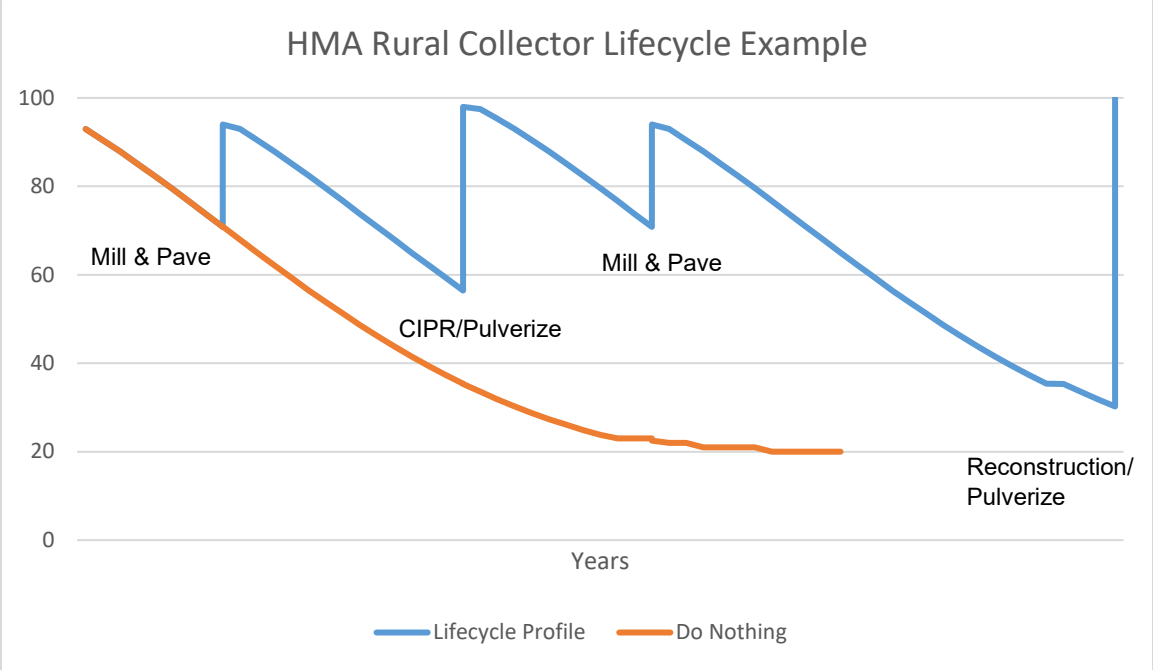
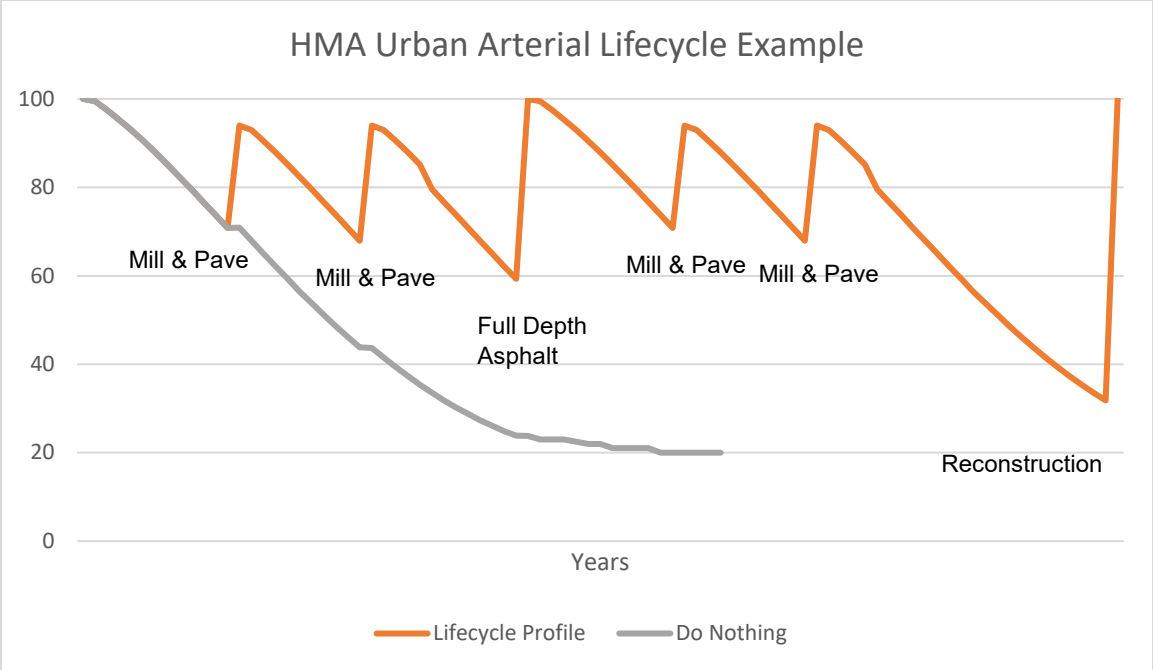


Figure 62 - HMA Urban Arterial Lifecycle

Activity	Activity Type	Trigger
Crack Sealing	Maintenance	3-5 years post rehab.
Mill and Pave – 50mm	**Rehabilitation**	**PCI: 65-71, Year: 10-13**
Crack Sealing	Maintenance	2-5 years post rehab.
Mill and Pave – 100mm	**Rehabilitation**	**PCI: 55-65, Year: 23-25**
Crack Sealing	Maintenance	2-5 years post rehab.
Full Depth Asphalt Replacement	**Rehabilitation**	**PCI: 40-60, Year: 35-40**
Crack Sealing	Maintenance	3-5 years post rehab.
Mill and Pave – 50mm	**Rehabilitation**	**PCI: 65-71, Year: 50-53**
Crack Sealing	Maintenance	2-5 years post rehab.
Mill and Pave – 100mm	**Rehabilitation**	**PCI: 55-65, Year: 63-65**
Crack Sealing	Maintenance	2-5 years post rehab.
Reconstruction	**Replacement**	**PCI: 40-60, Year: 70-80**

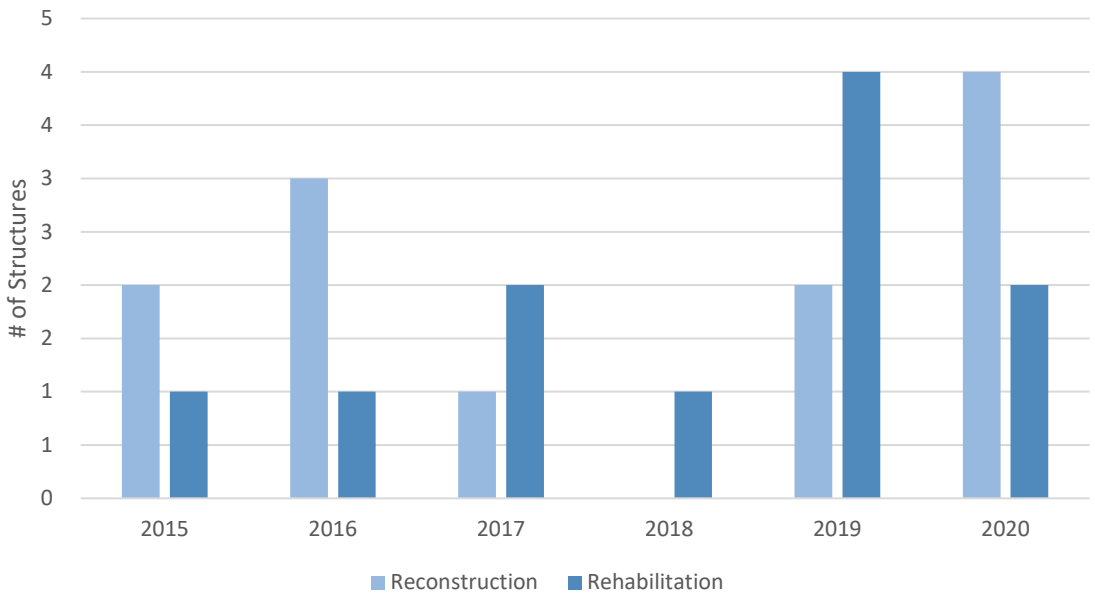


Structures

The rehabilitation and renewal process for our structures is fully integrated with our biennial OSIM inspections. Through these inspections, needs based recommendations are made for structure rehabilitation and renewals.

Figure 13 presents that during 2015 – 2020, we have reconstructed 12 and rehabilitated 11 structures.

Figure 7 - Structures Renewal Summary



Rehabilitation and renewal activities are determined based on a combination of both external expertise (OSIM inspections) and internal expertise (organizational priorities and available budget).

Structure lifecycle management is driven through the recommendations from our biennial OSIM inspections. However high-level llifecycle strategies have been developed to demonstrate a proactive approach to managing the lifecycle of our various structures and to plan for long term funding needs.

These lifecycle strategies can be divided into three distinct asset classes: bridges, concrete culverts and steel culverts. Table 20 shows the high-level lifecycle activities used for these asset classes.

Table 19 - Structures Asset Classes

Bridges		
Minor Rehabilitation (30% Replacement cost)	Rehabilitation	25 Year
Major Rehabilitation (55% Replacement cost)	Rehabilitation	50 Year
Replacement	Renewal	75 Year
Concrete Culverts		
Major Rehabilitation (55% Replacement cost)	Rehabilitation	35 Year
Replacement	Renewal	75 Year
Steel Culverts		
Replacement	Renewal	45 Year

A.4.4 Disposal Plan

In some cases, disposing of an asset is more appropriate than replacing or renewing it. Given the growth of our population and the steadily increasing movement of people and goods, disposal is not a common activity for transportation assets.

In some cases, we may close our transportation assets for use, by limiting the maintenance performed or gating it off. When an asset is closed and deemed a risk, our Engineering and Operations service areas will coordinate with contractors to ensure the safe removal of the asset. In very few instances are their dedicated projects specific for the disposal of a transportation asset.

A.5 Financial Strategy

A.5.1 Asset Investment Needs

Our investment needs are identified through a range of mandated and industry standard planning processes, supported by detailed analysis to ensure we identify our needs for investment. This allows us to maintain service delivery, meet future demand and achieve our strategic objectives. The needs identified through these various planning processes are then prioritized through a capital project prioritization process, which evaluates projects using various criteria to determine the most important needs and initiatives to be funded.

The following sections describes our capital investment needs to maintain existing infrastructure and associated service delivery, along with the requirements for additional infrastructure to meet the growing needs of our communities.

Capital Renewal

Norfolk has undertaken a comprehensive analysis to determine the capital needs of its transportation assets to deliver the services expected by its communities and stakeholders. We have adopted an industry standard approach to the identification of capital renewal needs for our core asset areas, featuring an integrated risk-based analysis supported by a decision support system.

A more detailed breakdown of the Transportation needs by asset class is as follows:

Roads

Based on the lifecycle strategies identified for both surface treated and asphalt roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for our Road Network. The annual capital requirement represents the results of Performance Modeling which is used to maintain the existing network Pavement Condition Index (PCI).

Performance modeling utilizes lifecycle strategies, and allows us to run scenarios based on funding, condition, etc. Urban reconstruction projects consider the risk level of the underlying infrastructure, therefore reconstruction needs are based on High and Very High Risk sanitary, water and stormwater road sections. More detail on risk levels of underground assets can be found in the corresponding Appendices.

Norfolk County's 10-year roads needs are based on maintaining our network PCI, with the exception of urban road reconstructions which may often be driven by the condition of the underground infrastructure. The resulting analysis for our core roads assets demonstrates that the County has a 10-year renewal need of $336.6 million.

Structures

The 10 year forecasted needs of Norfolk's structures are based on the recommendations of our 2020 OSIM inspections. These recommendations utilize inspection data, rehabilitation history and industry best practices to ensure that our structures remain safe and sustainable while minimizing lifecycle costs. The analysis concludes the 10-year renewal needs of Norfolk Conty's structures is $75.8 million.

Growth Needs

In addition to targeting and prioritizing the investment needed to maintain existing assets, there are also planning processes in place to determine the additional assets needed to meet growing demand for service through population increases or demand for new services. The projects targeted to meet growth come from various plans such as the Integrated Sustainable Master Plan (ISMP) and Development Charge Study. These growth-related projects are primarily funded through Development Charges – the mechanism that enables recovery of growth-related capital expenditures from new development, or other municipal financing sources. The process for creation and acquisition of assets for growth is described in the Creation/Acquisition section of the Asset Lifecycle Management Strategy.

A.5.2 Funding Strategies

To support the transportation assets that provide services within the County, we require sufficient funding in order to maintain the assets in a state of good repair, as well as to create new assets to support future growth. Our current financing strategies and revenue sources are allocated based on our prioritization model discussed in the Investment Needs section. This model considers the currently available funding sources for transportation assets in order to deliver our current investment plan effectively.

A.6 Stakeholder Engagement

A.6.1 Users of the Service

Our various communities are the primary users of our transportation network along with transient users who are visiting or travelling throughout our area. This network is also vital for the movement of goods that contribute to the economic health of the County. Therefore, our users also include those providing commercial services and goods.

We provide a range of engagement points for our users, including online (both through the website and social media), by email, phone, or letter. In addition to these traditional channels of engagement, the development of the ISMP & Our Future Norfolk - Strategic Areas of Focus included a significant public consultation exercise featuring a range of opportunities to consult with stakeholders directly on the subject of transportation in the County.

A.6.2 Service Delivery Partners

We rely on partnerships to aid the delivery of service and improvements to our assets and to implement appropriate controls and processes to ensure the impact of our work on stakeholders and delivery partners is communicated to avoid risks and adverse impacts.

Within transportation, it is particularly important that we work with our external contractors in the delivery of our renewal programs, as well as with utility providers to minimize disruption and coordinate efforts for maximizing efficiency. We maintain close relationships with both our internal and external partners and maintain processes to engage with each of our service delivery partners as required.

A.6.3 Public and Private Infrastructure Owning Bodies

Norfolk County shares transportation assets (mainly Roads and Structures) with other local municipalities which are managed through Boundary Agreements. The shared Transportation assets are outlined in *Table 21*.

Table 20 - Shared Transportation Assets

Municipality	Shared Assets
Haldimand County	Roads and Structures
Elgin County	Roads and Structures
Oxford County	Roads
Brant County	Roads and Structures
Norwich Township	Roads and Structures
Bayham Township	Roads and Structures
Town of Tillsonburg	Roads

Additionally, the County contains three Provincial Highways which are maintained and owned by the province as outlined in *Table 22*. We are committed to continuing to work with the Ministry of Transportation of Ontario on managing these critical assets.

Table 21 - Provincial Highways within Norfolk County

Provincial Highway	Extents
Hwy 24	Norfolk County Northern Boundary South to Simcoe Town Limit
Hwy 3	Norfolk County Western Boundary East to Norfolk County Eastern Boundary (excluding portions within Delhi and Simcoe Town Limits)
Hwy 6	Norfolk County Eastern Boundary Southwest to Lynn River bridge in Port Dover

Appendix B: Drinking Water

B.1 Introduction

The County maintains a diverse portfolio of assets that are required to provide our communities with safe drinking water. Our municipal drinking water system is made up of five independent systems serving the urban communities of Delhi/Courtland, Port Dover, Port Rowan/St. Williams, Simcoe and Waterford. We have two different asset classes within the Water portfolio in order to effectively deliver clean water to our community.

Table 22 – Drinking Water Assets

Service Area:	**Water**	
Asset Class:	**Treatment**	**Distribution**
Asset Type:	• Water Treatment Plants • Wells • Booster Stations & Reservoirs • Water Towers/Standpipes • Other Water Facilities	• Local Mains • Transmission Mains • Services • Water Meters • Hydrants

This collection of assets is critical to the County. Sound management of our drinking water systems help us realize our vision of a clean and green county. Like many of our assets, drinking water assets are facing increased challenges as a result of aging infrastructure, increasing demand due to growth in our communities and regulatory changes. Our investment in these assets must therefore be balanced to optimize investment for renewal with the growing needs of our community.

This appendix provides information regarding our approach to the management of our drinking water assets over the next 10 years, demonstrating our commitment to assessing and meeting the LoS valued by our residents.

B.1.1 Scope

This section identifies the requirements for each Phase of O.Reg.588/17 applicable to the assets within this service area. Our compliance with these requirements for the asset classes within this service area are presented in *Table 24* to highlight areas of future development in advance of regulation phases. The following sections of this appendix will present further detailed information to meet the requirements for each section of the regulation. *Table 7* of the main body of our AMP provides a summary of compliance for all service areas.

Table 23 – Drinking Water: Compliance with O. Reg. 588/17

Core Assets		Phase 1						Phase 3 – July 1, 2025						
Service Area	Asset Class	Asset Inventory	Weighted Average	Replacement Value	Average Age	Current LoS	Costs to Maintain LoS	Proposed LoS	Creation/ Acquisition Plan	Operations & Maintenance Plan	Rehab & Renewal Plan	Disposal Plan	Investment Needs	Financial Strategy
Water	Plant	●	●	●	●	●	●	◔	○	◔	◔	○	◔	◔
	Linear	●	●	●	●	●	●	◔	○	◔	◔	○	◔	◔

● Compliant ◔ Partially Compliant ○ Not Compliant

Table 24 demonstrates that our assets within the water service area are fully compliant with the regulation requirements for Phase 1.

B.1. 2 Strategic Connections

The strategic and master plans summarized in this section are all related to our drinking water assets and have been considered while developing this AMP.

Table 24 – Drinking Water: Strategic Documents

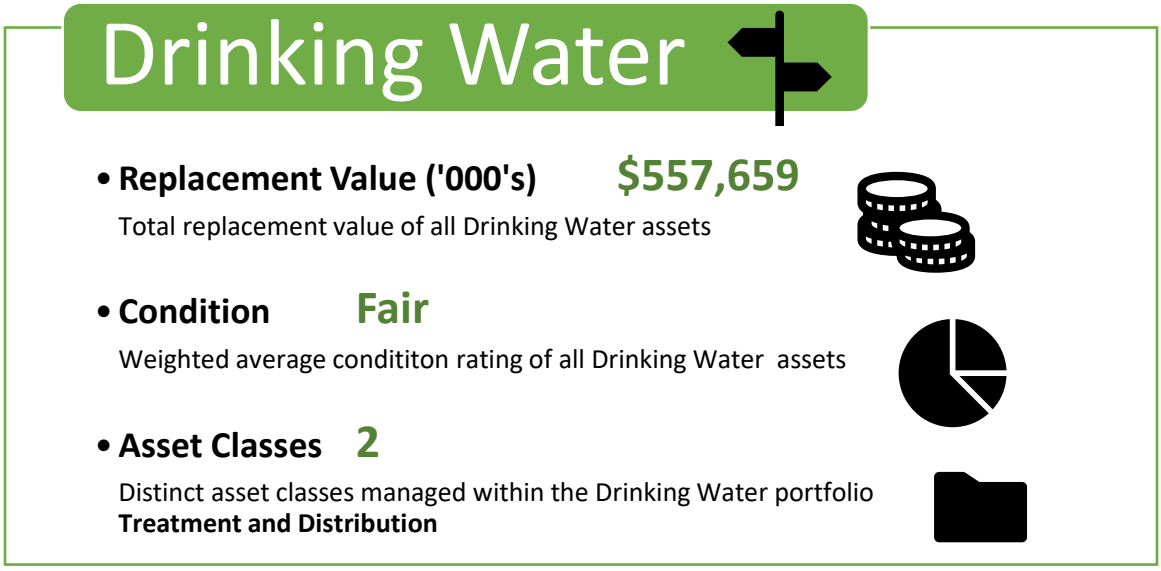
Strategic Document	Linkage(s) to AMP
Norfolk County Council Strategic Priorities 2022-2026	The Strategic Plan sets the stage for decision-making, prioritization, and ongoing performance management. The Strategic Plan sets a priority of "Building Norfolk", and specifically emphasizes that Norfolk County will strive to be a well-run organization, with financial sustainability and asset management as the cornerstone of the County's future success. More specific to core assets, the Strategic Plan sets a priority to "Building Norfolk" developing the infrastructure and supports needed to ensure complete communities. This AMP assists the County in relating decision- making, prioritization, and performance management, ultimately enabling us to maintain our infrastructure.
Integrated Sustainable Master Plan (ISMP)	The Integrated Sustainable Master Plan (ISMP) is a comprehensive Master Plan which addresses the long-term planning and visioning for water, wastewater, transportation and active transportation infrastructure needs County-wide. More specific to Water, the ISMP developed recommendations that will ensure that deficiencies, limitations and vulnerabilities will be addressed as the County population grows and water demands increase. Individual linear water infrastructure improvements were also identified, and opportunities to strategically integrate those improvements in order to minimize impacts and costs. This AMP utilizes the ISMP to ensure that service delivery and asset condition goals and objectives for the County are aligned.
Water and Wastewater Rate Study	The primary purpose of the Water and Wastewater Rate Study was to identify the full costs of managing the County's water and wastewater systems based on the most recent available information; evaluate and compare alternative rate structure options against guiding principles and recommend a preferred rate structure for the recovery of the full costs of water and wastewater services; and update the County's rates and charges to its customers, using the preferred structure. Infrastructure data and needs identified by the County's Asset Management system will be considered as part of this study going forward.
Development Charges Background Study (2019)	A by-law that imposes certain Development Charges in the Corporation of Norfolk County pursuant to the Development Charges Act, S.O., 1997, c. 27, as amended. The growth plans and infrastructure investment proposed within the AMP must consider whether development charges will be incurred pursuant to the County's bylaws. The Development Charges Background Study is essential to this AMP as it supports the County in identifying its funding gap included in the Financial Strategy.

B.2 State of Infrastructure

Drinking Water Overview

Drinking Water assets are those that provide easy access to a safe, sustainable supply of potable water. Our water assets are one of our most utilized and important assets and are foundational to the communities quality of life. It includes everything from water pipes that service our homes and businesses throughout the County to the treatment plants which ensure that water is safe.

We recognize that our water assets are imperative to the livelihood of our community and extends into all other portfolios, which is what makes water services particularly important.



Treatment

Replacement Value ('000's)

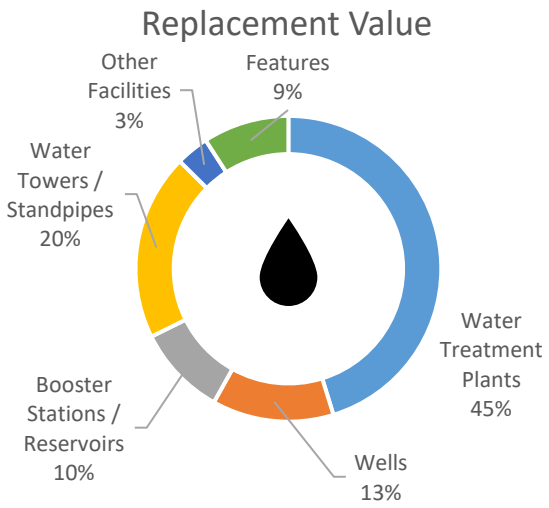
$155,220

Average Condition

Fair

Average Age

36 years



Distribution

Replacement Value ('000's)

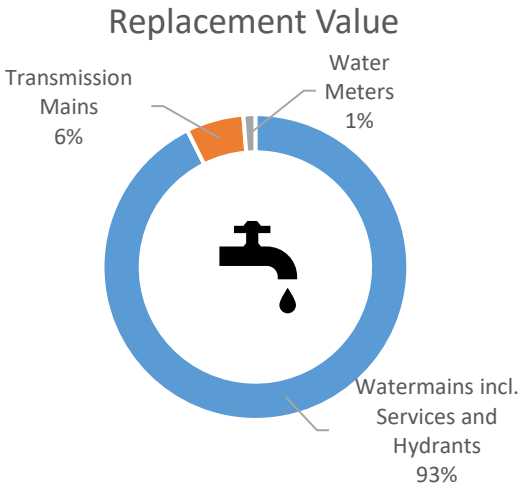
$402,429

Average Condition

Fair

Average Age

30 years



Treatment Overview

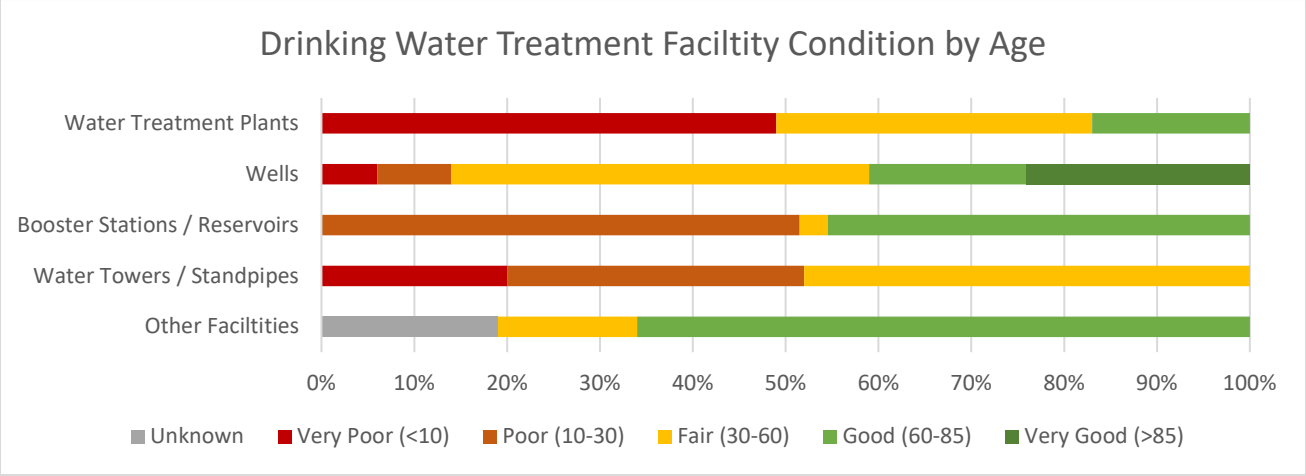
The table below includes the quantity, condition and total replacement value of each asset segment in our Drinking Water Treatment inventory. This table represents the overall status of these facilities.

Table 25 - Water Facility State of Infrastructure

Asset Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Water Treatment Plants	5	24.6 Years	$64,363	Fair
Wells	14	35.6 Years	$18,307	Poor
Booster Stations / Reservoirs	4	26.5 Years	$13,626	Fair
Water Towers / Standpipes	5	39.2 Years	$28,075	Good
Other Facilities	10	20.5 Years	$4,957	Good

The condition of our Water Treatment facilities by age is shown in Figure 14. The quantities are based on replacement costs as opposed to number of facilities.

Figure 14 - Drinking Water Treatment Facility Condition Profile



For our water assets: 44% of our drinking water assets are in poor or very poor condition, and 14% in good or very good condition in comparison to 6% and 74% respectively for Canadian municipalities reported on the Canadian Infrastructure Report Card; As such, it is evident that our drinking water treatment assets may be in worse condition than other Canadian municipalities. The 2019 Canadian Infratsructure Report Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

These facilities contain many components, referred to as Features, which are required to operate effectively. These features need to be operated, maintained, rehabilitated and replaced independently of the facility. Therefore it is important to look at these

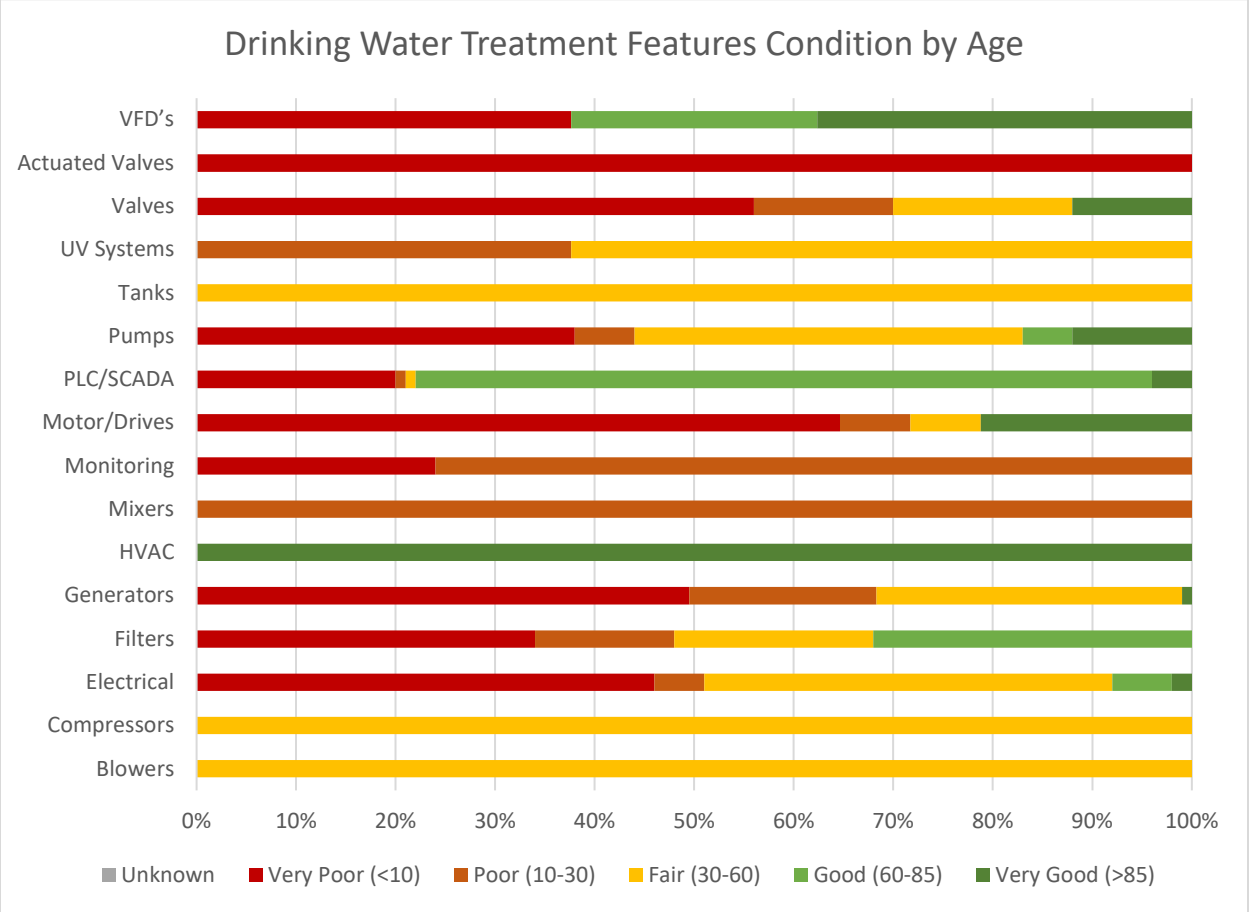
Features in addition to the facility as a whole. Table 27 includes the quantity, age and total replacement cost of the Features within our Water Treatment facilities by type.

Table 26 - Water Facility Features State of Infrastructure

Feature Type	Feature Quantity	Average Age	Replacement Cost	Average Condition (% life remaining)
Blowers	3	17.7	$80,320	41%
Compressors	2	16	$53,488	47%
Electrical	34	21.8	$2,474,514	30%
Filters	18	16.6	$1,306,239	38%
Generators	12	22.5	$1,898,426	22%
HVAC	1	1	$9,001	95%
Mixers	1	18	$17,829	28%
Monitoring	8	18.5	$111,478	11%
Motor/Drives	14	28.6	$374,422	25%
PLC/SCADA	26	6.8	$1,141,963	56%
Pumps	48	22.0	$2,793,890	37%
Tanks	4	15.5	$120,306	48%
UV Systems	16	12.6	$2,139,559	37%
Valves	16	40.2	$195,260	24%
Actuated Valves	1	15	$14,021	0%
VFD's	8	12.4	$213,995	53%

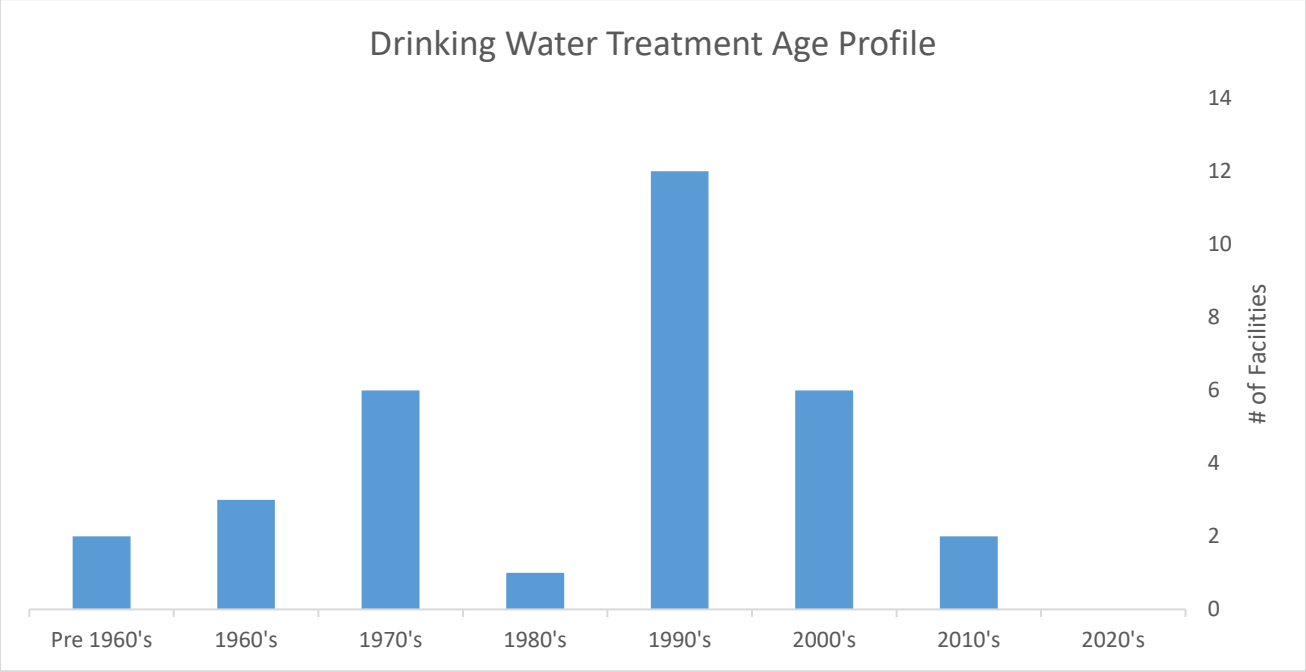
The condition of the Features within our Water Treatment facilities by age is shown in Figure 15. The quantities are based on replacement costs as opposed to number of facilities.

Figure 15 - Drinking Water Treatment Feature Condition Profile



To better understand our Water Treatment Facilities, Figure 16 contains the age profile of our facilities by decade.

Figure 16 - Drinking Water Treatment Age Profile



Assessment Approach

There are two aspects to the assessment of our Drinking Water Treatment facilities. The first looks at the overall condition of the facility itself (civil/structural), while the second focusses on the condition of the various components which make up each facility (HVAC/mechanical/electrical).

At this point in time, both of these approaches are utilizing the age and estimated useful lives of the facilities and their components. The assigned condition is then verified through a staff review and the condition may be changed based on individual characteristics noted. The conditions are assigned based on the criteria in Table 5 of the Main Body State of the Infrastructure section.

Distribution Overview

The table below includes the quantity, condition and total replacement cost of each asset segment in our Drinking Water Distribution inventory.

Table 27 - Water Distribution State of Infrastructure

Asset Class	Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Watermains	Local	288.4 km	31 Years	$372,840	Fair
	Transmission	19.5 km	21 Years	$25,511	Fair
Water Meters		16,253		$5,087	
Hydrants		1,511		Incl. in Watermains	

The condition of our Water Distribution assets by age is shown in Figure 17.

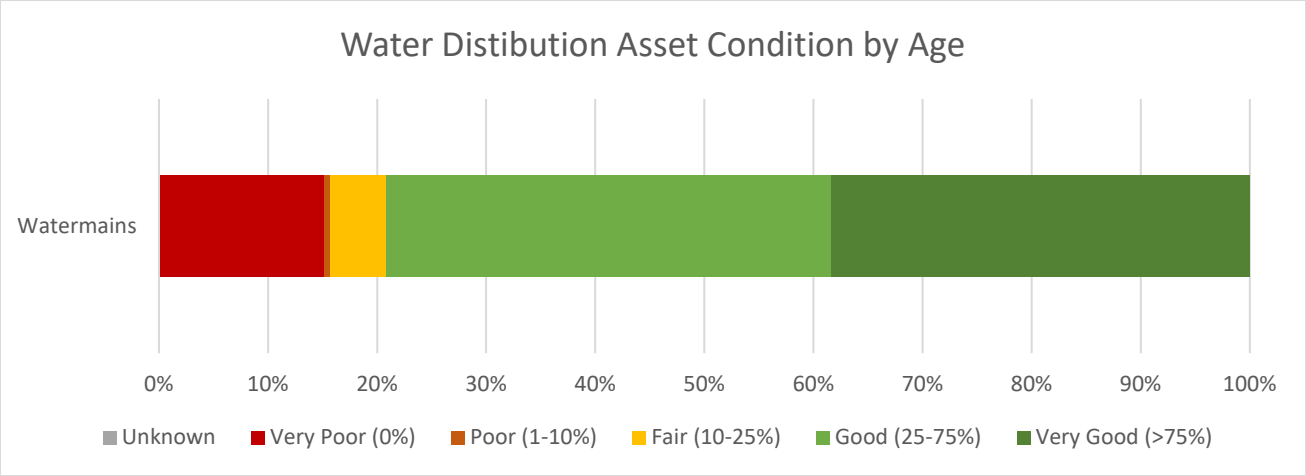


Figure 17 - Water Distribution Condition Profile

For our water distribution assets: 15.7% of these assets are in poor or very poor condition, and 79.1% in good or very good condition in comparison to 9% and 67% respectively for Canadian municipalities reported on the Canadian Infrastructure Report Card; As such, it is evident that our water assets are less evenly distributed than other Canadian municipalities, with both our Very Poor and Poor and Good and Very Good categories being higher. The 2019 Canadian Infratsructure Report Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

To better understand our Water Distribution assets, Figure 18 summarizes the age profile of our watermains by decade.

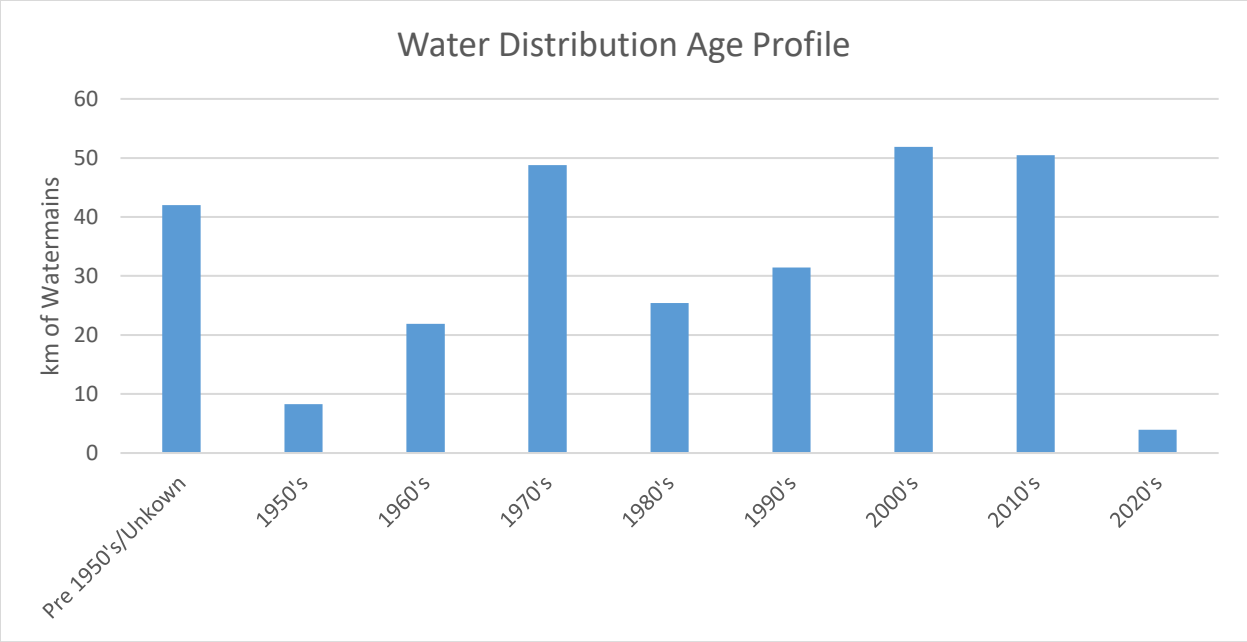


Figure 18 - Water Distribution Age Profile

Assessment Approach

Watermains are difficult to inspect due to the high pressure of water constantly flowing through them. Completing physical inspections would require disruptions to service, are time consuming and costly. The County will perform physical inspections on an as needed bases for large, critical pipes. There are also a number of new high tech, non-intrusive inspection techniques that the County continues to investigate.

Watermain breaks are helpful indicators of the condition of the pipe segment, as they can be used to predict pipe failure. The County tracks watermain breaks, and assigns them to their corresponding pipe segment, which assists in determining the potential risk of failure which will be discussed later in the Rehabilitation and Renewal Section.

The assessment approach for this part of the AMP is strictly based on pipe material and age. The conditions are assigned based on the criteria listed below in Table 29. Watermain break data will be incorporated into the Risk profiles during the Lifecycle Strategies Section.

Table 28 - Water Distribution Condition Practices

Condition Assessment	Remaining Useful Life (%)
Very Good	75+
Good	25-75
Fair	10-25
Poor	0-10
Very Poor	0

B.3 Levels of Service

B.3.1 Current Levels of Service

Under O.Reg.588/17, for our core assets, we are required to report the qualitative descriptions and technical metrics for our current Levels of Service (LoS). As such, we have reported the prescribed metrics from the regulation for our drinking water assets within our LoS framework, as outlined in *Table 30*.

Table 29 – Drinking Water: Prescribed Levels of Service

Description		Water assets in Norfolk County include drinking water distribution and treatment assets. The drinking water system comprises the drinking water systems in the County which provide water that is safe for drinking, and water pressures suitable for fire suppression. The County's assets include watermains, services, wells, water towers, water treatment plants, etc.		
Asset	**Service Attribute**	**Levels of Service**		
Drinking Water	Scope	**Community Levels of Service (Qualitative Descriptions)**		
		The municipal drinking water systems connect to most residential, commercial and industrial spaces in the urban areas of the County which are outlined in maps in Appendix F. The municipal drinking water system and hydrant network provides safe drinking water and fire protection to most residential, commercial and industrial spaces within urban areas of the County.		
		Technical Levels of Service (Technical Metrics)	**2019**	**2020**
		Percentage of properties connected to the municipal water system	44.7% (Total) 89% (Urban)	44.7% (Total) 89% (Urban)
		Percentage of properties where fire flow is available.	44.7% (Total) 89% (Urban	44.7% (Total) 89% (Urban
	Quality	**Community Levels of Service (Qualitative Descriptions)**		
		The County is constantly monitoring water quality and service to ensure minimal disruptions and complies with the Ontario Drinking Water Quality Management Standard (DWQMS). In the event of an adverse water quality incident or service disruptions, a notice is issued to the affected area to ensure all users are aware and can take appropriate precautions. The County has an objective to minimize water loss by detecting leaks and repairing them promptly.		
		Technical Levels of Service (Technical Metrics)	**2019**	**2020**
		The number of connection days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system.	0 days to 15,809 properties	0 days to 15,809 properties
		The number of connection days per year due to water main breaks compared to the total number of properties connected to the municipal water system.	0 days to 15,809 properties	0 days to 15,809 properties

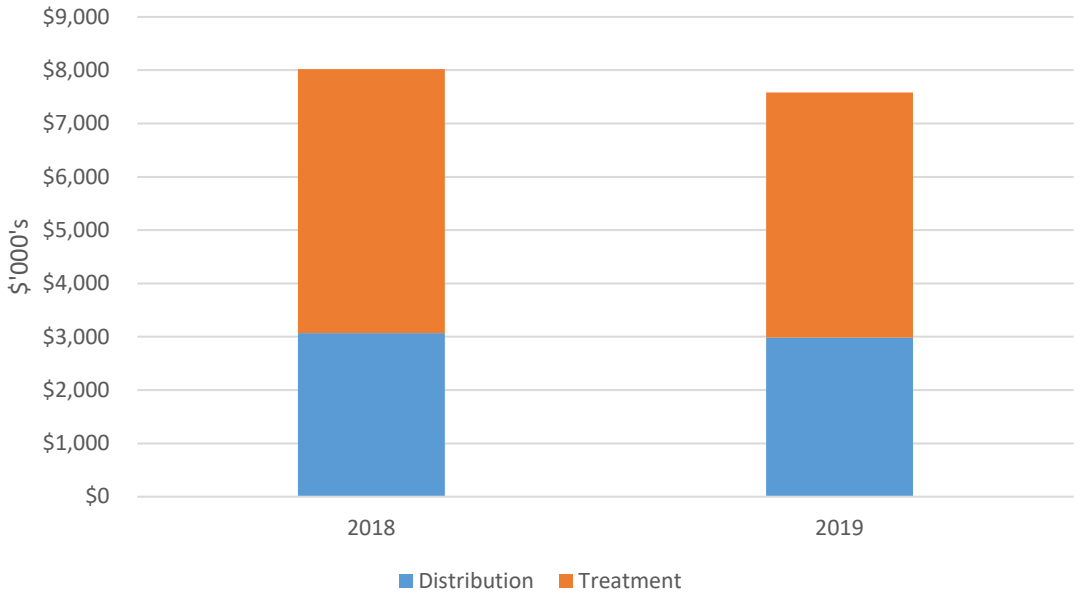
Additionally, we are pleased to report other current measures for our drinking water assets, outlined in *Table 31*.

Table 30 – Drinking Water: Additional Current Levels of Service

Asset Type		2019	2020
Drinking Water	Overall water consumption per account (Non-Residential) per day (m^3/day)	2.18 m^3	2.11 m^3
	Overall water consumption per account (Residential – Single Family) per day (m^3/day)	0.36 m^3	0.40 m^3
	Number of Service Requests	1,368	1,438
	Number of water main breaks per year	24	23
	Percentage of non-revenue water (Volume of non-revenue water in % of water purchased) (%)	14.61%	11.26%
	Total volume of bulk water purchases (m^3)	58,633 m^3	50,951 m^3

In order to deliver these current LoS for drinking water assets, we have spent $8.0 million and $7.6 million in operations related costs for 2018 and 2019 respectively as shown in Figure 19.

Figure 19 – Drinking Water: Operating Costs Annual Comparison ($'000's)



B.3.2 LoS Maps

Our water assets are comprised of a number of different assets within multiple systems throughout the County, as shown in Appendix F.

B.3.3 Proposed Levels of Service

Proposed LoS are not required for reporting by the Regulation until 2025, we will be proactively developing proposed measures for review and consultation as part of the exercise to develop a LoS framework for all assets across our portfolio.

B.4 Asset Lifecycle Management Strategy

B.4.1 Creation / Acquisition Plan

Master planning documentation supports the County in identifying the objectives around the specific asset services that are necessary to meet the needs and growth of Norfolk. We have developed various master plans and strategic plans over the years, including the Integrated Sustainable Master Plan (ISMP), which includes water distribution and treatment assets as a core element. The ISMP is a framework that guides our investment in various services, including water, to support growth and help shape Norfolk County for the future.

Creation and acquisition activities within our municipal boundaries are made in alignment with the objectives, stakeholder input, and long-term strategic plans set forth in the ISMP. Water assets are a critical element in the activities necessary to meet the demands associated with population growth and economic development. The water service area directly affects the health and safety of the residents of Norfolk. Documents such as these help the County in developing creation and acquisition plans, as these priorities and plans are taken into consideration.

The most common method of acquiring drinking water assets for Norfolk County is through the assumption of Development assets. These assets are typically funded and built by a developer and then handed over to the County upon completion. We would then be responsible for the assets remaining lifecycle activities as outlined below.

To ensure the County is assuming assets which were installed properly and functioning as intended, the County has detailed design requirements which Developers are required to follow. Before assuming assets, County staff inspect the assets against the requirements and any deficiencies are to be rectified prior to assumption to ensure we get the expected life out of the assets.

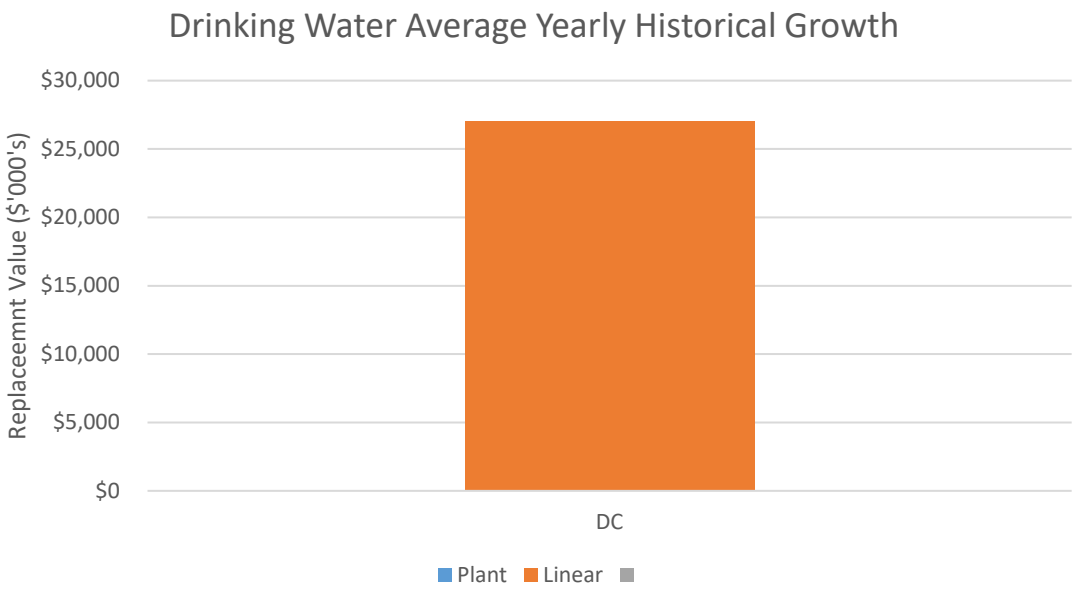
The second major contribution to the Creation/Acquisition plan would be the expansion of existing assets. Examples of these projects in drinking water could include increasing the capacity of water treatment plants or the upsizing of watermains. These projects would typically be funded entirely or partially through Development Charges.

The final contributor, unique to our drinking water assets, is new assets required to expand water capacity or improve sustainability of supply. This specifically relates to the Inter-Urban Water Project, where the County is looking at changes to its water sources based on long term needs. The County is pursuing inter-connecting the various water networks and finding a new source of water through neighboring Haldimand County.

It is important to look at our past growth via assumptions and DCs to ensure we plan for future growth properly.

Looking at the growth we have had in the past, since 2016, we have made considerable effort to invest in the growth of our drinking water assets. This growth is presented in *Figure 20*.

Figure 80 – Drinking Water: Average Growth by Year



More specifically, we are pleased to demonstrate in *Table 32*, the growth our watermains and water services have experienced, where we have added 34,875 meters and 1,694 services respectively since 2014.

Table 31 - Watermain & Water Services Growth by Year

Watermain and Water Services Growth by Year		
Year	**Watermain (m)**	**Water Services (each)**
2014	9,349	464
2015	6,442	318
2016	6,931	187
2017	1,386	73
2018	5,619	300
2019	5,148	352

B.4.2 Operations and Maintenance Plan

This stage of the asset lifecycle generates significant costs over time; therefore, we have implemented practices that enhance value through cost reduction and investment optimization. A successful operations and maintenance plan will ensure that our assets also meet the level of service commitments and expectations from those in our community.

Condition Assessment and Inspection

Based on standard condition assessment processes, maintenance of water assets begins with routine inspection to identify defects that could result in risks or higher costs in the future. This practice of early identification, through visual inspection and quantitative assessment allows for overall higher LoS and extended asset lifespans, as the outputs from the condition assessments are used in planning.

Asset types each have varying condition assessment and inspection procedures as shown in *Table 33*.

Table 32 – Drinking Water: Condition Assessment & Inspection Procedures

Asset Class	Condition Assessment & Inspection Procedure
Distribution	Norfolk County complies with the Ontario Drinking Water Quality Management Standard. The condition of the drinking water network is assessed based on a history of water main breaks, material, and age. Deterioration is based on observed failure rates and industry lifecycle probabilities.
Treatment	Norfolk County complies with the Ontario Drinking Water Quality Management Standard. The condition of our water treatment and storage assets are assessed based on the age of the facility and of the individual features of the facility. Useful lives are assigned to each of these features and failures/performance issues are tracked and factored into replacement decisions. Visual inspections of components are completed on a regular basis by staff during normal operations.

If a defect is uncovered during inspection, the next step is determining whether the defect will require minor or major maintenance.

Planned Operations and Maintenance

Norfolk County is committed to maintaining our assets in a state of good repair in order to meet provincial regulations as well as the requirements of the Ontario Drinking Water Quality Management Standard (DWQMS) in order to ensure that we deliver on our levels of service for our customers

Typically, in the case of minor maintenance, it is incorporated into planned operations and maintenance programs in order to make repairs based on condition assessments. A work order is created and distributed to Operations staff and/or contractors for repair, followed by an inspection to ensure completeness and payment once complete.

Currently, there are a number of planned operations and maintenance activities that are performed on the County's drinking water assets. If the inspection reveals that major maintenance is required, the County typically implements a rehabilitation and renewal plan.

Table 33 – Drinking Water: Planned Operations & Maintenance Activities

Asset Class	Activity	Performed By / Frequency
Distribution	Hydrant Painting	County Staff
	Hydrant Flushing	County Staff
	Hydrant Inspections	County Staff
	Curb Stop Assessments/Locates	County Staff
	Water Meter Chamber Inspections	County Staff
	Proactive Water Meter Replacement	County Staff
	Watermain Leak Detection	County Staff
	Valve Turning	County Staff
	Watermain Dead End Flushing	County Staff
	Proactive Swabbing and Flushing	County Staff
	Water Quality Testing	County Staff / as per DWQMS
Treatment	Facility Inspections	County Staff
	Feature Inspections	County Staff
	Pump Rebuilds	Contracted Out
	Water Tower Inspections	Contracted Out
	Water Tower Painting	Contracted Out
	Well Inspections	County Staff/Contracted Out

Unplanned Operations and Maintenance

Our major maintenance needs are identified through a number of sources, namely activities prescribed through the maintenance of assets. However, unexpected situations may occur which can result in unplanned maintenance activities. If major maintenance costs are significant, a more thorough review process becomes necessary and often involves consultation with various internal functions, such as our Asset Management, Finance, as well as our Engineering and Operations service areas to decide if the repair meets the capital budget criteria. Generally, this service area relies on outside contractors/consultants for investigation and suggested repairs when the scope of the maintenance is not easily determined.

Despite the fact that minor maintenance is incorporated into planned operations and maintenance programs, there are cases where it is unplanned. *Table 35* outlines some of the common unplanned maintenance activities that occur in the County and who typically performs them.

Table 34 – Drinking Water: Unplanned Operations & Maintenance Activities

Asset Class	Activity	Performed By
Distribution	Watermain Break Repairs	County Staff
	Service Break Repairs	County Staff
	Investigations/Repairs of Leaks	County Staff
	Repairs/Adjustments to Service Boxes	County Staff

	Investigations of Pressure Issues	County Staff
	Investigations of Dirty Water	County Staff
	Frozen Service Repairs	County Staff
	Replace Missing Valve Covers	County Staff
Treatment	Repair/Replace Failed Components	County Staff
	Investigate Pressure Issues	County Staff
	Investigate Water Quality Issues	County Staff

B.4.3 Rehabilitation and Renewal Plan

We employ an asset renewal process, using supporting software and consultation among multiple internal functions. The supporting software works as a decision support tool which allows us to utilize our asset State of Infrastructure data and operations and capital budget information in order to target efficient rehabilitation and renewal of our drinking water assets.

The rehabilitation and renewal plan begins with a needs assessment on an annual basis, followed by a review of the operational impacts of potential investments. If the need for rehabilitation or renewal is significant enough, the item moves to a more detailed level of scope including budget definition, financial forecasting, and finally Council approval. In some cases, for various assets which will affect a significant number of people, public consultation is necessary to make sure that our decisions align with the expectations and needs of the community.

Most renewal projects require construction and project management, particularly as the projects increase in scale. Following the renewal, commissioning and inspection activities are performed to ensure that our personnel have the understanding of the materials and processes recommended to maintain the asset at a cost-effective, and optimal level.

Distribution

The rehabilitation and renewal process for our drinking water distribution assets is fully integrated with the renewal needs of our roads and other underground infrastructure such as stormwater and wastewater. This integrated approach ensures our renewal projects for these service areas are delivered with optimal timing to increase value and minimize disruption to our communities. For example, if a road is targeted for renewal, coordination between service areas will determine whether the underlying stormwater, drinking water or wastewater infrastructure is also of an age or condition that requires renewal to ensure these projects are delivered together to reduce disruption for our communities and deliver enhanced value.

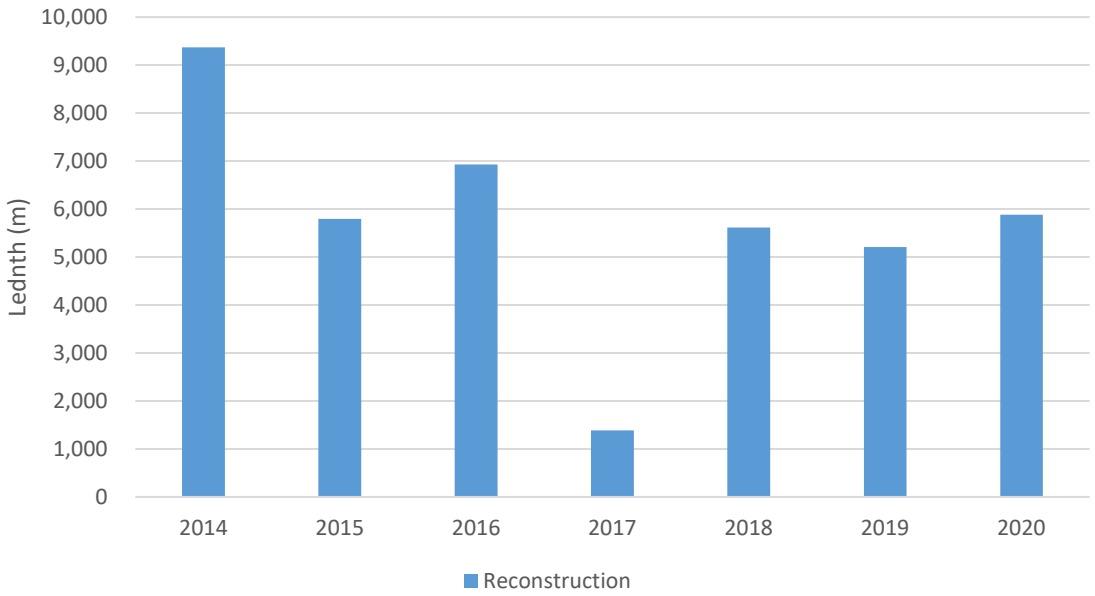
Norfolk County is committed to the rehabilitation and renewal of our drinking water assets. Below we have outlined the priorities for our assets:

- Replacement of pipes which need increased capacity/reliability as identified in the ISMP

- Replacement of thin wall cast iron water mains which have a record of multiple water main breaks
- Looping of dead-end watermains which require frequent flushing

To demonstrate this ongoing commitment to our drinking water network, *Figure 21* presents that during 2014 – 2020, we have reconstructed 40,180 metres of watermain.

Figure 9 – Drinking Water: System Renewal Summary



Renewal activities are determined based on the risk level of the watermains and accompanying infrastructure which determines whether the need is isolated or requires a complete reconstruction of the roadway. The Risk of an asset is a combination of the Probability of Failure and the Consequence of Failure and is identified in Figure 22. Risk rankings range from Very Low to Very High and incorporate the assets age, material, size, break history and ISMP recommendations.

Risk Matrix		Consequence of Failure (CoF)				
		Very Low	Low	Moderate	High	Very High
Probability of Failure (PoF)	Almost Certain	High	High	Very High	Very High	Very High
	Highly Likely	Moderate	Moderate	High	High	Very High
	Likely	Low	Low	Moderate	High	High
	Unlikely	Very Low	Low	Low	Moderate	Moderate
	Highly Unlikely	Very Low	Very Low	Very Low	Low	Low

Figure 10 - Risk Matrix

Probability of Failure: Based on the condition and/or performance of the asset. For condition, we are utilizing estimated useful lives based on the materials of the watermain as well as the break history. For performance, we are measuring the ability of the asset to provide established service levels, which for watermains primarily corresponds to undersized pipes and ISMP recommendations.

Consequence of Failure: Based on the size of the watermain. It is assumed that larger mains are designed to carry more water, and therefore would affect more infrastructure and residents in the case of a failure.

Treatment

The rehabilitation and renewal process for our treatment assets are determined based on a combination of external expertise (inspections), facility and feature useful lives, and internal expertise (organizational priorities and available budget).

Each facility has a useful life and the various features within those facilities are also assigned useful lives based on industry standards. These useful lives include triggers for rehabilitations where necessary. Renewals and rehabilitations are planned based on these useful lives and reviewed internally by staff before being recommended. The complete listing of our useful lives is contained in our asset management software.

To demonstrate our commitment to our water treatment facilities; our wells, booster stations and water towers undergo regular inspection and rehabilitations. Larger upgrade projects have been completed or are ongoing in the Port Rowan and Port Dover WTP's.

B.4.4 Disposal Plan

In some cases, disposing of an asset is more appropriate than replacing or renewing it. Given the growth of our population and the steadily increasing movement of people and goods, disposal is not a common activity for our drinking water assets.

In some cases, we may close or decommission our drinking water assets for use, by limiting the maintenance performed. When an asset is closed and deemed a risk, our Engineering and Environmental Services service areas will coordinate with contractors to ensure the safe removal of the asset. In very few instances are their dedicated projects specific for the disposal of a drinking water assets, an example of one would include the planned decommissioning of the Delhi Surface Water Filtration Plant.

B.5 Financial Strategy

B.5.1 Asset Investment Needs

Our investment needs are identified through a range of mandated and industry planning processes, supported by detailed analysis to ensure we identify our needs for investment. This allows us to maintain service delivery, meet future demand growth and achieve our strategic objectives. The needs identified through these various planning processes are then prioritized through a capital project prioritization process, which evaluates projects using various criteria to determine the most important needs and initiatives to be funded.

The following sections describes our capital investment needs to maintain existing infrastructure and associated service delivery, along with the requirements for additional infrastructure to meet the growing needs and demands of our communities.

Capital Renewal

Norfolk has undertaken a comprehensive analysis to determine the capital needs of its drinking water assets to deliver the services expected by its communities and stakeholders. We have adopted an industry standard approach to the identification of capital renewal needs for our core asset areas, featuring an integrated risk-based analysis supported by a decision support system.

A more detailed breakdown of our Drinking Water needs by asset class is as follows:

Distribution

The 10 year needs of our drinking water distribution assets has been determined utilizing the corresponding risk ratings of the watermain sections. The needs identified below are based on completing all Very High and High Risk sections within the 10-year window.

The resulting analysis for water distribution assets demonstrates that the County has a 10-year renewal need of $47 million for distribution assets.

Treatment

The 10 Year needs of our drinking water treatment facilities, including the features within them, has been determined based on their useful lives and reviewed internal by staff. The resulting analysis for water treatment assets demonstrates that the County has a 10-year renewal need of $24 million.

Growth Needs

In addition to targeting and prioritizing the investment needed to maintain existing assets, there are also planning processes in place to determine the additional assets needed to meet growing demand for service through population increases or demand for new services. The projects targeted to meet growth come from various plans such as the Integrated Sustainable Master Plan (ISMP), Development Charge Study and Inter-Urban Water Supply Study. These growth-related projects may be primarily funded through Development Charges – the mechanism that enables recovery of growth-

related capital expenditures from new development, or other municipal financing sources including grants from senior levels of government. The process for creation and acquisition of assets for growth is described in the Creation/Acquisition section of the Asset Lifecycle Management Strategy.

Additional growth-related assets will be acquired by Norfolk County through contributions from Development. Although the County does not pay for the construction of these assets, once they are assumed we will be responsible for the remaining lifecycle activities, including O&M, rehabilitations, and eventual replacements. It remains important to understand and plan for the assets we foresee the County taking on in the future.

B.5.2 Funding Strategies

To support the drinking water assets that provide services within the County, we require sufficient funding in order to maintain the assets in a state of good repair, as well as to create new assets to support future growth. This model considers the currently available funding sources for water assets in order to deliver our current investment plan effectively. Additionally, we continually assess opportunities for additional funding options and revenue streams to address our funding gaps.

B.6 Stakeholder Engagement

B.6.1 Users of the Service

Our valued communities are the primary users of our drinking water network along with transient users who are visiting our area. This network is also vital for protecting the health and environment of Norfolk County, as well as those that may share environmental facilities or watersheds within the County. This requires coordination within the County through constant engagement and collaborative planning.

We provide a range of engagement points for our users, including online (both through the website and social media), by email, phone, or letter. In addition to these traditional channels of engagement, the development of the ISMP & Norfolk County Strategic Priorities 2022-2026 included a significant consultation exercise featuring a range of opportunities to consult with stakeholders directly on the subject of drinking water in the County.

B.6.2 Service Delivery Partners

We rely on partnerships to aid the delivery of service and improvements to our assets and to implement appropriate controls and processes to ensure the impact of our work on stakeholders and delivery partners is communicated to avoid risks and adverse outcomes.

Within drinking water, it is particularly important that we work with our external contractors in the delivery of our renewal programs, as well as with utility providers to minimize disruption and coordinate efforts for maximizing efficiency. We maintain close

relationships with both our internal and external partners and maintain processes to engage with each of our service delivery partners as required.

B.6.3 Public and Private Infrastructure Owning Bodies

Norfolk County does not currently share any of its drinking water assets with other municipal bodies, however upcoming projects may see the county acquiring water from Haldimand County. If this occurs, the assets will be managed through an agreement stipulating the requirements of each municipality.

Drinking water assets are required to comply with provincial regulation and the Ontario Drinking Water Quality Management Standard. Norfolk County will continue to work with the province on ensuring we are meeting these requirements.

Appendix C: Wastewater

C.1 Introduction

The County maintains a diverse portfolio of assets that are required to provide our communities with the safe collection and treatment of our wastewater. Our municipal wastewater system is made up of five independent systems serving the urban communities of Delhi, Port Dover, Port Rowan, Simcoe and Waterford. We have two different asset classes within the Wastewater portfolio in order to effectively collect and treat wastewater from our community.

Table 35 – Wastewater Assets

Service Area:	**Wastewater**	
Asset Class:	**Treatment**	**Collection**
Asset Type:	• Wastewater Treatment Plants	• Sanitary Mains • Sanitary Forcemains • Sanitary Services • Sewage Pumping Stations

This collection of assets is critical to the County. Sound management of our wastewater systems helps us realize our vision of a clean and green county. Like many of our assets, wastewater assets are facing increased challenges as a result of aging infrastructure, climate change, increasing demand due to growth in our communities and regulatory changes. Our investment in these assets must therefore be balanced to optimize investment for renewal with the growing needs of our community.

This appendix provides information regarding our approach to the management of our wastewater assets over the next 10 years, demonstrating our commitment to assessing and meeting the LoS valued by our residents.

C.1.1 Scope

This section identifies the requirements for each Phase of O.Reg.588/17 applicable to the assets within this service area. Our compliance with these requirements for the

asset classes within this service area are presented in *Table 38* to highlight areas of future development in advance of regulation phases. The following sections of this appendix will present further detailed information to meet the requirements for each section of the regulation.

Table 36 – Wastewater: Compliance with O. Reg. 588/17

Core Assets		Phase 1						Phase 3 – July 1, 2025						
Service Area	**Asset Class**	Asset Inventory	Weighted Average	Replacement Value	Average Age	Current LoS	Costs to Maintain LoS	Proposed LoS	Creation/ Acquisition Plan	Operations & Maintenance Plan	Rehab & Renewal Plan	Disposal Plan	Investment Needs	Financial Strategy
Wastewater	**Plant**	●	●	●	●	●	●	◔	○	◔	◔	○	◔	◔
	Linear	●	●	●	●	●	●	◔	○	◔	◔	○	◔	◔

● Compliant ◔ Partially Compliant ○ Not Compliant

Table 38 demonstrates that our assets within the wastewater service area are fully compliant with the regulation requirements for Phase 1.

C.1. 2 Strategic Connections

The strategic and master plans summarized in this section are all related to our wastewater assets and have been considered while developing this AMP.

Table 37 – Wastewater: Strategic Documents

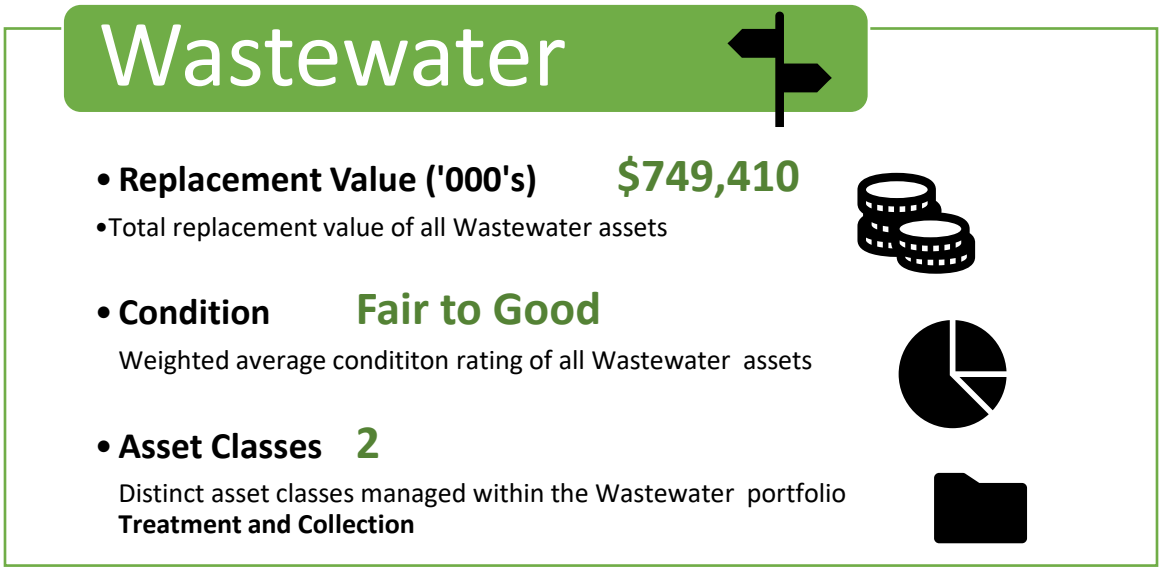
Strategic Document	Linkage(s) to AMP
Norfolk County Council Strategic Priorities 202-2026	The Strategic Plan sets the stage for decision-making, prioritization, and ongoing performance management. The Strategic Plan contemplates “Our Future Norfolk”, and specifically emphasizes that Norfolk County will strive to be a well-run organization, with financial sustainability and asset management as the cornerstone of the County’s future success. More specific to Wastewater Assets, the Strategic Plan sets a priority to “Building Norfolk” by demonstrating meaningful progress on projects that matter to residents and businesses and uses proactive infrastructure management strategies. This AMP assists the County in relating decision-making, prioritization, and performance management, ultimately enabling us to maintain our infrastructure.
Integrated Sustainable Master Plan (ISMP)	The Integrated Sustainable Master Plan (ISMP) is a comprehensive Master Plan which addresses the long-term planning and visioning for water, wastewater, transportation and active transportation infrastructure needs County-wide. More specific to Wastewater, the ISMP developed recommendations that will ensure that deficiencies, limitations and vulnerabilities will be addressed as the County population grows and wastewater demands increase. Individual linear wastewater infrastructure improvements were also identified, and opportunities to strategically integrate those improvements in order to minimize impacts and costs. This AMP utilizes the ISMP to ensure that service delivery and asset condition goals and objectives for the County are aligned.
Water and Wastewater Rate Study	The primary purpose of the Water and Wastewater Rate Study was to identify the full costs of managing the County’s water and wastewater systems based on the most recent available information; evaluate and compare alternative rate structure options against guiding principles and recommend a preferred rate structure for the recovery of the full costs of water and wastewater services; and update the County’s rates and charges to its customers, using the preferred structure.
Development Charges Background Study (2018)	A by-law that imposes certain Development Charges in the Corporation of Norfolk County pursuant to the Development Charges Act, S.O., 1997, c. 27, as amended. The growth plans and infrastructure investment proposed within the AMP must consider whether development charges will be incurred pursuant to the County’s bylaws. The Development Charges Background Study is essential to this AMP as it supports the County in identifying its funding gap included in the Financial Strategy.

C.2 State of Infrastructure

Wastewater Overview

Wastewater assets are those that enable us to live in a clean and safe environment. Our wastewater assets are one of our most utilized and important assets and are foundational to our quality of life. It includes everything from sanitary sewer mains that service our homes and businesses throughout the County to the treatment plants which ensure that wastewater is properly cleaned before being discharged into the environment.

We recognize that our wastewater assets are imperative to the livelihood of our community and extends into all other portfolios, which is what makes wastewater services particularly important.



Treatment

Replacement Value ('000's)

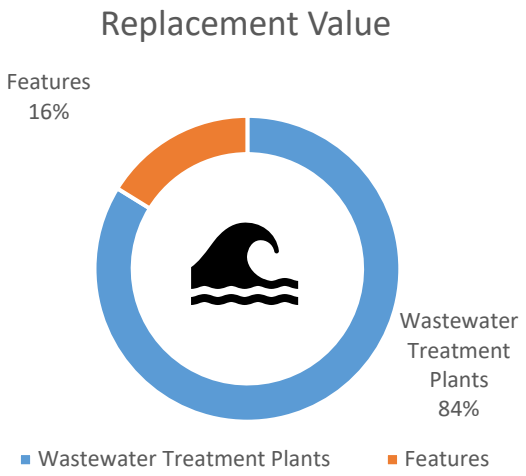
$333,492

Average Condition

Fair

Average Age

18 years



Collection

Replacement Value ('000's)

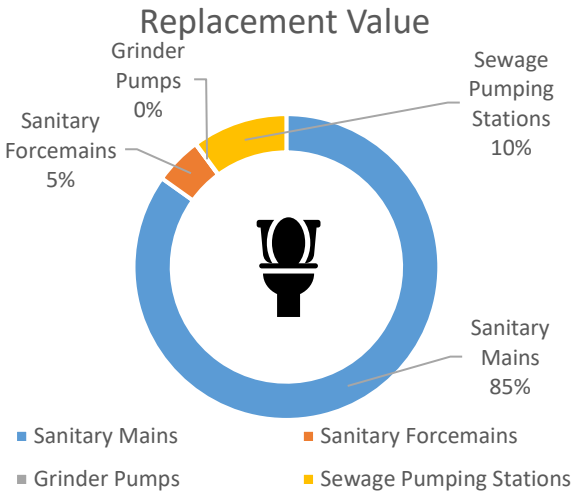
$415,917

Average Condition

Good

Average Age

35 years



Treatment Overview

The table below includes the quantity, condition and total replacement cost of each asset segment in our Wastewater Treatment inventory. This table represents the overall status of these facilities.

Table 38 - Wastewater Treatment Facility State of Infrastructure

Asset Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Wastewater Treatment Plants	5	17.6 Years	$279,510	Fair

The condition of our Wastewater Treatment facilities by age is shown in Figure 23. The quantities are based on replacement costs as opposed to number of facilities.

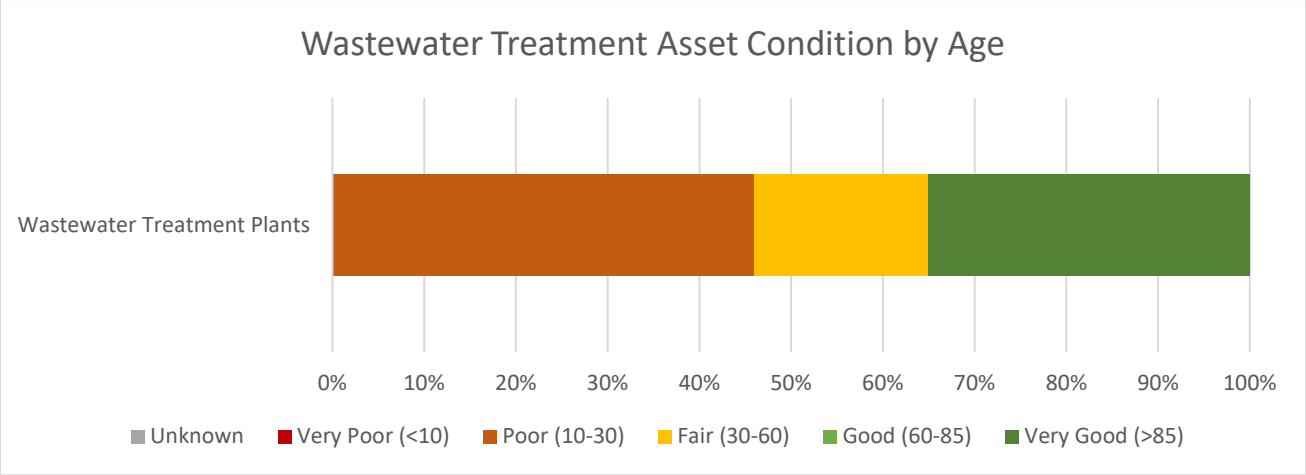


Figure 11 - Wastewater Treatment Facility Condition Profile

For our wastewater assets: 46% of these assets are in poor or very poor condition, and 35% in good or very good condition in comparison to 10% and 65% respectively for Canadian municipalities reported on the Canadian Infrastructure Report Card; As such, it would suggest that our wastewater assets may be in worse condition than other Canadian municipalities. It should be noted however, that previously budgeted projects at the Waterford and Simcoe WWTP's are yet to be completed and will significantly increase the condition of our treatment assets. The 2019 Canadian Infratsructure Report Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

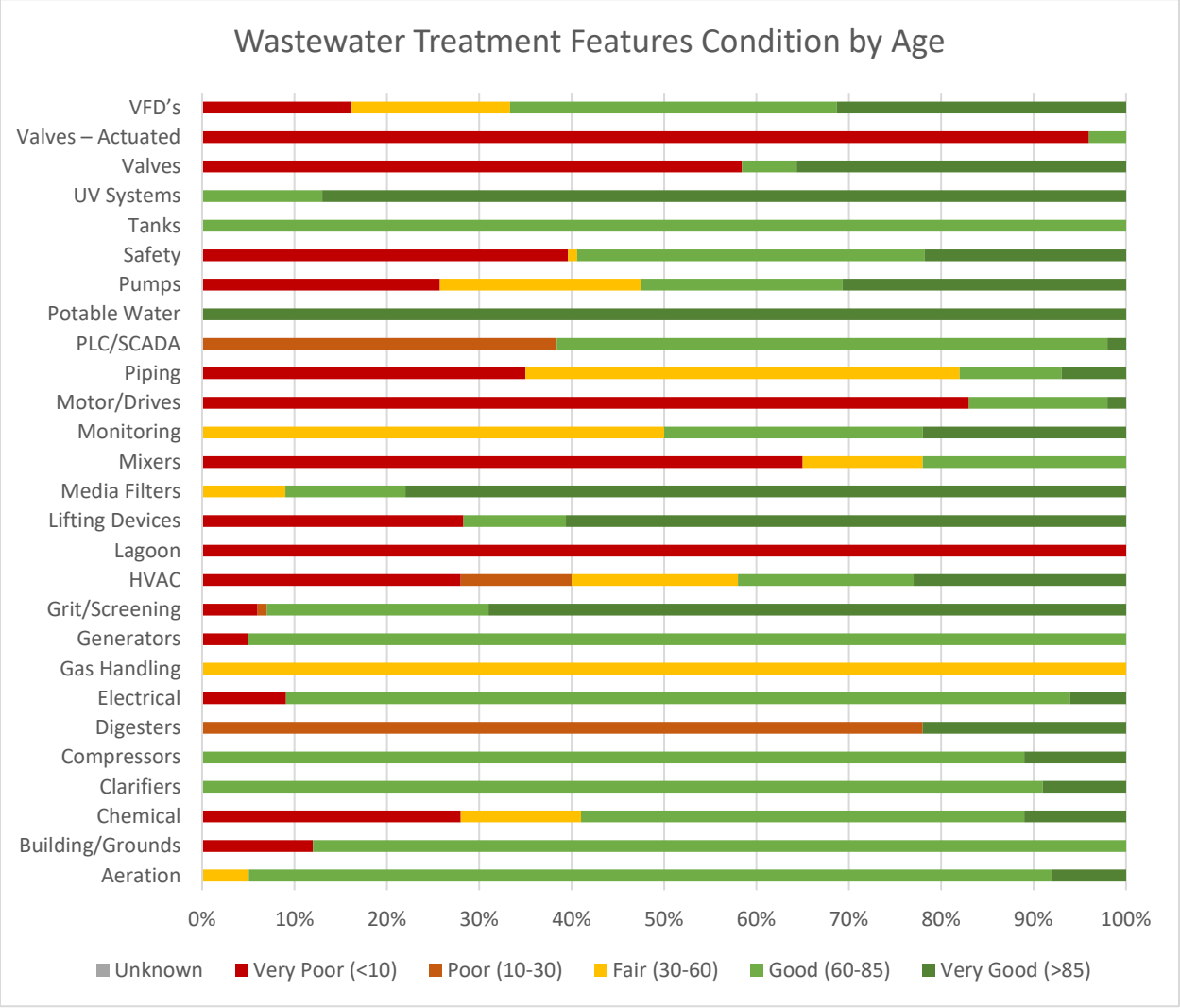
These facilities contain many components, referred to as Features, which are required to operate effectively. These features need to be operated, maintained, rehabilitated and replaced independently of the facility. Therefor it is important to look at these Features in addition to the facility as a whole. Table 41 includes the quantity, age and total replacement cost of the Features within our Water Treatment facilities by type.

Table 39 - Wastewater Facility Features State of Infrastructure

Feature Type	Feature Quantity	Average Age	Replacement Cost	Average Condition (% life remaining)
Aeration	38	8.8	$3,611,015	63%
Building/Grounds	12	16.9	$3,795,850	45%
Chemical	45	10.2	$607,448	49%
Clarifiers	13	7.4	$6,755,61	76%
Compressors	7	7.6	$219,818	75%
Digesters	5	20.8	$2,353,090	48%
Electrical	40	9.5	$6,415,343	69%
Gas Handling	8	30.1	$261,163	33%
Generators	4	12.5	$3,263,982	55%
Grit/Screening	24	15.6	$7,487,310	53%
HVAC	57	9.7	$2,095,481	61%
Lagoon	4	47	$260,228	0%
Lifting Devices	18	13.2	$498,567	50%
Media Filters	22	5.7	$5,888,713	68%
Mixers	9	14.6	$164,443	21%
Monitoring	32	7.8	$465,454	60%
Motor/Drives	33	17.9	$1,010,792	47%
Piping	22	14.3	$3,710,729	69%
PLC/SCADA	19	7.6	$615,866	51%
Potable Water	6	2.0	$69,406	97%
Pumps	100	11.8	$2,605,461	60%
Safety	18	9.7	$322,151	68%
Tanks	3	7.0	$14,960	73%
UV Systems	8	2.5	$274,072	83%
Valves	84	19.2	$544,028	41%
Valves – Actuated	19	19.6	$202,046	28%
VFD’s	41	11.0	$468,822	59%

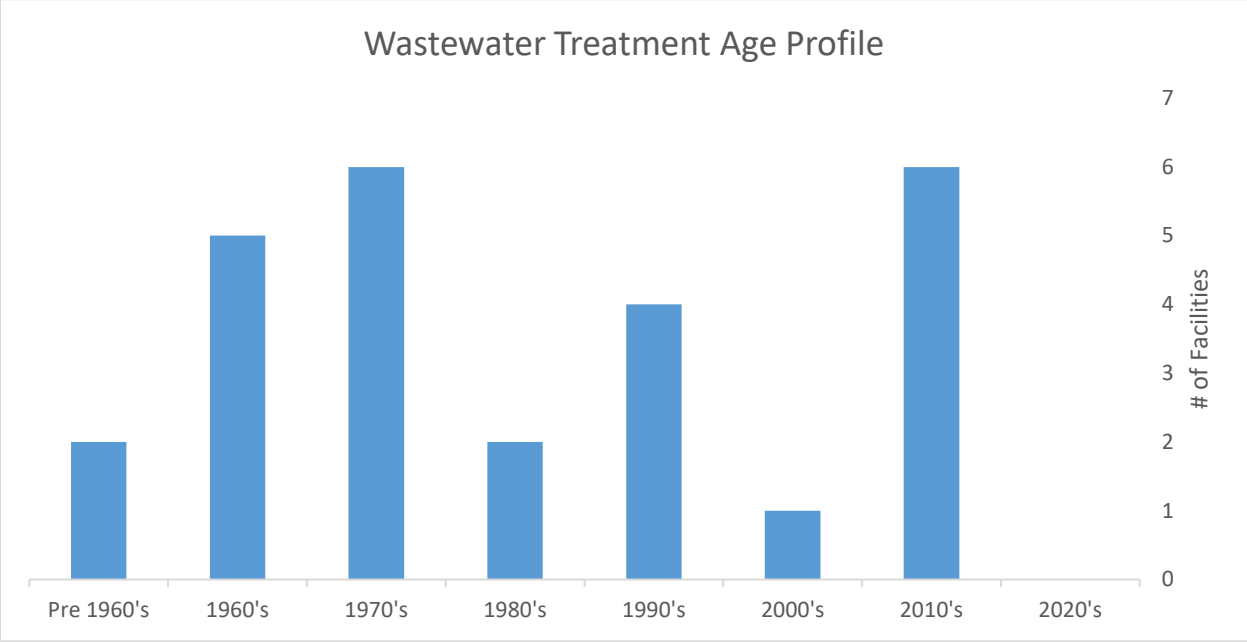
The condition of the Features within our Water Treatment facilities by age is shown in Figure 24. The quantities are based on replacement costs as opposed to number of facilities.

Figure 24 - Wastewater Treatment Feature Condition Profile



To better understand our Wastewater Treatment Facilities, Figure 25 summarizes the age profile of our facilities by decade.

Figure 25 - Wastewater Treatment Age Profile



Assessment Approach

There are two aspects to the assessment of our Wastewater Treatment facilities. The first looks at the overall condition of the facility itself, while the second focusses on the condition of the various components which make up each facility.

At this point in time, both of these approaches are utilizing the age and estimated useful lives of the facilities and their components. The assigned condition is then verified through a staff review and the condition may be changed based on individual characteristics noted. The conditions are assigned based on the criteria in Table 5 of the Main Body State of the Infrastructure section.

Collection Overview

The table below includes the quantity, condition and total replacement cost of each asset segment in our Wastewater Collection inventory.

Table 40 - Wastewater Collection State of Infrastructure

Asset Class	Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Sanitary Mains		213.3 km	37.3 Years	$357,371	
Sanitary Forcemains		12.8 km	31.7 Years	$21,141	
Grinder Pumps		12		$200	
Sewage Pumping Stations		21	14.9 Years	$37,203	Good

The condition of our Wastewater Collection assets by age is shown in Figure 26 - Wastewater Collection Condition Profile.

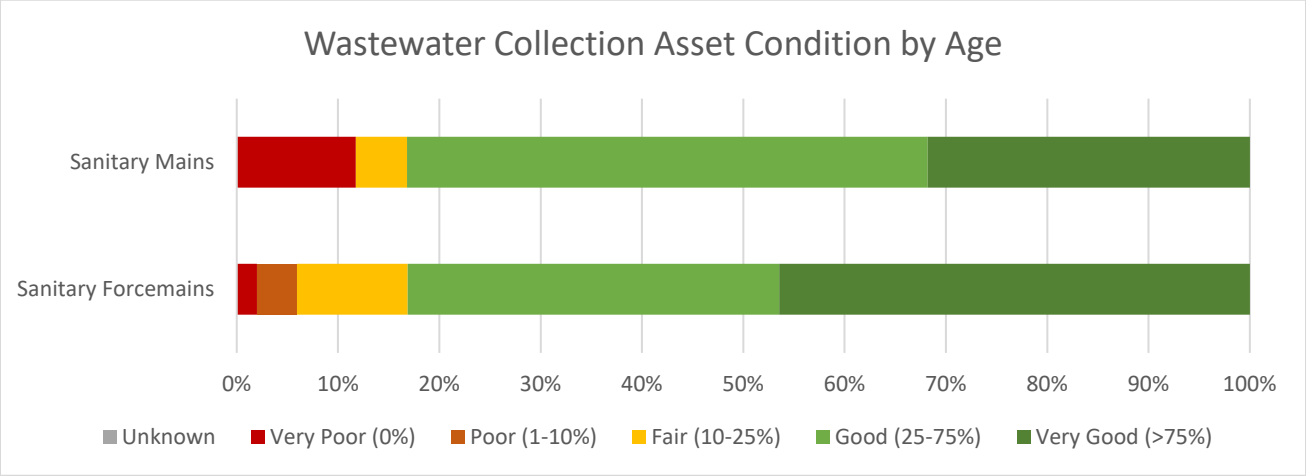


Figure 26 - Wastewater Collection Condition Profile

For our wastewater assets: 11.4% of these assets are in poor or very poor condition, and 83.2% in good or very good condition in comparison to 11% and 57% respectively for Canadian municipalities reported on the Canadian Infrastructure Report Card; As such, the data suggests that our wastewater assets may be in better shape than other Canadian municipalities. The 2019 Canadian Infratsructure Report Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

The sewage pumping stations contain many components, referred to as Features, which are required to operate effectively. These features need to be operated, maintained, rehabilitated and replaced independently of the facility. Therefor it is important to look at these Features in addition to the facility as a whole. Table 43 includes the quantity, age and total replacement cost of the Features within our sewage pumping stations by type.

Table 41 - Wastewater Collection Features State of Infrastructure

Feature Type	Feature Quantity	Average Age	Replacement Cost	Average Condition (% remaining)
Building/Grounds	15	23.9	$233,189	41%
Electrical	43	10.4	$491,436	64%
Generators	18	10.3	$1,245,420	62%
HVAC	16	13.7	$51,425	49%
Lifting Devices	9	8.4	$76,670	61%
Monitoring	4	7.8	$67,133	59%
Piping	1	7.0	$23,936	84%
PLC/SCADA	23	8.1	$585,684	46%
Pumps	52	14.8	$1,611,005	49%

Feature Type	Feature Quantity	Average Age	Replacement Cost	Average Condition (% remaining)
Tanks	2	9.5	$103,972	68%
Valves	37	15.0	$196,350	55%
Valves – Actuated	1	9.0	$11,968	55%
VFD's	10	8.8	$95,931	65%

The condition of the Features within our Sewage Pumping Stations by age is shown in Figure 27. The quantities are based on replacement costs as opposed to number of features/facilities.

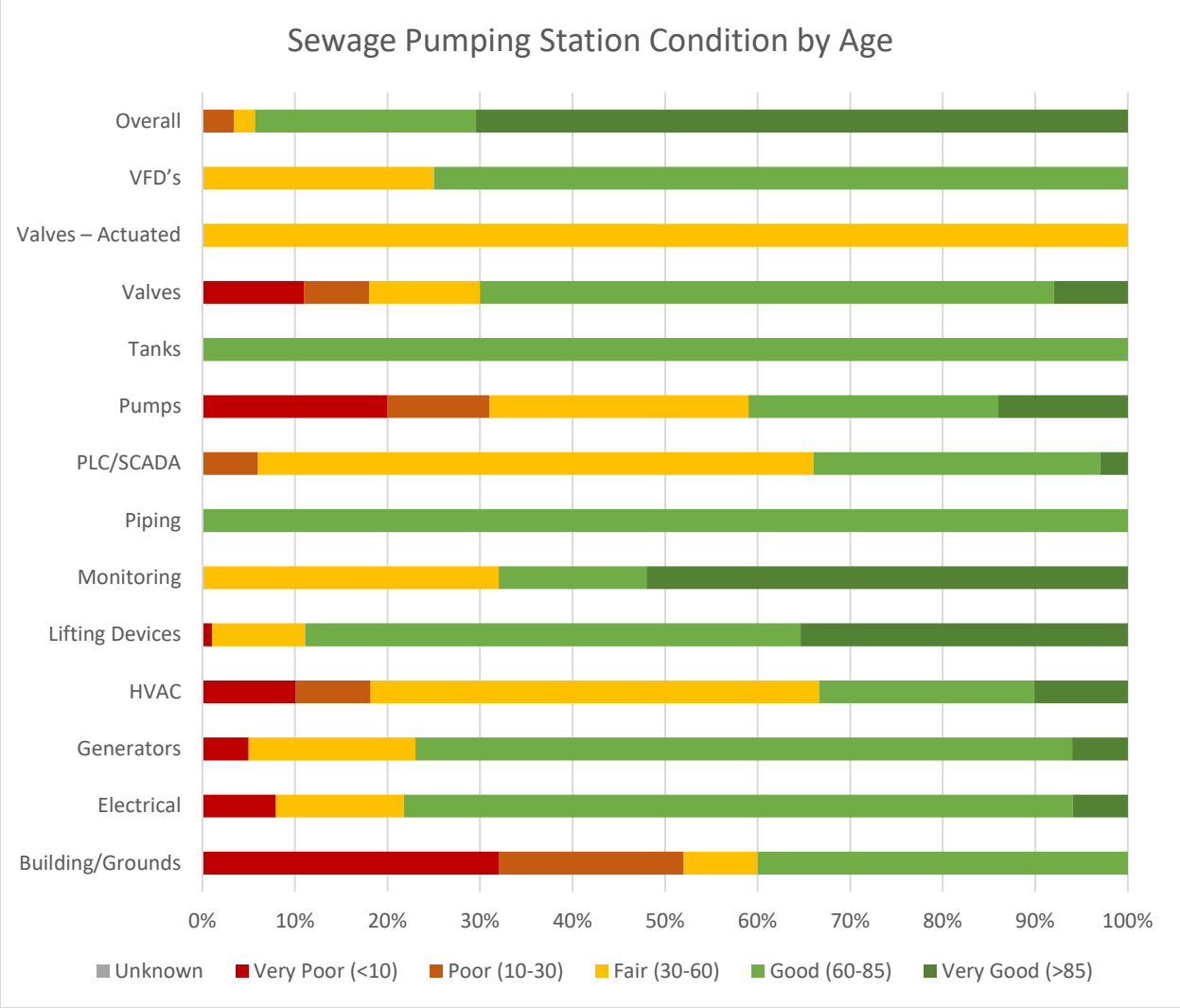


Figure 27 - Sewage Pumping Station Condition Profile

To better understand our Wastewater Collection assets, Figure 28 contains the age profile of our sanitary mains by decade.

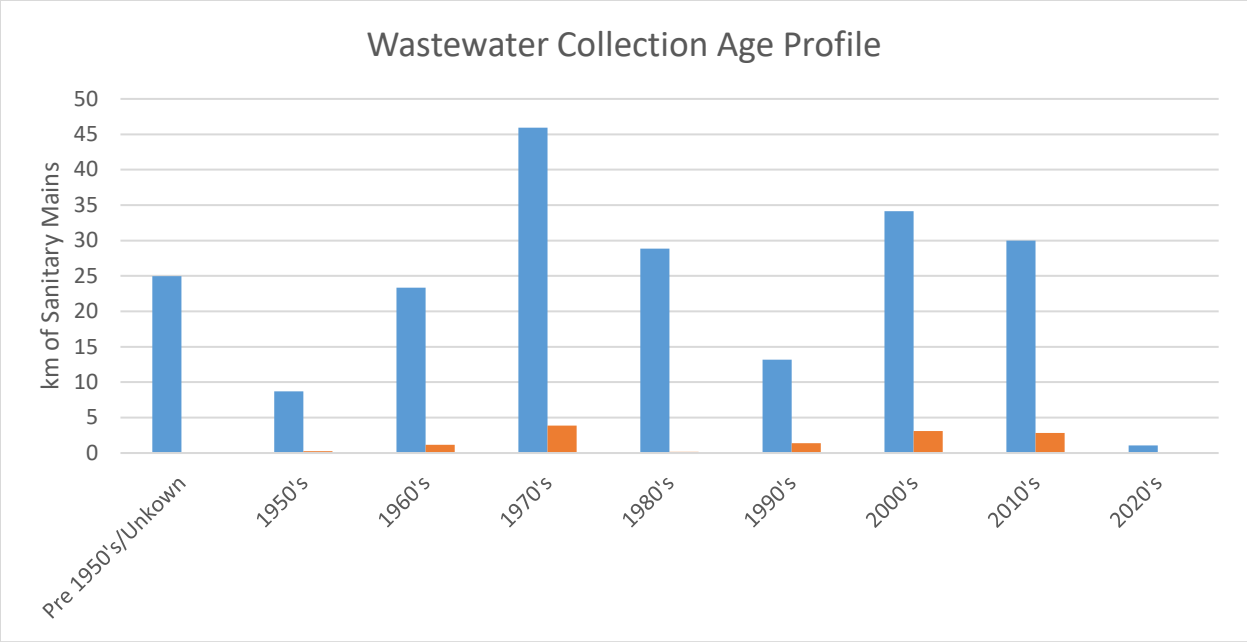


Figure 28 - Wastewater Collection Age Profile

Assessment Approach

There are two aspects to the assessment of our Sewage Pumping Stations. The first looks at the overall condition of the facility itself, while the second focusses on the condition of the various components which make up each facility.

At this point in time, both of these approaches are utilizing the age and estimated useful lives of the facilities and their components. The assigned condition is then verified through a staff review and the condition may be changed based on individual characteristics noted. The conditions are assigned based on the criteria in Table 5 of the Main Body State of the Infrastructure section.

The Pipeline Assessment Certificate Program is the North American Standard for pipeline defect identification and assessment. CCTV is the principal method of inspecting sewers. In this process a small robotic camera is lowered into the pipe though the maintenance hole to complete an inspection. A technician records information regarding the pipe, including number, type, and severity of defect. A structural rating, on a scale of 1-5 is then assigned based on the standards, with 0 representing a 'new like condition' pipe and 5 representing a failed or imminently failing pipe.

The County has completed CCTV inspections on most of its sanitary sewer mains. These sewer ratings, in conjunction with the age and material of the infrastructure are used to assign conditions to our sanitary collection system. This information is utilized to determine Risk, which will be discussed later in Rehabilitation and Renewal Section.

The assessment approach for this part of the AMP is strictly based on pipe material and age. The conditions are assigned based on the criteria listed below in Table 44.

Table 42 - Wastewater Collection Condition Practices

Condition Assessment	Remaining Useful Life (%)
Very Good	75+
Good	25-75
Fair	10-25
Poor	0-10
Very Poor	0

C.3 Levels of Service

C.3.1 Current Levels of Service

Under O.Reg.588/17, for our core assets, we are required to report the qualitative descriptions and technical metrics for our current LoS. As such, we have reported the prescribed metrics from the regulation for our wastewater assets within our LoS framework, as outlined in *Table 45*.

Table 43 – Wastewater: Prescribed Levels of Service

Description		Wastewater assets in Norfolk County include wastewater collection and treatment assets. The wastewater system comprises the assets throughout the County which provide for the safe collection and treatment of wastewater. The County's assets include sanitary mains, services, treatment plants, pumping stations, etc.		
Asset	**Service Attribute**	**Levels of Service**		
Wastewater	**Scope**	**Community Levels of Service (Qualitative Descriptions)**		
		The municipal wastewater systems connect to most residential, commercial and industrial spaces in the urban areas of the County which are outlined in maps in Appendix F. The municipal wastewater system provides for the safe collection and treatment of wastewater to most residential, commercial and industrial spaces within urban areas of the County.		
		Technical Levels of Service (Technical Metrics)	**2019**	**2020**
		Percentage of properties connected to the municipal wastewater system	43.2% (Total) 85.9% (Urban)	43.2% (Total) 85.9% (Urban)
	Quality	**Community Levels of Service (Qualitative Descriptions)**		
		The number of overflow or wastewater home backup events due to the absence of overflow structures in the municipal wastewater system is low. Sanitary sewers in the municipal wastewater system are resilient to major events. The County does not have any combined sewers and reducing stormwater infiltration into sanitary sewers and minimizing overloading of the municipal wastewater system is an objective of the County.		
		Technical Levels of Service (Technical Metrics)	**2019**	**2020**
		The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	N/A	N/A
		The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system	0 days to 14,906 properties	0 days to 14,906 properties
		The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	12 effluent violations to 14,906 properties	27 effluent violations to 14,906 properties

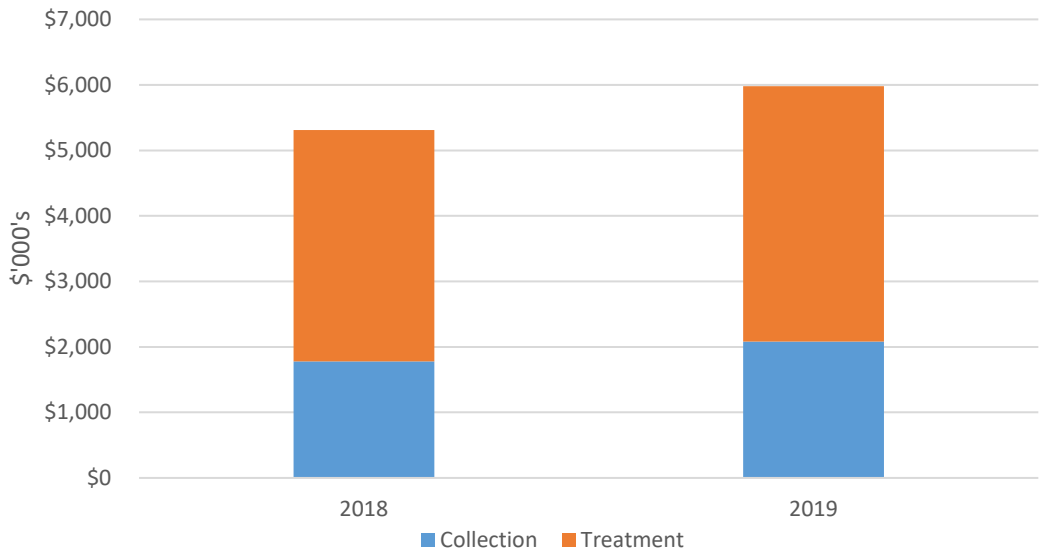
Additionally, we are pleased to report other current measures for our wastewater assets, outlined in *Table 46.*

Table 44 – Wastewater: Additional Current Levels of Service

Asset Type		2019	2020
Wastewater	Number of Service Requests	287	265
	Number of Pumping Station Major Failures	0	0
	Number of Blocked Service Connections	12	7
	Percentage of network with PACP Inspections	--	65.3%
	Percentage of Infiltration and Inflow of Storm or Groundwater into Sewage Network (%)	21-30%	21-30%
	Annual Number of Wastewater Main Backups	2	1
	Yearly Amount of Wastewater Treated (m^3)	5,393,926 m^3	5,194,909 m^3

In order to deliver these current LoS for our wastewater assets, we have spent $5.3 million and $6.0 million in operations related costs for 2018 and 2019 respectively as shown in *Figure 29*.

Figure 29 – Wastewater: Operating Costs Annual Comparison ($'000's)



C.3.2 LoS Maps

Our wastewater assets are comprised of a number of different assets within multiple systems throughout the County, as shown in Appendix F.

C.3.3 Proposed Levels of Service

Proposed LoS are not required for reporting by the Regulation until 2025, we will be proactively developing proposed measures for review and consultation as part of the exercise to develop a LoS framework for all assets across our portfolio.

C.4 Asset Lifecycle Management Strategy

C.4.1 Creation / Acquisition Plan

Master planning documentation supports the County in identifying the objectives around the specific asset services that are necessary to meet the needs and growth of Norfolk. We have developed various master plans and strategic plans over the years, including the Integrated Sustainable Master Plan (ISMP), which includes wastewater linear and plant assets as a core element. The ISMP is a framework that guides our investment in various services, including wastewater, to support growth and help shape Norfolk County for the future.

Creation and acquisition activities within our municipal boundaries are made in alignment with the objectives, stakeholder input, and long-term strategic plans set forth in the ISMP. Wastewater assets are a critical element in the activities necessary to meet the demands associated with population growth and economic development. The wastewater service area directly affects the health and safety of the residents of Norfolk. Documents such as these help the County in developing creation and acquisition plans, as these priorities and plans are taken into consideration.

The most common method of acquiring wastewater assets for Norfolk County is through the assumption of Development assets. These assets are typically funded and built by a developer and then handed over to the County upon completion. We would then be responsible for the assets remaining lifecycle activities as outlined below.

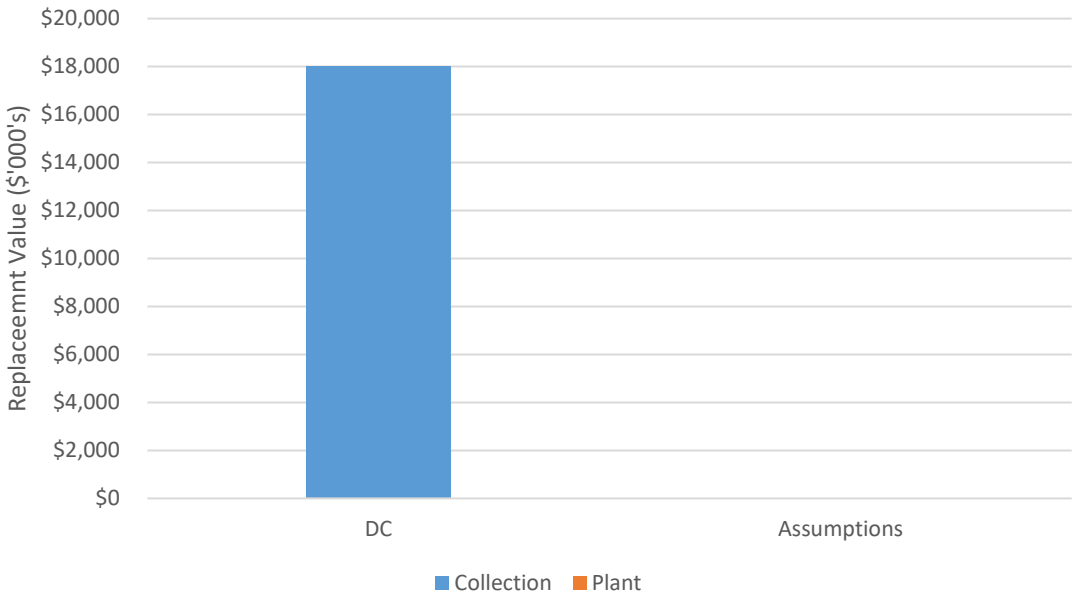
To ensure the County is assuming assets which were installed properly and functioning as intended, the County has detailed design requirements which Developers are required to follow. Before assuming assets, County staff inspect the assets against the requirements and any deficiencies are to be rectified prior to assumption to ensure we get the expected life out of the assets.

The second major contribution to the Creation/Acquisition plan would be the expansion of existing assets. Examples of these projects in wastewater could include increasing the capacity of wastewater treatment plants or the upsizing of sanitary mains. These projects would typically be funded entirely or partially through Development Charges.

It is important to look at our past growth via assumptions and DCs to ensure we plan for future growth properly.

Looking at the growth we have had in the past, since 2015, we have made considerable effort to invest in the growth of our wastewater assets. This growth is presented in *Figure 30*.

Figure 12 – Wastewater: Growth by Year



More specifically, we are pleased to demonstrate in *Table 47*, the growth our wastewater mains and wastewater services have experienced, where we have added 24,959 meters and 1,409 services respectively since 2014.

Table 45 – Wastewater Mains & Service Growth by Year

Wastewater Main and Service Growth by Year		
Year	**Wastewater Main (m)**	**Wastewater Services (each)**
2014	4,987	326
2015	5,285	269
2016	4,869	165
2017	875	68
2018	4,252	245
2019	4,691	336

C.4.2 Operations and Maintenance Plan

This stage of the asset lifecycle generates significant costs over time; therefore, we have implemented practices that enhance value through cost reduction and investment optimization. A successful operations and maintenance plan will ensure that our assets also meet the level of service commitments and expectations from those in our community.

Condition Assessment and Inspection

Based on standard condition assessment processes, maintenance of wastewater assets begins with routine inspection to identify defects that could result in risks or higher costs in the future. This practice of early identification, through visual inspection and quantitative assessment allows for overall higher LoS and extended asset lifespans, as the outputs from the condition assessments are used in planning.

Asset types each have varying condition assessment and inspection procedures as shown in *Table 48*.

Table 46 – Wastewater: Condition Assessment & Inspection Procedures

Asset Class	Condition Assessment & Inspection Procedure
Collection	Norfolk County complies with the system specific Environmental Compliance Approvals along with the most current applicable provincial and federal regulations. The condition of the wastewater collection network is assessed based on CCTV inspections, material, and age. Deterioration is based on observed failure rates, industry lifecycle probabilities and PACP sewer ratings. Sanitary mains and siphons are inspected using CCTV in order to identify, address and reduce inflow and infiltration, operational and maintenance emerging issues and capital renewal needs. Upon request from Engineering and Operations, flow volume is measured. Wastewater assets follow predictable patterns for future capacity limitations, and in some cases, older infrastructure experiences a reduction of peak flows due to water conservation trends which can extend its useful life.
Treatment	Norfolk County complies with facility specific Environmental Compliance Approvals along with the most current applicable provincial and federal regulations. The condition of our wastewater treatment and pumping station assets are assessed based on the age of the facility and of the individual components of the facility. Useful lives are assigned to each of these components and failures/performance issues are tracked and factored into replacement decisions. Visual inspections of components are completed on a regular basis by our Operating Authority during normal operations. Operating Authority staff perform regular program inspections and an annual safety inspection.

If a defect is uncovered during inspection, the next step is determining whether the defect will require minor or major maintenance.

Planned Operations and Maintenance

Norfolk County is committed to maintaining our assets in a state of good repair in order to ensure that we deliver on our levels of service for our customers

Typically, in the case of minor maintenance, it is incorporated into planned operations and maintenance programs in order to make repairs based on condition assessments. A work order is created and distributed to Operations staff and/or contractors for repair, followed by an inspection to ensure completeness and payment once complete.

Currently, there are a number of planned operations and maintenance activities that are performed on the County's wastewater assets. If the inspection reveals that major maintenance is required, the County typically implements a rehabilitation and renewal plan.

Table 47 – Wastewater: Planned Operations & Maintenance Activities

Asset Class	Activity	Performed By / Frequency
Wastewater - Collection	Syphon Inspection	County Staff/ As required
	Siphon Valve Turning	County Staff/ As required
	Siphon Flushing	Contractor/ As required
	Siphon CCTV	Contractor / As required
	CCTV Inspections	Contractor / As required
	Inspection of Access Issues	County Staff/ As required
	Manhole Investigations	County Staff / As required
	Infiltration & Inflow Repairs	County Staff / As required
	Flow Monitoring	Flow is monitored at the WWTP by the Operating Authority on a continuous basis
	Sanitary Mainline Cleaning	County Staff / Minimum 20% Annually
	Forcemain Swabbing	Operating Authority / As required
	Sanitary Mainline Repairs	County Staff / As required
	Frame and Lid Replacements	County Staff / Minimum 20% Annually
	Lateral Blockages	County Staff or Contractor / As required
	Lateral CCTV Inspection	County Staff / Annually of older infrastructure
	Lateral Relining	Contractor / As required
	Lateral Replacements	County Staff / As required
Wastewater - Plant	Facility Inspections	Operating Authority / Daily
	Component Inspections	Operating Authority / Daily and as required by the Facility's Operation Manual
	Pump Rebuilds	Operating Authority / Rebuild Schedules
	Generator Inspections	Operating Authority / Monthly
	Alarm Inspections	Operating Authority / Annually
	Wetwell Cleaning	Operating Authority / Annually

Unplanned Operations and Maintenance

Our major maintenance needs are identified through a number of sources, namely activities prescribed through the maintenance of assets. However, unexpected situations may occur which can result in unplanned maintenance activities. If major maintenance costs are significant, a more thorough review process becomes necessary and often involves consultation with various internal functions, such as our Asset Management, Finance, as well as our Engineering and Operations service areas to decide if the repair meets the capital budget criteria. Generally, this service area relies on outside contractors for investigation and suggested repairs when the scope of the maintenance is not easily determined.

Despite the fact that minor maintenance is incorporated into planned operations and maintenance programs, there are cases where it is unplanned. *Table 50* outlines some of the common unplanned maintenance activities that occur in the County and who typically performs them.

Table 48 – Wastewater: Unplanned Operations & Maintenance Activities

Asset Class	Activity	Performed By
Wastewater - Collection	Sanitary Main Repairs	County Staff
	Service Break Repairs	County Staff
	Removal of Blockages	County Staff
	Investigate Odour Complaints	Contracted Out
	Forcemain Repairs	Operating Authority
Wastewater - Plant	Repair/Replace Failed Components	Operating Authority
	Investigate Odour Issues	Operating Authority
	Investigate Effluent Quality Issues	Operating Authority

C.4.3 Rehabilitation and Renewal Plan

We employ an asset renewal process, using supporting software and consultation among multiple internal functions. The supporting software works as a decision support tool which allows us to utilize our asset State of Infrastructure data and operations and capital budget information in order to target efficient rehabilitation and renewal of our wastewater assets.

The rehabilitation and renewal plan begins with a needs assessment on an annual basis, followed by a review of the operational impacts of potential investments. If the need for rehabilitation or renewal is significant enough, the item moves to a more detailed level of scope including budget definition, financial forecasting, and finally Council approval. In some cases, for various assets which will affect a significant number of people, public consultation is necessary to make sure that our decisions align with the expectations and needs of the people we serve.

Most renewal projects require construction and project management, particularly as the projects increase in scale. Following the renewal, commissioning and inspection activities are performed to ensure that our personnel have the understanding of the materials and processes recommended to maintain the asset at a cost-effective, and optimal level.

Collection

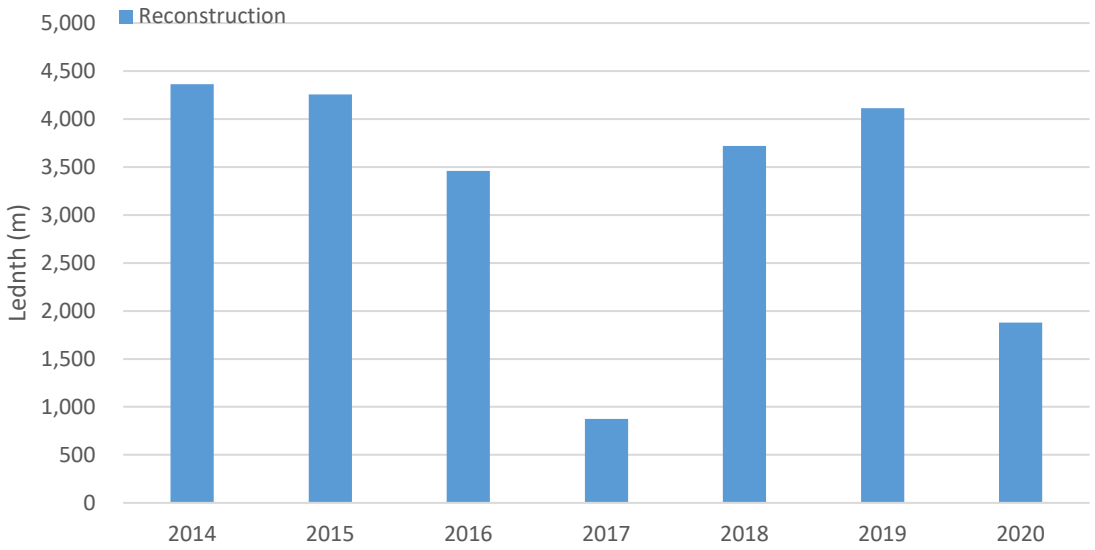
The rehabilitation and renewal process for our wastewater collection assets is fully integrated with the renewal needs of our roads and other underground infrastructure such as drinking water and stormwater. This integrated approach ensures our renewal projects for these service areas are delivered with optimal timing to increase value and minimize disruption to our communities. For example, if a road is targeted for renewal, coordination between service areas will determine whether the underlying stormwater, drinking water or wastewater infrastructure is also of an age or condition that requires renewal to ensure these projects are delivered together to reduce disruption for our communities and deliver enhanced value.

Norfolk County is committed to the rehabilitation and renewal of our wastewater assets. Below we have outlined the priorities for our assets:

- Replacement of old clay pipes
- Replacement of pipes which need increased capacity as identified in the ISMP
- Replacement of pipes which have high levels of infiltration and inflow

To demonstrate this ongoing commitment to our wastewater network*, Figure 31* presents that during 2014 – 2020, we have reconstructed 22,667 metres of sanitary main.

Figure 13 – Wastewater: System Renewal Summary



Renewal activities are determined based on the risk level of the sanitary mains and accompanying infrastructure which determines whether the need is isolated or requires a complete reconstruction of the roadway. The Risk of an asset is a combination of the Probability of Failure and the Consequence of Failure and is identified in Figure 32. Risk rankings range from Very Low to Very High and incorporate the assets age, material, size, PCAP condition and ISMP recommendations.

Risk Matrix		Consequence of Failure (CoF)				
		Very Low	Low	Moderate	High	Very High
Probability of Failure (PoF)	Almost Certain	High	High	Very High	Very High	Very High
	Highly Likely	Moderate	Moderate	High	High	Very High
	Likely	Low	Low	Moderate	High	High
	Unlikely	Very Low	Low	Low	Moderate	Moderate
	Highly Unlikely	Very Low	Very Low	Very Low	Low	Low

Figure 14 - Risk Matrix

Probability of Failure: Based on the condition and/or performance of the asset. For condition, we are utilizing estimated useful lives based on the materials of the sanitary main as the basis. PCAP ratings based on CCTV are then utilized to provide a more accurate condition measurement. For performance, we are measuring the ability of the asset to provide established service levels, which for sanitary mains primarily corresponds to undersized pipes and ISMP recommendations.

Consequence of Failure: Based on the size of the sanitary main. It is assumed that larger mains are designed to carry more sewage, and therefore would affect more upstream infrastructure and residents in the case of a failure.

Treatment

The rehabilitation and renewal process for our wastewater treatment assets are determined based on a combination of external expertise (inspections), facility and feature useful lives, and internal expertise (organizational priorities and available budget).

Each facility has a useful life and the various features within those facilities are also assigned useful lives based on industry standards. These useful lives include triggers for rehabilitations where necessary. Renewals and rehabilitations are planned based on these useful lives and reviewed internally by staff before being recommended. The complete listing of our useful lives is contained in our asset management software.

To demonstrate our commitment to our wastewater treatment facilities, over the past number of years the Delhi and Port Rowan WWTP have been replaced and major upgrades have been or are ongoing at the Waterford, Simcoe and Port Dover WWTP's.

C.4.4 Disposal Plan

In some cases, disposing of an asset is more appropriate than replacing or renewing it. Given the growth of our population and the steadily increasing movement of people and goods, disposal is not a common activity for our wastewater assets.

In some cases, we may close or decommission our wastewater assets for use, by limiting the maintenance performed. When an asset is closed and deemed a risk, our Engineering and Operations service areas will coordinate with contractors to ensure the safe removal of the asset. In very few instances are their dedicated projects specific for the disposal of a wastewater asset.

C.5 Financial Strategy

C.5.1 Asset Investment Needs

Our investment needs are identified through a range of mandated and industry planning processes, supported by detailed analysis to ensure we identify our needs for investment. This allows us to maintain service delivery, meet future demand growth and achieve our strategic objectives. The needs identified through these various planning processes are then prioritized through a capital project prioritization process, which evaluates projects using various criteria to determine the most important needs and initiatives to be funded.

The following sections describes our capital investment needs to maintain existing infrastructure and associated service delivery, along with the requirements for additional infrastructure to meet the growing needs and demands of our communities.

Capital Renewal

Norfolk has undertaken a comprehensive analysis to determine the capital needs of its wastewater assets to deliver the services expected by its communities and stakeholders. We have adopted an industry approach to the identification of capital renewal needs for our core asset areas, featuring an integrated risk-based analysis supported by a decision support system.

A more detailed breakdown of our Wastewater needs by asset class is as follows:

Collection

The 10 year needs of our wastewater collection assets has been determined utilizing the corresponding risk ratings of the sanitary main sections. The needs identified below are based on completing all Very High and High Risk sections within the 10-year window.

Treatment

The 10 Year needs of our wastewater treatment facilities, including the features within them, has been determined based on their useful lives and reviewed internal by staff.

Growth Needs

In addition to targeting and prioritizing the investment needed to maintain existing assets, there are also planning processes in place to determine the additional assets needed to meet growing demand for service through population increases or demand for new services. The projects targeted to meet growth come from various plans such as the Integrated Sustainable Master Plan (ISMP) and Development Charge Study. These growth-related projects are primarily funded through Development Charges – the mechanism that enables recovery of growth-related capital expenditures from new development, or other municipal financing sources. The process for creation and acquisition of assets for growth is described in the Creation/Acquisition section of the Asset Lifecycle Management Strategy.

Additional growth-related assets will be acquired by Norfolk County through contributions from Development. Although the County does not pay for the construction or these assets, once they are assumed we will be responsible for the remaining lifecycle activities, including O&M, rehabilitations, and eventual replacements. Therefore it is important to understand the assets we foresee the County taking on in the future.

C.5.2 Funding Strategies

To support the wastewater assets that provide services within the County, we require sufficient funding in order to maintain the assets in a state of good repair, as well as to create new assets to support future growth. Our current strategies and revenue sources are allocated based on our prioritization model discussed in the Investment Needs section. This model considers the currently available funding sources for wastewater assets in order to deliver our current investment plan effectively.

Additionally, we continually assess opportunities for additional funding options and revenue streams to address our funding gaps.

C.6 Stakeholder Engagement

C.6.1 Users of the Service

Our valued communities are the primary users of our wastewater network along with transient users who are visiting or travelling throughout our area. This network is also vital for protecting the environment and communities of Norfolk, as well as those that may share environmental facilities or watersheds within the County. This requires coordination within County through constant engagement and collaborative planning.

We provide a range of engagement points for our users, including online (both through the website and social media), by email, phone, or letter. In addition to these traditional channels of engagement, the development of the ISMP & Norfolk County Strategic Priorities 2022-2026 included a significant consultation exercise featuring a range of opportunities to consult with stakeholders directly on the subject of wastewater in the County.

C.6.2 Service Delivery Partners

We rely on partnerships to aid the delivery of service and improvements to our assets and to implement appropriate controls and processes to ensure the impact of our work on stakeholders and delivery partners is communicated to avoid risks and adverse impacts.

Within wastewater, it is particularly important that we work with our external contractors in the delivery of our renewal programs, as well as with utility providers to minimize disruption and coordinate efforts for maximizing efficiency. We maintain close relationships with both our internal and external partners and maintain processes to engage with each of our service delivery partners as required.

C.6.3 Public and Private Infrastructure Owning Bodies

Norfolk County does not currently share any of its wastewater assets with other municipal bodies. If this changes in the future, related assets will be managed through an agreement stipulating the requirements of each municipality.

Wastewater assets are required to follow the Environmental Compliance Approvals. Norfolk County will continue to work with the province on ensuring we are meeting these requirements.

Appendix D: Stormwater

D.1 Introduction

The County maintains a diverse portfolio of assets that are required to provide our communities with the safe collection and treatment of stormwater as well as flood protection. Our stormwater management system consists of five independent systems serving the drainage areas of the urban communities of Delhi, Port Dover, Port Rowan, Simcoe and Waterford. Rural drainage and municipal drains are not included in this plan and will be added in future versions. We have two different asset classes within the stormwater portfolio.

Table 49 – Stormwater Assets

Service Area:	**Stormwater**	
Asset Class:	**Treatment/Storage**	**Collection**
Asset Type:	• Stormwater Management Facilities • **Municipal Drains*	• Storm Mains • Catch Basins • **Ditches* • **Municipal Drains*

**Denotes Phase 2 Asset Types (not currently included)*

This collection of assets is critical to the County. Sound management of our stormwater systems help us realize our vision of a clean and green county. Like many of our assets,

stormwater assets are facing increased challenges as a result of climate change and regulatory changes.

This appendix provides information regarding our approach to the management of our stormwater assets over the next 10 years, demonstrating our commitment to assessing and meeting the LoS valued by our residents.

D.1.1 Scope

This section identifies the requirements for each Phase of O.Reg.588/17 applicable to the assets within this service area. Our compliance with these requirements for the asset classes within this service area are presented in *Table 52* to highlight areas of future development in advance of regulation phases. The following sections of this appendix will present further detailed information to meet the requirements for each section of the regulation. *Table 7* of the main body of our AMP provides a summary of compliance for all service areas.

Table 50 – Stormwater: Compliance with O. Reg. 588/17

Core Assets		Phase 1						Phase 3 – July 1, 2025						
Service Area	**Asset Class**	Asset Inventory	Weighted Average	Replacement Value	Average Age	Current LoS	Costs to Maintain LoS	Proposed LoS	Creation/ Acquisition Plan	Operations & Maintenance Plan	Rehab & Renewal Plan	Disposal Plan	Investment Needs	Financial Strategy
Stormwater	**SWM Facilities**	●	●	●	●	●	●	◔	○	◔	◔	○	◔	◔
	Collection	●	●	●	●	●	●	◔	○	◔	◔	○	◔	◔

● Compliant ◔ Partially Compliant ○ Not Compliant

Table 52 demonstrates that our assets within the stormwater service area are fully compliant with the regulation requirements for Phase 1.

D.1. 2 Strategic Connections

The strategic and master plans summarized in this section are all related to our stormwater assets and have been considered while developing this AMP.

Table 51 – Stormwater: Strategic Documents

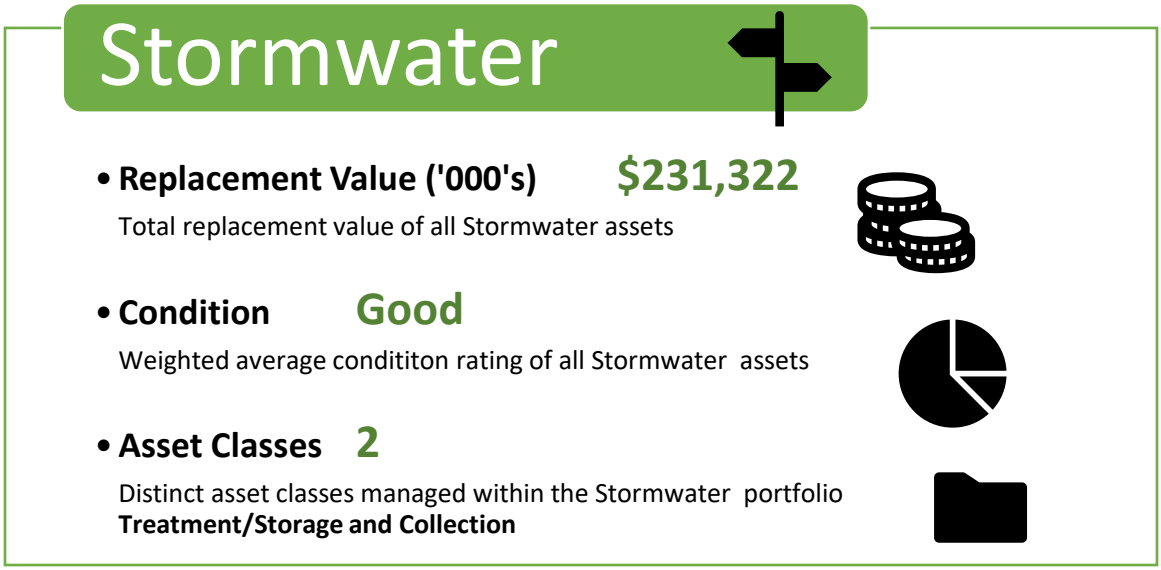
Strategic Document	Linkage(s) to AMP
Current Documents	
Norfolk County Council Strategic Priorities 2022-2026	The Strategic Plan sets the stage for decision-making, prioritization, and ongoing performance management. The Strategic Plan contemplates “Our Future Norfolk”, and specifically emphasizes that Norfolk County will strive to be a well-run organization, with financial sustainability and asset management as the cornerstone of the County’s future success. More specific to Stormwater, the Strategic Plan sets a priority to “Building Norfolk” by demonstrating meaningful progress on projects that matter to residents and businesses and uses proactive infrastructure management strategies. This AMP assists the County in relating decision-making, prioritization, and performance management, ultimately enabling us to maintain our infrastructure.
Integrated Sustainable Master Plan (ISMP)	The Integrated Sustainable Master Plan (ISMP) is a comprehensive Master Plan which addresses the long-term planning and visioning for water, wastewater, transportation and active transportation infrastructure needs County-wide. More specific to Stormwater, the ISMP identifies individual linear stormwater infrastructure improvements, and opportunities to strategically integrate those improvements in order to minimize impacts and costs. This AMP utilizes the ISMP to ensure that service delivery and asset condition goals and objectives for the County are aligned.
Development Charges Background Study (2019)	A by-law that imposes certain Development Charges in the Corporation of Norfolk County pursuant to the Development Charges Act, S.O., 1997, c. 27, as amended. The growth plans and infrastructure investment proposed within the AMP must consider whether development charges will be incurred pursuant to the County’s bylaws. The Development Charges Background Study is essential to this AMP as it supports the County in identifying its funding gap included in the Financial Strategy.

D.2 State of Infrastructure

Stormwater Overview

Stormwater assets are those that enable us to live in a clean and safe environment. Our stormwater assets are one of our most utilized and important asset types. It includes everything from the stormwater sewers that service our homes and businesses throughout the County to the SWM Ponds which ensure that water is properly stored and cleaned before being discharged into the environment.

We recognize that our stormwater assets are imperative to the livelihood of our community and extends into all other portfolios, which is what makes stormwater services particularly important.



Treatment/Storage

Replacement Value ('000's)

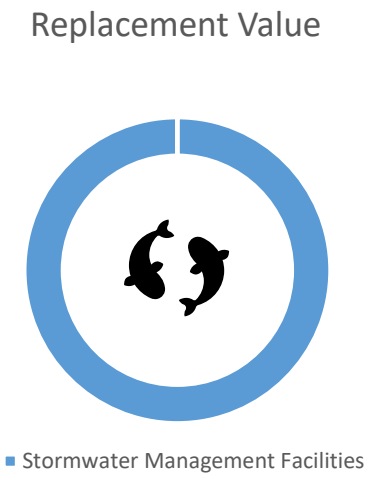
$4,618

Average Condition

Good

Average Age

20.3 years



Collection

Replacement Value ('000's)

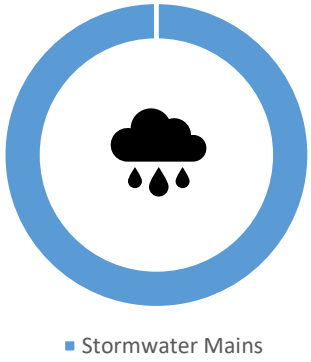
$231,322

Average Condition

Good

Average Age

29.4 years



Treatment/Storage Overview

The table below includes the quantity, age and total replacement cost of each asset class in our Stormwater Treatment/Storage inventory. This table represents the overall status of these facilities.

Table 52 - Stormwater Treatment/Storage State of Infrastructure

Asset Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Stormwater Management Facilities	24	20.3 Years	$4,618	Good

**Stormwater Management Facility Replacement costs are the cost to remove the sediment from the pond as these facilities are not typically replaced.*

The condition of our Stormwater Treatment/Storage facilities is shown in Figure 33. The quantities are based on replacement costs as opposed to number of facilities. Most of our dry ponds do not currently have condition data.

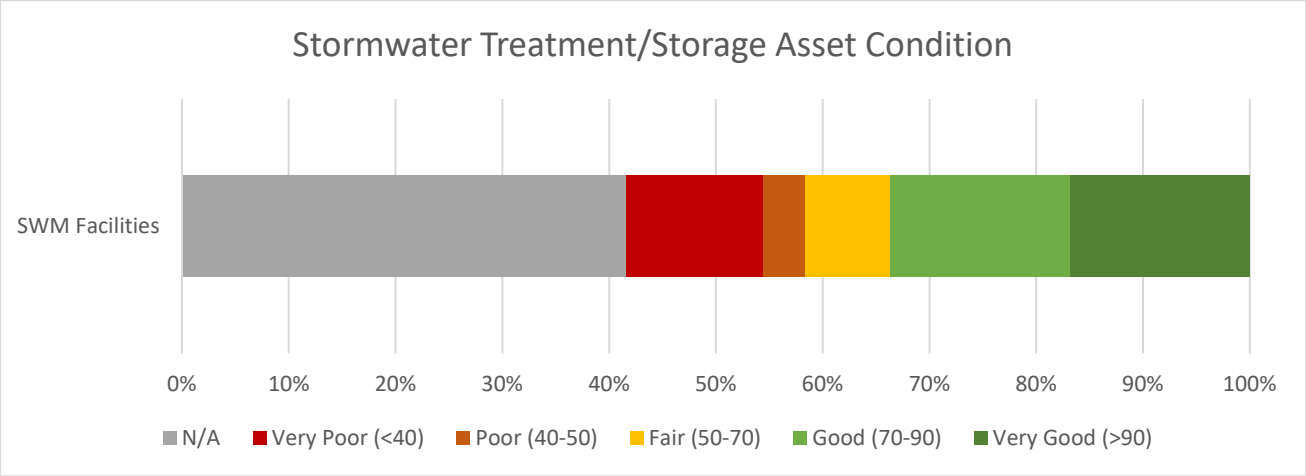


Figure 15 - Stormwater Treatment/Storage Condition Profile

For our stormwater treatment/storage assets: 17% of these assets are in poor or very poor condition, and 34% in good or very good condition in comparison to 4% and 54% respectively for Canadian municipalities reported on the Canadian Infrastructure Report Card; As such, it is evident that our stormwater assets may be in worse condition than other Canadian municipalities. The 2019 Canadian Infratsructure Report Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

To better understand our Stormwater Treatment/Storage Facilities, Figure 34 contains the age profile of our facilities by decade.

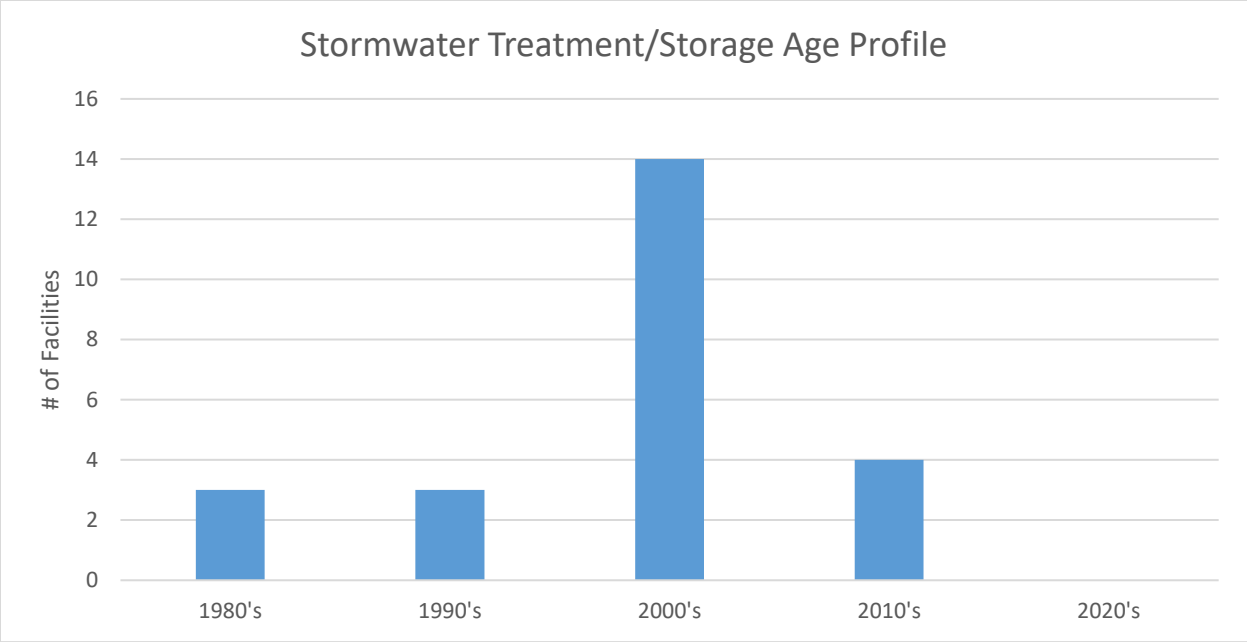


Figure 34 - Stormwater Treatment/Storage Age Profile

Assessment Approach

The assessment of our Stormwater treatment/storage assets is based on multiple factors including the design, age and condition data collected through inspections.

Because these facilities are not typically replaced, the condition is based on the remaining useful life before the facility requires a complete clean-out. ertain Dry Pond facilities are designed to not require cleanouts, only regular maintenance. hese Assets have been assigned a condition of N/A. The conditions are assigned based on the criteria in Figure 35.

Figure 35 - Stormwater Treatment/Storage Condition Practices

Condition Assessment	Estimated Years before complete Cleanout Required
Very Good	20+
Good	10-20
Fair	5-10
Poor	0-5
Very Poor	0

Collection Overview

The table below includes the quantity, condition and total replacement cost of each asset segment in our stormwater collection inventory.

Table 53 - Stormwater Collection State of Infrastructure

Asset Class	Asset Quantity	Average Age	Replacement Cost ('000's)	Average Condition
Stormwater Mains	169.8 km	29.4 Years	$231,332	Good

The condition of our Stormwater Collection assets by age is shown in Figure 36.

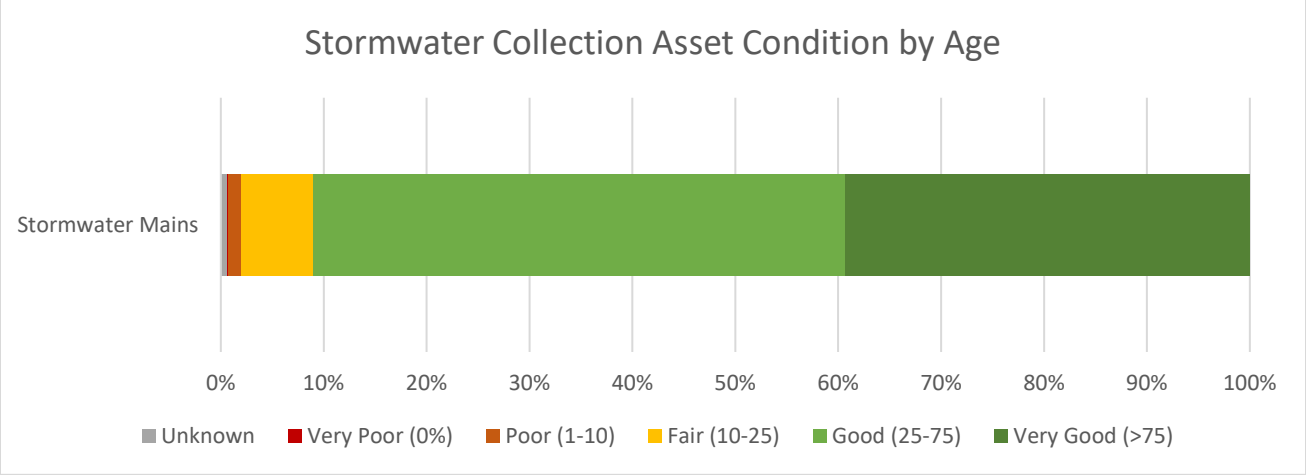


Figure 36 - Stormwater Collection Condition Profile

For our stormwater assets: 1.4% of these assets are in poor or very poor condition, and 91.6% in good or very good condition in comparison to 11% and 51% respectively for Canadian municipalities reported on the Canadian Infrastructure Report Card; As such, it is evident that our stormwater assets may be in better condition than other Canadian municipalities. The 2019 Canadian Infratsructure Report Card is an aggregate of self reported condition ratings across the Country and are based on a general rating scale which may not match Norfolk County's.

To better understand our Stormwater Collection assets, Figure 37 contains the age profile of our stormwater mains by decade.

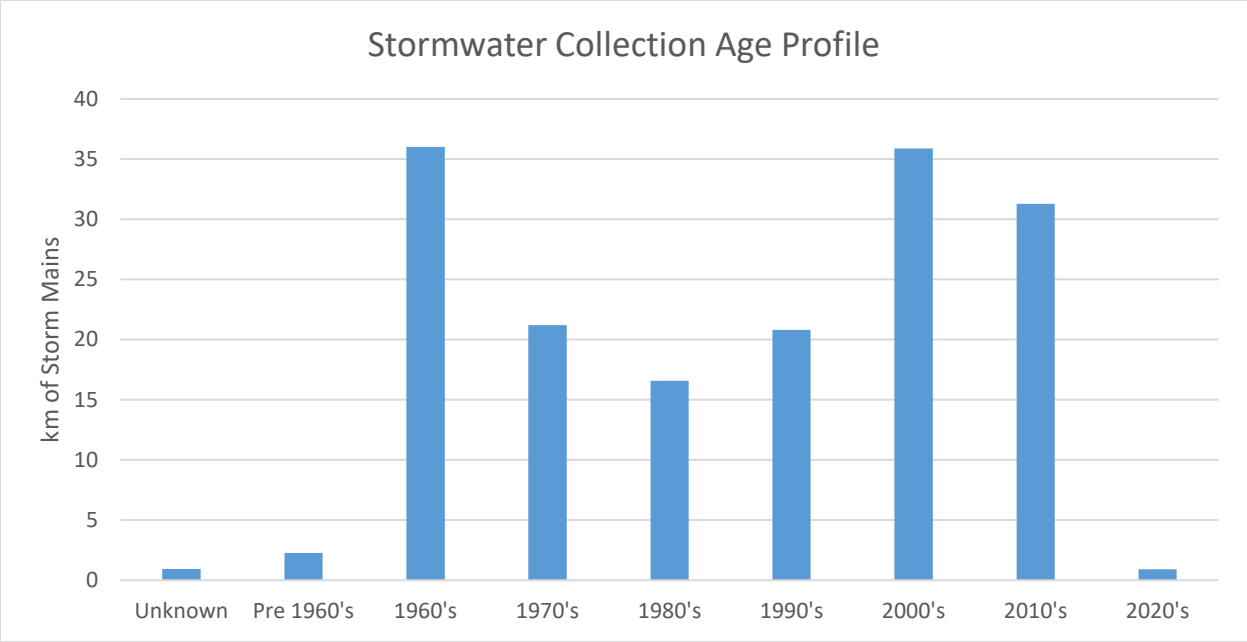


Figure 37 - Stormwater Collection Age Profile

Assessment Approach

The Pipeline Assessment Certificate Program is the North American Standard for pipeline defect identification and assessment. CCTV is the principal method of inspecting sewers. In this process a small robotic camera is lowered into the pipe though the maintenance hole to complete an inspection. A technician records information regarding the pipe, including number, type, and severity of defect. A structural rating, on a scale of 1-5 is then assigned based on the standards, with 0 representing a 'new like condition' pipe and 5 representing a failed or imminently failing pipe.

The County has completed limited CCTV inspections of its stormwater mains, typically on an as needed bases when looking at reconstruction projects. Due to a lack of sewer ratings, the age and material of the infrastructure are used to assign conditions to our stormwater collection system.

The conditions are assigned based on the criteria listed below in Table 58.

Table 54 - Stormwater Collection Condition Practices

Condition Assessment	Remaining Useful Life (%)
Very Good	75+
Good	25-75
Fair	10-25
Poor	0-10
Very Poor	0

D.3 Levels of Service

D.3.1 Current Levels of Service

Under O.Reg.588/17, for our core assets, we are required to report the qualitative descriptions and technical metrics for our current LoS. As such, we have reported the prescribed metrics from the regulation for our stormwater assets within our LoS framework, as outlined in *Table 57*.

Table 55 – Stormwater: Prescribed Levels of Service

Description		Stormwater assets in Norfolk County include stormwater collection and stormwater management facility assets. The stormwater system comprises the assets throughout the County which provide for the safe collection, storage and treatment of stormwater. The County's assets include storm mains, services, stormwater management ponds, etc.		
Asset	**Service Attribute**	**Levels of Service**		
Stormwater	**Scope**	**Community Levels of Service (Qualitative Descriptions)**		
		The municipal stormwater system mitigates the risk of flooding throughout the urban areas of the County. The County has outlined maps of its stormwater system in Appendix F. Specifically, those residences and businesses located near or on the food plain benefit from having an effective stormwater management system. We strive to protect the environment and implement quality measures before releasing stormwater to the environment.		
		Technical Levels of Service (Technical Metrics)	**2019**	**2020**
		Percentage of properties in the municipality resilient to a 100-year storm	92.8% (Urban)	92.8% (Urban)
		Percentage of the municipal stormwater system resilient to a 5-year storm	94.6% (Urban)	94.6% (Urban)

Additionally, we are pleased to report other current measures for our stormwater assets, outlined in *Table 58*.

Table 56 – Stormwater: Additional Current Levels of Service

Asset Type		**2020**	**2021**
Stormwater	Average Age Stormwater Pipe (years)	28.8	29.2
	Percentage of network with PACP Inspections	N/A*	N/A*
	Average Age of SWM Facilities (years)	18.3	19.3

*Norfolk does not currently have a stormwater CCTV program

Operating costs for our stormwater network are currently not tracked separately. The costs to deliver these current LoS for our stormwater assets are therefor included in other areas, primarily in Transportation for linear stormwater and Recreation for stormwater management facilities.

D.3.2 LoS Maps

Our stormwater assets are comprised of a number of different assets within multiple systems throughout the County, as shown in Appendix F.

D.3.3 Proposed Levels of Service

Proposed LoS are not required for reporting by the Regulation until 2025, we will be proactively developing proposed measures for review and consultation as part of the exercise to develop a LoS framework for all assets across our portfolio.

D.4 Asset Lifecycle Management Strategy

D.4.1 Creation / Acquisition Plan

Master planning documentation supports the County in identifying the objectives around the specific asset services that are necessary to meet the needs and growth of Norfolk. We have developed various master plans and strategic plans over the years, including the Integrated Sustainable Master Plan (ISMP), which includes stormwater collection and SWM assets as a core element. The ISMP is a framework that guides our investment in various services, including stormwater, to support growth and help shape Norfolk County for the future.

Creation and acquisition activities within our municipal boundaries are made in alignment with the objectives, stakeholder input, and long-term strategic plans set forth in the ISMP. Stormwater assets are a critical element in the activities necessary to meet the demands associated with population growth and economic development. The stormwater service area directly affects the property, health and safety of the residents of Norfolk. Documents such as these help the County in developing creation and acquisition plans, as these priorities and plans are taken into consideration.

The most common method of acquiring stormwater assets for Norfolk County is through the assumption of Development assets. These assets are typically funded and built by a developer and then handed over to the County upon completion. We would then be responsible for the assets remaining lifecycle activities as outlined below.

To ensure the County is assuming assets which were installed properly and functioning as intended, the County has detailed design requirements which Developers are required to follow. Before assuming assets, County staff inspect the assets against the requirements and any deficiencies are to be rectified prior to assumption to ensure we get the expected life out of the assets.

The second major contribution to the Creation/Acquisition plan would be the expansion of existing assets. Examples of these projects in stormwater could include the addition of treatment to stormwater outlets or the upsizing of storm mains. These projects would typically be funded entirely or partially through Development Charges.

It is important to look at our past growth via assumptions and DCs to ensure we plan for future growth properly. Due to our budgeting process of combining roadwork and stormwater, DC contributions in the past have been fully assigned to the roadway and are not included here.

More specifically, we are pleased to demonstrate in *Table 59*, the growth our stormwater mains have experienced, where we have added 18,958 meters since 2014

Table 57 – Stormwater Mains Growth by Year

Stormwater Main Growth by Year	
Year	**Stormwater Main (m)**
2014	3,492
2015	4,754
2016	3,696
2017	213
2018	3,237
2019	3,566

D.4.2 Operations and Maintenance Plan

This stage of the asset lifecycle generates significant costs over time; therefore, we have implemented practices that enhance value through cost reduction and investment optimization. A successful operations and maintenance plan will ensure that our assets also meet the level of service commitments and expectations from those in our community.

Condition Assessment and Inspection

Based on standard condition assessment processes, maintenance of stormwater assets begins with routine inspection to identify defects that could result in risks or higher costs in the future. This practice of early identification, through visual inspection and quantitative assessment allows for overall higher LoS and extended asset lifespans, as the outputs from the condition assessments are used in planning.

Asset types each have varying condition assessment and inspection procedures as shown in *Table 60*.

Table 58 – Stormwater: Condition Assessment & Inspection Procedures

Asset Class	Condition Assessment & Inspection Procedure
Collection	Stormwater assets are subject to demands that vary with season and topography and are experiencing trends with more frequent high intensity rainfall events. As a result, assessing the useful life of stormwater infrastructure to address urban flooding is a function of modelled pipe system capacity, development intensification, climate change, grading and major overland flow paths. To assess the condition of our stormwater assets we perform closed-circuit television (CCTV) camera inspections of existing storm mains based on our reconstruction schedule and identified needs. We do not yet have a system wide program for CCTV inspections on stormwater mains. The condition is rated based on the widely accepted pipeline assessment certification program (PACP).

	Replaced or new storm mains and services are also inspected using CCTV and minor culverts are visually inspected. Stormwater operations have a regular program of inspecting manholes and catch basins in addition to an annual program of flood wall testing.
Treatment / Storage	In 2021, the County initiated a program for the inspection and condition assessments of our stormwater management facilities. The program included both inhouse inspections of our smaller dry ponds, and full condition assessments of our larger facilities resulting in recommendations for sedimentation removal. Guidelines for inspection were developed and a regular program of inspection and condition assessment is recommended to be implemented within the next few years.

If a defect is uncovered during inspection, the next step is determining whether the defect will require minor or major maintenance.

Planned Operations and Maintenance

Norfolk County is committed to maintaining our assets in a state of good repair in order to ensure that we deliver on our levels of service for our customers

Typically, in the case of minor maintenance, it is incorporated into planned operations and maintenance programs in order to make repairs based on condition assessments. A work order is created and distributed to Operations staff and/or contractors for repair, followed by an inspection to ensure completeness and payment once complete.

Currently, there are a number of planned operations and maintenance activities that are performed on the County's stormwater assets. If the inspection reveals that major maintenance is required, the County typically implements a rehabilitation and renewal plan.

Table 59 – Stormwater: Planned Operations & Maintenance Activities

Asset Class	Activity	Performed By / Frequency
Stormwater Collection	CCTV Inspections	Contracted Out
	Inspection of Access Issues	County Staff
	Manhole Investigations	County Staff
	Frame and Lid Replacements	Contracted Out/County Staff
	Catch Basin Cleaning	Contracted Out
	Culvert Inspections	County Staff
	Culvert Replacements	County Staff
Stormwater Treatment / Storage	Grate Inspections	County Staff
	Vegetation Inspections	County Staff
	Vegetation Replanting	County Staff
	SWM Pond Inspections	Contracted Out/County Staff
	Oil/Grit Separator Inspection	Contracted Out
	Oil/Grit Separator Cleanout	Contracted Out/County Staff
	SWM Pond Sediment Depth Inspection	Contracted Out
	Signage Inspection	County Staff

	Access Inspection/Maintenance	County Staff
	Vegetation Management	County Staff

Unplanned Operations and Maintenance

Our major maintenance needs are identified through a number of sources, namely activities prescribed through the maintenance of assets. However, unexpected situations may occur which can result in unplanned maintenance activities. If major maintenance costs are significant, a more thorough review process becomes necessary and often involves consultation with various internal functions, such as our Asset Management, Finance, as well as our Engineering and Operations service areas to decide if the repair meets the capital budget criteria. Generally, this service area relies on outside contractors for investigation and suggested repairs when the scope of the maintenance is not easily determined.

Despite the fact that minor maintenance is incorporated into planned operations and maintenance programs, there are cases where it is unplanned. *Table 62* outlines some of the common unplanned maintenance activities that occur in the County and who typically performs them.

Table 60 – Stormwater: Unplanned Operations & Maintenance Activities

Asset Class	Activity	Performed By
Stormwater Collection	Storm Main Repairs	County Staff
	Service Break Repairs	County Staff
	Removal of Catch Basin and Pipe Blockages	County Staff
	Manhole repairs and Adjustments	Contracted Out
SWM Facilities	SWM Facility Maintenance/Repairs on a Complaint Basis	County Staff
	Removal of Blockages	County Staff
	Investigate Effluent Quality Issues	County Staff

D.4.3 Rehabilitation and Renewal Plan

We employ an asset renewal process, using supporting software and consultation among multiple internal functions. The supporting software works as a decision support tool which allows us to utilize our asset State of Infrastructure data and operations and capital budget information in order to target efficient rehabilitation and renewal of our stormwater assets.

The rehabilitation and renewal plan begins with a needs assessment on an annual basis, followed by a review of the operational impacts of potential investments. If the need for rehabilitation or renewal is significant enough, the item moves to a more detailed level of scope including budget definition, financial forecasting, and finally Council approval. In some cases, for various assets which will affect a significant

number of people, public consultation is necessary to make sure that our decisions align with the expectations and needs of the people we serve.

Most renewal projects require construction and project management, particularly as the projects increase in scale. Following the renewal, commissioning and inspection activities are performed to ensure that our personnel have the understanding of the materials and processes recommended to maintain the asset at a cost-effective, and optimal level.

Collection

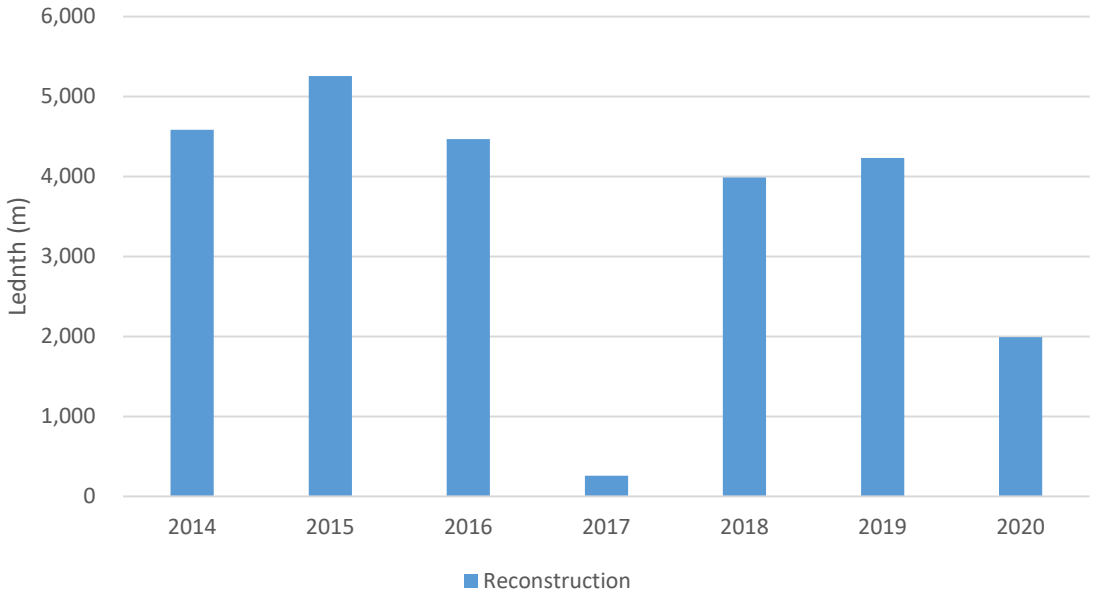
The rehabilitation and renewal process for our stormwater collection assets is fully integrated with the renewal needs of our roads and other underground infrastructure such as drinking water and wastewater. This integrated approach ensures our renewal projects for these service areas are delivered with optimal timing to increase value and minimize disruption to our communities. For example, if a road is targeted for renewal, coordination between service areas will determine whether the underlying stormwater, drinking water or wastewater infrastructure is also of an age or condition that requires renewal to ensure these projects are delivered together to reduce disruption for our communities and deliver enhanced value.

Norfolk County is committed to the rehabilitation and renewal of our stormwater assets. Below we have outlined the priorities for our assets:

- Replacement of pipes which need increased capacity as identified in the ISMP
- Upgrades to urban drainage systems that are subject to frequent but isolated flooding issues
- Rehabilitation of stormwater management facilities to remove sedimentation

To demonstrate this ongoing commitment to our stormwater network*, Figure 38* presents that during 2014 – 2020, we have constructed/reconstructed 24,785 metres of storm main.

Figure 38 – Stormwater: System Renewal Summary



Renewal activities are determined based on the risk level of the storm mains and accompanying infrastructure which determines whether the need is isolated or requires a complete reconstruction of the roadway. The Risk of an asset is a combination of the Probability of Failure and the Consequence of Failure and is identified in Figure 39. Risk rankings range from Very Low to Very High and incorporate the assets age, material, size and ISMP recommendations.

Risk Matrix		Consequence of Failure (CoF)				
		Very Low	Low	Moderate	High	Very High
Probability of Failure (PoF)	Almost Certain	High	High	Very High	Very High	Very High
	Highly Likely	Moderate	Moderate	High	High	Very High
	Likely	Low	Low	Moderate	High	High
	Unlikely	Very Low	Low	Low	Moderate	Moderate
	Highly Unlikely	Very Low	Very Low	Very Low	Low	Low

Figure 39 - Risk Matrix

Probability of Failure: Based on the condition and/or performance of the asset. For condition, we are utilizing estimated useful lives based on the materials of the storm main. PCAP ratings based on CCTV could also be used to measure condition, although we do not currently have a program to collect this information on our stormwater network. For performance, we are measuring the ability of the asset to provide established service levels, which in stormwater primarily corresponds to undersized pipes and ISMP recommendations.

Consequence of Failure: Based on the size of the stormwater main. It is assumed that larger mains are designed to carry more stormwater, and therefor would affect more upstream infrastructure in the case of a failure. In future iterations it is anticipated this will be further refined as more data becomes available, such as catchment areas, flood prone areas, etc.

Treatment/Storage

The rehabilitation and renewal process for our stormwater treatment/storage assets are based on estimated cleanout frequencies, measured sedimentation levels through internal/external inspections and facility design criteria.

Each stormwater facility has a sedimentation criterion based on its design. These sedimentation levels dictate when cleanouts are required. As sedimentation levels are measured, renewals and rehabilitations are planned based on the identified cleanout requirements and reviewed internally by staff before being recommended.

The cleanout frequencies on these facilities vary greatly based on sizing, facility type (wetland, wet pond, etc.), the inclusion of a forebay and the sediment loading levels in the area. We therefore rely on needs recommendations through inspections as opposed to standard useful lives.

To demonstrate our commitment to our stormwater facilities, during the 2013 – 2020 period, we have cleaned out 3 of our treatment facilities.

D.4.4 Disposal Plan

In some cases, disposing of an asset is more appropriate than replacing or renewing it. Given the growth of our population and the steadily increasing movement of people and goods, disposal is not a common activity for our stormwater assets.

In some cases, we may close or decommission our stormwater assets for use, by limiting the maintenance performed. When an asset is closed and deemed a risk, our Engineering and Operations service areas will coordinate with contractors to ensure the safe removal of the asset. In very few instances are their dedicated projects specific for the disposal of a stormwater asset.

D.5 Financial Strategy

D.5.1 Asset Investment Needs

Our investment needs are identified through a range of mandated and industry planning processes, supported by detailed analysis to ensure we identify our needs for investment. This allows us to maintain service delivery, meet future demand growth and achieve our strategic objectives. The needs identified through these various planning processes are then prioritized through a capital project prioritization process, which evaluates projects using various criteria to determine the most important needs and initiatives to be funded.

The following sections describes our capital investment needs to maintain existing infrastructure and associated service delivery, along with the requirements for additional infrastructure to meet the growing needs and demands of our communities.

Capital Renewal

Norfolk has undertaken a comprehensive analysis to determine the capital needs of its stormwater assets to deliver the services expected by its communities and stakeholders. We have adopted an industry standard approach to the identification of capital renewal needs for our core asset areas, featuring an integrated risk-based analysis supported by a decision support system.

The 10 year needs of our stormwater collection assets have been determined utilizing the corresponding risk ratings of the storm main sections. The needs identified below are based on completing all Very High and High Risk sections within the 10-year window.

The 10 Year needs of our stormwater treatment/storage facilities have been determined based on their lifecycles, facility inspections completed in 2021 and reviewed internally by staff.

Growth Needs

In addition to targeting and prioritizing the investment needed to maintain existing assets, there are also planning processes in place to determine the additional assets needed to meet growing demand for service through population increases or demand for new services. The projects targeted to meet growth come from various plans such as the Integrated Sustainable Master Plan (ISMP) and Development Charge Study. These growth-related projects are primarily funded through Development Charges – the mechanism that enables recovery of growth-related capital expenditures from new development, or other municipal financing sources. The process for creation and acquisition of assets for growth is described in the Creation/Acquisition section of the Asset Lifecycle Management Strategy.

Additional growth-related assets will be acquired by Norfolk County through contributions from Development. Although the County does not pay for the construction or these assets, once they are assumed we will be responsible for the remaining

lifecycle activities, including O&M, rehabilitations, and eventual replacements. Therefore it is important to understand the assets we foresee the County taking on in the future.

D.5.2 Funding Strategies

To support the stormwater assets that provide services within the County, we require sufficient funding in order to maintain the assets in a state of good repair, as well as to create new assets to support future growth. This model considers the currently available funding sources for stormwater assets in order to deliver our current investment plan effectively. Additionally, we continually assess opportunities for additional funding options and revenue streams to address our funding gaps. The following are options that have been used by other municipalities towards addressing their infrastructure gaps and we continue to review for implementation here in Norfolk County.

D.6 Stakeholder Engagement

D.6.1 Users of the Service

Our valued communities are the primary users of our stormwater network along with transient users who are visiting or travelling throughout our area. This network is also vital for protecting the environment and communities of Norfolk, as well as those that may share environmental facilities or watersheds within the County. This requires coordination within County through constant engagement and collaborative planning.

We provide a range of engagement points for our users, including online (both through the website and social media), by email, phone, or letter. In addition to these traditional channels of engagement, the development of the ISMP & Norfolk County Strategic Priorities 2022-2026 included a significant consultation exercise featuring a range of opportunities to consult with stakeholders directly on the subject of stormwater in the County.

D.6.2 Service Delivery Partners

We rely on partnerships to aid the delivery of service and improvements to our assets and to implement appropriate controls and processes to ensure the impact of our work on stakeholders and delivery partners is communicated to avoid risks and adverse impacts.

Within stormwater, it is particularly important that we work with our external contractors in the delivery of our renewal programs, as well as with utility providers to minimize disruption and coordinate efforts for maximizing efficiency. We maintain close relationships with both our internal and external partners and maintain processes to engage with each of our service delivery partners as required.

D.6.3 Public and Private Infrastructure Owning Bodies

Norfolk County does not currently share any of its stormwater assets with other municipal bodies. If this changes in the future, related assets will be managed through an agreement stipulating the requirements of each municipality.

Some stormwater assets are required to follow the Environmental Standards. Norfolk County will continue to work with the Province and Conservation Authorities on ensuring we are meeting these requirements.

Appendix E: Asset Summary

Service Area	Asset Class	Asset Type
Transportation	Active Transportation	*Sidewalks*
		Trails
		Pedestrian Bridges
		Walkways
		Bicycle Lanes
		Street Furniture
	Roads	Roads and Laneways
		Streetlights
		Guiderails
		Retaining Walls
		Traffic Signals
		Crossings
	Structures	Bridges
		Major Culverts
Drinking Water	Distribution	Local Mains
		Transmission Mains
		Services
		Hydrants
	Treatment	Water Treatment Plants
		Wells
		Reservoirs/Booster Station
		Water Towers/Standpipes
		Water Facilities
Wastewater	Collection	Sanitary Mains
		Sewage Pumping Stations
		Forcemains
	Treatment	Wastewater Treatment Plants
Stormwater	Collection	Stormwater Mains
		Catch Basins and Manholes
		Municipal Drains
	Treatment/Storage	SWM Ponds
		Oil/Grit Separators
		Municipal Drains

Appendix F: Asset Maps

The County has competed various Level of Service maps which were referenced in the Asset Specific Appendices (A-D). They are displayed on the following pages as follows:

Appendix A: Transportation

- Norfolk County Road Network

Appendix B: Drinking Water

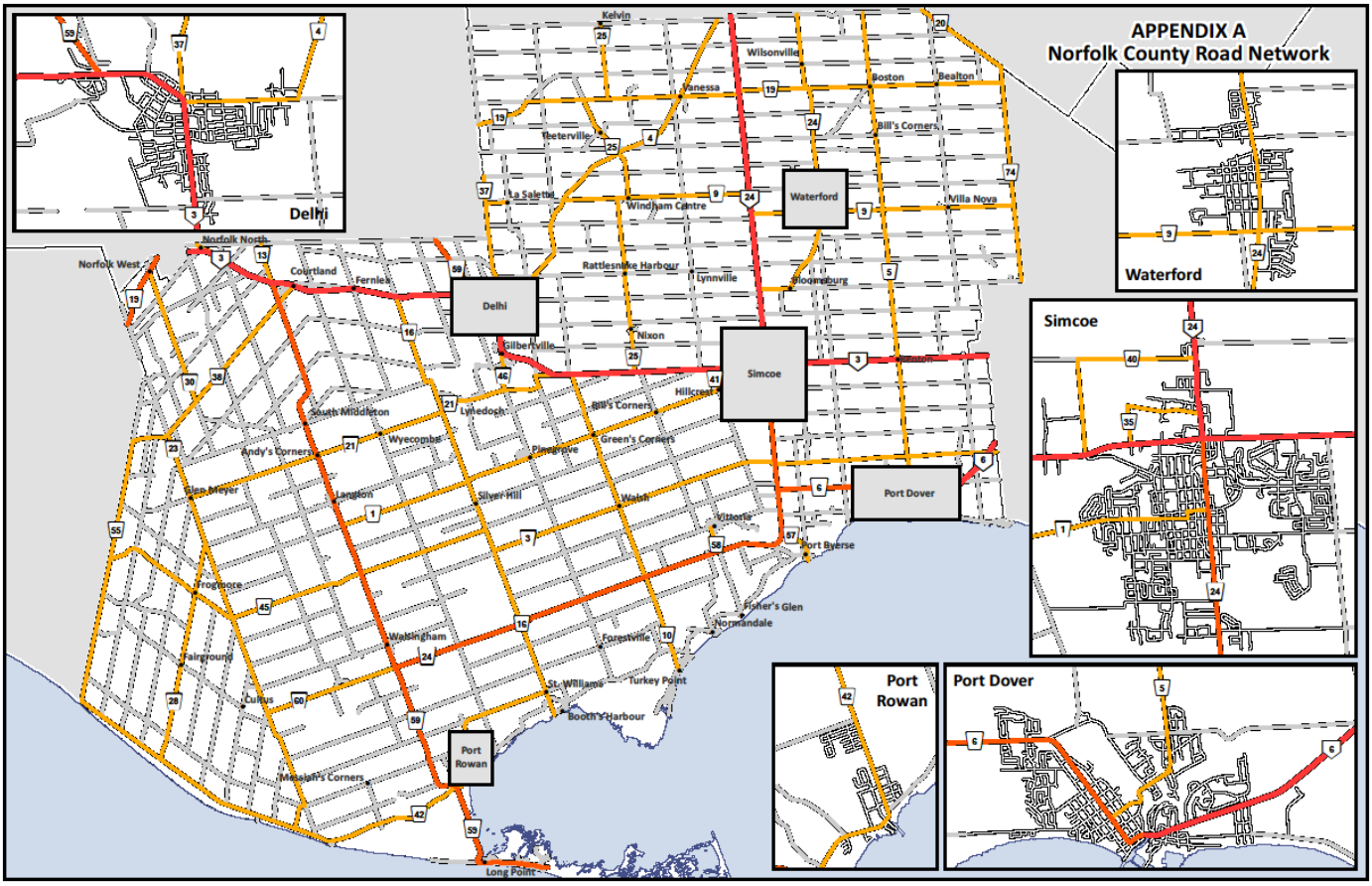
- Courtland Water Distribution System
- Delhi Water Distribution System
- Port Dover Water Distribution System
- Port Rowan / St. William Water Distribution System
- Simcoe Water Distribution System
- Waterford Water Distribution System

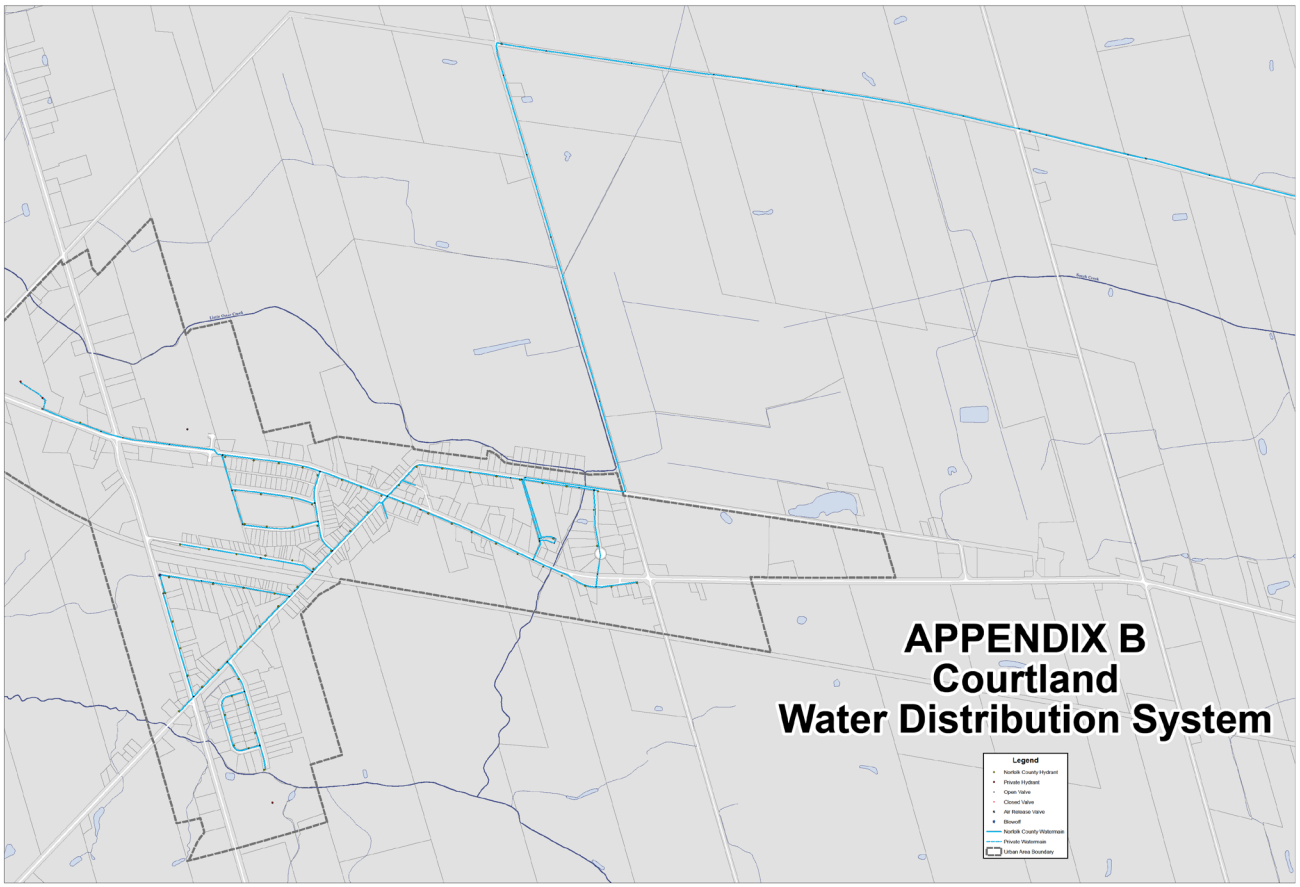
Appendix C: Wastewater

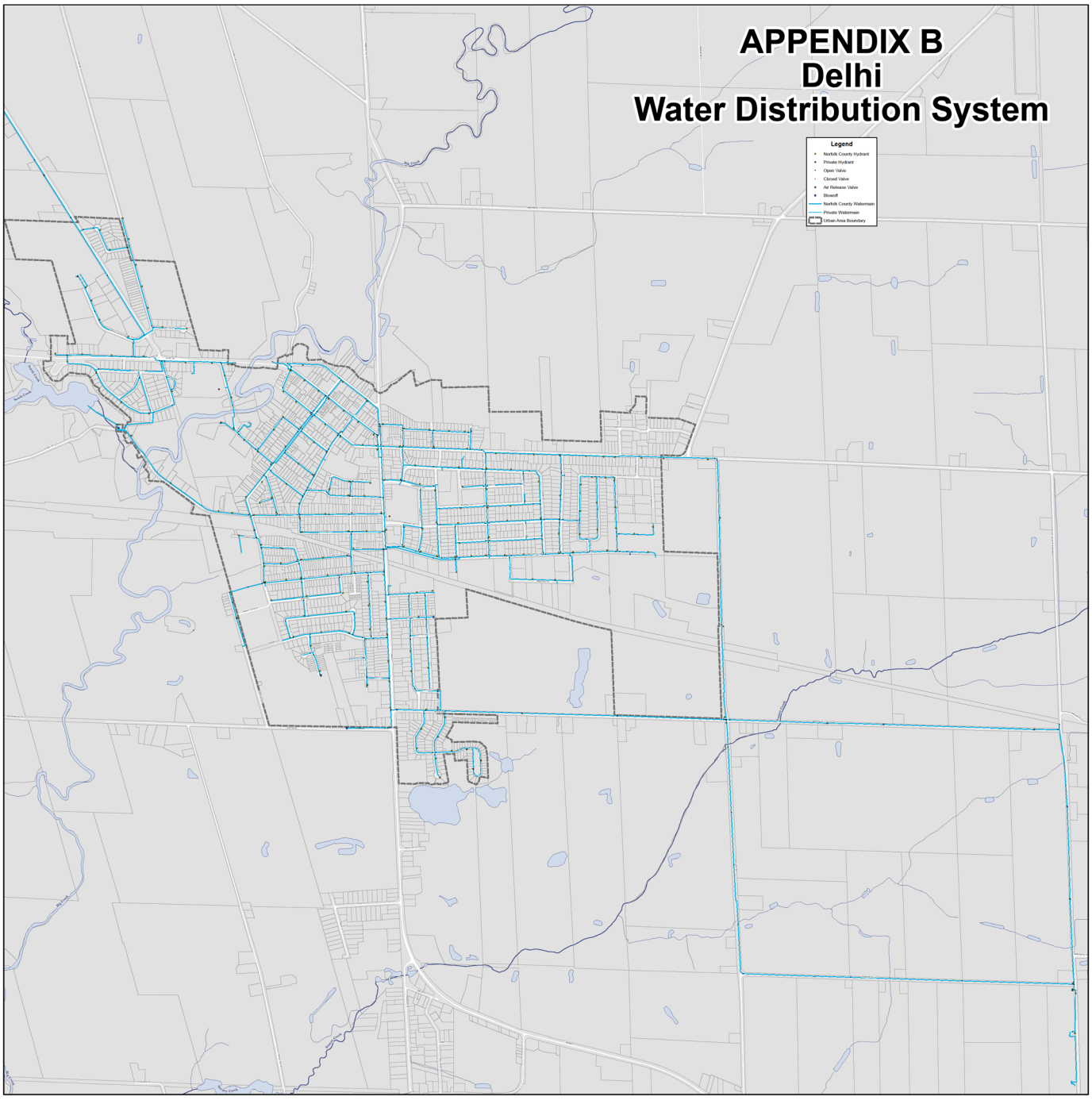
- Delhi Sanitary Sewer System
- Port Dover Sanitary Sewer System
- Port Rowan Sanitary Sewer System
- Simcoe Sanitary Sewer System
- Waterford Sanitary Sewer System

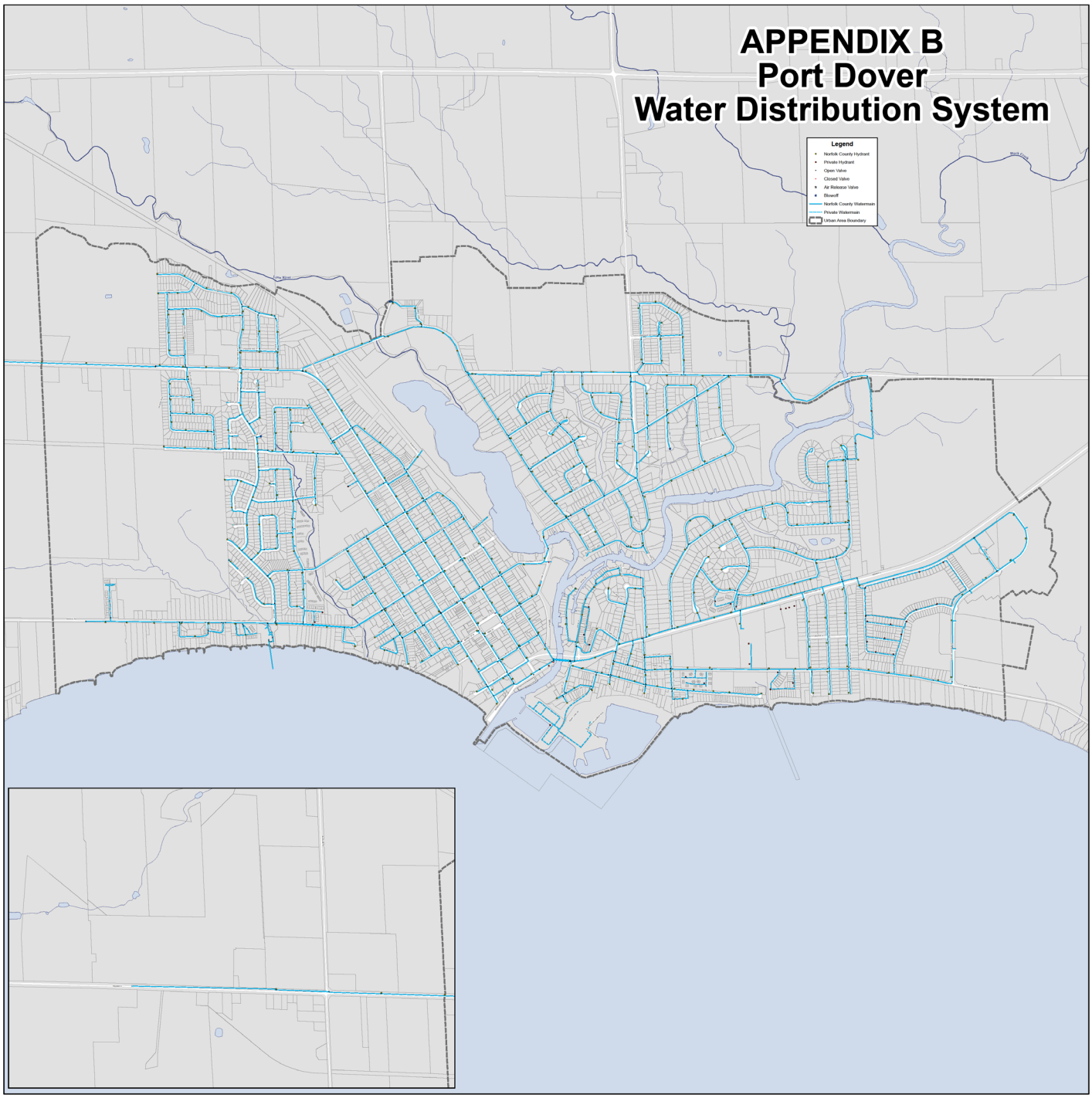
Appendix D: Stormwater

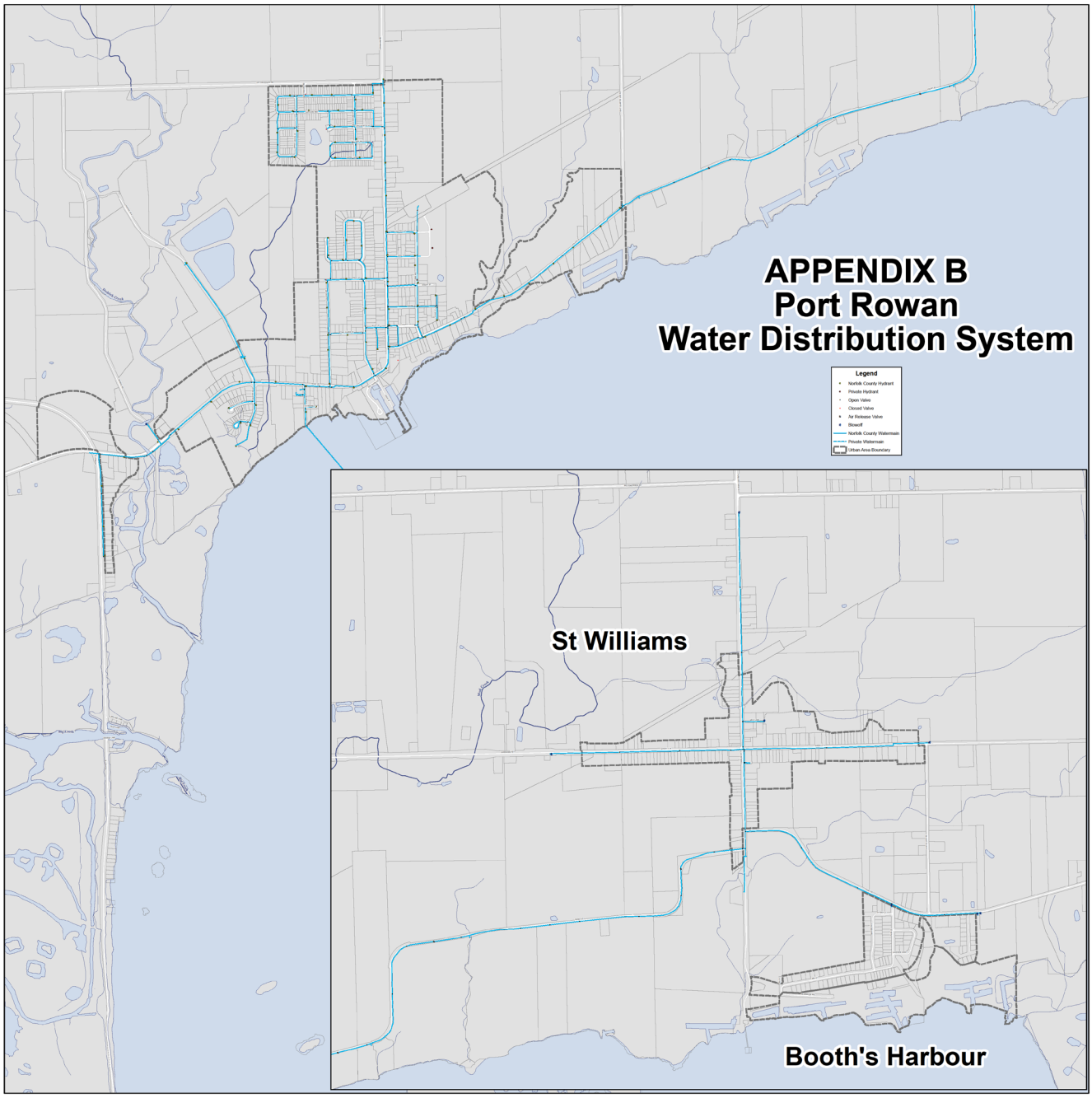
- Delhi Storm Sewer System
- Port Dover Storm Sewer System
- Port Rowan Storm Sewer System
- Simcoe Storm Sewer System
- Waterford Storm Sewer System

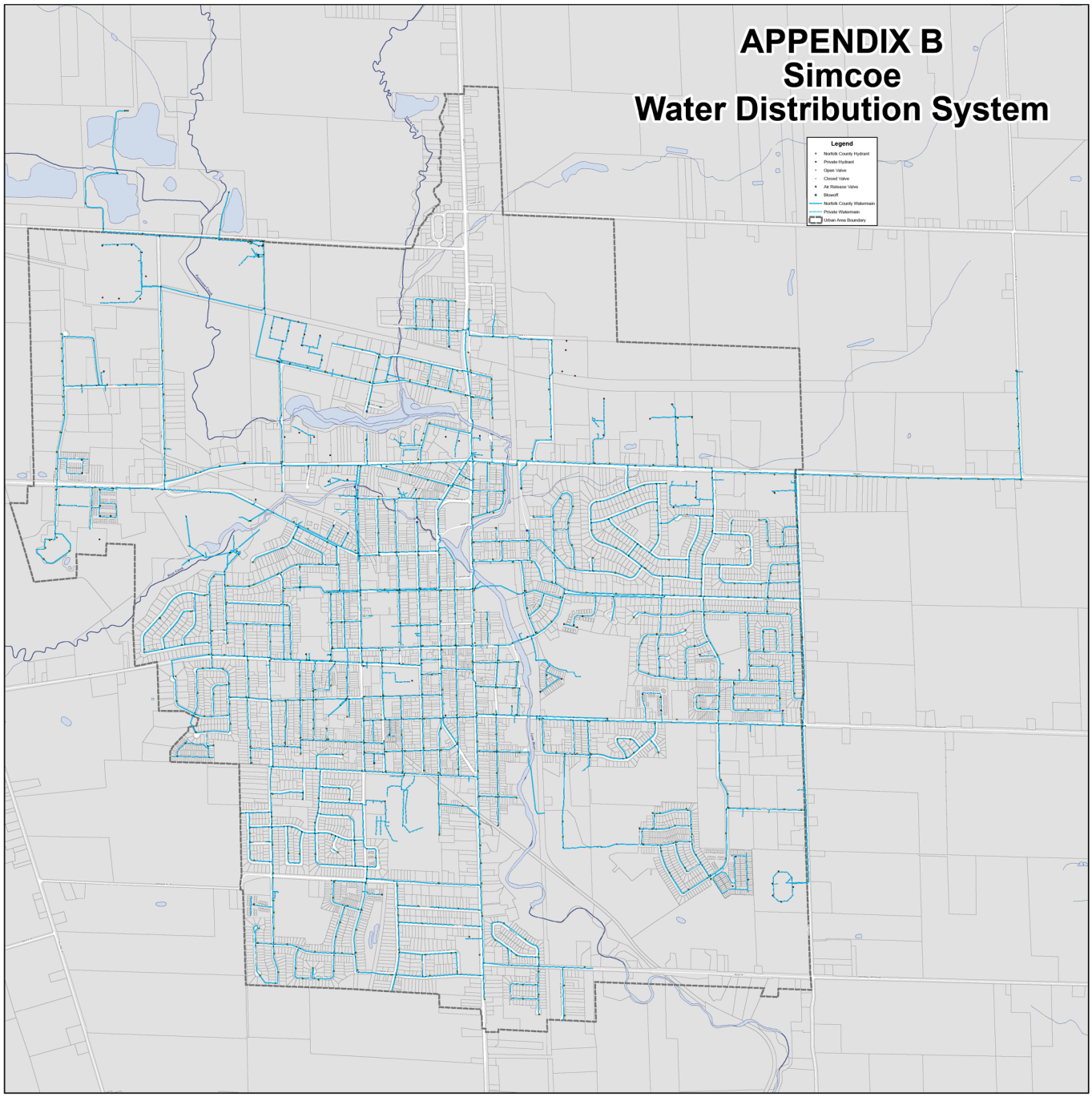

APPENDIX A
Norfolk County Road Network
Delhi
Waterford
Simcoe
Port Dover
Port Rowan
Kelvin
Wilsonville
Vanessa
Boston
Bealton
Bill's Corners
Teeterville
La Salette
Windham Centre
Villa Nova
Norfolk North
Norfolk West
Courtland
Fernlea
Rattlesnake Harbour
Lynnville
Bloomsburg
Nixon
Gilbertville
Hillcrest
South Middleton
Lynedoch
Wyecombe
Green's Corners
Andy's Corners
Glen Meyer
Langton
Silver Hill
Waleh
Victoria
Port Byerse
Frogmore
Fisher's Glen
Normandale
Forestville
Walsingham
Fairground
St. Williams
Turkey Point
Booth's Harbour
Culloa
Messiah's Corners
Long Point

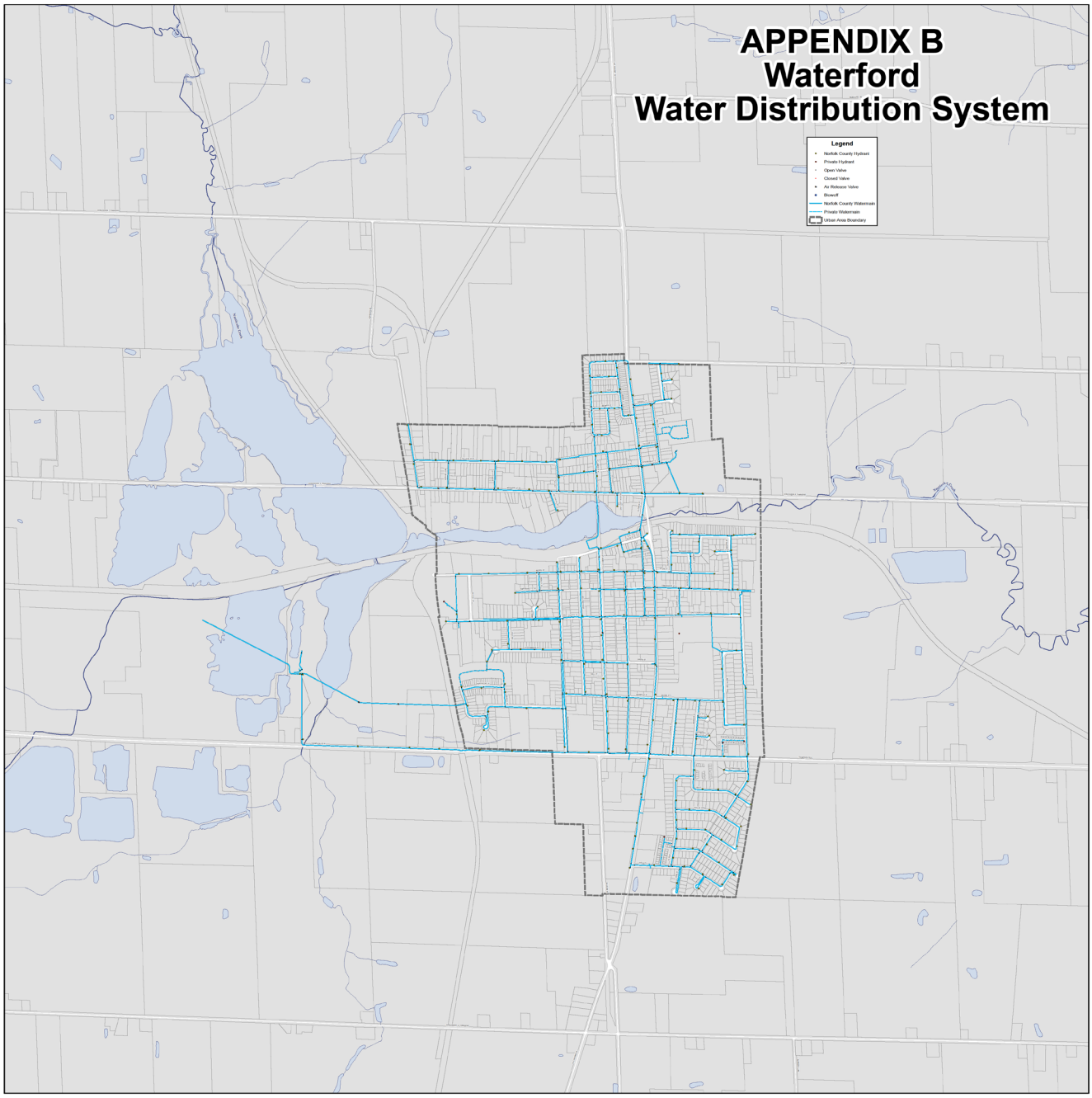

APPENDIX B
Courtland
Water Distribution System
Legend
Norfolk County Hydrant
Private Hydrant
Open Valve
Closed Valve
Air Release Valve
Blowoff
Norfolk County Watermain
Private Watermain
Urban Area Boundary

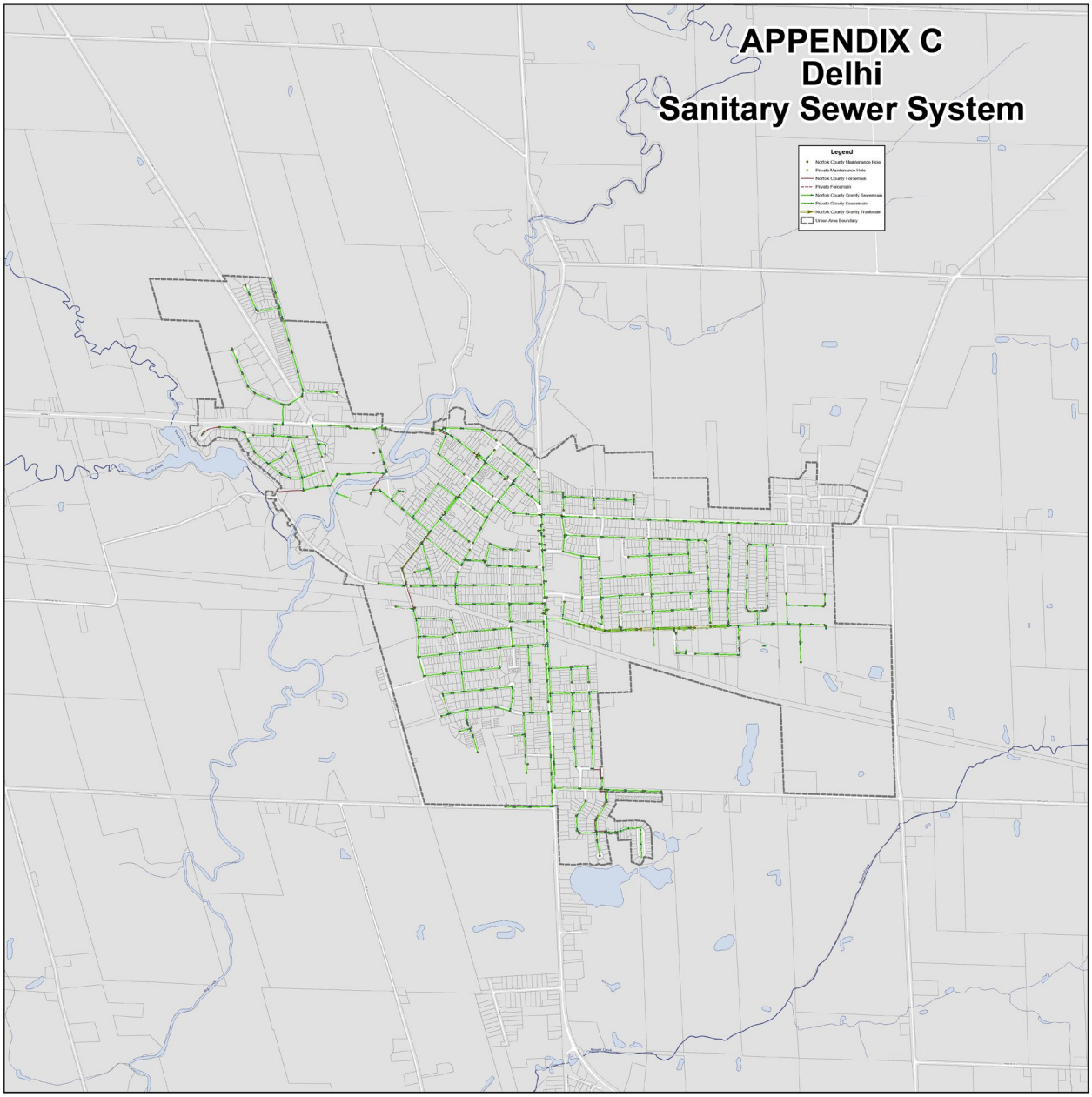

APPENDIX B
Delhi
Water Distribution System
Legend
Norfolk County Hydrant
Private Hydrant
Open Valve
Closed Valve
Air Release Valve
Blowoff
Norfolk County Watermain
Private Watermain
Urban Area Boundary

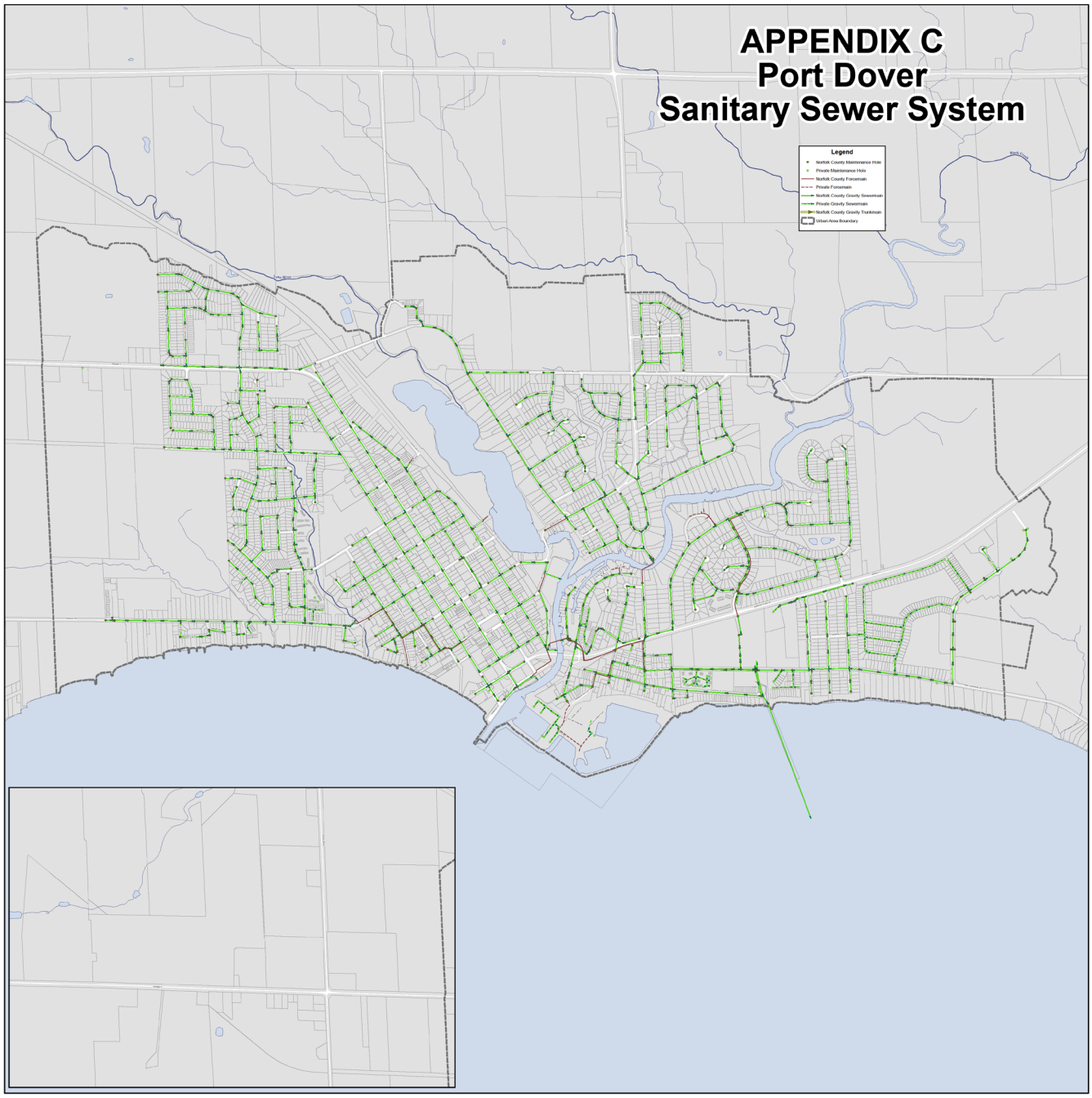

APPENDIX B
Port Dover
Water Distribution System
Legend
Norfolk County Hydrant
Private Hydrant
Open Valve
Closed Valve
Air Release Valve
Blowoff
Norfolk County Watermain
Private Watermain
Urban Area Boundary

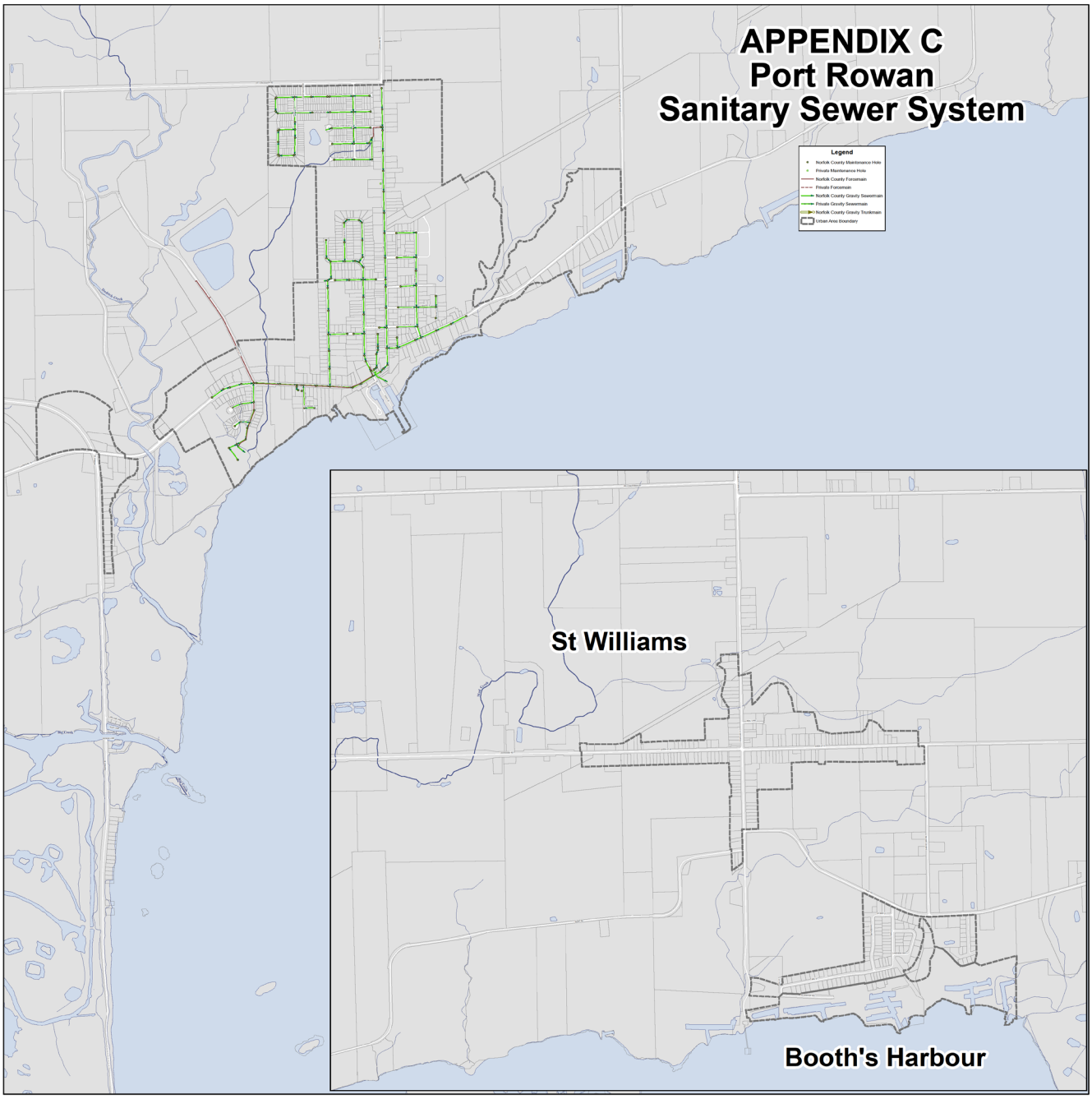

APPENDIX B
Port Rowan
Water Distribution System
Legend
Norfolk County Hydrant
Private Hydrant
Open Valve
Closed Valve
Air Release Valve
Blowoff
Norfolk County Watermain
Private Watermain
Urban Area Boundary
St Williams
Booth's Harbour

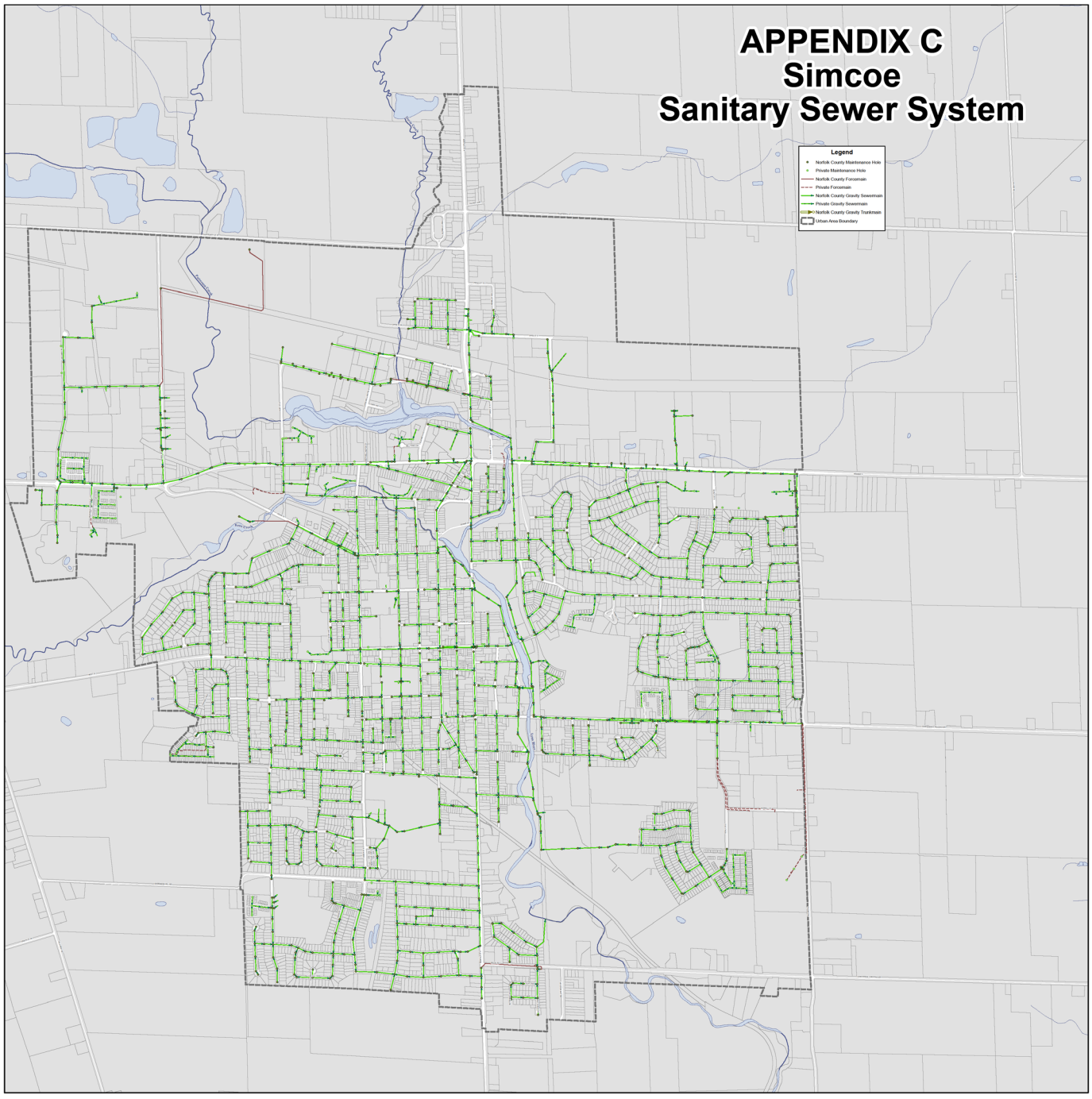

APPENDIX B
Simcoe
Water Distribution System
Legend
Norfolk County Hydrant
Private Hydrant
Open Valve
Closed Valve
Air Release Valve
Blowoff
Norfolk County Watermain
Private Watermain
Urban Area Boundary

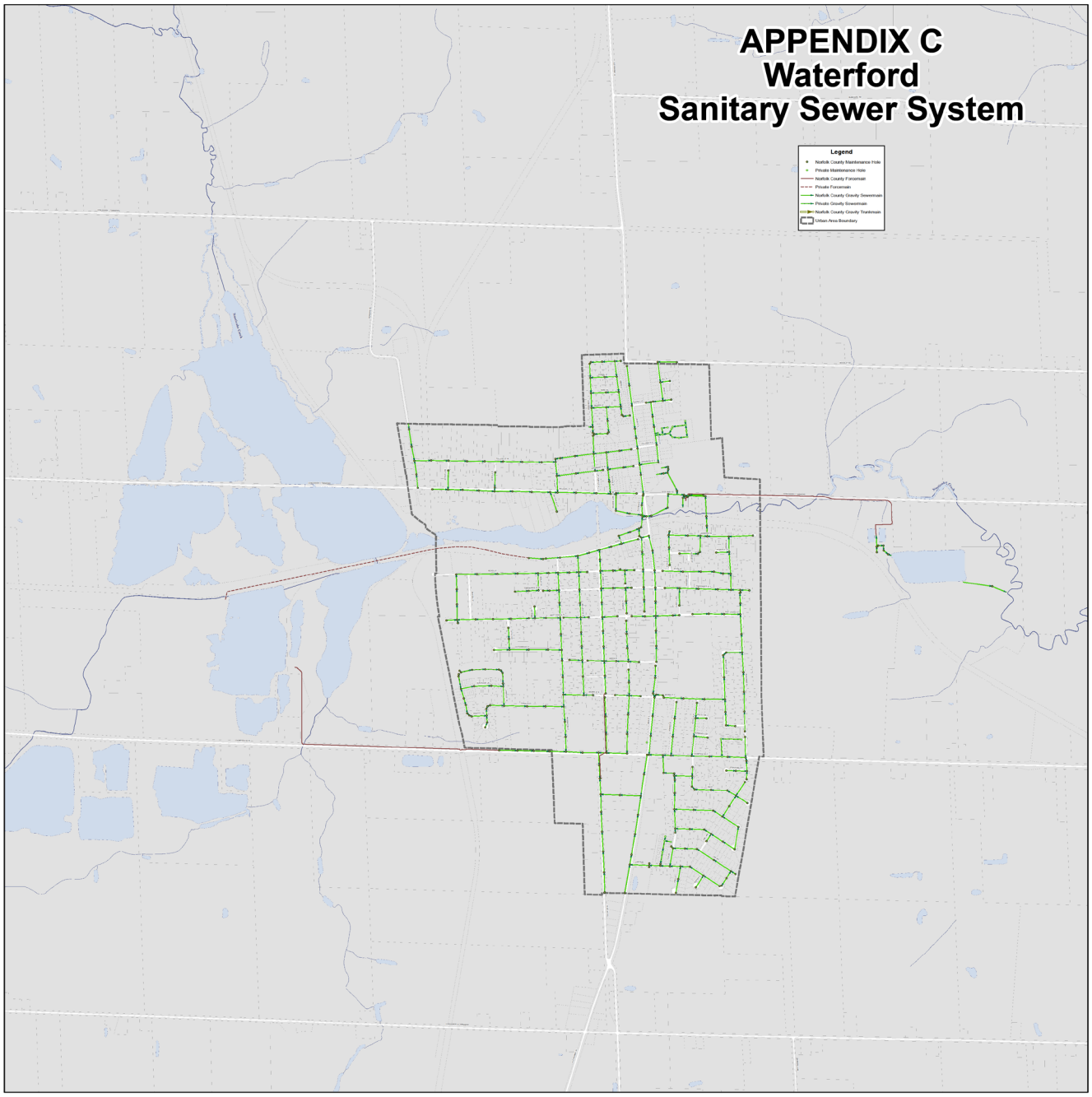

APPENDIX B
Waterford
Water Distribution System
Legend
Norfolk County Hydrant
Private Hydrant
Open Valve
Closed Valve
Air Release Valve
Blowoff
Norfolk County Watermain
Private Watermain
Urban Area Boundary

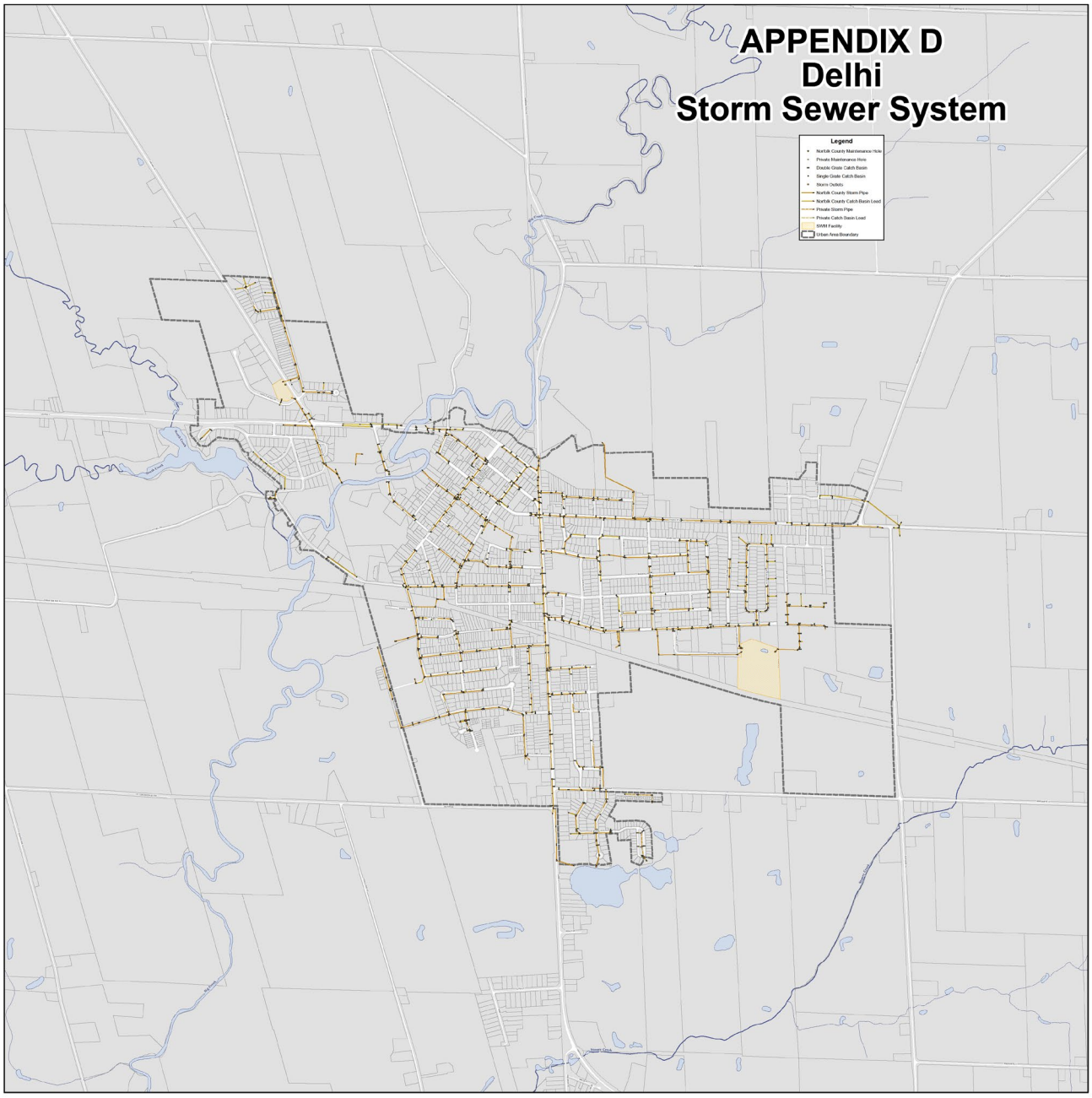

APPENDIX C
Delhi
Sanitary Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Norfolk County Forcemain
Private Forcemain
Norfolk County Gravity Sewermain
Private Gravity Sewermain
Norfolk County Gravity Trunkmain
Urban Area Boundary

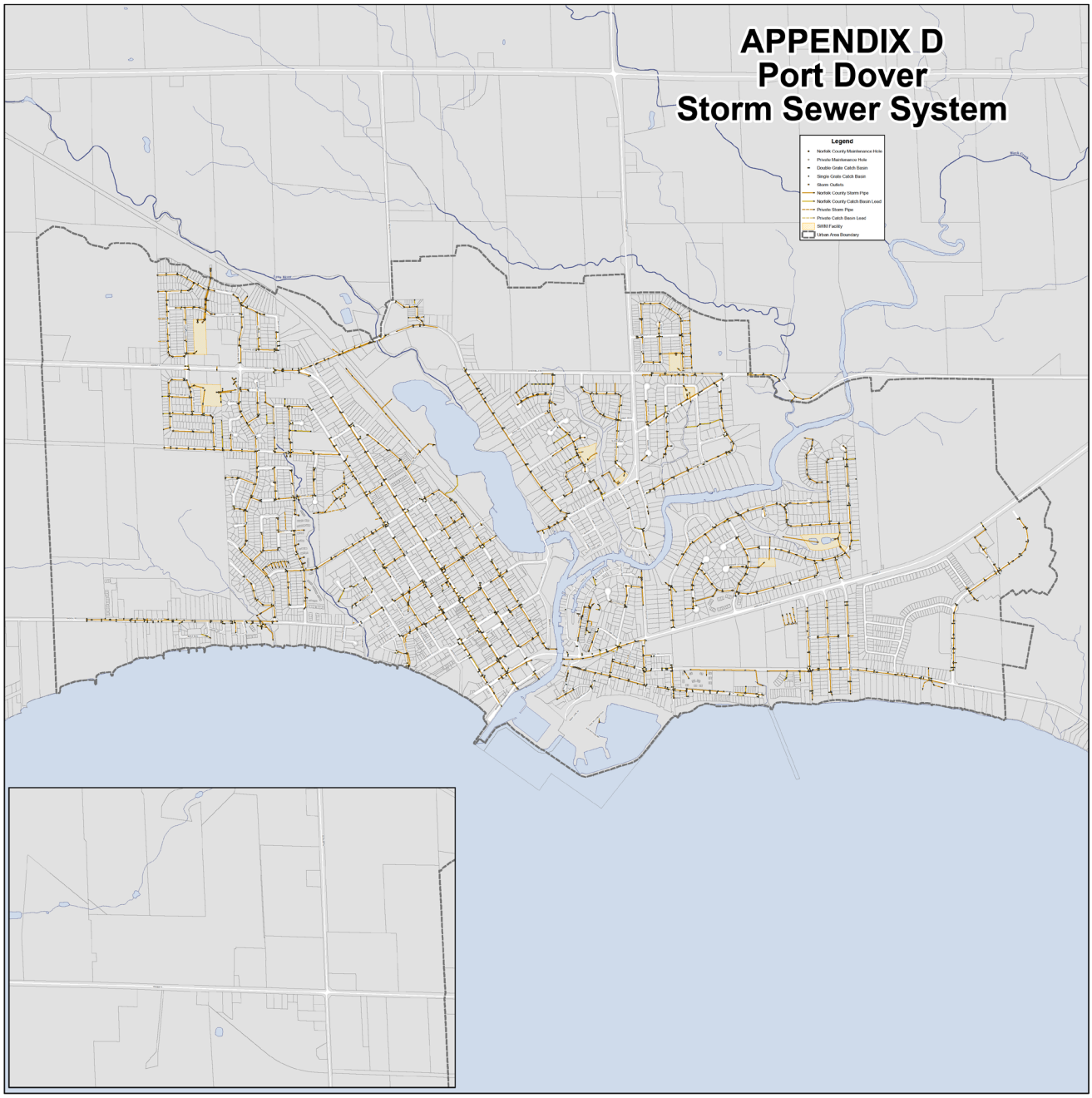

APPENDIX C
Port Dover
Sanitary Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Norfolk County Forcemain
Private Forcemain
Norfolk County Gravity Sewermain
Private Gravity Sewermain
Norfolk County Gravity Trunkmain
Urban Area Boundary

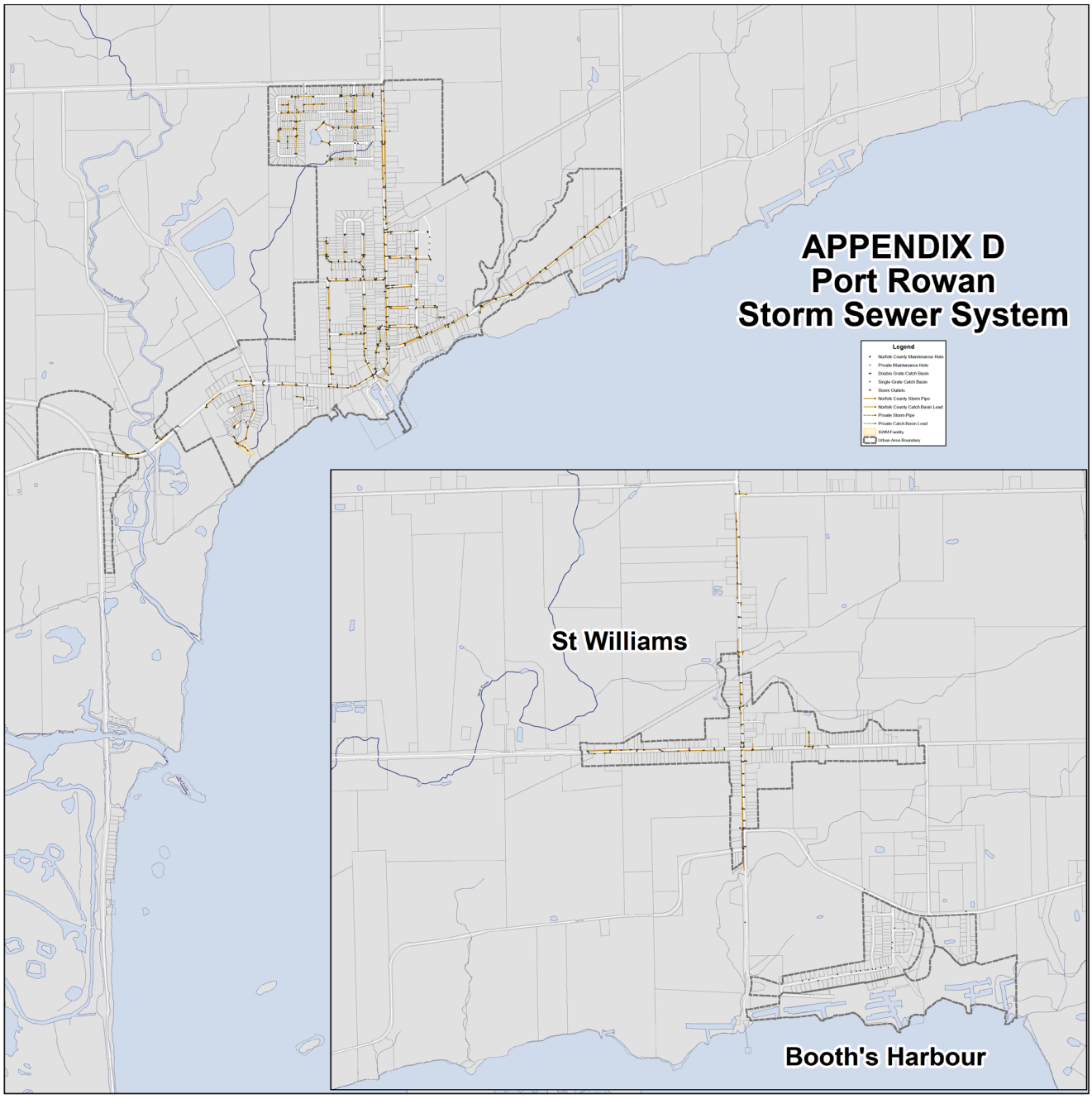

APPENDIX C
Port Rowan
Sanitary Sewer System
Legend
St Williams
Booth's Harbour

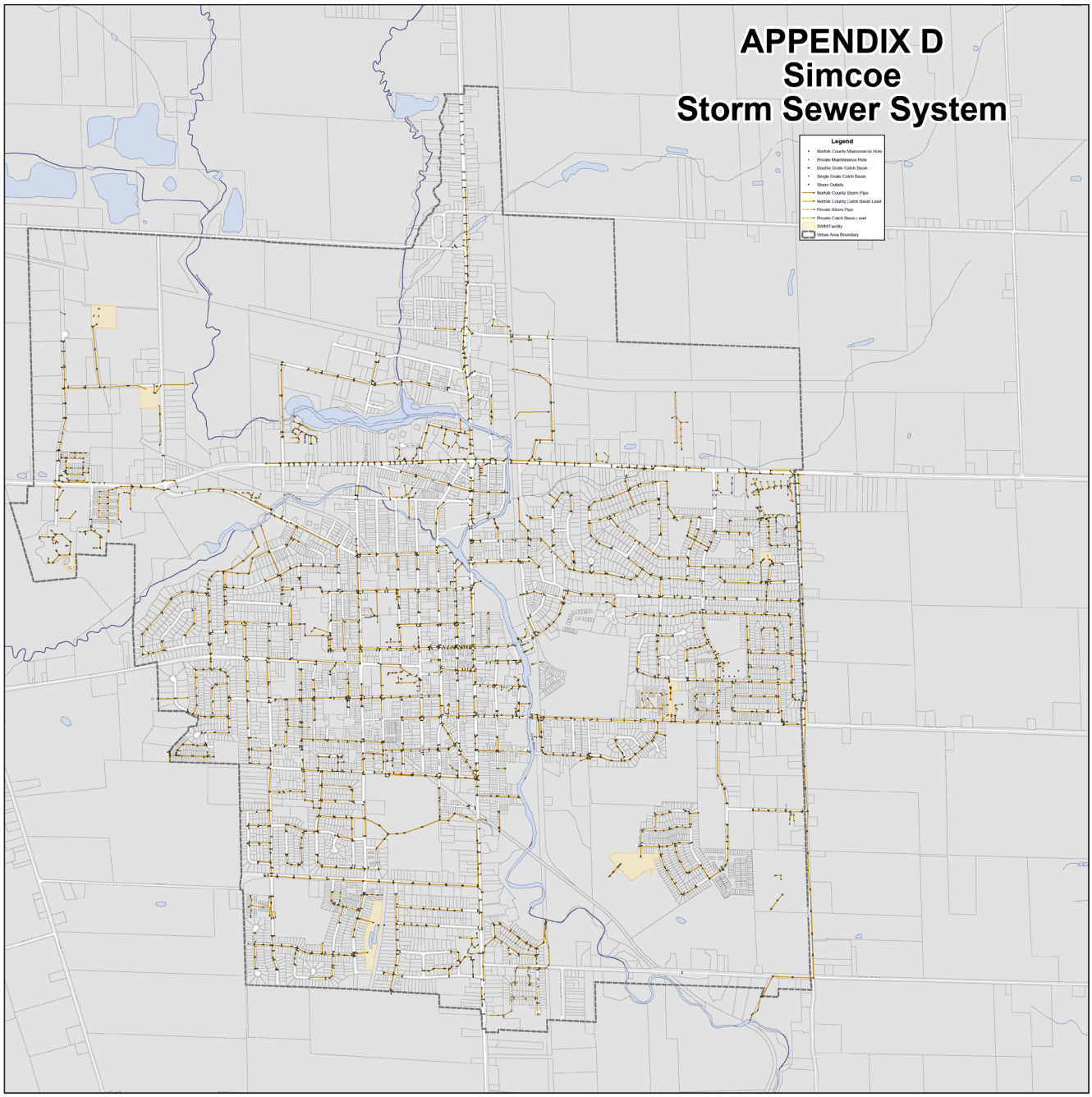

APPENDIX C
Simcoe
Sanitary Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Norfolk County Forcemain
Private Forcemain
Norfolk County Gravity Sewermain
Private Gravity Sewermain
Norfolk County Gravity Trunkmain
Urban Area Boundary

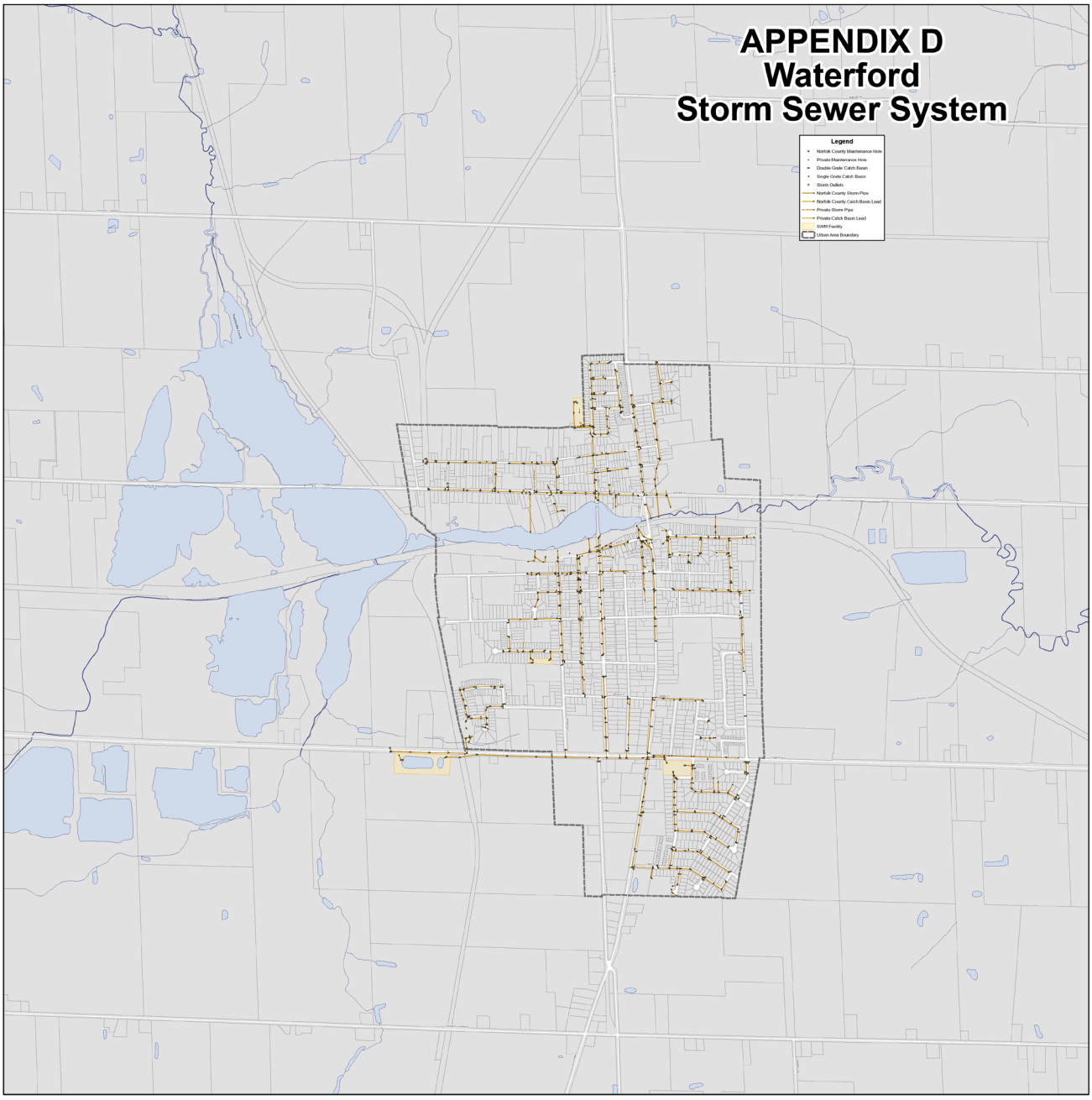

APPENDIX C
Waterford
Sanitary Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Norfolk County Forcemain
Private Forcemain
Norfolk County Gravity Sewermain
Private Gravity Sewermain
Norfolk County Gravity Trunkmain
Urban Area Boundary


APPENDIX D
Delhi
Storm Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Ductile Grate Catch Basin
Single Grate Catch Basin
Storm Outlets
Norfolk County Storm Pipe
Norfolk County Catch Basin Lead
Private Storm Pipe
Private Catch Basin Lead
SWM Facility
Urban Area Boundary


APPENDIX D
Port Dover
Storm Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Double Grate Catch Basin
Single Grate Catch Basin
Storm Outlets
Norfolk County Storm Pipe
Norfolk County Catch Basin Lead
Private Storm Pipe
Private Catch Basin Lead
SWM Facility
Urban Area Boundary


APPENDIX D
Port Rowan
Storm Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Double Grate Catch Basin
Single Grate Catch Basin
Storm Outlets
Norfolk County Storm Pipe
Norfolk County Catch Basin Lead
Private Storm Pipe
Private Catch Basin Lead
SWM Facility
Urban Area Boundary
St Williams
Booth's Harbour


APPENDIX D
Simcoe
Storm Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Double Grate Catch Basin
Single Grate Catch Basin
Storm Outlets
Norfolk County Storm Pipe
Norfolk County Catch Basin Lead
Private Storm Pipe
Private Catch Basin Lead
SWM Facility
Urban Area Boundary


APPENDIX D
Waterford
Storm Sewer System
Legend
Norfolk County Maintenance Hole
Private Maintenance Hole
Double Grate Catch Basin
Single Grate Catch Basin
Storm Outlets
Norfolk County Storm Pipe
Norfolk County Catch Basin Lead
Private Storm Pipe
Private Catch Basin Lead
SWM Facility
Urban Area Boundary

Appendix G: Structures Condition

The County has outlined different levels of structure condition ranging from Very Poor to Very Good based on the Bridge Condition Index (BCI) from our 2020 OSIM Inspections.

BCI values are used for planning purposes for repair work and do not represent the relative safety of the bridge. In general, for a bridge with a BCI value:

- Greater than 70 - Repair work is not usually required within the next five years.
- Between 60 and 70 - Repair work is usually scheduled within the next five years.
- Less than 60 - Repair work is usually scheduled within the next year.

Other factors are also considered in the prioritization of our structure rehabilitation recommendations including:

- state of deterioration and estimated length of prolonged useful lifespan.
- need for rehabilitation given the length of detour or alternate access.
- cost vs. benefit consideration with respect to possible future replacement.

The following are example structures in each of the condition categories to better demonstrate what the BCI value represents.

Very Good (BCI > 85)
Structure in new or like new condition.

Sample Structure: 010057 – Townline Bridge, BCI – 94

Good (BCI 70-85)
Structures showing minor deteriorations.

Sample Structure: 980101 – Hambleton Bridge, BCI – 75

Narrow map cracking

Fair (BCI 60-70)

Structures showing deterioration. Candidate for minor rehabilitation.

Sample Structure: D00019 – Lehman Bridge, BCI – 65

Narrow cracks and drainage blockages

Poor (BCI 45-60)

Structure showing extensive deterioration. Candidate for Major Rehabilitation or renewal.

Sample Structure: 982402 - Bloomsburg Bridge, BCI – 53

Spalling and deterioration at cold joint

Very Poor (BCI < 45)

Structure with severe deterioration. Candidate for closure, major rehabilitation or renewal.

Sample Structure: D00006 - Lot 11 Concession 3 Rd, BCI – 41

Sever corrosion

Appendix H: Roads Condition

The County has a Road Needs Study completed every 5 years, with the last being completed in 2018 by Golder Associates Ltd. During these inspections, Pavement Condition Indexes (PCI) are assigned to each roadway. These are based on the Ride Condition Rating as well as the types, severities and densities of the observed distresses. The PCI rating is rated on a scale from 0 to 100. The following is breakdown of PCI values and associated pavement descriptions for an asphalt roadway.

PCI Range	Description of Pavement
0-20	Pavement is in poor to very poor condition with extensive sever cracking, alligatoring and dishing. Rideability is poor and the surface is very rough and uneven.
20-30	Pavement is in poor condition with moderate alligatoring and extensive sever racking and dishing. Rideability is poor and the surface is very rough and uneven.
30-40	Pavement is in poor to fair condition with frequent moderate alligatoring and extensive moderate cracking and dishing. Rideability is poor to fair and surface is moderately rough and uneven.
40-50	Pavement is in poor to fair condition with frequent moderate cracking and dishing, and intermittent moderate alligatoring. Rideability is poor to fair and surface is moderately rough and uneven.
50-65	Pavement is in fair condition with intermittent moderate and frequent slight cracking, and with intermittent slight or moderate alligatoring and dishing. Rideability is fair and surface is lightly rough and uneven.
65-75	Pavement is in fairly good condition with slight or very slight dishing and a few areas of slight alligatoring. Rideability is fairly good with intermittent rough and uneven sections.
75-90	Pavement is in good condition with frequent very slight and slight cracking. Rideability is good with intermittent rough and uneven sections.
90-100	Pavement is in excellent condition with few cracks. Rideability is excellent with few areas of slight distortion.

Revision History

Revision Date	Description