TOWNSHIP OF
North Dundas

ASSET MANAGEMENT PLANNING FOR MUNICIPAL INFRASTRUCTURE
In Accordance with Ontario Regulation 588/17

37 Years Average Age of Core Capital as of 2021	**14 Years** Average Age for Non-Core Capital as of 2021
$35.6 Million Net Value of Core Infrastructure as of 2021	**$20.7 Million** Net Value of Non-Core Infrastructure as of 2021
$268 Million Estimated Replacement Value of Core Infrastructure as of 2021	**$51.4 Million** Estimated Replacement Value of Non-Core Capital as of 2021
$386.6 Million Estimated Total Lifecycle Replacement Value for all Assets as of 2021	**$839.73** Annual Lifecycle Replacement Capital Cost Per Capita
10.6% Portion of Total Capital Funding Sourced from Gas Tax	**51.2%** Portion of Total 2021 Revenues Spent on Capital Assets
47% Percentage of Assets in “Good” or Above Condition as of 2021	**30%** Percentage of Assets in “Poor” and Below Condition as of 2021
56% Percentage of Assets (Based on Replacement Cost) where Age is still being relied on for Condition Assessments.	

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Executive Summary

This asset management plan (AMP) is intended to provide data-driven guidance to the municipality of North Dundas on managing its capital asset portfolio; net book-valued (NBV) at $56.3 million as per financial documents, but costed for replacement value at $319.4 million. It is developed in accordance with Ontario Regulation 588/17 and addresses key reporting requirements, including outlining the state of the infrastructure, defining current levels of service (LOS), risk, and the associated lifecycle strategies.

Based on 2021 data, 70% of all assets analyzed in this AMP are in fair or better condition. Field condition assessments were used to determine actual condition for only 44% of assets, based on replacement cost. For 56% of assets, assessment data was unavailable and so age was used to approximate condition. This is a data gap that persists in most municipalities. Age can understate or overstate the true condition or performance of assets, making field assessments essential to accurate financial asset management planning, and a recurring recommendation in this AMP.

As required by O. Reg 588/17, North Dundas has established current levels of service (LOS) for its core asset classes which include roads, bridges and culverts, water, wastewater, and stormwater. LOS for non-core assets are also included in this AMP. Based on a 2020 Road Needs Study data, the average surface condition (rolled forward for 2021) for the municipality's road network was rated as 'Good' for pavement and 'Fair' for gravel. Similarly, for bridges, the average condition index is 72% or 'Good', while the average condition index for culverts is 68% or 'Fair'. No boil-water advisories were issued in 2021; however, there were 2 water main breaks and 1 wastewater main backup, all repaired within the same day. There are no combined sewers in the municipality. The storm network was designed only to handle a 5-year storm event, but it is estimated that only 60% may still be considered adequate for the task. This makes the community vulnerable to more extreme and unpredictable weather.

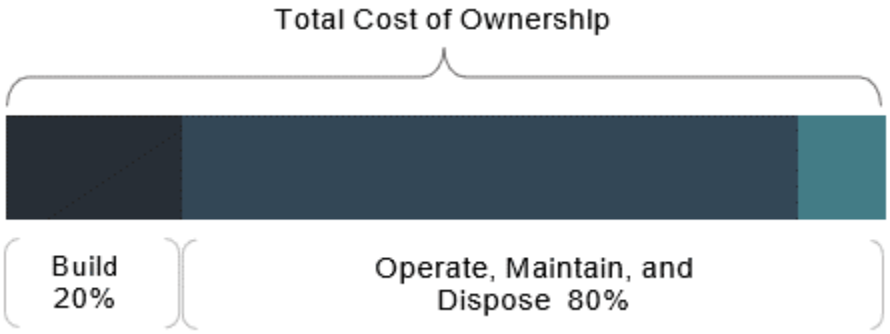
Central to asset management is selecting and applying the right combination of maintenance and rehabilitation options to minimize lifecycle costs and risks, extend the asset's useful life, and maximize value. As staff further develop an asset management program and consolidate data, similar strategies can be identified and applied to other asset classes to reduce the financial burden on ratepayers.

Currently, in addition to the $57.7 million infrastructure backlog, North Dundas has a total annual infrastructure funding shortfall of approximately $3.4 million.

O. Reg 588/17 currently doesn't require a financial strategy component to North Dundas' AMP, and so further analysis will be deferred to when more information is available for a more accurate representation of future plans.

An Overview of Asset Management

The initial acquisition of capital assets accounts for only 10-20% of their total cost of ownership. The remaining 80-90% comes from operations and maintenance. The intent of asset management is to minimize the lifecycle costs of delivering infrastructure services, and manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio.



These costs can span decades, requiring planning and foresight to ensure fiscal responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of broader asset management program. The diagram below depicts an industry- standard approach and sequence to developing a practical asset management program.

The diagram, adopted from the Institute of Asset Management (IAM), illustrates the concept of 'line of sight,' or alignment between the corporate strategic plan and various asset management documents. The strategic plan has a direct, and cascading impact on asset management planning and reporting—making it integral.

The municipality has not completed a documented asset management strategy. The strategy is an asset management best practice and is not required under any provincial or federal regulation.

Key Concepts of Management

Effective asset management integrates several key components, including lifecycle management, risk management, and levels of service. We apply these concepts throughout this asset management plan.

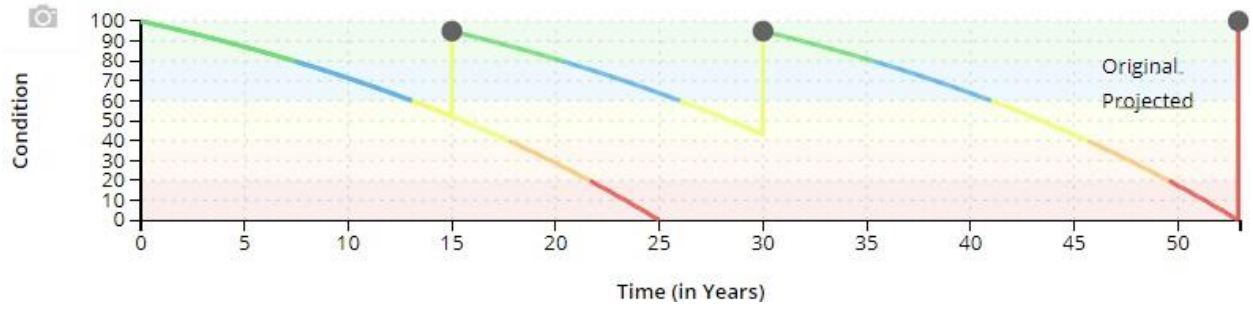
Lifecycle Management Strategies

Developing a lifecycle strategy will help staff to determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest cost. There are several field intervention activities that are available to extend the life of an asset. These activities can be placed into

one of three categories: maintenance, rehabilitation, and replacement. The following table provides a description of each type of activity and the general difference in cost:

Event Type	Description	Example for Roads	Cost
Maintenance	Activities that prevent defects or deteriorations from occurring	Crack Seal	**$**
Rehabilitation	Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	Mill & Resurface	**$$**
Replacement	Asset end-of-life activities that often involve the complete replacement of assets.	Full Reconstruction	**$$$**

The purpose of managing Lifecycles is to lengthen the useful life of assets – gaining the most amount of use for the lowest potential cost. Below, the alternative between an asset with an expected useful life of 25 years is compared against its counterpart which gained two rehabilitation events. This additional maintenance more than doubled the life of the asset.



Risk Management Strategies

Municipalities take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important than others, and their failure or disrepair poses more risk to the community than that of others. These high-value assets should receive funding before others.

By identifying the various impacts of asset failure and the likelihood that it will fail, risk management can identify critical assets, and determine where maintenance efforts, and spending, should be focused.

Levels of Service

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. Within each asset class in this AMP, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

These measures include a combination of those that have been outlined in O. Reg. 588/17 in addition to performance measures identified by the municipality as worth measuring and evaluating. The municipality measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service.

Community Levels of Service

Community levels of service provide a simple, plain language description or measure of how the community receives or experiences the services that the municipality provides. For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For non-core asset categories, the municipality has determined the qualitative descriptions that will be used to determine the community level of service provided. These descriptions can be found in the Levels of Service subsection within each asset category.

Technical Levels of Service

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. For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP. For non-core asset categories, the municipality has determined the technical metrics that will be used to determine the technical level of service provided. These metrics can be found in the Levels of Service subsection within each asset category.

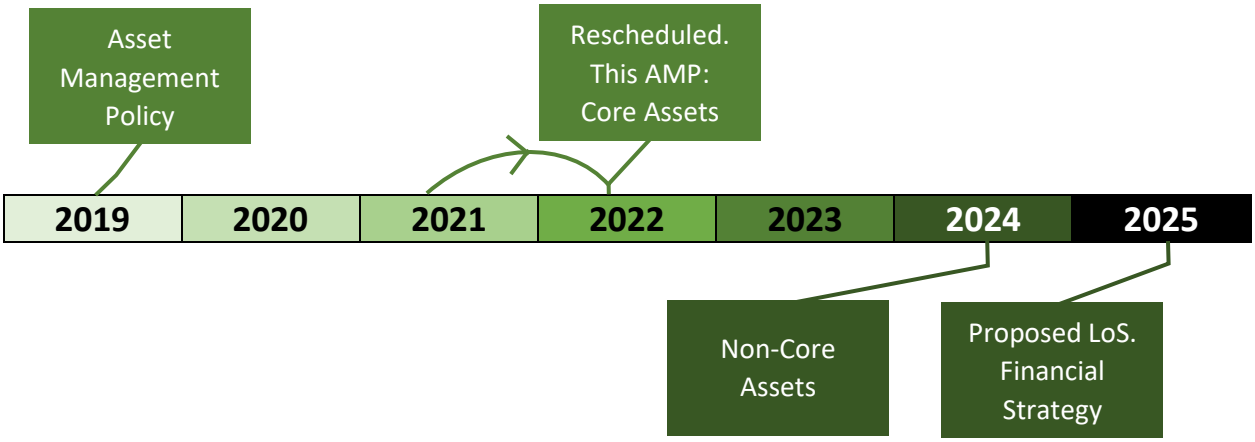
Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the municipality plans to establish proposed levels of service by July 2025, in accordance with O. Reg. 588/17. Proposed levels of service should be realistic and achievable within the timeframe outlined by the municipality. 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, the municipality must identify a lifecycle management and financial strategy which allows these targets to be achieved.

Ontario Regulation 588/17

As part of the *Infrastructure for Jobs and Prosperity Act*, 2015, the Ontario government introduced Regulation 588/17 - Asset Management Planning for Municipal Infrastructure (O. Reg 588/17).

Along with creating better performing organizations, more livable and sustainable communities, the regulation is a key, mandated driver of asset management planning and reporting. It places substantial emphasis on current and proposed levels of service and the lifecycle costs incurred in delivering them. The diagram below outlines key reporting requirements under O. Reg 588/17 and the associated timelines, with adjustments applied due to Covid-19 setbacks.



Requirement	2022	2024	2025
Inventory of Assets	X	X	X
Current Levels of Service	X	X	X
Proposed Level of Service for next 10 Years			X
Lifecycle Activities to sustain Current LoS	X	X	X
Lifecycle Management Strategy			X
Population and Growth Forecasts	X	X	X
Discussion of Growth Impacts	X	X	X
Financial Strategy			X
Discussion linking Growth to Financials			X

Scope and Methodology

Assets classes included in this AMP

This asset management plan for the municipality of North Dundas is produced in compliance with Ontario Regulation 588/17. The July 2022 deadline under the regulation - the first of three AMPs - requires analysis of only core assets. However, North Dundas is taking a more strategic and complete approach to this asset management plan by integrating all asset classes, not just core.

It summarizes the state of the infrastructure for the municipality's asset portfolio, establishes current levels of service and the associated technical and customer oriented key performance indicators (KPIs), and outlines lifecycle strategies for optimal asset management and performance for each of the categories below.

Asset Categories	Source of Funding
Road Network	Tax Levy Development Charges Upper Levels of Government Financing
Bridges, Culverts, and Guide Rails	
Storm Sewer Network	
Buildings and Facilities	
Land Improvements	
Vehicles	
Equipment	
Water Network	User Rates Capital Connections Cost Upper Levels of Government Financing
Wastewater Network	

Deriving Replacement Costs

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: Based on costs provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; staff estimates based on knowledge and experience.
- Cost Inflation: Historical cost of the asset is inflated based on 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.

Deriving Asset Condition

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 municipality's asset portfolio. Although the Pavement Condition

Index (PCI) and Bridge Condition Index (BCI) might disagree on a numerical value for 'Good,' having the ability to transition each of these separate standards into a singular language from 'Excellent' to 'Very Poor' allows assets to be more readily compared. The table 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, as seen in the column to the right.

Condition	Description	Criteria	Service Life Remaining (%)
Excellent	Fit for the future	Well maintained, good condition, new or recently rehabilitated.	80-100
Good	Adequate for now	Acceptable, approaching mid- stage of expected service life.	60-79
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies.	40-59
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, substantial portion of system exhibits significant deterioration.	20-39
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable.	0-19

The analysis in this AMP is based on assessed condition data only as available. The value of assessed condition data cannot be overstated (pardoning visually undetectable defects) as it provides a more accurate representation of the state of infrastructure than does an age-based indicator. Age-based condition tends to overstate asset condition, leading to ill-timed treatments.

The municipality employs a combination of both formal and informal condition assessment programs for municipal assets. The road network was assessed by an external consultant in 2020 as part of a Road Needs Study completed by D.M. Wills Associates Limited, and all bridges & structural culverts are assessed every two years as per provincial regulations (Ontario Structure Inspection Manual). Our last bridge inspection was done in 2020 by TSI Inc.

This AMP relies on assessed condition data for only 44% of assets; for the remaining portfolio, age is used as an approximation of condition. The table below outlines how condition ratings were assigned to assets.

Asset Class	Source	Core / Non-Core
Roads	Road Needs Study (D.M. Wills Ass.)	Core
Bridges & Culverts	Bridge Inspections (TSI Inc.)	Core
Storm Sewer Lines	Age-based	Core
Catch Basins	Age-based	Core
Water Lines	Age-based	Core
Hydrants	Age-based	Core
Valves	Age-based	Core
Wastewater Lines	Age-based	Core
Maintenance Access	Age-based	Core
Water/Wastewater Facilities	Age-Based*	Core
Water Meters	Age-based	Core
Buildings	Age-based*	Non-Core
Machinery & Equipment	Age-based	Non-Core
Land Improvements	Age-based	Non-Core
Vehicles	Age-based	Non-Core
Illumination	Age-based	Non-Core
Traffic Lights	Age-based	Non-Core
Parking	Age-based	Non-Core
Sidewalks	Age-based	Non-Core
Guide Rails	Age-based	Non-Core

*Building Condition Assessment Study to be completed by Roth IAMS by Summer 2022

Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which the municipality expects the asset to be available for use and remain in service before requiring replacement or disposal. The EUL for each asset in this AMP was assigned according to the knowledge and expertise of municipal staff and supplemented by existing industry standards when necessary. Due to the summarized nature of the data in this report, some EUL data are averaged for the purpose of ease of understanding.

By using an asset's in-service data and its EUL, the municipality can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, the municipality can more accurately forecast when it will require replacement. The SLR is calculated as follows:

$$Service\ Life\ Remaining\ (SLR) =$$

$$In\ Service\ Date + Estimated\ Useful\ Life (EUL) - Current\ Year$$

Reinvestment Rate

The reinvestment rate is a measurement of how much funding is available annually to individual asset classes relative to their current replacement cost.

AMP as a Living Document

As more accurate data is available, this document is intended to be updated to reflect the AMP changes to condition, replacement costs, investment rates, etc.

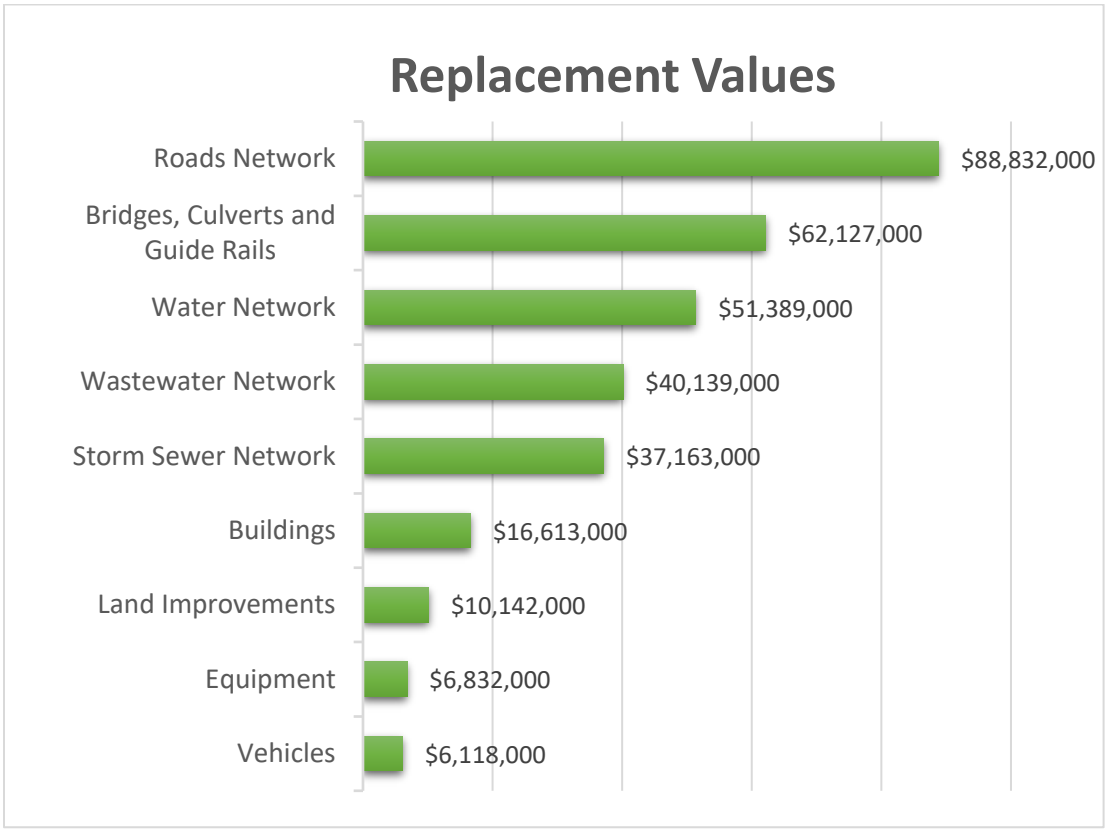
This document is not intended to override annual budgets, but is to be used as a tool to make budget decisions. Ultimately, final maintenance, rehabilitation, and capital decisions remain the responsibility of department heads and council.

Portfolio Overview

In this section, we provide a high-level summary of all asset classes before analyzing each asset class individually.

Current Value of Asset Portfolio

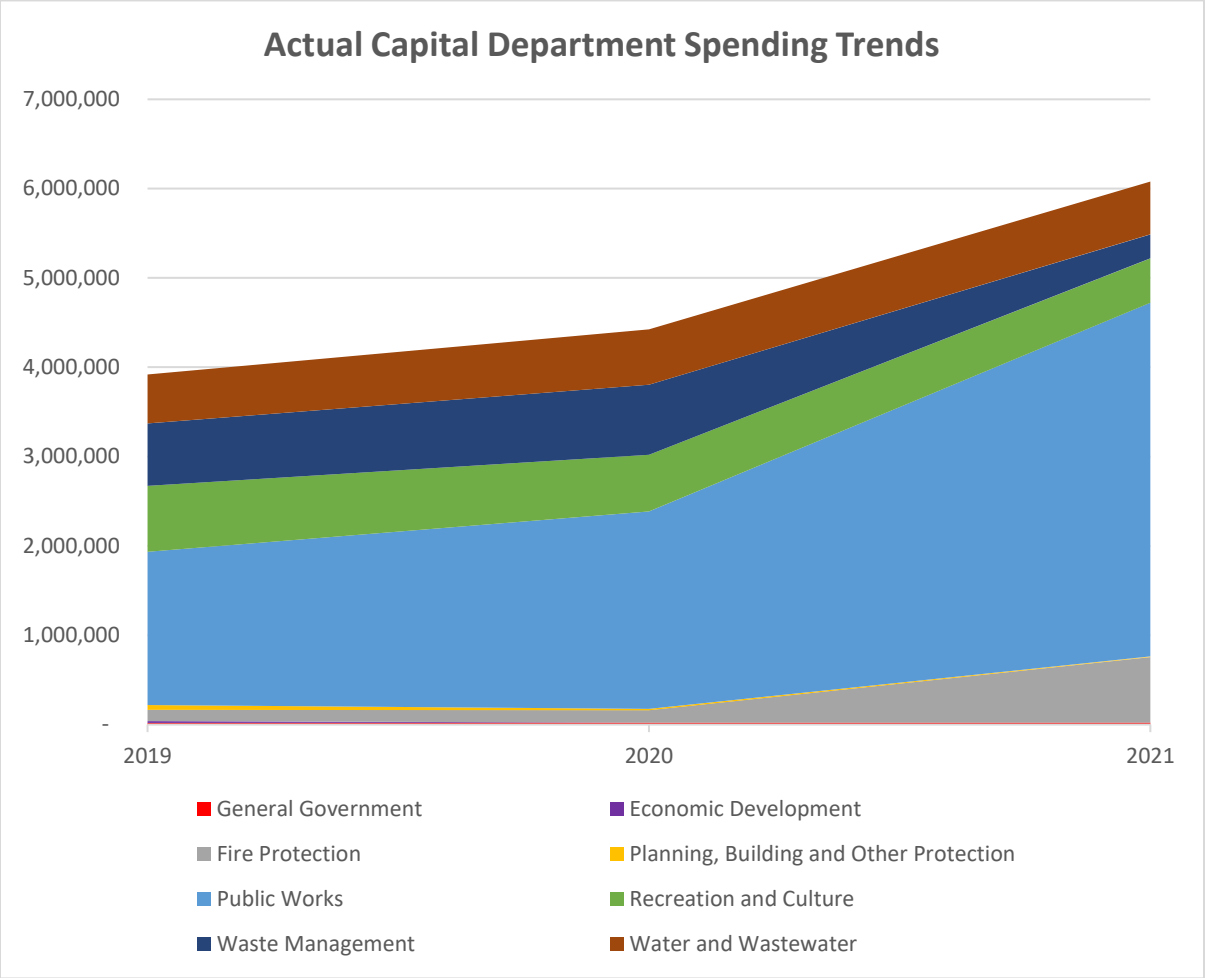
The asset categories analyzed in this AMP have a total 2021 replacement cost of $319.4 million. This total was determined based on a combination of user-defined costs and cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



Operating costs will not be considered in the financial strategy for this AMP.

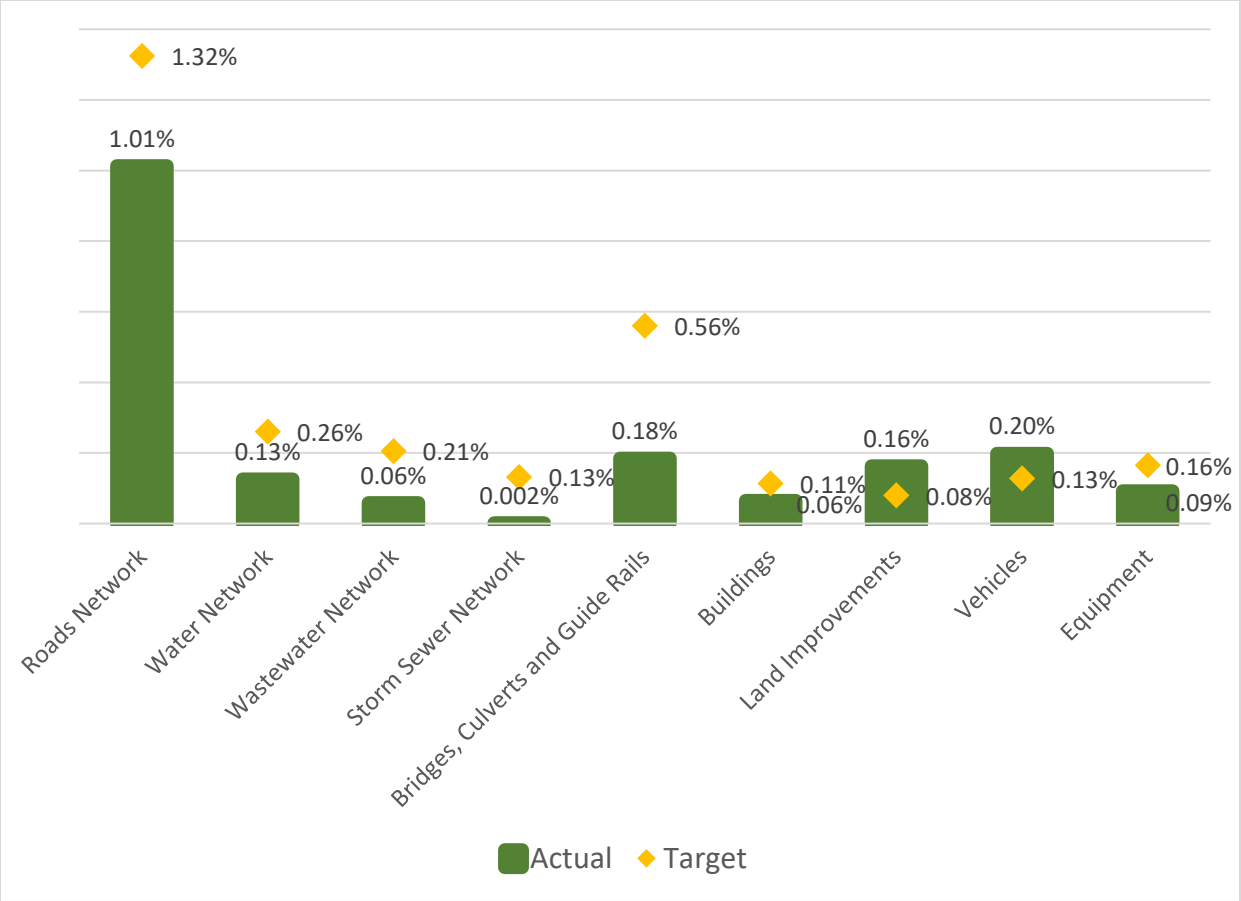
Historical Investments in Infrastructure

In addition to current replacement costs, a better understanding of historical infrastructure spending can help identify previous investment gaps and potential short- and medium-term spikes. The figure below illustrates historical investments North Dundas has made over the last three years in Asset Management.



Target vs. Actual Reinvestment Rate

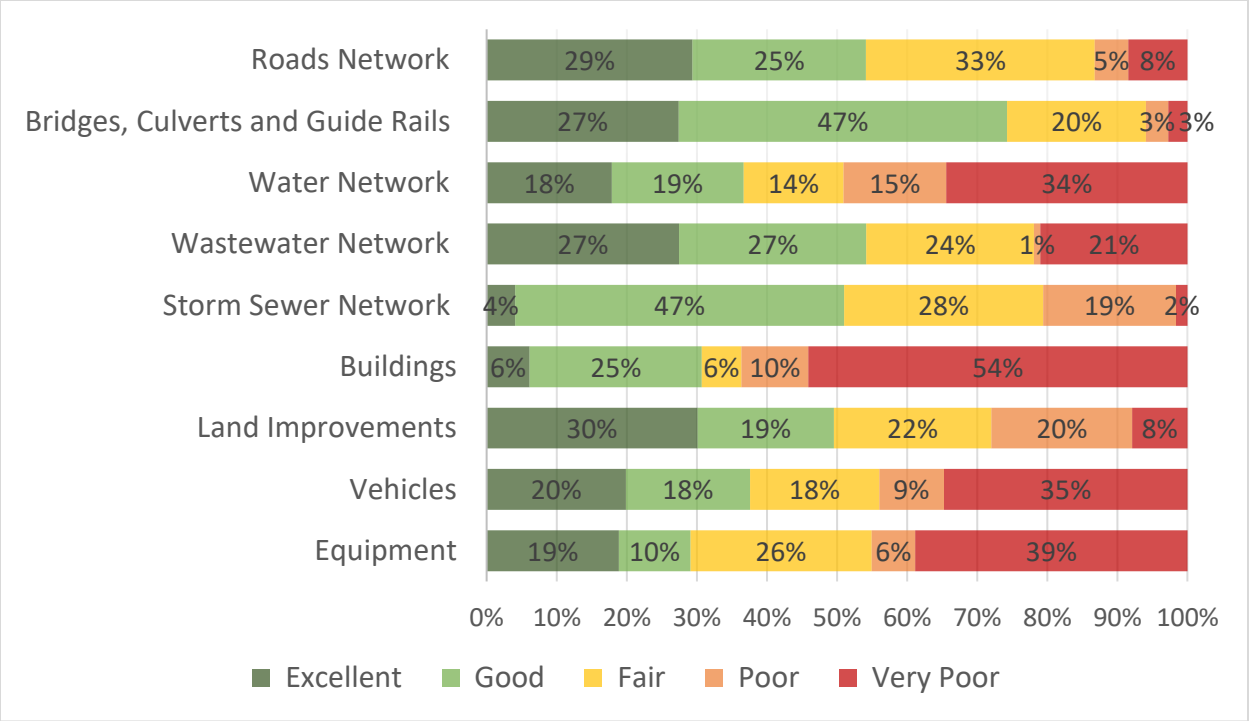
The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs of its $319.4 million asset portfolio, the municipality should be allocating approximately $9.5 million annually for replacement values, for a target reinvestment rate of 2.97%. Actual annual spending on infrastructure totals approximately $6 million, for an actual reinvestment rate of 1.90%.



Reinvestment Rate	2021	Actual	Target	Difference
		6,079,109.87	9,470,420.93	(3,391,311.06)
		1.90%	2.97%	-1.06%
Roads Network	3,235,055	1.01%	1.32%	-0.31%
Water Network	402,762	0.13%	0.26%	-0.13%
Wastewater Network	189,009	0.06%	0.21%	-0.15%
Storm Sewer Network	5,733	0.002%	0.13%	-0.13%
Bridges, Culverts and Guide Rails	590,580	0.18%	0.56%	-0.38%
Buildings	207,175	0.06%	0.11%	-0.05%
Land Improvements	520,203	0.16%	0.08%	0.08%
Vehicles	633,573	0.20%	0.13%	0.07%
Equipment	295,020	0.09%	0.16%	-0.07%

Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 70% of assets in North Dundas are in fair or better condition. This estimate relies on both age-based and field condition data.

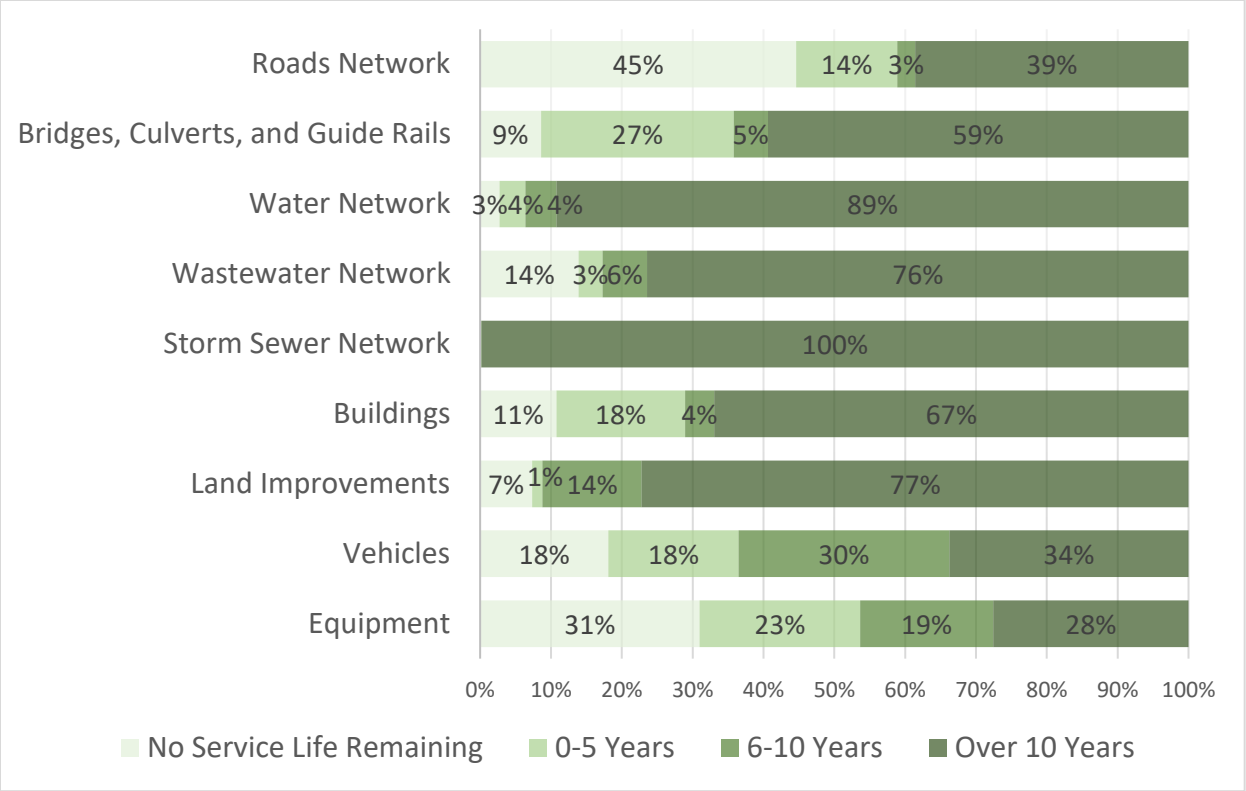


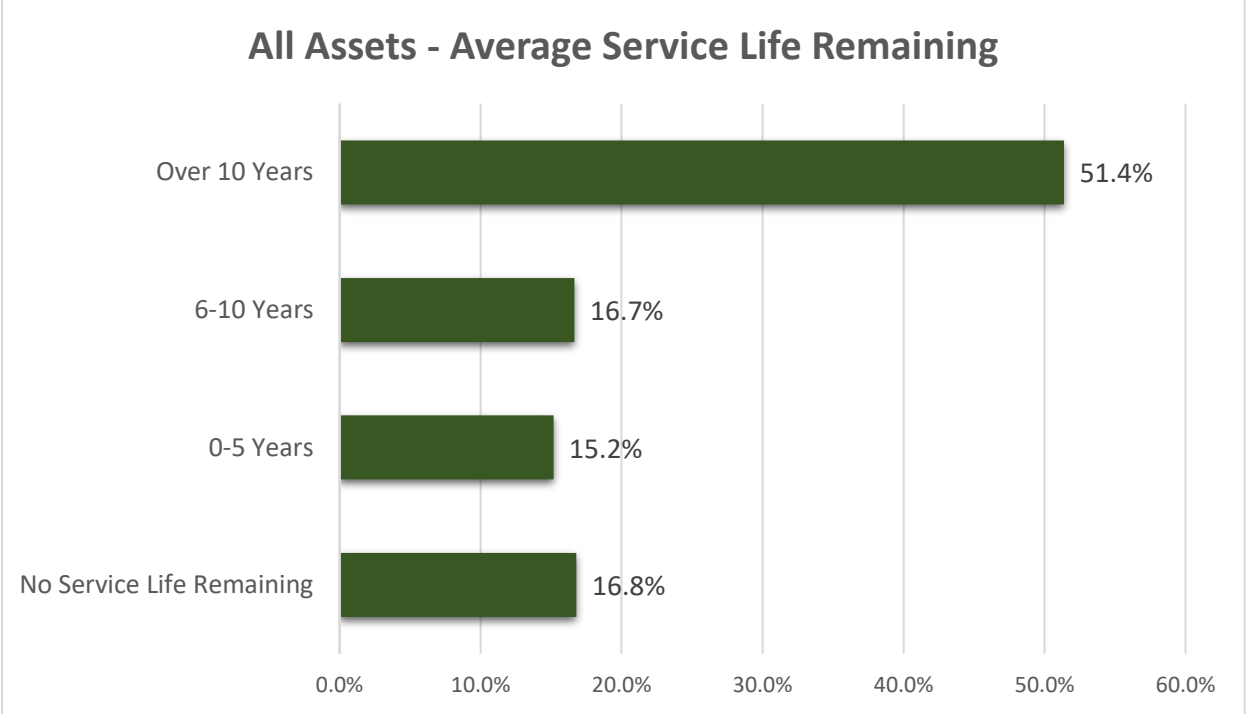
Field condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. A 2015 Public Sector Digest (PSD) study of 93 municipalities determined that using only age-based data can understate the condition of roads, bridges, and culverts by as much as 30% - leading to overstatement of financial needs. We are already aware at the municipality that certain asset classes have had rehabilitation work expensed rather than capitalized over the years, and this has caused even further misleading data. For example, North Dundas has identified 504 valves throughout the Water Network. The combined average Remaining Life is 1%, tagging the overwhelming majority of these assets as 'Very Poor' condition and included in the $57.7 million backlog. However, we do know that the valves (amongst other smaller infrastructure) undergo maintenance work on a rotational basis, meaning that their age-based analysis is most likely wildly disproportionate to their actual condition.

It is the intention of the municipality to eventually gain assessment data (internal or contract) for all capital asset classes identified in this AMP where it is cost-beneficial.

Service Life Remaining

Using replacement cost valuation, 51% of the municipality's assets have over 10 years of service life remaining, as shown in the graphs below; the vast majority of which being the Storm, Water, and Wastewater Networks. 17% of total assets (or $57.7 million) are currently listed as already backlogged for rehabilitation/replacement needs, and the remaining will be coming to the end of their useful lives within the decade.





This analysis is working under the assumption that the current life expectancy is accurate which, as already indicated when considering age-based assets, may not be the case.

Road Network

Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the municipality's Road Network inventory. Gravel roads have been included as they comprise a sizable portion of the municipality's road network. However, the lifecycle management strategies for these assets consist of perpetual maintenance activities and do not usually require capital costs for rehabilitation activities or end-of-life replacement.

Asset Type	Quantity	Units	Est. Replacement Cost	Cost Source
Road Surface (HCB)	137.59	km	$34,397,500	2022 Tenders
Road Surface (LCB)	131.12	km	$32,780,000*	2022 Tenders
Gravel Road	119.35	km	$11,935,000	2022 Tenders
Traffic Signals	4	Structure	$54,500	2021 CPI
Illumination	780	Structure	$1,980,000	2019 Historical Expense
Parking Lot	36,988	m^2	$1,849,400	2020 Historical Expense
Sidewalk	23,423.9	m	$5,835,325	2022 Engineer Quote
TOTAL			**$88,831,725**	

*Replacement cost for LCB Roads has been factored as HCB due to North Dundas' transition away from LCB road surfaces.

Connectivity & Density

The following is a breakdown of the Nodes/Sections/Dead-Ends as they are found in the municipality to decipher how idealistic each road network segment has been executed.

Area	Nodes	Linked Sections	Dead-End / Cul de Sacs	Total Sections	Sections that are Dead-Ends (%)	Nodes that Lead to Dead-Ends (%)
North Dundas	**389**	**379**	**88**	**467**	**19%**	**23%**
Outside of Villages	208	205	30	235	**13%**	**14%**
Chesterville	51	49	17	66	**26%**	**33%**
Hallville	11	10	4	14	**29%**	**36%**
Harmony	11	11	3	14	**21%**	**27%**
Inkerman	7	4	0	4	**0%**	**0%**
Morewood	12	11	5	16	**31%**	**42%**
Mountain	6	5	1	6	**17%**	**17%**
South Mountain	17	19	2	21	**10%**	**12%**
Winchester	66	65	26	91	**29%**	**39%**

If we assume that the roads maintain an average of six meters in width, we can find the square meters of the three road types through conversion. Of the municipality's 503.08 km^2 of land, the road density is 0.46%.

Road density is calculated as follows:

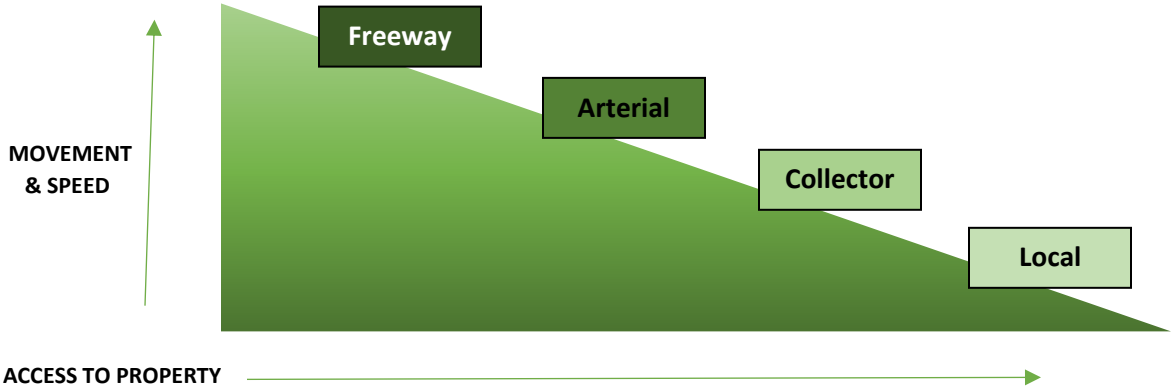
	(a)	(b)	(c)	(d)	(e)	(f)
Type	**Lane KM**	**KM**	**Meters**	**Meters Squared**	**KM Squared**	**Road Density**
		(a)/2 = (b)	(b)*1000 = (c)	(c)*6-meter width = (d)	(d)/1000000 = (e)	(e)/503.08km² = (f)
Total	**776.12**	**388.06**	**388,060**	**2,328,360**	**2.32836**	**0.46%**

Road systems have hierarchical elements which can be divided into:

Arterial: High-Capacity urban road. Primary function is to deliver traffic from collector roads to freeways or expressways.

Collector: Low-to-moderate capacity road which serves to move traffic from local streets to arterial roads. Unlike arterials, collector roads are designed to provide access to residential properties.

Local: A street primarily used to gain access to the property bordering it.



The municipality has only Local and (Rural) Collector roads. Roadways are deemed Collectors at speed limits of 80 km/h.

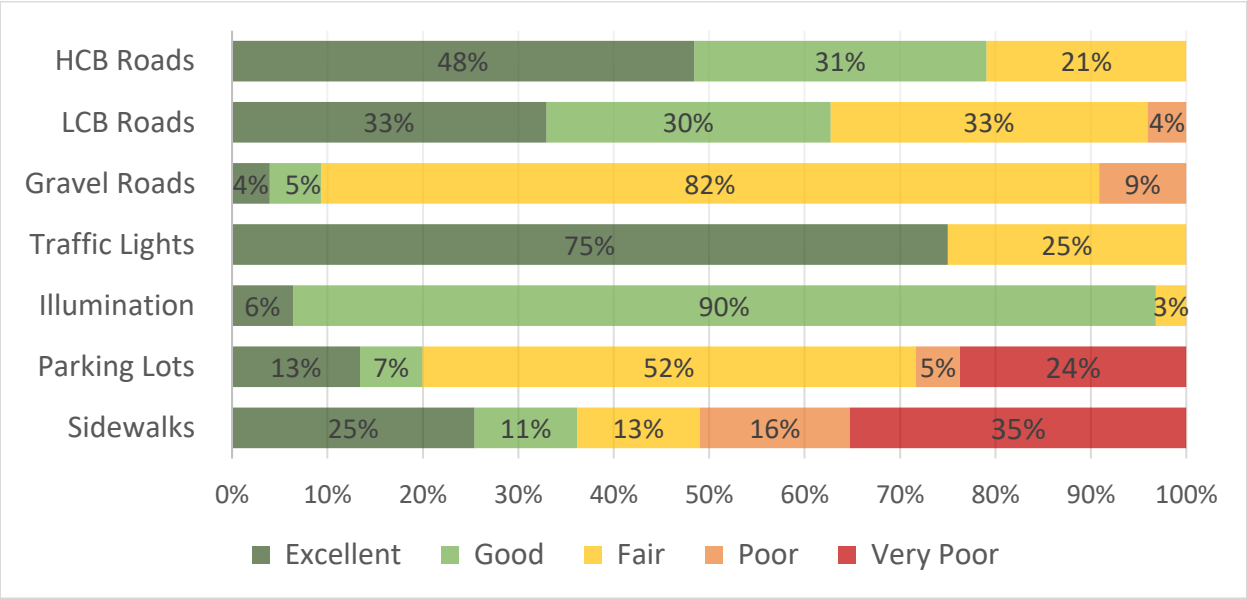
Although not included in the analysis of this AMP, the municipality Road Network also contains:

Unmaintained Roads	29	Sections
Road Allowances	2	Sections
Development Roads	13	Sections

Current Asset Condition

The following table identifies the source of available condition data and the average condition rating for each asset segment. The Average Condition (%) is a weighted value based on quantity of asset (length, area, quantity, etc.).

Asset Classes	Average Condition (%)	Average Condition Rating	Condition Source
Road Surface (HCB)	87.95	Good	2020 Road Needs Study (D.M. Wills Ass.)
Road Surface (LCB)	73.11	Good	2020 Road Needs Study (D.M. Wills Ass.)
Gravel Road	49.76	Fair	2020 Road Needs Study (D.M. Wills Ass.)
Traffic Signals	83.33	Excellent	Age-Based
Illumination	73.53	Good	Age-Based
Parking Lots	35.63	Poor	Age-Based
Sidewalks	31.79	Poor	Age-Based



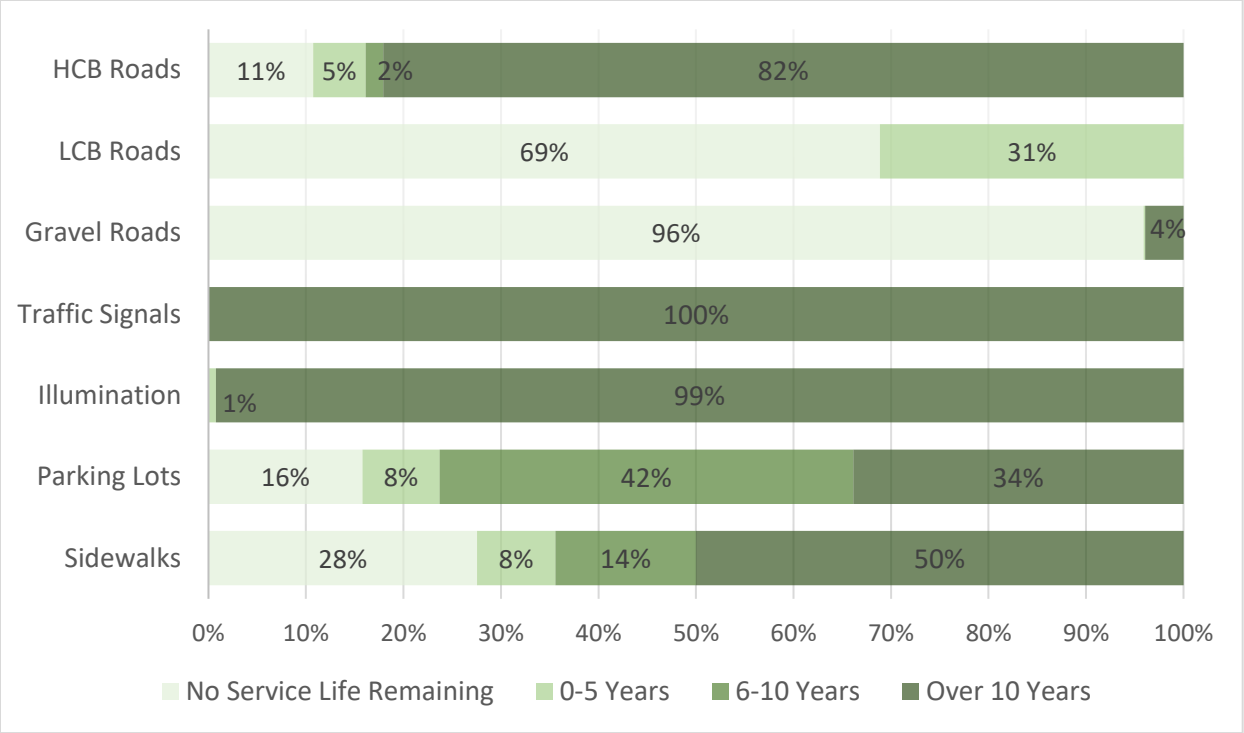
To ensure that the municipality's Road Network continues to provide an acceptable level of service, the municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Road Network.

Estimated Useful Life & Average Age

The Estimated Useful Life for Road Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age. It should be noted that assessed condition may increase or decrease the average service life remaining.

Asset Classes	Estimated Useful Life	Average Age (Yrs)	Average Service Life Remaining (Yrs)
Road Surface (HCB)	30	11	15.61
Road Surface (LCB)	7	9	(2.57)
Gravel Road	25	113*	(88.29)*
Traffic Signals	30	6	25.00
Illumination	30	8	25.57
Parking Lots	30	16	8.47
Sidewalks	30	21	7.97

*Due to their nature, gravel roads were never typically 'disposed', only given maintenance. This has distorted its averages.



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Asset Management Strategies

Condition Assessment & Data Collection

- The municipality has a Road Needs Study completed by an external consultant in 2020. The Study identifies a Pavement Condition Index (PCI) or Gravel Condition Index (GCI) for every municipal road. It also identifies drainage performances, shoulder widths, road widths, speed assessments, and travel comfort for the surface types.

- The Road Needs Study is a valuable source of information and heavily informs capital planning processes that address the need for rehabilitation and replacement activities.
- Remaining Road Network assets are planned to be assessed internally in the near future.

Lifecycle Management Strategy

Operations & Maintenance

Summer:

- Sidewalk repairs, grading, re-gravelling, dust control, ditching, roadside mowing, tree trimming, brush cleanup, road sign installation/maintenance, construction projects, pavement patching, line painting.

Winter:

- Snow plowing, sanding/salting, ice blading of gravel roads, snow removal.

Significant Operating Costs Include:

- Asphalt patching/repairs, gravel material purchase, tree cutting

Rehabilitation & Replacement

- 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, available budget).
- LCB roads are being phased out of use in the municipality. Roads of this type are either being returned to gravel roads, or changed to HCB. This decision is due to LCB roads not being able to maintain their expected 7-year life under traffic demands.
- Paved road rehabilitation and replacement is more of a reactive process currently.
- A 10-year capital plan is developed that identifies both replacement and rehabilitation events.

Lifecycle Strategy

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle HCB Roads. Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

Event Name	Event Class	Event Trigger
Microsurfacing	Rehabilitation	8 Years
Overlay	Rehabilitation	14 Years
Pulverize and Pave	Rehabilitation	22 Years
Full Reconstruction	Replacement	30 Years

LCB Roads will be continued to be phased out with no major maintenance efforts, unless otherwise necessary for budgetary purposes.

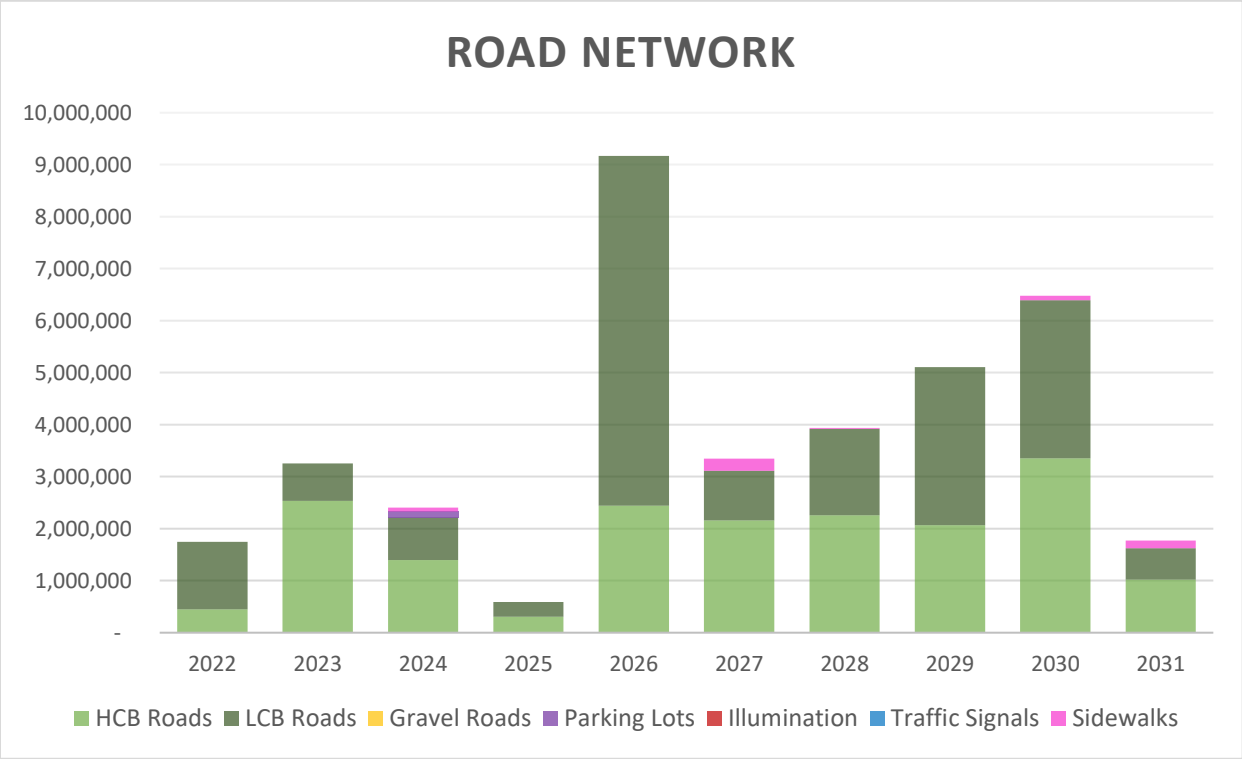
Forecasted Capital Requirements

Based on the lifecycle strategies identified for roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the Road Network

over the next ten years. The annual capital requirement represents the average amount per year that the municipality should allocate towards funding rehabilitation and replacement needs.

The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix C.

Annual Capital Requirement
$4,228,322



Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix E for the criteria used to determine the risk rating of each asset.

Only Roads themselves (HCB, LCB, and Gravel) were included in the risk assessment.

Roads		Probability				
		1	2	3	4	5
Consequence	1	$ -	$ -	$ -	$ -	$ -
		0 KM	0 KM	0 KM	0 KM	0 KM
	2	$ 10,800,000	$ 9,760,000	$ 10,887,500	$ 1,332,500	$ -
		43.2 KM	39.04 KM	43.55 KM	5.33 KM	0 KM
	3	$ 470,000	$ 220,000	$ 6,359,000	$ 480,000	$ -
		4.7 KM	2.2 KM	63.59 KM	4.8 KM	0 KM
	4	$ 16,662,500	$ 10,904,500	$ 10,576,500	$ 610,000	$ -
		66.65 KM	45.85 KM	62.55 KM	6.1 KM	0 KM
	5	$ -	$ -	$ -	$ -	$ -
		0 KM	0 KM	0 KM	0 KM	0 KM

Asset Prioritization List

The following table identifies the highest risk Roads according to the risk criteria identified in Appendix E. The risk rating is calculated by multiplying the probability of failure and the consequence of failure for each asset.

ID	Description	Replacement Value (2022)	Condition	Risk Rating
RB036	North Wing Rd - Section 13 - From: County Rd 3 To: Thompson Rd	$230,000	Poor	16
RB044	Benson George Rd - Section 46 - From: County Rd 31 To: Dead End (Quarry)	$130,000	Poor	16
RB112	Brown's Ln - Section 166 - From: Guy Rd To: McIntosh Rd	$50,000	Poor	16
RB119	Nelson Rd - Section 174 - From: County Rd 1 To: Dead End	$20,000	Poor	16
RB295	Baldwin Rd - Section 102B - From: 0.1 km South of Sandy Row Rd To: Kirkwood Rd	$180,000	Poor	16

This is not meant to be a definitive list of how the municipality should prioritize assets for rehabilitation and replacement. It is meant to be a decision-support tool that is supplemented by the knowledge and expertise of municipal staff when prioritizing capital needs. In some cases, assets may have a higher risk rating than expected due to a lack of available data (e.g., no assessed condition data).

Levels of Service

The following tables identify the municipality's current level of service for the Road Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Road Network.

Service Attribute	Qualitative Description	Current LOS	
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	North Dundas' Road Network is 388.06 km, or 776.12 lane km. It contains 119.35 km of Gravel Roads, 131.12 km of LCB Roads, and 137.59 km of HCB roads that service residents, commercial traffic, tourism, agriculture, and government operations. See Appendix D for Maps.	
		The Network had a manual overview which concluded with Connectivity specifications as noted below. *Connectivity:* 18.84% Road Sections which are Dead-Ends. 22.62% Road Nodes which Lead to Dead-Ends.	
Quality	Description or images that illustrate the different levels of road class pavement condition.	HCB Roads:	
		48%	Excellent (90 PCI and above)
		31%	Good (65 – 89 PCI)
		21%	Fair (40 – 64 PCI)
		0%	Poor (20 – 39 PCI)
		0%	Very Poor (19 PCI and below)
		LCB Roads:	
		33%	Excellent (80 PCI and above)
		30%	Good (60 – 79 PCI)
		33%	Fair (40 – 59 PCI)
		4%	Poor (20 – 39 PCI)
		0%	Very Poor (19 PCI and below)

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Road Network.

Service Attribute	Technical Metric	Current LOS	
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km2)	0 lane km/km²	
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km2)	1.10 lane km/km²	
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km2)	0.45 lane km/km²	
Quality	For paved roads in the municipality, the average pavement condition index value.	87.95	HCB PCI
		73.11	LCB PCI
Quality	For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).	49.76 GCI (Fair)	
Performance	Capital re-investment Rate	1.01%	

Recommendations

Replacement Costs

- Review and update replacement costs on an annual basis to ensure that short-, medium-, and long-term planning are based on the best available estimate of future costs.

Condition Assessment Strategies

- Review and establish a formal condition assessment program for the Road Network.
    - Condition assessments for roads should continue to be completed on a regular cycle and may be expanded to include sidewalks.

Risk Management Strategies

- This AMP includes a cursory review of risk and criticality. The municipality should work towards developing a formal risk management process to inform project prioritization and lifecycle management strategies with the goal of minimizing risk. In the short term, staff should review the highest risk assets and establish appropriate risk mitigation strategies.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the municipality believes to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

Bridges and Culverts

Asset Inventory & Replacement Cost

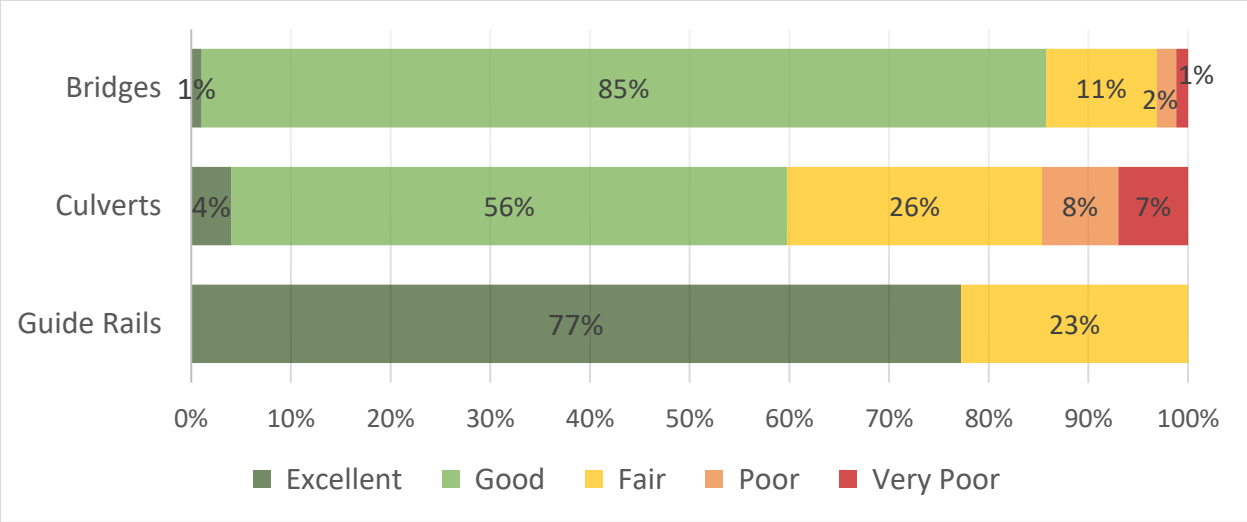
The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the municipality's Bridges & Culverts inventory.

Asset Type	Quantity	Units	Est. Replacement Cost	Cost Source
Bridges	18	Structure	$30,048,690	2020 OSIM
Culverts	31	Structure	$30,115,750	2020 OSIM
Guide Rails	5,607.54	m	$1,962,639	2021 Historical Expense
TOTAL			**$62,127,079**	

Current Asset Condition

The following table identifies the source of available condition data and the average condition rating for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Classes	Average Condition (%)	Average Condition Rating	Condition Source
Bridges	72.32	Good	2020 OSIM (TSI Inc.)
Culverts	68.34	Fair	2020 OSIM (TSI Inc.)
Guide Rails	85.15	Excellent	Age-Based



To ensure that the municipality's Bridges & Culverts continue to provide an acceptable level of service, the municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of

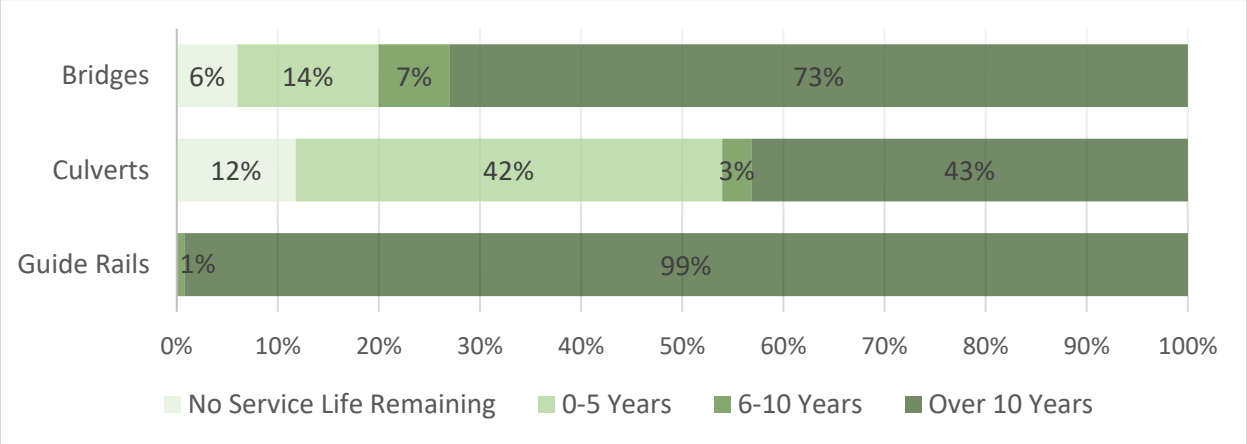
maintenance, rehabilitation, and replacement activities is required to increase the overall condition of the Bridges & Culverts.

Estimated Useful Life & Average Age

The Estimated Useful Life for Bridges & Culverts assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age. It should be noted that assessed condition may increase or decrease the average service life remaining.

Asset Classes	Estimated Useful Life	Average Age (Yrs)	Average Service Life Remaining (Yrs)
Bridges	68*	41	18.69
Culverts	46*	26	12.03
Guide Rails	25	4	21.00

*Averaged



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Asset Management Strategies

Condition Assessment & Data Collection

- All bridges and culverts with a span greater than or equal to three meters are inspected every two years according to provincial regulations outlined in the Ontario Structure Inspection Manual (OSIM).
- The municipality uses an engineering firm to complete inspections. The Inspection Report identifies maintenance, rehabilitation and replacement needs as well as an overall Bridge Condition Index (0-100) for each structure.

Lifecycle Management Strategy

Operations & Maintenance

- Operating costs identified in the Inspection Reports are integrated into annual operating budgets to ensure these structures are kept in an adequate state of repair.
- Annual operating budget includes basic patch repairs, power-washing, etc.

Rehabilitation & Replacement

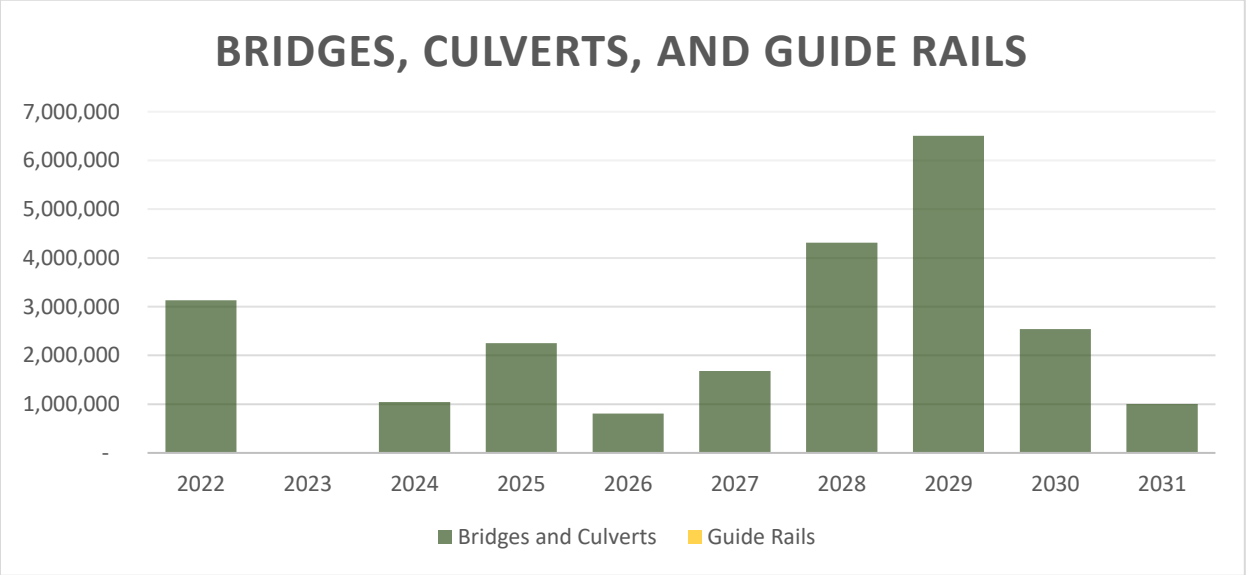
- Capital costs identified in the Inspection Reports are integrated into annual capital budgets as well as the 10-year capital plan to ensure these structures are being rehabilitated and replaced when necessary.

Forecasted Capital Requirements

Based on the assumption that all assets will require replacement at the end of their service life, the following graph forecasts capital requirements for the Bridges & Culverts. The annual capital requirement represents the average amount per year that the municipality should allocate towards funding rehabilitation and replacement needs.

The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix C.

Annual Capital Requirement
$1,788,449



Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix E for the criteria used to determine the risk rating of each asset.

Only Bridges and Culverts are included in the risk assessment.

Bridges & Culverts		Probability				
		1	2	3	4	5
Consequence	1	$ - 0 m²	$ - 0 m²	$ - 0 m²	$ - 0 m²	$ - 0 m²
	2	$ - 0 m²	$ 352,800 22.4 m²	$ - 0 m²	$ - 0 m²	$ - 0 m²
	3	$ 1,700,400 93.9 m²	$ 8,827,900 558.82 m²	$ 7,050,190 406.12 m²	$ 3,518,200 244.55 m²	$ 2,401,200 202.65 m²
	4	$ 1,024,590 35.1 m²	$ 21,999,725 2626.55 m²	$ 5,361,035 571.61 m²	$ - 0 m²	$ - 0 m²
	5	$ - 0 m²	$ 7,928,400 1057.12 m²	$ - 0 m²	$ - 0 m²	$ - 0 m²

Asset Prioritization List

The following table identifies the highest risk Bridges and Culverts according to the risk criteria identified in Appendix E. The risk rating is calculated by multiplying the probability of failure and the consequence of failure for each asset.

ID	Description	Replacement Value (2020)	Condition	Risk Rating
BR010	BRH017 - Kirkwood Road. 0.2km North of County Rd 5. - AADT 50. TSA (m2): 421.4	$3,160,500	Good	10
BR012	BRH011 - Nation Valley Road. 70m South of River Rd. - AADT 117. TSA (m2): 635.72	$4,767,900	Good	10
BR003	BRH006 - Development Road. 1.2 km North of Van Camp Road. - AADT 399. TSA (m2): 248.64	$2,113,440	Fair	12
BR014	BRH015 - Limerick Road. 0.8km East of County Rd 8. - AADT 76. TSA (m2): 108.8	$1,033,600	Fair	12
BR017	BRH009 - Cameron Road. 50m East of Boundary Rd. - AADT 205. TSA (m2): 69	$966,000	Poor	12

BR020	CUS016 - Pemberton Road. 0.45km South of Hogaboam Rd. - AADT 115. TSA (m2): 52.5	$910,000	Poor	12
BR025	CUS022 - Nesbitt Road. 0.3km West of Shay Rd. - AADT 150. TSA (m2): 115.5	$1,160,250	Fair	12
BR033	CUC014 - River Road. 0.2km South of County Rd 43. - AADT 150. TSA (m2): 98.67	$1,053,745	Fair	12
BR050	CUS007 - Spruit Rd. 0.43km East of Riddell Rd. - AADT 100. TSA (m2): 38.25	$696,150	Poor	12
BR055	CUS020 - Hollister Rd Equalizer. 0.9km South of River Rd. - AADT (County Road). TSA (m2): 84.8	$946,050	Poor	12
BR013	BRH012 - Nation Valley Road. 5km West of County Rd 43. - AADT 49. TSA (m2): 42	$840,000	Very Poor	15
BR028	CUC008 - Nation Valley Road. 0.6km West of County Rd 3. - AADT (Private Entrance). TSA (m2): 68.85	$607,500	Very Poor	15
BR049	CUS010 - Development Rd & CPR Railway. 1.0km South of County Rd 43. - AADT 88. TSA (m2): 91.8	$953,700	Very Poor	15

This is not meant to be a definitive list of how the municipality should prioritize assets for rehabilitation and replacement. It is meant to be a decision-support tool that is supplemented by the knowledge and expertise of municipal staff when prioritizing capital needs. In some cases, assets may have a higher risk rating than expected due to a lack of available data (e.g., no assessed condition data).

Levels of Service

The following tables identify the municipality's current level of service for Bridges & Culverts. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Bridges & Culverts.

Service Attribute	Qualitative Description	Current LOS
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	North Dundas' Bridges and Culverts are a key component of the municipal transportation network. Traffic in North Dundas includes but is not limited to heavy transport vehicles, agriculture machinery, motor vehicles, emergency vehicles, pedestrians, and cyclists. A pedestrian bridge is maintained for ease of access near the Chesterville Dam, but there are some bridges/culverts with dimensional restrictions which prevents use for some types of traffic. See Appendix D for map of structure locations.
Quality	Description or images of the condition of bridges and how this would affect use of the bridges.	The municipality is required to complete biennial inspections of all bridges and structural culverts greater than or equal to 3 meters in span according to the Ontario Structure Inspection Manual. Each structure is inspected by a licensed engineer and any maintenance, rehabilitation or replacement requirements are provided to the municipality. When bridges or structural culverts need to be closed or replaced it can have a significant impact on the efficiency of the transportation network and detours may be required. The OSIM inspection program helps the municipality to implement lifecycle strategies that minimize the impacts of these potential service disruptions.
Quality	Description or images of the condition of culverts and how this would affect use of the culverts.	

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by Bridges & Culverts.

Service Attribute	Technical Metric	Current LOS
Scope	Percentage of bridges in the municipality with loading or dimensional restrictions.	36.7% (18 Bridges and Culverts with a road width of 3.5m or less)
Quality	For bridges in the municipality, the average bridge condition index value.	72.32
Quality	For structural culverts in the municipality, the average bridge condition index value.	68.34
Performance	Capital re-investment Rate	0.18%

Recommendations

Risk Management Strategies

- This AMP includes a cursory review of risk and criticality. The municipality should work towards developing a formal risk management process to inform project prioritization and lifecycle management strategies with the goal of minimizing risk. In the short term, staff should review the highest risk assets and establish appropriate risk mitigation strategies.

Lifecycle Management Strategies

- This AMP only includes capital costs associated with the reconstruction of Bridges and Culverts. The municipality should work towards identifying projected capital rehabilitation and renewal costs for Bridges and Culverts and integrating these costs into long-term planning.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the municipality believe to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

Storm Sewer Network

Asset Inventory & Replacement Cost

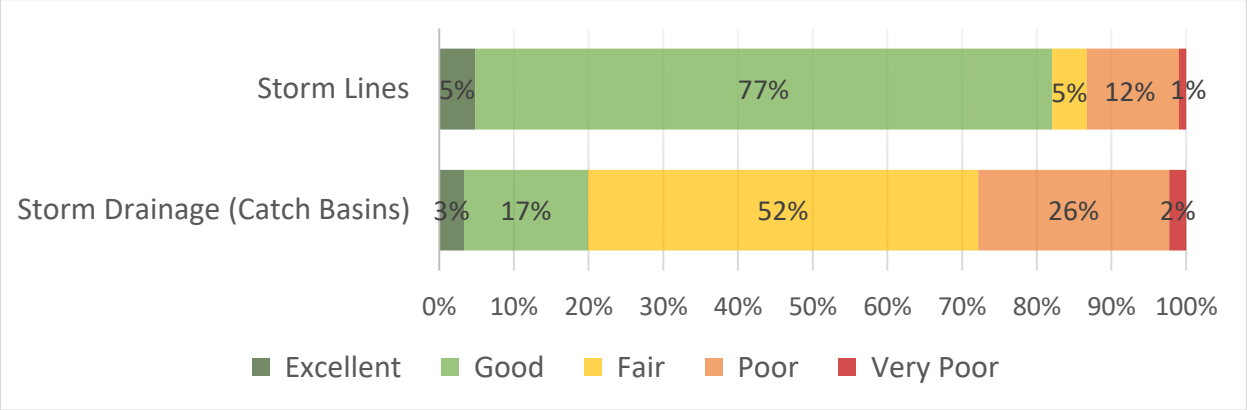
The following table includes the quantity, replacement cost method and total replacement cost of each asset segment in the municipality's Storm Sewer Network inventory.

Asset Type	Quantity	Units	Est. Replacement Cost	Cost Source
Storm Lines	37,013.62	m	$25,909,534	2022 Neighbouring Township's Unit Cost
Catch Basins	1,023	Structure	$11,253,000	2020 Historical Expense
TOTAL			**$37,162,534**	

Current Asset Condition

The following table identifies the source of available condition data and the average condition rating for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Classes	Average Condition (%)	Average Condition Rating	Condition Source
Storm Lines	59.35	Fair	Age-Based
Catch Basins	46.80	Fair	Age-Based



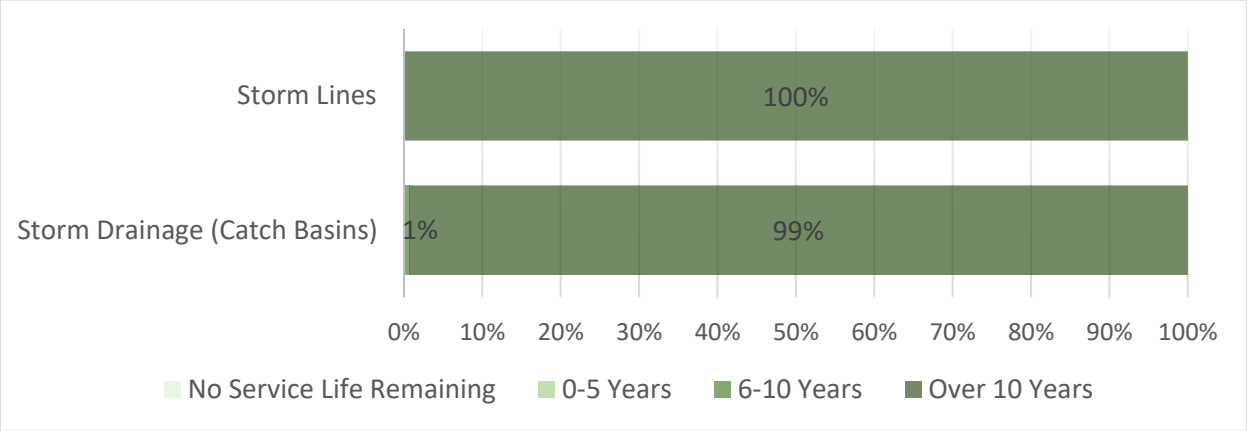
To ensure that the municipality's Storm Sewer Network continues to provide an acceptable level of service, the municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation, and replacement activities is required to increase the overall condition of the Storm Sewer Network.

Estimated Useful Life & Average Age

The Estimated Useful Life for Storm Sewer Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Classes	Estimated Useful Life	Average Age (Yrs)	Average Service Life Remaining (Yrs)
Storm Lines	96*	38	57.34
Catch Basins	75*	40	34.85

*Averaged



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Asset Management Strategies

Condition Assessment & Data Collection

- Establish a routine condition assessment process for storm sewer mains. This may include the use of CCTV cameras to inspect a portion of the stormwater network on a regular cycle. Assets can be prioritized for assessment according to their age and/or risk of failure.

Lifecycle Management Strategy

Operations & Maintenance

- There have been very few maintenance activities routinely completed to maintain the storm sewer network other than catch basin cleaning to ensure that stormwater can flow from the surface into stormwater mains without obstruction.

Rehabilitation & Replacement

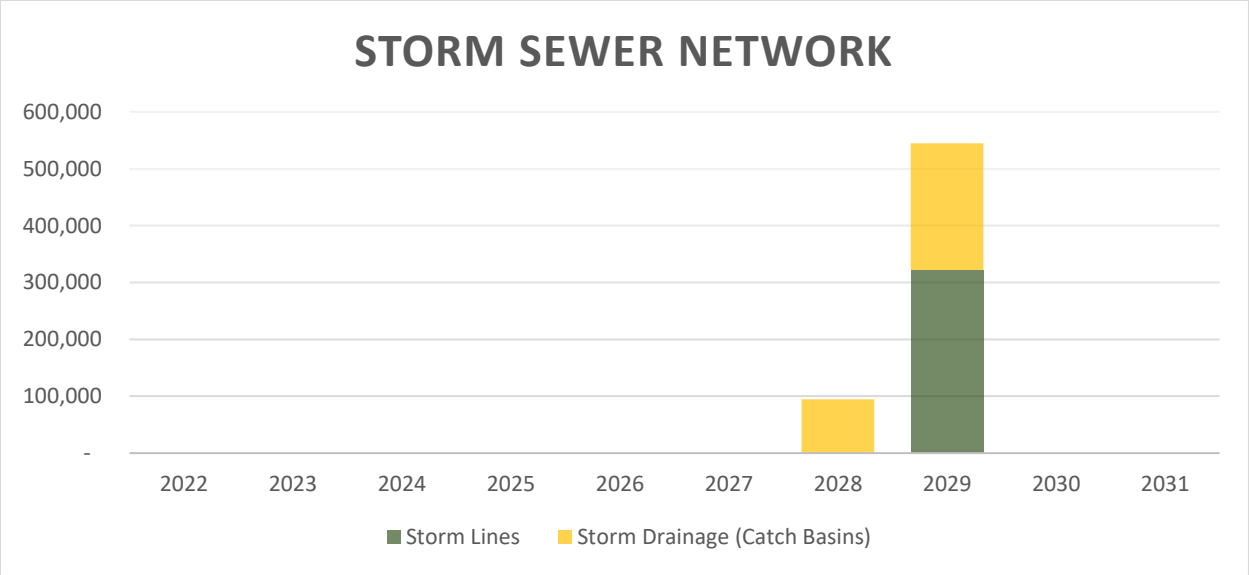
- Most storm sewer infrastructure is replaced solely once it reaches the end of its estimated useful life without many major rehabilitative efforts during its lifecycle.
- Reconstruction projects are completed only when they can be combined with planned road rehabilitation or reconstruction projects.
- Capital projects are included in the 10-year capital plan.

Forecasted Capital Requirements

Based on the assumption that all assets will require replacement at the end of their service life, the following graph forecasts capital requirements for the Storm Sewer Network. The annual capital requirement represents the average amount per year that the municipality should allocate towards funding rehabilitation and replacement needs.

The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix C.

Annual Capital Requirement
$419,931



Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix E for the criteria used to determine the risk rating of each asset.

Only Storm Water Lines are included in the risk analysis.

Storm Sewer		Probability				
		1	2	3	4	5
Consequence	1	$ 505,190	$ 5,184,697	$ 85,876	$ 608,629	$ 212,828
		721.7 m	7406.71 m	122.68 m	869.47 m	304.04 m
	2	$ 400,344	$ 6,109,138	$ 656,341	$ 1,452,262	$ -
		571.92 m	8727.34 m	937.63 m	2074.66 m	0 m
	3	$ 92,610	$ 1,324,204	$ 367,367	$ 572,635	$ -
		132.3 m	1891.72 m	524.81 m	818.05 m	0 m
	4	$ -	$ 1,696,996	$ 60,025	$ 152,866	$ -
		0 m	2424.28 m	85.75 m	218.38 m	0 m
	5	$ -	$ 1,067,507	$ -	$ 59,990	$ -
		0 m	1525.01 m	0 m	85.7 m	0 m

Asset Prioritization List

The following table identifies the highest risk Storm Water Lines according to the risk criteria identified in Appendix E. The risk rating is calculated by multiplying the probability of failure and the consequence of failure for each asset.

ID	Description	Replacement Value (2022)	Condition	Risk Rating
SS003	Chesterville - Ralph St, 30 to Casselman - Concrete - 900mm/26.18m	$18,326	Poor	16
SS006	Chesterville - Casselman St, Ralph to Water - Concrete - 900mm/96.5m	$67,550	Poor	16
SS117	Chesterville - Hummel St, 26 to Main - Concrete - 750mm/95.7m	$66,990	Poor	16
SS065	Winchester - Albert St, Caleb intersection (S) to 471 (Main) backyard - Concrete - 1500mm/65m	$45,500	Poor	20
SS221	Winchester - Albert St, 515 S end northward to SS060 - Plastic - 1500mm/20.7m	$14,490	Poor	20

Due to the outdated nature of the information regarding storm sewers, the assessment from 2006/2007 of Winchester and Chesterville's storm sewers is be used as a guide. A plan is put in place to conduct another outsourced study. The most recent study outlined in-use segments which were inadequate, as well as areas where no storm sewer line existed, but one was recommended.

The segments flagged were as follows by meter length:

Winchester	Section	Inadequate	Recommended
Ottawa	Main to Dufferin	209.00	-
Dufferin E	Ottawa to dead end	233.00	-
Centre	North to Queen		207.00
North	Centre to Ottawa		184.00
Queen	Ottawa to 432		190.00
Gladstone	462 to dead end		49.00
Alexander	476 to dead end		60.00
Gladstone	Main to 462	160.00	-
Alexander	Main to 476	298.00	-
Whitney	Main to dead end	102.00	-
Dufferin W	Annable to dead end		121.00
Annable	Dufferin to Howard		195.00
Howard	Dufferin to Main		228.00
Bailey	476 to 489		40.00
Dufferin W	Bailey to 582		27.00
Bailey	Main to Winfield		
Holmes	dead end to dead end		141.00
Bailey	Holmes to Dufferin		85.00
Louise	Main to Church	92.00	-
Church	St Lawrence to 542	363.00	-
Victoria	St Lawrence to Louise S		135.00
Victoria	Louise S to Cass	90.00	-
Louise S	Victoria to Clarence		105.00
Clarence	St Lawrence to Cass	231.00	-
Cass	Clarence to 539	57.00	-
Clarence	Cass to 533		
Louise S	Clarence to Fred		292.00
York	Louise S to St Lawrence		130.00
Fred	St Lawrence to Louise S	135.00	-
Fred	Louise S to 530		193.00
Louise S	Fred to 599		123.00
Henderson	Louise to Louise		312.00
Anne	St Lawrence to dead end		100.00
Quart	Sesame to dead end		45.00
Albert	Fred to Sesame		
Fred	496 to 464	212.00	-
Fred	464 to dead end		192.00
Wichers	Fred to May		141.00
May	456 to dead end		188.00
York	454 to 450		28.00
York	482 to Albert	53.00	-
May	Albert to 493		
May	493 to St Lawrence	94.00	-
Clarence	St Lawrence to Albert		145.00
Albert	Clarence to Caleb	205.00	-
Victoria	Albert to St Lawrence	187.00	-
Caleb	Albert to St Lawrence	194.00	-
Victoria	Albert to 462		100.00
		2,915.00	**3,756.00**

Chesterville	Section	Inadequate	Recommended
Howard	Main to dead end	415.60	
John	Francis to dead end		
Francis	Joseph to dead end		
Joseph	Francis to 66 driveway		
Queen	Industrial to 114		
Industrial	Queen to Brannen	273.00	
Industrial	Brannen to dead end		
Mary	Main to Armstrong	324.00	
Armstrong	Mary to Cul de Sac	73.00	
College	Church to South St	366.00	
Faubert	South to Thompson		330.00
Thompson	Faubert to Faubert		261.00
Harper	dead end to dead end		
		1,451.60	**591.00**

This is not meant to be a definitive list of how the municipality should prioritize assets for rehabilitation and replacement. It is meant to be a decision-support tool that is supplemented by the knowledge and expertise of municipal staff when prioritizing capital needs. In some cases, assets may have a higher risk rating than expected due to a lack of available data (e.g., no assessed condition data).

Levels of Service

The following tables identify the municipality's current level of service for the Storm Sewer Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Storm Sewer Network.

Service Attribute	Qualitative Description	Current LOS
Scope	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater system.	North Dundas' Storm Management system includes Storm Lines in the largest rural settlements of Chesterville and Winchester, as well as Catch Basin protection across Chesterville, Winchester, Mountain, South Mountain, Inkerman, and Winchester Springs. A network of ditches, municipal drains, and culverts are used to service users outside of these specified settlements. The system was designed to withstand a five-year storm event.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Storm Sewer Network.

Service Attribute	Technical Metric	Current LOS
Scope	Percentage of properties in municipality resilient to a 100-year storm event.	No reliable data available.
Scope	Percentage of the municipal stormwater management system resilient to a 5-year storm event.	60.36% Assessment encompassing only data from 2006, and does not factor in work done since then. A Study is being planned to properly assess all functions of the Storm Water Network to better answer this Level of Service.
Performance	Capital re-investment Rate	0.002%

Recommendations

Data Review/Validation

- Continue to review and validate inventory data, assessed condition data and replacement costs for all storm sewer.

Condition Assessment Strategies

- Establish a routine condition assessment process for storm sewer mains. This may include the use of CCTV cameras to inspect a portion of the stormwater network on a regular cycle. Assets can be prioritized for assessment according to their age and/or risk of failure.

Risk Management Strategies

- This AMP includes a cursory review of risk and criticality. The municipality should work towards developing a formal risk management process to inform project prioritization and lifecycle management strategies with the goal of minimizing risk. In the short term, staff should review the highest risk assets and establish appropriate risk mitigation strategies.

Lifecycle Management Strategies

- Identify the cost/benefit of optional lifecycle management strategies that may extend the life of storm sewer mains at a lower total cost of ownership. This may include the strategic use of structural pipe re-lining events.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the municipality believe to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

Water Network

Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the municipality's Water Network inventory.

Asset Type	Quantity	Units	Est. Replacement Cost	Cost Source
Water Lines	60,548.18	m	$36,328,908	2022 Neighbouring Township's Unit Cost
Facilities	8 / 4,275	Locations / Combined ft^2	$8,053,610*	2021 CPI
Water Towers	2 / 2,868	m^3	$1,871,000	2021 CPI
Valves	504	Structure	$2,520,000	2022 Neighbouring Township's Unit Cost
Hydrants	227	Structure	$1,702,500	2022 Neighbouring Township's Unit Cost
Water Meters	1919	Structure	$912,600	2019-2021 Historical Expense
TOTAL			**$51,388,618**	

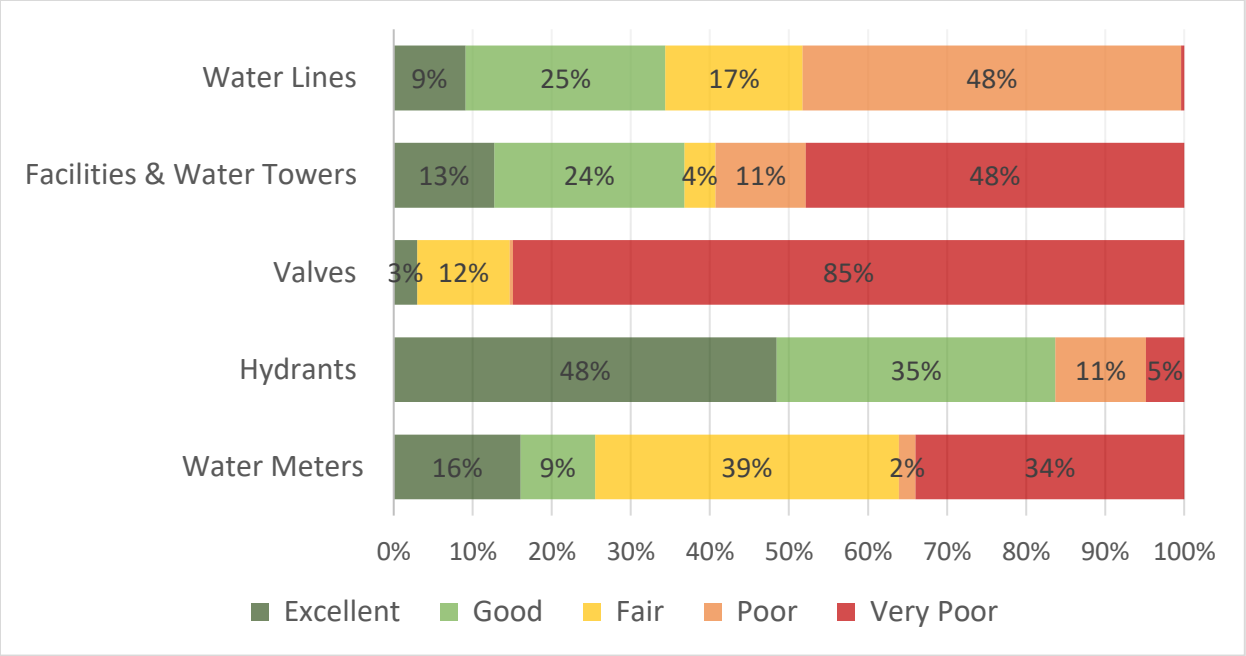
*To be reviewed by the Building Condition Assessment Study to be completed summer 2022.

Current Asset Condition

The following table identifies the source of available condition data and the average condition rating for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Classes	Average Condition (%)	Average Condition Rating	Condition Source
Water Lines	51.51	Fair	Age-Based
Facilities	35.48	Poor	Age-Based
Water Towers	48.73	Fair	Age-Based
Valves	0.61*	Very Poor*	Age-Based
Hydrants	72.42	Good	Age-Based
Water Meters	41.45	Fair	Age-Based

*Valves are replaced in parts. Due to this, a full replacement is very rarely accounted for. This distorts the age-based data.



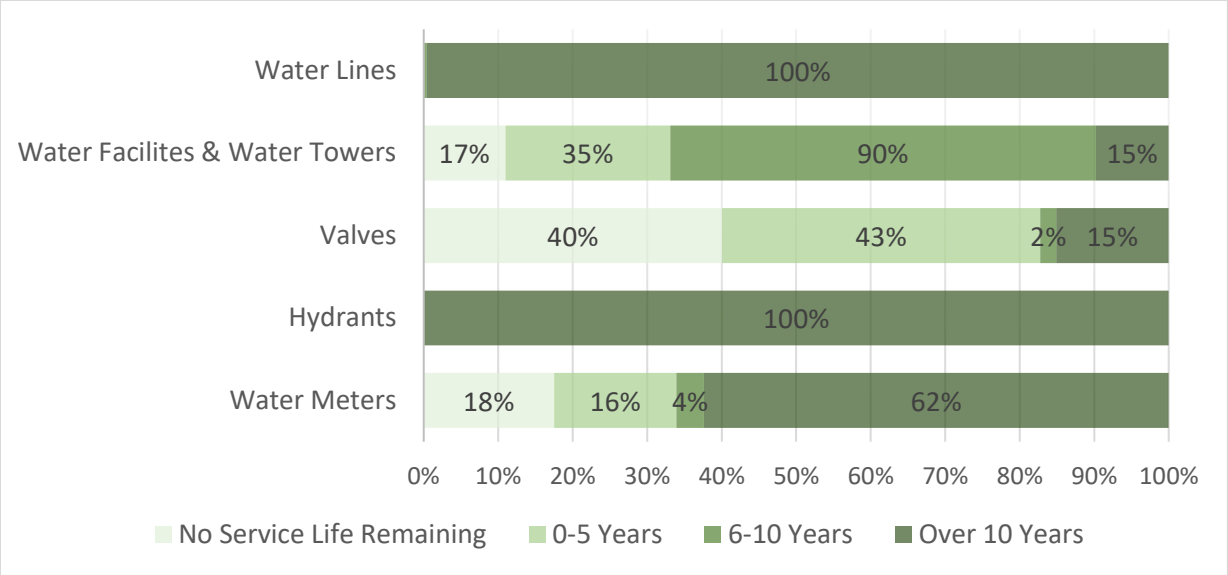
To ensure that the municipality's Water Network continues to provide an acceptable level of service, the municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the organization's Water Network.

Estimated Useful Life & Average Age

The Estimated Useful Life for Water Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age. It should be noted that assessed condition may increase or decrease the average service life remaining.

Asset Classes	Estimated Useful Life	Average Age (Yrs)	Average Service Life Remaining (Yrs)
Water Lines	96	44	46.64
Facilities & Water Tower	35**	24	16.72
Valves	50	50	0.31*
Hydrants	76	21	55.19
Water Meters	20	12	6.82

*Valves are replaced in parts. Due to this, a full replacement is very rarely accounted for. This distorts the age-based data.
**Averaged



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Asset Management Strategies

Condition Assessment & Data Collection

- There is no formally documented condition assessment program for Water infrastructure, although there is a budget for acoustic leak detection that helps to inform the municipality's maintenance strategy.
- Without physical condition assessment data, staff use break history, pipe material and age to determine the appropriate lifecycle strategy.
- A Building Condition Assessment is being performed for the Facilities and should be completed by summer 2022.

Lifecycle Management Strategy

Operations & Maintenance

- As required by provincial regulations, the municipality maintains a detailed operational plan that defines and documents the Quality Management System (QMS) for the water distribution systems. These systems are operated by Ontario Clean Water Agency (OCWA).
- OCWA is responsible for regular flushing of dead-end system main lines, system pressure regulator valve testing, and valve exercising. They are also responsible for the maintenance of all equipment within the distribution system.
- All maintenance is completed within government regulations.

Rehabilitation & Replacement

- OCWA is responsible for determining the need of replacement parts within the infrastructure and add them to a capital replacement plan to be provided to the municipality.

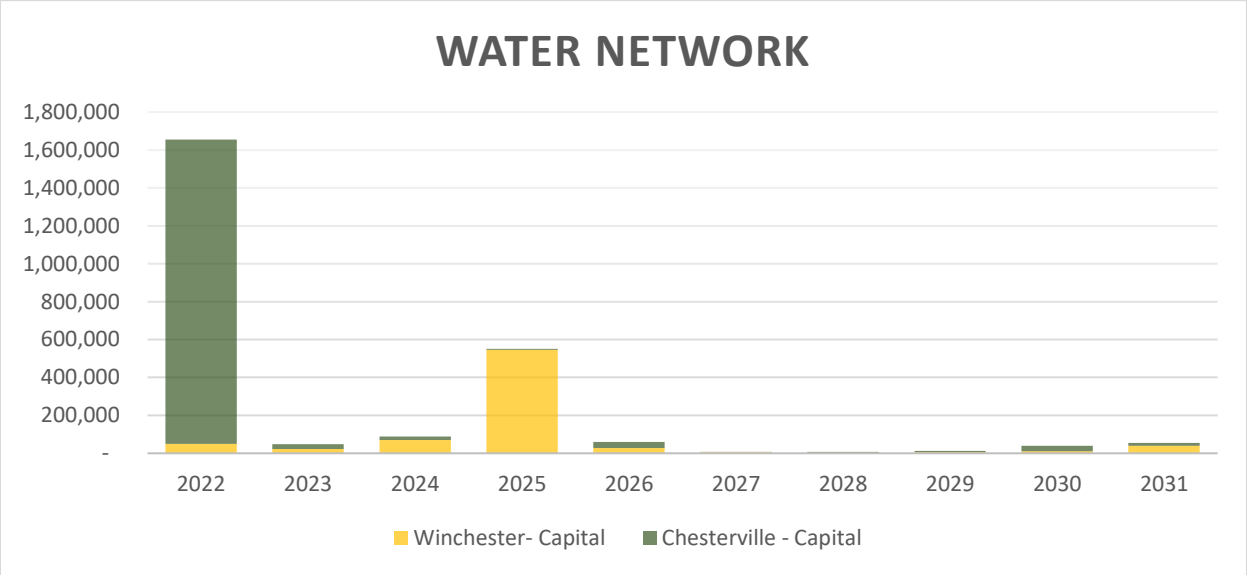
- There is an emphasis on replacing older water mains that are not PVC (e.g., transit or ductile iron) with PVC pipes that are expected to last longer and have a lower failure rate.
- Rehabilitation and reconstruction projects are completed when they can be combined with other capital projects (e.g., water mains, roads) to minimize service disruptions**.**
- Capital projects are included in the 10-year capital plan.

Forecasted Capital Requirements

Based on the assumption that all assets will require replacement at the end of their service life, the following graph forecasts capital requirements for water infrastructure. The annual capital requirement represents the average amount per year that the municipality should allocate towards funding rehabilitation and replacement needs as recommended by OCWA.

The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix C.

Annual Capital Requirement
$830,982



Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix E for the criteria used to determine the risk rating of each asset.

Water Lines		Probability				
		1	2	3	4	5
Consequence	1	$ -	$ -	$ 273,612	$ 8,838	$ -
		0 m	0 m	456.02 m	14.73 m	0 m
	2	$ 625,704	$ 708,300	$ 4,387,644	$ 9,073,986	$ 145,800
		1042.84 m	1180.5 m	7312.74 m	15123.31 m	243 m
	3	$ 2,610,000	$ 8,350,158	$ 1,460,064	$ 1,993,158	$ -
		4350 m	13916.93 m	2433.44 m	3321.93 m	0 m
	4	$ 68,880	$ 121,914	$ 176,250	$ 6,320,400	$ -
		114.8 m	203.19 m	293.75 m	10534 m	0 m
	5	$ -	$ -	$ 4,200	$ -	$ -
		0 m	0 m	7 m	0 m	0 m

Asset Prioritization List

The following table identifies the highest risk Water Lines according to the risk criteria identified in Appendix E. The risk rating is calculated by multiplying the probability of failure and the consequence of failure for each asset.

ID	Description	Replacement Value (2022)	Condition	Risk Rating
WL758	Winchester - County Rd 3, 139m West of 13077, across ditch - DI - 500mm/7m	$4,200	Fair	15
WL621	Winchester - County Rd 3, 12188 Ottawa to first tree line northward - DI - 300mm/194m	$116,400	Poor	16
WL622	Winchester - County Rd 3, WL621 to after northward farm - DI - 300mm/305m	$183,000	Poor	16
WL623	Winchester - County Rd 3, North of farm closest to town - DI - 300mm/3m	$1,800	Poor	16
WL624	Winchester - County Rd 3, WL622 to curb of Cayer - DI - 300mm/520m	$312,000	Poor	16
WL625	Winchester - County Rd 3, 122.8m West of 13077, East side of ditch - 150mm/25m	$15,000	Poor	16
WL626	Winchester - County Rd 3, across Cayer eastward to before 12401 - DI - 300mm/473m	$283,800	Poor	16
WL627	Winchester - County Rd 3, 13109 - 3m	$1,800	Poor	16
WL628	Winchester - County Rd 3, WL626 to 12445 - DI - 300mm/548m	$328,800	Poor	16
WL629	Winchester - County Rd 3, #628 to before 12494 - DI - 300mm/364m	$218,400	Poor	16
WL630	Winchester - County Rd 3, south of 12494 - DI - 300mm/5m	$3,000	Poor	16

WL631	Winchester - County Rd 3, WL629 to 50m before 12553 lane - DI - 300mm/588m	$352,800	Poor	16
WL632	Winchester - County Rd 3, 50m south of 12553 lane - DI - 300mm/3m	$1,800	Poor	16
WL633	Winchester - County Rd 3, WL631 to across N Wing Rd - DI - 300mm/500m	$300,000	Poor	16
WL634	Winchester - County Rd 3, north of N Wing - DI - 300mm/5m	$3,000	Poor	16
WL635	Winchester - County Rd 3, WL633 to 185m east of 2nd field entrance - DI - 300mm/500m	$300,000	Poor	16
WL636	Winchester - County Rd 3, 185m east of 2nd field entrance - DI - 300mm/3m	$1,800	Poor	16
WL637	Winchester - County Rd 3, WL635 to 230m before tree line - DI - 300mm/492m	$295,200	Poor	16
WL638	Winchester - County Rd 3, 230m west of tree line towards Thompson - DI - 300mm/1m	$600	Poor	16
WL639	Winchester - County Rd 3, WL637 to 12735 - DI - 300mm/530m	$318,000	Poor	16
WL640	Winchester - County Rd 3, 12735 to 38m east of 12785 - DI - 300mm/550m	$330,000	Poor	16
WL641	Winchester - County Rd 3, WL640 to 25m east of 12845 - DI - 300mm/500m	$300,000	Poor	16
WL642	Winchester - County Rd 3, 38m east of 12785 - DI - 300mm/2m	$1,200	Poor	16
WL643	Winchester - County Rd 3, WL641 to 40m before 12920 - DI - 300mm/474m	$284,400	Poor	16
WL644	Winchester - County Rd 3, 40m west of 12920 - DI - 300mm/3m	$1,800	Poor	16
WL645	Winchester - County Rd 3, WL643 to 140m before Steen - DI - 300mm/466m	$279,600	Poor	16
WL646	Winchester - County Rd 3, 140m west of Steen - DI - 300m/5m	$3,000	Poor	16
WL647	Winchester - County Rd 3, WL645 to 180m before culvert - DI - 300mm/386m	$231,600	Poor	16
WL648	Winchester - County Rd 3, WL647 to 50m past 13096 - DI - 300mm/560m	$336,000	Poor	16
WL649	Winchester - County Rd 3, WL648 to 13109 - DI - 300mm/70m	$42,000	Poor	16
WL650	Winchester - County Rd 3, WL649 up Lafleur 164m - DI - 300mm/643m	$385,800	Poor	16

WL651	Winchester - Lafleur Rd, north of CR3 - DI - 300mm/5m	$3,000	Poor	16
WL652	Winchester - Lafleur Rd, WL650 to 190m south of 1780 - DI - 300mm/596m	$357,600	Poor	16
WL653	Winchester - Lafleur Rd, WL652 to 408m north of 1780 - DI - 300mm/603m	$361,800	Poor	16
WL654	Winchester - Lafleur Rd, WL653 to 25m before 13225 Thompson - DI - 300mm/588m	$352,800	Poor	16
WL655	Winchester - Thompson Rd, 35m west 13225 Thompson - DI - 300mm/5m	$3,000	Poor	16
WL656	Winchester - Lafleur Rd, 48m south of Thompson - DI - 300mm/5m	$3,000	Poor	16
WL657	Winchester - Ottawa St, 12188 - DI - 300mm/3m	$1,800	Poor	16
WL658	Winchester - County Rd 3, 100m west of culvert on WL648 - DI - 300mm/3m	$1,800	Poor	16
WL659	Winchester - County Rd 3, 12735 - DI - 300mm/1m	$600	Poor	16
WL660	Winchester - County Rd 3, between 12845 and 12859 - DI - 300mm/1m	$600	Poor	16
WL661	Winchester - Lafleur Rd, 100m south of 1780 - DI - 300mm/1m	$600	Poor	16
WL662	Winchester - Ottawa St, 12175 - DI - 300mm/2m	$1,200	Poor	16

This is not meant to be a definitive list of how the municipality should prioritize assets for rehabilitation and replacement. It is meant to be a decision-support tool that is supplemented by the knowledge and expertise of municipal staff when prioritizing capital needs. In some cases, assets may have a higher risk rating than expected due to a lack of available data (e.g., no assessed condition data).

Levels of Service

The following tables identify the municipality's current level of service for the Water Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Water Network.

Service Attribute	Qualitative Description	Current LOS
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system.	North Dundas's Drinking Water System supplies user groups in the rural settlements of Chesterville (1.86km² / 1677 Population) and Winchester (2.26km² / 2394 Population). This area includes permanent residents, temporary residents, commercial businesses, farms, tourists, municipal staff, and emergency responders.
Scope	Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	All users with access to the North Dundas's Drinking Water System also has access to fire hydrant services.
Reliability	Description of boil water advisories and service interruptions.	In 2021, there were 0 Boil Water Events out of 1867 connected. In 2021, there were 2 Water Main Break Events (one in Winchester, one in Chesterville) affecting a total of 52 Properties out of 1867 connected, for a combined 2 days.
Performance	Capacity	As of year-end 2021, trends indicate system is maxed out during peak hours, but average demand on the system per day is reasonable.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Water Network.

Service Attribute	Technical Metric	Current LOS
Scope	Percentage of properties connected to the municipal water system.	27.8%
Scope	Percentage of properties where fire flow is available.	
Reliability	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.	0.00%
Reliability	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.	2.79%
Performance	Capital re-investment Rate	0.13%

Recommendations

Condition Assessment Strategies

- Establish a routine condition assessment process for the water network with OCWA's assistance. This may include the use of CCTV cameras to inspect a portion of the water network on a regular cycle. Assets can be prioritized for assessment according to their age and/or risk of failure.

Risk Management Strategies

- This AMP includes a cursory review of risk and criticality. The municipality should work towards developing a formal risk management process to inform project prioritization and lifecycle management strategies with the goal of minimizing risk. In the short term, staff should review the highest risk assets and establish appropriate risk mitigation strategies.

Lifecycle Management Strategies

- Identify the cost/benefit of optional lifecycle management strategies that may extend the life of water mains and lower the lower total cost of ownership. This may include the strategic use of structural pipe re-lining events.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the municipality believe to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

Wastewater Network

Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the municipality's Wastewater Network inventory.

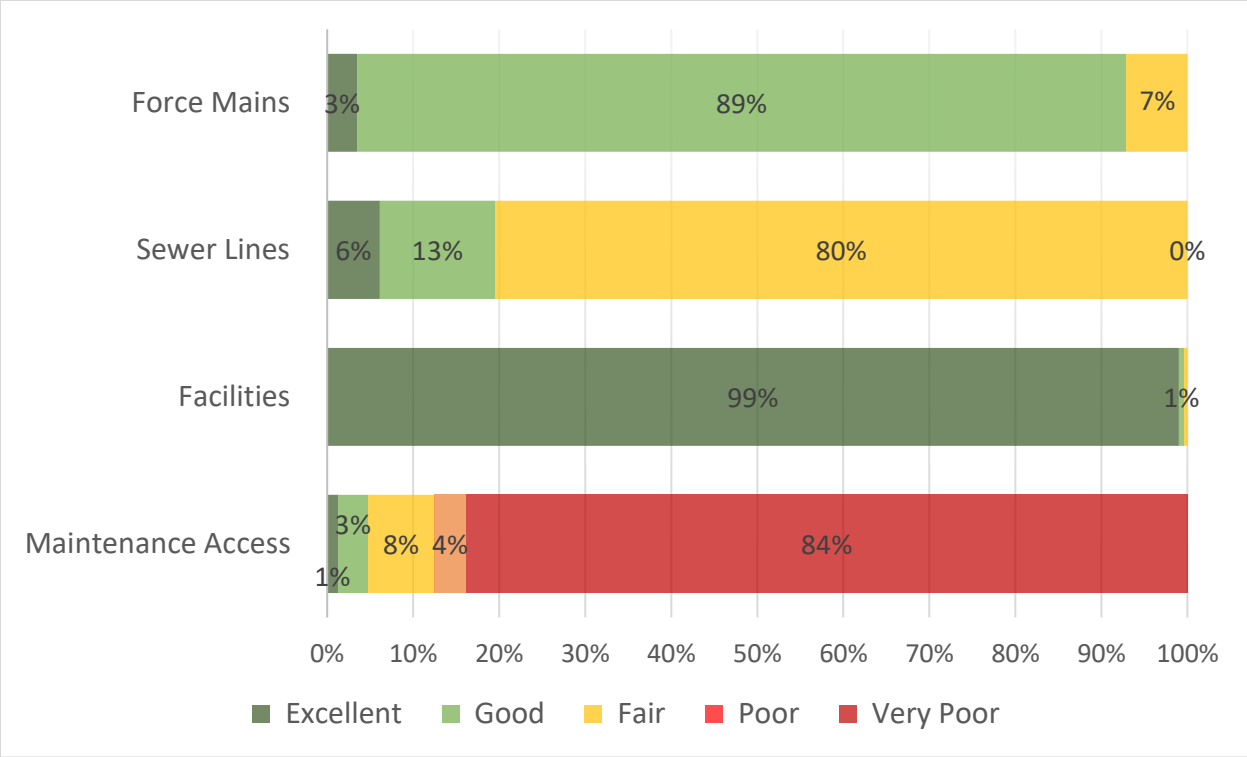
Asset Type	Quantity	Units	Est. Replacement Cost	Cost Source
Force Mains	9,766.42	m	$2,929,926	2022 Neighbouring Township Unit Cost
Sewer Lines	30,495.13	m	$24,396,104	2022 Neighbouring Township Unit Cost
Facilities	9 / 5,358	Locations / Combined ft²	$4,907,766	2021 CPI
Maintenance Access	465	Structure	$7,905,000	2022 Neighbouring Township Unit Cost
TOTAL			**$40,138,796**	

Current Asset Condition

The following table identifies the source of available condition data and the average condition rating for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Classes	Average Condition (%)	Average Condition Rating	Condition Source
Force Mains	74.56	Good	Age-Based
Sewer Lines	54.62	Fair	Age-Based
Facilities	22.52	Poor	Age-Based
Maintenance Access	7.02*	Very Poor*	Age-Based

*Maintenance Access points are replaced in parts. Due to this, a full replacement is very rarely accounted for. This distorts the age-based data.



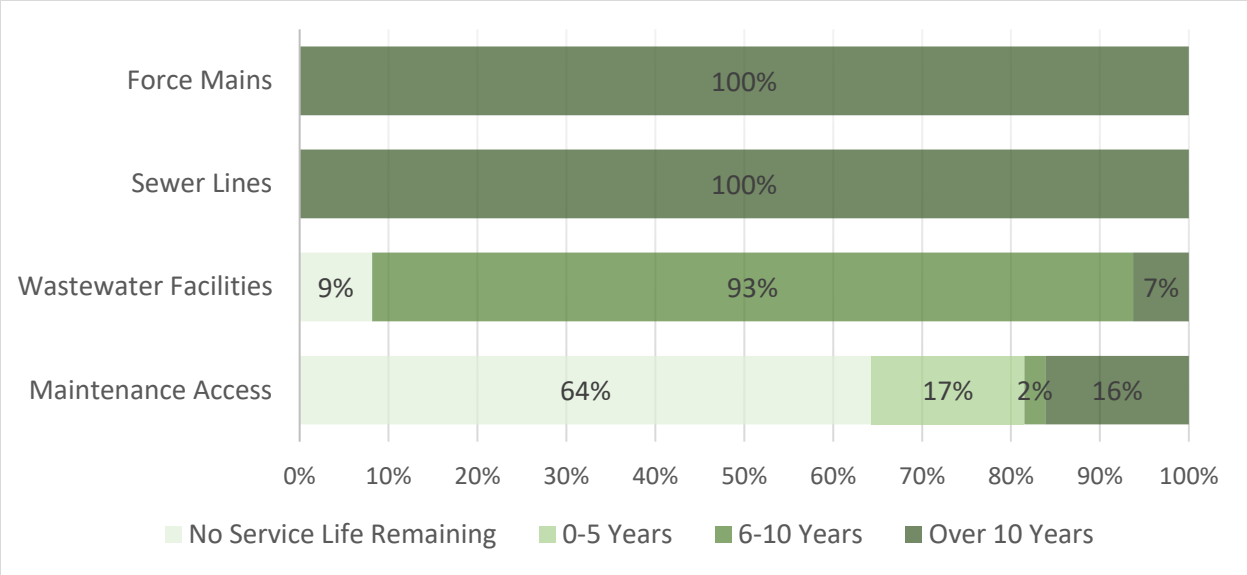
To ensure that the municipality's Wastewater Network continues to provide an acceptable level of service, the municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation, and replacement activities is required to increase the overall condition of the Wastewater Network.

Estimated Useful Life & Average Age

The Estimated Useful Life for Wastewater Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age. It should be noted that assessed condition may increase or decrease the average service life remaining.

Asset Classes	Estimated Useful Life	Average Age (Yrs)	Average Service Life Remaining (Yrs)
Force Mains	100	25	67.00
Sewer Lines	100	45	53.80
Facilities	31	25	17.06
Maintenance Access	50	46*	3.51*

*Maintenance Access points are replaced in parts. Due to this, a full replacement is very rarely accounted for. This distorts the age-based data.



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Asset Management Strategies

Condition Assessment & Data Collection

- OCWA is required to complete CCTV & acoustic testing on a portion of the collection system annually.
- Acoustic testing provides a rating that identifies the degree to which blockages are expected to be present. This data helps to inform further inspection (CCTV) and maintenance requirements.
- A Building Condition Assessment will be completed in summer 2022 which include wastewater facilities.

Lifecycle Management Strategy

Operations & Maintenance

- As required by provincial regulations, the municipality maintains a detailed operational plan that defines and documents the Quality Management System (QMS) for the wastewater distribution systems. These systems are operated by Ontario Clean Water Agency (OCWA).
- The system is inspected annually to ensure compliance with regulations mandated by the Ministry of the Environment.

Rehabilitation & Replacement

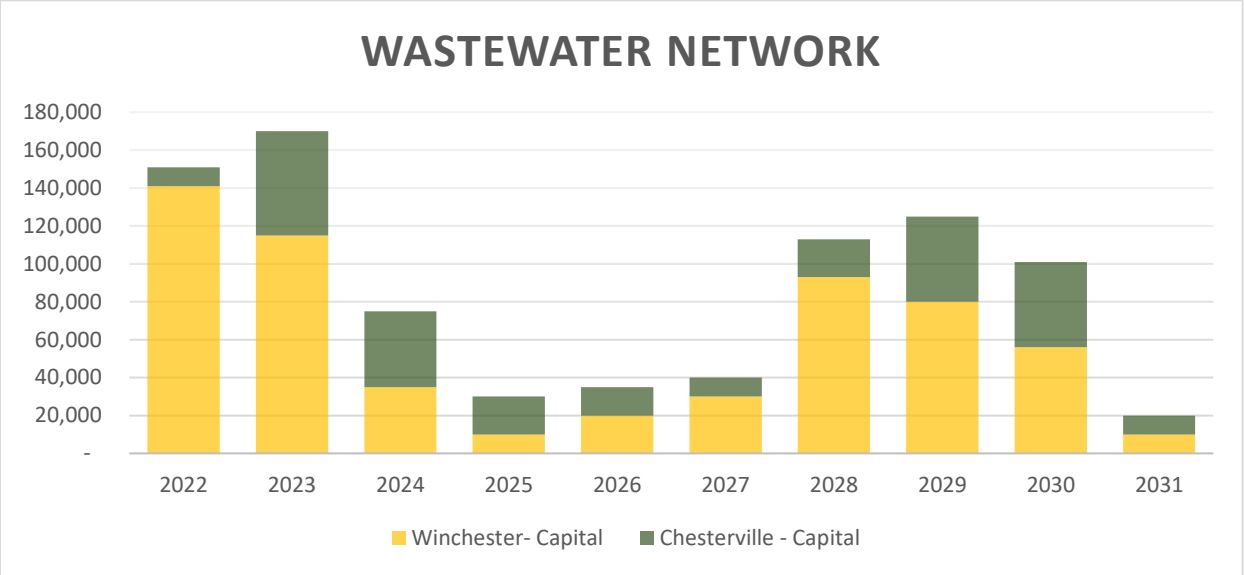
- The rehabilitation and replacement of sewer mains depends on several variables including pipe age, material and any concerns relating to capacity**.**
- Rehabilitation and reconstruction projects are completed when they can be combined with other capital projects (e.g., water mains, roads) to minimize service disruptions**.**
- Capital projects are included in the 10-year capital plan.

Forecasted Capital Requirements

Based on the assumption that all assets will require replacement at the end of their service life, the following graph forecasts capital requirements for wastewater. The annual capital requirement represents the average amount per year that the municipality should allocate towards funding rehabilitation and replacement needs as recommended by OCWA.

The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix C.

Annual Capital Requirement (Including Life Cycle Events)
$654,675



Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix E for the criteria used to determine the risk rating of each asset.

Only Sewer Lines and Force Mains are included in the risk assessment.

Wastewater Lines		Probability				
		1	2	3	4	5
Consequence	1	$ 102,426 341.42 m	$ - 0 m	$ - 0 m	$ - 0 m	$ - 0 m
	2	$ 337,248 421.56 m	$ 433,824 542.28 m	$ 16,551,794 21125.68 m	$ - 0 m	$ - 0 m
	3	$ 1,157,552 1446.94 m	$ 2,603,204 3731.13 m	$ 2,974,000 3717.5 m	$ - 0 m	$ - 0 m
	4	$ - 0 m	$ 2,651,638 8292.11 m	$ 240,832 301.04 m	$ - 0 m	$ - 0 m
	5	$ - 0 m	$ 194,768 243.46 m	$ 78,744 98.43 m	$ - 0 m	$ - 0 m

Asset Prioritization List

The following table identifies the highest risk Wastewater Lines according to the risk criteria identified in Appendix E. The risk rating is calculated by multiplying the probability of failure and the consequence of failure for each asset.

ID	Description	Replacement Value (2022)	Condition	Risk Rating
SL101	Winchester - Ottawa St, Main to 496 - AC - 600mm / 39.72m	$31,776	Good	10
SL102	Winchester - Ottawa St, 496 to towards 495 - AC - 600mm / 9.23m	$7,384	Good	10
SL103	Winchester - Ottawa St, 495 to Queen - AC - 600mm / 60.52m	$48,416	Good	10
SL107	Winchester - Ottawa St, Queen to 478 - AC - 600mm / 71.75m	$57,400	Good	10
SL108	Winchester - Ottawa St, 478 to Dufferin - AC - 600mm / 44.30m	$35,440	Good	10
SL109	Winchester - Ottawa St, Dufferin to across the street from 475 - AC - 600mm / 17.94m	$14,352	Good	10
SL277	Chesterville - Water St, 69 westward past Dam - AC - 375mm / 94.87m	$75,896	Fair	12
SL278	Chesterville - Water St, SL277 to the West corner - AC - 375mm / 29.37m	$23,496	Fair	12
SL279	Chesterville - Water St, SL278 to T near 50 - AC - 375mm / 54.58m	$43,664	Fair	12
SL280	Chesterville - Water St, T near 50 to Casselman - AC - 375mm / 93.41m	$74,728	Fair	12

SL482	Chesterville - Water St, 49 to T at 50 - AC - 375mm/28.81m	$23,048	Fair	12
SL100	Winchester - Main St, Albert to between 456/462 - AC - 600mm / 98.43m	$78,744	Fair	15

This is not meant to be a definitive list of how the municipality should prioritize assets for rehabilitation and replacement. It is meant to be a decision-support tool that is supplemented by the knowledge and expertise of municipal staff when prioritizing capital needs. In some cases, assets may have a higher risk rating than expected due to a lack of available data (e.g., no assessed condition data).

Levels of Service

The following tables identify the municipality's current level of service for the Wastewater Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Wastewater Network.

Service Attribute	Qualitative Description	Current LOS
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	North Dundas's Wastewater System supplies user groups in the rural settlements of Chesterville (1.86km2 / 1677 Population) and Winchester (2.26km2 / 2394 Population). This area includes permanent residents, temporary residents, farms, commercial businesses, tourists, municipal staff, and emergency responders.
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes.	There are no combined sewers in Chesterville or Winchester.
Reliability	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches.	
Reliability	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes.	This is often cause by improper residential connections to the sanitary sewer system, whereby water from sump pumps and downspouts are directed to the sanitary.
Reliability	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events of stormwater getting into the sanitary sewers.	Inspections of the systems are performed on a routine basis. A third party is contracted to flush and camera inspection a portion of the system each year. Any deficiencies noted during the inspections are identified and corrected.
Reliability	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	Municipal wastewater in Chesterville and Winchester is treated at facultative lagoons and discharged to the South Nation River. Effluent volumes and quality results are available in the annual reports generated for the systems each year.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by Wastewater Network.

Service Attribute	Technical Metric	Current LOS
Scope	Percentage of properties connected to the municipal wastewater system.	27.8%
Reliability	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.	There are no combined sewers in Chesterville or Winchester.
Reliability	The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.	0.21% 1 Wastewater Backup Event affecting a total of 4 Properties out of 1867 connected, for a combined 1 day.
Reliability	The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.	0.11% 2 Effluent Violation Events compared to a total of 1867 Properties Connected.
Performance	System Capacity (Average Flow)	*Chesterville* 1,660 m^3/day Capacity 0% of Total Flow Exceeded Capacity in 2021
		Winchester 2,220 m^3/day Capacity 0.04% of Total Flow Exceeded Capacity in 2021
Performance	System Capacity (Maximum Flow)	*Chesterville* 0.82% of Total Flow Exceeded Capacity in 2021
		Winchester 1.26% of Total Flow Exceeded Capacity in 2021
Performance	Capital re-investment Rate	0.06%

Recommendations

Condition Assessment Strategies

- Establish a routine condition assessment process for the Wastewater network with OCWA's assistance. This may include the use of CCTV cameras to inspect a portion of the Wastewater network on a regular cycle. Assets can be prioritized for assessment according to their age and/or risk of failure.

Risk Management Strategies

- This AMP includes a cursory review of risk and criticality. The municipality should work towards developing a formal risk management process to inform project prioritization and lifecycle management strategies with the goal of minimizing risk. In the short term, staff should review the highest risk assets and establish appropriate risk mitigation strategies.

Lifecycle Management Strategies

- Identify the cost/benefit of optional lifecycle management strategies that may extend the life of sanitary mains at a lower total cost of ownership. This may include the strategic use of structural pipe re-lining events.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the municipality believe to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

Buildings

It should be noted that the municipalities Buildings are currently undergoing a contracted Condition Assessment Study by Roth IAMS. It is due to be completed in summer 2022, and so this section should be viewed as a courtesy overview only until an update is done in the near future.

Aspects of our current data which are the most unreliable are accented via an asterisk (*).

Asset Inventory & Replacement Cost

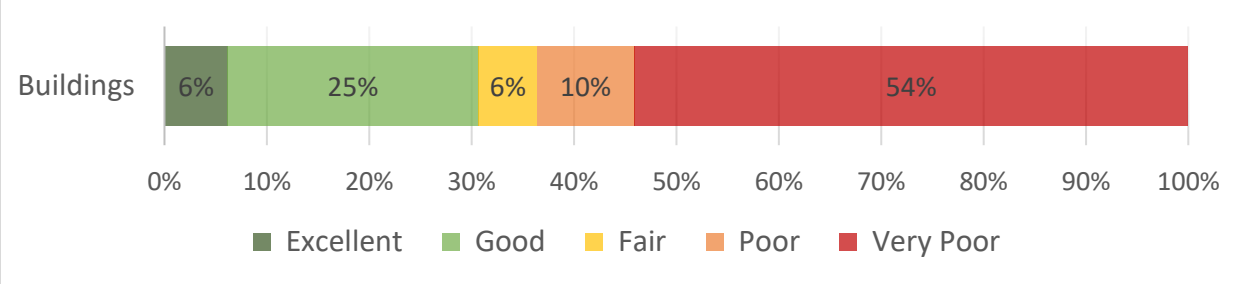
The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the municipality's Building and Facilities inventory.

Asset Type	# of Structures	Combined Units	Units	Est. Replacement Cost	Cost Source
Buildings	45	184,436	ft^2	$16,612,900*	2021 NRBCPI
TOTAL				**$16,612,900***	

Current Asset Condition

The following table identifies the source of available condition data and the average condition rating for each asset segment. For this AMP, Buildings is being assessed as a combined asset, but will be compartmentalized in the future. The Average Condition (%) is a weighted value based on replacement cost of the structures as well as the components.

Asset Classes	Average Condition (%)	Average Condition Rating	Condition Source
Buildings	17.95*	Very Poor*	Age-Based



To ensure that the municipality's Buildings continue to provide an acceptable level of service, the municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation, and replacement activities is required to increase the overall condition of the buildings.

Estimated Useful Life & Average Age

The Estimated Useful Life for Buildings assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Classes	Estimated Useful Life	Average Age (Yrs)	Average Service Life Remaining (Yrs)
Buildings	46*	26	17.88

Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Asset Management Strategies

Condition Assessment & Data Collection

- The municipality is responsible for the condition of all Buildings, and will be relying on information gained from a Building Condition Assessment Study outsourced to Roth IAMS, scheduled to be completed summer 2022.

Lifecycle Management Strategy

Operations & Maintenance

- The municipality is responsible for the condition of all Buildings, and will be relying on recommendations of the Building Condition Assessment Study to plan future costs.
- Roof sealing, plumbing and electrical maintenance, painting/rust removal, filters and oil for internal components.

Rehabilitation & Replacement

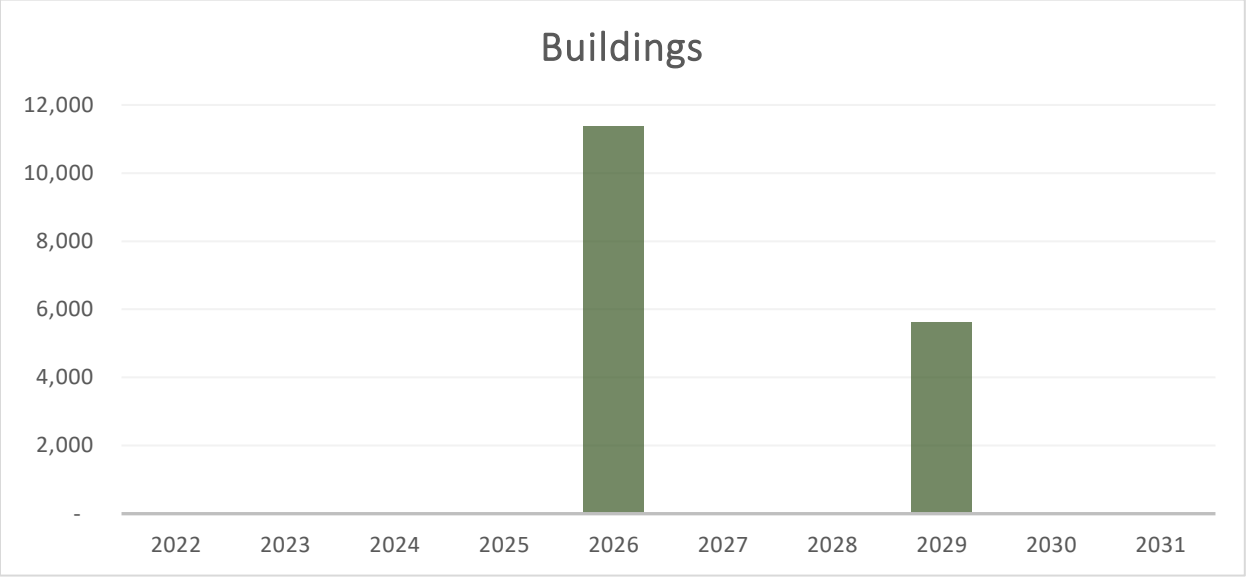
- The rehabilitation and replacement of Buildings depends on several variables including age, materials and any concerns relating to capacity**.**
- The Building Condition Assessment Study will be providing a breakdown per location of current and future needs for the next 15 years.
- Capital projects are included in the 10-year capital plan.

Forecasted Capital Requirements

Based on the assumption that all assets will require replacement at the end of their service life, the following graph* forecasts capital requirements for Buildings. The annual capital requirement represents the average amount per year that the municipality should allocate towards funding rehabilitation and replacement needs.

The projected cost of lifecycle activities anticipated to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix C.

Annual Capital Requirement
$361,150*



Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix E for the criteria used to determine the risk rating of each asset.

Buildings (Inc. Components)		Probability				
		1	2	3	4	5
Consequence	1	$ 432,788 52 asset(s)	$ 209,912 30 asset(s)	$ 192,709 18 asset(s)	$ 67,062 8 asset(s)	$ 89,912 11 asset(s)
	2	$ 218,351 6 asset(s)	$ 243,585 7 asset(s)	$ 89,293 3 asset(s)	$ 65,716 2 asset(s)	$ 85,006 2 asset(s)
	3	$ 415,087 5 asset(s)	$ 255,075 3 asset(s)	$ 236,065 3 asset(s)	$ - 0 asset(s)	$ 493,795 5 asset(s)
	4	$ 219,523 1 asset(s)	$ 416,374 2 asset(s)	$ 502,750 2 asset(s)	$ 447,751 2 asset(s)	$ 497,247 2 asset(s)
	5	$ 1,212,887 2 asset(s)	$ 4,269,626 6 asset(s)	$ - 0 asset(s)	$ 2,145,284 3 asset(s)	$ 3,807,098 3 asset(s)

Asset Prioritization List

The following table identifies the highest risk Buildings assets according to the risk criteria identified in Appendix E. The risk rating is calculated by multiplying the probability of failure and the consequence of failure for each asset.

ID	Description	Replacement Value (2021)	Condition	Risk Rating
BD021	Pool Building - 577 Main St, Winchester	$72,026	Very Poor	15
BD027	Public Works Maintenance Garage - 12715 Cty Rd 43, Winchester	$124,126	Very Poor	15
BD029	Old MTO Office - 12269 Cty Rd 43, Winchester	$107,298	Very Poor	15
BD044	Community Center/ Change Room - 10519 Kerrs Ridge Rd, Hallville	$70,807	Very Poor	15
BD048	Pavilion Building (Park) - 5 William St, Chesterville	$119,538	Very Poor	15
BD012	Fire Hall - 1650 County Road 1, Hallville	$255,858	Poor	16
BD014	Public Works Storage Garage - 12715 Cty Rd 43, Winchester	$191,893	Poor	16
BD008	Senior Support Centre - Winchester	$1,127,137	Poor	20
BD009	Nelson LaPrade Centre - 9 William St, Chesterville	$511,715	Poor	20
BD013	Fire Hall & PW/Rec Storage Facility - 3 Industrial Dr, Chesterville	$506,432	Poor	20
BD015	OCWA Office Building - 5 Industrial Drive	$322,486	Very Poor	20
BD045	Fire Hall (MW) - 21 Russell St, Morewood	$174,761	Very Poor	20
BD001	Arena & Community Centre (Joel Steele) - 577 Main St, Winchester	$1,444,851	Very Poor	25
BD002	Arena - 153 Queen St, Chesterville	$1,541,928	Very Poor	25
BD010	Fire Hall/ OPP Station/ Library - 547 St Lawrence St, Winchester	$820,319	Very Poor	25

This is not meant to be a definitive list of how the municipality should prioritize assets for rehabilitation and replacement. It is meant to be a decision-support tool that is supplemented by the knowledge and expertise of municipal staff when prioritizing capital needs. In some cases, assets may have a higher risk rating than expected due to a lack of available data (e.g., no assessed condition data).

Levels of Service

The following tables identify the municipality's current level of service for Buildings. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Buildings.

Service Attribute	Qualitative Description	Current LOS
Scope	Description of the buildings and facilities in the municipality.	North Dundas' buildings include emergency services, arenas, community centers, libraries, a museum, offices, garages, storage facilities, hazardous waste facilities, pavilions, pool buildings, rink houses, and a theatre.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by Buildings.

Service Attribute	Technical Metric	Current LOS
Scope	Max driving distance to an arena / pool.	21 km
Scope	Max driving distance to a library.	17 km
Performance	Reinvestment Rate	0.06%

Recommendations

Condition Assessment Strategies

- Review data gathered by Roth IAMS in the Building Assessment Study, and continue assessing buildings on a rotation in the future.
- Assets can be prioritized for assessment according to their age and/or risk of failure.
- Contract for an accessibility study in the near future.

Risk Management Strategies

- This AMP includes a cursory review of risk and criticality. The municipality should work towards developing a formal risk management process to inform project prioritization and lifecycle management strategies with the goal of minimizing risk. In the short term, staff should review the highest risk assets and establish appropriate risk mitigation strategies.

Lifecycle Management Strategies

- Identify the cost/benefit of optional lifecycle management strategies that may extend the life of buildings and facilities at a lower total cost of ownership.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the municipality believe to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

Land Improvements, Vehicles and Equipment

Asset Inventory & Replacement Cost

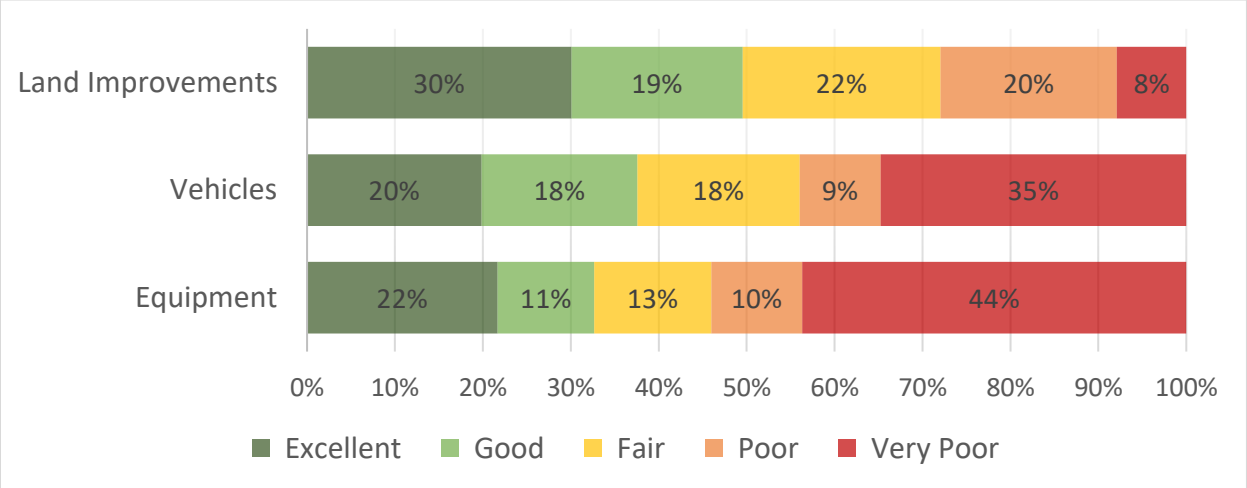
The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the municipality's Land Improvements, Vehicles and Equipment inventory.

Asset Type	Quantity	Est. Replacement Cost	Cost Source
Land Improvements	329	$10,142,000	2021 CPI
Vehicles	50	$6,117,800	2021 CPI
Equipment	340	$6,831,600	2021 CPI
TOTAL		**$23,091,400**	

Current Asset Condition

The following table identifies the source of available condition data and the average condition rating for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Classes	Average Condition (%)	Average Condition Rating	Condition Source
Land Improvements	56.35	Fair	Age-Based
Vehicles	30.11	Poor	Age-Based
Equipment	11.27	Very Poor	Age-Based



To ensure that the municipality's Land Improvements, Vehicles, and Equipment continue to provide an acceptable level of service, the municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine

what combination of maintenance, rehabilitation, and replacement activities is required to increase the overall condition of the Land Improvements, Vehicles, and Equipment

Estimated Useful Life & Average Age

The Estimated Useful Life for Land Improvements, Vehicles, and Equipment assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age. It should be noted that assessed condition may increase or decrease the average service life remaining.

Asset Classes	Estimated Useful Life	Average Age (Yrs)	Average Service Life Remaining (Yrs)
Land Improvements	40*	20	22.37
Vehicles	15*	10	3.19
Equipment	13*	15	1.53

*Averaged across various asset types

Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Asset Management Strategies

Condition Assessment & Data Collection

- The municipality is responsible for the condition of all Land Improvements, Vehicles, and Equipment.
- Annual Inspections for vehicles and major Equipment is most beneficial, with other more minor Equipment should be assessed on a performance basis when in use by staff.
- Land Improvements should be inspected annually by internal staff.

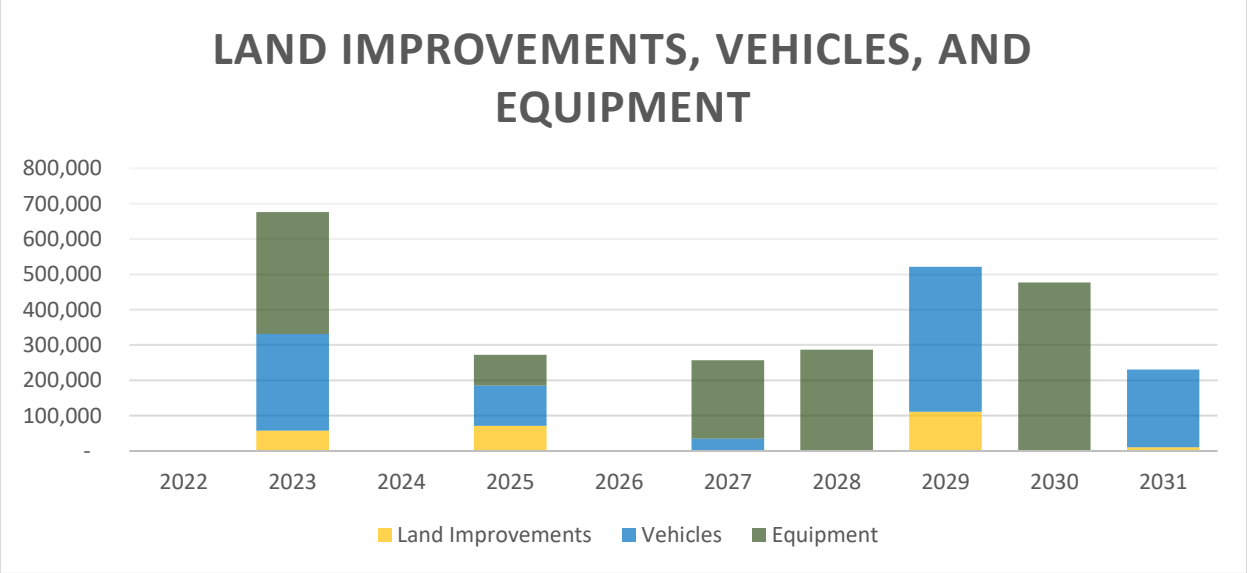
Rehabilitation & Replacement

- The rehabilitation and replacement of Land Improvements, Vehicles, and Equipment depends on several variables including age, materials and any concerns relating to performance and safety**.**
- Capital projects are included in the 10-year capital plan.

Forecasted Capital Requirements

Based on the assumption that all assets will require replacement at the end of their service life, the following graph forecasts capital requirements for Land Improvements, Vehicles, and Equipment. The annual capital requirement represents the average amount per year that the municipality should allocate towards funding rehabilitation and replacement needs.

Annual Capital Requirement
$253,550 (Land Improvements)
$407,853 (Vehicles)
$525,508 (Equipment)



Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix E for the criteria used to determine the risk rating of each asset.

Land Improv., Vehicles & Equipment		Probability				
		1	2	3	4	5
Consequence	1	$ 789,610 141 asset(s)	$ 392,957 70 asset(s)	$ 412,297 80 asset(s)	$ 352,753 78 asset(s)	$ 945,215 168 asset(s)
	2	$ 283,455 8 asset(s)	$ 524,449 16 asset(s)	$ 383,287 11 asset(s)	$ 337,803 9 asset(s)	$ 663,881 20 asset(s)
	3	$ 396,193 5 asset(s)	$ 332,878 4 asset(s)	$ 418,708 5 asset(s)	$ 390,995 4 asset(s)	$ 1,789,055 21 asset(s)
	4	$ 1,939,441 8 asset(s)	$ 1,284,528 7 asset(s)	$ 1,976,921 10 asset(s)	$ 1,014,238 6 asset(s)	$ 2,195,404 9 asset(s)
	5	$ 3,666,846 6 asset(s)	$ 432,410 1 asset(s)	$ 1,659,541 3 asset(s)	$ - 0 asset(s)	$ 508,455 1 asset(s)

Asset Prioritization List

The following table identifies the highest risk Land Improvements, Vehicles, and Equipment assets according to the risk criteria identified in Appendix E. The risk rating is calculated by multiplying the probability of failure and the consequence of failure for each asset.

ID	Description	Replacement Value	Condition	Risk Rating
EQ010a	15hp Pumps, Main Street, Winchester,	$98,304	Very Poor	15
EQ010b	15hp Pumps, Main Street, Winchester,	$98,304	Very Poor	15
EQ023	Chesterville Well # 6 Pump	$63,414	Very Poor	15
EQ059	Sky Jack 3220	$101,999	Very Poor	15
EQ090	1998 Mobark Chipper Winchester	$64,464	Very Poor	15
EQ092	1996 Champion Grader Winchester	$121,822	Very Poor	15
EQ093	1999 Superpac Roller Winchester	$72,382	Very Poor	15
EQ094	2004 Trackless Street Cleaner Winchester	$119,481	Very Poor	15
EQ095	2004 Trackless Street Cleaner Chesterville	$108,844	Very Poor	15
EQ103c	Jaws of Life Winchester	$51,640	Very Poor	15
EQ146	Olympia Millennium Ice Resurfacer	$99,169	Very Poor	15
EQ158	1986 Olympia Ice Resurfacer (Parade Use ONLY)	$106,070	Very Poor	15
EQ199	Used 2004 Case loader	$119,667	Very Poor	15
EQ213	CAT 252B2 Ma8 SSL With heat	$73,577	Very Poor	15
EQ236	Natural Gas Generator at Chesterville Reservoir	$62,358	Very Poor	15
EQ278	Olympia Millennium Ice Resurfacer	$95,642	Very Poor	15
LI063	Water Production Well, Production Well # 5	$71,122	Very Poor	15
LI072	Winchester Lagoon Cell 3, 12396 Ottawa Street North, Winchester	$427,600	Fair	15
LI073	Winchester Lagoon Cell 4, 12396 Ottawa Street North, Winchester	$526,803	Fair	15
LI077	Park Upgrade, 100 Club Park Revitalization Project - Landscaping	$705,138	Fair	15
LI080	Pool, Chesterville Pool/ Filter, 1 William Street, Chesterville, 019-002-35800	$54,099	Very Poor	15
VH002	2004 Chevrolet Silverado One Ton, SN: 1GBJC34254E284585	$53,314	Very Poor	15
VH011	2008 Chevrolet Silverado 4x4 (White), SN: 1GBJK34638E144482	$51,930	Very Poor	15
VH012	2005 International 4300 4x2 DT 466 220HP, SN: 1HTMMAAM55H123429	$101,452	Very Poor	15
EQ012c	25hp Pumps, Ottawa Street, Winchester,	$160,545	Poor	16
EQ147	2 New Compressor & New Tube Chiller	$134,347	Poor	16
LI064	Water Production Well, Production Well # 6	$174,263	Poor	16

VH023	2003 International Water Truck, SN: 1HTXHATT63J079713	$163,745	Poor	16
VH037	2009 International 7600, SN: 1HTWYAHT59J108356	$253,620	Poor	16
VH071	2007 International 7400 flatbed VIN# IHTWGAZT07J441157	$127,717	Poor	16
EQ012a	25hp Pumps, Ottawa Street, Winchester,	$160,545	Very Poor	20
EQ012b	25hp Pumps, Ottawa Street, Winchester,	$160,545	Very Poor	20
EQ091	1995 Champion Grader Winchester	$309,656	Very Poor	20
LI099	Recreational Fencing, Various Locations	$157,786	Very Poor	20
VH005	2004 International Tandem Dump Truck, SN: 1HTWYAHT24J083635	$257,782	Very Poor	20
VH007	2007 International Tandem Dump Truck, SN: 3HTWYAHT17N424024	$252,654	Very Poor	20
VH017	1998 FL80 Freightliner (Tanker Pumper 2B), SN: 1FVXJLCBXWH910313	$285,278	Very Poor	20
VH020	2007 International - Navistar Pump (pump # 3), Model #: 4400 SN: 1HTMKAZR77H405001	$324,178	Very Poor	20
VH022	1999 Freightliner Pumper, SN: 1FV6JJCB4XHB02396	$286,979	Very Poor	20
LI101	Floodlighting Equipment, Various Locations	$508,455	Very Poor	25

This is not meant to be a definitive list of how the municipality should prioritize assets for rehabilitation and replacement. It is meant to be a decision-support tool that is supplemented by the knowledge and expertise of municipal staff when prioritizing capital needs. In some cases, assets may have a higher risk rating than expected due to a lack of available data (e.g., no assessed condition data).

Levels of Service

The following tables identify the municipality's current level of service for Land Improvements, Vehicles, and Equipment. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Land Improvements, Vehicles, and Equipment.

Service Attribute	Qualitative Description	Current LOS
Scope	Description of the land improvements in the municipality.	Land improvements within North Dundas include berms, wells, lagoon cells, outdoor furnishings (picnic tables, benches, etc), fencing, recreational areas (baseball fields, soccer fields, etc), park equipment, and a boat launch.
Scope	Description of the vehicles owed by the municipality.	Vehicles in use in North Dundas include tanker trucks, plow trucks, garbage/recycling trucks, an ambulance, trailers, an ATV with rescue rigging, trucks, and multi-person vehicles.
Scope	Description of the equipment owed by the municipality.	Equipment in use in North Dundas include electronics (laptops, monitors, water meter readers, etc), tools (pumps, generators, jaws of life, post pounders, etc.), machinery (snowblowers, ice resurfacers, excavators, etc), fire gear (helmets, bunker gear, etc), furnishings (bunker gear washers, office chairs, etc), and storage containers.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by Land Improvements, Vehicles, and Equipment.

Service Attribute	Technical Metric	Current LOS
Performance	Reinvestment Rate	0.16% (Land Improvements)
		0.20% (Vehicles)
		0.09% (Equipment)

Recommendations

Condition Assessment Strategies

- Begin annual assessments of all township Land Improvements, Vehicles, and Equipment. Assets can be prioritized for assessment according to their age and/or risk of failure.
- There should be a focus placed on performance to determine if the asset is achieving if intended purpose.

Risk Management Strategies

- This AMP includes a cursory review of risk and criticality. The municipality should work towards developing a formal risk management process to inform project prioritization and lifecycle management strategies with the goal of minimizing risk. In the short term, staff should review the highest risk assets and establish appropriate risk mitigation strategies.

Lifecycle Management Strategies

- Identify the cost/benefit of optional lifecycle management strategies that may extend the life of land improvements, vehicles, and equipment at a lower total cost of ownership.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the municipality believe to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

Impacts of Growth

Planning for forecasted population growth will require the expansion of existing infrastructure and services. As growth-related assets are constructed or acquired, they should be integrated into the municipality's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the municipality will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

As per Figure 6 below, the Municipality estimates a population growth of roughly 4% every five years, or 0.745% annually. National annual inflations rates are expected to remain at 2%. It is the intention of the Municipality to keep pace with this growth rate in relation to infrastructure.

Year	Population
1956	7,699
1961	8,089
1966	7,984
1971	8,082
1976	8,760
1981	9,239
1986	9,851
1991	10,661
1996	11,064
2001	11,014
2006	11,095
2011	11,225
2016	11,278
2021	11,677
2026	12,151
2031	12,638

Area	Km²	Population (2021)	Density/km²
Total Municipality	503.21	11,278	22.42
Winchester	2.26	2,394	1,059.29
Chesterville	1.86	1,677	901.61

The desired Level of Service (LOS) for maintaining assets across the municipality is decided by using the life cycles of components, the intended use, and the average condition rating of to determine the optimal average condition rating. Using this, we can properly schedule preventative maintenance and replacement projects to adhere to that optimal standard.

Financial Strategy

For an asset management plan to be effective and meaningful, it must be integrated with financial planning and long-term budgeting. The development of a comprehensive financial plan will allow the Township of North Dundas to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

This financial strategy should include recommendations that avoid long-term funding deficits.

Financial Strategy Overview

This report will develop such a financial plan by presenting several scenarios for consideration and culminating with final recommendations. As outlined below, the scenarios will model different combinations of the following components:

1. The financial requirements for:
    a. Existing assets
    b. Existing service levels
    c. Requirements of contemplated changes in service levels
    d. Requirements of anticipated growth
2. Use of traditional sources of municipal funds:
    a. Tax levies
    b. User fees
    c. Reserves
    d. Debt
    e. Development charges
3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
4. Use of Senior Government Funds:
    a. Canada Community Building Fund (formerly known as the Gas Tax Fund)
    b. Ontario Community Infrastructure Fund (OCIF)
    c. Other grants

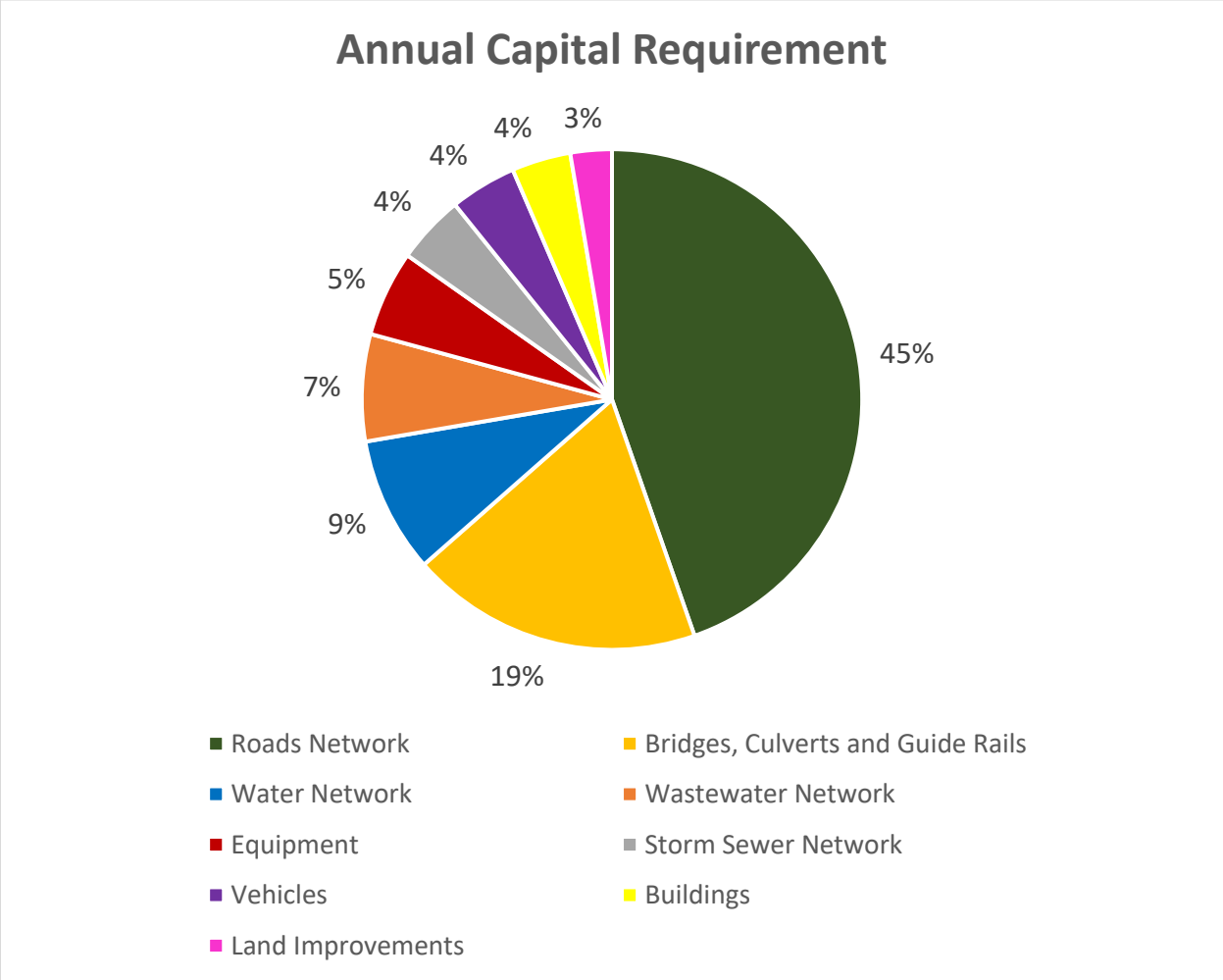
Note: Periodic grants are normally not included due to Provincial requirements for firm commitments. However, if moving a specific project forward is dependent on receiving a one-time grant, the replacement cost included in the financial strategy is the net of such grant being received.

If the financial plan component results in a funding shortfall, the province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the province may evaluate a municipality's approach to the following:

1. To reduce financial requirements, consideration has been given to revising service levels downward.
2. All asset management and financial strategies have been considered. For example:
    a. Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

Annual Requirements & Capital Funding

The annual requirements represent the amount the municipality should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability. In total, the municipality must allocate approximately $9.5 million annually to address capital requirements for the assets included in this AMP.



For most asset categories, the annual requirement has been calculated based on a “replacement only” scenario, in which capital costs are only incurred at the construction and replacement of each asset.

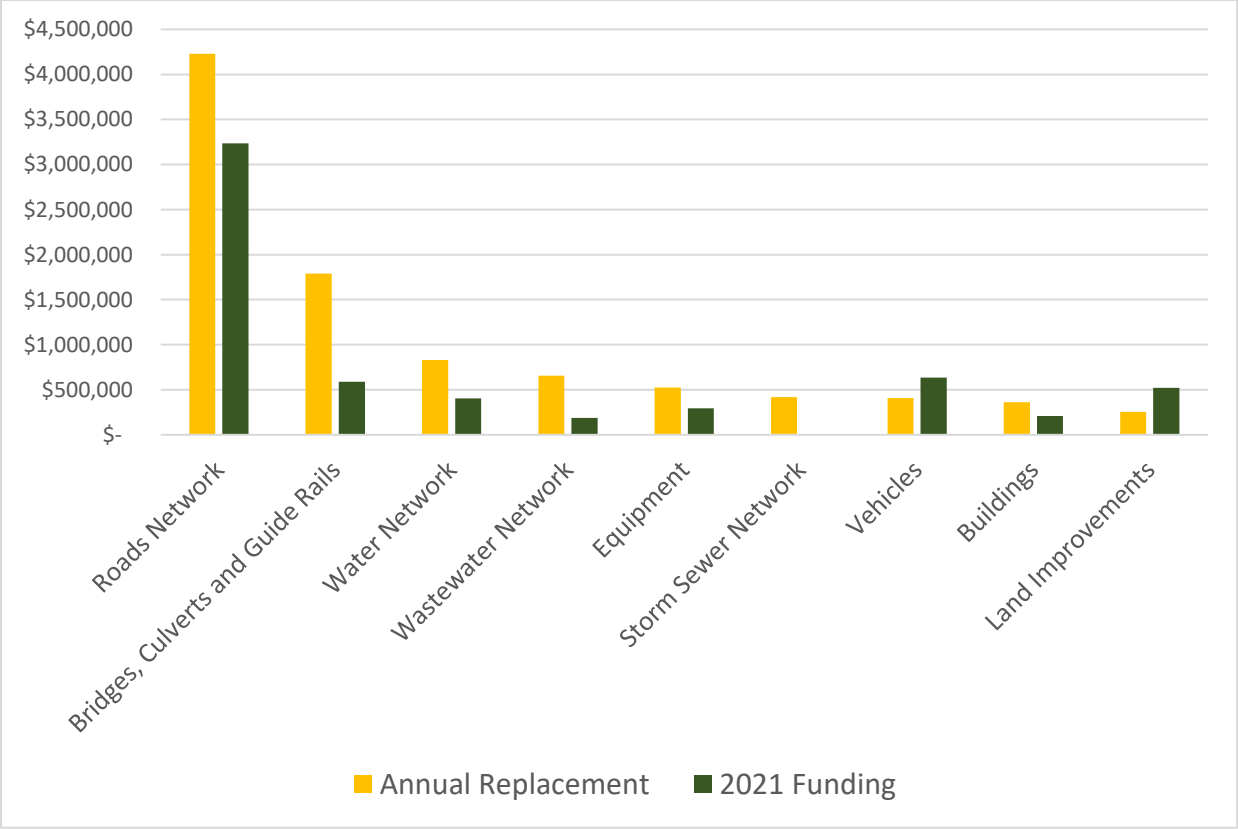
However, for the Road Network, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the municipality's roads. The development of this strategy allows for a comparison of potential cost avoidance if the strategy were to be implemented across all municipal roads. The following table compares two scenarios for the Road Network:

1. Replacement Only Scenario: Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.
2. Lifecycle Strategy Scenario: Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.

The implementation of a proactive lifecycle strategy for roads leads to a potential cost avoidance of approximately $34,000, or 7%, off the cost of every road km. Across all HCB roads, this would be a total savings of $9,136,140. As this is the lowest cost option available to the municipality, we have used this value in the development of the financial strategy.

Annual Funding Available

Based on the trend analysis for capital funding sources from 2019 to 2021, the municipality is committing approximately $6,079,110 towards capital projects annually. Given the annual capital requirement of $9,470,721, there is currently a funding gap of $3,391,311 annually.



Funding Objective

North Dundas aims to develop a strategy once in progress studies are completed (Buildings and Storm Water).

Financial Profile

As per O. Reg. 588/17, a financial plan is not required until July 1st, 2025.

Currently, the municipality has chosen to wait in a completed financial profile and detailed strategy until the Building Condition Assessment is completed in July 2022, as well as the assessment pertaining to Storm Water throughout the Township. Without this data, North Dundas' financial plans would be distorted, so it is instead going to be readdressed in the near future when all the data is accumulated.

Recommendation

- In 2024, Ontario Regulation 588/17 will require North Dundas to integrate proposed levels of service for all asset classes in its asset management plan update. We recommend that future planning should reflect adjustments to service levels and their impacts on reserve balances.
- In 2024, Ontario Regulation 588/17 will require a completed financial plan to assess funding gaps throughout municipal infrastructure. We recommend that future data gathering should reflect this requirement.

Appendices

Appendix A: Infrastructure Report Card

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Roads Network	B	Excellent	29%	B	Annual Requirement	$ 4,228,322	B
		Good	25%		Funding Available	$ 3,235,055	
		Fair	33%				
		Poor	5%				
		Very Poor	8%		(Deficit) / Surplus	$ (993,267)	

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Bridges, Culverts and Guide Rails	C	Excellent	27%	D	Annual Requirement	$ 1,788,449	D
		Good	47%		Funding Available	$ 590,580	
		Fair	20%				
		Poor	3%				
		Very Poor	3%		(Deficit) / Surplus	$ (1,197,869)	

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Storm Sewer Network	C	Excellent	4%	F	Annual Requirement	$ 419,931	D
		Good	47%		Funding Available	$ 5,733	
		Fair	28%				
		Poor	19%				
		Very Poor	2%		(Deficit) / Surplus	$ (414,198)	

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Water Network	C	Excellent	18%	D	Annual Requirement	$ 830,982	C
		Good	19%		Funding Available	$ 402,762	
		Fair	14%				
		Poor	15%				
		Very Poor	34%		(Deficit) / Surplus	$ (428,220)	

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Wastewater Network	C	Excellent	27%	D	Annual Requirement	$ 654,675	D
		Good	27%		Funding Available	$ 189,009	
		Fair	24%				
		Poor	1%				
		Very Poor	21%		(Deficit) / Surplus	$ (465,666)	

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Buildings	C	Excellent	6%	C	Annual Requirement	$ 361,150	C
		Good	25%		Funding Available	$ 207,175	
		Fair	6%				
		Poor	10%				
		Very Poor	54%		(Deficit) / Surplus	$ (153,975)	

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Land Improvements	B	Excellent	30%	A	Annual Requirement	$ 253,550	A
		Good	19%		Funding Available	$ 520,203	
		Fair	22%				
		Poor	20%				
		Very Poor	8%		(Deficit) / Surplus	$ 266,653	

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Vehicles	C	Excellent	20%	A	Annual Requirement	$ 407,853	B
		Good	18%		Funding Available	$ 633,573	
		Fair	18%				
		Poor	9%				
		Very Poor	35%		(Deficit) / Surplus	$ 225,720	

Asset Category	Asset Health (Condition)			Financial Capacity			Overall Grade
	Grade	Condition Ratings		Grade	Current Financial Capacity		
Equipment	C	Excellent	22%	C	Annual Requirement	$ 525,508	C
		Good	11%		Funding Available	$ 295,020	
		Fair	13%				
		Poor	10%				
		Very Poor	44%		(Deficit) / Surplus	$ (230,488)	

Appendix B: Infrastructure Report Card Description

Financial Capacity Grade	
% of Funding Current Available	Letter Grade Applicable
100%	A
99% - 75%	B
74% - 50%	C
49% - 25%	D
24% - 0%	F

Asset Health (Condition)		
Letter Grade Applicable	Condition Rating (Converted PCI, GCI, BCI, Age, etc)	Description
A	Excellent	Assets are new or recently rehabilitated.
B	Good	Assets are no longer new, but is fulfilling its function. Preventive maintenance is beneficial at this stage.
C	Fair	Deterioration is evident, but assets continue to fulfill its function. Preventive maintenance is beneficial at this stage.
D	Poor	Significant deterioration is evident, and service is at risk.
F	Very Poor	Assets are beyond expected life and has deteriorated to the point that it may no longer be able to fulfill its function.

Combined Rating		
Letter Grade Applicable	Rating	
A	Excellent	The asset is functioning and performing well; only normal preventive maintenance is required. The municipality is fully prepared for its long-term replacement needs based on its existing infrastructure portfolio.
B	Good	The municipality is well prepared to fund its long-term replacement needs but requires additional funding strategies in the short-term to begin to increase its reserves.
C	Fair	The asset's performance or function has started to degrade, and repair/rehabilitation is required to minimize lifecycle cost. The municipality is underpreparing to fund its long-term infrastructure needs. The replacement of assets in the short- and medium-term will be deferred to future years.
D	Poor	The asset's performance and function metrics are below the desired level and immediate repair/rehabilitation is required. The municipality is not well prepared to fund its replacement needs in the short-, medium- or long- term. Asset replacements will be deferred, and levels of service may be reduced.
F	Very Poor	The municipality is significantly underfunding its short-term, medium-term, and long-term infrastructure requirements based on existing funds allocation. Asset replacements will be deferred indefinitely. The municipality may have to divest some of its assets (e.g., bridge closures, arena closures) and levels of service will be reduced significantly.

Appendix C: 10-Year Capital Requirements

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Bridges and Culverts	3,132,333	-	1,042,134	2,253,739	807,029	1,680,189	4,311,715	6,507,019	2,542,951	1,002,884
Guide Rails	-	-	-	-	-	-	-	-	-	-
Bridges, Culverts, and Guide Rails	**8,312,350**	**4,012,682**	**5,239,763**	**6,705,597**	**11,132,344**	**7,151,239**	**13,141,612**	**19,295,143**	**12,112,437**	**4,042,845**

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
HCB Roads	447,617	2,536,888	1,393,588	306,859	2,442,370	2,157,903	2,256,708	2,066,647	3,355,577	1,018,500
LCB Roads	1,300,375	716,108	819,545	281,377	6,723,790	955,242	1,660,330	3,040,248	3,036,860	604,762
Gravel Roads	-	-	-	-	-	-	-	-	-	-
Parking Lots	-	-	119,326	-	-	-	-	-	-	-
Illumination	-	-	-	-	-	-	-	-	-	-
Traffic Signals	-	-	-	-	-	-	-	-	-	-
Sidewalks	-	-	74,852	-	-	234,631	21,215	-	89,377	150,183
Road Network	**1,747,992**	**3,252,995**	**2,407,310**	**588,236**	**9,166,160**	**3,347,776**	**3,938,253**	**5,106,895**	**6,481,813**	**1,773,445**

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Meters	-	76,491	-	20,259	-	9,791	-	7,981	-	10,550
Water Lines	-	-	-	-	-	174,093	-	-	-	-
Hydrants	-	-	-	-	-	-	-	85,507	-	20,159
Valves	-	5,305	38,245	894,780	133,317	-	196,780	12,668	65,239	-
Water Network	**-**	**81,795**	**38,245**	**915,039**	**133,317**	**183,884**	**196,780**	**106,155**	**65,239**	**30,708**

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Forcemains	-	-	-	-	-	-	-	-	-	-
Sewer Lines	-	-	-	-	-	-	-	-	-	-
Maintenance Access	297,670	-	705,902	420,940	216,784	-	-	-	-	-
Wastewater Network	**297,670**	**-**	**705,902**	**420,940**	**216,784**	**-**	**-**	**-**	**-**	**-**

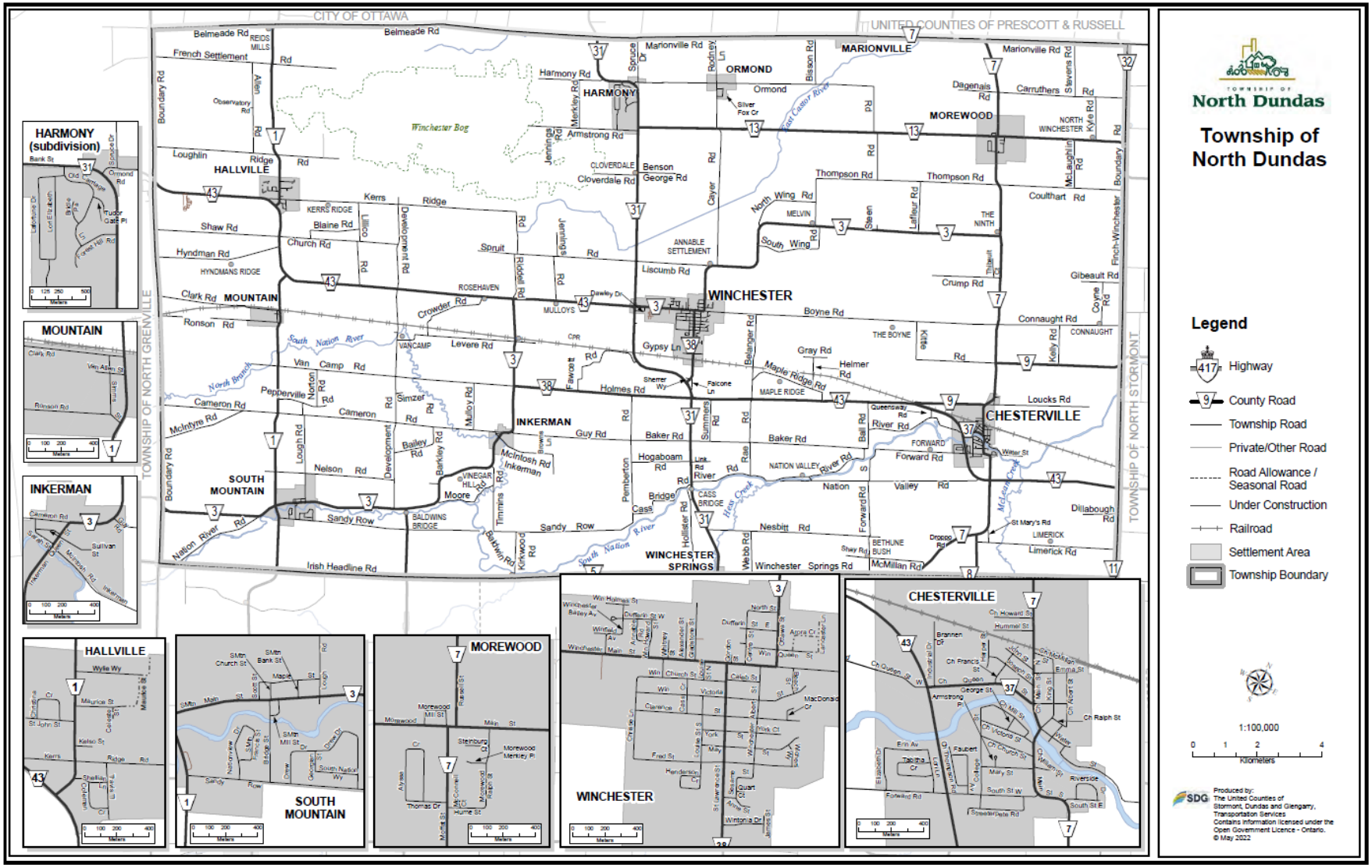
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Storm Lines	-	-	-	-	-	-	-	321,718	-	-
Storm Drainage (Catch Basins)	-	-	-	-	-	-	94,700	222,952	-	-
Storm Sewer Network	**-**	**-**	**-**	**-**	**-**	**-**	**94,700**	**544,669**	**-**	**-**

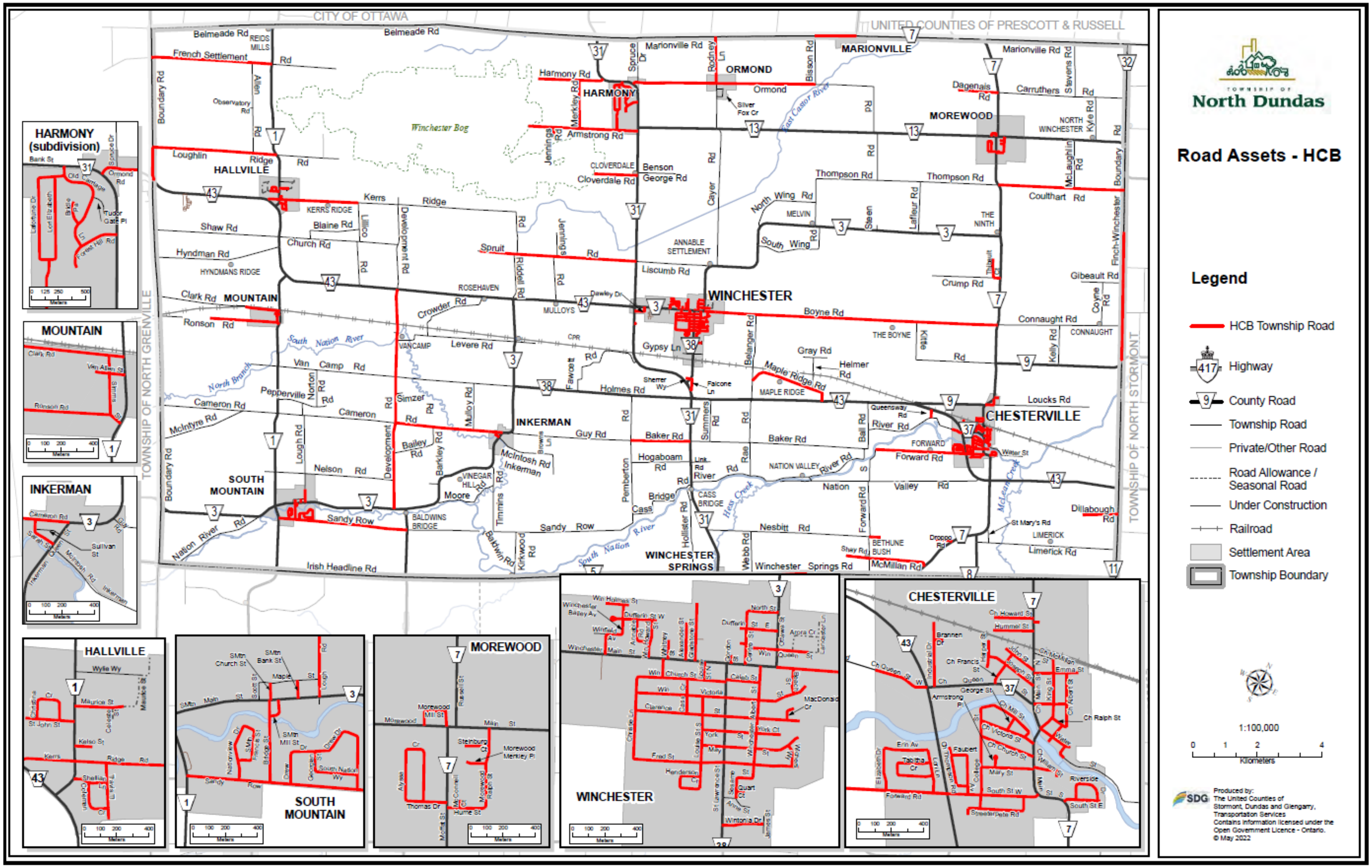
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Buildings	-	-	-	-	11,375	-	-	5,616	-	-
Equipment	**-**	**344,994**	**2,015**	**86,932**	**-**	**221,814**	**286,420**	**-**	**477,454**	**-**
Vehicles	**-**	**273,481**	**-**	**114,185**	**-**	**35,360**	**-**	**410,661**	**-**	**220,060**
Land Improvements	**-**	**57,393**	**-**	**70,763**	**-**	**-**	**-**	**110,695**	**-**	**10,832**

OCWA Recommendations	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Winchester- Capital	50,000	22,000	70,000	546,000	27,000	5,000	2,000	5,000	10,000	40,000
Chesterville - Capital	1,605,000	26,000	18,000	5,000	33,000	2,000	5,000	8,000	30,000	15,000
Water Network	**1,655,000**	**48,000**	**88,000**	**551,000**	**60,000**	**7,000**	**7,000**	**13,000**	**40,000**	**55,000**

OCWA Recommendations	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Winchester- Capital	141,000	115,000	35,000	10,000	20,000	30,000	93,000	80,000	56,000	10,000
Chesterville - Capital	10,000	55,000	40,000	20,000	15,000	10,000	20,000	45,000	45,000	10,000
Wastewater Network	**151,000**	**170,000**	**75,000**	**30,000**	**35,000**	**40,000**	**113,000**	**125,000**	**101,000**	**20,000**

Appendix D: Level of Service Maps




North Dundas
Road Assets - HCB
Legend
HCB Township Road
Highway
County Road
Township Road
Private/Other Road
Road Allowance / Seasonal Road
Under Construction
Railroad
Settlement Area
Township Boundary
1:100,000
Kilometers
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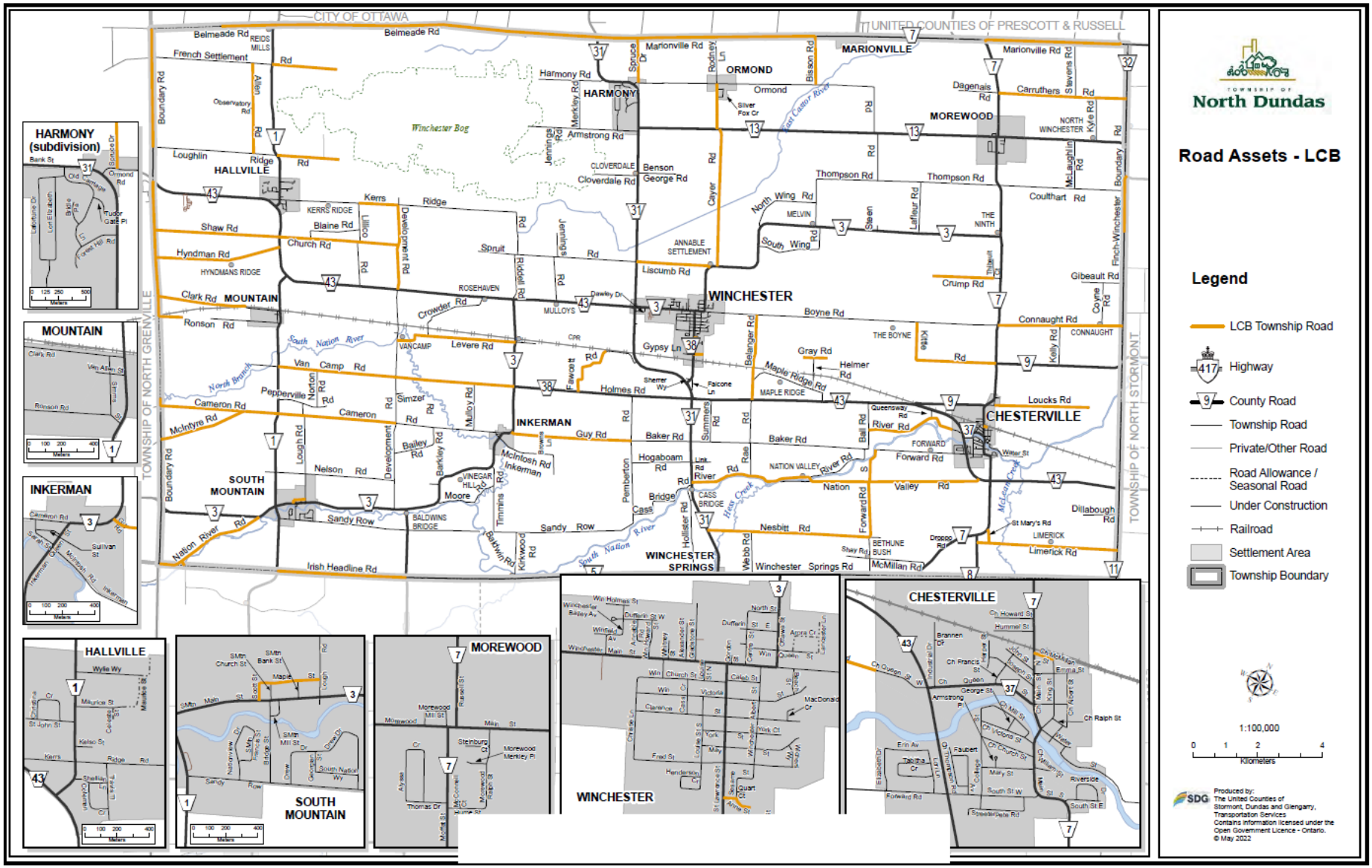
CITY OF OTTAWA
UNITED COUNTIES OF PRESCOTT & RUSSELL
TOWNSHIP OF NORTH GRENVILLE
TOWNSHIP OF NORTH STORMONT
HARMONY
ORMOND
MARIONVILLE
MOREWOOD
HALLVILLE
MOUNTAIN
WINCHESTER
INKERMAN
CHESTERVILLE
SOUTH MOUNTAIN
WINCHESTER SPRINGS
Winchester Bog
HARMONY (subdivision)
MOUNTAIN
INKERMAN
HALLVILLE
SOUTH MOUNTAIN
MOREWOOD
WINCHESTER
CHESTERVILLE


CITY OF OTTAWA
UNITED COUNTIES OF PRESCOTT & RUSSELL
TOWNSHIP OF NORTH GRENVILLE
TOWNSHIP OF NORTH STORMONT
HARMONY (subdivision)
MOUNTAIN
INKERMAN
HALLVILLE
SOUTH MOUNTAIN
MOREWOOD
WINCHESTER
CHESTERVILLE
HARMONY
ORMOND
MARIONVILLE
MOREWOOD
HALLVILLE
MOUNTAIN
WINCHESTER
INKERMAN
CHESTERVILLE
WINCHESTER SPRINGS
SOUTH MOUNTAIN
Road Assets - LCB
Legend
LCB Township Road
Highway
County Road
Township Road
Private/Other Road
Road Allowance / Seasonal Road
Under Construction
Railroad
Settlement Area
Township Boundary
1:100,000
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Kilometers
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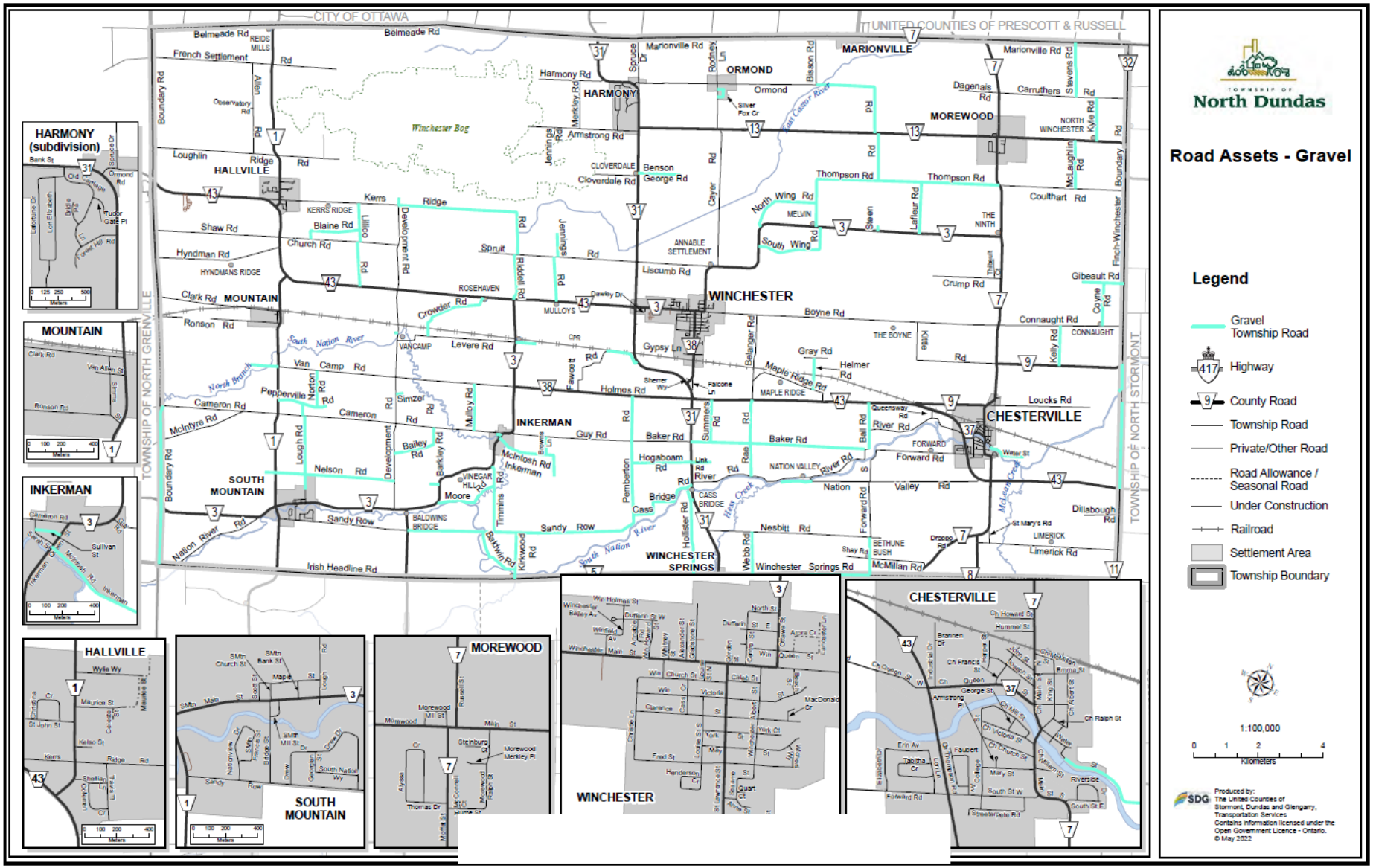
CITY OF OTTAWA
UNITED COUNTIES OF PRESCOTT & RUSSELL
TOWNSHIP OF NORTH GRENVILLE
TOWNSHIP OF NORTH STORMONT
HARMONY (subdivision)
MOUNTAIN
INKERMAN
HALLVILLE
SOUTH MOUNTAIN
MOREWOOD
WINCHESTER
CHESTERVILLE
HARMONY
ORMOND
MARIONVILLE
MOREWOOD
HALLVILLE
MOUNTAIN
WINCHESTER
INKERMAN
CHESTERVILLE
WINCHESTER SPRINGS
Road Assets - Gravel
Legend
Gravel Township Road
Highway
County Road
Township Road
Private/Other Road
Road Allowance / Seasonal Road
Under Construction
Railroad
Settlement Area
Township Boundary
1:100,000
0 1 2 4
Kilometers
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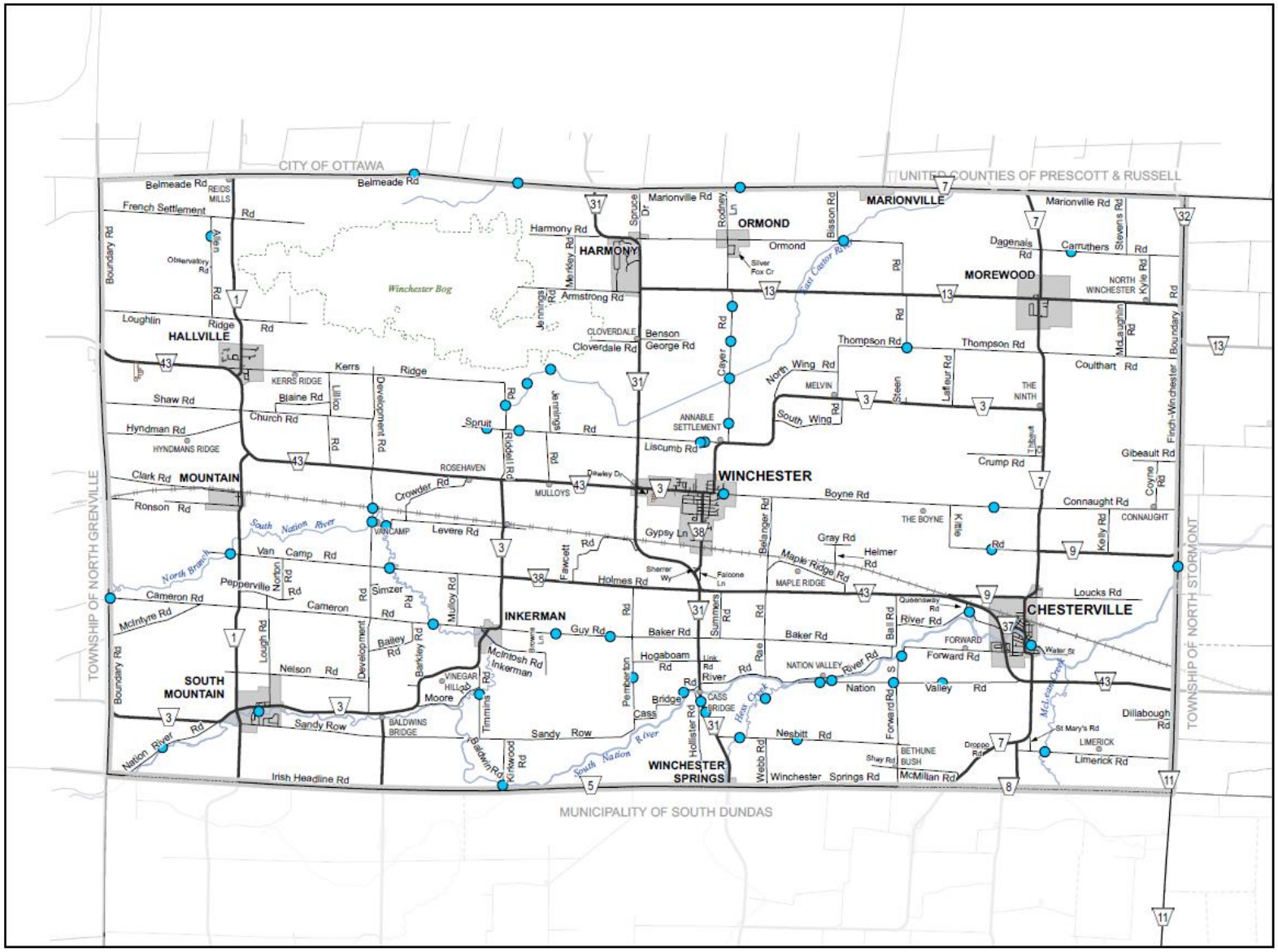

Bridges & Major Culverts

Legend

- Bridge / Major Culvert
- 417 Highway
- 9 County Road
- Township Road
- Private/Other Road
- Road Allowance / Seasonal Road
- Under Construction
- Railroad
- Settlement Area
- Township Boundary

1:100,000

0 1 2 4
Kilometers

SDG

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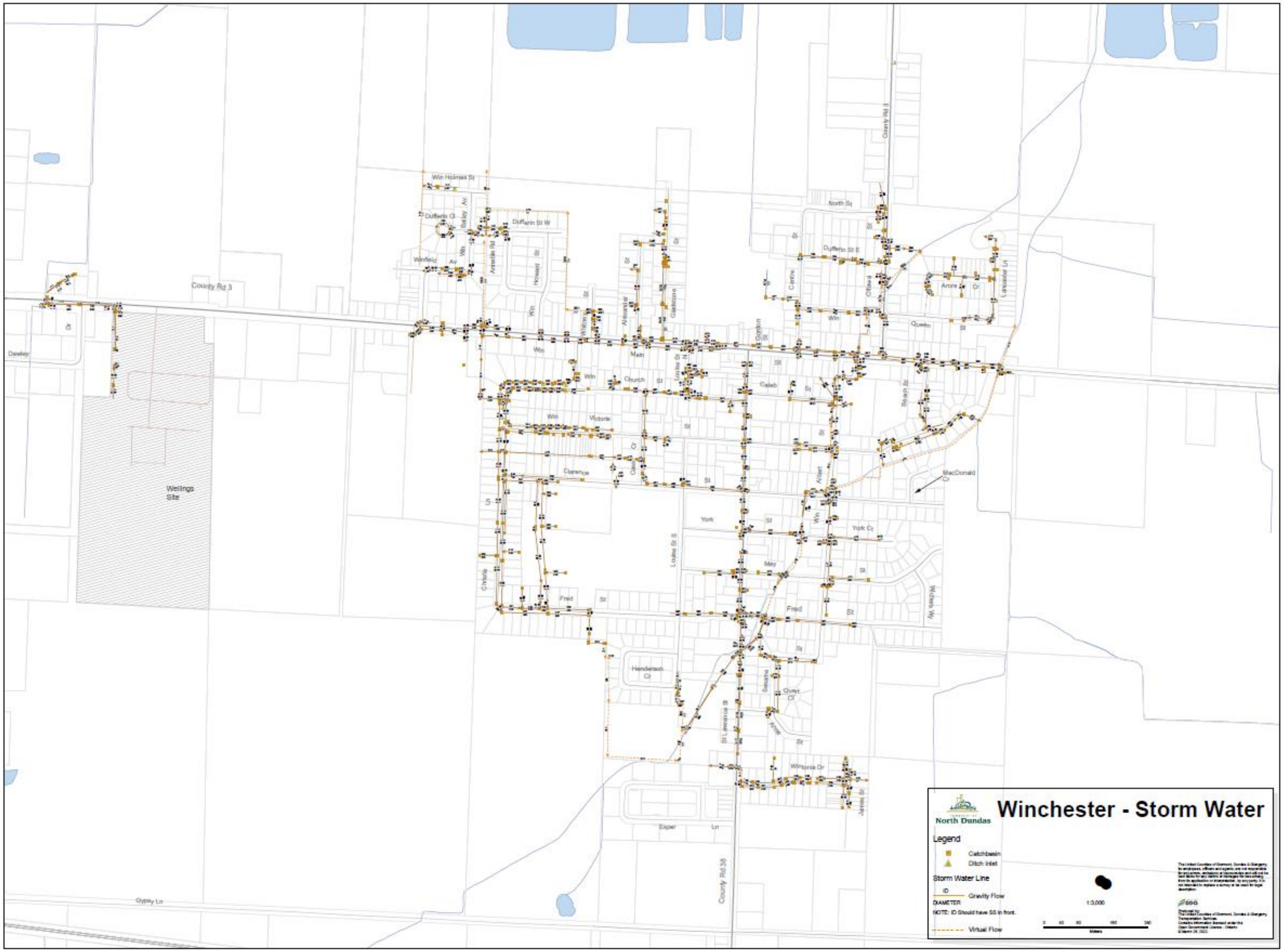
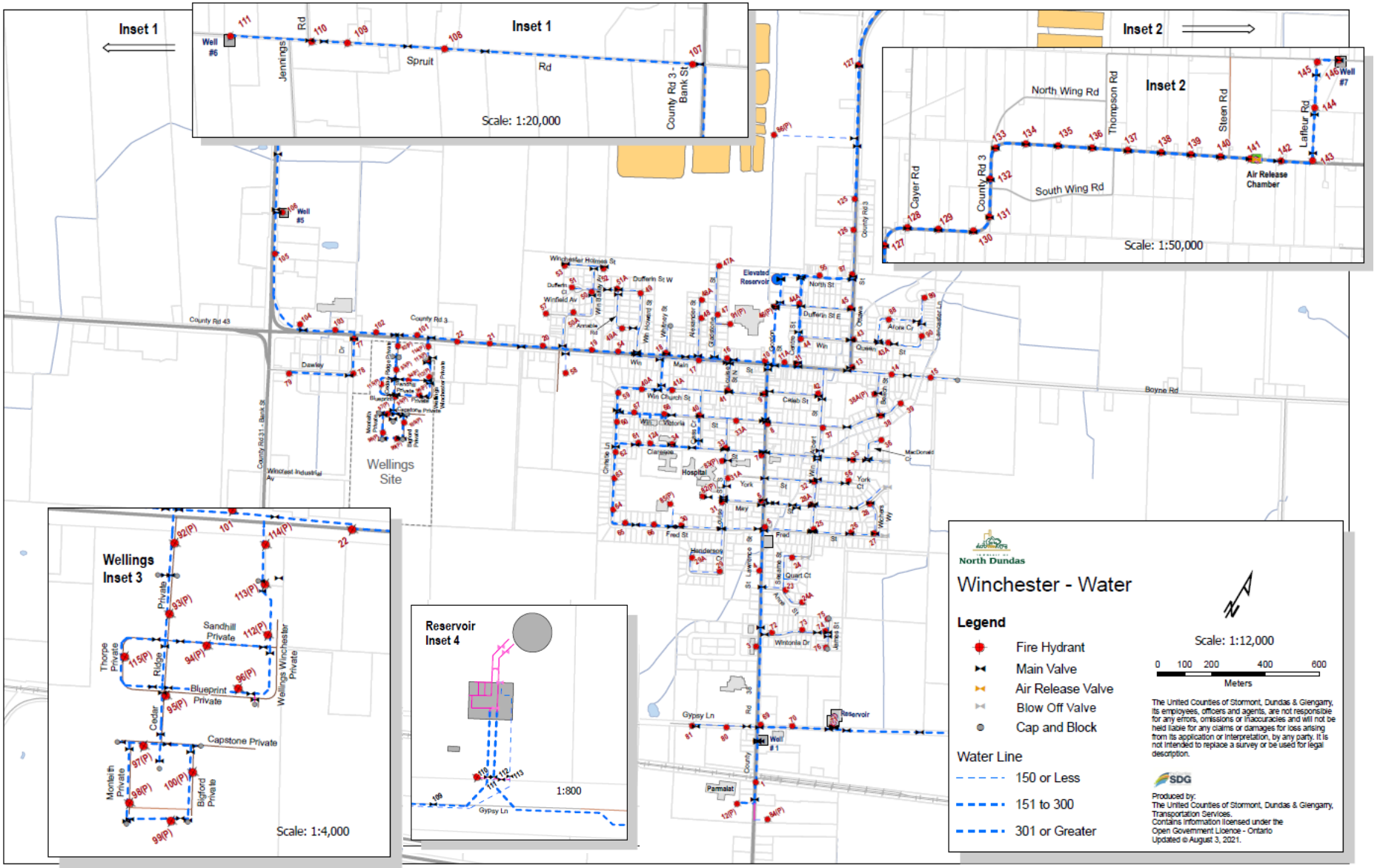
Chesterville - Storm Water
Legend
Catchbasin
Ditch Inlet
Storm Water Line
Gravity Flow
Virtual Flow
1:3,000


Winchester - Storm Water
North Dundas
Legend
Catchbasin
Ditch Inlet
Storm Water Line
ID
Gravity Flow
DIAMETER
NOTE: ID Should have SS in front.
Virtual Flow
1:3,000
County Rd 3
County Rd 38
Wellings Site
Gypsy Ln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Inset 1
Scale: 1:20,000
Inset 2
Inset 2
Scale: 1:50,000
Wellings Inset 3
Scale: 1:4,000
Reservoir Inset 4
1:800
Wellings Site
Winchester - Water
Legend
Fire Hydrant
Main Valve
Air Release Valve
Blow Off Valve
Cap and Block
Water Line
150 or Less
151 to 300
301 or Greater
Scale: 1:12,000
0 100 200 400 600
Meters
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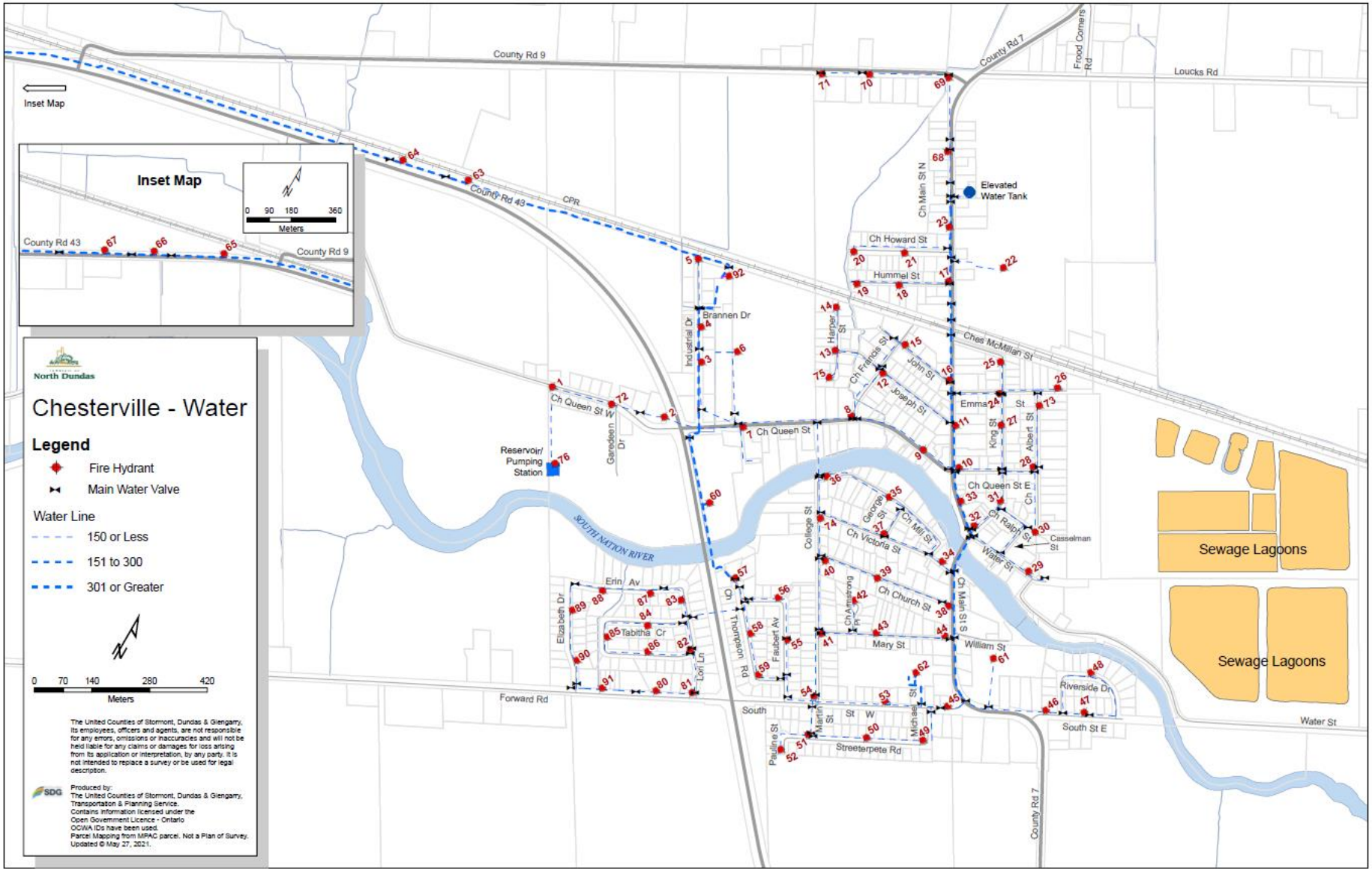
Jennings Rd
Spruit Rd
County Rd 3 - Bank St
North Wing Rd
South Wing Rd
Thompson Rd
Steen Rd
Cayer Rd
Lafleur Rd
County Rd 3
Air Release Chamber
Well #6
Well #5
Well #7
Well #1
Elevated Reservoir
Reservoir
Hospital
Boyne Rd
County Rd 43
County Rd 31 - Bank St
Gypsy Ln
Parmalat
Sandhill Private
Blueprint Private
Capstone Private
Thorpe Private
Ridge Private
Cedar Private
Monteith Private
Bigford Private
Wellings Winchester Private


Inset Map
Inset Map
0 90 180 360
Meters
County Rd 43
County Rd 9
North Dundas
Chesterville - Water
Legend
Fire Hydrant
Main Water Valve
Water Line
150 or Less
151 to 300
301 or Greater
0 70 140 280 420
Meters
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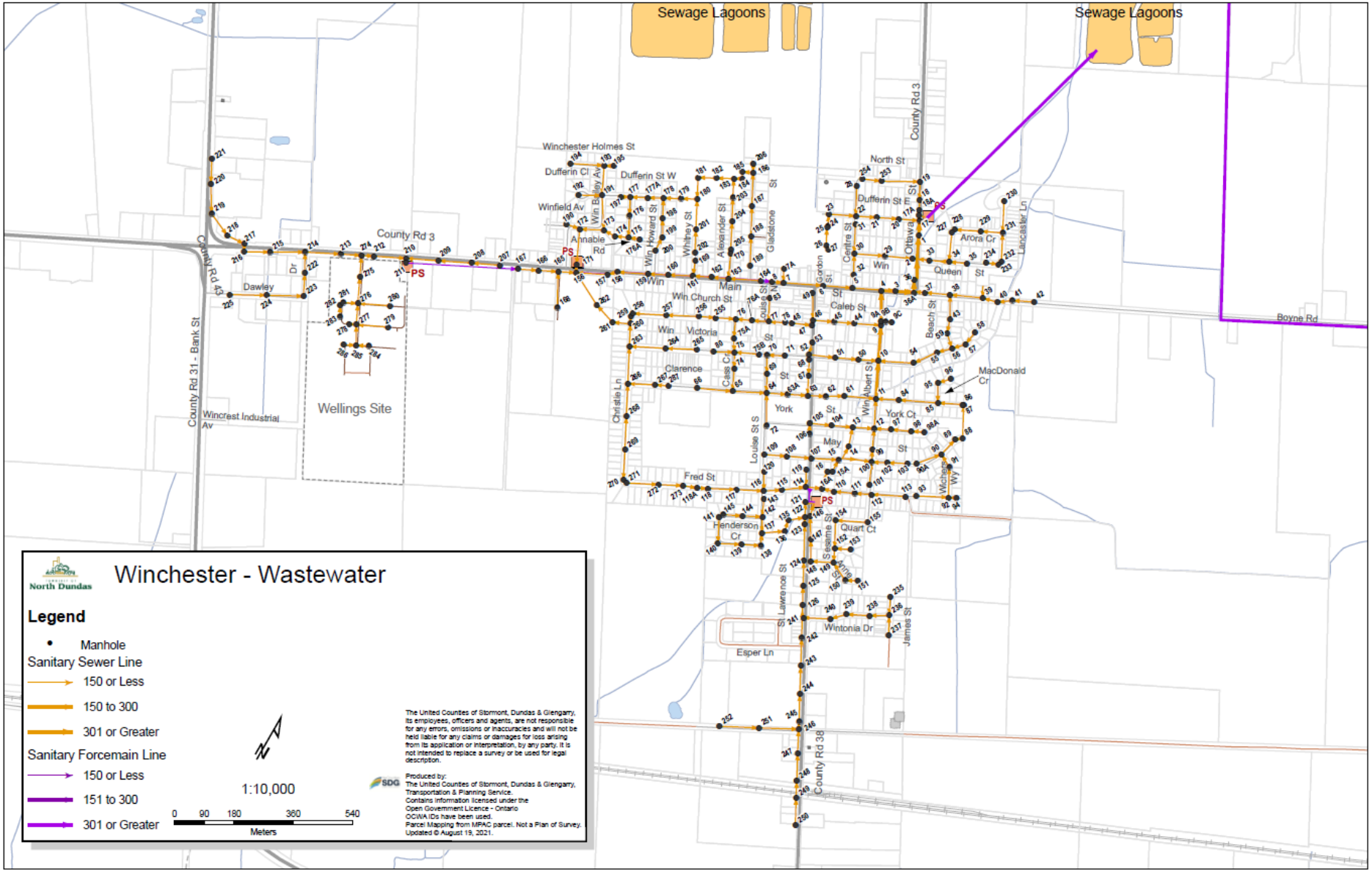
County Rd 9
County Rd 43
CPR
County Rd 7
Frood Corners Rd
Loucks Rd
Elevated Water Tank
Ch Main St N
Ch Howard St
Hummel St
Ches McMillan St
Brannen Dr
Industrial Dr
Harper St
Ch Francis St
John St
Joseph St
Emma St
King St
Albert St
Ch Queen St W
Ch Queen St
Ch Queen St E
Gerodeen Dr
Reservoir/ Pumping Station
SOUTH NATION RIVER
College St
George St
Ch Mill St
Ch Victoria St
Ch Ralph St
Casselman St
Water St
Sewage Lagoons
Sewage Lagoons
Erin Av
Elizabeth Dr
Tabitha Cr
Lori Ln
Ch Thompson Rd
Faubert Av
Ch Armstrong Dr
Ch Church St
Ch Main St S
Mary St
William St
Forward Rd
South
Martin St W
Michael St
Pauline St
Streeterpete Rd
Riverside Dr
South St E
Water St
County Rd 7


Sewage Lagoons
Sewage Lagoons
Winchester Holmes St
Dufferin Cl
Dufferin St W
Winfield Av
Annable Rd
County Rd 3
Dawley Dr
County Rd 31 - Bank St
Wincrest Industrial Av
Wellings Site
PS
Main St
Win Church St
Victoria St
Clarence St
York St
May St
Fred St
Henderson Cr
Quart Ct
Esper Ln
Wintonia Dr
St Lawrence St
Steams St
Louise St S
Christie Ln
Cass Cr
Albert St
Gordon St
Gladstone St
Alexander St
Whitney St
Howard St
Bay Ave
Centre St
Ottawa St
North St
Dufferin St E
Arora Cr
Queen St
Caleb St
Beach St
MacDonald Cr
York Ct
Lancaster Ln
James St
Boyne Rd
County Rd 38
Winchester - Wastewater
North Dundas
Legend
Manhole
Sanitary Sewer Line
150 or Less
150 to 300
301 or Greater
Sanitary Forcemain Line
150 or Less
151 to 300
301 or Greater
1:10,000
0 90 180 360 540
Meters
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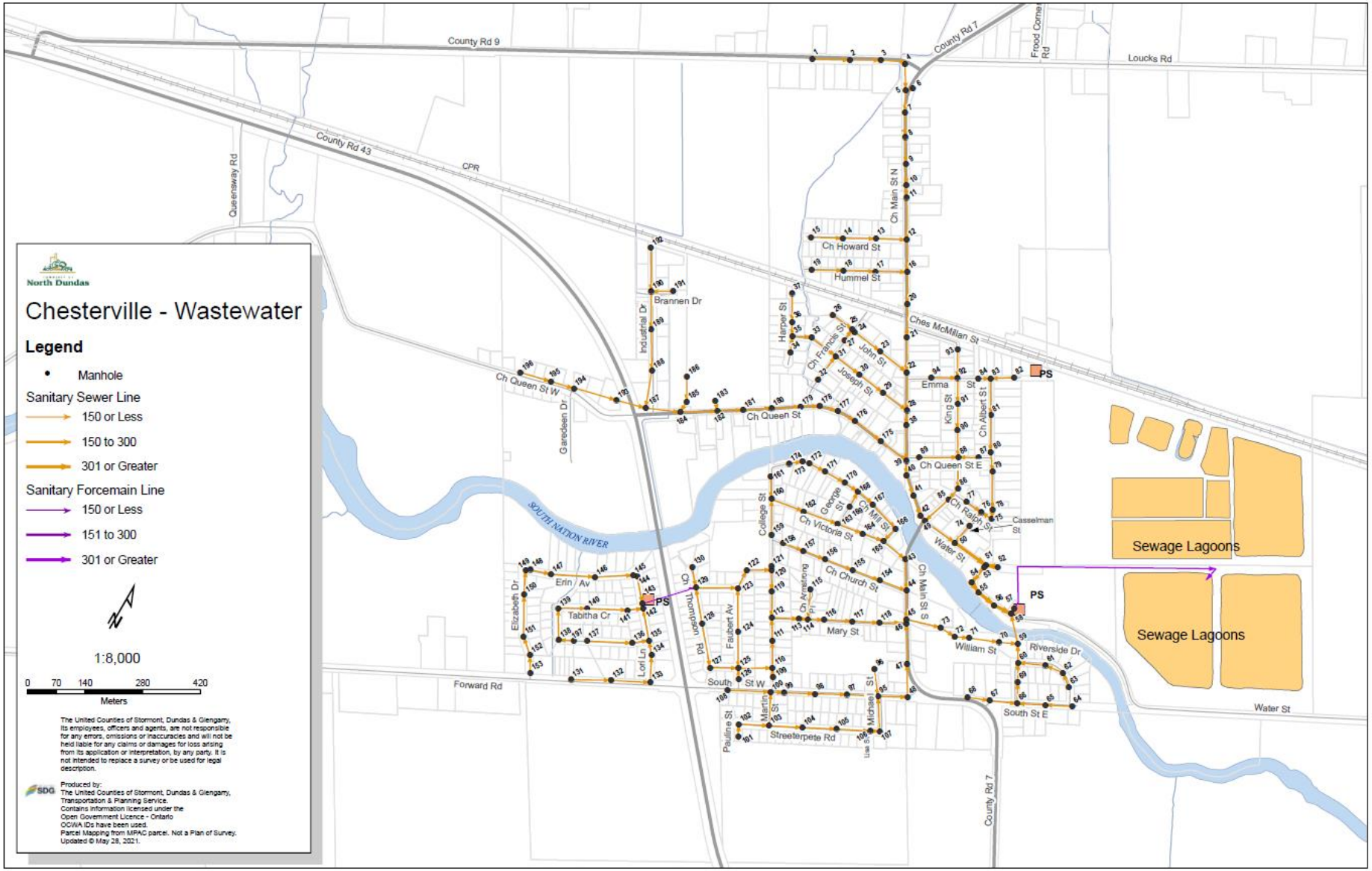
Chesterville - Wastewater
Legend
Manhole
Sanitary Sewer Line
150 or Less
150 to 300
301 or Greater
Sanitary Forcemain Line
150 or Less
151 to 300
301 or Greater
1:8,000
0 70 140 280 420
Meters
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Parcel Mapping from MPAC parcel. Not a Plan of Survey.
Updated © May 28, 2021.
County Rd 9
County Rd 43
CPR
Queensway Rd
County Rd 7
Loucks Rd
Frood Corners Rd
Ch Main St N
Ch Howard St
Hummel St
Brannen Dr
Industrial Dr
Harper St
Ch Francis St
John St
Joseph St
Ches McMillan St
Emma St
King St
Ch Albert St
PS
Ch Queen St W
Ch Queen St
Ch Queen St E
Garadeen Dr
SOUTH NATION RIVER
College St
George St
Ch Victoria St
Ch Mill St
Ch Ralph St
Casselman St
Water St
Ch Church St
Ch Main St S
Ch Armstrong Pl
Mary St
William St
Riverside Dr
Sewage Lagoons
Sewage Lagoons
Erin Av
Elizabeth Dr
Tabitha Cr
Lori Ln
Thompson Rd
Faubert Av
South St W
Martin St
Michael St
Pauline St
Streeterpete Rd
South St E
Water St
Forward Rd
County Rd 7

Appendix E: Risk Rating Criteria

Probability of Failure				
Asset Category	**Risk Criteria**	**Criteria Weighting**	**Value/Range**	**Consequence Score**
All	Condition	100%	Excellent	1
			Good	2
			Fair	3
			Poor	4
			Very Poor	5

Consequence of Failure				
Asset Category	**Risk Criteria**	**Criteria Weighting**	**Value/Range**	**Consequence Score**
Road Network	Surface	50%	Gravel	2
			LCB	2
			HCB	4
	MMS	50%	6	2
			5	3
			4	3
			3	4
			2 or 1	5
Bridges and Culverts	Replacement Cost	100%	$2,500,001 and above	5
			$2,500,000 and below	4
			$1,000,000 and below	3
			$500,000 and below	2
			$250,000 and below	1
Storm Sewer Network	Diameter	100%	1001mm and above	5
			1000mm and below	4
			650mm and below	3
			450mm and below	2
			250mm and below	1
Water Network	Diameter	100%	451mm and above	5
			450mm and below	4
			250mm and below	3
			150mm and below	2
			100mm and below	1

Wastewater Network	Diameter	100%	501mm and above	5
			500mm and below	4
			350mm and below	3
			200mm and below	2
			150mm and below	1
Land Improvements, Vehicles, and Equipment	Replacement Cost	100%	$350,001 and above	5
			$350,000 and below	4
			$125,000 and below	3
			$50,000 and below	2
			$25,000 and below	1
Buildings (Including Components)	Replacement Cost	100%	$350,001 and above	5
			$350,000 and below	4
			$125,000 and below	3
			$50,000 and below	2
			$25,000 and below	1

Appendix F: Condition Assessment Guidelines

The foundation of good asset management practice is accurate and reliable data on the current condition of infrastructure. Assessing the condition of an asset at a single point in time allows staff to have a better understanding of the probability of asset failure due to deteriorating condition.

Condition data is vital to the development of data-driven asset management strategies. Without accurate and reliable asset data, there may be little confidence in asset management decision-making which can lead to premature asset failure, service disruption and suboptimal investment strategies. To prevent these outcomes, the municipality's condition assessment strategy should outline several key considerations, including:

- The role of asset condition data in decision-making
- Guidelines for the collection of asset condition data
- A schedule for how regularly asset condition data should be collected

Role of Asset Condition Data

The goal of collecting asset condition data is to ensure that data is available to inform maintenance and renewal programs required to meet the desired level of service. Accurate and reliable condition data allows municipal staff to determine the remaining service life of assets, and identify the most cost-effective approach to deterioration, whether it involves extending the life of the asset through remedial efforts or determining that replacement is required to avoid asset failure.

In addition to the optimization of lifecycle management strategies, asset condition data also impacts the municipality's risk management and financial strategies. Assessed condition is a key variable in the determination of an asset's probability of failure. With a strong understanding of the probability of failure across the entire asset portfolio, the municipality can develop strategies to mitigate both the probability and consequences of asset failure and service disruption. Furthermore, with condition-based determinations of future capital expenditures, the municipality can develop long- term financial strategies with higher accuracy and reliability.

Guidelines for Condition Assessment

Whether completed by external consultants or internal staff, condition assessments should be completed in a structured and repeatable fashion, according to consistent and objective assessment criteria. Without proper guidelines for the completion of condition assessments there can be little confidence in the validity of condition data and asset management strategies based on this data.

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff define the condition rating criteria that should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.

There are many options available to the municipality to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

Developing a Condition Assessment Schedule

Condition assessments and general data collection can be both time-consuming and resource- intensive. It is not necessarily an effective strategy to collect assessed condition data across the entire asset inventory. Instead, the municipality should prioritize the collection of assessed condition data based on the anticipated value of this data in decision-making. The International Infrastructure Management Manual (IIMM) identifies four key criteria to consider when making this determination:

1. Relevance: every data item must have a direct influence on the output that is required
2. Appropriateness: the volume of data and the frequency of updating should align with the stage in the assets life and the service being provided
3. Reliability: the data should be sufficiently accurate, have sufficient spatial coverage and be appropriately complete and current
4. Affordability: the data should be affordable to collect and maintain

Appendix G: Public Availability

All reports referred to in this document are listed on the municipality's website for the public's convenience.

- Winchester Wastewater System; March 31, 2022.
- Chesterville Wastewater System; March 31, 2022.
- North Dundas Drinking Water System; February 25, 2022.
- 2020 OSIM Bridge Inspection & Needs Study; February 2021.
- Road Needs Study Report 2020; January 2021.

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