THE CORPORATION OF THE TOWNSHIP OF MCGARRY
BY-LAW NO. 2024-34

BEING A BY-LAW TO ADOPT AN ASSET MANAGEMENT PLAN – CORE ASSETS FOR THE TOWNSHIP OF MCGARRY

WHEREAS the infrastructure for Jobs and Prosperity Act, 2015 and Section 3 of Ontario Regulation 588/17 requires a municipality to prepare a strategic Asset Management Policy;

AND WHEREAS Section 5 of the Ontario Regulation 588/17 as amended requires that an Asset Management Plan in respect of its core municipal infrastructure assets be prepared by July 1, 2023.

NOW THEREFORE THE COUNCIL OF THE TOWNSHIP OF MCGARRY HEREBY ENACTS AS FOLLOWS:

1. **THAT** this By-Law shall be entitled the "Asset Management Plan – Core Assets By-Law".

2. **THAT** the Asset Management Plan – Core Assets as set out in Schedule "A" attached hereto, is adopted for the Township of McGarry.

3. **THAT** this By-Law shall come into force on the date of its passing.

READ a first and second time this 14th day of May 2024.

READ a third time and finally passed this 14th day of May 2024.

Sonita Cuthbertson
Mayor

K Dubeau
Clerk-Treasurer

"Schedule A"
By-law 2024-34

MARMAK
Large City Functionality, Small Town Affordability.

"ASSET MANAGEMENT FOR CORE ASSETS"

Prepared for:

The Township of McGarry

30 Intermodal Drive, Suite 204, Brampton Ontario Tel: (905) 458-6686

Glossary of Terms

Level of Service	Technical Level of Service (TLoS) is measured through a performance condition indexes, remaining useful life, inspections of various asset attributes including number of deficiencies.
Baseline weight	Baseline Weight is a numeric value assigned to each asset category as a starting position or handicapping. Baseline weight enables the municipality to prioritize the asset category with relationship to other municipal assets
PoF	Probability of failure (POF) is a rationalized value for level of service, derived from a number of factors including, the condition rating of an asset, the remaining useful life, the priority and network value of the asset.
CoF	Consequence of failure (COF) is rationalized from 5 key attributes associated to risk. These are; environmental, financial, Health and safety, Legal and Operational conditions. These conditions, descriptions and details outline the severity of the consequence associated with each attribute
Risk	Risk is a combination as PoF and CoF which identifies the ramifications associated with a lack of action
Risk Matrix	Risk matrix corresponds to conditions ranging from negligible to serious • **Very High Risk:** Maximum risk mitigation measures should be in place, together with recovery plans, and availability of critical spares. • **High Risk:** risk mitigation measures should be in place providing layers of deterrence, high probability of detection, and rapid effective response. Insurance coverage is essential but may not be able to provide adequate coverage to prevent significant liability. • **Moderate Risk:** Risk should be managed by the introduction of mitigation strategies and operational procedures. • **Low Risk:** Minimal risk mitigation measures necessary. Risk should be managed through operational procedures or accepted as a low business risk.
MMS O.Reg. 239/02	Minimum maintenance standards were developed to provide municipalities with a defence against liability from actions arising with regard to levels of care on roads and bridges. Regulation 239/02, which came into force on November 1, 2002, contains the minimum maintenance standards.
O.Reg. 588/17	On January 1, 2018, Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure came into effect. The regulation sets out requirements for municipal asset management planning to help municipalities better understand their infrastructure needs and inform infrastructure planning and investment decisions.

Phase-in schedule

July 1, 2019: Date for municipalities to have a finalized strategic asset management policy that promotes best practices and links asset management planning with budgeting, operations, maintenance and other municipal planning activities.

July 1, 2022: Date for municipalities to have an approved asset management plan for core assets (roads, bridges and culverts, water, wastewater and stormwater management systems) that identifies current levels of service and the cost of maintaining those levels of service.

July 1, 2023: Date for municipalities to have an approved asset management plan for all municipal infrastructure assets that identifies current levels of service and the cost of maintaining those levels of service.

July 1, 2024: Date for municipalities to have an approved asset management plan for all municipal infrastructure assets that builds upon the requirements set out in 2023. This includes an identification of proposed levels of service, what activities will be required to meet proposed levels of service, and a strategy to fund these activities.

Objectives as defined by the Ontario reg. 588/17
A municipality's asset management plan must include for each asset category, the current levels of service being provided, determined in accordance with qualitative descriptions and technical metrics based on data from at most the two calendar years prior to the year in which all information required under this section is included in the asset management plan.

For each asset category, a summary of the assets in the category, the replacement cost of the assets in the category, the average age of the assets in the category, determined by assessing the average age of the components of the assets, the information available on the condition of the assets in the category, and a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.

For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service for each of the 10 years following the year for which the current levels of service are determined and the costs of providing those activities based on an assessment of the following: The full lifecycle of the assets, the options for which lifecycle activities could potentially be undertaken to maintain the current levels of service and the risks associated with the options.

Council Responsibility

- Member of council play an important role in validating municipal level of service. Not only through the policies that they adopt, the yearly review and the ongoing involvement when levels are adversely affected.

- Council must be educated on the asset management strategies which comprise of lifecycle events in order to reduce risk impact.

- Council's responsibility is to provide direction to staff while supporting qualified staff in their choices.

- The frequency of these reviews should be established and followed by staff as part of the Asset Management Policy

- Validate and support the amount of time it will take to reach expected Levels of Service

Asset Management Components

Accurate and detailed asset inventory

- a summary of the assets in the category
- condition of the assets in the category
- the average age of the assets in the category
- operations, such as increased maintenance schedules

Lifecycle Management

- The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.
- The lifecycle activities undertaken for the lowest cost to maintain the current levels of service
- Lifecycle management and financial strategy that sets out the following information with respect to the assets in each asset category for the 10-year period.

Level of Service

- Establishing Level of services
- The risks associated with the options

Financial Controls

- An estimate of the annual costs for each of the 10 years of undertaking the lifecycle activities separated into capital expenditures and significant operating costs.
- the replacement cost of the assets in the category
- If based on the funding projected to be available, the municipality identifies a funding shortfall for the lifecycle activities.
- An identification of the annual funding projected to be available to undertake lifecycle activities and an explanation of the options examined by the municipality to maximize the funding projected to be available.

Municipal Engagement

- municipal residents and other interested parties to provide input.
- Service request associated to location, deficiency type, action required and associated photos. Input deficiency, create work orders, and manage the repairing, the deadlines and follow up comments.

Level of Service Policies

The core purpose of a Township is to provide services to residents and other stakeholders. Physical assets are simply a portion of what is required to deliver the various levels of service as determined by the Township. The Township needs to ensure that the infrastructure performs to meet the level of service goals at an affordable and sustainable cost. An objective of Levels of Service analysis is to find a balance between the expected levels of service and the cost of providing that level of service. Determining municipal level of service policies requires first developing a baseline for acceptable and affordable levels of service. This is done by first examining present-day service levels, community needs, regulatory or legal obligations and the cost of service delivery. Once present-day service levels have been examined, this baseline can be compared against level of service expectations.

The Process

Levels of Service analysis may involve:

1. Developing
   - Customer vs. Technical Levels of Service
   - Current vs. Expected Levels of Service
   - Use of performance measures
   - Financial validation

2. Communication
   - Receive input from staff
   - Receive input from citizens
   - Communicate the Levels of Service to stakeholders
   - Council approval of Levels of Service strategies

3. Update
   - Updating the Levels of Service Analysis on a yearly basis

Level of Service Overview

LoS is a balance between user expectations for overall quality, performance, availability and safety versus affordability.

Level of Service requires asset category, performance measurement, a current measurement, a target measurement, an achievement date, an approximate cost and a priority assigned to each performance measurement.

AMPs typically comprise of theoretical models which need to be vetted against operational models concluding with practical realities. LoS can be considered the practical component of an AMP. Operational and practical data is used to establish and validate LoS which in turn will feed into the financial component. This closed-loop approach will either validate the AMP or indicate required changes to the financial strategy. LoS is a key driver which influences asset management decisions, and depending on asset type can be either condition or age based.

LoS outlines the overall quality, performance, availability and safety of the service being provided. LoS contains a number of distinct categories:

- Service Identification
- Financial
- Municipal risk
- Community Expectations
- Technical component
- Strategic component

Community

Community levels of service outline the overall quality, performance, availability and safety of the service being provided. Level of service is a balance between user (customer) expectations for overall quality, performance, availability and safety of infrastructure assets with a cost that is affordable.

LoS should reflect the priorities and expectations of the community. At some point it is necessary to ensure that the services provided does in fact reflect the community's priorities and expectations. It may also be important to determine if the services provided are at a level that the community finds acceptable or if those service levels should be increased or decreased.

Technical levels of service outline the operating, maintenance, rehabilitation, renewal and upgrade activities expected to occur. Level of service is a balance between user (customer) expectations for overall quality, performance, availability and safety of infrastructure assets with a cost that is affordable. Concurrent with the development/revision of customer levels of service, technical levels of service must be considered that also look at the risk associated with providing the service. Proposed targets for community and technical levels of service should be included as part of the asset management. Performance measures should be developed and the actual results achieved reported annually.

Financial investment

The management of physical assets, their selection, maintenance, inspection and renewal plays a key role in determining the operational performance and viability of organizations that operate assets as part of their core business. LoS typically comprise of theoretical models which need to be vetted against practical realities.

LOS Matrix

Determining the desired levels of service for core asset type is achieved with consideration of a number of factors including costs, user expectations and government mandated and minimum requirements.

LOS outlines the overall quality, performance, availability, and safety associated to municipal assets and services. Each asset category can have its own Key Performance Indicator, current measurements, target measurements, achievement date, approximate costs associated to each component and a priority listing based on staff and council consensus.

There are three (3) distinct categories of LoS:

- Municipal risk
- Asset Life Cycle cost implications
- Financial Options

LoS outlines the overall quality, performance, availability and safety of the service being provided. Technical levels of service (TLS) outline the operating, maintenance, rehabilitation, and renewal strategies. LoS is a balance between user expectations for overall quality, performance, availability and safety versus affordability

Technical levels of service (TLS) outline the operating, maintenance, rehabilitation, and renewal strategies. Technical levels of service outline the operating, maintenance, rehabilitation, renewal and upgrade activities expected to occur. Technical levels of service must also consider the risk associated with providing the service. Proposed targets for customer and technical levels of service must be included as part of the asset management strategy. Performance measures should be developed, and the actual results achieved reported and updated annually.

PoF Matrix

PoF	Rating	Age Based	Condition Index	Score Card
1	Excellent	0-10%of UL	90 – 100	A
2	Good	11-25 % of UL	75 - 89	B
3	Fair	26-50 % of UL	50 - 74	C
4	Poor	51-65 % of UL	35 - 49	D
5	Severe	66 > % of UL	<34	E

Financial

Financial data is linked to the inventory for increased continuity, and offers access to lifecycle details, financial forecasting and associated levels of Risk. Year over year this will help the municipality get a better understanding of what it will cost them to maintain all of their assets and where to dedicate their funds. The expectation is to link revenue to the asset's lifecycle events as well as the PoF and CoF

Invoices

Attaching invoice and track annual maintenance associated to an asset validates necessary dollar investment. Staff will electronically collect all invoices for work done on each asset. Use this data to compare financial investments required to maintain the asset. Run yearly comparisons to seed if other lifecycle events may be considered.

Lifecycle costing

Establish actual costs that a municipality validates through tenders and quotes associated with each lifecycle treatment.

Managing the deficit;

- Increasing municipal taxes
- Implementing or increasing user fees
- Accept decreased levels of service

Financial ramifications

- Capital cost
- Operational cost
- Maintenance cost
- Replacement cost

Calculating replacement cost

For linear asset replacement cost is calculated by multiplying the length of the asset times the cost of the specific lifecycle event.

For point assets the replacement cost is calculated by manufactures price list.

Data Validation and visualization

Accurate inventory

- Accurate inventory
  - Sufficient fields of information
  - Proper structure
  - Dates such as installation, replacement, useful life
- Current condition ratings utilizing any criteria such as PCI or percentage of Remaining Useful Life
- Calculating Total km of infrastructure broken down into major categories
- Connecting Components to standards
  - Road assets connected to MMS standards; Gravel, HCB, LCB .....
- Establishing and Validated lifecycle event strategies
  - such as maintenance, rehabilitation, reconstruction
- Consistent Condition evaluation methodology
  - Piped linear to include flushing, camera inspections, relining
- Financial constraints, validate replacement costs
  - square meter costs per unit of roads
  - linear meter costs for piped infrastructure
- Data Visualization
  - Utilizing a variety of tools to visualize location of assets.
  - This may include photos, videos, integration to corporate GIS solution as well as links into Google Maps.
- 10-year capital plan

Asset Matrix

category	Type	Confidence
roads	roads	Good
	Sidewalks	Good
Storm	Storm lines	Good
	manholes	Average
Water	waterlines	Good
	Hydrants	average
Sanitary	Sewer lines	Good
	Manholes	Good

Asset Condition Information

category	Type	Current Condition rating	Optimal condition rating
roads	roads	Estimated useful life	PCI
	Sidewalks	Estimated useful life	inspections
	gutters	Estimated useful life	inspections
	Point furniture	Estimated useful life	inspections
water	waterline	Estimated useful life	inspections
	hydrants	Estimated useful life	inspections
Storm water	Storm lines	Estimated useful life	inspections
	Catch basins	Estimated useful life	inspections
	manholes	Estimated useful life	inspections
	culverts	Estimated useful life	inspections
Waste water	Sewer lines	Estimated useful life	inspections
	Manholes	Estimated useful life	inspections

Asset attributes

Asset category	Asset attributes	Data collection
road	Area square	✓
	Road class	✓
	Surface material	✓
	date	
storm	Length	✓
	diameter	✓
	Material	✓
	date	
sanitary	Length	✓
	diameter	✓
	Material	✓
	date	
water	length	✓
	diameter	✓
	Material	✓
	date	

Prioritization Matrix

Assigning a base line value from 10 – 50 for each municipal asset category will enable to prioritize and compare various asset categories. Is a road more important than a waterline, more important than a firetruck?

Probability of Failure (PoF)

Begin by establishing a desired level of service. For road assets it may be a PCI rating of 75.

Not all assets deteriorate at the same level. For certain road assets PoF may be associated to PCI rating of 75, for other assets such as water it may be remaining useful life. In some cases, the deterioration may be quantitative as 2 pci per year while others may be based on asset longevity. As the assets deteriorate the probability of failure increases. POF for an asset category such as roads requires a combination of attributes including baseline weight, material, classification, condition rating and useful life. These values are normalized to a value from 1-5. The condition rating and useful life are matched against a desired level of service for a visual representation. The results are including percentage weight produce a PoF rating from 1-5

Consequence of Failure (CoF)

Not all assets pose the same level of risk. Even within the same category a road in front of a hospital, over a body of water, or a main road versus a cottage road pose different risk or consequence of failure. CoF can be derived for each asset category from the calculation of an asset category baseline weight, and 5 criteria including; safety, operational, environment, finance, and legal.

Risk Components

Environmental conditions; Values from 1- 10 with associated description and details outlining the severity of the consequence associated to the environment
Financial conditions; Values from 1- 10 with associated description and details outlining the severity of the consequence associated to the financial
Health and safety conditions; Values from 1- 10 with associated description and details outlining the severity of the consequence associated to the health and safety
Legal; Values from 1- 10 with associated description and details outlining the severity of the consequence associated to the Legal
Operational conditions; Values from 1- 10 with associated description and details outlining the severity of the consequence associated to the Operational

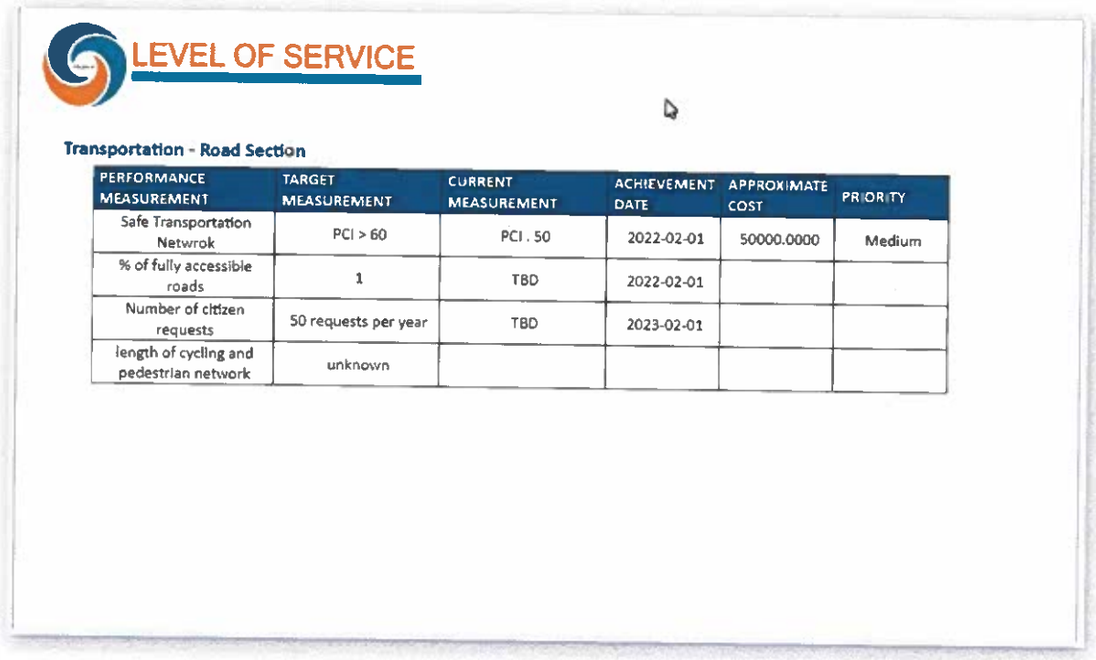
LoS Matrix

Current LoS Versus Expected LoS

Current Levels of Service equates to what service level is currently provided, expected Levels of Service outlines the overall objective or target Levels of Service to be reached at some point in time. The amount of time it will take to reach expected Levels of Service depends on the municipality's assumptions within the asset management planning process.

Ongoing Review, Updates and, Improvements

The frequency of these reviews should be established and followed by staff as part of the Asset Management Policy.



LEVEL OF SERVICE

Transportation - Road Section

PERFORMANCE MEASUREMENT	TARGET MEASUREMENT	CURRENT MEASUREMENT	ACHIEVEMENT DATE	APPROXIMATE COST	PRIORITY
Safe Transportation Netwrok	PCI > 60	PCI . 50	2022-02-01	50000.0000	Medium
% of fully accessible roads	1	TBD	2022-02-01		
Number of citizen requests	50 requests per year	TBD	2023-02-01		
length of cycling and pedestrian network	unknown				

Applicable legislation

The risk matrix is to be vetted against the financial costs associated in mitigating the municipal risks as well as the legislative requirements.

legislation	compliancy
MMS O.Reg, 239/02	✓
Standards for bridges O.Reg, 104/97	✓
O. Reg., 588/17	✓

Roads

The regulation requirements

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)	
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	Number of lane-kilometers of each of arterial roads, collector roads and local roads as a proportion of square kilometers of land area of the municipality.	See Images Below
Quality	Description or images that illustrate the different levels of road class pavement condition.	1. For paved roads in the municipality, the average pavement condition index value. 2. For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).	See Images below

The LOS Target

The Municipality has established a PCI rating for the target level of service for roads by classifying road segments based on surface types and the Minimum maintenance standard 389 (traffic and speed) others. The desired level of service for Municipal roads is to maintain an average weighted condition rating of for the entire road network based on each asset category such as HCB, LCB, and gravel. The municipal road network should be evaluated through completion of the 10 Year Roads Improvement Plan. The rating system consists of a number 1 through 100. For the purposes of this LOS, the following assumptions were made for road deterioration rates:

- Low Class Bituminous Roads - Condition rating reduced by 1 PCI per year
- High Class Bituminous Roads - Condition rating reduced by 2 PCI per year
- Gravel Roads - Condition rating is maintained with regular maintenance
- Earth Roads

Technical level of service

Surface type	Existing PCI Rating	Target PCI Rating	Replacement cost
H.C.B. (Asphalt)	71	70	
L.C.B. (Surface Treatment)	78	70	

Road Conditions Images

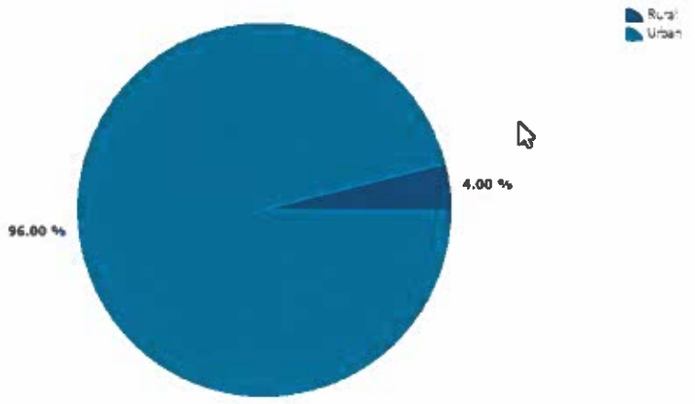
Good Condition

Fair Condition

Poor Condition

LINEAR ASSETS BY SURROUNDING ENVIRONMENT

Road Section



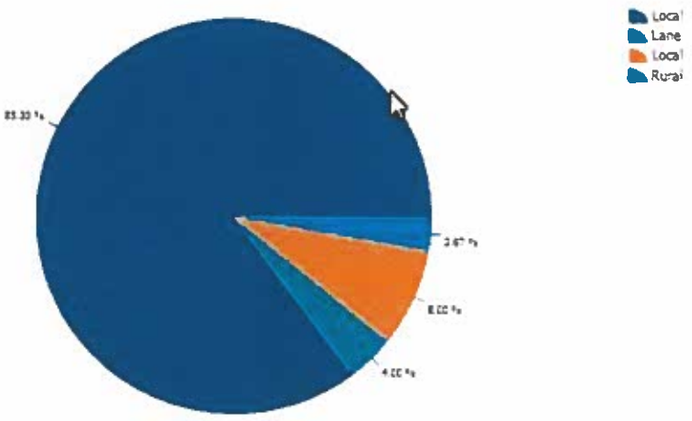
SURROUNDING ENVIRONMENT	SURFACE TYPE	No. OF ASSETS	LENGTH (in Meters)
Urban	High Class Bituminous (HCB)	64	9764
Rural	Gravel	3	5500
Urban	Gravel	8	1646

Sum Assets: 75 Sum Length: 16910 Meters

Total Assets: 75 Total Length: 16910 Meters

LINEAR ASSETS BY CLASSIFICATIONS

Road Section



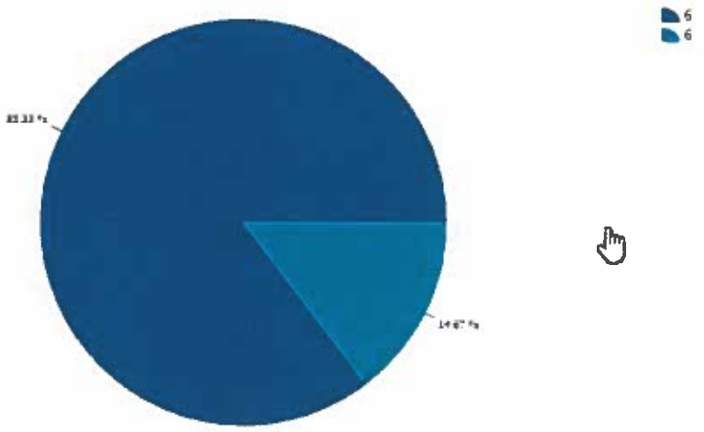
CLASSIFICATION	SURFACE TYPES	No. OF ASSETS	LENGTH (In Meters)
Local	High Class Bituminous (HCB)	64	9764
Lane	Gravel	3	547
Local	Gravel	6	2049
Rural	Gravel	2	4550

Sum Assets: 75 Sum Length: 16910 Meters

Total Assets: 75 Total Length: 16910 Meters

LINEAR ASSETS BY MAINTENANCE CLASS

Road Section



MAINTENANCE CLASS	SURFACE TYPES	No. OF ASSETS	LENGTH (In Meters)
6	High Class Bituminous (HCB)	64	9764
6	Gravel	11	7146

Sum Assets: 75 Sum Length: 16910 Meters

Total Assets: 75 Total Length: 16910 Meters

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)		Column 3 Technical levels of service (technical metrics)	
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	The Town has paper maps of municipal wastewater infrastructure.	Percentage of properties connected to the municipal wastewater system.	The town has 656 properties of which 610 have wastewater connection Approximately 0 of properties have storm sewer connection
Reliability	1. 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. 2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches. 3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes. 4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3. 5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	Town has no combined sewers 0 volume of overflows No connection Based on engineering design standards	1. 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. 2. The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system. 3. 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 days 0 days 0 violations

Technical level of service

Waste Water	Existing Rating	Target Rating	Replacement cost
Waste Watermain	Remaining useful life	Remaining useful life > 50 years	
	25 years	60 years	$660.00/m for wastewater $13,600 per manhole

Water

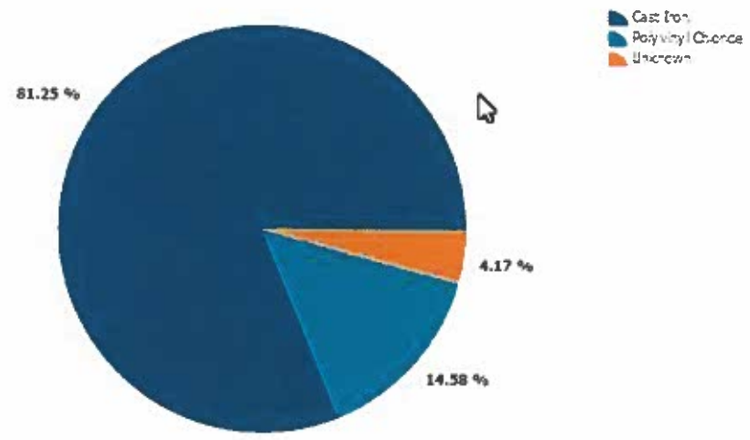
Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	1. Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system. 2. Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	1. Percentage of properties connected to the municipal water system. (93%) 2. Percentage of properties where fire flow is available. (100%)
Reliability	Description of boil water advisories and service interruptions.	1. 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. (36 days) 2. 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. 36 days compared to 656 properties.

Technical level of service

Water	Existing Rating	Target Rating	Replacement cost
Watermain	Remaining useful life	Remaining useful life > 50 years	$200,000.00
	25 years	60 years	$650.00 /m, $2000.00 per valve

LINEAR ASSETS BY MATERIALS

Waterline



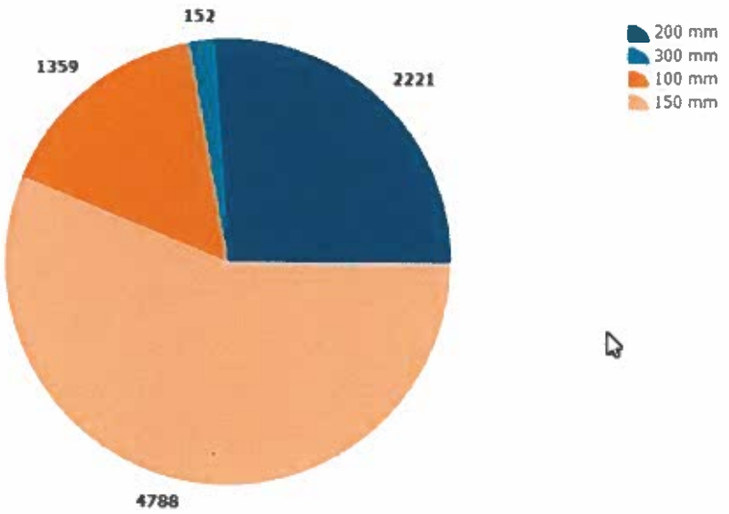
MATERIAL	SURFACE TYPE	No. OF ASSETS	LENGTH (In Meters)
Cast Iron	Iron	39	6351
Polyvinyl Chloride	Plastic	7	2169
Unknown	Other	2	

Sum Assets: 48 Sum Length: 8520 Meters

Total Assets: 48 Total Length: 8520 Meters

ASSETS BY WIDTH

Waterline



WIDTH	No. OF ASSETS	LENGTH (In Meters)
200 mm	10	2,221.00
300 mm	1	152.00
100 mm	9	1,359.00
NULL	2	
150 mm	26	4,788.00

Stormwater

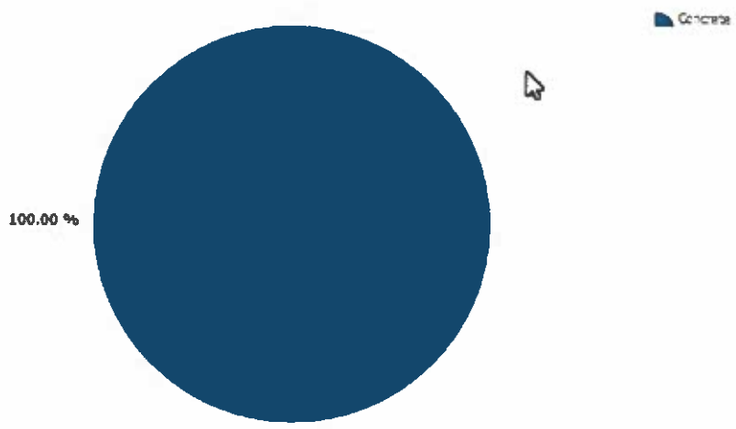
Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	1. Percentage of properties in municipality resilient to a 100-year storm. (12%) 2. Percentage of the municipal stormwater management system resilient to a 5-year storm. (82%)

Technical level of service

Storm Water	Existing Rating	Target Rating	Replacement cost
Storm main	Remaining useful life	Remaining useful life > 50 years	$200,000.00
Virginiatown	Fair	40 years	$550.00/m. for a 450mm pipe $12,500 for CBMH
North Virginiatown	Excellent	New as of November 2017	$550.00/m for a 450 mm pipe $12,500 for CBMH

LINEAR ASSETS BY MATERIALS

Stormline



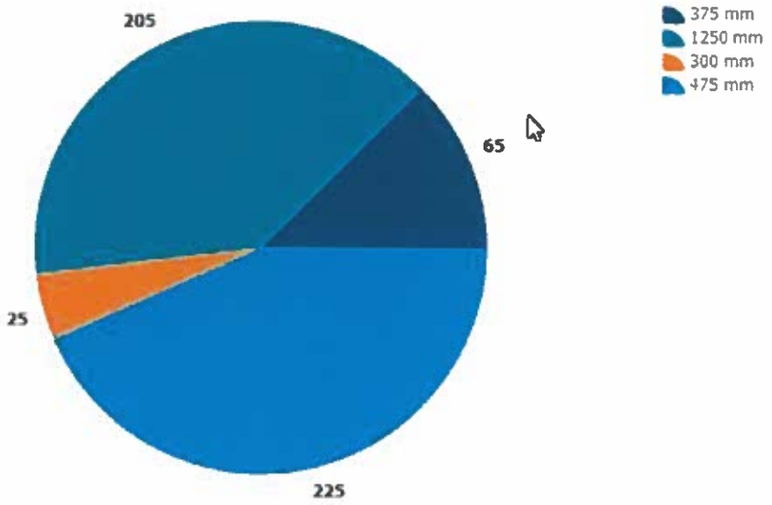
MATERIAL	SURFACE TYPE	No. OF ASSETS	LENGTH (In Meters)
Concrete	Concrete	4	520

Sum Assets: 4 Sum Length: 520 Meters

Total Assets: 4 Total Length: 520 Meters

ASSETS BY WIDTH

Stormline



WIDTH	No. OF ASSETS	LENGTH (In Meters)
375 mm	1	65.00
1250 mm	1	205.00
300 mm	1	25.00
475 mm	1	225.00