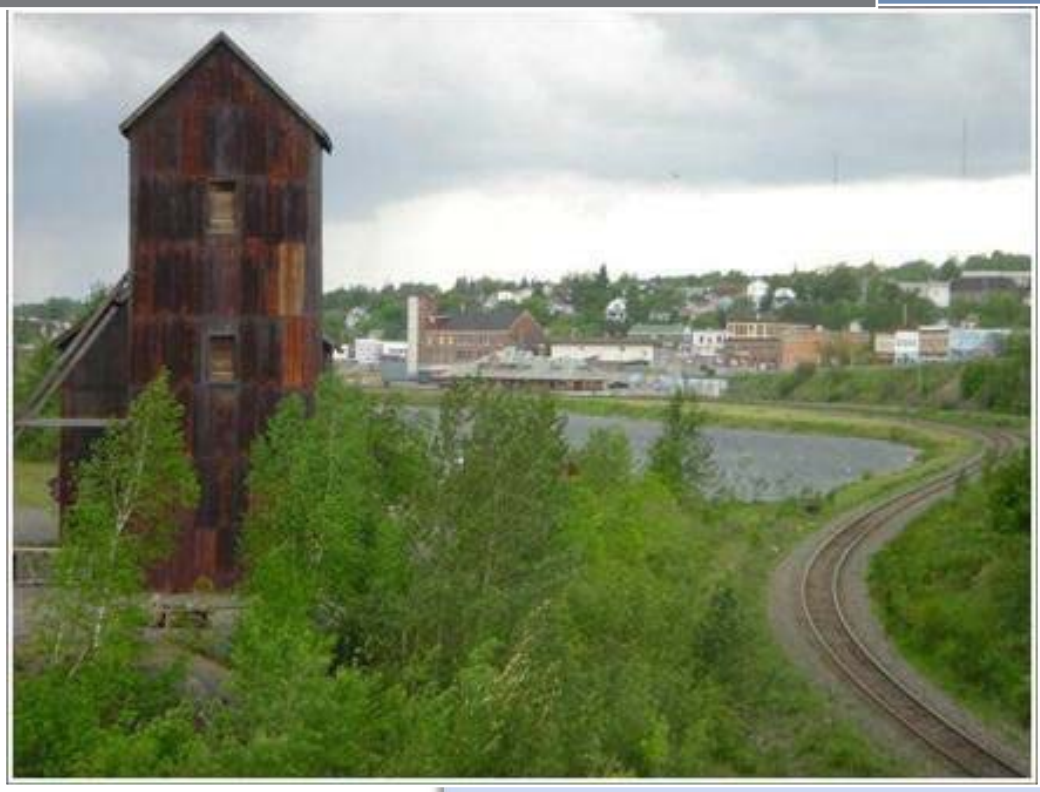
2014

The Corporation of the Town of Cobalt

Asset Management Plan



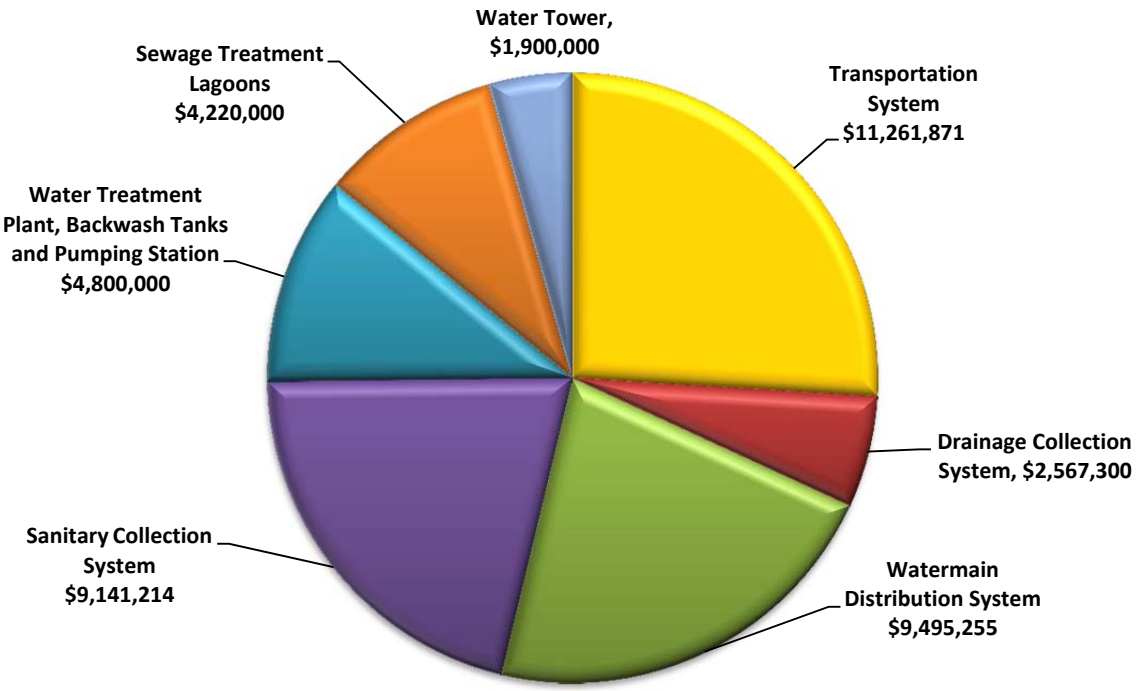
Consolidated Period:
From April 29, 2014 to October 26, 2016

Last Amendment:
October 26,2016

Executive Summary

This Asset Management Plan has been developed by the Town of Cobalt for our Water System, Sanitary System, Drainage System and Road System and is based on the guidelines provided by the Ontario Ministry of Infrastructure in their Building Together Guide for Municipal Asset Management Plans. Detailed in the graphic and chart below is a summary of the assets included in this plan. The total replacement cost (2013) of the assets is provided in the Table below. It is interesting to note that the depreciated value of our infrastructure in our Financial Information return is $15,000,000 while the replacement cost of our infrastructure in this report is $43,000.000.

Water System	Sanitary System	Drainage System	Road System
• 13,206 m of Water Main • 92 Hydrants • 145 Valves • 562 Services • 1 Water Treatment Plant	• 11,138m of Sanitary Sewer • 535 Services • 173 Manholes • 1 Wetlands • 1 Pumping Station	• 2,740m of Storm Sewer • 49 Storm Manholes • 92 Catch Basins	• 13,895m of Roads



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1. Introduction

1.1 The Town of Cobalt

The Town of Cobalt was created by the building of the Temiskaming and Northern Ontario (T & NO) Railway (now called the ONTC Railway) during one of the largest Silver mining booms in history. The community was incorporated as the Town of Cobalt in late 1908. The railway was responsible for the development of this area of Northeastern Ontario until Ferguson Highway, now called Provincial Highway 11, was opened in 1927. The 2011 census indicates that the population of Cobalt is 1,133 persons, a 9.2% decrease from the 2006 census. The Town is situated along Provincial highway No. 11B, 20 km south of Temiskaming Shores and 145 km north of North Bay.

The Municipality is committed to improving resident's quality of life; encouraging tourism, establishing long term development strategies and providing a nurturing environment for new and future business.

Infrastructure supports services vital to achieving these goals: the water system provides life sustaining potable water; the wastewater system removes sewage to improve hygiene and quality of life, the road network provides access to businesses and homes, and the drainage system provides flooding protection and surface water control. To facilitate the provision of these services, the Town owns, operates and maintains a various number of infrastructure assets.

1.2 Asset Management

All Municipally owned infrastructure systems are made up of assets that require monitoring and maintenance. The goal of asset management is defined as meeting a required level of service in the most cost effective way through the creation, acquisition, operation, maintenance, rehabilitation and disposal of assets to provide for present and future municipal users.

Municipalities should care about managing these assets in a cost effective manner for the reasons as follows:

1. Infrastructure assets are a major municipal investment.
2. Maintained infrastructure is important to economic development.
3. Proper operation and maintenance is essential for public health and safety.
4. Infrastructure provides an essential customer service.
5. Asset management promotes efficiency and innovation in the operation of the infrastructure.

1.3 Benefits of Asset Management

There are many benefits of asset management and once the principals are incorporated by the Municipality, some of the results will be immediately apparent while others will take time to implement. Some of the benefits of asset management are as follows:

- Better operational decisions;
- Improved emergency response;
- Ability to plan and pay for future repairs and replacements;
- Increased knowledge of the location of assets;
- Increased knowledge of which infrastructure assets are critical to the Municipality;
- Additional efficient operation of asset;
- Better communication with municipal users;
- Tax rates and user fees based on sound operational information;

- Increased acceptance of tax rates and user fees; and
- Capital improvement projects that meet the needs of the system.

1.4 Plan Assets

Asset Management Plans can be prepared for a portion of or all of the municipal assets as follows:

- Bridges and culverts (>3m);
- Roads (paved, gravel, and surface treated);
- Signs (regulatory, warning and information);
- Traffic signal systems;
- Guiderails, retaining walls and safety barriers;
- Storm water management system including storm sewers, maintenance holes, catch basins, ditches, etc.;
- Sanitary system including sewage treatment plant, sanitary sewers, maintenance holes, services, etc.;
- Water system, including water treatment plant, water main, valves, hydrants, services, etc;
- Municipal buildings including works garage, municipal building, arena, library, community center;
- Rolling stock including tractors, trucks, loaders, graders, etc.;
- Social housing;
- Recreational Facilities including baseball diamonds, outdoor rinks, playgrounds; and
- Other facilities such as cemetery, landfill, etc.

Since developing an asset management plan for this number of assets is very onerous for a small municipality and could result in stalling needed projects from moving forward, a smaller sample of assets will be included in the initial plan. For our Municipality only the more expensive portion of assets is being considered under their plan and they are as follows:

1. Municipal roads (bridges and culverts over 3m in diameter are not included)
2. Storm water management system including storm sewers, maintenance holes, catch basins, ditches, etc.;
3. Water system, including water treatment plant and tower, water main, valves, hydrants, services, etc.; and
4. Sanitary system including sewage treatment lagoon, sanitary sewers, maintenance holes, services, etc.,

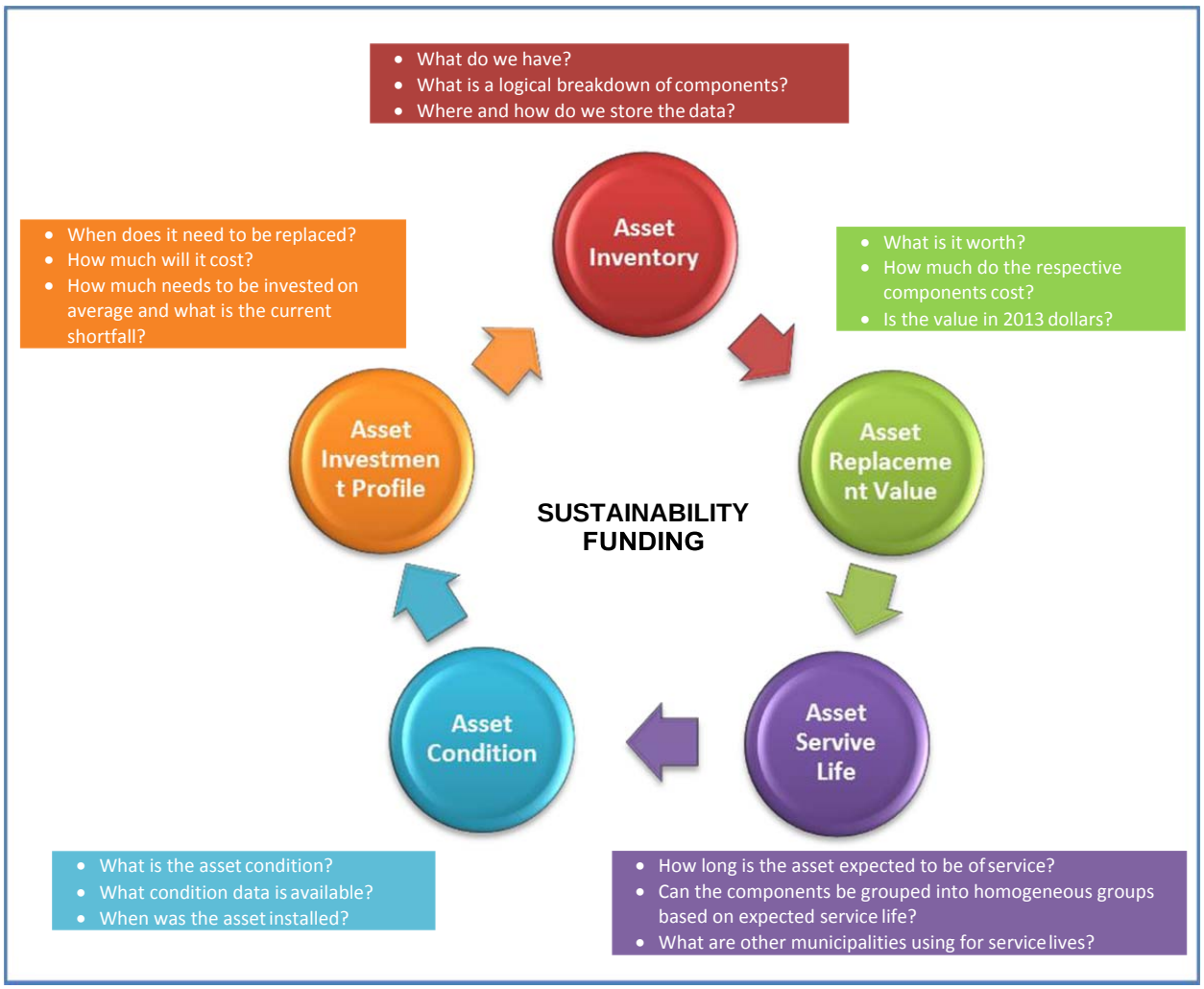
As the Municipality moves forward with asset management and staff become more familiar with the use of the document additional assets can be added or revised to include new information or greater clarification.

1.5 Plan Development and Methodology

This plan was developed using the Ministry of Infrastructure guidelines and data provided through the municipality. Municipal staff, council, and AECOM (tabular summary of assets) assisted in completing the asset management plan.

Cobalt performed an asset review using a methodology originally developed by the National Research Council of Canada (NRC) and popularized by the National Guide to Sustainable Municipal Infrastructure's ("InfraGuide") best practice on Managing Infrastructure Assets. The methodology follows a series of logical steps for answering questions related to asset inventory, replacement value, condition and expected service life to develop a long-term capital replacement profile, as summarized below:

Figure 1.5-1: Plan Development and Methodology



1.6 Plan Implementation

As with all planning documents that require constant review this asset management plan will cover the Town's identified assets over the next ten (10) years and should be updated as needed to reflect any new asset information. The recommended asset improvements should be reviewed annually by the Town to determine if revisions to the program are necessary due to unexpected changes in the condition of assets or where work could not be completed as planned.

1.7 Report Format

The report is structured in separate sections for each of Transportation, Drainage, Water, and Sanitary Systems with each main section addressing asset-specific questions related to asset inventory, replacement value, service life, condition and replacement profiles, and key recommendations.

Appendixes A to D contain tabular summaries of the Transportation, Drainage, Water, and Sanitary asset inventories, as indicated in the Index.

1.8 Financial Considerations

The renewal forecast for this study was completed using an MS-Excel based Capital Asset Planning (CAP) model. It is important to note that the model and the findings in this report provide a current "snapshot" of the Town's Transportation, Drainage, Water and Sanitary infrastructure as per the asset data from the following sources:

1. The work completed to satisfy the Public Sector Accounting Board's (PSAB) reporting requirements for Tangible Capital Assets (TCA) completed in 2009, primarily for non-linear assets. The Town of Cobalt's 2013 Consolidated Financial Report shows that we have Tangible Assets (Note 11) in the amount of $15,195,871.00
2. Data exported from the Town's GIS, primarily road, sewer and water infrastructure.
3. Data exported from the Town's previous water and sewer replacement upgrade projects.
4. Data obtained from existing sewer and water plans.

As this Asset Management Plan was based on information generally available in 2013, should any of the infrastructure elements change in the future, such as the upgrade or replacement of a water main, then the model needs to be updated accordingly.

All costs estimates have been prepared using current (2013) Canadian dollars to facilitate year to year comparisons and to avoid the uncertainty of projecting inflation and discount rates far into the future.

There is a major road resurfacing project scheduled for the summer of 2014. The Capital Cost for the project is $2,100,000 and will be completed by the late fall of 2014. At that time the Asset management plan will be updated.

2. State of Local Infrastructure

The Town provides numerous services to their community and has various assets as indicated previously but the only assets to be included in this plan at this time are the following:

- Transportation system;
- Drainage System;
- Water System; and
- Sanitary System

2.1 Transportation System

2.1.1 Transportation Asset Inventory

Cobalt completed a review of all of the Town roads in the fall of 2013, to determine the current condition of the road system. The roads were evaluated using the procedures outlined in the Methods and Inventory Manual for Road Management Plans for Small, Lower Tier Municipalities which was produced by the Ministry of Transportation in 1987. This manual was designed as a simple way to assess roads and develop long range planning for rehabilitation and reconstruction.

Most of the Town's roads are considered semi-urban (open ditches) with the main street (Lang/Prospect/Silver/Miller) section that is considered urban (underground storm sewer and curb and gutter).

2.1.2 Breakdown of Road System by Function

The Town streets are laid out in a haphazard fashion with the Ontario Northland Railway running North/South on the East side of town. Cobalt Lake runs along the East side as well. Lang Street provides access to land west of the tracks and neighbouring Town. Lang Street, Silver Street, Prospect Street, Miller Street and is recognised as a link of Provincial Highway No.11B. A breakdown of the Town roads by function is summarized in Table 2.1-1.

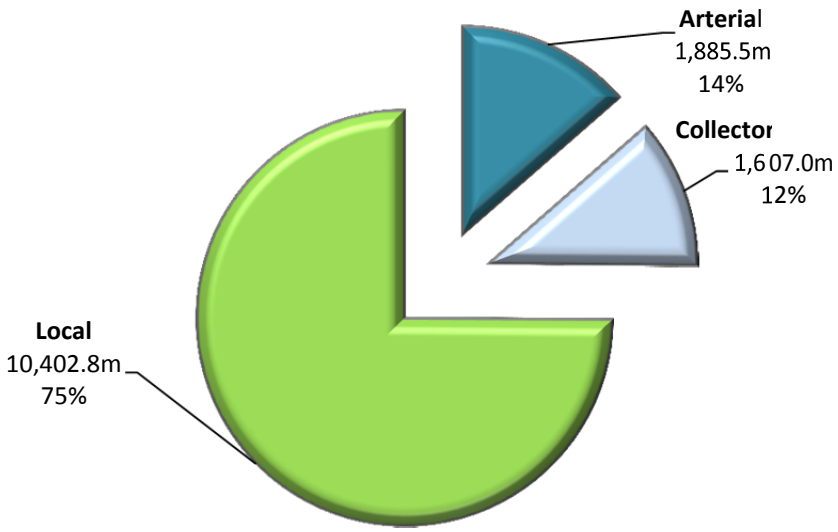


Figure 2.1-1: Breakdown of Roads by Function

2.1.3 Breakdown of Road System by Surface Type

The surface type of the Municipalities road system does not reflect the condition of the road structure but does indicate locations where the road does not meet Town standards and require rehabilitation / maintenance earlier in its life cycle.

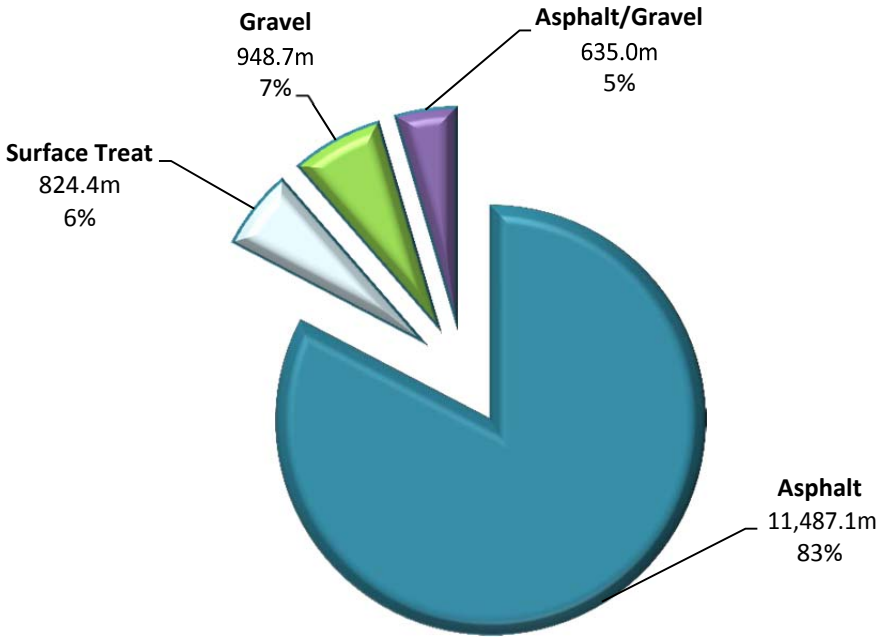


Figure 2.1-2: Breakdown of Roads by Surface Type

2.1.4 Asset Replacement Value

Accepted replacement values in 2013 dollars for the Municipalities transportation assets are summarized in Table 2.1-1.

Table 2.1-1: Road Replacement Unit Costs

Type of Road	Cost per meter of Road
Asphalt Surface semi-urban (single lift of HMHL)	$158.00
Asphalt surface urban (double lift HMHL, 4 lane)	$486.00
Granular Base semi-urban (2 lane)	$72.00
Granular Base urban (4 lane)	$94.00
Granular Sub-Base semi-urban (2 lane)	$115.00
Granular Sub-Base urban (4 lane)	$125.00
Earth Excavation semi urban (2 lane)	$120.00
Earth Excavation urban (4 lane)	$120.00
Curb and Gutter (both sides of Road)	$200.00
Sidewalk (both sides of road)	$240.00
Misc. Semi Urban (Engineering, Contingencies) -	$116.00
Misc. Urban (Engineering, Contingencies)	$330.00

The above cost applies to one meter of road reconstructed across its total width but does not include ditching or storm sewers which are included in the Drainage component of this AMP.

The total replacement value of the Municipalities roads using an asphalt surface is summarized in Table 2.1-2.

Table 2.1-2: Road Replacement Cost

Road Type	Cost per Meter	Length	Total (2013)
Urban	$1,648	1723.7m	$ 2,840,707.00
Semi-Urban	$581	12,171.4m	$ 7,071,595.00
Total		13,895.2m	$ 9,912,302.00

2.1.5 Asset Service Life

The expected service life of transportation assets, as experienced by the industry and other municipalities in Northeastern Ontario and depending on traffic volumes are summarized in Table 2.1-3.

Table 2.1-3: Road Asset Expected Service Life

Material	Years
Asphalt Pavement	20
Surface Treatment	10
Gravel Surface	20
Road Base	50

It is important to note that expected service lives are entirely contingent upon maintenance funding. For example, pavement structure is dependent on a number of factors including:

- Quality of initial design.
  - Adequate drainage.
  - Accurate traffic counts.
  - Accurate truck counts.
- Quality of the materials.
- Quality of the construction.
- Maintenance programming.

2.1.6 Asset Condition

By visual inspecting each road section we were able to identify the various existing pavement distress types and associate it with a specific condition rating. A simplified condition rating associated with this traffic type was implemented as detailed in Table 2.1-4.

Table 2.1-4: Road Condition Rating Description

Condition	Description
Excellent	**Very smooth with no cracking, surface deformation or surface defects**
Good	**Smooth with a few cracks, surface deformation or surface defects**

Condition	Description
Fair	**Comfortable with intermittent cracks, surface deformations or surface cracks**
Poor	**Uncomfortable with frequent cracks, surface deformation or surface defects**
Very Poor	**Uncomfortable with constant cracks, surface deformation or surface defects. Trail roads are included with this pavement condition.**

The Town transportation system has a condition rating as indicated in Figure 2.1-3.

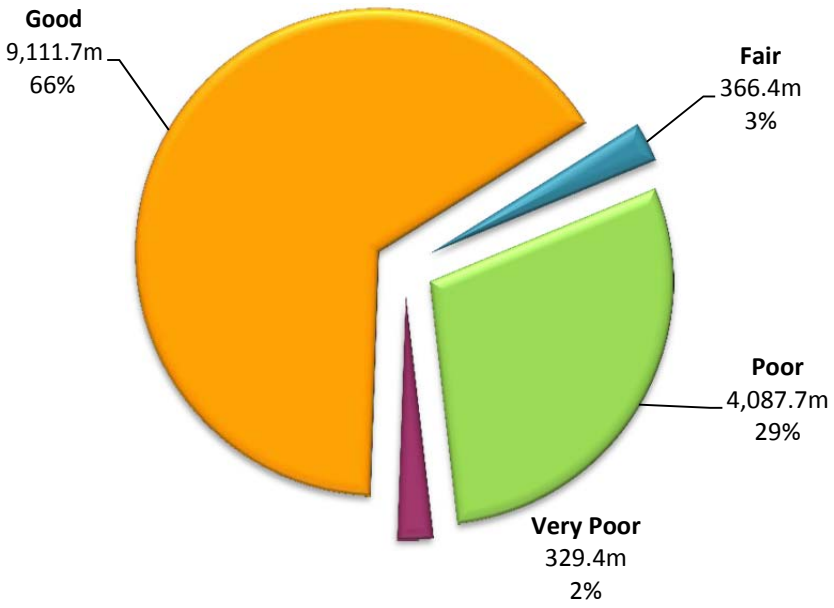


Figure 2.1-3: Road Condition Rating

To assist the Town to make decisions on where to budget for maintenance work or what sections of road that will be rehabilitated or reconstructed through the Town capital works budget, a decision matrix is provided in Table 2.1-5.

This matrix is a guideline and should be used in conjunction with municipal personnel observations of the road. The Town can adjust the matrix to provide alternate trigger points for rehabilitation or reconstruction. Specific maintenance and rehabilitation actions should always be based on the actual distress of the existing pavement.

Table 2.1-5: Road Improvement Time

Condition	Time of Improvement in Years	Cost (2013)
Excellent	10 – 18	$214,900
Good	6 – 10	$94,800
Fair	1 – 5	$2,287,000
Poor	Now - Rehabilitate	$1,518,600
Very Poor	Now - Reconstruct	$58,800
	Total	$4,174,100

To ensure that the Town is able to provide the level of service required, rehabilitation type improvements were estimated for each condition other than the very poor road(s) that require reconstruction. As each time for improvement occurs, the roads can be reassessed and adjustments to the timing can be determined so rehabilitation of the roads can fit within the Town's budget.

2.2 Drainage System

2.2.1 Drainage Asset Inventory

The data for the Towns drainage inventory was obtained from data supplied by the Municipality and from observations of each road during the condition review completed in 2013. Roads identified as having storm sewers were not camera inspected and associated structures (maintenance holes, catch-basins) were not opened or entered for inspection.

2.2.2 Breakdown of Drainage System by Type

The majority of the drainage systems in the Town are either a combination of storm sewers and ditches or a cross connection directly into the sanitary lines. The storm flow is directed to large ditches and under the tracks or to the Cobalt Lake to the East. The Town is considered sloped to the lake with very little drainage problems associated with the flat grade of roads and minimal storm water outlets. The main exception is the Trailer Park area where each spring there is flooding of properties

The breakdown of Drainage System Types is as indicated in Figure 2.2-1

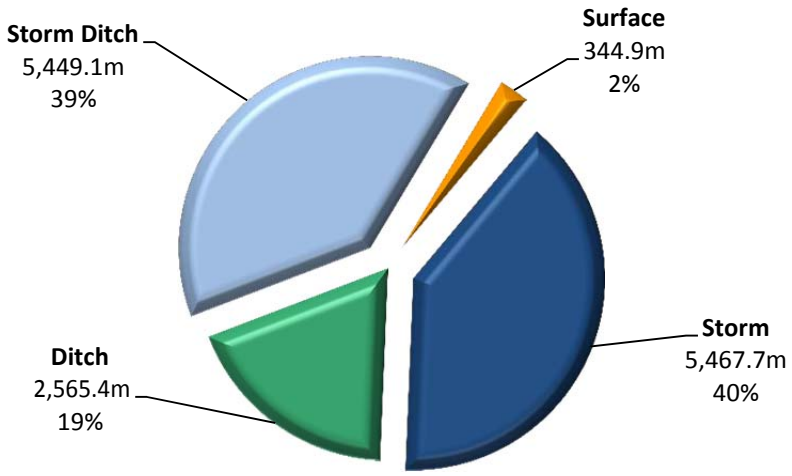


Figure 2.2-1: Drainage System Types

The Municipality does not have any storm water management ponds.

2.2.3 Asset Replacement Value

Acceptable replacement values in 2013 dollars for the Municipalities drainage assets are summarized in Table 2.2-1.

Table 2.2-1: Drainage Unit Replacement Costs

Description	Cost
Roadside Ditching	$80.00/m
CSP Storm Sewer	$800.00/m
Concrete Structure	$5,000.00/ea.
CSP Culvert	$300.00/m

The unit rates indicated above reflect recent reconstruction projects completed in the Town.

The total replacement values of the Municipalities Drainage System in 2013 dollars is summarised in Table 2.2-2

Table 2.2-2 Drainage Replacement Cost

Description	Cost
Roadside Ditching	$ 2,467,200
Storm Sewer	$ 967,000
Concrete Structure	$ 880,000
CSP (Corrugated Steel Pipes) Culverts	$ 1,863,900
Total	**$6,178,100**

2.2.4 Asset Service Life

The expected service life of drainage assets, as experienced by the industry and other municipalities in Northeastern Ontario are summarized in Table 2.2-3.

Table 2.2-3 Drainage Estimated Service life

Asset	Estimated Service life
Ditches	100 years
CSP Sewer	50 years
Concrete MH	50 years
CSP Culvert	50 years

2.2.5 Asset Condition

Based on observations made during the inspections of the transportation and drainage systems, the drainage system conditions reflect the conditions of the roads and can be summarized as per Figure 2.2-2.

Reconstruction or rehabilitation of the drainage assets will occur at the same time as the various roads are completed. Drainage cost should be added to the Roads cost when determining budgets.

2.3 Water System

2.3.1 Water Asset Inventory

The data for the Town's Water inventory is based on their GIS, and drawings supplied by the Town. Although the Town is over 100 years old and locations of some drawings indicating the systems existing age or pipe material are unknown the majority of pipes are in known locations. The Town has various sized water mains as summarized in Table 2.3-1.

Table 2.3-1: Water main Inventory

Watermain Material	Pipe Diameter	Length (m)
PVC	150	9,619.2m
	200	1,840.5m
	250	822.8m
	300	923.7m
	Total	13,206.2m

2.3.2 Breakdown of Water main by Diameter

During planning of the water system in the 70's, the Town decided that their distribution system would be able to provide fire flow. A review of their WTP pumps indicate that they can provide the necessary fire flow from their wells, but the distribution system water main and hydrants are sized and located as per MOE guidelines.

A breakdown of the water main by size and material is summarized in Figure 2.3-1

2.3.3 Breakdown of Water Main by Age

Many of the water mains in town were upgraded from 1988 to 1990 and as such are in relatively good shape.

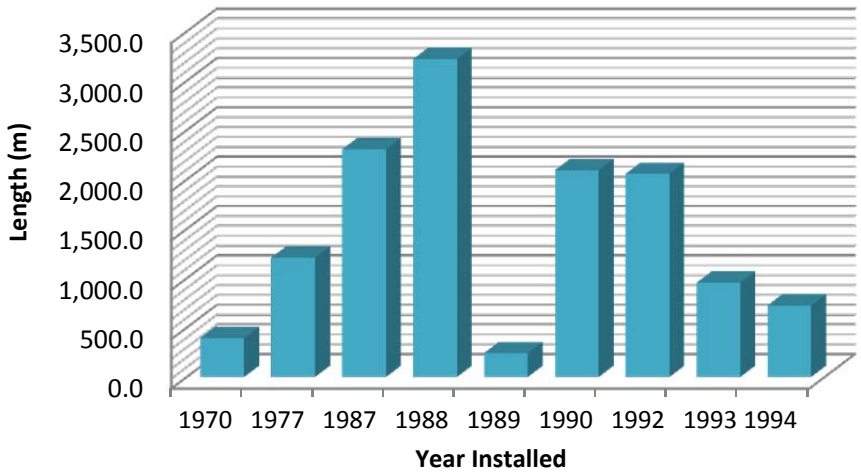


Figure 2.3-1: Water Main Breakdown by Age

2.3.4 Inventory of Hydrants, Valves and Water Services.

The Town appears to have sufficient hydrants in accordance with the coverage as per MOE guidelines. The Fire Chief for the Town confirmed the adequacy of the hydrant coverage. The existing age of the hydrant will reflect the age of the water main it is connected to.

Table 2.3-2: Hydrant Inventory

Hydrant	Quantity
Fire Hydrants	**92**

The Town appears to have sufficient valves throughout the community but could benefit from additional valves at multiple legged intersections as per the MOE guideline. The existing age of the valve will reflect the age of the water main it is connected to.

Table 2.3-3: Valve Inventory

Size	Quantity
150mm	103
200mm	14
250mm	10
300mm	16
Total	**143**

Table 2.3-4: Service Inventory

Service Size	Quantity
19mm	**558**
25mm	**0**
38mm	**1**
50mm	**2**
100mm	**1**

2.3.5 Inventory of Water Treatment Plant

The system pumps water from Lake Sasaginaga, via high lift pumps and treating it through the processes, including coagulation addition, pH adjustment (if necessary), pre-contact tanks for coagulation flocculation, pressure filters, primary disinfection through Ultra Violet (UV), secondary disinfection through free chlorine and post pH adjustment (if required) before discharging to the distribution system. There is an approximately 8.2 m wide by 32.5 m long enclosure building housing all facilities as well as laboratory and workshop.

Table 2.3-5 summarizes the major process equipment currently installed at the Cobalt WTP. The information in this table was obtained from the Certificate of Registration, Plant Operation & Maintenance Manuals, and the observations during the plant visit.

Table 2.3-5 Cobalt WTP Major Process Equipment/Components

Component	Equipment/ Description
Intake Crib and Pipe	• A 215 m long, 450 mm diameter polyethylene raw water intake pipe, with an intake capacity of 8,726 m3/d. • Located approximately 191 m into Lake Sasaginaga • The intake is equipped with a 2,440 mm diameter drum base with a 560 mm diameter manually adjustable conical cover. Intake ports are covered with 20 mm HDPE mush and fastened with stainless steel bands
Pre-Contact Tanks	• Two (2) pre-contact vessels, each with a volume of 3.6 m3 complete with two (2) automatic air release valves: one for each pre-contact tank
Storage Tanks	• Two (2) 225 L double-walled chemical solution tanks c/w mixers, level indication and leak detection • Two (2) metering pumps (one duty, one standby) for polymer feed each rated at approximately 4.4 L/h • One (1) chemical drum pump for transferring chemical from delivery tanks • One (1) polyethylene spill platform to provide storage containment. • Addition of coagulant/polymer, prior to the pre-contact tank
Filters	• Filtration equipment consisting of four (4) parallel dual media (sand and anthracite) filters, each with a diameter of 2.14 m, a surface area of 3.59 m2 and a side water depth of 1.52 m, equipped with backwash piping and valves to backwash each filter. • Four (4) turbidimeters; one for each pressure filter, linked to backwash initiation, to monitor filtered effluent; • Four (4) air release valves, one for each pressure filter • Sample taps
Process Waste Management	• A 2400 mm diameter duplex Grey Water Pumping Station with two (2) submersible non-clog pumps rated at 16.0 L/s at a TDH of 14.0 m, pumping to the Sanitary Sewer System • Portable Lifting Davit and Hoist • Wastewater magnetic flow meter; • Two (2) actuated valves to direct flow to either the clarifier or equalization chamber • One (1) sump pump rated a 1.2 L/s at a TDH of 2.5 m to transfer analyser waste to the clarifier/equalization chamber; • One (1) ultrasonic level transmitter in Pumping Station; • 450 m of 150 mm diameter forcemain including Air Release Chamber; • Three (3) interconnected backwash equalization tanks with a volume of 43.8
High Lift Pumps	• A high lift pumping station having a rated capacity of 47 L/s (4,060 m3/d), taking raw water from the intake and pumping into the pre contact tank • A wet well including manual screens and lifting equipment; • Three (3) end suction pumps (two duty, one standby), each rated at 35.9 L/s at a total dynamic head of 75.0 m, controlled on an on-off operation basis; • Three (3) booster pump solenoid control valves; one for each High Lift Pump • Treated water turbidity, pH, chlorine residual monitors and chart recorder; • Treated water magnetic flow meter, pressure-indicating transmitter; • High lift pump interlock with treated water turbidity, pH and chlorine residual monitors • Chemical injection points; • Sample tap; • Surge-anticipating pressure relief valve and discharge line; • Air release and air-vacuum valves; • Raw water magnetic flow meter; • Raw water temperature, turbidity, pH and chart recorder; • Raw Water Sample Pump from Wet Well to analyzers; and Intake flush line.

The Town has completed a review and third party inspection of the WTP (i.e. pump, vessels, etc.). The Plant is in relatively good condition with ongoing upgrades required on an annual basis.

The following are the upgrades which have been identified as priorities for the water treatment plant:

CT Simulation

High lift Variable flow pumps (1 X 25 hp, 2 x 50 hp)

20 Valves

Chlorinator

Chart Recorder and SCADA upgrade with computer and tower

2.3.6 Asset Replacement Value

Accepted replacement values in 2013 dollars for the Municipality's water distribution system assets are detailed in Table 2.3-6.

Table 2.3-6: Water System Estimated Unit Replacement Cost

Asset	Size	Unit Cost
Water main	38mm	$375.00/m
	50mm	$400.00/m
	100mm	$500.00/m
	150mm	$560.00/m
	200mm	$600.00/m
	250mm	$640.00/m
	300mm	$675.00/m
Hydrant		$6,500.00/ea.
Valve	38mm	$1,000.00/ea.
	50mm	$1,100.00/ea.
	100mm	$1,300.00/ea.
	150mm	$1,600.00/ea.
	200mm	$2,000.00/ea.
	250mm	$2,600.00/ea.
	300mm	$2900.00/ea.
Service	19mm	$2,000.00/ea.
	25mm	$2,200.00/ea.
	38mm	$2,400.00/ea.
	50mm	$2,800.00/ea.
	100mm	$4,200.00/ea.
	150mm	$5,600.00/ea.

Accepted order of magnitude replacement values in 2013 dollars, using comparisons to facilities recently constructed in the Northeastern Ontario for the Municipalities water treatment plant, standpipe assets are detailed in Table 2.3-7.

Table 2.3-7: Non-Linear Estimated Replacement Cost

Description	Unit cost
Water Treatment Plant	$ 3,800,000.00
Water Tower	$1,900,000.00
Total	$5,700,000.00

The total replacement value of the municipality's water (not including the Non-Linear items) system in 2013 dollars is summarized in Table 2.3-8.

Table 2.3-8: Replacement Cost of Water System

Water Asset	Replacement Cost
Water main	$7,395,455
Hydrants	$ 598,000
Valves	$ 257,400

Water Asset	Replacement Cost
Services	$ 1,244,400
WTP	$ 3,800,000
Total	**$13,295,255**

2.3.7 Asset Service Life

An asset's expected service life is that period of time which it is expected to be of use to the owner, after which it needs to be replaced. This section will address in detail the different expected service lives assumed for the range of water assets owned and managed by the Town.

The *expected* service life of water assets, as experienced by the industry and other municipalities in Northeastern Ontario are summarized in Table 2.3-9.

Table 2.3-9: Water Assets Estimated Service Life

Asset Description	Estimated Service Life (ESL)
PVC Water main	100
Ductile Iron Water main	100
Copper Water main	100
PEX Water main	100
Hydrants	100
Valves	100
Copper Service	100

Table 2.3-10: Water Treatment Plant Estimated Service Life - Components

Description	Estimated Service Life (ESL)
Water Treatment Plant	22

For the Town's first asset management plan the ESL for each of the non-linear assets will be assumed using an average weighted expected useful life of all the traditional assets found in each. Once the Town creates an inventory of individual assets within each non-linear asset indicating the condition, age, service history, cost, etc. they can better define their life cycle costs.

2.3.8 Asset Condition

The Town has not kept records of the number water main breaks a certain main has since it was installed and we may not be able to provide details on the condition of any mains they unearthed when working on the water main (i.e. valve replacement, installing a water service, etc.). For this first asset management plan, the condition of the water main and associated hydrants and valves will be based on the age of the pipe and the remaining service life. Therefore, the condition of the Town's water mains is between very good and excellent as the remaining useful life ranges from 63 years to 78 years respectively.

A review that was completed in 2013 has indicated that the water treatment plant has installed major treatment equipment with sufficient rated capacity to meet water production requirements for the next 20 years. The Cobalt WTP is not expected to experience the shortages on its treated water fire pumping capacities, and the treated water storage capacity in the future.

2.4 Sanitary System

2.4.1 Sanitary Asset Inventory

The data for the Town's sanitary sewer inventory is based on their GIS, upgrades to their sanitary system and drawings supplied by the Town. Although the Town is over 100 years old and locations of some drawings indicating the systems existing age or pipe material is known. The Town has various sized sewer pipe with most of the sanitary pipes properly mapped.

Table 2.4-1: Sanitary Sewer Pipe Inventory

Sewer Pipe Material	Pipe Diameter	Length (m)	Total Length (m)
PVC	100	145.0	6,555.0
	150	257.6	
	200	3,933.3	
	250	661.3	
	300	48.0	
	375	597.5	
	750	912.3	
AC	100	97.1	1,724.8
	150	214.0	
	200	1,151.7	
	300	262.0	
Clay	200	1,630.7	1,630.7
PVC FM	200	431.7	431.7
VITRIFIED CLAY	200	305.0	305.0
Total Length of Water Main		10,647.2	10,647.2

2.4.2 Breakdown of Sewer Pipe by Diameter and Material

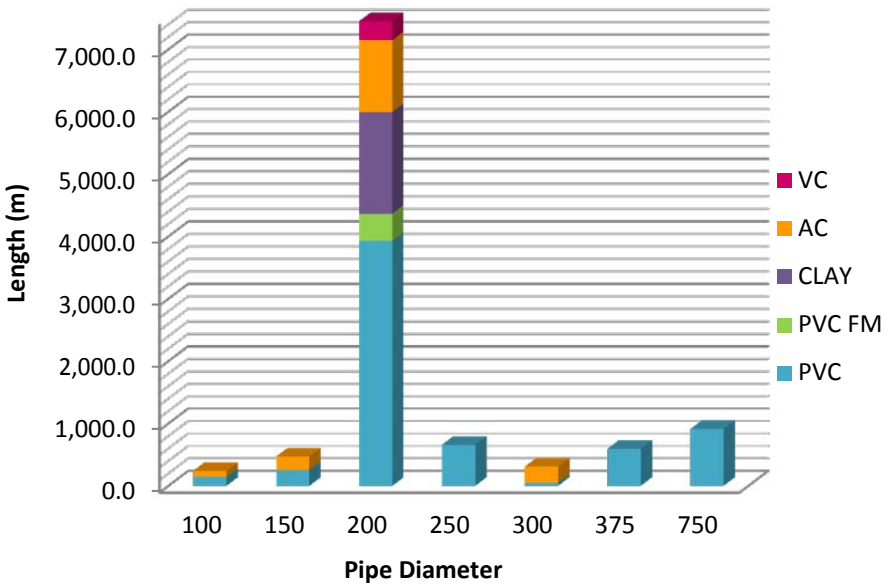


Figure 2.4-1: Sanitary Sewer Breakdown by Size and Material

2.4.3 Breakdown of Sanitary Sewer by Material

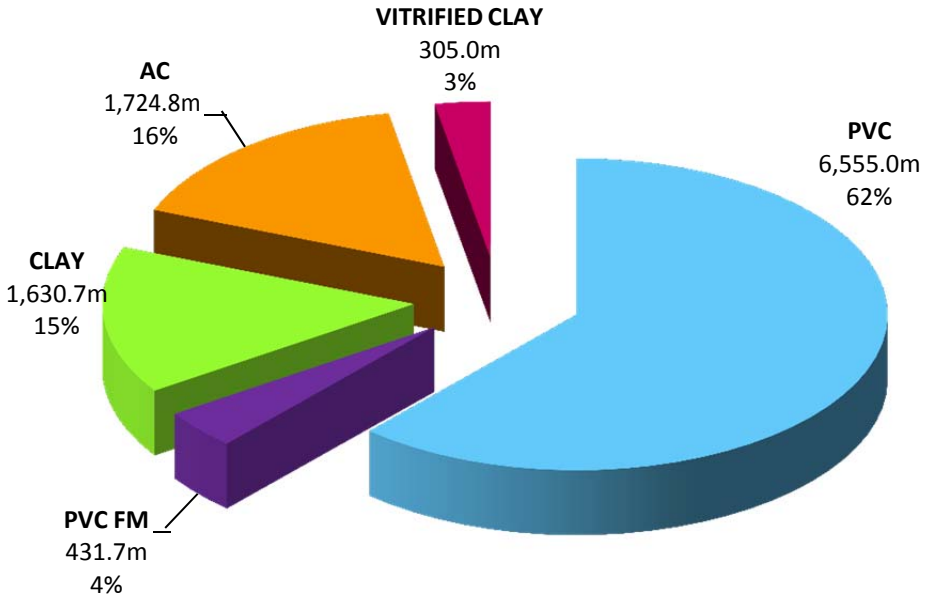


Figure 2.4-2: Sanitary Sewer Breakdown by Material

2.4.4 Inventory of Maintenance Holes and Services

Table 2.4-2: Maintenance Hole Inventory

Description	Quantity
Maintenance Holes	173

Table 2.4-3: Sanitary Service Inventory

Description	Quantity
150mm Sanitary Service	535

2.4.5 Pumping Station (Process Waste Management)

The Town has one pumping station
with a 2400mm diameter duplex Grey Water Pumping Station with two (2) submersible non-clog pumps rated at 16L/s at a TDH of 14.0m, pumping directly to the Sanitary Sewer System.

2.4.6 Reconstructed Wetlands

The Town treats their sewage at a Reconstructed Wetlands property located north/west of the ONR tracks. The wetlands have an aeration system driven by several small wind turbines. Effluent (which includes significant storm water) is directed to wind through cat tail channels then is exited out to a receiving creek and on to Lake Temiskaming. The challenge is to have sufficient holding time in the channels for the aeration and solid separation to occur so the outfall effluent meets the standards set by MOE.

An assessment and feasibility study are required to improve upon the quality of wetlands effluent.

2.4.7 Asset Replacement Value

Accepted replacement values for the Town's sewage collection system were obtained from recently completed projects and are detailed in Table 2.4-4

Table 2.4-4: Sewage Collection Replacement Estimated Unit Cost

Asset Description	Unit Cost
200mm sanitary sewer	$500/m
250mm sanitary sewer	$510/m
300mm sanitary sewer	$520/m
375mm sanitary sewer	$570/m
525mm sanitary sewer	$590/m
525mm sanitary sewer and Casing	$2,900/m
Maintenance Hole	$6,000/ea.
150mm sanitary service	$2,000/ea.

Accepted order of magnitude replacement values in 2013 dollars, using comparisons to facilities recently constructed in the Northeastern Ontario for the Municipalities pumping station and lagoon assets are detailed in Table 2.4-5

Table 2.4-5: Non-Linear Pumping station and Reconstructed Wetlands Estimated Upgrade Value

Description	Cost
Pumping Station	$90,000
Wetlands	$1,800,000
New Sewage Treatment Plant	$3,800,000

The total replacement value of the Town's Sewage collection and treatment system (less non-linear costs) is summarized in Table 2.4-6. It is very difficult to determine the costs associated with upgrading the Wetlands. A general cost to construct a waste water treatment plant is $3,800,000.

Table 2.4-6: Replacement Cost of Sanitary System

Asset	Replacement Cost
Sewer Pipe	$5,460,340
Maintenance Holes	$1,038,000
Services	$1,337,500
Pumping station	$90,000
Upgrade to Wetlands	$1,800,000
Total	$9,725,840

2.4.8 Asset Service Life

An asset's expected service life is that period of time which it is expected to be of use to the owner, after which it needs to be replaced. This section will address in detail the different expected service lives assumed for the range of sanitary assets owned and managed by the Town.

A sewer pipe service life depends on many factors – material, quality of installation, soil conditions, and disturbances by adjacent construction.

The expected service life of sewer assets, as experienced by the industry and other municipalities in Northeastern Ontario are summarized in Table 2.4-7

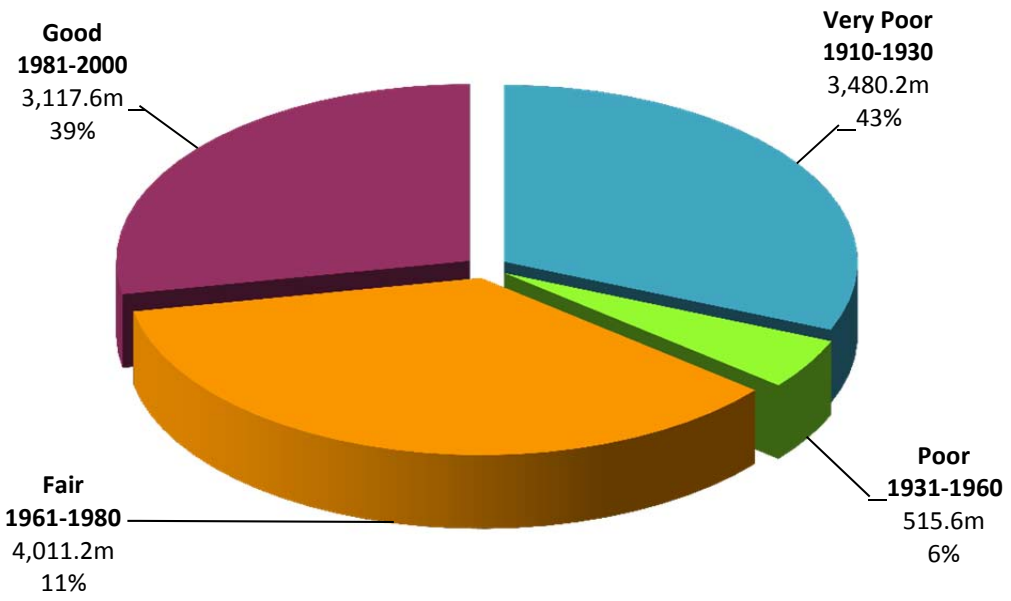
Table 2.4-7: Sanitary System Estimated Service Life

Asset	Estimated Service Life
Gravity Sewer Pipe	75
Maintenance Hole	75
Service	75
Wetlands	100

2.4.9 Asset Condition

For this first asset management plan the condition of the water main and associated maintenance holes and services will be based on the age of the pipe and the remaining service life. As a result the sanitary system condition is summarized in Figure 2.4-3.

Figure 2.4-3: Sanitary Sewer Condition Rating



2.5 Municipal Facilities

2.5.1 The Public Works Garage

The municipal garage is a prefabricated steel building (Quonset Hut). The building is a mechanic's garage and is used to maintain the community vehicles and the storage supplies. The main bay area has a concrete pad floor and a concrete foundation. Large cracks in the flooring throughout the building indicate very poor condition. The roof is leaking causing health and safety concerns. It is recommended for immediate repair. The rear entry is a metal garage door on a track. It is no longer operational and in need of immediate repair. A separate portable structure is used as the primary public works office. It is in very poor condition with structural deficiency and health and safety concerns. It is recommended that this structure be demolished.

A visual assessment of all municipal buildings was undertaken in support of development of the Action Plan.
Given the number of components in the building that are in critical condition and in need of immediate repair or replacement, it is recommended that the building be decommissioned as the main garage to be used strictly for cold salt storage and a new garage be built which will incorporate the office.

Given the number of components in the building that are in critical condition and in need of immediate repair or replacement, it is recommended that the building be decommissioned as the main garage to be used strictly for cold salt storage and a new garage be built which will incorporate the office.

Table 2.5.1: Action Plan

Asset ID	Name	Condition	Work	Estimated Cost
BUI_001	Public Works Garage	Critical	Replace	$700,000

3. Desired Level of Service

The Town currently provides a high level of service for all their assets but the only assets to have a defined service level under this plan are as follows:

- Transportation System;
- Drainage System;
- Sanitary System;
- Water System.

The service levels for each system are discussed in the sections below.

3.1 Transportation System

3.1.1 Introduction

A level of service defines the way the Town and its staff (includes contractors) want the transportation system to perform over the long term and the costs associated with that commitment. As with all municipalities the costs associated with the level of service provided to their residents for these services is always under scrutiny. To ensure the least cost approach is delivered to the community, a defined level of service will be established.

3.1.2 Level of Service

The Town's Transportation Level of Service is as follows:

- All work on municipal roads by Town Staff and contractors will follow safety requirements as set by provincial and federal legislation.
- Vehicle ride should be smooth with minimum bumps and need to avoid rough road sections.
- All potholes will be filled with either cold mix or hot mix (when available) upon detection by the Town staff. Any customer complaints about potholes will be filled within a four (4) hour period. If pot filling material is not available and the hole is significant, a florescent marker (pylon) will warn travelers of the location.
- All gravel shoulders will be inspected in the spring to ensure that sufficient granular material exists along the edge of all roads to ensure pavement edge cracking does not occur.
- Roads will be plowed after every significant snow storm (10mm snow accumulation on the ground), or in accordance with newly adopted Winter Standards Operations Policy to be established in 2014.
- Plowed roads will have sand applied at each leg of intersection.
- Any necessary work on municipal roads will be completed with either at least one lane of traffic and proper vehicle control or a detour as set out in provincial and federal legislation.

3.1.3 Critical Assets

The Town has four collector roads that connect up with the main arterial road (Lang\Prospect\Silver\Miller) and each can be accessed using the existing local road pattern during emergencies. Critical roads in the town of Cobalt can be identified as roads through their downtown core and roads adjacent to schools. These roads must be maintained at all times and are closely reviewed daily by Town public works staff.

3.2 Drainage System

3.2.1 Introduction

A level of service defines the way the Town and its staff (includes contractors) want the drainage system to perform over the long term and the costs associated with that commitment. As with all municipalities the costs associated with the level of service provided to their residents for these services is always under scrutiny. To ensure the least cost approach is delivered to the community, a defined level of service will be established.

3.2.2 Level of Service

The Town's drainage system Level of Service is as follows:

- All work on municipal drainage systems by Town Staff will follow safety requirements as set by provincial and federal legislation.
- Storm water flow will be maintained in the system for a minimum 2-year storm. All major storm flows will be drained using the existing right of ways. Efforts to be made to reduce cross connections with storm and sanitary lines.
- Address flooding through targeted snow removal and consideration of well points.
- Drainage ditches will be maintained and filling of ditches in front of houses will not be permitted.

3.2.3 Critical Assets

There are approximately three (3) locations where storm water flow from town crosses the ONR tracks through pipe culverts owned and maintained by ONR forces. If any of these culverts were to plug storm water would back up into the roadside ditches creating minor flooding. If the culvert crossing was to collapse ONR forces would need to make repairs under emergency conditions and could have an effect on drainage from town property.

3.3 Sanitary System

3.3.1 Introduction

A level of service defines the way the Town and its staff (includes contractors) want the Sanitary system to perform over the long term and the costs associated with that commitment. As with all municipalities the costs associated with the level of service provided to their residents for these services is always under scrutiny. To ensure the least cost approach is delivered to the community, a defined level of service will be established.

3.3.2 Level of Service

The Town's sanitary system Level of Service is as follows:

- All work on municipal sanitary systems by Town Staff will follow safety requirements as set by provincial and federal legislation.
- Through best management practices and technological advancements, the Town is committed to maintaining the health of our environment, and its watershed.
- Provide adequate infrastructure capacity

3.3.3 Critical Assets

Our Constructed Wetlands project effectively diverts all wastewater through a natural filtering process and recycles the water back into our infrastructure. Sewage treatment plant, rated at 1063 m3/d, consisting of:

1. an inlet chamber;
2. two (2) grit channels each approximately 5.4 m long and a maintenance forebay providing approximately 4 hours retention at average dry weather flow of 631 m3/d;
3. one wetland splitter chamber;
4. 5.0 hectares of constructed wetland in three (3) cells with internal baffles and a liquid operating depth of 0.1 - 0.65 m;
5. outlet chamber and outfall to Sasaginaga Creek;

including facility for augmentation of flow from Sasaginaga Creek, associated piping, valves, controls systems all in accordance with Environmental Study Report dated March 1997, design brief, final plans and specifications prepared by KMK Consultants Limited, Consulting Engineers.

3.4 Water system

3.4.1 Introduction

A level of service defines the way the Town and its staff (includes contractors) want the water system to perform over the long term and the costs associated with that commitment. As with all municipalities the costs associated with the level of service provided to their residents for these services is always under scrutiny. To ensure the least cost approach is delivered to the community, a defined level of service will be established.

3.4.2 Level of Service

The Town’s level of service for the water system is as follows:

- Provide clean, safe drinking water through the operation and maintenance of the water system in a manner that adheres to all applicable legislation and regulations.
- All work on the municipal water system by Town Staff will follow safety requirements as set by provincial and federal legislation
- Repair all water main leaks immediately as they are found and the resources to make the repair are organized;
- Provide potable water to the community of Cobalt, and those customers that are located in Coleman Township, that is economical to produce.

3.4.3 Critical Assets

When requiring a clean, safe, reliable and economic water system all parts of the asset are critical. The Town should continue to operate and maintain their system in this fashion. The water treatment plant has installed major treatment equipment with sufficient rated capacity to meet water production requirements

4. Asset Management Strategy

4.1 Introduction

The asset management strategy is the set of planned actions that will enable the assets to provide the desired levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost (e.g., through preventative action).

Life Cycle Costs of Infrastructure Ownership

Life cycle cost is the total cost of an asset throughout its life including planning, design, construction, operation, maintenance, renewal, replacement, and disposal costs. Once the Town acquires infrastructure assets, they become responsible for a substantial stream of future resourcing requirements that will be required not only as long as the asset can be operated cost effectively, but as long as the service that the asset provides is required. In other words, the Town is responsible for the replacement of deteriorated assets as long as the service is required. While individual assets may have a useful life that can be predicted in years or decades, the service that the asset provides could be required for a substantially longer duration (perhaps in perpetuity). The purpose of the Asset Management Strategy is to fully understand and predict the financial requirements for the Town's infrastructure to provide the desired levels of service in a sustainable way, while managing risk at the lowest lifecycle cost.

The Figure 4.1-1 illustrates how costs typically accumulate over an asset's life.

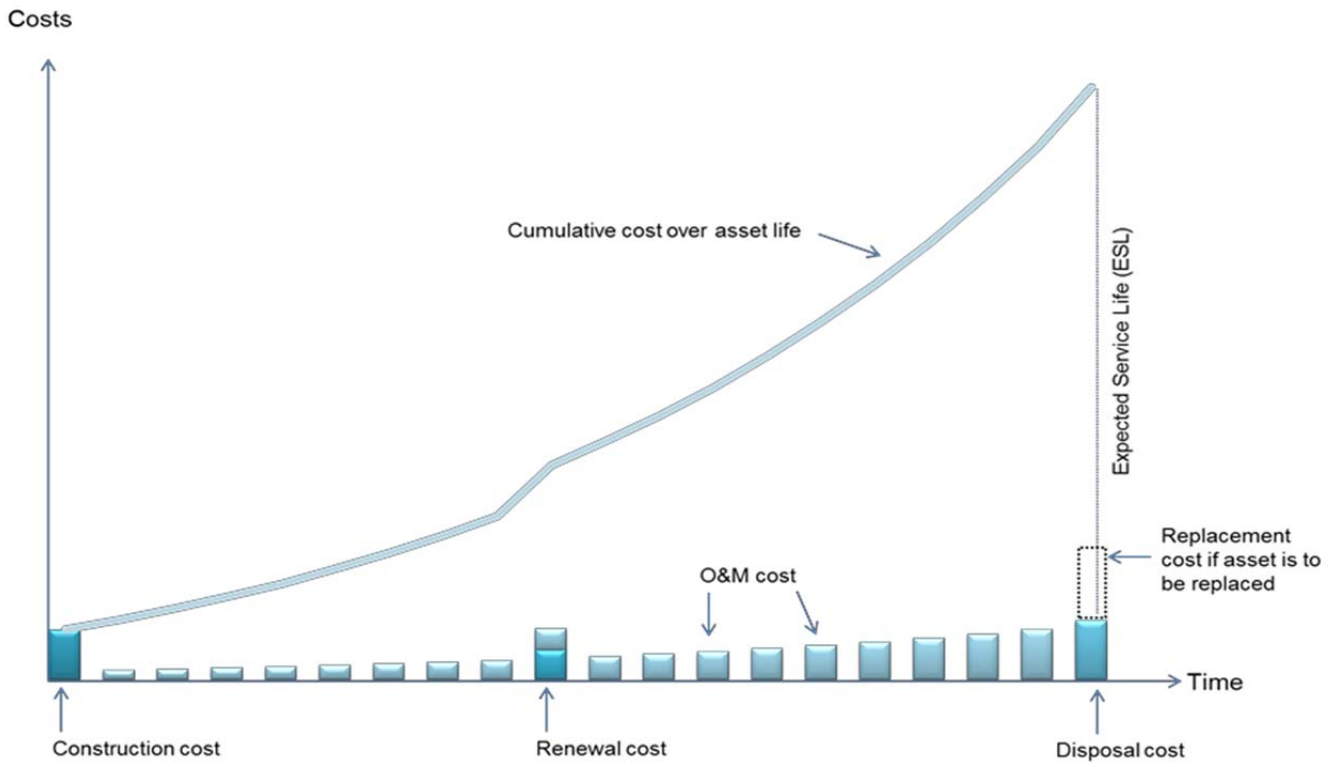


Figure 4.1-1 Accumulation of Costs Over an Asset's Life

Expressed simply, full life cycle cost of infrastructure can be accumulated under the following broad headings:

1. **Installation Cost:** The largest investment that the Town has made is the design and construction of its municipal infrastructure. The Town's infrastructure inventory was therefore created over many decades through infrastructure paid for by the Town as well as funding after the 1977 Fire.

2. **Ongoing Operations and Maintenance (O&M) Cost:** The Town accepts the responsibility of operating and maintaining the infrastructure according to O&M standards to ensure that the infrastructure is safe and reliable. Operations staff provides the day to day support required to operate infrastructure. In some cases, operations costs are minor, or they can be substantial and technically complex. For example, underground pipes require almost no operational support while a treatment plant may require full-time staff to operate the facility safely and efficiently. Maintenance expenses include periodic preventive maintenance to ensure that the infrastructure can provide reliable service throughout the life of the asset and corrective maintenance that is required to repair defective assets as and when needed. The amount of O&M resources required in any period is a function of the current inventory of infrastructure and total O&M needs required for each asset. As the Town's inventory of infrastructure grows, total O&M requirements will also grow.

3. **Renewal or Replacement Cost:** The third portion of full life cycle costing relates to the renewal and replacement of infrastructure that has deteriorated to the point where it no longer provides the required service. Renewal cost is sometime incurred during the life of an asset where an investment is made to improve the condition and / or functionality of the asset e.g., resurfacing of a road. Disposal and replacement costs are incurred at the end of an asset's life when it is disposed of and replaced by a fully new asset. Many Canadian municipalities have not traditionally factored renewal or replacement costs into future budget projections, except for assets that have a relatively short life such as computer equipment and vehicles. Part of the problem lies in the fact that large portions of this infrastructure inventory can have a very long life e.g., from 75 to 100 years for underground pipes. For young communities like the Town of Cobalt, there has not been a historical need to forecast expenses that are not anticipated for decades.

4. The Asset Management Strategy therefore presents the Town's current approach for responding to the full life cycle costs of all its infrastructure assets, as well as the strategy to improve the Town's ability to predict full life cycle costs of their infrastructure over time. Cobalt's approach to managing assets considers:

    - Non-Infrastructure Strategies
    - Operations and Maintenance Strategies
    - Asset-specific planning for Rehabilitation/Replacement and Expansion activities
    - Water System specific strategies
    - Drainage System specific strategies
    - Roads System specific strategies
    - Procurement strategies
    - Risk Management strategies

4.2 Non-Infrastructure Strategies

Non-infrastructure solutions are actions that are undertaken to either extend asset life or lower costs. These strategies are not directly related to individual assets, but affect the system as a whole.

1. Water Conservation Program
2. Leak Detection Program
3. CCTV Inspection Program

4. Drainage Maintenance Program
5. Road Maintenance Program
6. Integrated infrastructure planning – e.g. scheduling road and water replacement at the same time
7. Data Verification
8. Elimination of cross connections between the storm water and sanitary system

4.2.1 Water Conservation Program

Conservation measures encourage the efficient use of water, thereby reducing the quantity of water required per capita, and reducing the need for additional water infrastructure to meet population growth needs. As part of their water system operation and maintenance, the Town should find any location of homes using bleeders and provide information on when to start the bleeders in the late fall and when to shut them off in the spring. A permanent list of residents using bleeders should be maintained by the Town. Contact with residents using bleeders will be made using a direct mail-out or insert in the tax bills.

4.2.2 Leak Detection Program

Leak detection programs focus on water distribution networks and assist municipalities to locate where water is being lost. A simple way to address water loss in a system is to fix the problem once it is observed flowing on the surface but this is not always the case due to soil conditions. Strategies to address water loss vary but the cost savings achieved from treatment and distribution of the water lost as well as the potential capacity regained through leak detection activities can hold significant benefits to a Town. A leak detection survey should be completed on the Town's water system to ensure that treated water is not being lost

4.2.3 CCTV Inspection Programs

In order to properly assess the conditions facing the sewer system the Town needs to embark upon a comprehensive CCTV inspection and review process. Only through conducting and reviewing video tapes of the underground infrastructure can a municipality properly determine where the areas of concern may be and what action need to be taken in order to rehabilitate the sewer pipes and associated manholes. Not only should the mains be inspected but an investigation of maintenance holes, catch basin and ditch inlets should be a fundamental element to any program. Several preventive maintenance initiatives can then be developed based on the outcome of this work.

4.2.4 Drainage Maintenance Program

A properly drained road and community relies on properly designed storm infrastructure such as storm sewers and ditches. Cobalt is a community where much of the storm drainage is via ditches. The Town should make their residents aware that installing undersized culverts or filling of the ditch without permission will directly affect the operation of this infrastructure. Locations where the ditch has been filled in by a homeowner or filled over time by silt accumulating in the ditch will minimize the condition of the system. Existing ditches and culverts should be lowered to provide proper drainage of the road base and ensure culverts are open and clear so blockage of drainage does not occur. This work can occur on its own or during the rehabilitation of the existing road.

4.2.5 Road Maintenance Program

A road maintenance program will focus on maintaining existing roads and extending its life as long as possible. Maintenance programs should include the following components:

- Spot improvements to the asphalt surface.
- Spot improvements to the road drainage system.
- Crack sealing.
- Resurfacing/overlays at the appropriate time.
- Pavement preservation strategies if appropriate, include:
  - Micro-surfacing.
  - Crack sealing.
  - Surface Treatment
  - Slurry Seals.

Each one of the above-noted treatments represents an extension to the pavement's life at relatively lesser cost than rehabilitation or full reconstruction. For example, it is generally accepted that crack sealing will extend the pavement life by two years; slurry seals, micro surfacing and surface treatment for four to seven years. However, preservation type treatments do have a functional limit for usage and cannot be the exclusive technique used for pavement management as these treatments generally do not have a structural value. Hot Mix Asphalt Overlay treatments will add structure and extend the pavement life from 7 to 10 years depending on traffic volumes. Optimal timing of maintenance and rehabilitation efforts is the key to maximizing life expectancy of existing pavement structures

4.2.6 Integrated Infrastructure Renewal

Through determining road, sanitary sewer and water main replacement schedules, actions can be taken to align replacement times. For example, if a road section was approaching its replacement year, but a sanitary sewer and water main located underneath the road was expected to be replaced in 5 years, the road could be flagged as potential candidate for rehabilitative/maintenance actions to increase its service life.

Through taking actions to increase the service life of the road through rehabilitative/maintenance actions (i.e. pulverize and repave, etc.), the road life can be extended to match the sewer pipe and water main replacement year, allowing for the road to be replaced after excavation of the site occurs which would be required to replace sewer and water main pipes. Utilizing this approach saves costs, minimizes waste, and maximizes the use of assets. This approach will only be successful in a few locations in Cobalt due to most of the underground infrastructure being located is in back yard laneways and not under the roads.

4.2.7 Data Verification

Following the completion to this document, the Town's first Asset Management Plan (AMP) the Town will continue work on asset management, utilizing lessons learned during the preparation of the AMP to consolidate the existing data and add remaining assets (ex. buildings, rolling stock, etc.). The Town will need to obtain information (asset description, installation date, estimated service life, rehabilitation date, etc.) on the individual assets located at the water treatment plant and sewage treatment lagoons and insert into the future revised asset management plan.

4.3 Operation and Maintenance Strategies

The goal of a maintenance plan is to ensure infrastructure assets are being maintained in a reliable and sustainable manner that supports customer satisfaction, and ensures, for example, treatment and distribution of safe potable

water that meets or exceeds regulatory requirements. Adopting comprehensive operation and maintenance programs, coupled with supporting policies, procedures, and systems, is the number one approach to ensure the reliability, sustainability and safe operation of infrastructure assets and the functions they serve: safe and reliable delivery of services. Well maintained assets reduce the risk of failure; regularly conducted preventive maintenance and inspections help identify problems before they become a serious and potentially costly issue, minimizing or eliminating consequences of asset failures when they do occur.

As assets continue to age, it is expected that corrective maintenance will gradually increase; there is also an increased risk that more assets will fail as they approach the end of their expected life (this is when the decision should be made to run an asset to failure, for example if redundancy is in place, or to replace the asset. At the same time, the asset base continues to expand as population and demand increase; this also translates into increases in preventive and corrective maintenance activities. To address these combined challenges, best practices support enhanced preventive maintenance programs to extend the lives of assets (potentially reducing future corrective maintenance requirements) to help ensure a safe, efficient, and reliable service. This combination of enhancing preventive maintenance and addressing increasing corrective maintenance requirements requires organizational commitment, resources, funding, and support.

4.4 Asset Renewal/Rehabilitation/Replacement and Growth/Expansion Strategies

Rehabilitation and renewal of existing infrastructure involves performing significant repairs designed to extend the life and return assets to near-original condition and operation, for example pulverizing the existing asphalt surface and repaving. Replacement of existing infrastructure involves the construction of a new asset to fulfill the service requirements of the existing asset, and is typically expected to occur when the asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.

To best plan for rehabilitation and replacement of infrastructure, it is necessary to estimate both the year (range of years) when the activity is expected, and the necessary cost. Because assets typically have a long life-span (30-100 years) and deteriorate at varying rates, depending on everything from local soil conditions, weather, installation/construction practices, materials, and maintenance performed on the asset, it is difficult to know the rehabilitation and replacement needs of a particular asset without knowing its current condition.

The roads condition information is provided through the recently completed visual review of all roads and drainage assets. However, for sewer, water and drainage assets, age is the only documented proxy for condition. In addition, unlike above ground assets, condition data is not always available for buried water and sewer mains.

Typically, non-linear asset investment profiles are created using basic inventory data coupled with straight-line depreciation over expected service life. This approach was utilized for roads, sewer pipe, structures, water main, hydrants, valves, and services. However, for more complex, non-linear assets such as treatment plants, pumping station, lagoons and wells, this approach could not reasonably be applied. It is recognized that major components that comprise these assets have different service lives than the overall assets. These complex infrastructure assets are comprised of, for example, process mechanical, structural, building mechanical, electrical and instrumentation control components with varying expected service lives. For example, pumps may have an expected service life of 25 years, so applying an overall service life of 75 years to an overall pumping station would misrepresent the facility's reinvestment requirements for pumps which have a shorter life expectancy. In addition, the approach would not recognize any improvements or reinvestments already made to the stations. To more accurately predict the replacement and renewal of these more complex infrastructure assets, an asset inventory at the component level and current condition data is required.

It is the Town's intention to collect this information over time and store this information in the existing infrastructure data management system.

4.5 Water System

4.5.1 Water System Infrastructure Operations and Maintenance

The goals of the Town's operation and maintenance (O&M) activities are as follows:

- Ensure infrastructure assets are being maintained in a reliable and sustainable manner that supports customer satisfaction as outlined in the levels of service framework.
- Support treatment and distribution of safe potable water that meets or exceeds regulatory requirements.
- Reduce the risk of failure which is directly related to meeting regulatory requirements and customer satisfaction.
- Maximize value by determining lowest sustainable cost alternatives for maintenance over asset lifecycles.

The following water Operations and Maintenance activities have been identified as necessary for the Town's infrastructure:

- Flushing, and disinfecting water mains
- Site works and structural maintenance for facilities
- Maintenance of process mechanical (pumps, valves, piping, etc.) for facilities
- Maintenance of electrical systems (control panels, distribution, transformers, stand-by power, etc.) for facilities
- Interior and exterior painting of facilities
- Valve cycling
- Hydrant inspections and maintenance
- Emergency and non-emergency repairs
- Operation of water treatment, supply and distribution infrastructure.

The Town of Cobalt implemented a Quality Management System Operation Plan in 2009. It is through our Drinking Water Quality Management System that we monitor potable water and its distribution system. Our system went through its first independent review in 2013 without any major issues. *NSF International Strategic Registrations* provided a *Certificate of Registration* showing this assessment on January 27, 2014. Annual Compliance Reports are submitted in accordance with *Drinking-Water Systems Regulation 170/03*. It is the Town's intention to build upon the existing asset inventory, develop an asset hierarchy, and collect asset component and condition data. As this is completed, the Town will be in a better position to detail all O&M activities required and completed against each asset component. For the purposes of this first draft of the Town's Asset Management Plan, current O&M practices and budgets are assumed to be adequate to meet the Town's needs, however, this will continue to be evaluated as the Town expands on current Asset Management Planning and Management. Future O&M needs are estimated based on budgeted costs and the anticipated needs.

The Town's O&M needs for 2012 and 2013 were presented in the Town's 2013 Operating Budget. The 2014 operations and capital budgets were passed on April 8, 2014 and includes capital costs for the following services:

- The resurfacing of Lang Street, including the replacement of a major retaining wall.
- Activities relating to ensuring regulatory compliance.
- A number of sewer line repairs

The Operating and Maintenance costs included in this analysis do not include capital-related costs (debt-related costs, capital reserve transfers, etc.). A breakdown of the of the Town's current budgeted operating costs is presented in Table 4.5-1.

Table 4.5-1: Budgeted Water Operating Costs

Expenditures	2013 (actual)	2014 (budget)
Wages & Benefits (applied 25% of one labourer)	$181,440	$183,000
Materials & Supplies	$54,339	$59,000
Utilities	$43,816	$43,000
Contracted Services	$6,000	$6,400
Total Expenditures	$285,595	$291,400

The costs included in this analysis do not include capital-related costs (debt-related costs, capital reserve transfers, etc.).

Projected O&M costs were developed considering an expected increase in cost of 3% annually. Costs are expected to increase from an actual cost of $245,595 in 2014 to an expected cost of $389,378 in 2023 as highlighted in Figure 4.5-1. The increase to utility rates has been included to reflect the anticipated increase over the next 4 years.

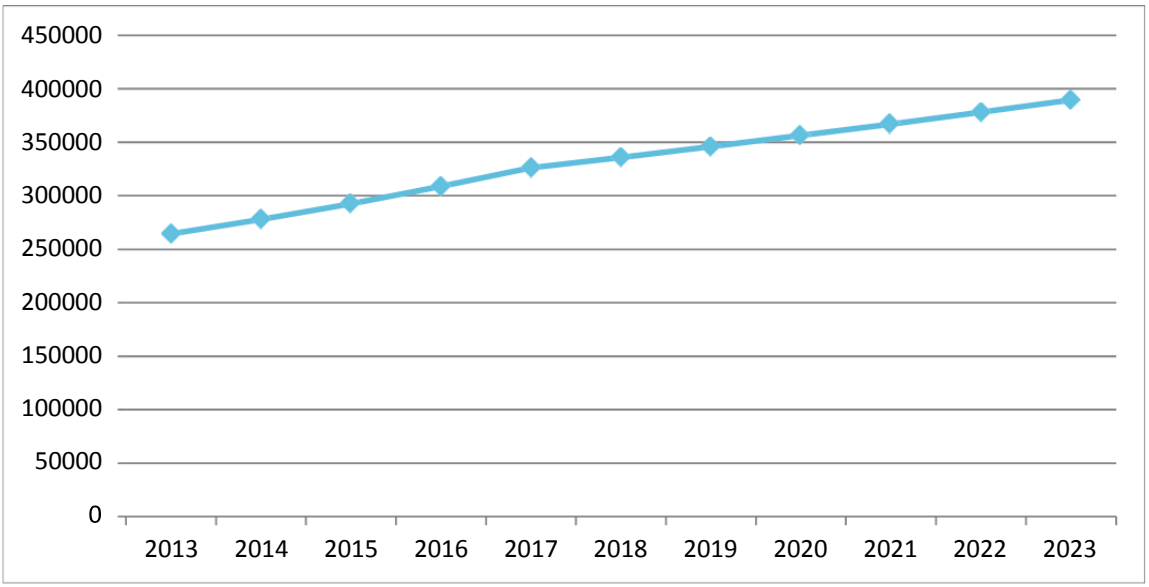


Figure 4.5-1: Operating and Maintenance Cost

4.5.2 Water Infrastructure Strategy

4.5.2.1 Distribution System

The Town will continue to maintain our water system by completing hydrant flushing, valve turning and reducing water usage. These costs are included in their operating and maintenance costs indicated in Table 4.5-1. The Town will strive to place funds on annual basis into a capital reserve.

4.5.2.2 Water Treatment Plant

Since the water treatment plant was originally constructed, the Town has upgraded various assets within the system when those assets were determined to be at their expected life. The Town, has on annual basis, improved the piping at the cost of approximately 10k a year for the last five years. The Town realizes that their water treatment plant requires upgrading and will need to pay for their portion of the costs required by the Small Rural and Northern Municipal Infrastructure Fund. This amount also represents the amount the town will need to put into reserve to pay for the next upgrade or replacement of their plant at the end of its estimated life (the exact estimated life of their WTP can be determined once more information of the existing individual pieces of equipment is compiled).

4.5.2.3 Water Source

All water that is consumed and used by the Town, and those customers (48) in Coleman Township, is taken from Sasaginaga Lake, and untouched and uncontaminated body of water that abides by the Acts that were put in place when the original infrastructure was put into place.

4.5.3 Water Infrastructure Renewal, Rehabilitation and Replacement

The local infrastructure is in fairly decent condition considering it was replaced after the fire, and has a life expectancy a lot longer than the time difference.

4.5.3.1 Water Distribution System

The costs below only represent the water section and the sanitary sewer portion should be added to cost estimate.

Table 4.5-2: Water Main Replacement Capital Expenditure

Year	Section	Name	From	To	Size	Length	Estimated Year installed	Cost to Replace (2013 $) Water main	Cost to Replace Hydrant (2013 $)	Cost to Replace Valves	Cost to Replace Services (2013 $)	Total Cost (2013 $)
2015												
2017												
2019												
2021												
2024												

As water mains and sanitary sewers are reconstructed, the Town should insert additional sections to the end of the list. If additional money is found within the budget or additional funding is available for the various level of government numerous water and sewer sections could be completed under one contract and should be based on their location to each other.

4.5.3.2 Water Treatment Plant

Table 4.5-3: Water Treatment Plant and Tower Capital Expenditure

Year	Description	Estimated Cost
2014-2024		
	Process Improvements annually	$25,000
	Water Tower ladder repair 2015	$30,000
	Reline tank and replace aeration system 2018	$300,000
	Project Contingencies	$15,000
	Engineering	$20,000
	Net HST	$6,776
	Total	**$391,776**

4.5.3.3 Water Tower

The water tower does not appear to require any immediate major rehabilitation of upgrades. There will be a need to re-coat the interior and upgrade the aeration system with 7-10 years. There is concern, however, that the ladder to the top of the tower is not in good shape and should be looked at from a safety perspective. The Tower was built in 1988. The tank capacity is 370,000 gallons and the life span is 100 years with an estimated replacement cost of $1,900,000.00.

4.6 Sanitary System

4.6.1 Sanitary System Infrastructure Operations and Maintenance

The Goals of the Town's Operation and Maintenance (O&M) Activities are as follows:

- Ensure infrastructure assets are being maintained in a reliable and sustainable manner that supports customer satisfaction.
- Support collection and treatment of wastewater that meets regulatory requirements.
- Reducing the risk of failure which is directly related to meeting regulatory requirement and customer satisfaction.
- Maximize value by determining lowest sustainable cost alternatives for maintenance over asset lifecycles.
- Determine sustainability of the current wetlands operations. Start looking at whether there will be a need for a sewage treatment plant in the future.

For the purposes of this study, current O&M practices and budgets are assumed to be adequate to meet the Town's needs.

The Town's Operation Budget outlines the anticipated costs for the following:

- Operation and maintenance of our Wetlands Lagoon;

- Flow monitoring, control and recording
- Process Control sampling and testing
- Wastewater sample collection compliance testing
- Analyzing microbiological effectiveness
- Sewer main and lateral locates for contractors and residents
- Investigation of complaints regarding lateral blockages and odours
- Building maintenance
- Ensuring that biosolids are spread on receiving field in conformance with NASM plans as issued by the Ministry of Environment
- Various other duties involving resident inquiries and complaints that are directed to this service area.

The Operating and Maintenance costs included in this analysis for 2012 and 2013 do not include capital-related costs (debt-related costs, capital reserve transfers, etc.). A breakdown of the of the Town's current budgeted (2013 & 2014) operating costs is presented in Table 4.6-1.

Table 4.6-1: Cobalt Sanitary Sewer Operating Costs

Expenditures	2013 (Actual)	2014 (Budget)
Wages & Benefits	$76,060	$100,000
Materials & Supplies	$19,650	$26,500
Utilities	$2,647	$2,800
Contracted Services	$2,694	$7,500
Total Expenditures	$101,051	**$**136,800

Projected O&M costs were developed considering an expected increase in cost of 3% annually. The following Figure 4.6-1 presents forecasted O&M costs for the sanitary system.

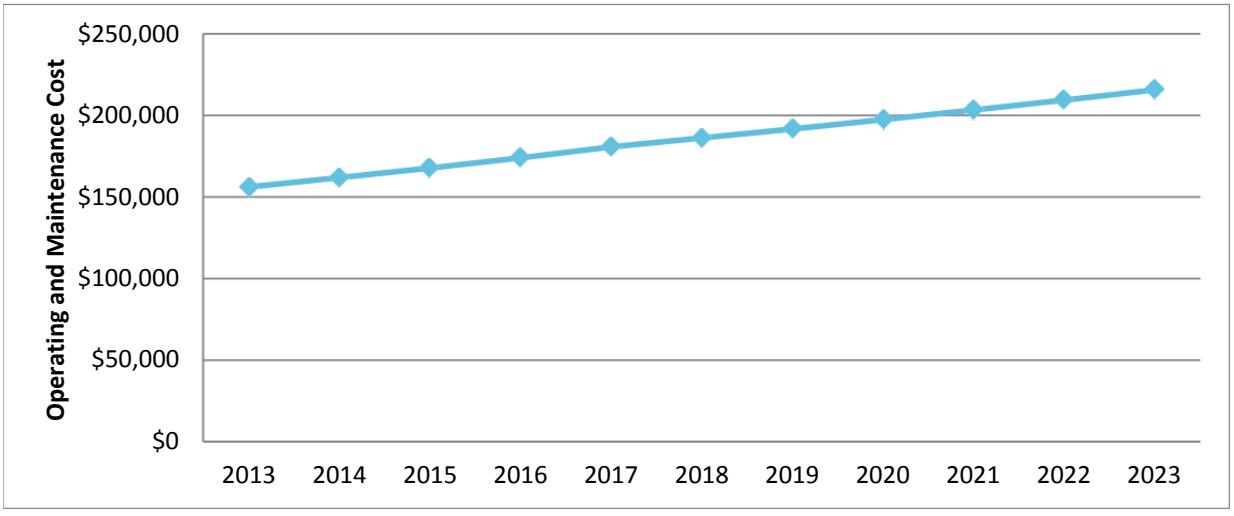


Figure 4.6-1: Sanitary Operating and Maintenance Costs

The operations and maintenance costs for the Town sanitary system is expected to increase.

4.6.2 Sanitary Infrastructure Strategy

4.6.2.1 Collection System

The municipality will maintain their sewage system by completing inspections of their structures and Camera inspections. This cost should be included in their operating and maintenance costs indicated in Table 4.5-1. To ensure assets are replaced at the end of their estimated life the municipality will budget funds to be held within a sewage system replacement reserve. The yearly budgeted goal amount to be placed in this reserve should be equal to the 2014 cost to replace the collection system divided by the remaining useful life of the particular asset. At present, the Town is unable to meet this financial commitment.

4.6.2.2 Reconstructed Wetlands Lagoon

The Town has upgraded various assets within the lagoon system when they were determined to be at their expected life and although the municipality does not have an exact listing of the assets age or condition, the information provided herein will be a good starting point and can be updated as the Municipality proceeds with asset management. The exact estimated life of the lagoon can be determined once more information of the existing individual pieces of the process have been studied and approved by MOE for a final CofA.

4.6.3 Sanitary System Infrastructure Renewal and Rehabilitation and Growth

The following Table 4.6-2 presents the sanitary sewer replacement profile for the next 10 years and reflects the work required on the sewage system within the narrow right of ways. The costs below only represent the sewage sections and the watermain portion should be added to cost estimate.

Table 4.6-2: Sanitary System - Work Program

Year	Section	Name	From	To	Size	Sewer Length	Estimated Year installed	Cost to Replace San Sewer (2013 $)	Cost to Replace Structure (2013 $)	Cost to Replace Services (2013 $)	Total Cost (2013 $)
2015	30-31	Russell St	Larose Ave	Ferland Ave	200 mm	307m	1914	$184,000	$30,000	$25,000	$239,000
2017	67-67.2	Cobalt St.	Miller St	MH42a	200	154m	1914	$39,600	$15,000	$10,000	$64 600
2017	68-68.1	Baker St.	Prospect Ave	MH354	200	96m	1914	$76,800	0	$20,000	$104,300
2017	71-74	Nickel St.	Prospect Ave	Commission	150-200	488.7	1914	$293,220	$52,500	$165,000	$359,520
2017	75-76	Helen St	Prospect Ave	Commission	200	435	1914	$261,000	$37,500	$102,500	$418,500
2019	102.1-103.0	Cambrian	Prospect Ave	West Ed	100-200	345	1925	$207,000	$60,000	$92,500	$359,500
2021											
2024											

As water mains and sanitary sewers are reconstructed, the Town should insert additional sections to the end of the list. If additional money is found within the budget or additional funding is available from the various levels of government, numerous water and sewer sections could be completed under one contract and should be based on their location to each other.

4.7 Road and Drainage Systems

These infrastructure systems are being combined at this point due to their associated nature. Work on any particular roadway will require the drainage infrastructure to be included in any future rehabilitation or construction project.

4.7.1 Road and Drainage System Infrastructure Operations and Management

The Goals of the Town's Operation and Maintenance (O&M) Activities are as follows:

- Ensure infrastructure assets are being maintained in a reliable and sustainable manner that supports customer satisfaction.
- Reducing the risk of failure which is directly related to meeting regulatory requirements and customer satisfaction.
- Maximize value by determining lowest sustainable cost alternatives for maintenance over asset lifecycles.

The following Roads Services Operations and Maintenance items were identified in the Town's operating budget and are assumed to be necessary for the Town's Roads and Drainage infrastructure.

- Hard Top Maintenance - Slurry Seal; patching; line striping and durable pavement markings.
- Winter Control – Snow ploughing and snow removal; sanding and salting; culvert thawing.
- Roadside Maintenance – ditching; debris and litter removal and vegetation/weed control.
- Traffic Safety Devices – Signage, guide rail and guide wire, line striping; pavement markings.
- Drainage – Storm sewer and road crossing culverts.
- Sidewalk maintenance – very minimal
- Fleet management - Road Services including fuel storage, handling, dispensing of fuel
- Garbage and Recycling
- Street lights including maintenance and repair.

Although the Town currently tracks operations and maintenance according to various asset categories, the Town does not currently track assets in such a way that they can be attributed to an individual asset. After the Town develops a comprehensive asset hierarchy, O&M activities can be assigned to an asset component. For the purposes of this first iteration of the Town's Asset Management Plan, future O&M needs are estimated based on budgeted amounts and the assumption that O&M costs for Roads Services would increase at a rate of 2% per year.

A breakdown of the of the Town's current budgeted (2013 & 2014) operating costs is presented in Table 4.7-1.

Table 4.7-1 2013 Town of Cobalt Public Works Services (less water/sewer) Operating Costs

Expenditures	2013 (Actual)	2014 (Budget)
Wages & Benefits	$	$
Materials & Supplies	$	$
Utilities	$	$
Contracted Services	$	$
Total Expenditures	$	$

Operating costs are forecasted to increase from $ in 2014 to $ in 2024 and highlighted in Figure 4.7-1.

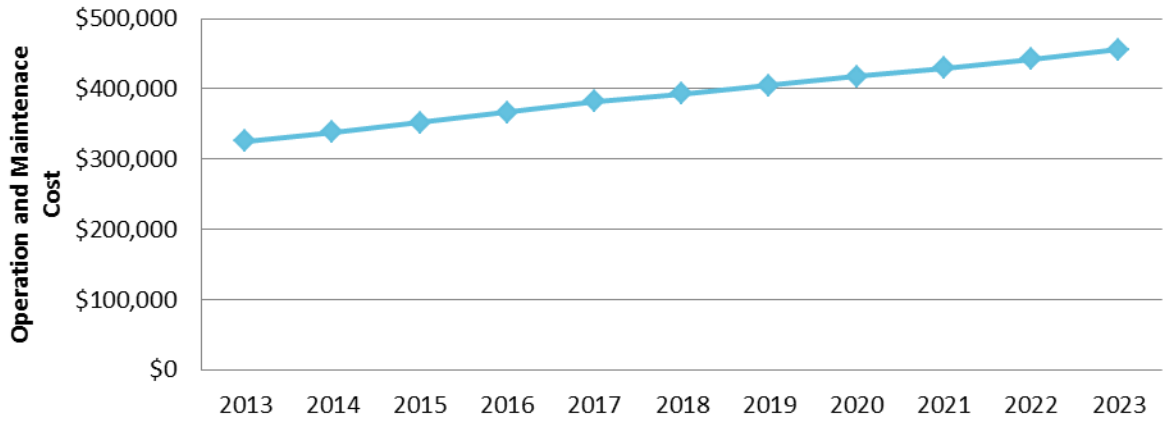


Figure 4.7-1: Operation and Maintenance Projected Cost

4.7.2 Road and Drainage Infrastructure Strategy

The Town has indicated that some existing roads should be reconstructed and rehabilitated with an asphalt surface and maintenance upgrades at the 15 and 20 year anniversary to extend the roads estimated service life. At the end of the 50 year estimated service life for roads in Cobalt the Town would need to reconstruct the road. A graphic of this option is provided in Figure 4.7-2. At present, the Town cannot meet this financial commitment.

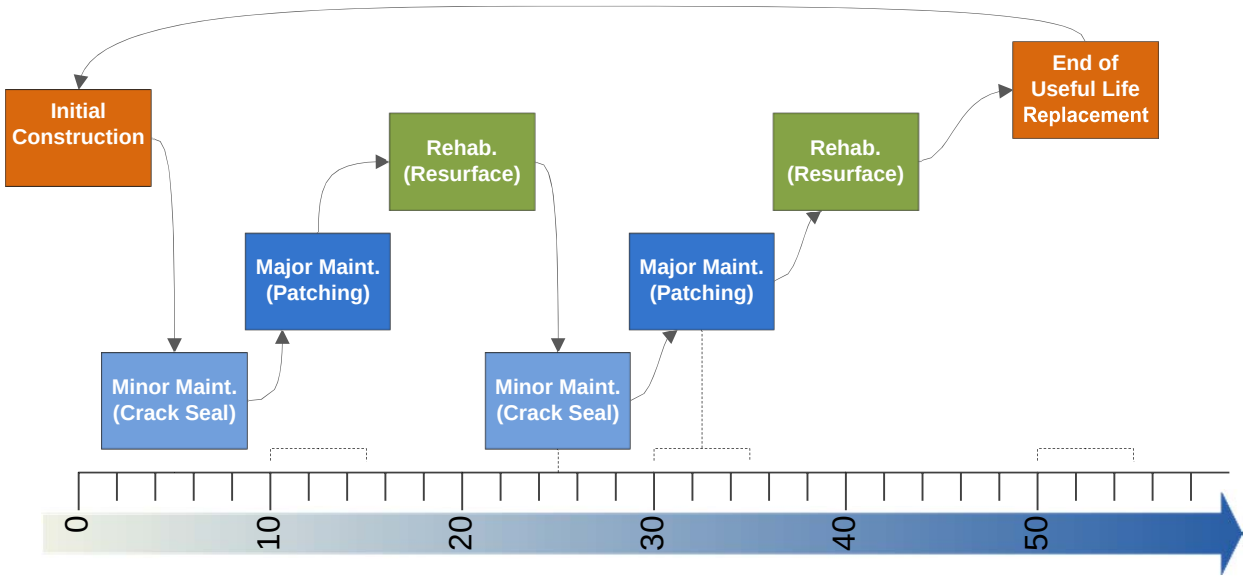


Figure 4.7-2: Graphic of Road Life Cycle

The estimated extended service life for municipal roads, especially with the low expected traffic counts, for this option is 50 years. Without taking into account any existing municipal reserves set aside for capital work on roads the municipality should try to generate $50,000.00 per year with a 1%-2% increase every year for inflation in addition to the budgeted operational and maintenance costs detailed above.

4.7.3 Roads Infrastructure Renewal, Rehabilitation and Replacement

The visual road condition identified numerous roads that are considered poor and reflect the end of service life for an asphalt / surface treatment road. The Town has previously completed a reconstruction of roads as part of their recent projects that required underground infrastructure to also be replaced. A major resurfacing project is underway in 2014 for the main travelled road comprised of Lang Street, Silver Street and Miller Street

Table 4.7-2: Road Asset - Work Program

	Section	Name	From	To	Length (m)	Visual Condition Rating	Type of Improvement	Road Cost	Drainage Cost	Total Cost
2014	1.0-19.0	11B Link	Third St.	Buffalo Rd.	1,885.5	Fair	Resurfacing/Retaining Wall	$1,950,000	$150,000	$2,100,000
2015	80.0-81.0	Commission St.	Jamieson Ave.	Jamieson Ave.	329.4	Very Poor	Road Rehabilitation	$197,640	$0	$197,640
2016	104.0-107.0	Cambrian Ave.	Cambrian Ave.	Buffalo Rd.	731.7	Poor	Road Reconstruction	$331,049	$35,000	$336,049
2017	69.0-72.0	Baker St.	Grandview Ave.	Miller St.	259.0	Poor	Road Rehabilitation	$49,952	$0	$49,952
2018	*Review tabular stats for the future*									
2019										
2020										
2021										
2022										
2023										

As roads are rehabilitated, the Town should insert additional road sections to the end of the list from the roads needs study. If additional money is found within the budget or additional funding is available for the various level of government numerous road sections could be completed under one contract and should be based on their location to each other.

4.8 Procurement Methods

Standard procurement methods for the Town are based on council decision but generally follow the standard method with thresholds indicated in Table 4.8-1

Table 4.8-1 Purchase Method Purchase Threshold

Low Cost Purchase	< $10,000
Informal Request for Quote / Request for Proposal	Over $10,000 up to $25,000
Informal RFP for Consulting & Professional Services	Over $25,000 up to $75,000

Low Cost Purchase	< $10,000
Formal RFP for Consulting & Professional Services	>$75,000
Formal RFQ / RFP	Over $25,000 up to $200,000
Request for Tender	>$200,000

Other methods of procurement exist for various special cases. The Town of Cobalt recently passed a Purchase Policy Bylaw that sets limits. The Town has an Engineering Firm that has been appointed to provided engineering services for the Town. One case that can significantly cut costs is cooperative purchasing, accomplished through partnering with other municipalities in order to obtain the benefits of volume purchasing and the reduction in administrative efforts and cost.

4.9 Risk

The Town's overall Asset Management Strategy is founded on available data, anticipated service levels, growth expectations and other assumptions. Assumptions in these items introduce some unavoidable risk that the overall strategy may change over time as the Town evolves and develops more complete data and processes. Recognizing these uncertainties, the Town is developing strategies to address each source of risk so that the Asset Management Strategy can evolve over time. Risk mitigation strategies for each of the following are discussed below:

- Data quality
- Levels of Service
- Growth – expected vs. actual
- Assumptions

Data quality

The data provided and collected for the report for various aspects were given only reflecting a very high level of the asset components, and did not accurately reflect the service life's of the necessary components of the assets (i.e. a water treatment plant was assessed at a facility level and did not have age, conditional, performance, or maintenance data for any of the facilities components (i.e. SCADA system, pumps, etc.). Given the high level of the data, significant risk exists in the component asset life reaching the end of their respective service lives before the facility has reached the end of the facility life. This introduces significant difficulty to establish a yearly budget that accurately would reflect the required asset replacement / rehabilitation cost required.

Strategy to address:
It is suggested an inspection program of assets should be established to utilize the new workflow structure and build the existing database. With a newly built database, the report should be reviewed and see if the new data produces significant changes to the asset management strategy.

Levels of Service

The levels of service present a risk, since no previous levels of service were established for the Town. The Levels of Service therefore have never been measured in previous years and the expectation of each level of service has not been established. Adjustment is expected in the early years of levels of service to better reflect the level of commitment from the Town, but risk exists if a level of service is set at a higher expectation then what is possible at the current levels of funding.

Strategy to address:
It is suggested that to address this source of risk, the targets established in the first year of utilizing the Levels of Service should be reviewed along with the cost to provide the levels of service. If the cost of the level of service is

too high to maintain the target should be adjusted or alternative strategies to accomplish the level of strategy should be investigated.

Growth Levels

Growth forecasts are not guaranteed, and while effort has to be made to ensure that services are provided if the growth is met, growth can be greater or lesser then the expected forecast. This can potentially create a surplus or deficit of funding available.

Strategy to address:
It is suggested that the growth of the Town should be reviewed on a yearly basis to determine if the forecast is accurate, and if possible the budgets should be adjusted accordingly.

Assumptions

Assumptions have been made in the report to fill data gaps and have been noted where undertaken. As with any assumption, risk exists in that the assumption made not account for a large enough percentage of the assets and could potentially results in unexpected costs if not corrected (i.e. year of installation assumed, when the asset is past its expected service life, and due to the degradation of the asset, effecting surrounding assets).

Strategy to address:
It is suggested that an inspection program should be developed utilizing the information provided herein to eliminate the largest assumptions. The new findings should then be used to adjust the report findings, correcting the asset management strategy if required.

5. Financing Strategy

Having a financial plan is critical for putting an asset management plan into action. In addition, by having a strong financial plan, municipalities can demonstrate that they have made a concerted effort to integrate asset management planning with financial planning and budgeting and to make full use of all available infrastructure financing tools.

5.1 Non-Infrastructure Solutions

As described in Section 4.1, there are a number of non-infrastructure solutions – actions or policies that can lower costs or extend asset life – that would greatly benefit the Town as they plan to sustainably manage their infrastructure assets. The forecasted costs of these recommended initiatives are presented in the following Table 5.1-1.

Table 5.1-1: Non-Infrastructure Solution Estimated costs

Program	Estimated Cost	Timeline	Notes
Water Conservation Plan	$1,000	2014	Savings will be realized from less water pumped
Leak Detection Program	$20,000	2014	Constant due diligence will minimize the water lost and savings from less pumped water
Camera Inspection Program	$3,000	2016	Constant video inspection will result in refining the preventative maintenance program
Drainage Maintenance Program	$3,000	2015	Reinstalling ditch where its location was filled in by homeowner
Road Maintenance Plan	$1,500	2014	Various road maintenance items to repair surface
Data Verification	$12,000	2015	Obtain additional asset data and add other assets to the plan
Water Facility Inspections	$4,000	2015	Review individual assets and determine existing age and estimated life
Sewage Treatment and Pumping Station Inspection	$4,000	2015	Review individual assets and determine existing age and estimated life
TOTAL	$ 48,500		

The timeline for these programs are indicated as occurring within the next 2-3 years but could be adjusted to suit any priorities the municipality determines to be more critical. Some of these tasks should occur annually and could be included with the annual operation and maintenance budget (i.e. Road maintenance plan).

5.2 Sustainable Asset Management

The Town realizes that to best manage its infrastructure assets, a financial plan is critical. The following section presents the Town's forecast expenditures, summarizes the recommended funding to sustainably manage assets, and identifies their infrastructure funding shortfall.

Table 5.2-1 indicates the amount of money that should be going into the Towns reserves each year (plus 1%-2% for inflation) in preparation for rehabilitation while being used and reconstruction of each system at the end of the assets life expectancy. The amount indicated for the water distribution system and the sanitary collection system can be reduced to $200,000 and $150,000, respectively, after the 10 year plan of backlog work is complete. The values presented in Table 5.2-1 do not reflect any existing reserve money for each of the assets that the Town may have already accumulated.

Table 5.2-1: Annual Asset Funding Needs – 10 Year Plan

System	Asset	Amount per year	Total per year
Water	Water Distribution System	$50,000.00	$120,000.00
	Water Treatment Plant	$50,000.00	
	Water Tower	$20,000.00	
Sanitary	Sewage Collection System	$120,000.00	$151,000.00
	Sewage Pumping station	$5,000.00	
	Reconstructed Wetlands	$26,000.00	
Roads and Drainage	Roads	$100,000.00	$100,000.00
Total			$371,000.00

The total amount of funds needed to maintain the existing Cobalt infrastructure does not take into account and money already placed into reserve. The amount of money the Town needs to put into reserve each year to rehabilitate and /or reconstruct various assets as indicated above is beyond the capabilities of the Town and their tax base. To continue to maintain the level of service the rate payers have come to expect, the town will require putting aside the maximum funds it can into reserve and obtain additional funding sources from provincial or federal agencies. Undertaking construction using loans at minimal interest is also an option but is not desirable to the Town. The amount of $371,000 is beyond our reach at this time; however, it is still much less than the $926,449 per year that is shown in our XL summary document that takes into account full replacement costs at the earliest year.

The Town will need to plan for rehabilitation and reconstruction of their assets and typical funding sources are indicated in Table 4.7-4.

Table 5.2-2: Expenditure Funding Sources

Expenditure Type	Description	Funding Source
Operational	Activities which have no effect on asset condition but are necessary to keep the asset utilized appropriately (i.e. power costs, Labour, etc.	Town's annual budget, user fees (i.e. water rates) and revenue (hook-up fees, etc.)
Maintenance	The ongoing day to day work required to keep assets operating at a required service level (i.e snow plowing, repairs, etc.)	Town's annual budget, user fees and revenues
Rehabilitation and/or Replacement	Significant work that restores or replaces an existing asset towards its original size, condition or capacity.	Town's annual budget, user fees, revenues, provincial & federal grants and loans
New Capital Work	Work to create a new asset, or to upgrade an existing asset beyond its original capacity or performance, in response to changes in usage, customer expectations, or anticipated future needs.	Town's annual budget, user fees, revenues, provincial & federal grants and loans

Provincial Funding

The Municipality has indicated that the upgrades to our sanitary lines and mitigating measures to the cross connections with storm drainage and the sanitary lines are the most critical in planning for rehabilitation. An ongoing

concern is the effectiveness of the Reconstructed Wetlands in meeting MOE regulations. There may be a need for a sewage treatment plant sometime in the future.