County of Peterborough

Asset Management Plan 2018

Munford Solutions

Peterborough County

Asset Management Plan (AMP)

Executive Summary

The County of Peterborough manages a broad cross section of assets providing core services to residents, businesses and visitors. The County is committed to being good stewards of these assets for both current and future generations.

The Asset Management Plan (AMP) has these goals:

1. Work towards complying with Ontario Regulation 588/17
2. Identify the work needed to maintain the County's infrastructure at current levels, and at the lowest possible cost
3. Identify the work needed to meet capacity demands
4. Present options to fund the identified needs
5. Articulate risks if needs are not funded
6. Operationalize asset management by ensuring the processes, people and systems are in place for ongoing improvements

The plan covers all assets owned by the County valued at $5,000 or greater including Engineered Structures (Bridges and Culverts), Roads, Cross Culverts (less than 3m dia.), Facilities, Equipment, Traffic Signals, Forests, Trails and the Landfill.

Growth related Infrastructure needs are covered in the Transportation Master Plan (TMP). The TMP is a comprehensive assessment of the County's current and future transportation system improvement needs. It includes recommendations for new / improved infrastructure (e.g. roads, transit, cycling, walking), operational design standards, and transportation policies. The TMP was last updated in 2014 with an updated plan in 2019.

Asset preservation needs are based on activity level plans to maintain assets at their current service levels (condition), over the next 10 years, at the lowest possible cost.

Baseline funding has been developed using the County's 10-year reserve plan and, where applicable, forecast operating budgets.

The funding gap is the difference in 10-Year capital needs and projected 10-year funding. The Funding Gap is summarized below.

	Comments	10-Year Need	Baseline Funding	Funding Gap
Transportation-Preservation	Roads, Bridges, Culverts, Signals, Cross-Culverts. Baseline funding includes existing plans for an annual increase of 2% each year for the next 10 years.	$181,275,326	$151,068,426	$30,206,900
Transportation Master Plan (Growth)	Assumption that transportation growth is only funded from Development Charges	$31,891,454	$14,700,000	$17,191,454
Facilities	10-Year needs based on 2018 inspections on all facilities.	$7,749,178	$2,164,160	$5,585,018
Equipment	10-year capital needs for Equipment can be managed with the current equipment reserve plans.			
Total		$220,915,958	$167,932,586	$52,983,372

Table 1: Funding Gap Executive Summary

Closing the funding gap could include any combination of cost savings, asset divesture, spending reductions, debenture or revenue increases. All options are reviewed in this document. Future discussions with Council will determine the final plan.

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Introduction

Asset Management can be best defined as an integrated business approach within an organization that minimizes the lifecycle costs of owning, operating, and maintaining assets, at an acceptable level of risk, while continuously delivering expected levels of service for present and future stakeholders.

While the County has always been proactive in asset management, new importance has been added with the introduction of Ontario Regulation 588/17. This regulation requires all municipalities to implement asset management policies and plans. This document is an important step towards complying with Regulation 588/17. More specifically, a 10-year activity level plan that cost effectively maintains the current service levels.

The development of the plan has followed industry best practices and augmented with local observations and experiences.

An evaluation of available funding sources is provided as well as funding projections.

The funding gap is identified – as being the difference between the recommended 10-year needs and baseline funding.

To facilitate development of a plan to close the funding gap, options are presented.

County of Peterborough

The County of Peterborough, located approximately 125 kilometres north-east of the Greater Toronto Area, is an upper tier municipality covering over 376,928 hectares of some of the most picturesque rural landscape in Ontario. The County consists of eight lower tier municipalities, Asphodel-Norwood, Cavan Monaghan, Douro-Dummer, Havelock-Belmont-Methuen, Municipality of Trent Lakes, North Kawartha, Otonabee-South Monaghan, and Selwyn Township and is bordered by the neighboring municipalities of City of Kawartha Lakes (to the west), Haliburton County (to the north), Northumberland County (to the south), and Hastings County (to the east).

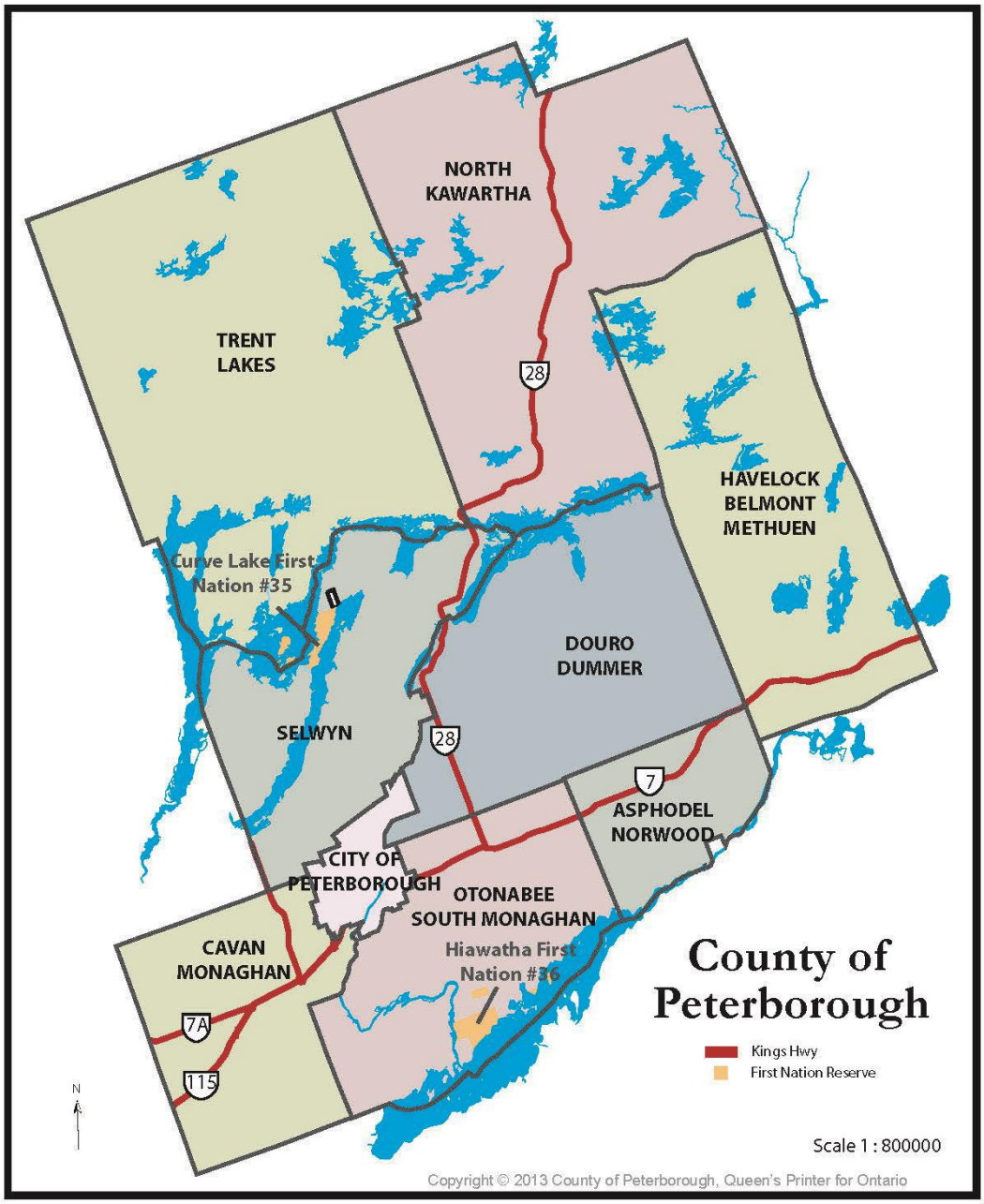

Figure 1: Map of Peterborough County

Just 90 minutes from Toronto and three and half hours from Ottawa, Peterborough County offers all the benefits of a rural life style without sacrificing availability to large metropolitan centers. The County's natural beauty has long made it a destination of choice for outdoor enthusiasts, vacationers, and tourists from all over the world. With 55,783 permanent residents comprising 35,797 households, Peterborough County embodies a vibrant mix of industry, commerce, agriculture, and tourism. Peterborough County's assets include approximately 709 kilometres of roadway, 153 engineered structures (over 3m span) and over 1200 cross culverts (less than 3m span). The County owns 34 facilities with uses including administration, road depots, Lang Pioneer Village and paramedic services. Delivering these services requires over 110 equipment units.

This infrastructure forms the backbone upon which the quality of life enjoyed by our permanent residents is built. Without it, commerce would slow or grind to a halt, tourism would cease, and our economic survival would fall into jeopardy. It is not overstating the importance of our infrastructure to say it is the very substance of our survival. It should be no surprise then, maintaining it in good order is a high priority to the community.

Ontario Regulation 588/17

One of the main drivers of this document is Ontario Regulation 588/17. A copy of the full regulation is in Appendix A. Additional information and resources can be obtained on the MFOA website. The regulation requires all municipalities to prepare an asset management plan (5.(1)). An AMP will also be a requirement for Federal Gas Tax funding which is administered through the Association of Municipalities of Ontario (AMO).

This document on its own will not result in full compliance with the regulation. This is one part of the many activities to be undertaken by the County.

A summary of key principles is provided below.

Key Dates

- **July 1, 2019:** Strategic Asset Management Policy
  - Outline commitments to best practices and continuous improvement
- **July 1, 2021:** Asset Management Plan – Phase 1
  - For core assets (roads, bridges & culverts, water, wastewater, and stormwater):
    - Inventory of Assets
    - Current levels of service
    - Costs to maintain levels of service
- **July 1, 2023:** Asset Management Plan – Phase 2
  - Builds out the Phase 1 plan to include all assets (facilities, equipment, traffic signals, County forests, and trails)
- **July 1, 2024:** Asset Management Plan – Phase 3
  - Builds on Phase 1 and 2 by adding:
  - Proposed levels of service
  - Lifecycle management & Financial strategy

Service Levels

The regulation makes frequent mention of service levels. In phase 1 of the regulation the focus is on describing current levels of service and plans to maintain those levels of service. In Phase 3 municipalities will have more latitude to describe the proposed levels of service. The regulation contains some service level metrics (tables 1, 2, 3, 4, 5).

For the purpose of this document and the analysis there are two types of service levels:

- Physical Condition.
- Capacity, defined as the ability for the asset to meet usage demands.

Statistics

Municipalities must be able to report on key statistics (5.(2)). Those statistics include replacement costs, age, condition, quantities and other service metrics.

Plan Requirements

Municipalities must first determine the work necessary to maintain current service levels in the most cost-effective manner. This plan must be at an activity level. (5.(2)4).

Should a municipality be unable to deliver the recommended plan the municipality must define the activities it can fund and how risks associated with unfunded activities will be managed. (6.(1)4.iv).

Endorsement and Approval

Every AMP must be:

(a) endorsed by the executive lead of the Municipality; and (8(a))

(b) approved by a resolution passed by Council (8(b))

Updates and Annual Reviews

The AMP is to be updated at least every 5 years after the year the plan is completed (7.(1)).

Every year on or before July 1 starting the year after the AMP is completed there should be a review of the progress and trajectory. (7(1), 9(1))

Communication

The County is to post its Strategic Asset Management Policy and Asset Management Plan on a website available to the public and provide a copy to any person who requests it. (10)

Asset Management Plan Scope and Goals

Scope

The Asset Management Plan (AMP) covers all County assets with a value over $5,000.

This plan focuses on asset preservation and growth-related expansion. It is understood that proper maintenance is necessary for cost effective asset management but this is not covered by this report. In general, this report covers any activity that improves the value of an asset by more than $5,000 or extends the useful life by 2 or more years.

Goals

Goals are:

- Work towards complying with Ontario Regulation 588/17
- Identify the work needed to maintain the County's infrastructure at current levels, and at the lowest possible cost
- Identify the work needed to meet capacity demands
- Present options to fund the identified needs
- Articulate risks if needs are not funded
- Operationalize Asset Management Plan by ensuring the processes, people and systems are in place for ongoing improvements to asset management

Summary of County Assets

County assets as of December 31, 2018 are listed below.

Asset Type	Inventory	Comments
Bridges	127 Bridges	Includes bridges with a 3m or greater diameter on County roads or bridges greater than 6m located on lower tier roads.
Culverts	26 Culverts	Includes culverts with a 3m or greater diameter on County roads or culverts greater than 6m located on lower tier roads.
Cross Culverts	1,200 Cross Culverts	Culverts under 3m diameter facilitating drainage under or along County roads. Does not include culverts under entrances.
Equipment	106 units	Only equipment over $5,000 in replacement cost. Includes equipment for all departments. Includes fleet, IT equipment and safety equipment.
Facilities	34 Facilities	Includes all County owned buildings. Does not include any leased properties.
Forests	3	Three forest blocks.
Landfill	1	Landfill is jointly owned and operated with the City of Peterborough.
Road	709.86 km	Centerline kilometers of roads managed by the County.
Signals	10	Traffic control devices at signalized intersections.
Trails	1	One trail.

Table 2: Summary of County Owned Asset Types

Developing the Plan

In this section we describe the steps and process followed in developing this plan.

Project Steps

Steps taken in the development of this plan are summarized below.

- Project scope. Define the assets to be covered and project goals.
- Project team organization. The team included representatives from all affected departments and supplemented by external consultants.
- Asset Type definitions including inspection methodology, critical attributes, benchmark costs.
- Data Gaps. Where needed, plans developed to fill in data gaps.
- Compilation of asset inventory and condition.
- Assessment of asset needs.
- Development of a 10-year capital plan to maintain current levels of service in the most cost-effective manner possible. Three methodologies were used as described in the following section.
- Evaluate funding options.
- Compile baseline 10-year funding.
- Determine funding gap: difference between the baseline funding and recommended capital plan.
- Develop options to close the funding gap.

Preservation Needs Assessment Methodologies

The following methods were used to determine asset preservation needs. The Best Practices method is mainly used as a supporting methodology as it does not provide an activity level workplan. In some cases, multiple evaluation methods were used on the same asset type as a way to validate and improve the analysis.

	Performance Modelling	Best Practices	Manual
Description	Generate a detailed workplan for up to 100 years taking into account current state, local priority scheme and technical best practices	Calculate average annual costs by class of asset and improvement type based on activities performed on each class of asset over its lifetime	A knowledgeable user identifies specific actions for each asset over the next 1 to 10 years.
Required Data Confidence	High. High confidence in individual asset information	Low. The inventory and classifications need to be accurate. Condition information not needed.	High. High confidence in the inspector and individual asset information
Used for	Roads, cross culverts	Roads, signals	Bridges, Culverts, Facilities, Equipment
Workplan	Detailed workplans for the next 10 years	None.	Detailed workplans for the next 10 years
Metrics	Return on Investment Needs Savings Asset Value Condition Funding by Improvement Class Backlog by year Budget by year	Average Annual Funding by asset type and Improvement	Backlog by year Budget by year
Tools Used	Worktech Performance Modelling with Munford Solutions Extender	Worktech best Practices	Asset Repair Program Equipment 10 Year Plan

Table 3: Needs Assessment Methodologies

Performance Modelling

Performance modelling provides the most options for assessing various strategies with activity level workplans.

The analysis logic is generally as follows:

- Collect data on assets to be modelled. Classification, dimensions, condition, needs
- Do Nothing impacts. Determine the ending condition, required improvement and cost if the current needs are not funded
- Assign a priority number to all needed improvements using the priority formula specified in the scenario. Almost any asset data can be used in the priority calculation. Standard priority methods include
    - Needs Savings = Improvement Cost if not funded – Current Improvement cost
    - Return on Investment (ROI)
      Asset Value Change = (Asset Value if funded – Asset Value if not funded)
      ROI = (Greater of: Needs Savings or Asset Value Change)/Improvement Cost
    - Worst First = 1/condition
- Fund improvements based on highest priority value until…
    a) available funding is used or,
    b) target overall condition is met
- For each funded improvement, adjust the year end condition and value based on the effect on asset settings for the improvement
- For assets not funded, deteriorate the asset according to the deterioration profile for the applicable asset class. Reassess the asset needs based on the new condition.
- Repeat for as many years as desired

By setting the target condition to 100, the program will fund all needs. By setting the target condition to 99 the program will fund all needs but delay rehabilitation activities as long as possible.

Performance modelling recognizes there will always be a need for some human intervention to account for factors such as development, cross asset conflicts, project co-ordination and local knowledge. There are tools to assist this intervention. Specific projects to be funded in a scenario can be identified and the workplan can be manually adjusted.

Scenario inputs include:

- Asset types and filters
- Objectives e.g. maintain current condition, achieve a target condition, optimizing a fixed budget

- Budget, by year if optimizing a budget. Improvement type budgets and limits can also be set
- Prioritization model e.g. ROI, Worst First, Custom
- Funded projects

Scenario outputs and metrics, at an individual workplan item level and summarized as needed:

- Expenditures: Value spent on funded workplan items
- Needs: Cost of required rehab/improvement
- Lost opportunity cost: Added costs incurred by missed rehabilitation
- Return on investment (ROI): Difference in asset value vs do nothing / investment cost
- Loss on Investment. Where an improvement impacts a recent improvement e.g. new watermains under a road resurfaced 4 years ago causes loss of 50% of resurfacing investment
- Starting and Ending condition
- Starting and Ending asset value
- Detailed workplan: Asset, year, improvement, priority weighting, effect on asset

Best Practices

The method is very straight forward. The steps are:

- Collect asset inventory by asset class
- For each class of asset define the “Best Practices” – the activities performed on that class of asset over its lifetime that will most cost effectively meet minimum service levels
- For each asset, calculate lifetime activity costs to get total lifetime cost
- Divide the lifetime cost by life expectancy to get an average annual cost

A simple example is provided below

- Signals Inventory = 10
- Best Practices
  - Life expectancy = 75 years
  - Controller replacement every 10 years @ $10,000 (years 10, 20, 30, 40, 50, 60, 70 (50%), 75)
  - Signal replacement every 75 years @ $120,000
- Average Annual Cost = 10 * (($10,000 * 7.5) + $120,000) / 75)
  = 10 Signals * $2,600/Signal/Year
  = $26,000

Manual

With this method an expert performs a visual inspection, possibly augmented by tests to assess the asset condition and capital needs. The inspector would consider likelihood of failure and impact of failure in determining the best plan for managing the asset.

This methodology is typically used for bridges, culverts, facilities and equipment due to the complex nature of these assets. It is a good supplement to performance modelling as performance modelling cannot take into account micro-level considerations.

Growth Needs Assessment

The County performed a thorough evaluation of growth-related infrastructure needs in the 2014 Transportation Master Plan. Critical projects to support growth over the next 20 years were identified. Projects included system expansion and design standard upgrades.

The Transportation Master Plan is scheduled for review and update in 2019 but the outstanding projects list is still considered to be valid.

State of the Infrastructure (Capital Needs)

This section includes, for each asset type, a description of key terminology, attributes, inspection methods, statistics, needs assessment method and 10-year needs.

Roads

The County owns over 709 km of roads. Roads account for over 75% of the total asset value for the County.

Terminology

Key attributes are Surface Type, Service Class, Roadside Environment and Asset Class.

Surface Types

County road surface types are either High Class Bituminous (HCB) or Low Class Bituminous (LCB). An illustration of these two surface types is provided below.

HCB (Hot Mix Asphalt) **LCB (Surface Treatment)**

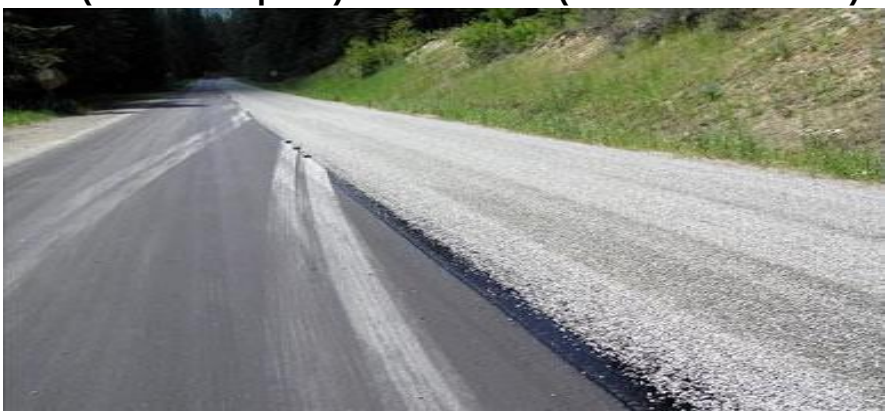

Figure 2: Illustration of Road Surface Types

Service Class

Roads are assigned a service class which indicates the importance of the road from a user perspective. The service class is based on average annual daily traffic (AADT) and speed limits. Service classes set operating and maintenance standards and can influence capital work prioritization. Minimum tolerable condition levels are set by service class.

TABLE

CLASSIFICATION OF HIGHWAYS

Column 1 Average Daily Traffic (number of motor vehicles)	Column 2 91 - 100 km/h speed limit	Column 3 81 - 90 km/h speed limit	Column 4 71 - 80 km/h speed limit	Column 5 61 - 70 km/h speed limit	Column 6 51 - 60 km/h speed limit	Column 7 41 - 50 km/h speed limit	Column 8 1 - 40 km/h speed limit
53,000 or more	1	1	1	1	1	1	1
23,000 - 52,999	1	1	1	2	2	2	2
15,000 - 22,999	1	1	2	2	2	3	3
12,000 - 14,999	1	1	2	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	4	4
5,000 - 5,999	1	2	2	3	3	4	4
4,000 - 4,999	1	2	3	3	3	4	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	5	5
1,000 - 1,999	1	3	3	3	4	5	5
500 - 999	1	3	4	4	4	5	5
200 - 499	1	3	4	4	5	5	6
50 - 199	1	3	4	5	5	6	6
0 - 49	1	3	6	6	6	6	6

O. Reg. 366/18, s. 1 (5).

Figure 3: Road Service Class Criteria

Roadside Environment

Roadside environment indicates the drainage characteristics and land use adjacent to the road. Illustrations provided below. Roadside environment affects design standards and improvement costs.

Rural (R)

Urban (U)

Figure 4: Illustrations of Roadside Environment

Asset Class

Asset Classes describe the physical characteristics of the road and how the road is likely to behave over time. Asset classes incorporate traffic, roadside environment and surface type.

[Traffic] - [Roadside Environment] – [Surface Type]

The Traffic component generally reflects the service class and is set as follows:

Class A Roadways (CLA) = ≥5000 AADT
Class B Roadways (CLB) = >1000 and <5000 AADT
Class C Roadways (CLC) = ≤1000 AADT

The asset classes are:

CLA_R_HCB	Class A Road - Rural - Hot Mix
CLA_U_HCB	Class A Road - Urban - Hot Mix
CLB_LCB	Class B Road - Surface Treated
CLB_R_HCB	Class B Road - Rural - Hot Mix
CLB_U_HCB	Class B Road - Urban - Hot Mix
CLC_LCB	Class C Road - Surface Treated
CLC_R_HCB	Class C Road - Rural - Hot Mix
CLC_U_HCB	Class C Road - Urban - Hot Mix

For each asset class we identify the recommended activities to be performed over the lifecycle of the asset. An example is provided below with all asset class profiles included in Appendix B.

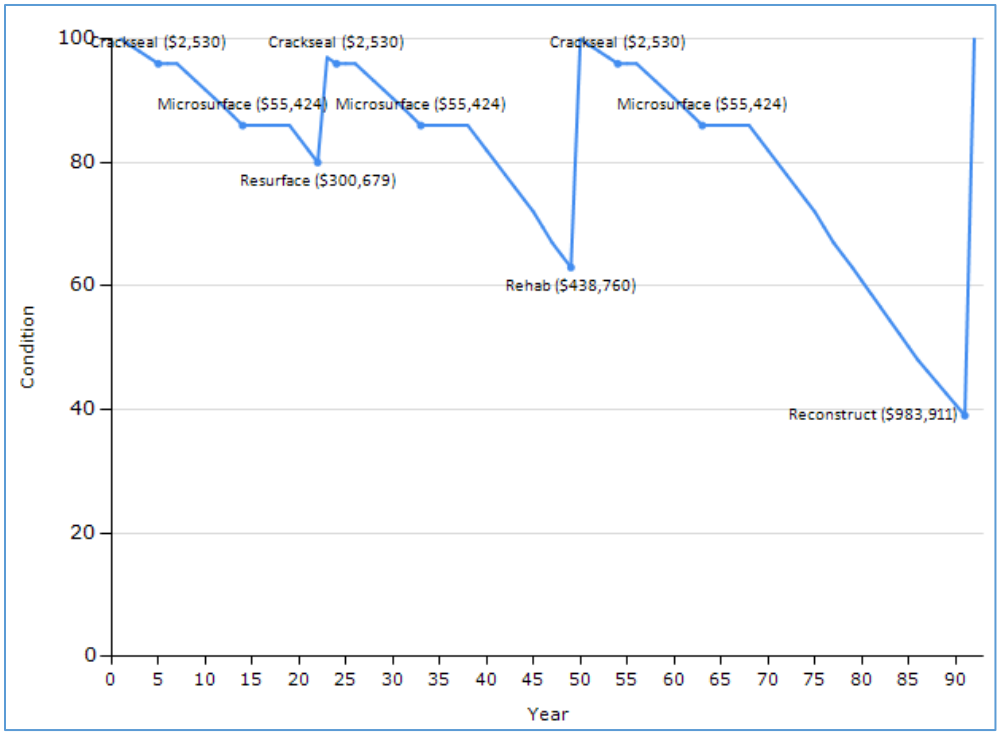

Figure 5: Recommended Lifecycle for Class B Rural Hot Mix (CLB_R_HCB)

Year	Condition	Description (approx. cost/km)	Affect
5	96	Crack Sealing ($2,530)	Hold for 2 years
14	86	Microsurfacing ($55,424)	Hold for 5 years
22	80	Rural Overlay - ($300,679)	Increase by 17
24	96	Crack Sealing ($2,530)	Hold for 2 years
33	86	Microsurfacing ($55,424)	Hold for 5 years
49	63	Rehabilitation ($438,760)	Restore To 100
54	96	Crack Sealing ($2,530)	Hold for 2 years
63	86	Microsurfacing ($55,424)	Hold for 5 years
91	39	Reconstruction ($983,911)	Restore To 100

Table 4: Recommended Lifecycle Activities for Class B Rural Hot Mix

As mentioned, the recommended activities are intended to maintain service levels at the lowest possible cost. The following graph illustrates the difference between two approaches. Not only does the recommended approach result in a lower cost of ownership but the average condition is significantly higher.

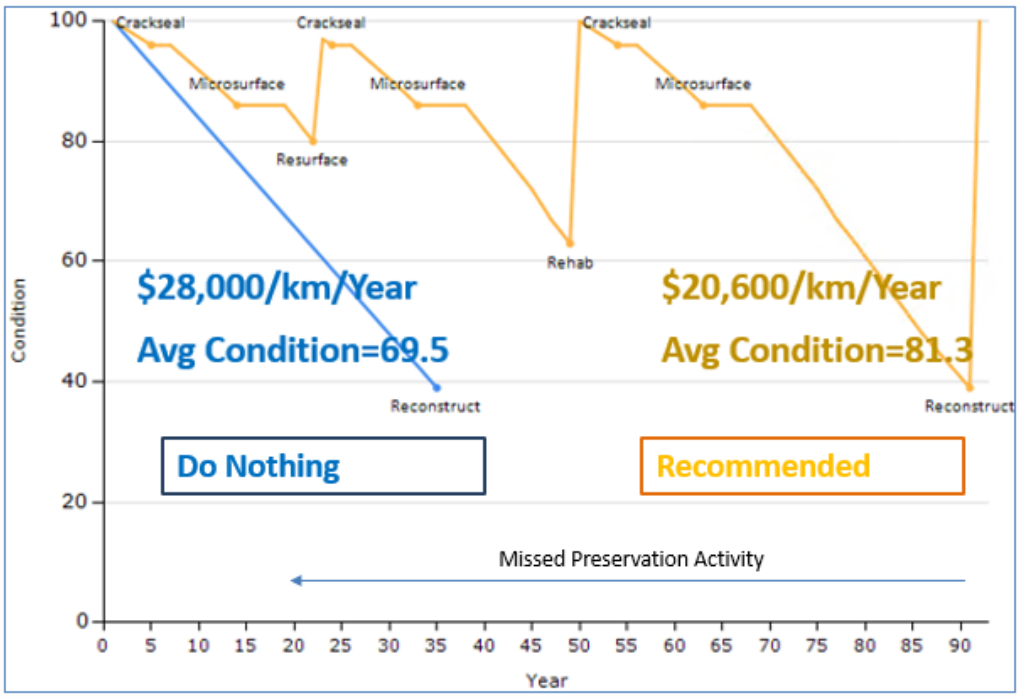

Figure 6: Comparison of "Do Nothing" vs Recommended Lifecycle Activities

Inspection Method

Roads are inspected using the Ministry of Transportation's Pavement Condition Index (PCI). Sample PCI scores are illustrated below. Roads are inspected biennially by County staff with the next inspections planned for 2019. A more extensive summary of PCI conditions is in Appendix B.

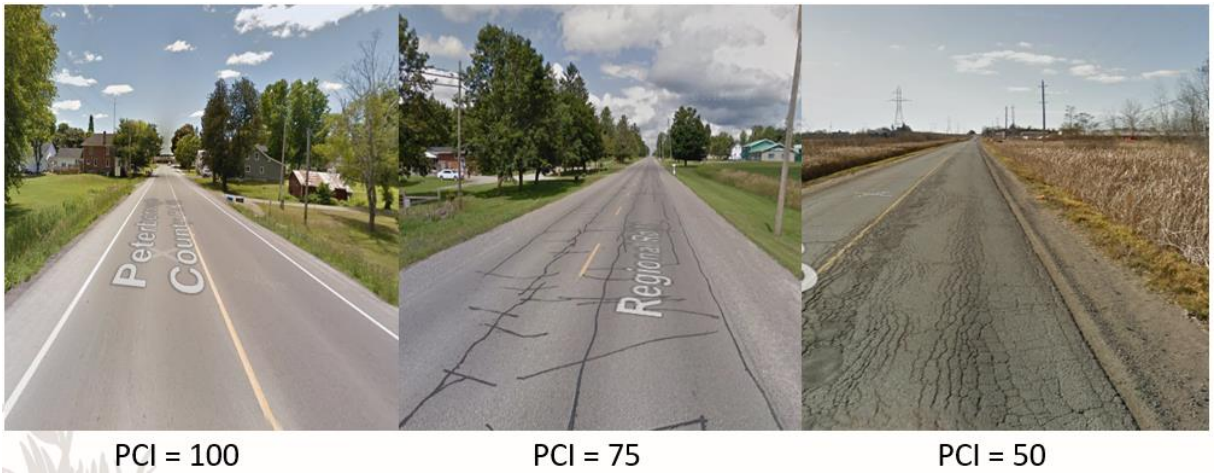

Figure 7: PCI Illustration Examples

Inventory

Roads inventory by asset class is provided below

Asset Class		Length (km)	Replacement Cost	Avg PCI
CLA_R_HCB	Class A Road - Rural - Hot Mix	56.40	$ 77,610,839	78.53
CLA_U_HCB	Class A Road - Urban - Hot Mix	6.97	$ 14,935,966	84.35
CLB_LCB	Class B Road - Surface Treated	78.14	$ 59,332,132	76.57
CLB_R_HCB	Class B Road - Rural - Hot Mix	323.81	$ 352,741,100	75.85
CLB_U_HCB	Class B Road - Urban - Hot Mix	18.99	$ 37,948,863	81.69
CLC_LCB	Class C Road - Surface Treated	112.51	$ 82,552,716	74.76
CLC_R_HCB	Class C Road - Rural - Hot Mix	109.77	$ 111,798,785	67.92
CLC_U_HCB	Class C Road - Urban - Hot Mix	3.27	$ 7,863,553	72.62
		709.86	$ 744,783,954	74.90

Table 5: Road Inventory by Asset Class

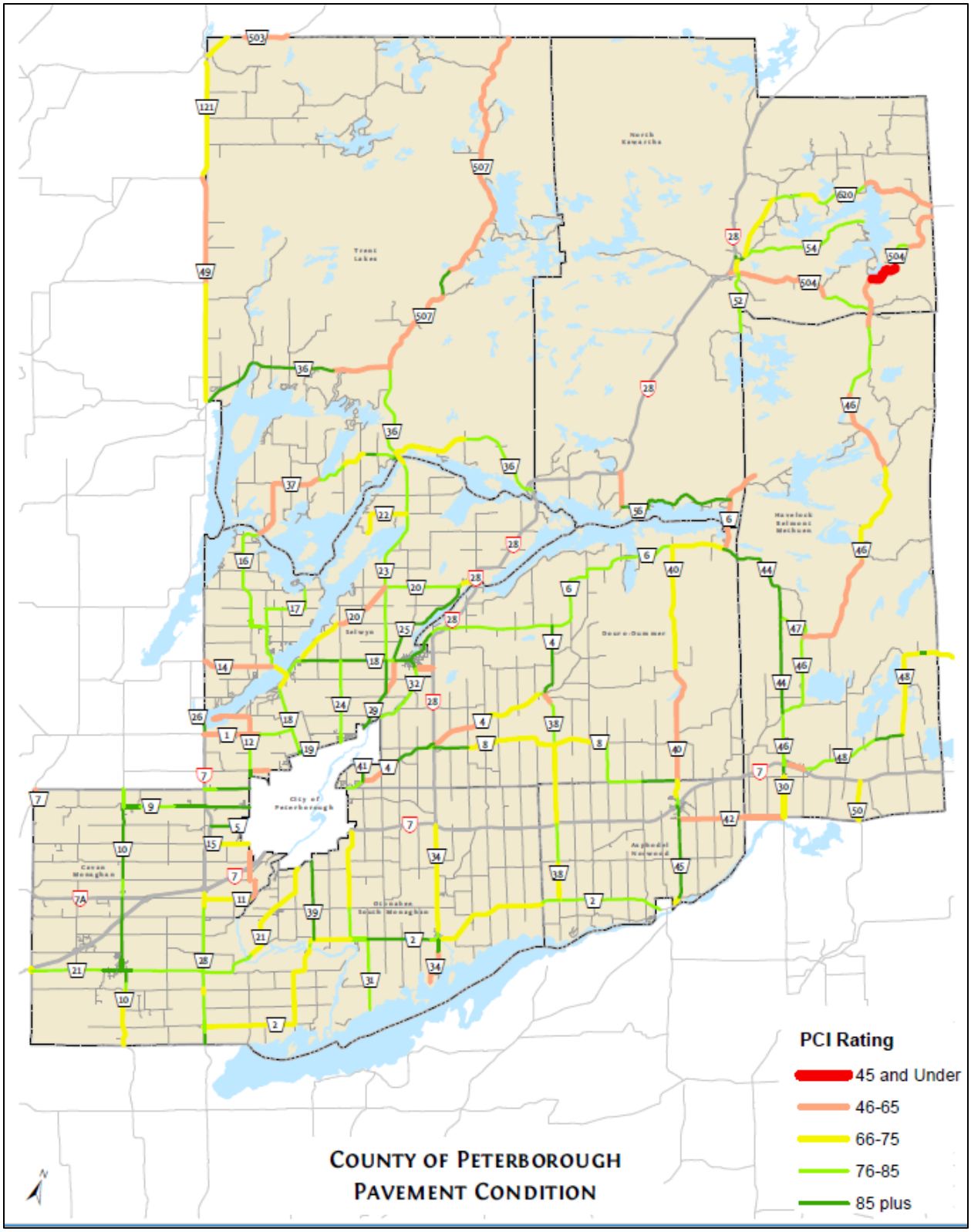

Figure 8: Map of County Roads with PCI Ratings

10-Year Needs

The following assessments of road needs were performed:

- Best Practices
- Performance Modelling
    - Optimal Workplan
    - Maintenance Workplan
- Inspection based (Manual workplan)

Best Practices

This was developed using the Asset Class recommended lifecycle activities. As described earlier in this document, best practices does not account for individual asset conditions. Rather it determines the activities that would be performed on each asset over the asset's lifetime and the cost of those activities. The Best Practice cost = lifetime activity costs / expected life. Using this method, the following average annual activity costs are determined.

Improvement Description	Avg Annual Cost
Double Surface Treatment Rehab	$511,189
Microsurfacing - Scratch and Surface Lift	$949,856
Grind and Overlay - Urban	$144,636
Rural Overlay - County	$1,623,064
Single Surface Treatment - County	$260,580
Cold in Place Recycling - Rural (100mm)	$343,434
Cold in Place Recycling - Urban	$55,925
Crack Sealing	$115,306
Full Depth Expanded Rural	$2,030,755
Full Depth Expanded - Urban	$131,561
Low Class Bituminous Reconstruction	$165,221
LCB Full Reconstruct	$1,200,217
Class A Roads - Rural - Hot Mix - Reconstruction	$823,889
Class B Roads - Rural - Hot Mix - Reconstruction	$3,399,440
Class C Roads - Rural - Hot Mix - Reconstruction	$1,001,328
Class B & C Roads - Urban - Hot Mix Reconstruction	$430,000
Class A Road - Urban - Hot Mix - Reconstruction	$144,165
	$13,330,568

Table 6: Roads Best Practices Summary by Improvement Type

Performance Modelling

Two Performance Modelling scenarios were developed – Optimal and Maintenance.

Optimal

In this model the program generates a workplan to do every activity when needed. In theory this model would result in the lowest overall average annual cost over the asset lifecycle. In practice the model typically identifies an unrealistic amount of work in the early years as the backlog of work is dealt with. Still, it is a useful reference point when run over a long period of time.

The 40-year spending profile for the optimal scenario is provided below. The average annual cost is $12.5 million.

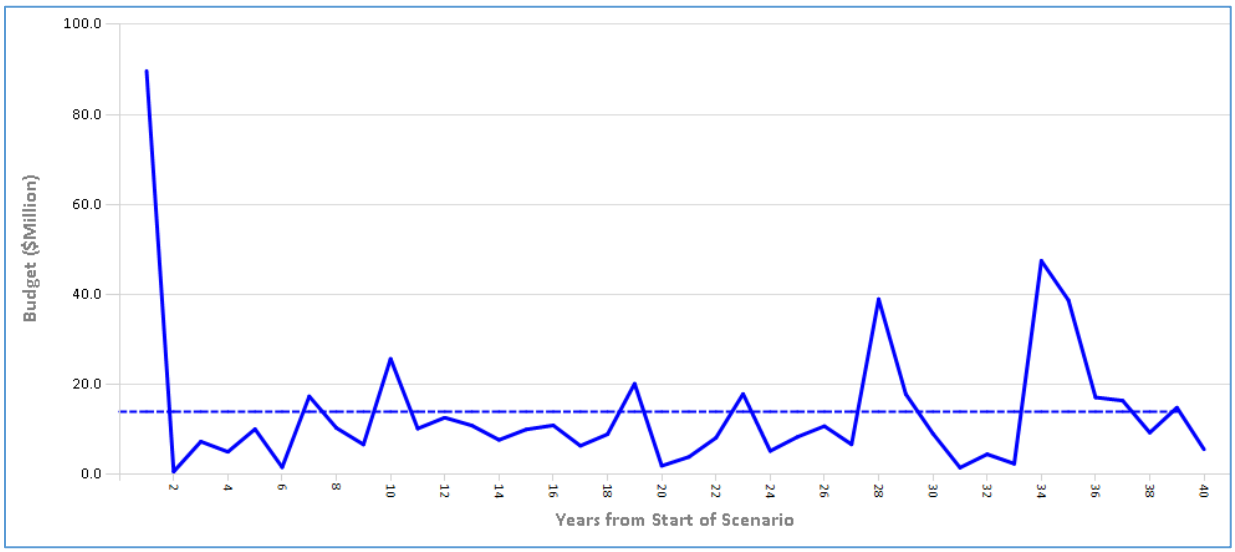

Figure 9: Roads – Optimal Performance Modelling Scenario

Maintain

In this model the program is directed to develop an activity level workplan that maintains the current average condition level. Activity selection was based on Return on Investment (ROI) to identify the lowest possible cost.

The spending profile for the Maintain scenario is provided below. The average annual cost is $11.6 million. It may be noted that in the early years the annual costs are lower than the overall average. This is due to the modelling logic essentially doing what is asked, i.e.finding the lowest cost plan to maintain average condition. In practice some of those opportunities will have been completed recently and are no longer possible. Still, over a long period of time the model provides an accurate assessment of costs and provides a good workplan starting point.

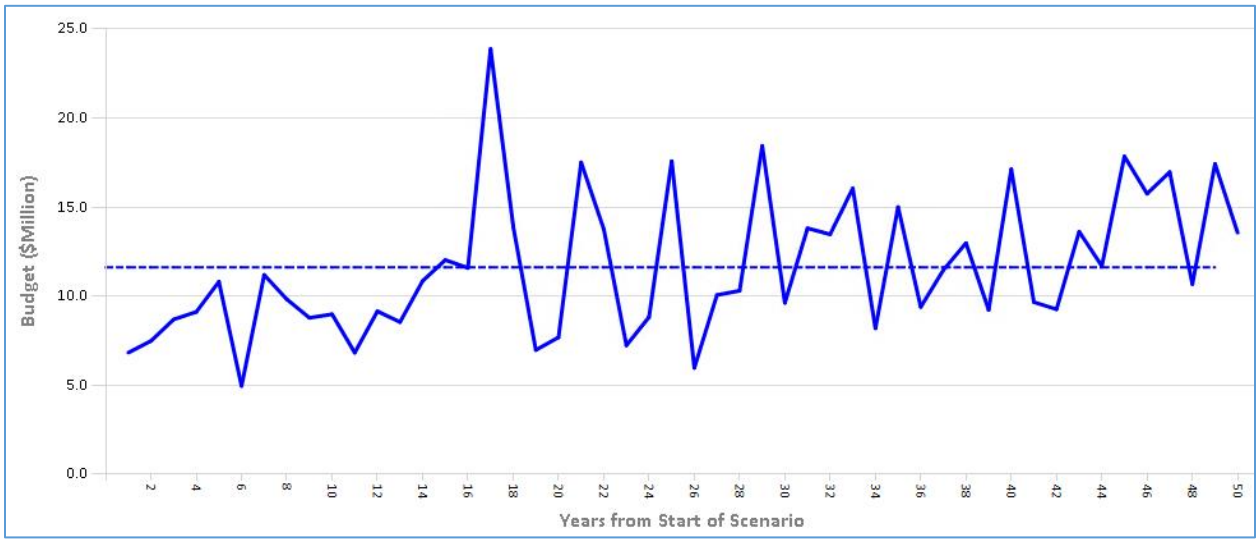

Figure 10: Roads – Annual budget to Maintain Average Road Condition

Inspection (Manual Workplan)

An inspection based workplan was developed by County staff. As mentioned, there are practical limits to how much data can be collected and maintained for use in Performance Modelling. The County has optimized the power of performance modelling with the benefit of more localized situation understanding.

Staff use recommendations from Performance modelling and then adjust based on localized factors not built into Performance Modelling. Factors include:

- Maintenance: Areas of high maintenance demand
- Safety: Areas with high levels of accidents or safety concerns
- Construction: Local factors affecting construction costs e.g. poor drainage
- Work Scheduling: Adjustments to work timing to best co-ordinate work, reduce costs and public disruption.

From this a detailed workplan is developed for the next 10 years.

Methodology Summary

The analysis described above are summarized in the table below

Analysis	Description	Result (M/year)
Best Practices	Best Practices	$13.33 M/yr.
Optimal	All activities done when needed	$12.50 M/yr.
Maintain	Cost to Maintain current condition	$11.61 M/yr.
Inspection (Manual)	Manual Workplan, considers additional factors such as safety, maintenance	$13.00 M/yr.

Table 7: Road Needs Analysis Comparisons

It is concluded that the annual spending for Roads should be $13 million per year. The activity level workplan is described in the 2019 10-year manual workplan.

Structures (Bridges and Culverts)

Includes bridges and culverts with a 3 meter or greater diameter on County roads or bridges and culverts greater than 6 meter in diameter located on lower tier roads.

Terminology

Sample illustrations of a bridge and culvert are provided below.

Figure 11: Gannon's Narrows Bridge

Figure 12: Deer Bay Culvert

Inspection Method

Bridges and Culverts were inspected in 2018 by a consulting engineering firm. The inspection methodology used was the MTO's Ontario Structure Inspection Method (OSIM). This document provides summary level information on the inspection results and 10-year needs.

Using the OSIM methodology, the condition of bridges is measured with the Bridge Condition Index (BCI). The BCI is based on an assessment of each component's likelihood of failure and impact of failure. The BCI value will range from 0 to 100 with a new structure having a value of 100.

BCI values will generally decline over time. The reduction in BCI, in theory, is a function of many factors including: traffic volume, truck use, use of de-icing chemicals, exposure to the elements and the type of structure. Each bridge will decline at its own rate but it is reasonable to expect that the decline begins slowly and accelerates as the structure gets older.

The Canadian Highway Bridge Design Code has a target service life of approximately 75 Years. It is recognized that maintenance, repair, and rehabilitations will be required along the way to reach or exceed this target. Bridge and culvert infrastructure can be organized into several BCI ranges.

Good – BCI Range 70 to 100

A bridge with a BCI greater than 70 is generally considered to be in good to excellent condition and significant repair or rehabilitation work is not usually required within the next ten years. Routine maintenance, such as sweeping, cleaning and washing are still recommended.

Fair – BCI Range 60 to 70

A bridge with a BCI between 60 and 70 is generally considered to be in fair condition. The most effective improvement in a structure's service life can be achieved by completing repairs while in this range. Identified work will fall into three categories

1. Minor Repairs.
2. Major Rehabilitation (>25% of replacement cost).
3. Replacement: When the costs of rehabilitation cannot be justified in light of the replacement cost.

Poor – BCI Range 50 to 60

A bridge with a BCI between 50 and 60 is generally considered to be in Poor condition. The bridge will likely need replacement and major rehabilitation is probably not cost effective. Any rehabilitation work would be to extend the useful life and to address critical safety issues.

Very Poor – BCI Less than 50

A bridge with a BCI rating of less than 50 is generally considered very poor with lower

numbers representing structures nearing the end of their service life. Replacement is recommended. Replacement timing would normally be in the one to ten-year timeframe depending on factors such as safety and impact of failure.

Inventory

Bridge and culvert inventory

Asset Type	Count	Quantity	Units	Replacement Cost	Needs	Value	Avg BCI	Avg Age
Bridge	127	24,145	m2 (deck Area)	123,249,841	27,079,584	99,626,299	74.10	54.28
Culvert	26	691.50	M (Length)	22,342,364	2,734,683	9,064,140	66.16	50.35
Total	153			145,592,205	29,814,267	108,690,438		

Table 8: Structure Inventory

Distributions of structures by BCI and year-built ranges are provided. A few observations on these charts are as follow.

The majority of structures are in the 70-79 BCI range. These structures typically do not require significant repairs or rehabilitation. However, in the next 10 years most of these will be in the 60-69 range where cost effective repairs are typically performed.

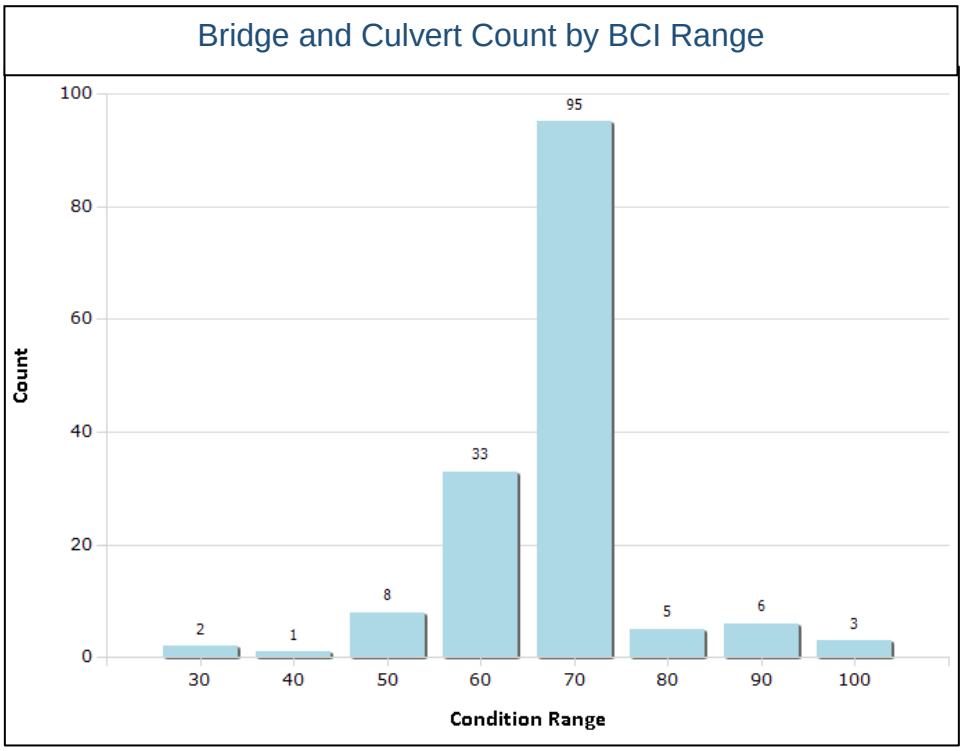

Figure 13: Structure Count by BCI Range

Older bridges and culverts often had design lives of 50 years while newer structures would be designed for 75 years.

There would appear to be a significant wave of bridges approaching the end of their design life.

With these two factors in mind the County will continue to monitor bridge conditions and needs through OSIM inspections on a biennial basis.

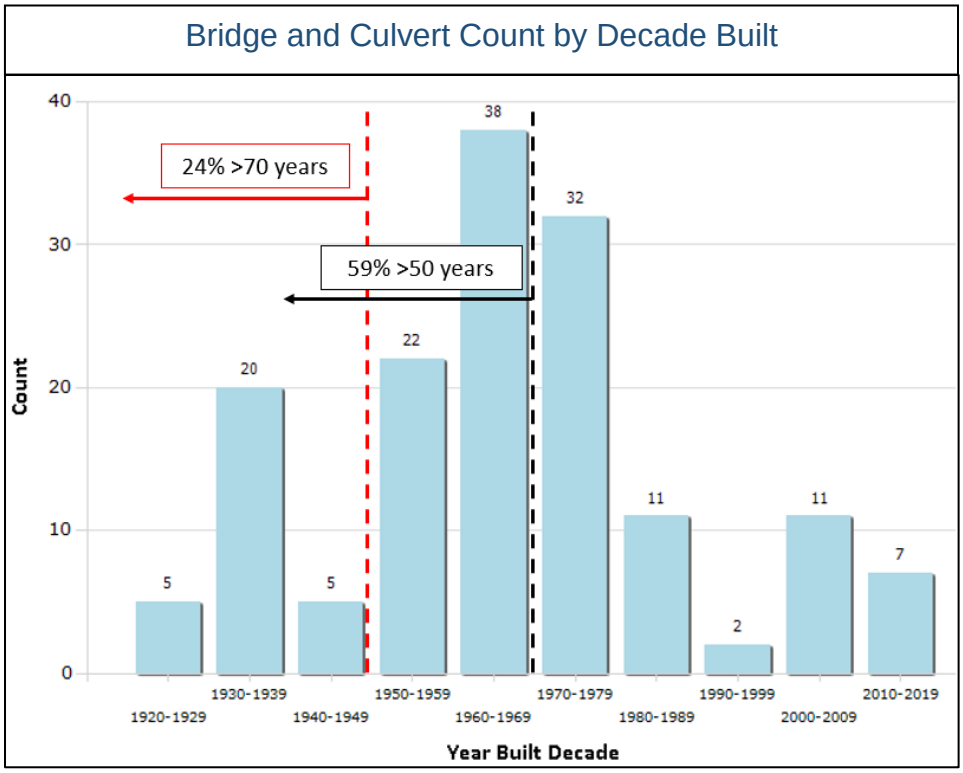

Figure 14: Structure Count by Decade Built

The distribution of structures in the County is provided below:

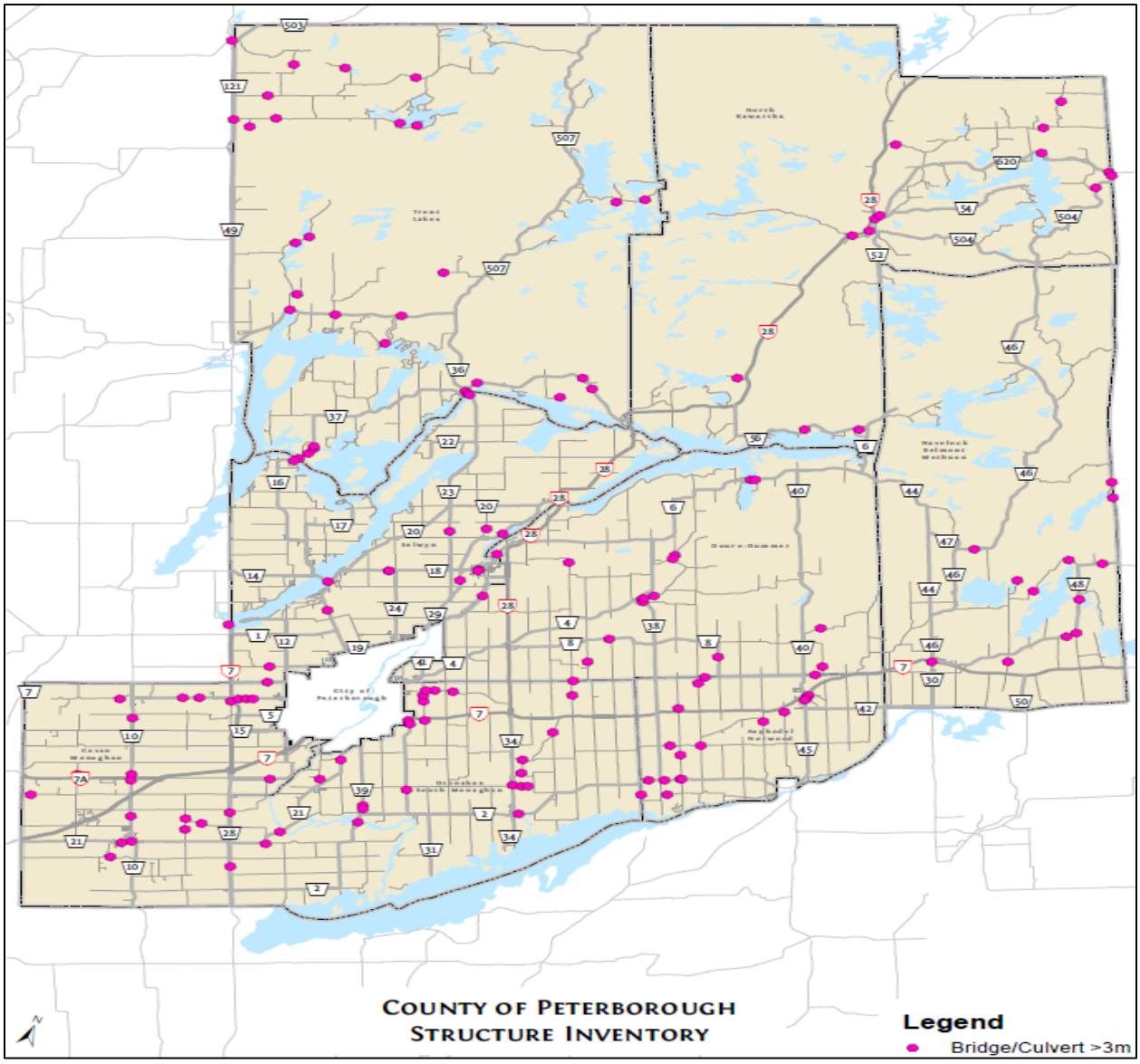

Figure 15: Map of Bridge and Culverts

10-Year Needs

The starting point for the 10-Year needs was the plan developed through the 2017/2018 inspection. Staff took the recommendations and made adjustments as follows.

- Timing: To organize the work into a practical plan. For example, the inspectors identified needs to be completed in the NOW, 1-5 year and 6-10 year timeframes. Staff put specific years to those improvements. There was also a practical need to stage the work over the next 10 years. A steady workplan helps manage staffing requirements and improves contract pricing.
- Costs: The inspection developed estimated costs using standard benchmark costs. Staff adjusted some estimates using more detailed designs and by comparing the work to recent Peterborough County contracts. In many cases staff estimates were greater than those provided by the inspector.
- Available funding

The activity level workplan is described in the 2019 10-year manual workplan. A 10-Year summary is provided below:

Year	Needs
2019	$4,818,665
2020	$2,951,829
2021	$4,037,104
2022	$3,446,606
2023	$4,457,388
2024	$3,938,850
2025	$3,516,989
2026	$4,437,342
2027	$4,736,566
2028	$4,624,202
Total	$40,965,541
Average/Yr.	$4,096,554

Table 9: Bridge and Culvert 10-Year Capital Needs

Cross Culverts

Cross culverts are structures less than 3 meters in width/diameter. Cross culverts facilitate drainage of County roads. The County is not responsible for culverts associated with entrances to private property. The County owns over 1,200 cross culverts.

Terminology

Key attributes are Material, depth and Asset Class

Material Types

Plastic | Steel (CSP) | Concrete

Figure 16: Cross Culvert Materials

Material has an impact on cost and expected lifespan.

Depth

Deeper culverts cost substantially more to replace due to added excavation, materials and traffic control.

Asset Classes

Asset Classes take into account the material and depth. They are described below along with the expected lifecycle activities.

Class	Lifespan	Count	Year	Activity
CSP - Shallow	50	1017	50	Replacement $25k
CSP - Deep	50	90	40 115	Lining $50k Replacement $75k
Plastic - Shallow	75	56	75	Replacement $25k
Plastic - Deep	75	5	75	Replacement $75k
Concrete	75	32	75	Replacement $40k

Table 10: Cross Culvert Asset Classes and Lifecycle Activities

A sample deterioration profile is provided below. In this example two options are presented. The blue line (Profile) is how the culvert will deteriorate over time if no work is done. The Yellow line (Recommended) is how the culvert will behave over time with recommended work.

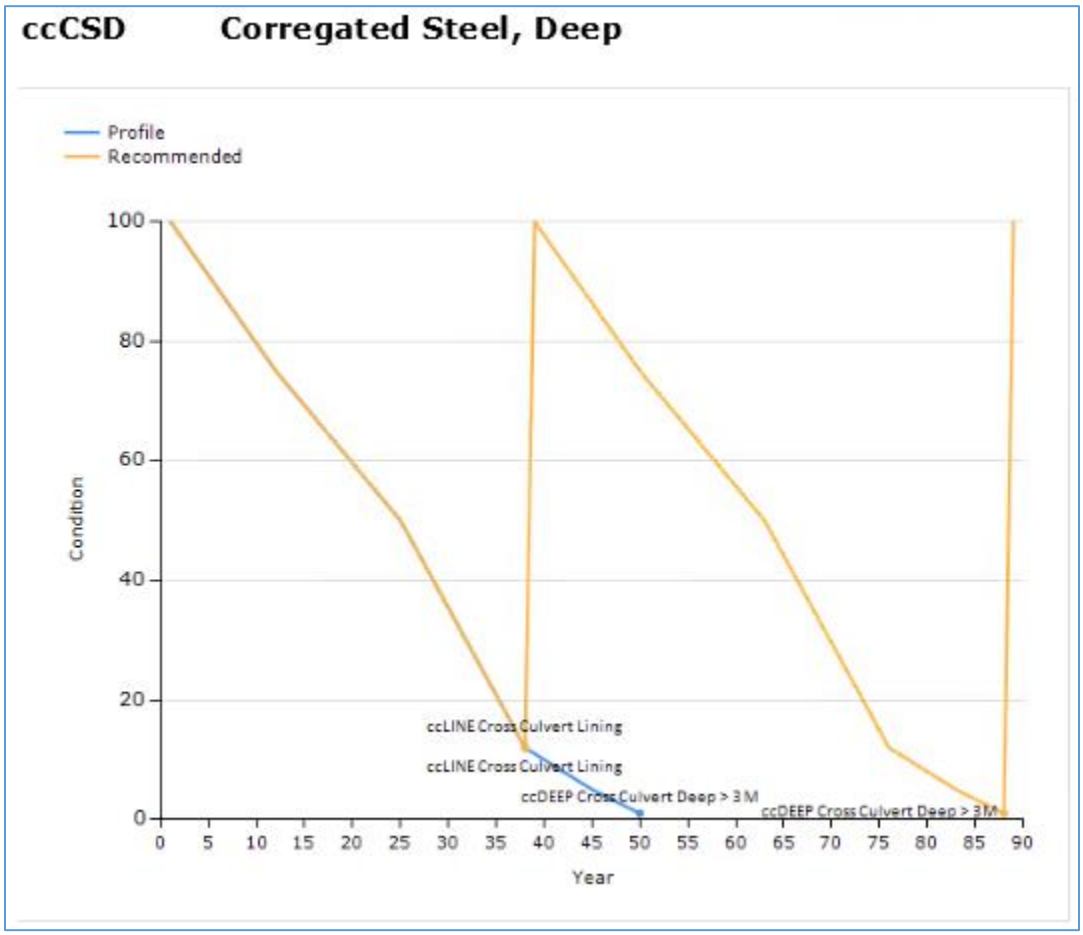

Figure 17: Cross Culvert Sample Deterioration Profile

Inspection Method

Field inspections were performed in 2018. The inspections were primarily an update to existing information. Some additions and deletions were noted. A few culverts were not updated due to health and safety issues and/or accessibility.

Of primary importance was to update the material, depth and condition. Culverts were rated Excellent to Very Poor. The textual ratings were later converted to numerical condition ratings based on the culvert asset class and deterioration profile. A sample asset class deterioration profile with condition descriptors is provided below.

Year	Condition	Description	
1	100	Excellent	New
12	75	Very Good	No visible sign of rust
25	50	Good	Minor discoloring, rust
38	12	Fair	Extensive rust
45	5	Poor	Sections have rusted through
50	1	Very Poor	Culvert at risk of failure

Table 11: Cross Culvert Sample deterioration profile with condition descriptors

Inventory

Cross culvert inventory

Asset Class	Records	Length (M)	Replacement Cost
Concrete	32	756.35	$ 1,100,000
Steel, Deep	90	2,229.73	$ 6,225,000
Steel, Shallow	1,017	18,608.12	$ 25,425,000
Plastic, Deep	5	125.17	$ 300,000
Plastic, Shallow	56	922.82	$ 1,400,000
Total	1,200	22,642	$ 34,450,000

Table 12: Cross Culvert Inventory by Asset Class

Condition	Records	Length (M)	Replacement Cost
1-Excellent	2	40.04	$ 50,000
2-Very Good	97	1,843.16	$ 2,975,000
3-Good	527	9,893.60	$ 15,100,000
4-Fair	347	6,405.77	$ 9,850,000
5-Poor	183	3,657.27	$ 5,425,000
6-Very Poor	23	456.30	$ 675,000
7-Unknown	21	346.05	$ 375,000
Total	1,200	22,642	$ 34,450,000

Table 13: Cross Culvert Inventory by Condition

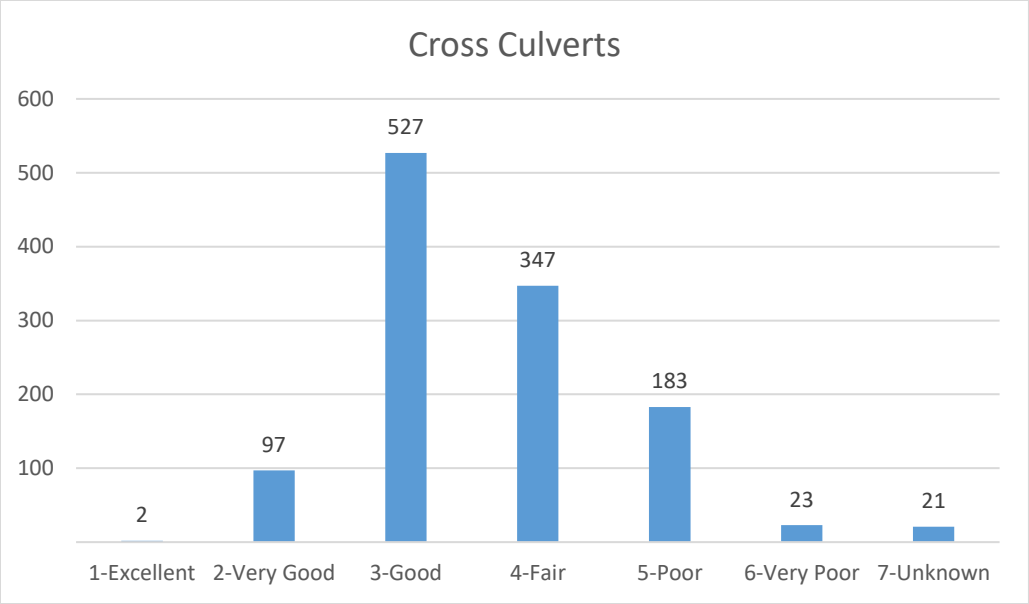

Figure 18: Cross Culvert Inventory by Condition

10-Year Needs

A 10-Year plan was developed using Performance Modelling. Because the condition ratings were somewhat generalized the model predicts replacements in batches. Over a long period of time an average annual cost can be derived. From an operational perspective we would know the general timeframe for each culvert's replacement. More specific timing would be based on co-ordination with other roadwork and yearly inspection of at-risk culverts.

Based on the analysis, the average annual cost is $679,100.

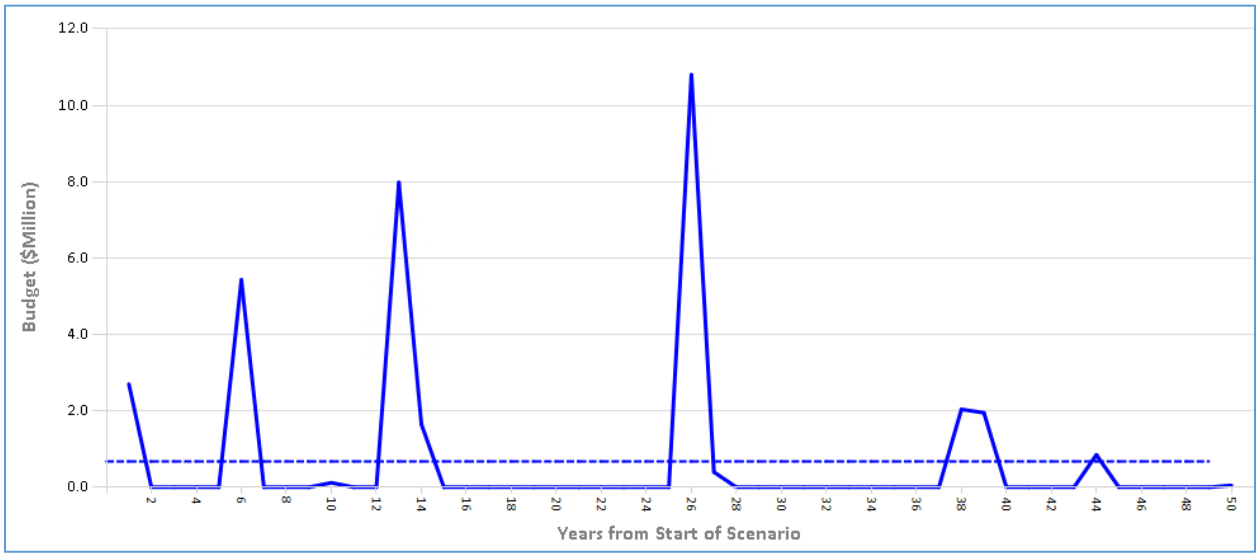

Figure 19: Cross Culvert Budget by Year from Performance Modelling

Facilities

The County owns and manages 34 facilities. The County also leases facilities. The AMP only covers facilities owned by the County.

The majority of facilities are for County use only with the exception being Lang Pioneer Village (LPV). The AMP covers five of the larger buildings within LPV. The other buildings are deemed “artifacts” and the funding and preservation of those artifacts is covered by the LPV reserve fund.

The largest facility is the County Courthouse, 470 Water Street, Peterborough. The original court house was completed in 1840 and the jail in 1842.

In 1862, various municipal changes resulted in the stone building becoming the headquarters for the County of Peterborough solely. Renovations in 1878 removed the original cupola which lit the courtrooms, and various renovations over the years have changed the appearance of the entrance and central section of the building. The matching stone north wing was built during 1927-1929. Considered, architecturally, to be one of the finest court houses in Ontario, the historical significance of Peterborough County's Court House was designated by the Archaeological and Historical Sites Board of Ontario in 1958. Renovations during 1959-1960 resulted in the modern south wing, once occupied by the registry office, but now occupied by County offices.

The historic County Jail was built in 1845 and was operated by the Province of Ontario as a jail facility until 2001 when an inmate riot structurally damaged the building and it was permanently closed. In 2016, County Council approved the strategic demolition of the historic Peterborough County Jail and the creation of the Heritage Jail Park.

As can be inferred from the history, the Courthouse brings with it many unique challenges from an asset preservation perspective.

Terminology

For the purpose of this document the only key term is the Asset Class

Asset Class

Facilities are organized by Asset Class and represent the general purpose of the facility.

Class	Count	Description
PCCP	1	PCCP Service Base (Apsley)
Garage	1	Vehicle garage (Caretakers House Garage)
Office	9	Office buildings including County Courthouse
Quonset	1	Quonset
Salt Shed	7	Salt Shed
Sand Dome	7	Sand Dome
Storage Garage	4	Storage Garage
Tourism	4	Lang Pioneer Buildings excluding office

Table 14: Facility Classes

Inspection Method

All facilities were inspected in 2018.

The inspections identified needs related to:

- Public and staff health and safety
- Preserve structural integrity
- Preserve building envelope
- Maintain optimally functional mechanical and electrical systems
- Replace other components and elements at end of useful life for safety, functionality and appearance
- Reduce energy and realize operational savings

It may be noted that needs were generally not identified for aesthetic reasons or with sale/rental considerations.

Approximately 975 needs were identified on 34 facilities. Timing of the work was generally as follows:

Near Term

- Repairs to extend life of existing building elements for 5 to 10 years, e.g. roofing, paving, masonry repairs etc.
- Structural investigations for Court House exterior walls, Sand Domes, Armour Road base, etc.
- Green energy replacements
- Replace vs repair assessment for aging facilities

Mid Term

- Design work for more complex projects
- Structure remediation work

Long Term

- Scheduled component replacement schedule
- Facility evaluation
- Green energy

To convey the overall level of service (condition) of facilities we use a Facility Condition Index (FCI). FCI values are calculated as follows.

$$FCI = \frac{\text{Replacement Value - Repair costs identified over next 4 years}}{\text{Replacement Value}}$$

A facility with no repairs identified in the next 4 years would score 100.

FCI Descriptor	FCI Condition Range
Good	Greater than 95
Fair	From 90 to 95
Poor	Less than 90

Table 15: FCI Ranges

Inventory

County owned facilities are shown below:

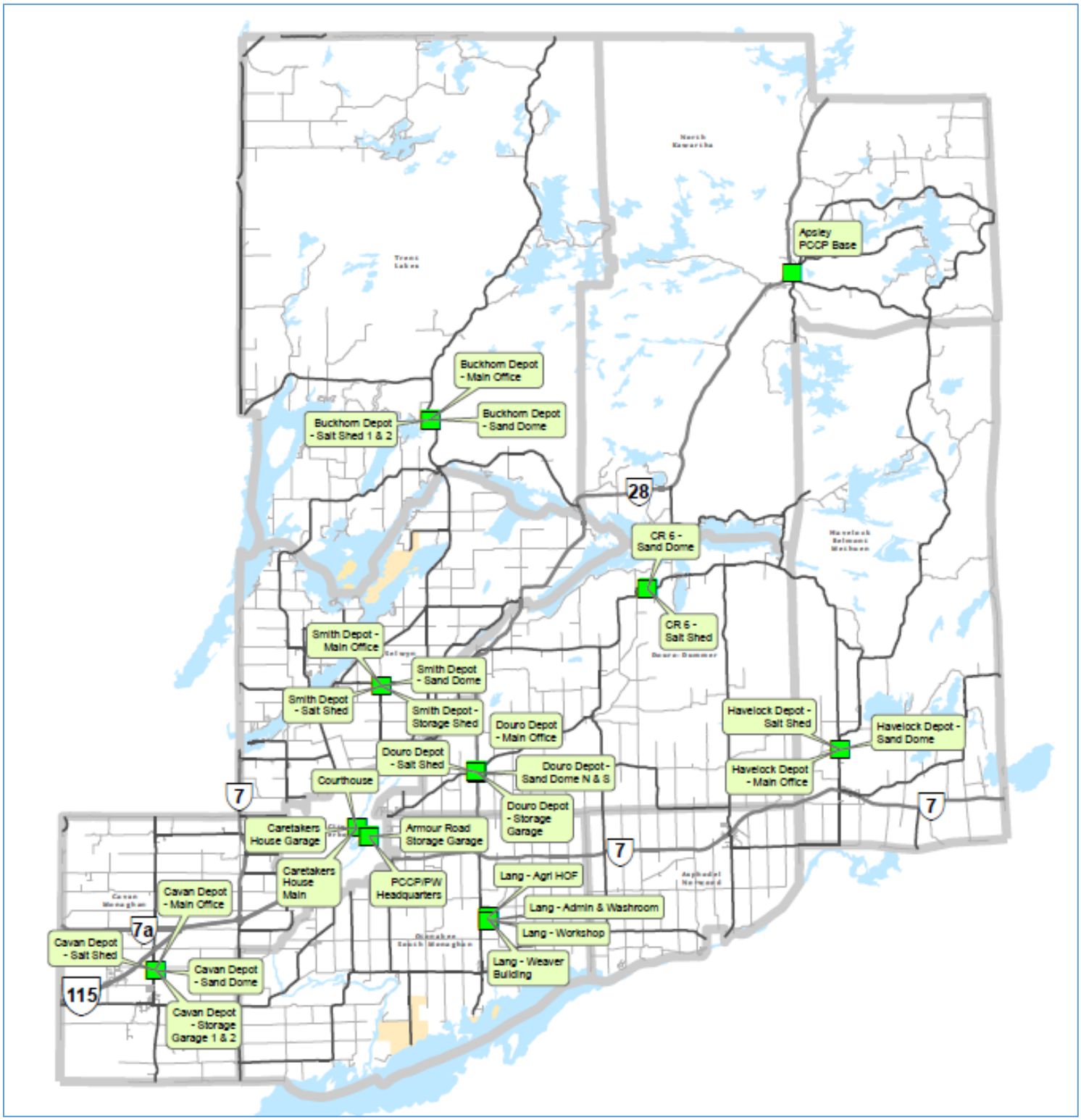

Figure 20: Map of County Owned Facilities

Facility inventory is provided below. In some cases, year built is estimated and may not reflect the age of certain components that have been renovated.

Class	Description	Area (sq.ft)	Year Built	Replacement Cost ($)	2019 FCI
PCCP	Apsley PCCP Base	2,000	2012	500,000.00	95%
Office	Armour Road PCCP/PW Headquarters	30,800	1982	7,392,000.00	96%
Storage Garage	Armour Road Storage Garage	520	2008	104,000.00	100%
Office	Buckhorn Roads Depot Office	3,700	1970	814,000.00	89%
Sand Dome	Buckhorn Sand Dome	8,000	1970	280,000.00	99%
Salt Shed	Buckhorn Depot Salt Shed 1	1,300	1970	156,000.00	94%
Salt Shed	Buckhorn Depot Salt Shed 1	1,300	1970	156,000.00	97%
Garage	Caretakers House Garage (*replace in 2024)	260	1920	50,200.00	*100%
Office	Caretakers House Main	2,800	1920	560,000.00	95%
OFFICE	Courthouse	36,000	1850	10,800,000.00	92%
Sand Dome	CR06-SD	8,000		280,000.00	88%
Salt Shed	CR06-SS	1,300		156,000.00	95%
Office	Douro Roads Depot Main	6,100	1970	1,342,000.00	94%
Sand Dome	Douro Sand Dome North	8,000	1970	280,000.00	97%
Sand Dome	Douro Sand Dome South	8,000	1970	280,000.00	97%
Storage Garage	Douro Storage Garage	4,700	1970	1,034,000.00	99%
Salt Shed	Douro Depot Salt Shed	1,300	1970	156,000.00	71%
Office	Havelock Roads Depot Main	5,300	1970	1,166,000.00	91%
Sand Dome	Havelock Sand Dome	8,000	1970	280,000.00	98%
Salt Shed	Havelock Salt Shed	1,300	1970	156,000.00	91%
Office	Lang Pioneer Village Admin Building	11,000	1983	2,750,000.00	97%
Tourism	Lang Pioneer Village Agricultural Heritage Building	11,400	2017	2,850,000.00	99%
Tourism	Lang Pioneer Village David Mitchell Workshop	3,000	2012	600,000.00	99%
Tourism	Lang Pioneer Village Weaver Building	2,300	2010	575,000.00	98%
Tourism	Lang Pioneer Village Washroom	375	1983	75,000.00	91%
Office	Millbrook Roads Depot Main	4,200	1970	924,000.00	98%
Sand Dome	Millbrook Depot Sand Dome	8,000	1970	280,000.00	96%
Storage Garage	Millbrook Storage Garage 1	1,500	1980	150,000.00	100%
Storage Garage	Millbrook Storage Garage 2	200	1970	20,000.00	63%
Salt Shed	Millbrook Salt Shed	1,300	1970	156,000.00	97%
Quonset	Selwyn Quonset Shelter	2,000	1990	50,000.00	100%
Office	Selwyn Roads Depot	1,200	1970	240,000.00	94%
Sand Dome	Selwyn Depot Sand Dome	8,000	1970	800,000.00	99%
Salt Shed	Selwyn Depot Salt Shed	1,300	1970	156,000.00	93%
				35,568,200.00	

Table 16: Facility Inventory, Full List

Summary by Class is provided below. While there are specific buildings in poor shape, on average the County's facilities are in fair to good shape.

Class	Count	2019 FCI
PCCP	1	95.4%
Garage	1	100.0%
Office	9	94.0%
Quonset	1	100.0%
Salt Shed	7	91.0%
Sand Dome	7	96.6%
Storage Garage	4	98.9%
Tourism	4	99.1%
		94.9%

Table 17: Facility Inventory by Class

The following chart shows the condition ratings weighted by facility replacement cost. Only 3.6% of the county's facilities, by value, are in poor shape.

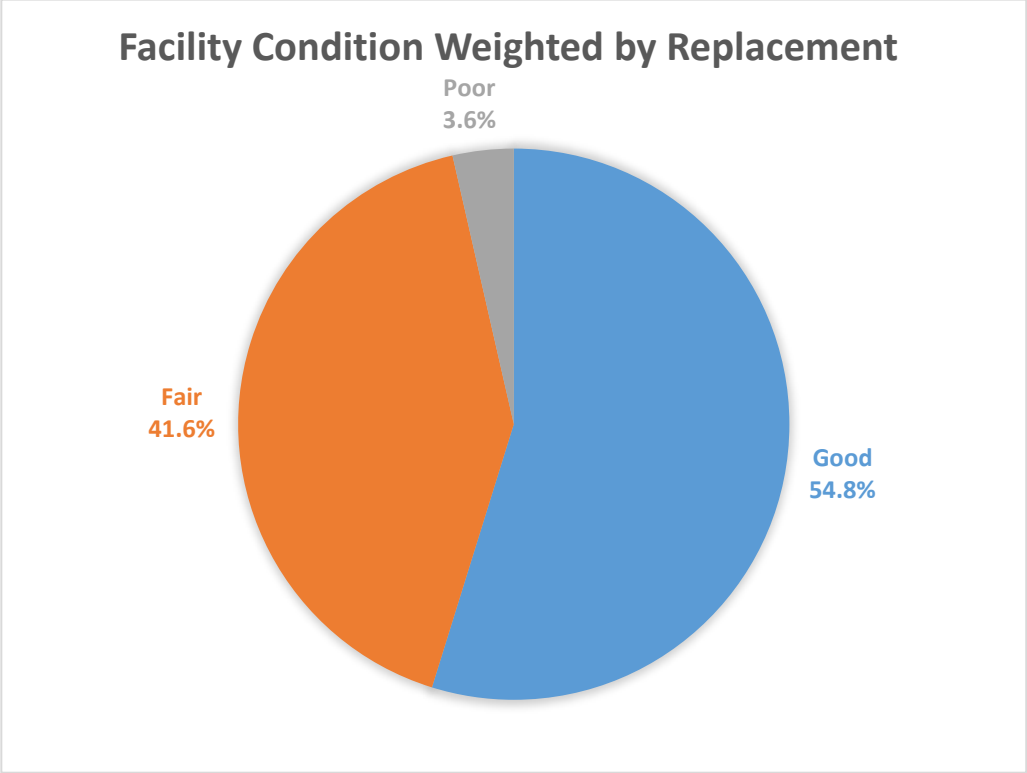

Figure 21: County Facilities by Condition – Weighted by Replacement

10-Year Needs

A summary of the 10-year needs is provided below.

Asset Class	2019	2020	2021	2023	2024	2025	2026	2027	2028	Total
PCCP	17,100	5,380		900	5,600		1,150	12,800	10,000	53,680
Garage				50,200						50,200
Office	138,100	409,330	572,060	424,240	722,250	577,810	791,410	754,700	1,147,070	5,970,520
Quonset					15,000				800	15,800
Salt Shed	11,300	42,400	28,200	70,600	36,960	27,250	20,020	60,251	29,190	342,793
Sand Dome	27,380	26,670	20,100	42,520	18,000	93,060	80,300	87,050	258,960	663,490
Storage Garage	1,500	1,800	10,700		211,170	42,800	5,000	35,800	17,600	326,370
Tourism	18,400	13,960	3,400	4,800	1,430	640	15,950	31,000	53,890	143,470
	213,780	499,540	634,460	593,260	1,010,410	741,560	913,830	981,601	1,517,510	7,566,322

Table 18: 10-Year Facility Needs ($)

The projected trend in FCI values is governed by two factors

1. Capital work performed. If identified needs are not addressed the backlog of work will build up and the FCI values will trend down
2. Work Timing. More expensive repairs and renovations were generally scheduled in later years to allow for design work and repair vs replace evaluation, where applicable.

The effect of point 2 is that even if all needed capital work is performed the FCI values will trend down before they begin to recover. The following graph illustrates this.

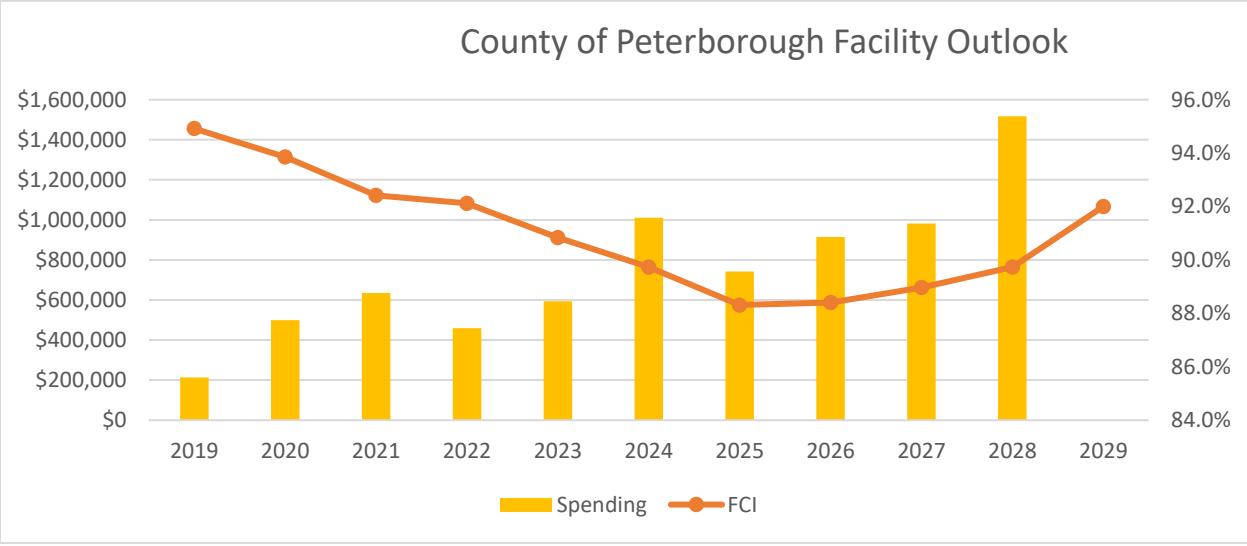

Figure 22: Facility FCI Projection

Traffic Signals

The County owns 10 signalized intersections.

Terminology

Traffic signals are divided into two components:

- Signals: Signals have an expected useful life of 75 years and replacement cost of $120,000
- Controllers: Controllers have an expected useful life of 10 years and replacement cost of $10,000

Inspection Method

All traffic signal components were not recently inspected. Capital works timing for each intersection has not been developed and is usually a result of other roadwork e.g. intersection widening. Repairs or replacement may also be scheduled as needed due to increasing operating costs.

Inventory

Signalized intersections are as follows:

County Road	Intersecting Road	Year Built
29	Concession Street	2013
29	Reid Street	1980
29	Bridge Street	1970
29	Clementi Street	1980
29	County Road 18	2015
18	County Road 14	1980
18	County Road 1	1980
18	County Road 19	1980
18	Wilcox	2010
23	County Road 36	1990

Table 19: Signalized Intersection Inventory

10-Year Needs

For traffic signals, a best practices approach was used. The result is a need of $26,000/year

Equipment

The AMP only covers equipment owned by the County.

Equipment includes rolling stock, IT equipment and paramedic equipment. Anything with a replacement value over $5,000 is included in the AMP.

The AMP only covers replacement costs. It is understood and assumed that proper preventative maintenance will be performed.

Terminology

Key attributes of equipment are Class and Department.

Equipment Class

Equipment is grouped by Class. The Equipment Classes describe the physical characteristics of the equipment and some expected useful life information. From an operational perspective, preventative maintenance activities are often set by equipment class and operating efficiency is assessed by comparing to other units of the same class.

Department

Department links each equipment to the appropriate reserve fund. The departments and reserve funds are:

- Public Works (PW): Includes fleet vehicles, snow plows, and other large machinery.
- Corporate Services (Corp): Includes IT equipment and the facilities supervisor truck.
- Environmental Services (ENV): Includes a Waste Management vehicle.
- Peterborough County – City Paramedics (PCCP): Includes ambulances and equipment.
- Emergency Measures (EM): Includes EM vehicles.

Inspection Method

The equipment replacement plan is updated annually by County staff. While the class provides some level of expectation on useful life, the plan is based on a number of factors including but limited to:

- Industry standards
- Expected useful life
- Mileage thresholds
- Past performance
- Type of use
- Risk of failure
- Impact of failure

Inventory

Inventory by Class and department is provided.

Class	Description	Units	Replacement Cost ($)	Avg Age
EQ01	Grading	4	913,877	5.00
EQ02	Loaders	3	631,807	7.67
EQ03	Excavation	5	1,036,667	6.60
EQ04	Mowers	6	187,294	7.33
EQ05	Plow Trucks	15	3,538,169	6.80
EQ06	Supervisor/Inspection	8	268,724	7.13
EQ07	Other Equipment	10	589,137	14.60
EQ08	Trailers	3	86,039	6.00
EQ09	Fleet Vehicle	25	1,026,971	5.36
EQ12	Ambulances	24	2,864,467	3.63
IT82	Servers	1	160,000	2.00
IT84	Tech Appliance	2	18,000	2.00
		106	11,321,152	

Table 20: Equipment Inventory by Class

Department	Class	Units	Replacement Cost ($)	Avg Age in Years
Corporate	Fleet Vehicle	2	65,000	5.00
Corporate	Servers	1	160,000	2.00
Corporate	Tech Appliance	2	18,000	2.00
Emergency Measures	Fleet Vehicle	2	40,000	5.00
Environmental	Fleet Vehicle	3	34,795	8.33
PCCP	Ambulances	22	2,824,467	3.50
Public Works	Excavation Equipment	5	1,036,667	6.60
Public Works	Fleet Vehicle	20	927,176	4.95
Public Works	Grading Equipment	4	913,877	5.00
Public Works	Loaders	3	631,807	7.67
Public Works	Mowers	6	187,294	7.33
Public Works	Other Equipment	10	589,137	14.60
Public Works	Plow Trucks	15	3,538,169	6.80
Public Works	Supervisor/Inspection Vehicles	8	268,724	7.13
Public Works	Trailers	3	86,039	6.00
		106	11,321,152	

Table 21: Equipment Inventory by Department and Class

10-Year Needs

The 10-year equipment replacement plan is provided below. Costs include inflation of 2%. In the consolidated asset information section this inflation is backed out for asset class consistency.

Year	Corporate (CORP)	Emergency Measures (EM)	Environmental (ENV)	PCCP	Public Works	Total
2019	$65,000	$40,000		$636,840	$854,135	$1,595,975
2020				$660,196	$551,466	$1,211,662
2021				$303,566	$434,504	$738,070
2022	$178,000			$540,459	$699,166	$1,417,625
2023				$636,504	$1,073,008	$1,709,512
2024				$503,742	$904,174	$1,407,916
2025			$34,795	$621,196	$842,185	$1,498,176
2026				$303,566	$703,015	$1,006,581
2027	$243,000			$540,459	$1,036,992	$1,820,451
2028				$514,836	$1,096,115	$1,610,951
Total	$486,000	$40,000	$34,795	$5,261,364	$8,194,760	$14,016,919
Avg/Yr.	$48,600	$4,000	$3,480	$526,136	$819,476	$1,401,692

Table 22: Equipment 10-Year plan by Department

Dept	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
CORP	65			178					243		486,000
EM	40										40,000
ENV							34				34,795
Paramedic	636	660	303	540	636	503	621	303	540	514	5,261,364
PW	854	551	434	699	1,073	904	842	703	1,036	1,096	8,194,760
	1,595	1,211	738	1,417	1,709	1,407	1,498	1,006	1,820	1,610	14,016,919

Table 23: Equipment 10-Year plan by Department (Values in $Thousands)

Parks and Trails

The County owns one trail, the Scenic River Road Trail.

The Scenic River Road Trail is a picturesque 8.5 km path from Trent University to Lakefield. It was opened for public use on July 5, 2000 and is accessible year-round. It is jointly owned by Peterborough County and Trent University, each of whom manage their respective properties.

The trail has a gravel surface. While the trail requires yearly maintenance there are no capital needs identified over the next 10 years.

Forests

The County owns three forest blocks as shown below:

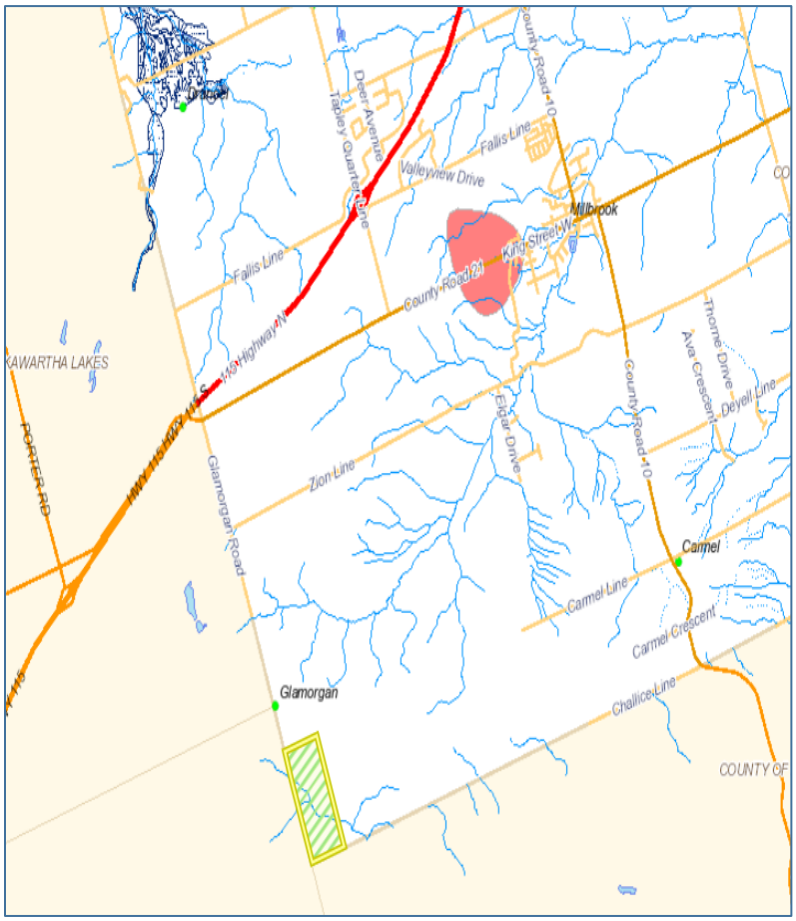

Figure 23: Cavan Forest – 223 Acres

Figure 24: Havelock Depot Forest
180 Acres

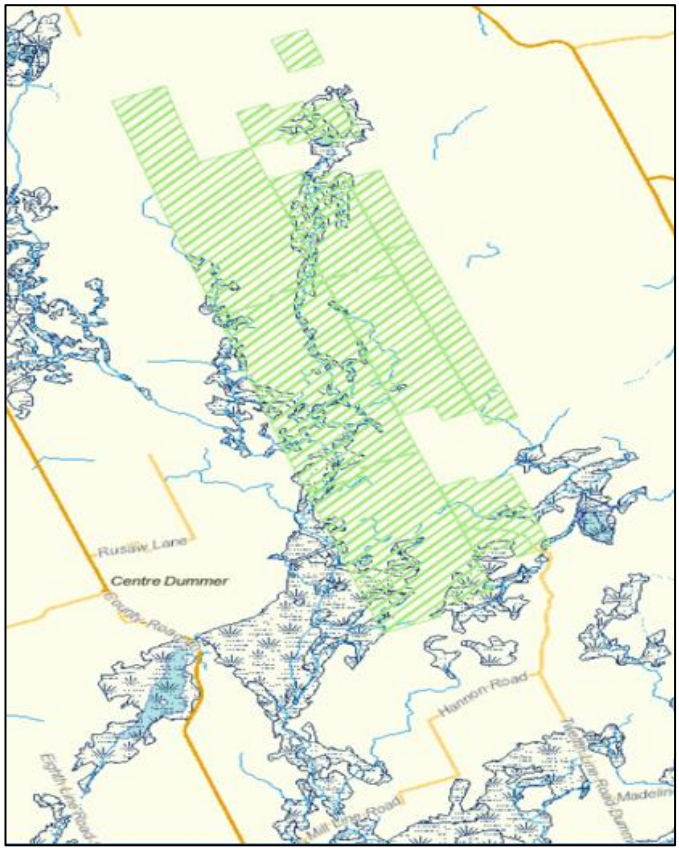

Figure 25: Belmont-Dummer Forest
4,862 Acres

There are no capital needs identified over the next 10 years for the County forests.

Landfill

The County jointly owns and operates the landfill site on Bensfort Road with the City of Peterborough. The landfill has an expected useful life of 15 years with ongoing efforts to extend that through Reduce, Reuse, Recycle initiatives as well as site optimization.

A reserve fund is in place to cover the retirement of the site.

The landfill has no capital needs identified over the next 10 years and there are no specific plans to replace the landfill site.

For the purpose of this document no costs are included for the landfill. That should be reviewed annually as more details are available on future landfill management plans.

Transportation Master Plan (Growth)

Growth related Infrastructure needs are covered in the Transportation Master Plan (TMP). The TMP is a comprehensive assessment of the County's current and future transportation system improvement needs. It includes recommendations for new / improved infrastructure (e.g. roads, transit, cycling, walking), operational design standards, and transportation policies. The TMP was last updated in 2014 with an updated plan in 2019.

A summary of projects yet to be completed is provided in Appendix B.

Some of those projects have been scheduled. Others have not, due to funding uncertainty. Most of the planned work in between 2019 and 2021.

For capital planning purposes the estimated costs are divided into two groups:

- Planned Work. This totals $13,412,284 over the next 10 years
- Unplanned Work. The estimated costs are as follows

$57,645,000	Transportation Plan, remaining projects
- $1,185,000	Funded in 2018
- $13,412,284	Planned 2019-2028
=$43,047,716	Unplanned (Unfunded)
/17	Spread over 17 years
= $2,532,219	Per year over next 17 years

The 10-Year needs for the Transportation plan are shown below

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Funded (Planned)	1,885,000	6,360,000	2,697,284	360,000	260,000	260,000	260,000	260,000	310,000	760,000	13,412,284
Unplanned				2,532,219	2,532,219	2,532,219	2,532,219	2,532,219	2,532,219	2,532,219	17,725,530
Total	1,885,000	6,360,000	2,697,284	2,892,219	2,792,219	2,792,219	2,792,219	2,792,219	2,842,219	3,292,219	31,137,814

Table 24: 10-Year Transportation Plan Capital Needs ($)

Cost Reduction Options

Before finalizing the 10-year needs analysis staff considered possibilities to reduce capital needs. A list of options considered is provided along with additional comments on options recommended for further evaluation.

While several options were identified for further review there was insufficient clarity or certainty on the outcomes to affect the recommended 10-year needs.

Options Considered

A summary of options considered to reduce capital needs.

Option	Description	Evaluation Summary	Recommendation
Conversion to Gravel	Convert road surface to gravel	Literature and experience indicate gravel roads are only more cost effective at very low traffic volumes. Furthermore, you need a sufficient quantity and connectivity of gravel roads to support the necessary equipment and operations.	Not recommended
Reduce Road Service Levels	Reduce the tolerable condition levels for roads	The roads needs are based on the most cost-effective approach to maintaining roads over their lifetime. Accepting lower condition levels would lead to missed preservation work which would result in higher lifetime annual costs	Not recommended
Bridge Closures	Close bridges on low volume roads and where alternate routes are available	The option is viable and has been used by the County in the past. However, the requirements to close bridges is fairly stringent and it is not expected that significant new opportunities are available	Recommended
Facility Co-location	Work with lower tiers to consolidate facilities	Several opportunities seem to be available to consolidate maintenance facilities with lower tier municipalities.	Recommended
Toll Roads	Add tolls to major roads sections	Regulatory challenges and not considered a viable option at this time.	Not recommended

Table 25: Cost Reduction Options Considered

Options for Further Evaluation

A summary of options identified for further evaluation for spending reductions is provided along with suggestions for specific actions.

Bridge Closures

It should be noted this is not a new option. The County has always looked at the option for bridge closure when major work is needed. That practice will continue.

Facility Co-location

It is recommended that the County's Facilities department meets with lower tier municipalities to identify short and long term options for facility co-location.

Climate Change

As written in the Strategic Asset Management Policy "The County will consider the impacts of its Asset Management activities in respect to the anticipated costs that could arise, adaptation opportunities to manage vulnerabilities, mitigation approaches, disaster planning, and contingency funding". Further information can be found in the Greater Peterborough Area Climate Change Action Plan.

Consolidated Asset Information

Details for each class of asset were provided in each asset section. Those values are summarized in this section.

All Assets – Inventory

Asset Type	Records	Quantity		Replacement Cost
Bridge	127	24,157.59	M2 (Deck Area)	$133,395,879
Cross Culvert	1,200	22,642.19	M (Length)	$34,450,000
Culvert	26	691.50	M (Length)	$13,413,042
Equipment	106	106.00	Each	$11,177,152
Facility	32	185,155.00	Sq. Ft (Floor Area)	$35,133,080
Forests	3	2,130.80	Hectare (Area)	$0
Landfill	1	162.00	Hectare (Area)	$0
Road	225	709.86	Km (Length)	$744,783,954
Signals	10	10.00	Each	$741,000
Trails	1	5.35	Km (Length)	$0
				$ 973,094,107

Table 26: All Assets Inventory

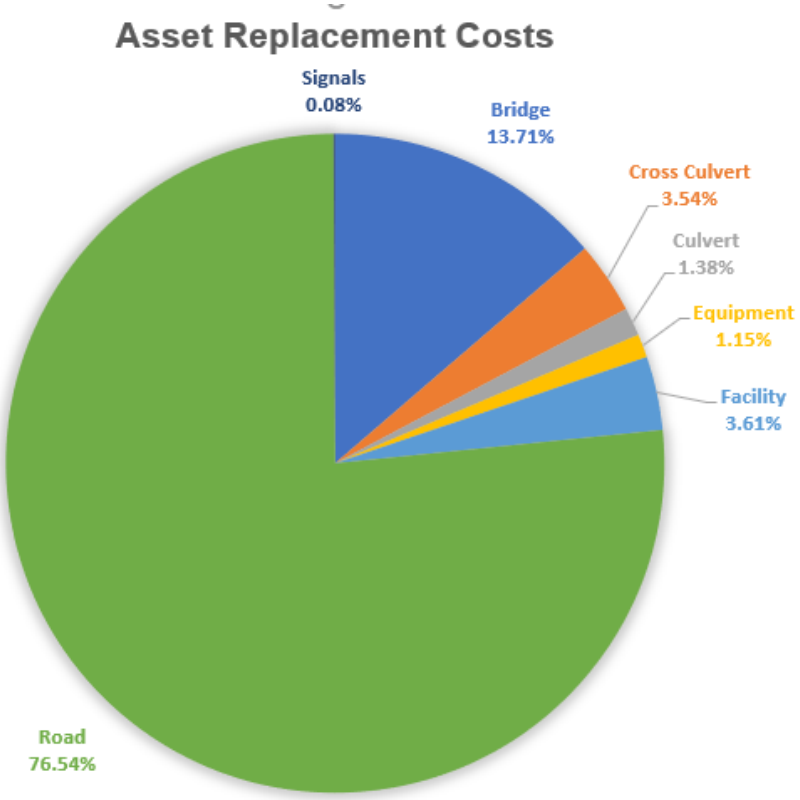

Figure 26: All Assets, Asset Replacement Costs

All Assets – 10-Year Needs

A summary of needs over the next 10 years is provided below.

A few important qualifiers

- Base Year: All needs have been normalized to 2018 costs.
- Objective: The needs are those identified to most cost effectively maintain current condition levels over the next 10 years.
- Supporting Workplans: For most asset types there are detail workplans supporting these needs. Where feasible, those workplans are included in this report or a reference is provided for the supporting details.
- Staff Costs: An allowance has been made for increased staff costs for Public Works and Facility spending. The assumption is that existing staff levels would allow for a slight increase in work delivery but additional staff would be required beyond those levels. These staffing costs are estimated at 6% of costs above $13 million. The additional staff would help plan, manage and deliver the work. Even if the design and contract management is outsourced someone still has to manage the consultant and ensure proper Quality Assurance (QA) is performed.
- Contractor Capacity: It is assumed that there is sufficient capacity to deliver the work. Experience indicates even during spikes in construction spending any capacity issues are short lived.
- Inflation: It is assumed that construction costs will increase at the pace of inflation.

Asset Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	Avg. /Yr.
Struct.	$4,818,665	$2,951,829	$4,037,104	$3,446,606	$4,457,388	$3,938,850	$3,516,989	$4,437,342	$4,736,566	$4,624,202	$40,965,541	4,096
Cross Culvert	$694,031	$697,248	$694,603	$693,919	$695,146	$695,043	$694,231	$695,485	$695,933	$696,837	$6,952,476	695
Equip	$1,572,075	$1,176,114	$705,829	$1,332,400	$1,586,872	$1,287,599	$1,349,897	$893,553	$1,582,958	$1,388,104	$12,875,400	1,287
Facility	$218,480	$512,889	$648,944	$470,418	$607,278	$1,034,131	$758,083	$935,879	$1,005,932	$1,557,145	$7,749,178	774
Road	$13,285,821	$13,347,399	$13,296,771	$13,283,688	$13,307,164	$13,305,197	$13,289,653	$13,313,663	$13,322,231	$13,339,539	$133,091,127	13,309
Signals	$26,572	$26,695	$26,594	$26,567	$26,614	$26,610	$26,579	$26,627	$26,644	$26,679	$266,182	26
Transp. Plan	$1,926,444	$6,529,959	$2,758,859	$2,955,333	$2,858,193	$2,857,771	$2,854,432	$2,859,589	$2,912,669	$3,378,206	$31,891,454	3,189
Total	$22,542,088	$25,242,132	$22,168,704	$22,208,931	$23,538,655	$23,145,201	$22,489,863	$23,162,139	$24,282,933	$25,010,712	$233,791,358	23,379

Table 27: All Assets 10-Year Capital Needs ($)

The same 10-year needs displayed in a different format.

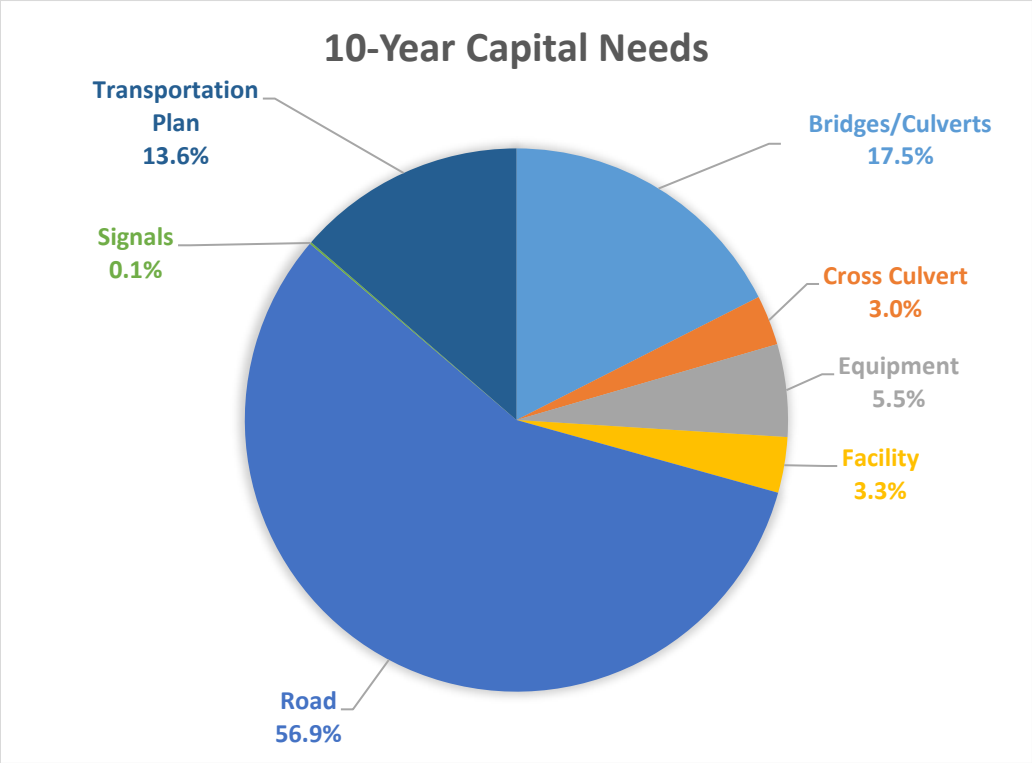

Figure 27: 10-Year Capital Needs

All Assets – Historic and Current Spending

The average 10-year needs are compared to past spending and current budgets. The 2019 budget values have not been approved at this time. For cross culverts, facilities and traffic signals the budget value is an assumption of what portion of the operating budget would be used for asset preservation.

A few qualifiers

- Historic values do not include the new Lang Pioneer Building
- Historic costs do not include Airport Road construction

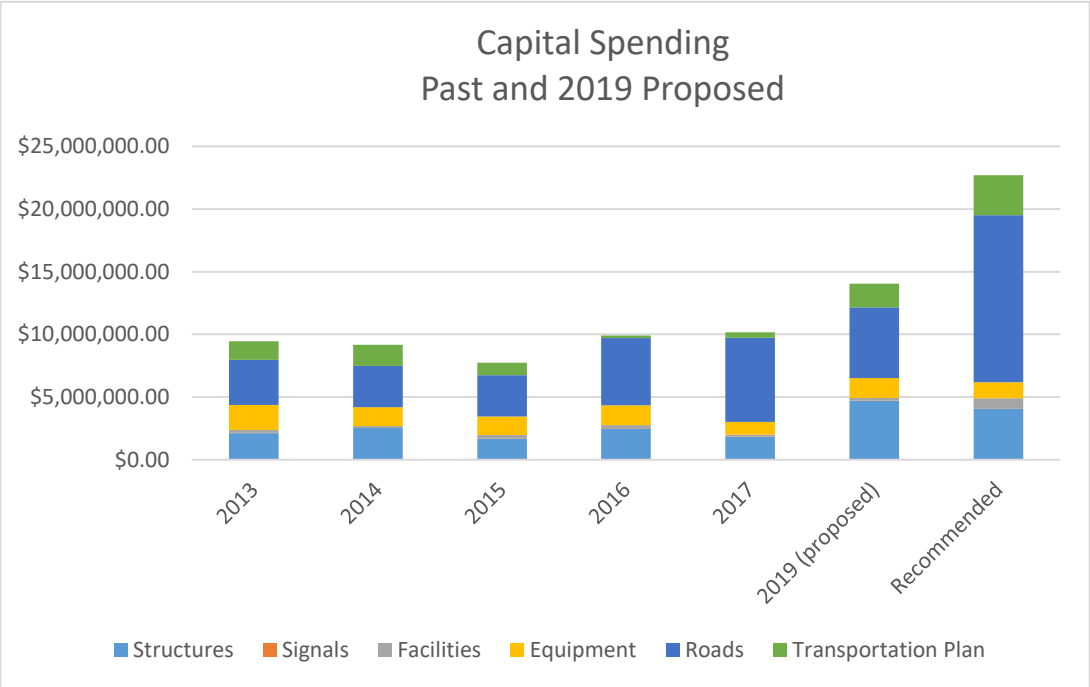

Figure 28: All Assets Spending – Historic, 2019 Proposed, Recommended

Financial Analysis

Having identified the 10-year capital needs the next step in the analysis is an assessment of the funding sources available to the County.

Funding Source Options

The various funding source options are listed below along with some general comments on their suitability and impact on the AMP.

Grants

Grants are the most difficult revenue source to review and project. Past grants are generally no indication of future grant levels. Historical reliance on grants is seen on the 9-year summary below. Grants are represented by the orange line. The fluctuation in grant levels is visible with a general trend in reduced reliance on grants.

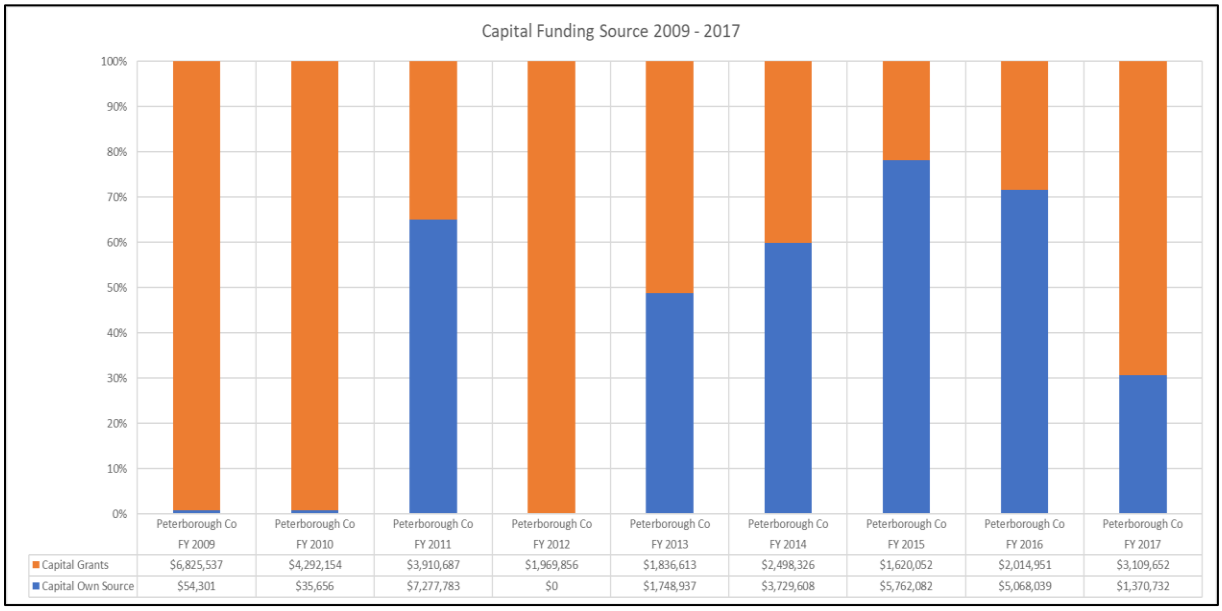

Figure 29: Historic Grants vs Own Source Funding

A list of Grant Sources the County has received in the past include the following:

- Federal Gas Tax
- Ontario Community Infrastructure Fund (OCIF)
- Ontario Small Town and Rural Development Infrastructure Program (OSTAR)
- Canada-Ontario Municipal Rural Infrastructure (COMRIF)
- Move Ontario
- Rural Infrastructure Investment Initiative (RIII)
- Municipal Road and Bridge Infrastructure
- Ontario Municipal Commuter Cycling Program

There have been many grant funding options in the past but they have been limited in recent years. It is difficult to predict future grant programs and should not be relied upon.

Own Source

Own source funding can be further broken down into these sub-types:

- Property Tax
- Rate Supported
- Reserves

Property Tax (Levy)

It is anticipated that most of the funding shortfall would be funded by property taxes. Consideration should be given to a segment of the tax bill specifically for infrastructure (i.e. Infrastructure Levy). The rationale being the public would be willing to pay more taxes as long as they know where those increases are going. This would need to be accompanied by clear and accurate reporting visible to the public.

Rate Supported

An example is a typical water service where users are charged a fee based on usage.

There are no rate supported services related to the assets under review.

Reserves

Reserves are complimentary to Property Taxes and not a new source of funding. Reserves help smooth out revenue generation and provide some certainty for capital planning. For example, rather than have a large tax levy increase in one year when a large piece of equipment is due for replacement, an amount is set aside each year in a reserve fund so that when the equipment needs replacing, the funding is available and the tax levy is relatively stable each year.

It is recommended that a reserve fund be created specifically for facilities.

Debt

The County has the option to fund certain work through borrowing. There are regulations in place to govern the level of debt a municipality can take on. From a practical perspective those debt thresholds are not expected to be the limiting factor in how much capital work is funded by debt. Of more importance are the criteria used to identify candidate projects for debt financing.

Suggested criteria for debt financing are:

- Clearly defined projects.
- Growth related: A significant proportion of the benefit is for future use.

It is assumed that all borrowing would be paid off within 10 years.

Capital Lease

A capital lease is a long-term contract that provides the County the use of an asset for the majority of its useful life, without the upfront costs of purchasing the asset.

Pros:

- Ongoing cost emulates amortization
- Reduced administration and maintenance.
- New asset when useful life nears expiry
- Works well for equipment, particularly vehicles and IT

Cons:

- Generally higher cost of ownership
- Asset is still a ‘capital’ asset on municipal books if meets the leased capital asset definition
- Additional accounting

While leasing remains an option for funding some assets such as facilities and equipment, it is not anticipated that the overall cost to the County would decrease.

Development Charges

The County recently completed a review of the Development Charge (DC) policies and rates. That information has been used in the development charge forecasts.

One aspect of the County’s DC policies is that up to 15% of road rehabilitation costs can be attributed to growth and funded from DC’s. Development Charges can also be used to fund the Transportation Master Plan projects. It is recommended that priority be given to using DC funds for the Transportation Master Plan projects.

Private Public Partnerships (3Ps)

With this funding source, the service is delivered by a private company in partnership with the County. An example is the privatization of Highway 407.

This option changes the financing profile of capital works but it does not take away the costs.

There are no available options for 3P funding for the County at this time.

Projected 10 Year Baseline Funding

In this section we provide the projected 10-Year baseline funding and the methodology used to develop it.

Methodology

There were two primary sources of information.

2019 Reserve Plans, Appendix A.

For some equipment reserves the capital funding was only a portion of the reserve and, some reserve plans factored in inflation while others did not. The steps taken were:

- Review the overall reserve plan and determine the portion of the opening balance associated with asset management
- Review the reserve plan activity and determine the percentage of contribution associated with asset management
- Establish the target reserve plan balance, for the purpose of asset management. In the case of Roads and Bridges the assumption was the current reserve balance was adequate and simply needs to be preserved. It was also assumed that there is no desire to maintain a reserve balance for DCs.
- Determine the inflation value used and back out inflation

Operating Spending

For cross culverts, signals and facilities some spending is part of operating budgets. For these assets a review of recent transactions was used to estimate if any could be attributed to capital.

A final adjustment was made for DCs to reflect higher than anticipated DC revenues in 2018.

Details of these calculations are in Appendix D. The results are provided in the following section:

Baseline Funding

Baseline funding for the 10-year period 2019 to 2028 is provided.

Baseline funding includes planned funding increases for Transportation and the PCCP equipment. The PCCP equipment increases are partly anticipating service expansion for which details are not available. The Transportation baseline includes planned increases in funding by 2% per year over 10 years.

Fund Source	Total
Reserve – Roads & Bridges	$126,691,082
Operating - Cross Culverts	$1,840,000
Operating - Signals	$100,000
Operating - Facilities	$2,164,160
Reserve Corp Equip	$521,838
Reserve Env Equip	$59,070
Reserve PCCP Equip	$8,317,307
Reserve EM Equip	$130,294
Reserve PW Equip	$7,146,869
Gas Tax	$17,227,596
DC - Roads	$14,700,000
OCIF	$5,209,748
Total	$184,107,965

Table 28: 10-Year Total Baseline Funding

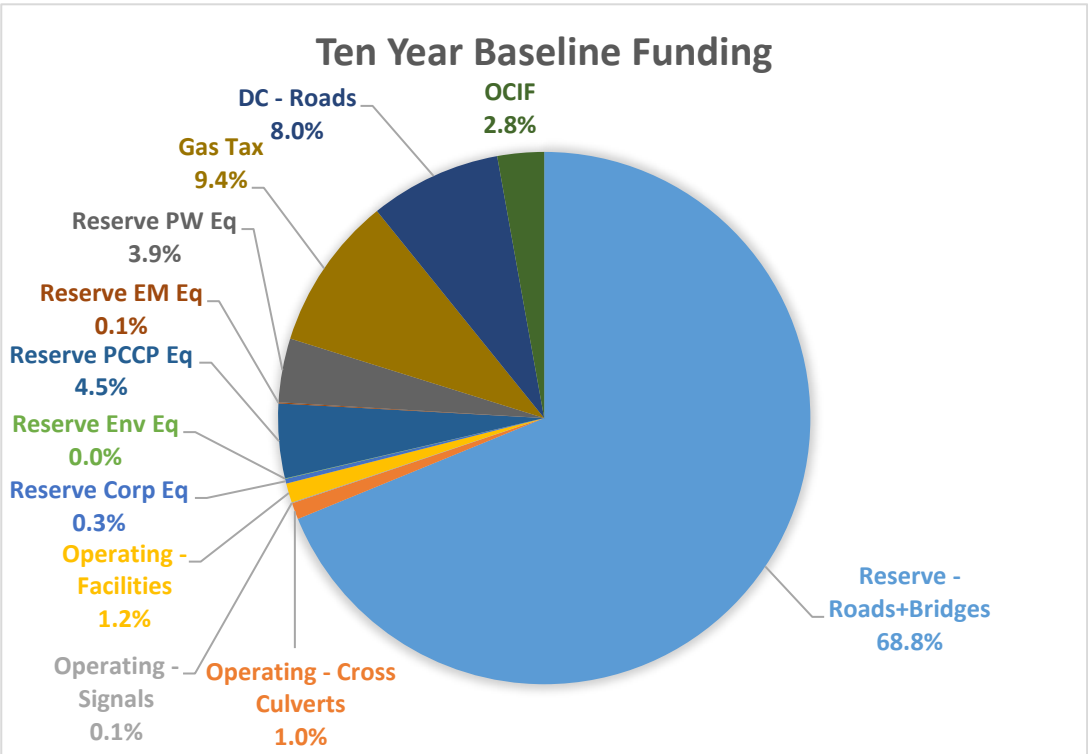

Figure 30: 10-Year Baseline Funding Chart

A breakdown by year is provided below. For now, we assume the current DC balance of $4.5 million will be spent in 2019. That could be deferred to 2020 to coincide with a large Transportation Plan spend. The equipment reserve funding has been allocated by year.

Fund Source	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Reserve – Roads Bridges	$8,680,828	$9,520,713	$10,377,395	$11,251,211	$12,142,503	$13,051,621	$13,978,922	$14,924,768	$15,889,531	$16,873,590	**$126,691,082**
Operating – Cross Culverts	$184,000	$184,000	$184,000	$184,000	$184,000	$184,000	$184,000	$184,000	$184,000	$184,000	**$1,840,000**
Operating - Signals	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	**$100,000**
Operating - Facilities	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	**$2,164,160**
Reserve Corp Equip	$52,184	$52,184	$52,184	$52,184	$52,184	$52,184	$52,184	$52,184	$52,184	$52,184	**$521,838**
Reserve Env Equip	$5,907	$5,907	$5,907	$5,907	$5,907	$5,907	$5,907	$5,907	$5,907	$5,907	**$59,070**
Reserve PCCP Equip	$831,731	$831,731	$831,731	$831,731	$831,731	$831,731	$831,731	$831,731	$831,731	$831,731	**$8,317,307**
Reserve EM Equip	$13,029	$13,029	$13,029	$13,029	$13,029	$13,029	$13,029	$13,029	$13,029	$13,029	**$130,294**
Reserve PW Equip	$714,687	$714,687	$714,687	$714,687	$714,687	$714,687	$714,687	$714,687	$714,687	$714,687	**$7,146,869**
Gas Tax	$1,692,246	$1,692,246	$1,769,166	$1,769,166	$1,846,087	$1,691,737	$1,691,737	$1,691,737	$1,691,737	$1,691,737	**$17,227,596**
DC - Roads	$6,000,000	$1,500,000	$1,200,000	$1,200,000	$800,000	$800,000	$800,000	$800,000	$800,000	$800,000	**$14,700,000**
OCIF	$497,150	$523,622	$523,622	$523,622	$523,622	$523,622	$523,622	$523,622	$523,622	$523,622	**$5,209,748**
	$18,898,178	$15,264,535	$15,898,137	$16,771,953	$17,340,166	$18,094,934	$19,022,235	$19,968,081	$20,932,844	$21,916,903	**$184,107,965**

Table 29: All Funding Sources 10-Year Baseline ($)

Funding Gap

In this section we merge the capital needs with baseline funding. To simplify the analysis, we assess the funding gap for equipment separately and then infrastructure.

Equipment

The calculation approach is:

Opening Reserve Balance
+ 10-year forecast reserve contributions
- 10-year equipment replacement costs
- Reserve Target Balance
= Projected Over (under) Reserve Balance

	Opening	+ Levy	- 10 Year Needs	= Forecast	- Reserve Target	= Over (Under)
Reserve Corp	$112,017	$446,544	($431,502)	$127,060	$36,723	$90,336
Reserve Env	$40,000	$59,070	($31,351)	$67,719	$40,000	$27,719
Reserve PCCP	$1,587,829	$10,456,495	($4,864,799)	$7,179,525	$3,727,017	$3,452,508
Reserve EM	$30,000	$160,294	($39,409)	$150,886	$60,000	$90,886
Reserve PW	$3,476,516	$6,621,129	($7,508,339)	$2,589,306	$2,950,776	($361,470)

Table 30: Equipment Reserve Forecast

Observations

- A potential surplus exists for PCCP but no action is recommended until details of potential service expansion are available
- All other reserves to be monitored and adjusted annually
- There is no funding gap for equipment

Infrastructure

For infrastructure the first step is to align the funding sources to the asset type to be funded. The following assumptions were made:

- DC are only used for the Transportation Master Plan projects
- Federal Gas Tax is only used for road preservation
- OCIF is only used for road preservation
- Funding requirements for Federal Gas Tax, OCIF and DC are limited to the baseline funding

The chart below shows the alignment of baseline funding to Asset Type. The blue columns indicate funding needed, the green columns are baseline funding and the orange row is the shortfall (Funding Gap).

			Needs by Fund Sources ($)						
Asset Type	**Possible Fund Source(s)**	**Need**	**Levy-R&B**	**Levy-CC**	**Levy-Signals**	**Levy-Fac**	**Gas Tax**	**OCIF**	**DC**
Structures	Levy, Gas Tax, OCIF	40,965,541	40,965,541						
Cross Culverts	Levy	6,952,476		6,952,476					
Facilities	Levy	7,749,178				7,749,178			
Roads	Levy, Gas Tax, OCIF, DC	133,091,127	110,653,783				17,227,596	5,209,748	
Signals	Levy, Gas Tax	266,182			266,182				
Trans. Plan	Levy, Gas Tax, OCIF, DC	31,891,454	17,191,454						14,700,000
	Total Needs	220,915,958	168,810,778	6,952,476	266,182	7,749,178	17,227,596	5,209,748	14,700,000
	Baseline Funding		126,691,082	1,840,000	100,000	2,164,160	17,227,596	5,209,748	14,700,000
Funding Gap ($)			42,119,696	5,112,476	166,182	5,585,018			

Table 31: All Assets Funding Gap ($)

A further simplification is provided below where all Transportation Preservation needs are grouped (Roads, Bridges, Signals, and Cross Culverts). All of these serve the same purpose and largely share the same revenue sources.

	Need	Funding	Shortfall
Transportation-Preservation	$181,275,326	$151,068,426	$30,206,900
Transportation Master Plan	$31,891,454	$14,700,000	$17,191,454
Subtotal - Transportation	$213,166,780	$165,768,426	$47,398,354
Facilities	$7,749,178	$2,164,160	$5,585,018
Total	$220,915,958	$167,932,586	$52,983,372

Table 32: Simplified 10-Year Funding Gap

For clarity, what this shows is a gap in funding over the next 10 years between Capital Needs and Baseline funding of $52,983,372

Closing the Funding Gap

The funding gap is significant and development of a specific plan to close that gap is beyond the scope of this document. However, information can be provided to assist in the decision-making process. In this section we review the various remedy options by which the funding gap could be closed should Council decide to do so. Examples are provided to demonstrate how closing the funding gap could look like.

Funding Gap Remedy Options

A final solution may involve one or more of these or other options yet to be identified.

Efficiencies, Cost Savings

As covered in the Needs section we've identified the lowest cost option to preserve existing levels of service. A few potential cost savings initiatives were identified but at this point they are not a possibility. One of these options included facility co-location.

Divesture

The services covered in this plan are essential. There are no options of significance to cease providing those services. There could be discussion around downloading asset responsibility to lower tiers but the expectation is lower tiers would expect some compensation for the new responsibility. There would not be any cost savings of significance, at least in the next 10 years.

Revenue Base Increase

The simplest manifestation is to have more people and companies move into the County. The same tax levy rate would generate more revenue. The concept is good and is pursued by the County on an ongoing basis. Some of the challenges with building a strategy around this are:

- Global trend to urbanization
- Uncertainty on growth
- Growth would also be accompanied with service expansion pressure. Current expansion is underfunded. DC revenues cover less than 50% of the Transportation Master Plan projects. A recent review of DC rates and policies was completed with no significant changes.

Spending Reduction

Regulation 588/17 allows for this option with the stipulation that:

- the associated risks need to be understood
- the reductions are targeted and an activity level 10-year plan is still required
- there is a risk mitigation plan

In light of this option a section is provided on risks. These describe the types of risks associated with not addressing the recommended funding. More specific information along with risk mitigation can be developed once the specific spending reductions are

identified. For example, if spending is reduced by $1 million we would assume the cuts would be made to the lowest risk activities. Risks would be lower and risk mitigation would be as needed. If spending were reduced by $20 million then activities with much higher risk would be cut and the risk mitigation plan would be more advanced.

Property Tax Increase

The last option is to raise taxes to generate more own-source revenue for the County.

Risks

Potential risks that may be associated with underfunding the 10-year needs are described below.

Facilities:

- Potential danger to health and safety of occupants
- Acceleration of component replacements (e.g. roofing and paving)
- Catastrophic repairs & associated premiums
- Interruption or loss of operations
- Loss of operating savings
- Increasing capital costs resulting from inflation
- Deterioration of facilities to the point of loss of use and/or requirement for replacement

Roads:

- Reduced Value = 110% Underspend. For every $1 of underspending approximately $1.10 in asset value is lost
- Higher risk of failure for bridges and culverts
- Inability to address safety concerns
- Higher travel times at certain locations

Closing the Funding Gap – Examples

In this section we provide some examples for what closing the funding gap could look like for demonstration purposes.

Assumptions

- In all scenarios we've assumed the goal is to fully fund the 10-year capital needs. With Year 1 being 2019 it is anticipated that the target spending for Roads will not be met. It is assumed that shortfall needs to be made up in future years.
- By 2029 (Year 11) the County wants to be at a steady state. Revenues are exactly equal to spending needs.
- Inflation is not factored in.
- A 1% Tax Levy increase in 2019 would equate to $411,708.00.
- Future assessment base is only increased by the increases built into each scenario. This does not affect the dollar change in levy. It only affects the levy change percent value.
- Tax Bill examples are based on a median 2018 assessment of $249,500 which works out to a median household County tax of $834.38/year.
- Debt borrowing rate is 3.3% over a 10-year period.
- The only funding source that is changeable is property tax levy.

Most of the analysis is based on closing the gap between the baseline funding and needs. The baseline funding includes proposed increases for roads therefore we have provided information on the total levy change. This should illustrate how each year will feel to a taxpayer.

There are six scenarios, two for facilities and four for roads. One of the scenarios utilizes debt. All scenarios result in tax levy increases. Details for each scenario are provided following a summary of all scenarios.

The scenarios largely differ in the speed by which the funding gap is closed.

All values in dollars.

Example 1A – Facilities Immediate

In this example, the facilities funding gap is closed in 2020. For the first 4 years the funding would exceed needs. That excess would be put into a facilities reserve fund and would help offset projected higher costs in years 2024+.

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Needs	$218,480	$512,889	$648,944	$470,418	$607,278	$1,034,131	$758,083	$935,879	$1,005,932	$1,557,145	$7,749,178
Baseline Funding	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$216,416	$2,164,160
Shortfall	$2,064	$296,473	$432,528	$254,002	$390,862	$817,715	$541,667	$719,463	$789,516	$1,340,729	$5,585,018
Levy Adjustment		$617,562									
Cumulative Levy Adj.		$617,562	$617,562	$617,562	$617,562	$617,562	$617,562	$617,562	$617,562	$617,562	$5,558,058
Levy increase %		1.50%									1.50%
Adjusted Funding	$216,416	$833,978	$833,978	$833,978	$833,978	$833,978	$833,978	$833,978	$833,978	$833,978	$7,722,218
Shortfall (Surplus)	$2,064	($321,089)	($185,034)	($363,560)	($226,700)	$200,153	($75,895)	$101,901	$171,954	$723,167	$26,960

Table 33: Facilities Funding Gap Example 1A Immediate

Example 1B – Facilities Incremental

In this example, levy increases are phased in over four years starting in 2020 and ending in 2023.

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Needs	218,480	512,889	648,944	470,418	607,278	1,034,131	758,083	935,879	1,005,932	1,557,145	7,749,178
Baseline Funding	216,416	216,416	216,416	216,416	216,416	216,416	216,416	216,416	216,416	216,416	2,164,160
Shortfall	2,064	296,473	432,528	254,002	390,862	817,715	541,667	719,463	789,516	1,340,729	5,585,018
Levy Adjustment		205,854	206,883	207,918	104,479						
Cumulative Levy Adj.		205,854	412,737	620,655	725,134	725,134	725,134	725,134	725,134	725,134	5,590,048
Levy increase %		0.50%	0.50%	0.50%	0.25%						1.75%
Adjusted Funding	216,416	422,270	629,153	837,071	941,550	941,550	941,550	941,550	941,550	941,550	7,754,208
Shortfall (Surplus)	2,064	90,619	19,791	(366,653)	(334,272)	92,581	(183,467)	(5,671)	64,383	615,595	(5,030)

Table 34: Facilities Funding Gap Example 1B Incremental ($)

Example 2A – Transportation Immediate

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Preservation	18,825,089	17,023,171	18,055,072	17,450,781	18,486,313	17,965,701	17,527,452	18,473,118	18,781,374	18,687,257	181,275,326
Transportation Plan	1,926,444	6,529,959	2,758,859	2,955,333	2,858,193	2,857,771	2,854,432	2,859,589	$2,912,669	$3,378,206	31,891,454
Subtotal - Needs	20,751,533	23,553,129	20,813,931	20,406,114	21,344,506	20,823,471	20,381,884	21,332,707	21,694,043	22,065,463	213,166,780
Baseline Funding	12,564,224	17,930,581	14,064,183	14,937,999	15,506,212	16,260,980	17,188,281	18,134,127	19,098,890	20,082,949	165,768,426
Shortfall (Surplus)	8,187,309	5,622,548	6,749,748	5,468,115	5,838,294	4,562,491	3,193,603	3,198,580	2,595,153	1,982,514	47,398,354
Starting Levy Base	41,170,800	41,170,800	46,436,545	46,436,545	46,436,545	46,436,545	46,436,545	46,436,545	46,436,545	46,436,545	
Yearly Levy Adjustment		5,265,745									
Cumulative Levy Adjustment		5,265,745	5,265,745	5,265,745	5,265,745	5,265,745	5,265,745	5,265,745	5,265,745	5,265,745	47,391,708
Levy increase %		12.79%									12.79%
Adjusted Funding	12,564,224	23,196,326	19,329,928	20,203,744	20,771,957	21,526,725	22,454,026	23,399,872	24,364,635	25,348,694	213,160,134
Adjusted Shortfall (Surplus)	8,187,309	356,803	1,484,003	202,369	572,548	(703,254)	(2,072,143)	(2,067,166)	(2,670,593)	(3,283,231)	**6,646**

Table 35: Transportation Funding Gap Example 2A – Immediate ($)

Example 2B – Transportation Incremental

In this example, the levy is increased by 2.24% in years 2020 to 2028. This is in addition to any baseline increases.

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Transportation Preservation	$18,825,089	$17,023,171	$18,055,072	$17,450,781	$18,486,313	$17,965,701	$17,527,452	$18,473,118	$18,781,374	$18,687,257	$181,275,326
Transportation Plan	$1,926,444	$6,529,959	$2,758,859	$2,955,333	$2,858,193	$2,857,771	$2,854,432	$2,859,589	$2,912,669	$3,378,206	$31,891,454
Subtotal - Transportation Needs	$20,751,533	$23,553,129	$20,813,931	$20,406,114	$21,344,506	$20,823,471	$20,381,884	$21,332,707	$21,694,043	$22,065,463	$213,166,780
Baseline Funding	$12,564,224	$17,930,581	$14,064,183	$14,937,999	$15,506,212	$16,260,980	$17,188,281	$18,134,127	$19,098,890	$20,082,949	$165,768,426
Shortfall (Surplus)	$8,187,309	$5,622,548	$6,749,748	$5,468,115	$5,838,294	$4,562,491	$3,193,603	$3,198,580	$2,595,153	$1,982,514	$47,398,354
Yearly Levy Adjustment		$940,639	$980,522	$1,021,676	$1,064,135	$1,107,936	$1,153,118	$1,199,720	$1,247,780	$1,297,341	
Cumulative Levy Adjustment		$940,639	$1,921,161	$2,942,837	$4,006,972	$5,114,908	$6,268,027	$7,467,747	$8,715,527	$10,012,868	$47,390,686
Levy increase - year over year		2.24%	2.24%	2.24%	2.24%	2.24%	2.24%	2.24%	2.24%	2.24%	20.16%
Adjusted Funding	$12,564,224	$18,871,220	$15,985,344	$17,880,836	$19,513,184	$21,375,888	$23,456,308	$25,601,874	$27,814,417	$30,095,817	$213,159,112
Adjusted Shortfall (Surplus)	$8,187,309	$4,681,909	$4,828,587	$2,525,278	$1,831,322	($552,417)	($3,074,424)	($4,269,167)	($6,120,374)	($8,030,354)	**$7,668**

Table 36: Transportation Funding Gap Example 2B – Incremental ($)

Example 2C – Transportation Incremental 2

In this example, the baseline and additional levy increases are combined into 5 increases in 2020 to 2024

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Transportation Preservation	$18,825,089	$17,023,171	$18,055,072	$17,450,781	$18,486,313	$17,965,701	$17,527,452	$18,473,118	$18,781,374	$18,687,257	$181,275,326
Transportation Plan	$1,926,444	$6,529,959	$2,758,859	$2,955,333	$2,858,193	$2,857,771	$2,854,432	$2,859,589	$2,912,669	$3,378,206	$31,891,454
Subtotal - Transportation Needs	$20,751,533	$23,553,129	$20,813,931	$20,406,114	$21,344,506	$20,823,471	$20,381,884	$21,332,707	$21,694,043	$22,065,463	$213,166,780
Baseline Funding	$12,564,224	$17,930,581	$14,064,183	$14,937,999	$15,506,212	$16,260,980	$16,260,980	$16,260,980	$16,260,980	$16,260,980	$156,308,099
Shortfall (Surplus)	$8,187,309	$5,622,548	$6,749,748	$5,468,115	$5,838,294	$4,562,491	$4,120,904	$5,071,727	$5,433,063	$5,804,483	$56,858,681
Yearly Levy Adjustment		$1,478,147	$1,559,741	$1,644,799	$1,733,455	$1,825,846					
Cumulative Levy Adjustment		$1,478,147	$3,037,888	$4,682,687	$6,416,142	$8,241,988	$8,241,988	$8,241,988	$8,241,988	$8,241,988	$56,824,801
Levy increase - year over year		3.52%	3.52%	3.52%	3.52%	3.52%					17.60%
Adjusted Funding	$12,564,224	$19,408,728	$17,102,071	$19,620,686	$21,922,354	$24,502,968	$24,502,968	$24,502,968	$24,502,968	$24,502,968	$213,132,900
Adjusted Shortfall (Surplus)	$8,187,309	$4,144,402	$3,711,860	$785,427	($577,848)	($3,679,496)	($4,121,084)	($3,170,261)	($2,808,925)	($2,437,504)	**$33,880**

Table 37: Transportation Funding Gap Example 2C - Incremental 2 ($)

Example 2D – Transportation with Debt

In this example, the unfunded Transportation Plan is funded through debt. Each year is assumed to be at 3.3% and paid back over 10 years.

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Preservation	18,825,089	17,023,171	18,055,072	17,450,781	18,486,313	17,965,701	17,527,452	18,473,118	18,781,374	18,687,257	181,275,326
Transportation Plan	1,926,444	6,529,959	2,758,859	2,955,333	2,858,193	2,857,771	2,854,432	2,859,589	2,912,669	3,378,206	31,891,454
Subtotal - Needs	20,751,533	23,553,129	20,813,931	20,406,114	21,344,506	20,823,471	20,381,884	21,332,707	21,694,043	22,065,463	213,166,780
Baseline Funding	12,564,224	17,930,581	14,064,183	14,937,999	15,506,212	16,260,980	17,188,281	18,134,127	19,098,890	20,082,949	165,768,426
Shortfall (Surplus)	8,187,309	5,622,548	6,749,748	5,468,115	5,838,294	4,562,491	3,193,603	3,198,580	2,595,153	1,982,514	47,398,354
Borrowing, for TP	426,444	529,959	1,558,859	1,755,333	2,058,193	2,057,771	2,054,432	2,059,589	2,112,669	2,578,206	17,191,454
Interest		(13,522)	(29,101)	(75,740)	(124,033)	(176,635)	(222,880)	(262,465)	(295,450)	(323,112)	(1,522,938)
Principle repayment		(83,317)	(83,317)	(219,909)	(377,942)	(567,264)	(762,893)	(964,790)	(1,173,894)	(1,394,559)	(5,627,885)
Current Debt	426,444	873,086	2,348,628	3,884,052	5,564,304	7,054,810	8,346,349	9,441,148	10,379,923	11,563,570	
Yearly Levy Adjustment		4,150,017									
Cumulative Levy Adjustment		4,150,017	4,150,017	4,150,017	4,150,017	4,150,017	4,150,017	4,150,017	4,150,017	4,150,017	37,350,150
Levy increase %		10.08%									10.08%
Adj Funding	12,990,668	22,513,717	19,660,641	20,547,700	21,212,447	21,724,869	22,406,956	23,116,477	23,892,232	25,093,500	203,118,576
Shortfall (Surplus)	7,760,865	1,039,412	1,153,290	(141,586)	132,058	(901,397)	(2,025,073)	(1,783,771)	(2,198,189)	(3,028,037)	**7,573**

Table 38: Transportation Funding Gap Example 2D – With Debt ($)

Example 2E – Immediate 2

In this example, all levy increases, baseline and additional are implemented in 2020.

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	2029
Preservation	18,825,089	17,023,171	18,055,072	17,450,781	18,486,313	17,965,701	17,527,452	18,473,118	18,781,374	18,687,257	181,275,326	18,687,257
Trans. Plan	1,926,444	6,529,959	2,758,859	2,955,333	2,858,193	2,857,771	2,854,432	2,859,589	2,912,669	3,378,206	31,891,454	3,378,206
Subtotal - Needs	20,751,533	23,553,129	20,813,931	20,406,114	21,344,506	20,823,471	20,381,884	21,332,707	21,694,043	22,065,463	213,166,780	22,065,463
Baseline Levy	8,874,828	9,714,713	10,571,395	11,445,211	12,336,503	13,245,621	14,172,922	15,118,768	16,083,531	17,067,590		18,566,435
Baseline Other	3,689,396	3,715,868	3,492,788	3,492,788	3,169,709	3,015,359	3,015,359	3,015,359	3,015,359	3,015,359		3,015,359
Base Funding	12,564,224	17,930,581	14,064,183	14,937,999	15,506,212	16,260,980	17,188,281	18,134,127	19,098,890	20,082,949	165,768,426	21,581,794
Shortfall (Surplus)	8,187,309	5,622,548	6,749,748	5,468,115	5,838,294	4,562,491	3,193,603	3,198,580	2,595,153	1,982,514	47,398,354	483,669
Extra Levy Adj.		8,851,722										483,669
Extra Levy Adj		8,851,722	8,851,722	8,851,722	8,851,722	8,851,722	8,851,722	8,851,722	8,851,722	8,851,722	79,665,498	
Levy Extra % incr		21.50%									21.50%	0.94%
Baseline Levy Decrease			(856,682)	(1,730,498)	(2,621,790)	(3,530,908)	(4,458,209)	(5,404,055)	(6,368,818)	(7,352,877)	(32,323,837)	
Levy Change		8,851,722	7,995,040	7,121,224	6,229,932	5,320,814	4,393,513	3,447,667	2,482,904	1,498,845	47,341,661	
Total Trans Levy-Base+Extra	8,874,828	18,566,435	18,566,435	18,566,435	18,566,435	18,566,435	18,566,435	18,566,435	18,566,435	18,566,435		19,050,104
Levy Change - year over year	823,416	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	95,458,623	483,669
Total Levy % - year over year	2.00%	23.54%										0.94%
Levy vs 2018	823,416	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023	10,515,023		10,998,692
Levy % vs 2018	2.00%	25.54%	25.54%	25.54%	25.54%	25.54%	25.54%	25.54%	25.54%	25.54%		26.71%
Adj. Funding	12,564,224	26,782,303	22,059,223	22,059,223	21,736,144	21,581,794	21,581,794	21,581,794	21,581,794	21,581,794	213,110,087	22,065,463
Shortfall_(Surplus)	8,187,309	(3,229,174)	(1,245,292)	(1,653,109)	(391,638)	(758,323)	(1,199,910)	(249,087)	112,249	483,669	56,693	
Res Tax Bill	851.07	1,047.48	1,047.48	1,047.48	1,047.48	1,047.48	1,047.48	1,047.48	1,047.48	1,047.48		1,057.28
Tax Bill Yr. Inc	16.69	196.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		9.80
Tax Bill vs 2018	16.69	213.10	213.10	213.10	213.10	213.10	213.10	213.10	213.10	213.10		222.90
Tax Bill vs 2018	2.00%	25.54%	25.54%	25.54%	25.54%	25.54%	25.54%	25.54%	25.54%	25.54%		26.71%

Table 39: Transportation Funding Gap Example 2E – Immediate 2 ($)

Summary of all Examples

To assist making comparisons the facility and transportation examples have been combined and summarized.

Example	Description	Sum of annual levy increases	2029 Median Tax vs 2018
A: Immediate	• Baseline 2% levy increase 2019 – 2028 • Additional 2020 levy increase of 14.3%	34.3%	219
B: Incremental	• Baseline 2% levy increase 2019 – 2028 • Additional 2.24% increase in 2020-2028	41.91%	219
C: Incremental 2	• Baseline and additional levy increased consolidated into 5.52% increases for 5 years	31.10%	219
D: With Debt	• Baseline 2% levy increase 2019 – 2028 • Additional 2020 levy increase of 11.58% • Borrowing of 17M to cover transportation plan	31.58%	245
E: Immediate 2	• 2020 levy increase of 25.54% • Baseline 2% levy 2019 only	25.54%	219

Table 40: Summary of Examples to Close the Funding Gap

A graph of the cumulative levy increases is provided below.

Comments and Observations

- Debt is the higher cost option due to interest costs.
- The longer it takes to implement levy increases the more of an adjustment is needed to reach a steady funding level.

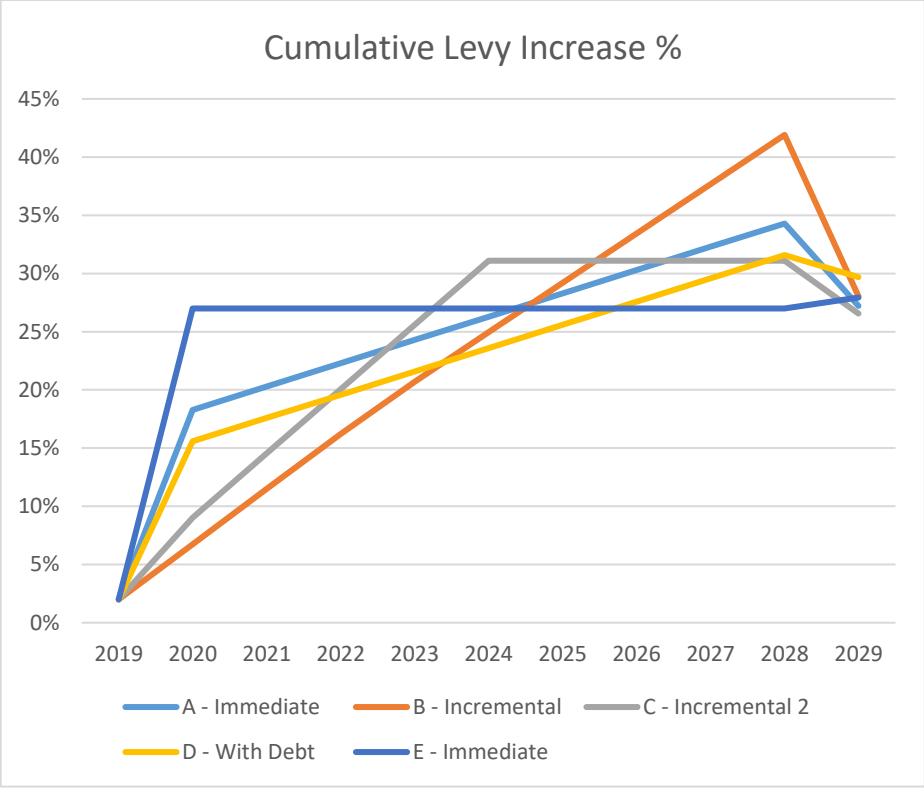

Figure 31: Graph of Cumulative Levy Increases

Implementation

Following finalization of the Asset Management Plan, several actions will need to be taken to ensure efficient execution of the plan. Many of these steps are required by Regulation 588/17.

Processes and Procedures

Asset Management is part of every County staff's job duties. It does not end with the preparation of this document. The County is developing detailed processes and procedures to ensure the Asset Management Plan is continuously updated and improved. These include identification of:

- What action needs to be taken?
- Who is responsible?
- When does this need to be completed?

Key Performance Indicators (KPI's)

These are key to establishing accountability and for ongoing improvement. Plans are developed with expected outcomes. It is imperative to report on the outcomes and with that information improve future asset management planning.

The KPI's will assist in two main ways:

- Internal: Assist staff to make adjustments to continually improve on the AMP.
- External: Inform ratepayers and other external stakeholders on progress of the AMP. This will be particularly important if the County makes any levy adjustments and if those are implemented as an infrastructure levy. The public will expect to know what the infrastructure levy was used for and if it was used wisely.

Communication

It will be important to communicate the AMP and update as new information is made available.

The County is currently developing a website to communicate the AMP and to solicit public input. The website could be used to communicate construction plans, KPI's and the County's asset management strategy.

Summary of Consultants Recommendations for Future Consideration

Throughout this document certain recommendations have been made. A summary is provided below. They are not listed in any specific order.

Topic	Description
Accept 10-Year Needs	Accept the analysis and recommendations in this document for the 10-year capital needs
Tax Rate Comparison	Investigate County taxes as they compare to similar counties. In the event taxes are raised to cover infrastructure costs it would be an important message if County tax levels are low by comparison
Funding Gap Strategy	The County needs to make decisions on how to close the funding gap. The regulations provide for the option to not fund all of the capital needs. In that scenario the County still needs to identify the risks and establish a risk mitigation plan.
Facility Revenue Fund	A Reserve Fund for Facilities should be established
Facility co-location	Investigate options for facility co-location with lower tier municipalities
Cross Culvert, Signal Funding	Include funding for cross culverts and signals into the Road and Bridge reserve plan
Infrastructure Levy	If a tax increase is implemented for infrastructure • make that a specific line on the tax bill • improved cost tracking • new and/or improved metrics, visible to the public
Cost Tracking	Implement accounting practices to more easily account for all capital expenditures
Reserve Plan Commitment	Make commitments to reserve plans.
County-wide Asset Management	Develop processes by which all municipalities within the County can share AMPs, standards and practices. Reasons are: • Reduced costs to prepare AMPs • Consistency • Knowledge sharing

Table 41: Summary of Recommendations

Prepared by:

County of Peterborough Staff
Munford Solutions Inc.
Ron Awde Architect
WSCS Consulting Inc

The preparation of this project was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the

authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them."

Appendix A – Ontario Regulation 588/17

The regulation is provided for convenience. This copy was made January 31, 2019.

Français

ONTARIO REGULATION 588/17

made under the

INFRASTRUCTURE FOR JOBS AND PROSPERITY ACT, 2015

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ASSET MANAGEMENT PLANNING FOR MUNICIPAL INFRASTRUCTURE

CONTENTS

INTERPRETATION AND APPLICATION

Definitions

1. (1) In this Regulation,

"asset category" means a category of municipal infrastructure assets that is,

(a) an aggregate of assets described in each of clauses (a) to (e) of the definition of core municipal infrastructure asset, or

(b) composed of any other aggregate of municipal infrastructure assets that provide the same type of service; ("catégorie de biens")

"core municipal infrastructure asset" means any municipal infrastructure asset that is a,

(a) water asset that relates to the collection, production, treatment, storage, supply or distribution of water,

(b) wastewater asset that relates to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater,

(c) stormwater management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater,

(d) road, or

(e) bridge or culvert; ("bien d'infrastructure municipale essentiel")

"ecological functions" has the same meaning as in Ontario Regulation 140/02 (Oak Ridges Moraine Conservation Plan) made under the *Oak Ridges Moraine Conservation Act, 2001*; ("fonctions écologiques")

"green infrastructure asset" means an infrastructure asset consisting of natural or human-made elements that provide ecological and hydrological functions and processes and includes natural heritage features and systems, parklands, stormwater

stormwater management systems, street trees, urban forests, natural channels, permeable surfaces and green roofs; ("bien d'infrastructure verte")

"hydrological functions" has the same meaning as in Ontario Regulation 140/02; ("fonctions hydrologiques")

"joint municipal water board" means a joint board established in accordance with a transfer order made under the *Municipal Water and Sewage Transfer Act, 1997*; ("conseil mixte de gestion municipale des eaux")

"lifecycle activities" means activities undertaken with respect to a municipal infrastructure asset over its service life, including constructing, maintaining, renewing, operating and decommissioning, and all engineering and design work associated with those activities; ("activités relatives au cycle de vie")

"municipal infrastructure asset" means an infrastructure asset, including a green infrastructure asset, directly owned by a municipality or included on the consolidated financial statements of a municipality, but does not include an infrastructure asset that is managed by a joint municipal water board; ("bien d'infrastructure municipale")

"municipality" has the same meaning as in the *Municipal Act, 2001*; ("municipalité")

"operating costs" means the aggregate of costs, including energy costs, of operating a municipal infrastructure asset over its service life; ("frais d'exploitation")

"service life" means the total period during which a municipal infrastructure asset is in use or is available to be used; ("durée de vie")

"significant operating costs" means, where the operating costs with respect to all municipal infrastructure assets within an asset category are in excess of a threshold amount set by the municipality, the total amount of those operating costs. ("frais d'exploitation importants")

(2) In Tables 1 and 2,

"connection-days" means the number of properties connected to a municipal system that are affected by a service issue, multiplied by the number of days on which those properties are affected by the service issue. ("jours-branchements")

(3) In Table 4,

"arterial roads" means Class 1 and Class 2 highways as determined under the Table to section 1 of Ontario Regulation 239/02 (Minimum Maintenance Standards for Municipal Highways) made under the *Municipal Act, 2001*; ("artères")

"collector roads" means Class 3 and Class 4 highways as determined under the Table to section 1 of Ontario Regulation 239/02; ("routes collectrices")

"lane-kilometre" means a kilometre-long segment of roadway that is a single lane in width; ("kilomètre de voie")

"local roads" means Class 5 and Class 6 highways as determined under the Table to section 1 of Ontario Regulation 239/02. ("routes locales")

(4) In Table 5,

"Ontario Structure Inspection Manual" means the Ontario Structure Inspection Manual (OSIM), published by the Ministry of Transportation and dated October 2000 (revised November 2003 and April 2008) and available on a Government of Ontario website; ("manuel d'inspection des structures de l'Ontario")

"structural culvert" has the meaning set out for "culvert (structural)" in the Ontario Structure Inspection Manual. ("ponceau structurel")

Application

2. For the purposes of section 6 of the Act, every municipality is prescribed as a broader public sector entity to which that section applies.

STRATEGIC ASSET MANAGEMENT POLICIES

Strategic asset management policy

3. (1) Every municipality shall prepare a strategic asset management policy that includes the following:

1. Any of the municipality's goals, policies or plans that are supported by its asset management plan.
2. The process by which the asset management plan is to be considered in the development of the municipality's budget or of any long-term financial plans of the municipality that take into account municipal infrastructure assets.
3. The municipality's approach to continuous improvement and adoption of appropriate practices regarding asset management planning.
4. The principles to be followed by the municipality in its asset management planning, which must include the principles set out in section 3 of the Act.

5.The municipality's commitment to consider, as part of its asset management planning,

i. the actions that may be required to address the vulnerabilities that may be caused by climate change to the municipality's infrastructure assets, in respect of such matters as,

A. operations, such as increased maintenance schedules,

B. levels of service, and

C. lifecycle management,

ii. the anticipated costs that could arise from the vulnerabilities described in subparagraph i,

iii. adaptation opportunities that may be undertaken to manage the vulnerabilities described in subparagraph i,

iv. mitigation approaches to climate change, such as greenhouse gas emission reduction goals and targets, and

v. disaster planning and contingency funding.

6. A process to ensure that the municipality's asset management planning is aligned with any of the following financial plans:

i. Financial plans related to the municipality's water assets including any financial plans prepared under the *Safe Drinking Water Act, 2002*.

ii. Financial plans related to the municipality's wastewater assets.

7. A process to ensure that the municipality's asset management planning is aligned with Ontario's land-use planning framework, including any relevant policy statements issued under subsection 3 (1) of the *Planning Act*, any provincial plans as defined in the *Planning Act* and the municipality's official plan.

8. An explanation of the capitalization thresholds used to determine which assets are to be included in the municipality's asset management plan and how the thresholds compare to those in the municipality's tangible capital asset policy, if it has one.

9. The municipality's commitment to coordinate planning for asset management, where municipal infrastructure assets connect or are interrelated with those of its upper-tier municipality, neighbouring municipalities or jointly-owned municipal bodies.

10. The persons responsible for the municipality's asset management planning, including the executive lead.

11. An explanation of the municipal council's involvement in the municipality's asset management planning.

12. The municipality's commitment to provide opportunities for municipal residents and other interested parties to provide input into the municipality's asset management planning.

(2) For the purposes of this section,

"capitalization threshold" is the value of a municipal infrastructure asset at or above which a municipality will capitalize the value of it and below which it will expense the value of it. ("seuil de capitalisation")

Update of asset management policy

4. Every municipality shall prepare its first strategic asset management policy by July 1, 2019 and shall review and, if necessary, update it at least every five years.

ASSET MANAGEMENT PLANS

Asset management plans, current levels of service

5. (1) Every municipality shall prepare an asset management plan in respect of its core municipal infrastructure assets by July 1, 2021, and in respect of all of its other municipal infrastructure assets by July 1, 2023.

(2) A municipality's asset management plan must include the following:

1. For each asset category, the current levels of service being provided, determined in accordance with the following qualitative descriptions and technical metrics and 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:

i. With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.

ii. With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.

at most two calendar years prior to the year in which all information required under this section is included in the asset management plan.

3. For each asset category,
    i. a summary of the assets in the category,
    ii. the replacement cost of the assets in the category,
    iii. the average age of the assets in the category, determined by assessing the average age of the components of the assets,
    iv. the information available on the condition of the assets in the category, and
    v. 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.
4. For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:
    i. The full lifecycle of the assets.
    ii. The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.
    iii. The risks associated with the options referred to in subparagraph ii.
    iv. The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.
5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, the following:
    i. A description of assumptions regarding future changes in population or economic activity.
    ii. How the assumptions referred to in subparagraph i relate to the information required by paragraph 4.
6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census, the following:
    i. With respect to municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are set out in Schedule 3 or 7 to the 2017 Growth Plan, those forecasts.
    ii. With respect to lower-tier municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are not set out in Schedule 7 to the 2017 Growth Plan, the portion of the forecasts allocated to the lower-tier municipality in the official plan of the upper-tier municipality of which it is a part.
    iii. With respect to upper-tier municipalities or single-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the municipality that are set out in its official plan.
    iv. With respect to lower-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the lower-tier municipality that are set out in the official plan of the upper-tier municipality of which it is a part.
    v. If, with respect to any municipality referred to in subparagraph iii or iv, the population and employment forecasts for the municipality cannot be determined as set out in those subparagraphs, a description of assumptions regarding future changes in population or economic activity.
    vi. For each of the 10 years following the year for which the current levels of service under paragraph 1 are determined, the estimated capital expenditures and significant operating costs related to the lifecycle activities required to maintain the current levels of service in order to accommodate projected increases in demand caused by growth, including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets.

(3) Every asset management plan must indicate how all background information and reports upon which the information required by paragraph 3 of subsection (2) is based will be made available to the public.

(4) In this section,

"2017 Growth Plan" means the Growth Plan for the Greater Golden Horseshoe, 2017 that was approved under subsection 7 (6) of the *Places to Grow Act, 2005* on May 16, 2017 and came into effect on July 1, 2017; ("Plan de croissance de 2017")

"Greater Golden Horseshoe growth plan area" means the area designated by section 2 of Ontario Regulation 416/05 (Growth Plan Areas) made under the *Places to Grow Act, 2005*. ("zone de croissance planifiée de la région élargie du Golden Horseshoe")

Asset management plans, proposed levels of service

6. (1) Subject to subsection (2), by July 1, 2024, every asset management plan prepared under section 5 must include the following additional information:

1. For each asset category, the levels of service that the municipality proposes to provide for each of the 10 years following the year in which all information required under section 5 and this section is included in the asset management plan, determined in accordance with the following qualitative descriptions and technical metrics:
    i. With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.
    ii. With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.
2. An explanation of why the proposed levels of service under paragraph 1 are appropriate for the municipality, based on an assessment of the following:
    i. The options for the proposed levels of service and the risks associated with those options to the long term sustainability of the municipality.
    ii. How the proposed levels of service differ from the current levels of service set out under paragraph 1 of subsection 5 (2).
    iii. Whether the proposed levels of service are achievable.
    iv. The municipality's ability to afford the proposed levels of service.
3. The proposed performance of each asset category for each year of the 10-year period referred to in paragraph 1, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency.
4. A 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 referred to in paragraph 1:
    i. An identification of the lifecycle activities that would need to be undertaken to provide the proposed levels of service described in paragraph 1, based on an assessment of the following:
        A. The full lifecycle of the assets.
        B. The options for which lifecycle activities could potentially be undertaken to achieve the proposed levels of service.
        C. The risks associated with the options referred to in sub-subparagraph B.
        D. The lifecycle activities referred to in sub-subparagraph B that can be undertaken for the lowest cost to achieve the proposed levels of service.
    ii. An estimate of the annual costs for each of the 10 years of undertaking the lifecycle activities identified in subparagraph i, separated into capital expenditures and significant operating costs.
    iii. 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.
    iv. If, based on the funding projected to be available, the municipality identifies a funding shortfall for the lifecycle activities identified in subparagraph i,
        A. an identification of the lifecycle activities, whether set out in subparagraph i or otherwise, that the municipality will undertake, and
        B. if applicable, an explanation of how the municipality will manage the risks associated with not undertaking any of the lifecycle activities identified in subparagraph i.
5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, a discussion of how the assumptions regarding future changes in population and economic activity, set out in subparagraph 5 i of subsection 5 (2), informed the preparation of the lifecycle management and financial strategy referred to in paragraph 4 of this subsection.
6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census,

i. the estimated capital expenditures and significant operating costs to achieve the proposed levels of service as described in paragraph 1 in order to accommodate projected increases in demand caused by population and employment growth, as set out in the forecasts or assumptions referred to in paragraph 6 of subsection 5 (2), including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets,

ii. the funding projected to be available, by source, as a result of increased population and economic activity, and

iii. an overview of the risks associated with implementation of the asset management plan and any actions that would be proposed in response to those risks.

7. An explanation of any other key assumptions underlying the plan that have not previously been explained.

(2) With respect to an asset management plan prepared under section 5 on or before July 1, 2021, if the additional information required under this section is not included before July 1, 2023, the municipality shall, before including the additional information, update the current levels of service set out under paragraph 1 of subsection 5 (2) and the current performance measures set out under paragraph 2 of subsection 5 (2) based on data from the two most recent calendar years.

Update of asset management plans

7. (1) Every municipality shall review and update its asset management plan at least five years after the year in which the plan is completed under section 6 and at least every five years thereafter.

(2) The updated asset management plan must comply with the requirements set out under paragraphs 1, 2 and 3 and subparagraphs 5 i and 6 i, ii, iii, iv and v of subsection 5 (2), subsection 5 (3) and paragraphs 1 to 7 of subsection 6 (1).

Endorsement and approval required

8. Every asset management plan prepared under section 5 or 6, or updated under section 7, must be,

(a) endorsed by the executive lead of the municipality; and

(b) approved by a resolution passed by the municipal council.

Annual review of asset management planning progress

9. (1) Every municipal council shall conduct an annual review of its asset management progress on or before July 1 in each year, starting the year after the municipality's asset management plan is completed under section 6.

(2) The annual review must address,

(a) the municipality's progress in implementing its asset management plan;

(b) any factors impeding the municipality's ability to implement its asset management plan; and

(c) a strategy to address the factors described in clause (b).

Public availability

10. Every municipality shall post its current strategic asset management policy and asset management plan on a website that is available to the public, and shall provide a copy of the policy and plan to any person who requests it.

TABLE 1

WATER ASSETS

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. 2. Percentage of properties where fire flow is available.
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. 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.

TABLE 2

WASTEWATER ASSETS

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.	Percentage of properties connected to the municipal wastewater system.
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.	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.

TABLE 3

STORMWATER MANAGEMENT ASSETS

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. 2. Percentage of the municipal stormwater management system resilient to a 5-year storm.

TABLE 4

ROADS

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-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality.
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).

TABLE 5

BRIDGES AND CULVERTS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Percentage of bridges in the municipality with loading or dimensional restrictions.
Quality	1. Description or images of the condition of bridges and how this would affect use of the bridges. 2. Description or images of the condition of culverts and how this would affect use of the culverts.	1. For bridges in the municipality, the average bridge condition index value. 2. For structural culverts in the municipality, the average bridge condition index value.

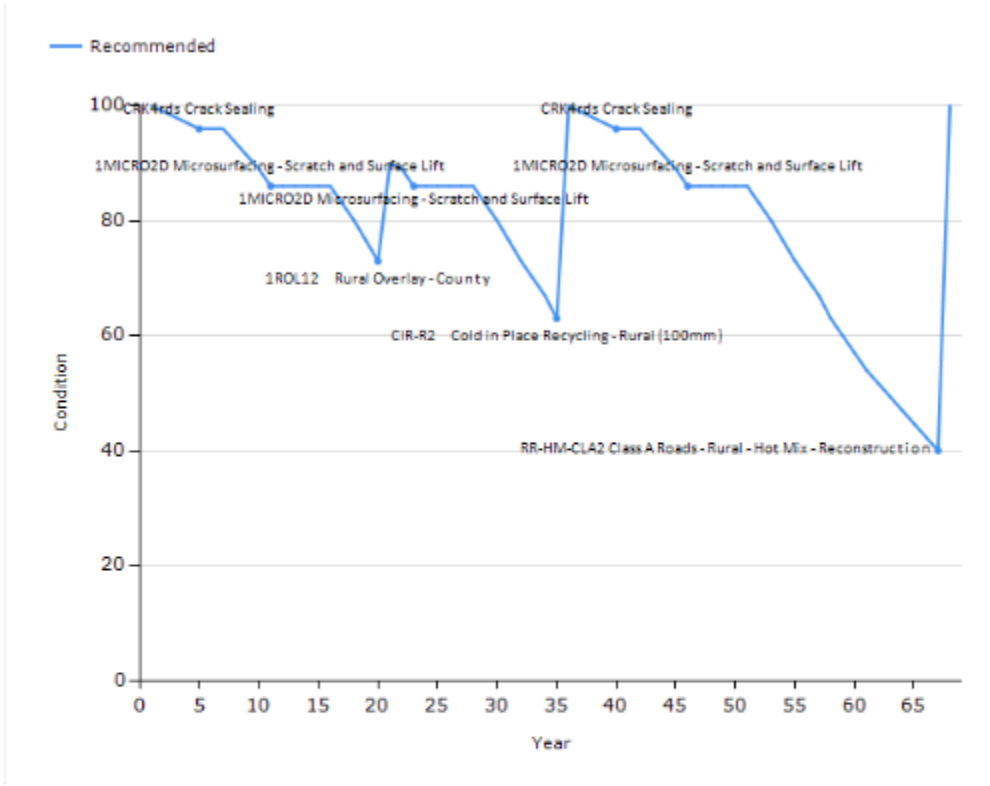
Appendix B – State of the Infrastructure Details

Additional information not suitable for inclusion in the body of the report is provided.

Roads - Asset Classes

Asset Classes are the drive of the capital planning analysis

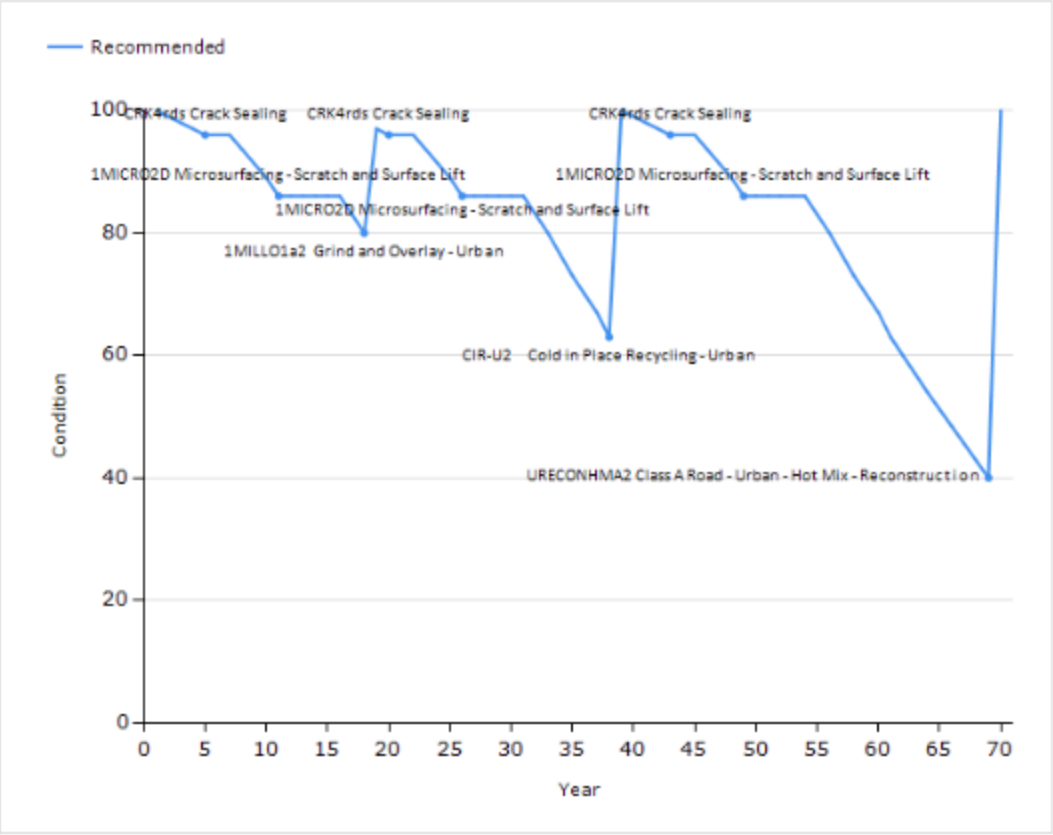
CLA_R_HCB **Class A Road - Rural - Hot Mix**



Recommended

Yr	Condition	Improvement	Description	Affect
5	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
11	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
20	73.00	1ROL12	Rural Overlay - County	Increase by 17
23	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
35	63.00	CIR-R2	Cold in Place Recycling - Rural (100mm)	Restore To 100
40	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
46	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
67	40.00	RR-HM-CLA2	Class A Roads - Rural - Hot Mix - Reconstruction	Restore To 100

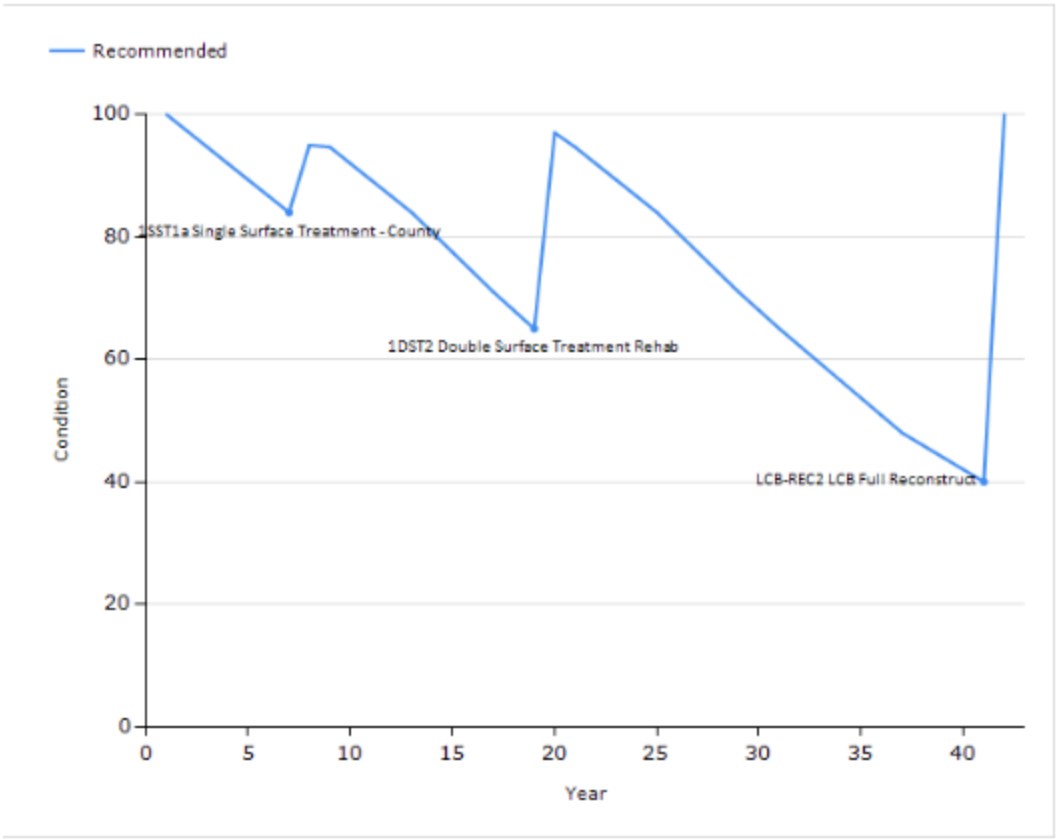
CLA_U_HCB Class A Road - Urban - Hot Mix



Recommended

Yr	Condition	Improvement	Description	Affect
5	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
11	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
18	80.00	1MILLO1a2	Grind and Overlay - Urban	Increase by 17
20	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
26	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
38	63.00	CIR-U2	Cold in Place Recycling - Urban	Restore To 100
43	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
49	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
69	40.00	URECONHMA2	Class A Road - Urban - Hot Mix - Reconstruction	Restore To 100

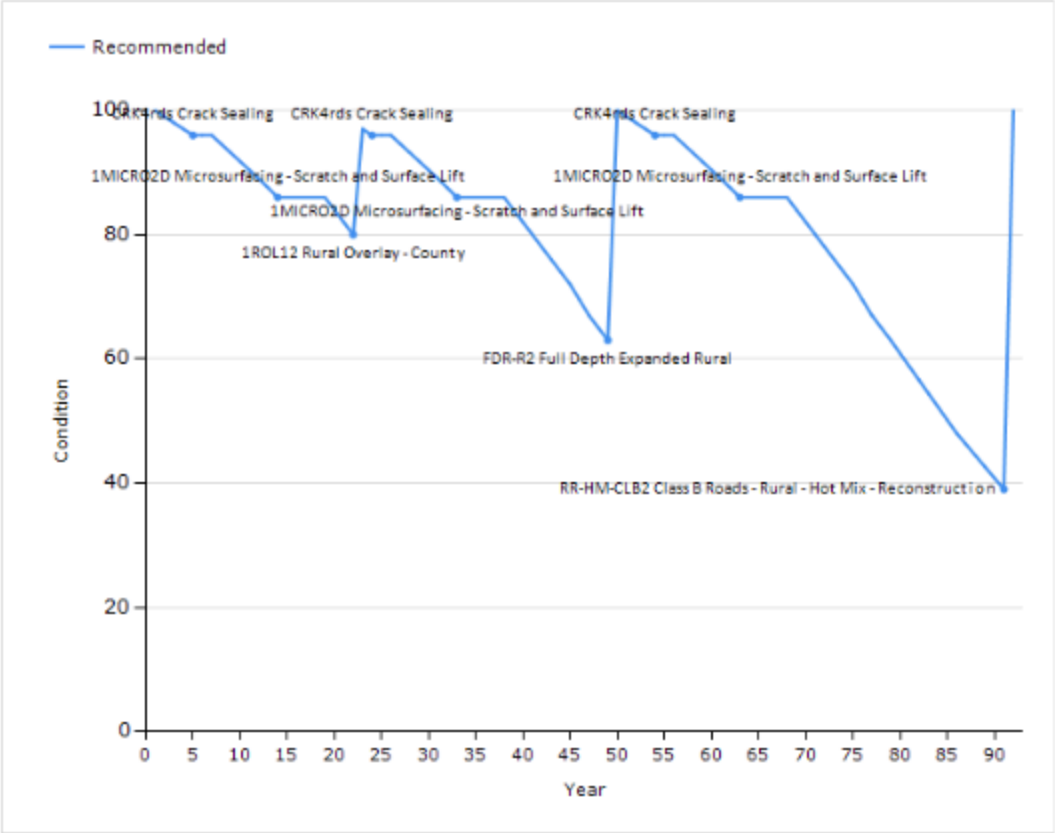
CLB_LCB Class B Road - Surface Treat



Recommended

Yr	Condition	Improvement	Description	Affect
7	84.00	1SST1a	Single Surface Treatment - County	Restore To 95
19	65.00	1DST2	Double Surface Treatment Rehab	Restore To 97
41	40.00	LCB-REC2	LCB Full Reconstruct	Restore To 100

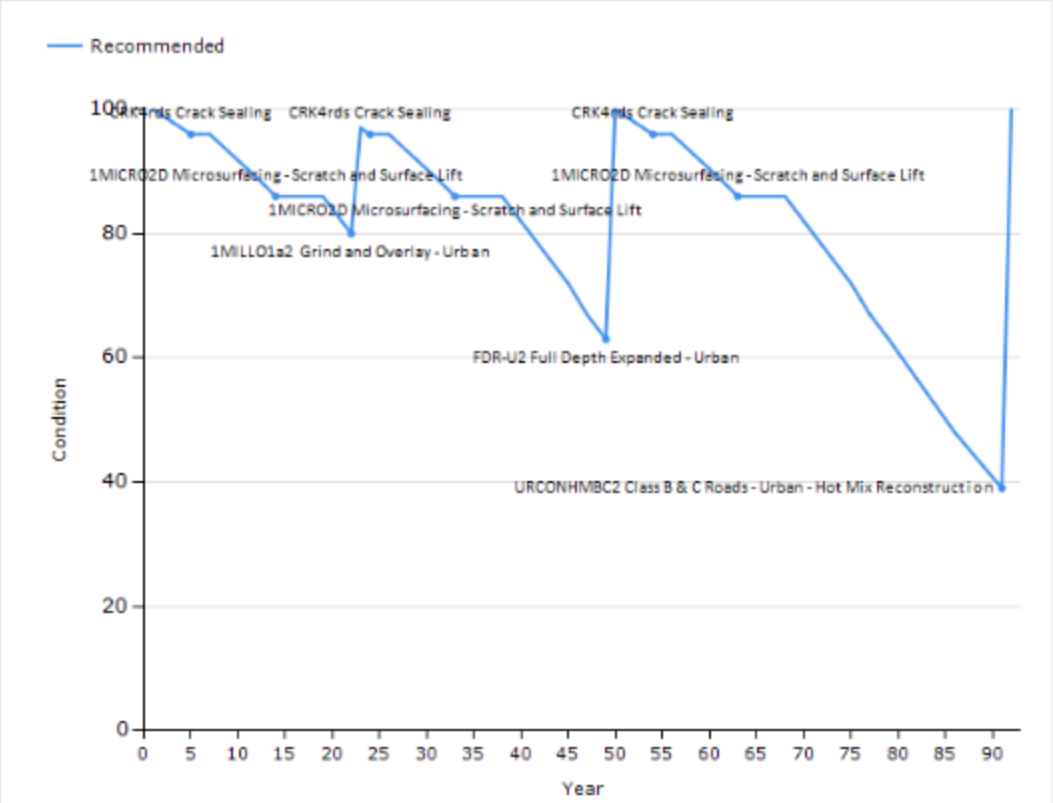
CLB_R_HCB Class B Road - Rural - Hot Mix



Recommended

Yr	Condition	Improvement	Description	Affect
5	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
14	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
22	80.00	1ROL12	Rural Overlay - County	Increase by 17
24	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
33	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
49	63.00	FDR-R2	Full Depth Expanded Rural	Restore To 100
54	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
63	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
91	39.00	RR-HM-CLB2	Class B Roads - Rural - Hot Mix - Reconstruction	Restore To 100

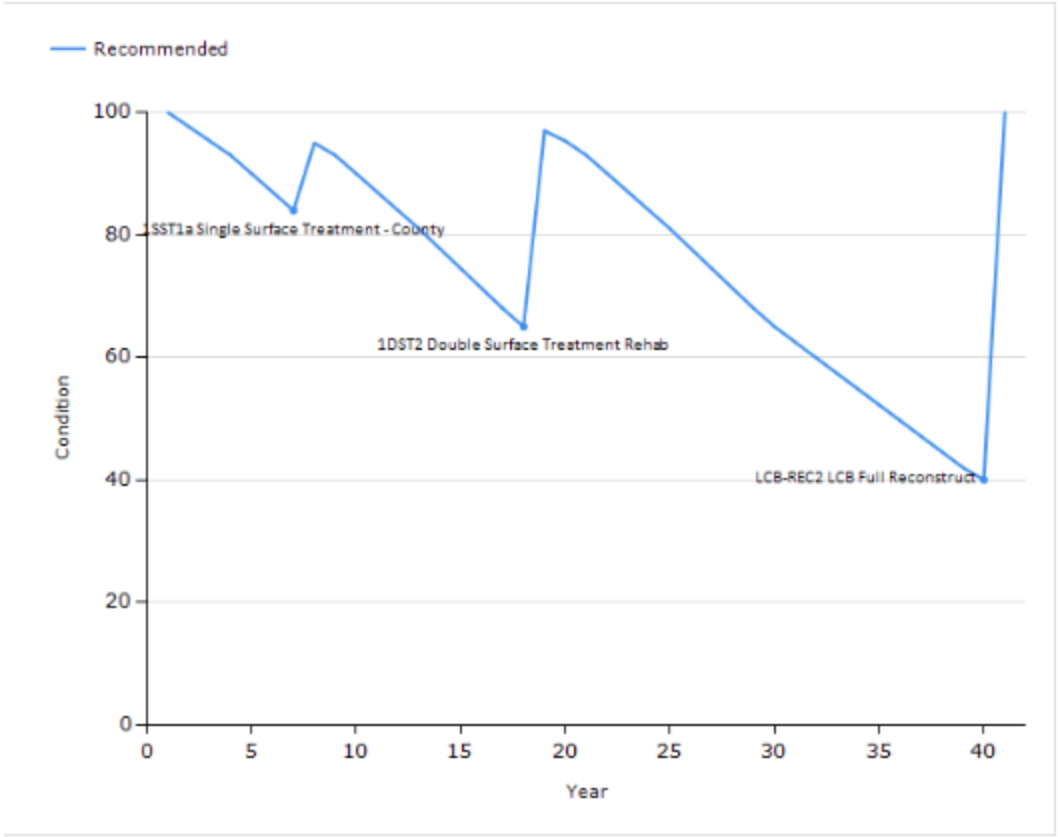
CLB_U_HCB Class B Road - Urban - Hot Mix



Recommended

Yr	Condition	Improvement	Description	Affect
5	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
14	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
22	80.00	1MILLO1a2	Grind and Overlay - Urban	Increase by 17
24	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
33	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
49	63.00	FDR-U2	Full Depth Expanded - Urban	Restore To 100
54	96.00	CRK4rds	Crack Sealing	Hold for 2 yrs
63	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
91	39.00	URCONHMBC2	Class B & C Roads - Urban - Hot Mix Reconstruction	Restore To 100

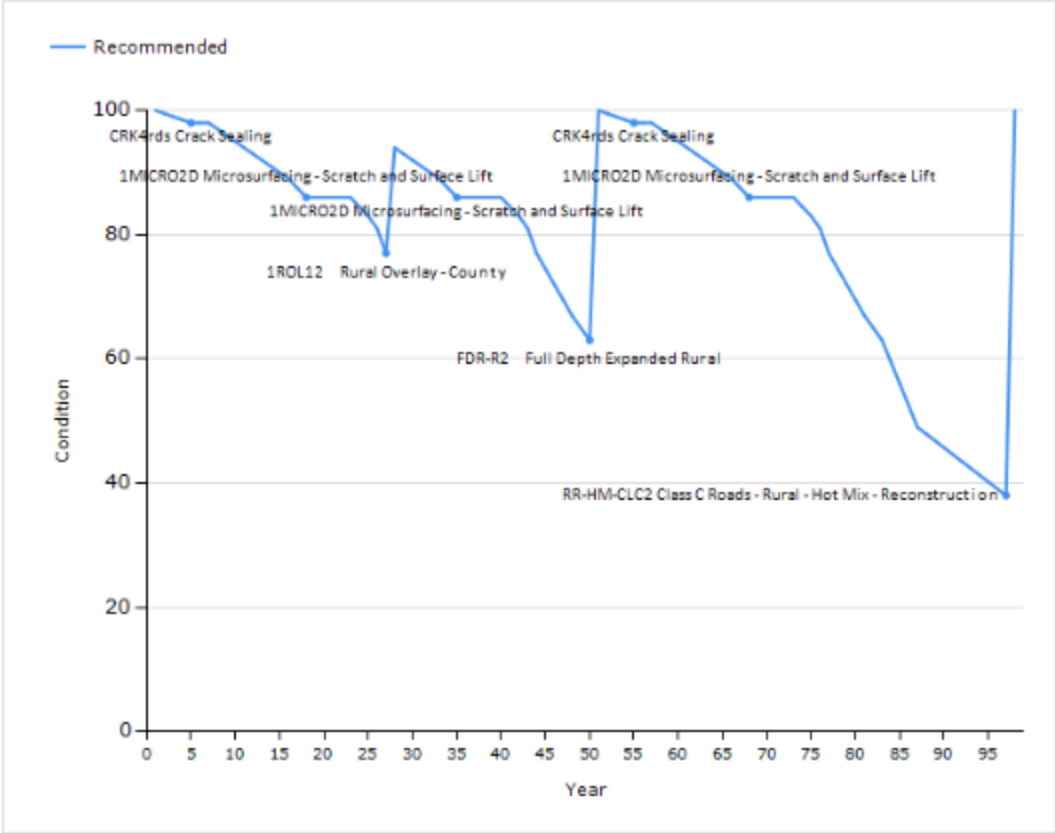
CLC_LCB Class C Road - Surface Treat



Recommended

Yr	Condition	Improvement	Description	Affect
7	84.00	1SST1a	Single Surface Treatment - County	Restore To 95
18	65.00	1DST2	Double Surface Treatment Rehab	Restore To 97
40	40.00	LCB-REC2	LCB Full Reconstruct	Restore To 100

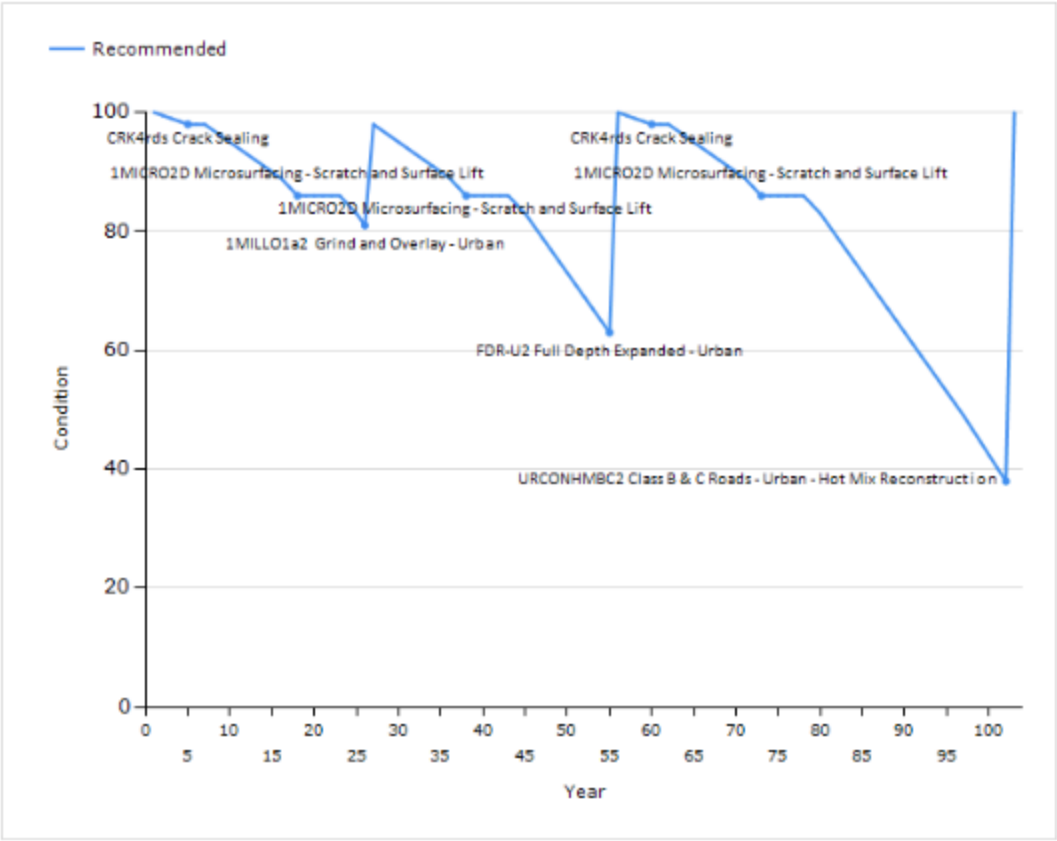
CLC_R_HCB Class C Road - Rural - Hot MIx



Recommended

Yr	Condition	Improvement	Description	Affect
5	98.00	CRK4rds	Crack Sealing	Hold for 2 yrs
18	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
27	77.00	1ROL12	Rural Overlay - County	Increase by 17
35	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
50	63.00	FDR-R2	Full Depth Expanded Rural	Restore To 100
55	98.00	CRK4rds	Crack Sealing	Hold for 2 yrs
68	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
97	38.00	RR-HM-CLC2	Class C Roads - Rural - Hot Mix - Reconstruction	Restore To 100

CLC_U_HCB **Class C Road - Urban - Hot Mix**



Recommended

Yr	Condition	Improvement	Description	Affect
5	98.00	CRK4rds	Crack Sealing	Hold for 2 yrs
18	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
26	81.00	1MILLO1a2	Grind and Overlay - Urban	Increase by 17
38	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
55	63.00	FDR-U2	Full Depth Expanded - Urban	Restore To 100
60	98.00	CRK4rds	Crack Sealing	Hold for 2 yrs
73	86.00	1MICRO2D	Microsurfacing - Scratch and Surface Lift	Hold for 5 yrs
102	38.00	URCONHMBC2	Class B & C Roads - Urban - Hot Mix Reconstruction	Restore To 100

Figure 32: Road Asset Class Recommended Lifecycle Activities

Roads – Benchmark Costs

Asset Class	Improvement ID	Description	Lanes	Record Count	Benchmark Cost
CLA_R_HCB	1MICRO2D	Microsurfacing - Scratch and Surface Lift	2	22	$ 55,815.40
CLA_R_HCB	1MICRO2D	Microsurfacing - Scratch and Surface Lift	4	2	$ 104,334.40
CLA_R_HCB	1ROL12	Rural Overlay - County	2	22	$ 291,683.80
CLA_R_HCB	1ROL12	Rural Overlay - County	4	2	$ 459,484.50
CLA_R_HCB	CIR-R2	Cold in Place Recycling - Rural (100mm)	2	22	$ 490,208.30
CLA_R_HCB	CIR-R2	Cold in Place Recycling - Rural (100mm)	4	2	$ 871,333.80
CLA_R_HCB	CRK4rds	Crack Sealing	2	22	$ 2,530.00
CLA_R_HCB	CRK4rds	Crack Sealing	4	2	$ 5,060.00
CLA_R_HCB	RR-HM-CLA2	Class A Roads - Rural - Hot Mix - Reconstruction	2	22	$ 1,175,019.30
CLA_R_HCB	RR-HM-CLA2	Class A Roads - Rural - Hot Mix - Reconstruction	4	2	$ 1,849,276.50
CLA_U_HCB	1MICRO2D	Microsurfacing - Scratch and Surface Lift	2	6	$ 69,266.10
CLA_U_HCB	1MICRO2D	Microsurfacing - Scratch and Surface Lift	4	1	$ 104,332.80
CLA_U_HCB	1MILLO1a2	Grind and Overlay - Urban	2	6	$ 395,089.80
CLA_U_HCB	1MILLO1a2	Grind and Overlay - Urban	4	1	$ 527,707.10
CLA_U_HCB	CIR-U2	Cold in Place Recycling - Urban	2	6	$ 699,388.90
CLA_U_HCB	CIR-U2	Cold in Place Recycling - Urban	4	1	$ 933,006.80
CLA_U_HCB	CRK4rds	Crack Sealing	2	6	$ 2,530.00
CLA_U_HCB	CRK4rds	Crack Sealing	4	1	$ 5,060.00
CLA_U_HCB	URECONHMA2	Class A Road - Urban - Hot Mix - Reconstruction	2	6	$ 1,799,731.80
CLA_U_HCB	URECONHMA2	Class A Road - Urban - Hot Mix - Reconstruction	4	1	$ 2,302,855.50
CLB_LCB	1DST2	Double Surface Treatment Rehab	2	30	$ 135,550.20
CLB_LCB	1SST1a	Single Surface Treatment - County	2	30	$ 34,279.60
CLB_LCB	LCB-REC2	LCB Full Reconstruct	2	30	$ 561,557.60
CLB_R_HCB	1MICRO2D	Microsurfacing - Scratch and Surface Lift	2	84	$ 49,899.30
CLB_R_HCB	1ROL12	Rural Overlay - County	2	84	$ 251,556.50
CLB_R_HCB	CRK4rds	Crack Sealing	2	84	$ 2,454.70
CLB_R_HCB	FDR-R2	Full Depth Expanded Rural	2	84	$ 417,093.50
CLB_R_HCB	RR-HM-CLB2	Class B Roads - Rural - Hot Mix - Reconstruction	2	84	$ 910,856.80
CLB_U_HCB	1MICRO2D	Microsurfacing - Scratch and Surface Lift	2	21	$ 58,453.00
CLB_U_HCB	1MILLO1a2	Grind and Overlay - Urban	2	21	$ 341,624.90
CLB_U_HCB	CRK4rds	Crack Sealing	2	21	$ 2,530.00
CLB_U_HCB	FDR-U2	Full Depth Expanded - Urban	2	21	$ 548,572.10
CLB_U_HCB	URCONHMBC2	Class B & C Roads - Urban - Hot Mix Reconstruction	2	21	$ 1,739,067.50
CLC_LCB	1DST2	Double Surface Treatment Rehab	2	31	$ 120,793.40
CLC_LCB	1SST1a	Single Surface Treatment - County	2	31	$ 30,882.70

Asset Class	Improvement ID	Description	Lanes	Record Count	Benchmark Cost
CLC_LCB	LCB-REC2	LCB Full Reconstruct	2	31	$ 510,960.10
CLC_R_HCB	1MICRO2D	Microsurfacing - Scratch and Surface Lift	2	22	$ 45,762.40
CLC_R_HCB	1ROL12	Rural Overlay - County	2	22	$ 215,095.50
CLC_R_HCB	CRK4rds	Crack Sealing	2	22	$ 2,357.50
CLC_R_HCB	FDR-R2	Full Depth Expanded Rural	2	22	$ 383,631.90
CLC_R_HCB	RR-HM-CLC2	Class C Roads - Rural - Hot Mix - Reconstruction	2	22	$ 797,913.10
CLC_U_HCB	1MICRO2D	Microsurfacing - Scratch and Surface Lift	2	6	$ 51,046.70
CLC_U_HCB	1MILLO1a2	Grind and Overlay - Urban	2	6	$ 300,615.80
CLC_U_HCB	CRK4rds	Crack Sealing	2	6	$ 2,319.20
CLC_U_HCB	FDR-U2	Full Depth Expanded - Urban	2	6	$ 494,058.40
CLC_U_HCB	URCONHMBC2	Class B & C Roads - Urban - Hot Mix Reconstruction	2	6	$ 1,766,682.60

Table 42: Road Benchmark Costs

PCI Rating Descriptions

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

Figure 33: PCI Condition Descriptions

Facilities – 10-Year Needs by Facility

Descrip.	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Apsley PCCP Base	17,100	5,380	0	750	900	5,600	0	1,150	12,800	10,000	53,680
Armour Road PCCP/PW Headquarter	3,400	75,750	137,300	55,700	14,040	35,990	42,000	4,700	19,460	356,000	744,340
Buckhorn Roads Depot Office	11,600	47,400	22,300	10,000	20,500	4,000	5,200	720	18,100	160,600	300,420
Buckhorn Sand Dome	1,900	0	0	1,700	10,000	0	0	0	0	77,500	91,100
Buckhorn Depot Salt Shed 1	0	4,000	0	6,000	1,300	17,100	11,400	0	8,300	3,500	51,600
Buckhorn Depot Salt Shed 2	1,300	4,000	0	0	5,300	16,000	11,200	0	13,000	3,500	54,300
Caretakers House Garage	0	0	0	0	50,200	0	0	0	0	0	50,200
Caretakers House Main	3,100	7,600	0	20,100	5,200	7,500	6,590	11,920	29,500	10,020	101,530
Courthouse	74,200	223,900	338,960	224,700	344,900	494,800	407,200	645,300	529,760	366,100	3,649,820
County Road 6 Sand Dome	0	17,970	15,000	1,650	6,800	18,000	0	4,800	1,650	6,000	71,870
County Road 6 Salt Shed	0	0	7,000	1,251	0	850	850	0	1,251	3,390	14,593
Douro Roads Depot Main	15,700	17,100	24,700	16,400	15,900	32,000	13,100	39,500	43,300	94,800	312,500
Douro Sand Dome North	5,900	0	0	2,500	8,150	0	0	0	2,500	73,810	92,860
Douro Sand Dome South	6,800	0	0	1,800	5,770	0	85,160	0	1,700	4,500	105,730
Douro Storage Garage	1,500	0	5,000	0	0	211,170	42,800	5,000	35,800	14,000	315,270
Douro Depot Salt Shed	2,500	25,300	17,300	600	7,000	2,500	1,300	3,700	0	0	60,200
Havelock Roads Depot Main	10,500	7,000	20,250	68,300	2,600	5,900	9,500	29,200	17,000	34,200	204,450
Havelock Sand Dome	3,900	0	0	1,800	5,800	0	7,900	70,900	1,700	4,500	96,500
Havelock Salt Shed	2,500	1,200	1,300	8,770	37,500	0	0	3,010	0	9,600	63,880
LPV Admin Building	12,000	17,260	24,900	29,550	17,600	132,800	16,320	35,900	17,000	67,690	371,020

Descrip.	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
LPV Agricultural Heritage Building	5,000	10,100	0	0	1,200	0	0	0	1,800	42,260	60,360
LPV David Mitchell Workshop	2,000	3,200	0	0	3,600	0	0	0	3,800	4,180	16,780
LPV Weaver Building	8,400	660	0	0	0	1,430	640	0	7,500	7,450	26,080
LPV Washroom	3,000	0	3,400	0	0	0	0	15,950	17,900	0	40,250
Millbrook Roads Depot Main	3,000	5,900	3,650	7,200	3,500	5,760	77,900	23,400	59,400	36,480	226,190
Millbrook Depot Sand Dome	4,490	4,000	2,600	0	3,000	0	0	2,300	0	84,300	100,690
Millbrook Storage Garage 1	0	0	0	0	0	0	0	0	0	3,600	3,600
Millbrook Storage Garage 2	0	1,800	5,700	0	0	0	0	0	0	0	7,500
Millbrook Salt Shed	0	4,000	1,300	0	19,500	510	2,500	10,000	1,300	0	39,110
Selwyn Quonset Shelter	0	0	0	0	0	15,000	0	0	0	800	15,800
Selwyn Roads Depot	4,600	7,420	0	1,600	0	3,500	0	770	21,180	21,180	60,250
Selwyn Depot Sand Dome	4,390	4,700	2,500	0	3,000	0	0	2,300	79,500	8,350	104,740
Selwyn Depot Salt Shed	5,000	3,900	1,300	0	0	0	0	3,310	36,400	9,200	59,110
	213,780	499,540	634,460	460,371	593,260	1,010,410	741,560	913,830	981,601	1,517,510	7,566,322

Table 43: Facility 10-Year Plan by Summarized by Facility ($)

Facilities – Facility Condition Index (FCI) Values by Facility

FCI values for specific facilities are provided below. FCI values in years 2020+ show how the FCI values would deteriorate if no capital activities are undertaken. It should be noted that the proposed 10-year capital plan for facilities pushes most of the higher cost work to future years allowing for proper design and evaluation

Facility	2019	2020	2021	2022	2023	2024
Apsley PCCP Base	95%	95%	94%	94%	94%	91%
Armour Road PCCP/PW Headquarters	96%	96%	96%	95%	95%	95%
Armour Road Storage Garage	100%	100%	100%	100%	100%	100%
Buckhorn Roads Depot Office	89%	86%	86%	85%	85%	83%
Buckhorn Sand Dome	99%	95%	95%	95%	95%	95%
Buckhorn Depot Salt Shed 1	94%	93%	82%	74%	74%	69%
Buckhorn Depot Salt Shed 1	97%	93%	83%	76%	76%	68%
Caretakers House Garage	100%	0%	0%	0%	0%	0%
Caretakers House Main	95%	94%	92%	91%	89%	84%
Courthouse	92%	89%	84%	80%	74%	70%
CR06-SD	88%	85%	79%	79%	77%	76%
CR06-SS	95%	95%	94%	94%	94%	93%
Douro Roads Depot Main	94%	93%	91%	90%	87%	84%
Douro Sand Dome North	97%	94%	94%	94%	94%	93%
Douro Sand Dome South	97%	95%	95%	64%	64%	64%
Douro Storage Garage	99%	99%	79%	75%	74%	71%
Douro Depot Salt Shed	71%	66%	65%	64%	61%	61%
Havelock Roads Depot Main	91%	91%	90%	89%	87%	85%
Havelock Sand Dome	98%	96%	96%	93%	68%	67%
Havelock Salt Shed	91%	67%	67%	67%	65%	65%
Lang Pioneer Village Admin Building	97%	96%	91%	91%	90%	89%
Lang Pioneer Village Agricultural Heritage Building	99%	99%	99%	99%	99%	99%
Lang Pioneer Village David Mitchell Workshop	99%	99%	99%	99%	99%	98%
Lang Pioneer Village Weaver Building	98%	98%	98%	98%	98%	97%
Lang Pioneer Village Washroom	91%	91%	91%	91%	70%	46%
Millbrook Roads Depot Main	98%	97%	97%	88%	86%	79%
Millbrook Depot Sand Dome	96%	95%	95%	95%	94%	94%
Millbrook Storage Garage 1	100%	100%	100%	100%	100%	100%
Millbrook Storage Garage 2	63%	63%	63%	63%	63%	63%
Millbrook Salt Shed	97%	84%	84%	82%	76%	75%
Selwyn Quonset Shelter	100%	100%	70%	70%	70%	70%
Selwyn Roads Depot	94%	94%	93%	93%	93%	84%
Selwyn Depot Sand Dome	99%	98%	98%	98%	98%	88%
Selwyn Depot Salt Shed	93%	93%	93%	93%	91%	68%

Table 44: Facility Projected FCI values – Do Nothing

Transportation Master Plan

Below are details of the Transportation Plan. These are the projects remaining to be completed over the next 20 years.

	Estimate	2018 Carry over	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Roadworks - design standards upgrades												
CR 20 - CR18 to Selwyn - Surface Treat existing - CR18 to CR 23	5,410	73	200	5	2,350							
CR 19 Upgrade - CR 18 to Hilliard St.	1,350											
CR 46 Upgrade - CR 504 to S. of Oak Lake	10,280											
CR 56 Upgrade - Hwy 28 to CR 6	5,980											
CR 33 Upgrade - Hwy 28 to CR 32	670											
Roadworks - safety & optimization improvements												
Short Term Widening of CR 18 - City limits to CR 1	800											
CR 18 Widening - 4 lanes to 5 lanes - City limits to Wild Water	2,020											
CR 18 Widening - 4 lanes to 5 lanes - Wild Water to CR 1	2,250											
CR 18/23 Intersection - signalization/controls - at intersection	270											
CR 1/12 Intersection - signalization/controls - at intersection	400											
CR 45/42 Intersection - geometric improvements - at intersection	70											
CR 18/5th Line Intersection - signalization/controls - at intersection	350		50			900						
CR 24/Woodland Drive - O/H flashing beacon - at intersection												
CR4/University Road - intersection upgrades - at intersection	100	77										
CR 12 (Lily Lake/Ackison Rd) - signalization/controls - at intersection	275											
CR 2/35 Intersection - geometric improvements - at intersection	100											
CR 29/23 Intersection - geometric improvements - extend acceleration lane	50						50					
CR 18/20 Intersection - geometric improvements - extend slip-thru lane	100											

	Estimate	2018 Carry over	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
CR 23/36 Intersection - signalization/geometric impr - at intersection	150											
Roadworks - capacity enhancement improvements												
Ward St. (CR 18) Widening - 3 lane cross-section - Gore St to Champlain	2,550	10	50	3	2,500							
CR 18 Widening - 2 lanes to 5 lanes - EA + design - CR 1 to Bridgenorth By-pass	5,500											
Bridgenorth By-Pass - property acqusition commencement - CR 18 to Ward St.	8,300											
James A. Gifford Causeway												
Causeway - rock fill widening (4 year reserve) - Ward St to Robinson Rd	5,000	900	1,200	30	1,250	1,537						
CR 14/18 Intersection - roundabout - Ward St intersection	1,800											
CR 14/16 Intersection - traffic control signals - Robinson Rd intersection	400											
Roadside Safety Devices												
Steel Beam/Cable Guiderail - County wide - annual allowance	2,500		250	13	250	250	250	250	250	250	250	250
Environmental Assessment Updates												
Transportation Master Plan - County wide	250	125	125	13								
Bridgenorth By-Pass - Sch. C - CR 1 to Ward St.	250											50
CR 28 (Fraserville EA) - Sch. C - 115 to Fraserville	250											
James A Gifford Causeway - Sch. C - CR 18 to CR 16	100						50					
Active Transportation Master Plan - County wide	100		10	1	10	10	10	10	10	10	10	10
Organization Review - Operations	20											
Total	57,645	1,185	1,885	63	6,360	2,697	360	260	260	260	260	310

Table 45: Transportation Master Plan Details ($)

Appendix C – Baseline Funding Details

This appendix provides background data and calculations for the Revenue Projections. All values in $.

- Res. Open – Indicates opening balance of reserves associated with capital planning
- Target – Indicates reserve balance target at end of 2028, for capital planning
- Infl% - indicates inflation included in these numbers
- Cap% - Indicates percent of the annual contributions for capital plan purposes

	Res. Open	Target	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Addition + Opening	Available (less target)	Infl%	Cap %
Levy - Transportation	7,584,085	7,584,085	8,680,828	9,520,713	10,377,395	11,251,211	12,142,503	13,051,621	13,978,922	14,924,768	15,889,531	16,873,590	134,275,167	126,691,082	0.0	100
Levy - Cross Culverts	Operating		184,000	184,000	184,000	184,000	184,000	184,000	184,000	184,000	184,000	184,000	1,840,000	1,840,000		100
Levy - Signals	Operating		10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000	100,000		100
Levy - Facilities	Operating		216,416	216,416	216,416	216,416	216,416	216,416	216,416	216,416	216,416	216,416	2,164,160	2,164,160		100
(Levy) LPV			63,000	63,000	63,000	63,000	63,000	63,000	63,000	63,000	63,000	63,000	630,000	630,000		0
(Levy) Corp Equip	112,017	36,723	$67,903	80,903	93,903	106,903	119,903	132,903	145,903	158,903	171,903	184,903	1,376,047	1,339,324	2.0	40
(Levy) Env Equip	40,000	40,000	31,015	36,015	41,015	46,015	51,015	51,015	51,015	51,015	51,015	51,015	500,150	460,150	1.5	14
(Levy) PCCP	1,587,829	3,727,017	819,024	877,636	940,658	1,008,430	1,081,320	1,159,726	1,244,075	1,334,831	1,432,491	1,537,593	13,023,613	9,296,596	1.5	100
(Levy) EM	30,000	60,000	14,000	16,000	18,000	20,000	21,000	21,000	21,000	21,000	21,000	21,000	224,000	164,000	1.5	90
(Levy) PW	3,476,516	2,950,776	650,000	664,625	679,579	694,870	710,504	726,490	742,836	759,550	776,640	794,115	10,675,725	7,724,949	1.5	100
Gas Tax			1,692,246	1,692,246	1,769,166	1,769,166	1,846,087	1,691,737	1,691,737	1,691,737	1,691,737	1,691,737	17,227,596	17,227,59		100
DC	4,500,000	0	1,500,000	1,500,000	1,200,000	1,200,000	800,000	800,000	800,000	800,000	800,000	800,000	14,700,000	14,700,000		100
OCIF			497,150	523,622	523,622	523,622	523,622	523,622	523,622	523,622	523,622	523,622	5,209,748	5,209,748		100
			14,425,582	15,385,176	16,116,754	17,093,633	17,769,370	18,631,530	19,672,526	20,738,842	21,831,355	22,950,991		187,547,605		

Table 46: Baseline Funding Raw Data ($)

Appendix D – Baseline Needs Details

This appendix provides unadjusted 10-Year Capital Needs. All values in $.

The column Infl % - Indicates inflation percentage included

Final 10-Year needs values used for funding gap analysis use these values with inflation backed out and incremental staffing costs added in for Transportation and Facilities.

Asset Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total	Avg./Yr.	Infl %
Bridges/Culverts	4,715,000	2,875,000	3,947,000	3,373,000	4,354,500	3,848,500	3,440,335	4,332,800	4,622,000	4,506,500	40,014,635	4,001,464	
Cross Culvert	679,100	679,100	679,100	679,100	679,100	679,100	679,100	679,100	679,100	679,100	6,791,000	679,100	
Equip CORP	65,000			178,000					243,000		486,000	48,600	2.00%
Equip ENV							34,795				34,795	3,480	1.50%
Equip EM	40,000										40,000	4,000	1.50%
Equip PCCP	636,840	660,196	303,566	540,459	636,504	503,742	621,196	303,566	540,459	514,836	5,261,364	526,136	1.50%
Equip PW	854,135	551,466	434,504	699,166	1,073,008	904,174	842,185	703,015	1,036,992	1,096,115	8,194,760	819,476	1.50%
Facility	213,780	499,540	634,460	460,371	593,260	1,010,410	741,560	913,830	981,601	1,517,510	7,566,322	756,632	
Road	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	130,000,000	13,000,000	
Signals	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	260,000	26,000	
Transp. Plan	1,885,000	6,360,000	2,697,284	360,000	260,000	260,000	260,000	260,000	310,000	760,000	13,412,284	1,341,228	
Transp. Plan - Unfunded				2,532,219	2,532,219	2,532,219	2,532,219	2,532,219	2,532,219	2,532,219	17,725,530	1,772,553	
	22,114,855	24,651,302	21,721,914	21,848,315	23,154,591	22,764,145	22,177,390	22,750,530	23,971,371	24,632,280	229,786,691	22,978,669	

Table 47: 10-Year Needs, Raw Data ($)