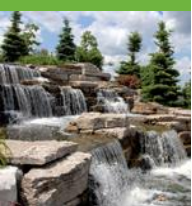




Asset Management

An Introduction

October 2017



Agenda

- What is Asset Management?
 - Asset Management
 - AM vs MBA
 - Municipal Asset Management in Ontario
 - PSAB / TCA / AM Regulations
 - 7 Key Asset Management Questions
 - Asset Management Plans
- Valuing Assets
 - PSAB & Natural Assets

Asset Management

Asset

Something of value

Management

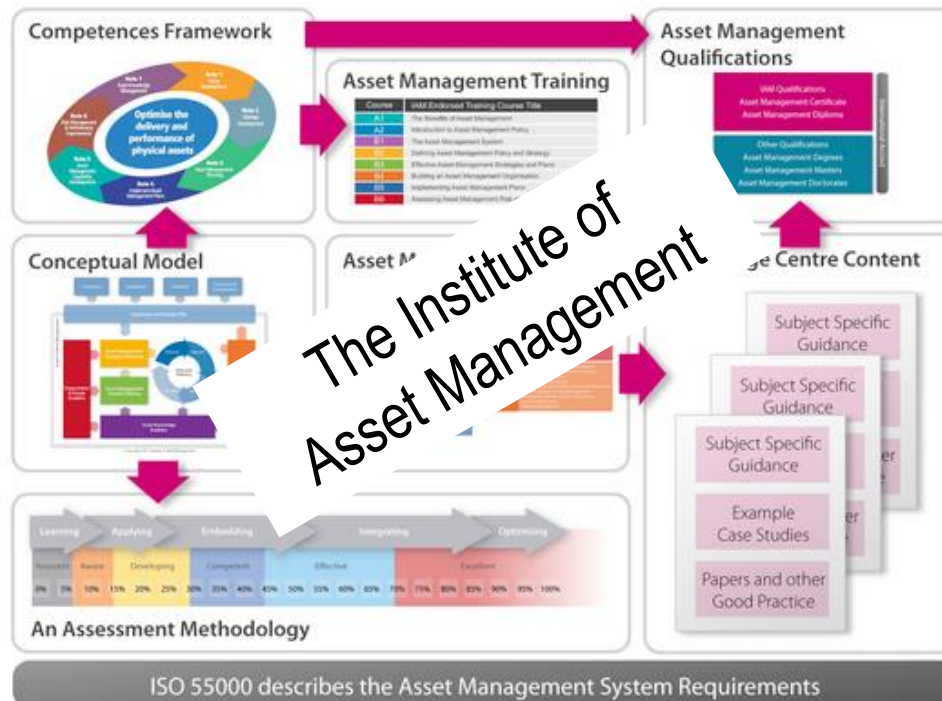
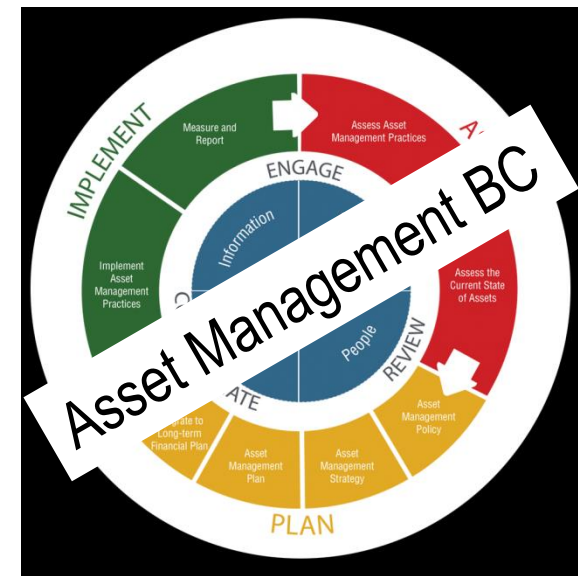
The process of dealing with or controlling things or people

Asset Management



AIChE

Components of Asset Management



Richmond Hill

MBA vs Asset Management



One of:

- Finance
- Industry/Operations
- Marketing
- Supply chain management
- Human resources
- Accounting



Municipal Asset Management

All of:

- Finance
- Accounting
- Information Technology
- Forestry
- Operations Management
- Urban Planning
- Engineering
- Strategic Planning & Management

Asset Management

Effective Utility Management Model

Balanced Scorecard Perspectives



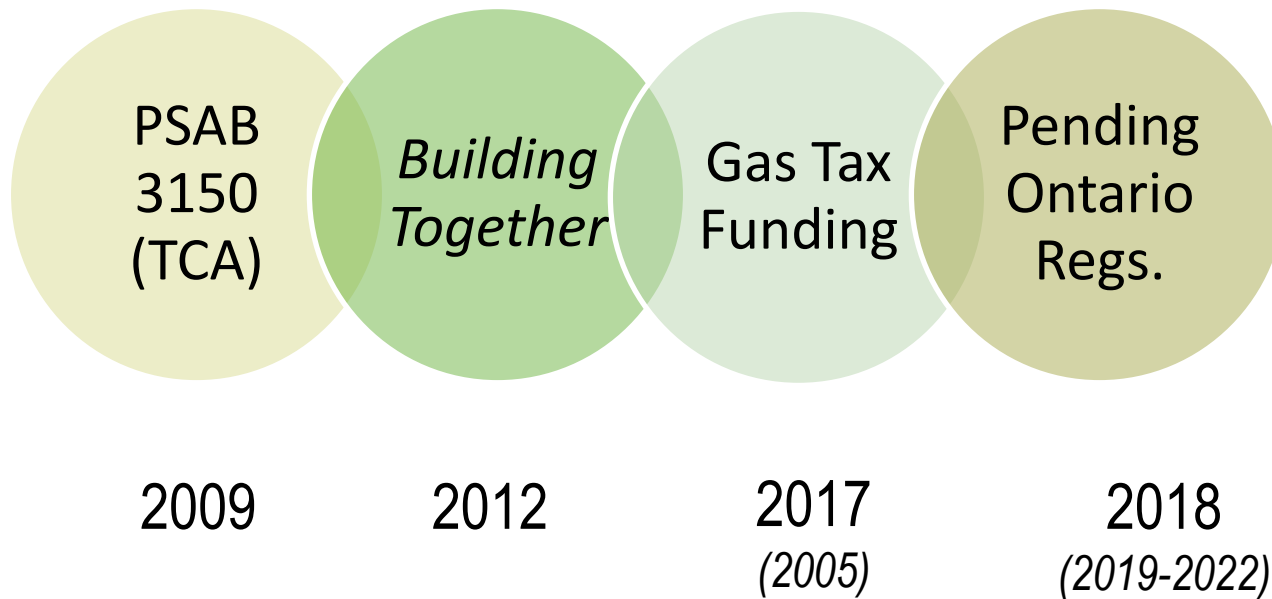
Abstract

<http://www.free-management-ebooks.com/news/balanced-business-scorecard/>

Specific



Legislation & Standards in Ontario



7 Key Questions

- Many ways to describe “good AM planning”
 - ISO 55000
 - PAS 55
 - International Infrastructure Manual (IIMM)
 - *Building Together Guideline*
- AM Organizations
 - Institute of Asset Management (IAM)
 - NAMS (New Zealand)
 - CNAM (Canada)
- Projects & Initiatives
 - Municipal Natural Capital Initiative (MNCI)

Fundamental AM Questions

Building Together Chapter

Q1 What do we own and what is the condition?

State of the Local Infrastructure

Q2 What are they worth?

Desired Levels of Service

Q3 How are they performing?

Q4 What do we need to do?

Asset Management Strategy

Q5 When do we need to do it?

Q6 How much will it cost?

Financing Strategy

Q7 How will we fund it?

Asset Management Plans

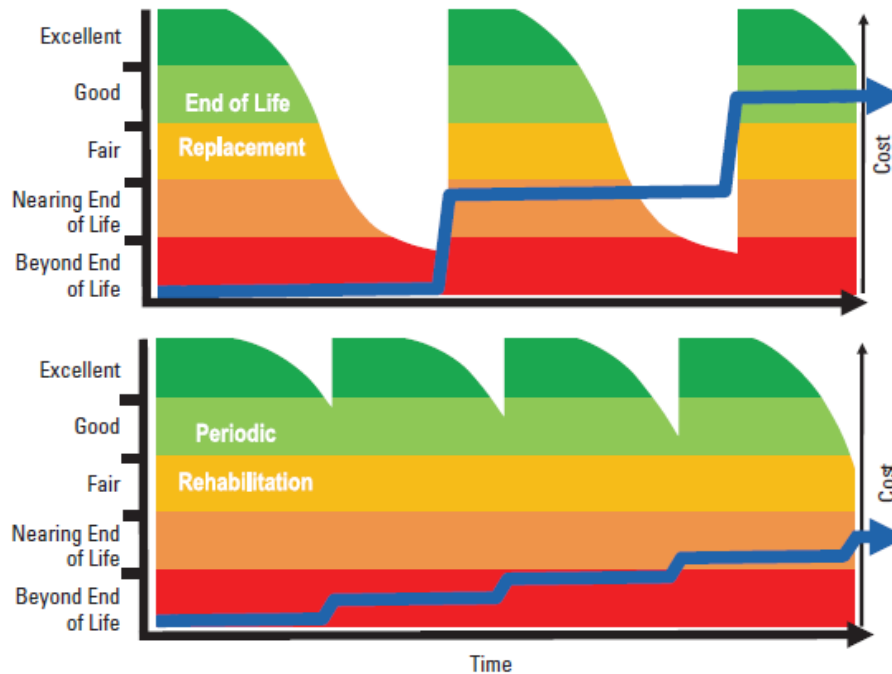
Asset Management Plan common components:

- Asset Management Policy
- State of Local Infrastructure
- Desired Levels of Service
- Asset Management Strategy
- Financing Strategy
- Implementation Plan

Asset Management - Goals

- Meet the expected level of service at the lowest total cost.

Figure 42: Total Lifecycle Costs Example

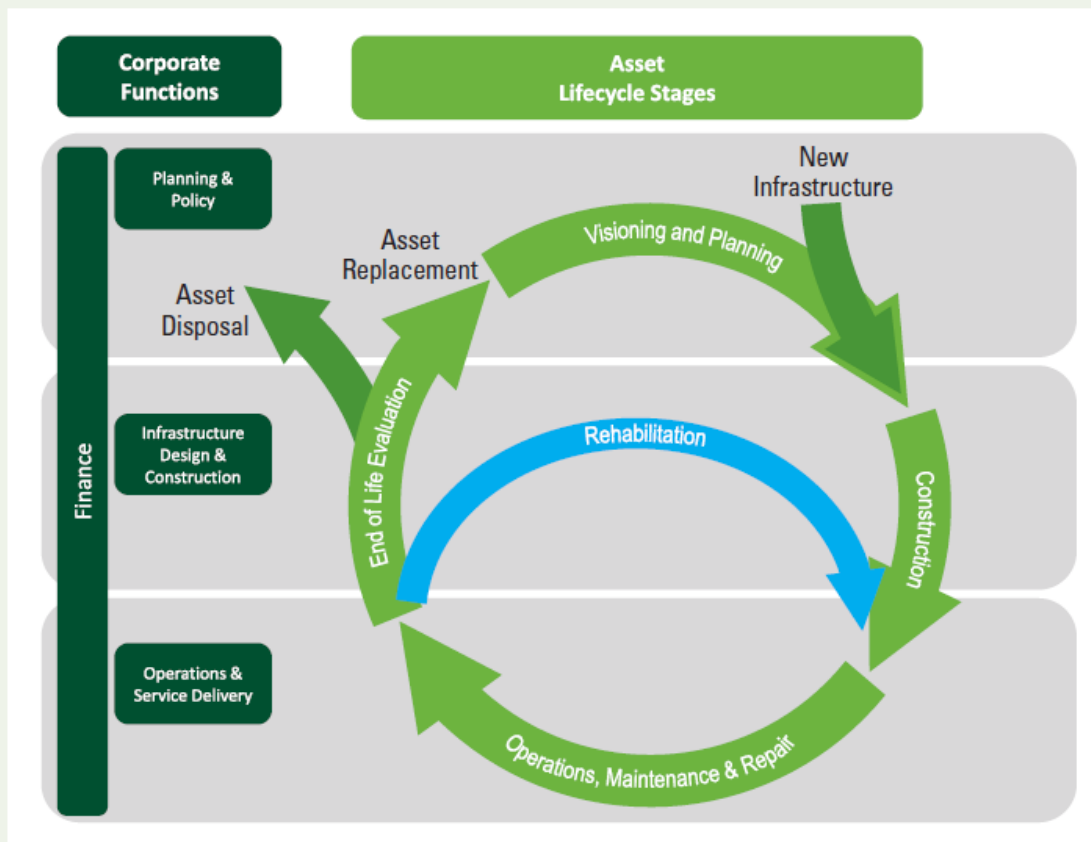


Periodic, planned rehabilitation of roadway asphalt has lower total lifecycle costs than rebuilding the road on a less frequent basis. Rehabilitation has higher costs at first, but becomes less expensive over the long term.

Asset Management - Goals

- Consider all of the lifecycle stages.

Figure 41: Asset Lifecycle Stages



State of Local Infrastructure - Inventory

Table 8: Roadway System Inventory & Current Value			
Asset Class	Replacement Cost (2014 dollars)	Quantity	Data Confidence
Roadway System	\$ 618.1 M		
Road Bed & Road Surface	\$ 458.6 M	4,686,944 m2	Intermediate
Sidewalks & Walkways	\$ 61.1 M	601,982 m	Advanced
Bridges & Culverts	\$ 53.8 M	55 locations	Advanced
Street Lighting	\$ 39.4 M	16,122 components	Basic
Traffic Signals	\$ 5.1 M	35 locations	Basic

State of Local Infrastructure - Condition

Figure 9: Roadway System Asset Condition Distribution

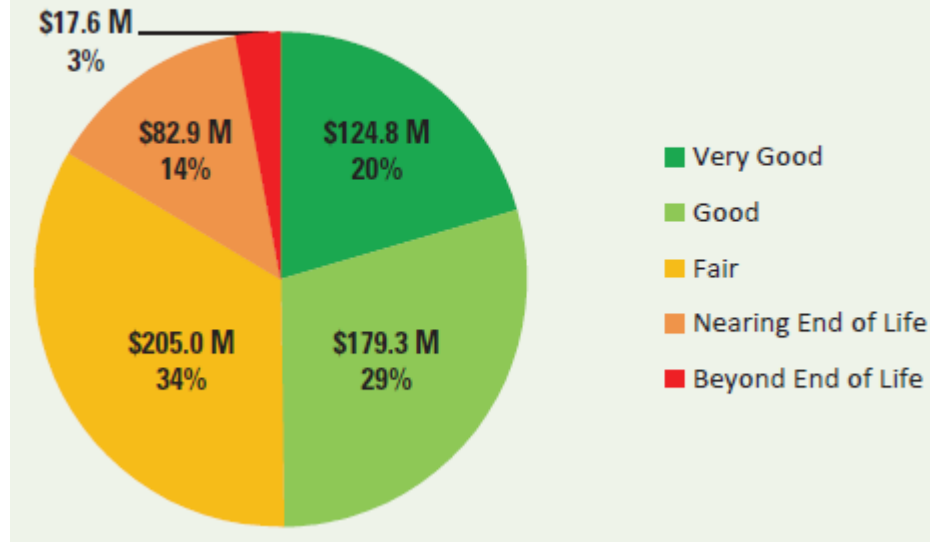
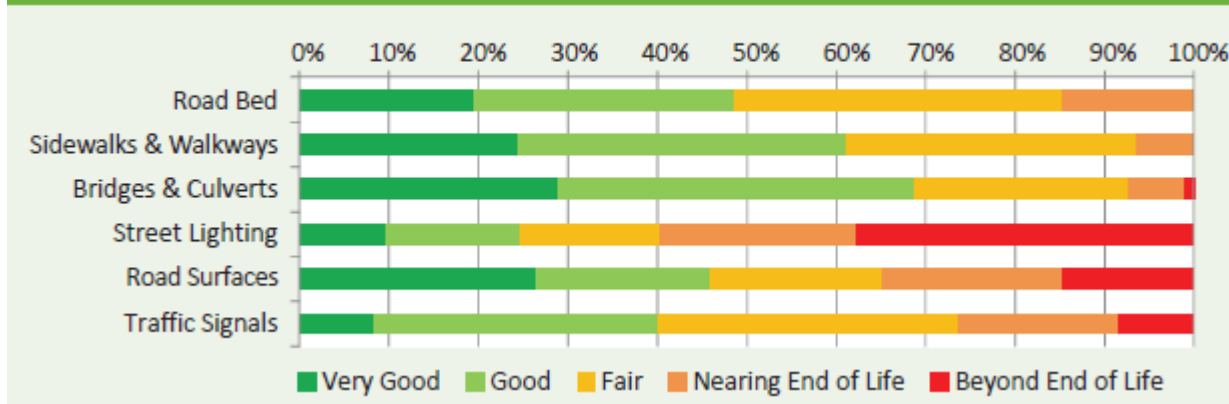
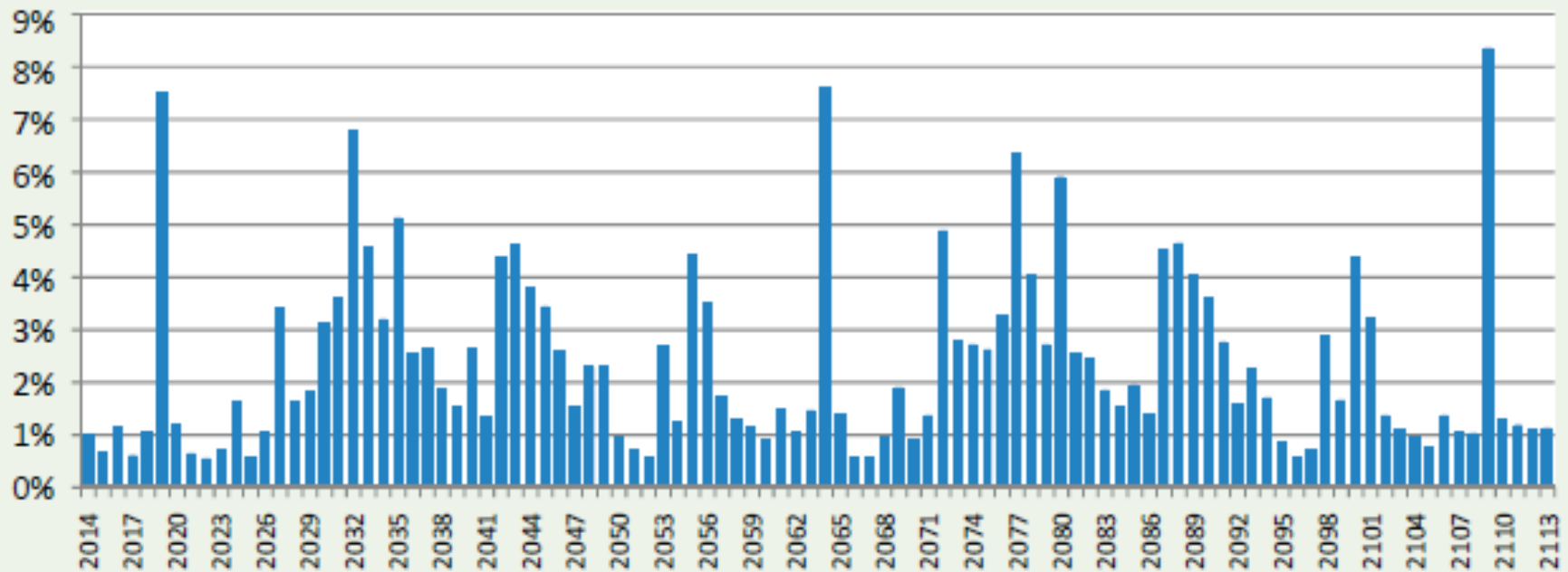


Figure 10: Roadway System Components Age Distribution



State of Local Infrastructure – End of Life

Figure 11: Roadway System 100 Year Annual Percentage Reaching End of Life



Levels of Service – What is the Service?

What is the service delivered by “Buildings”?

Well-functioning buildings provide reliable, safe and predictable access and amenities for the purposes for which they were designed, such as arenas, community gyms, meeting rooms or swimming pools. Mechanical, electrical and architectural components perform in a way they do not detract from the experience or purpose of the building while minimizing energy and water usage.

Levels of Service – Performance Measures

Table 21: Buildings Levels of Service and Community Satisfaction Measures				
Asset	Performance Measure	Measure Type	Target	Results (2012-2016)
Buildings	Energy Conservation	Regulatory*	Energy consumption reduced by 8.5% (4.1 million ekWh/year) over the life of the plan	Annual Consumption 2012: 48.1 million ekWh 2013: 52.1 million ekWh 2014: 56.0 million ekWh
	Facility Condition Index (FCI)	Condition	7%	Results not available
	Repair Responsiveness: Routine Repairs	Safety & Condition	Completed with 14 days	Reportable on a case by case basis
	Repair Responsiveness: Urgent Repairs	Safety & Condition	Completed within 48 hours	Reportable on a case by case basis
	Recreation Facilities: % Satisfied or Very Satisfied	Community Survey	No target defined	2016: 91%
Mechanical sub-components	Manufacturer's recommended scheduled maintenance	Best Practice	No target defined	Reportable on a case by case basis

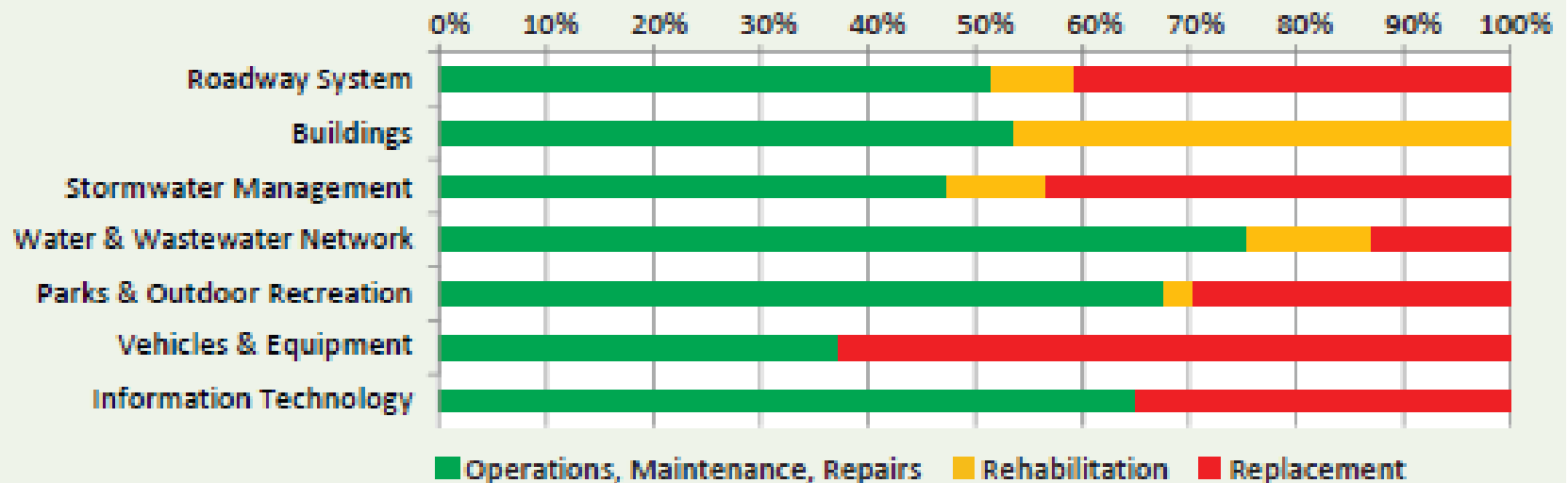
Management Strategies

Sanitary Collection	
Monitoring	Sani Manhole Visual Inspection
Condition Assessment	Sani Main Line CCTV Sani Lateral Line TV Inspection
Operations & Maintenance	Sani Manhole Maintenance Sani Main Line Flushing
Repairs	Sani Lateral Line Blocked Sani Lateral Line Repair Sani Lateral Line Replace Sani Manhole Repair Sani Manhole Replace Sani Main Line Blocked Sani Main Line Repair
Rehabilitation	Sani Main Line Reaming Sani Main Line Replace Capital business case Sanitary sewer relining
End of Life	Road Reconstruction Priority Rating System considers Wastewater Network when identifying priority projects to include in the Ten Year Capital Forecast

Vehicles & Equipment	
Monitoring	Daily Circle Checks Annual Inspection Annual Safety Validation Emissions testing
Operations & Maintenance	Annual Service Seasonal Service 'A' Service Manufacturer Recommended Scheduled Maintenance Retorque Wheels
Repairs	Demand Work Orders
End of Life	Disposal of Vehicles & Equipment (Auction) Capital business case for replacement

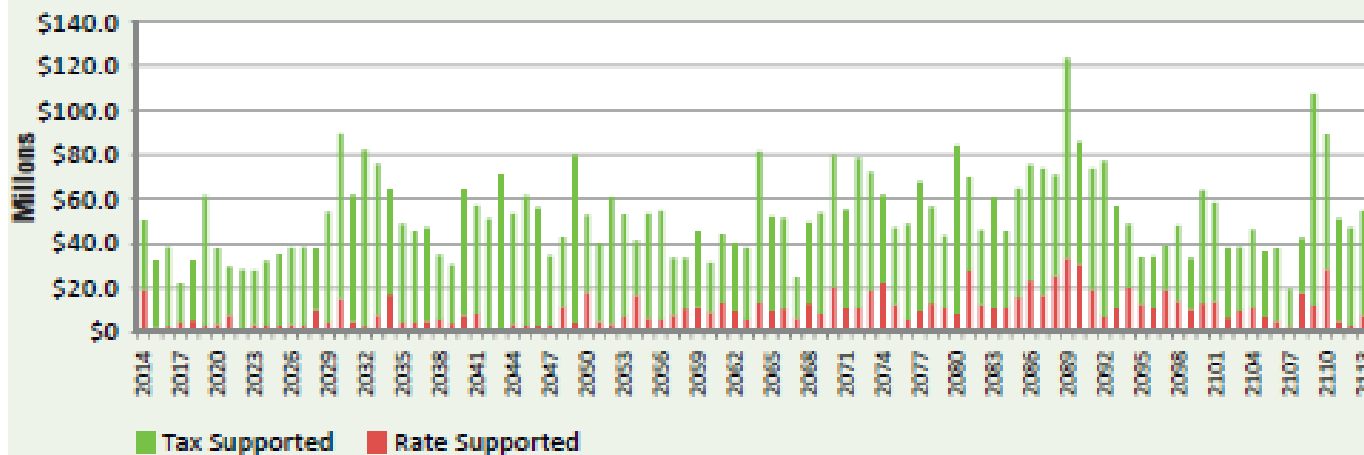
Financial Strategies

Figure 45: Breakdown of Budgeted Expenditures by Lifecycle Expenditure Type (2014-2016)



Financial Strategies

Figure 51: Value of Assets Reaching Estimated End of Life



End of life replacement models

Table 44: Forecasted Contributions to Repair & Replacement Reserve Funds

Revenue Source	Reserve Fund	Allocation (\$ million)			
		2016	2017	2018	2019
Property Tax	Repair & Replacement Reserve Funds	8.9	9.8	10.8	11.8
Water & Wastewater Rates	Water & Wastewater Reserve Funds	6.5	6.7	7.0	7.3
Stormwater Rates	Water Quality Protection Reserve Fund	1.1	1.4	1.4	1.5
Gas Tax	Federal Gas Tax Reserve Fund	5.6	5.6	5.9	5.9

Reserve fund modeling

Financial Strategies

Options Analyzed

1. Increase R&R contribution by inflation percentage each year
2. Increase R&R contribution by growth percentage each year
3. Increase the Capital Sustainability Levy
4. Allocate Gas Tax
5. Pursue other revenue sources
6. Extend end of life
7. Increased deferred maintenance
8. Debt
9. Alternative Financing and Procurement

Implementation Plan

- Richmond Hill's AMP includes 22 recommendations.
- The approximate timeframe is the next 4 years.
- Staffing requirements will be brought forward through the budget process.

Valuing Assets

Value

Centralized Water Treatment

- Reduced disease & lower costs

Paved Roads & Signals

- Lower accidents
- Lower transportation costs

Urban Trees

- Reduced GHG & heat island effect
- Improved water management

Business Case

Cost

Centralized Water Treatment

- Costs to construct, operate & replace

Paved Roads & Signals

- Costs to construct, operate & replace

Urban Trees

- Costs to plant, maintain & replace

Accounting

Recap

- Asset Management is focused on effectively providing services.
- An AMP usually includes:
 - Asset Management Policy
 - State of Local Infrastructure
 - Desired Levels of Service
 - Asset Management Strategy
 - Financing Strategy
 - Implementation Plan
- The PSAB tangible capital asset registry is commonly used for establishing the asset management inventory.
- Asset management uses *costs*.
- Business cases use the *value* of assets.

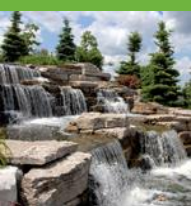
Thank You

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Environmental Assets in Richmond Hill's AMP

October 2017

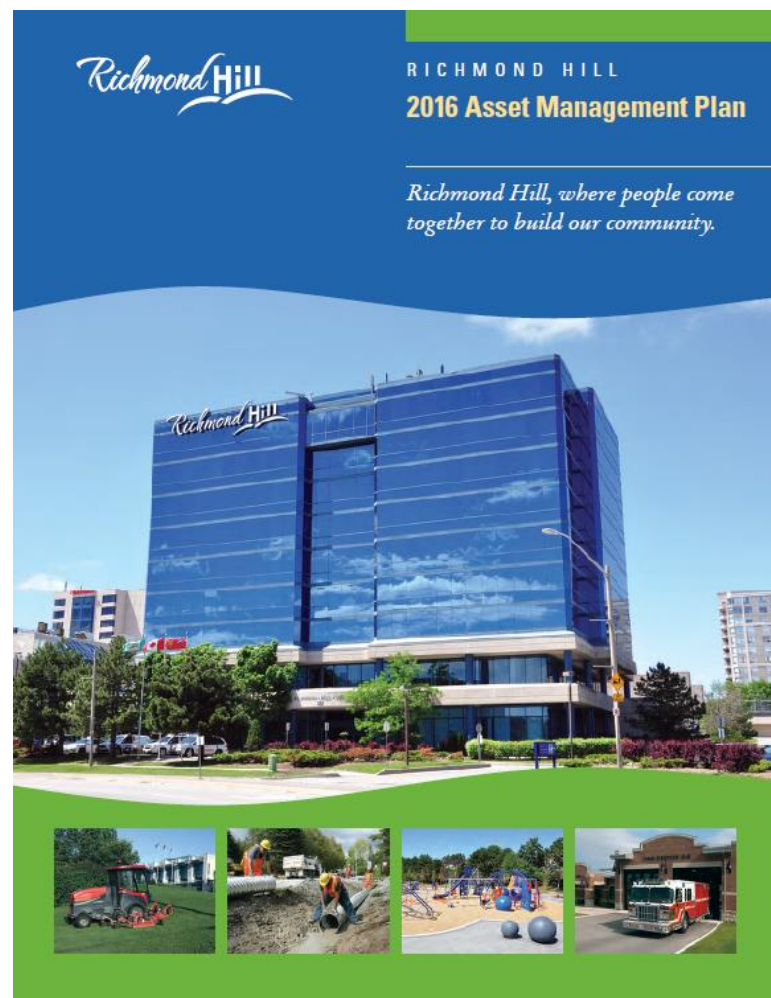


Agenda

- Richmond Hill's AMP
- Green Infrastructure in the AMP
- Challenges & Opportunities
- Next Steps

Richmond Hill's AMP

- Completed in 2016
- Follows *Building Together*
- Uses the PSAB Tangible Capital Asset registry as the base data
- “Made in Richmond Hill” approach – not trying to fit into one of the standards
- Documentation of existing data, processes and measures



Richmond Hill's AMP

- All assets (grey & green) analyzed the same way:
 - Inventory (Value and Quantity)
 - Levels of Service
 - Management Strategies
- Green Infrastructure in the AMP:
 - Street Trees
 - Natural Areas - Forest

Green Infrastructure - Inventory

Table 18: Environmental Assets Inventory and Current Value

Asset Class	Replacement Cost (2014 dollars)	Quantity	Data Confidence
Street Trees	\$13.4 M	43,217 trees	Intermediate
Natural Areas - Forest	\$74.2 M	696.2 hectares	Intermediate

Figure 39: Environmental Assets Condition Distribution

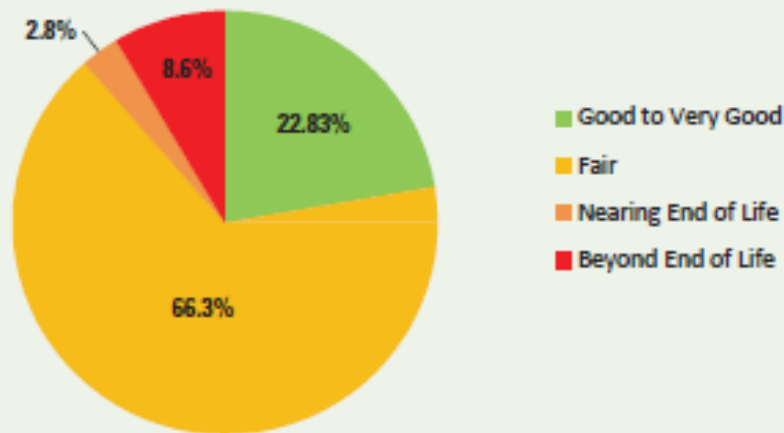
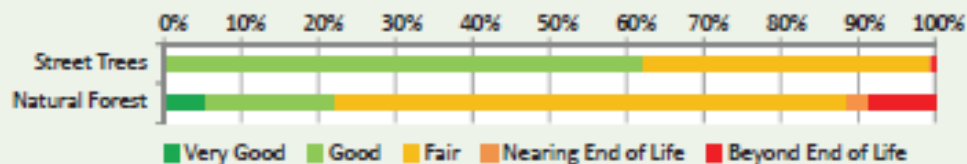


Figure 40: Environmental Assets Condition Distribution by Subclass



Biodiversity in Richmond Hill

The 2014 inventory and assessment of Richmond Hill's plant and animal diversity and health identified that the Town is benefiting from being connected to the Oak Ridges Moraine, with some of the highest biodiversity in the Greater Toronto Area.

- 223 vegetative communities
- 918 flora species with 271 species of regional concern
- 149 fauna species with 111 species of regional & urban concern

Levels of Service

What is the Service that Environmental Assets Provide?

“Well-functioning Environmental Assets provide healthy and resilient forest cover and water conveyance while contributing to a range of environmental and community benefits such as: stormwater control, biodiversity, clean air and water, opportunities to connect with nature, and overall improved quality of life.”

Levels of Service

Table 28: Environmental Assets Levels of Service and Community Satisfaction Measures

Asset	Performance Measure	Measure Type	Target	Results (2012-2016)
Environmental Assets	Species at Risk requirements	Regulatory	Meet or exceed the Species at Risk conditions in Town owned Natural Areas	Reportable on a case by case basis
	Natural Cover	Condition	25% natural cover	2012: 25%
	Stream Channel Stability	Condition	Prevent damage to public infrastructure and private property	High Priority Areas Identified
	Biodiversity	Condition	No target defined	2014: 271 plant species of concern, 111 animal species of concern
	Environmental Protection: % Satisfied or Very Satisfied	Community Survey	No target defined	2012: 89 2016: 80
	Resident Connection to Nature in Town Parks and Natural Areas: %	Community Survey	No target defined	2012: 87 2016: 84

Management Strategies

Table 38: Environmental Assets - Asset Management Strategies			
	Street Trees	Natural Areas	Streams
Monitoring	Inspection	Annual restoration site monitoring (baseline at 2 and 5 years)	Stream flow and elevation
Condition Assessment	Tree Condition Inventory	Natural Area Inventory	Stream Condition Inventory
Operations & Maintenance	Block pruning Fertilizing	Tree & shrub planting Watering & mulching	
Repairs	Pruning	Invasive species removal	Emergency repairs
Rehabilitation		Community Stewardship Program Long Term Woodlot Restoration Program Healthy Yards Program LEAF's Backyard Tree Planting Program	Valleyland Capital Works Priority Rating System identifies priority projects to include in the Ten Year Capital Forecast
End of Life	Street Tree Replacement Contract Emerald Ash Borer Strategy		

Financial Strategies

“Richmond Hill has \$1.85 billion in infrastructure assets and an additional \$87.6 million in Environmental Assets.”

- Asset management plans do not have to follow PSAB requirements.
- There is flexibility to analyze non-PSAB assets.
- Be clear on what is being reported.

Green Infrastructure AM Challenges

- Creating similar Condition categories
- Deciding on an asset value methodology
- Determining expected life

Challenges - Condition

Table 5: Age-based Asset Condition Rating System

Rating Category	% of Estimated Life Remaining	Asset Condition Characteristics
Very Good	76% - 100%	"Fit for the Future": New or recently rehabilitated. Very low risk of failure. Low capital maintenance needs. Scheduled maintenance reduces the probability of premature failure.
Good	51% - 75%	"Adequate for Now": Some signs of deterioration. Low risk of failure. Some unplanned maintenance is required.
Fair	26% - 50%	"Requires Attention": Additional signs of deterioration. Level of service may be affected. Some failures occur. Rehabilitation possible.
Nearing End of Life	0% - 25%	"At Risk": Failures will increasingly occur. Reduced ability to provide the service. Maintenance costs will likely increase. Rehabilitation may become impossible.
Beyond End of Life	< 0%	"At Risk": Similar characteristics to Nearing End of Life. Assets in this category are considered to be part of the "Infrastructure Backlog".

Table 19: Tree Condition Rating Systems

% Dieback of Branches	Tree Condition Rating	AMP Condition Rating
(< 1 dieback)	Excellent	Very Good
1-10	Good	Good
11-25	Fair	Fair
26-50	Poor	Nearing End of Life
51-75	Critical	Beyond End of Life
76-99	Dying	Beyond End of Life
100 - no leaves	Dead	Beyond End of Life

Challenges - Asset Value

Value

Centralized Water Treatment

- Reduced disease & lower costs

Paved Roads & Signals

- Lower accidents
- Lower transportation costs

Urban Trees

- Reduced GHG & heat island effect
- Improved water management

Business Case

Cost

Centralized Water Treatment

- Costs to construct, operate & replace

Paved Roads & Signals

- Costs to construct, operate & replace

Urban Trees

- Costs to plant, maintain & replace

Accounting

Challenges - Asset Value

APPENDIX B1 – QUOTATION PRICING FORM

The Quotation Pricing Form must be completed in its entirety and in accordance with Stage II. NOTE: Any quantities set out herein are estimates only and are provided as a basis for establishing and comparing submissions only

FALL PLANTING 2016 - CONTRACT TERM: ENDING DECEMBER 2016

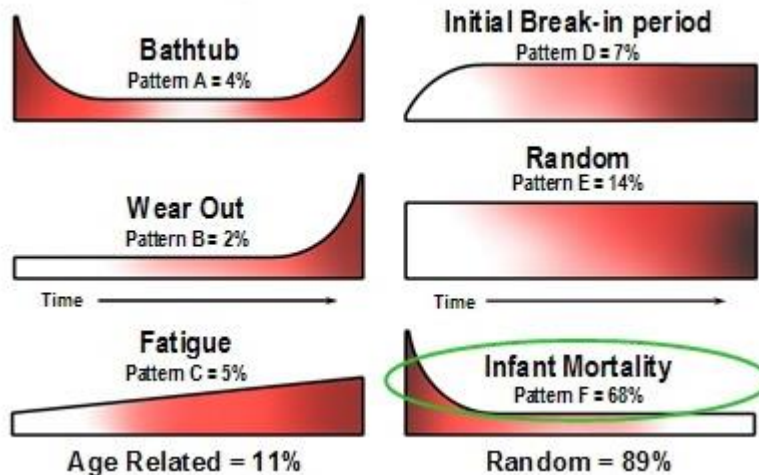
TABLE 2 – REPLACEMENT TREE SPECIES LIST			
Item	Common Name	Botanical Name	REPLACEMENT FEE UNIT PRICE
1	Burr Oak	<u>Quercus macrocarpa</u>	\$ <u>3600-</u>
2	Japanese Zelkova	<u>Zelkova serrata</u>	
3	Hackberry	<u>Celtis occidentalis</u>	
4	Ohio Buckeye	<u>Aesculus glabra</u>	

Opportunity – AM Regulations

- PSAB 3150 drove early AM activity
- Ontario's AM regulations will drive future activity, and will include green infrastructure
- **AMP's do not have to use PSAB definitions**

Challenges - Expected Life

Asset Mortality Distributions



Nolan and Heap Curves: http://www.assetinsights.net/Glossary/G_Nolan-and-Heap_Curves.html

- Grey infrastructure lifespans are derived from their mortality (failure) probabilities.

Challenges - Expected Life

Mortality rates and lifespan are reciprocals.

Mortality to Lifespan:

- Street trees: 3.5% = 28.5 years
- Natural Forest Area: 1% = 100 years

Next Steps

- Trees in Parks
 - Handled as individual trees, similar to Street Trees
- Valley lands
 - Inventory
 - Ownership: Town, TRCA, Private, Other(s)
 - Management Strategies
 - Unlikely to include a Cost/Value measure