



Life Cycle Management of Water and Wastewater Systems

Cost and Performance Considerations



Who We Are

A not-for-profit network of infrastructure management professionals

Our mandate:

- To support infrastructure management planning for municipalities in Atlantic Canada
- Provide free, open-source tools and resources to municipalities
- Conduct education, awareness and training programs
- Provide direct technical assistance to municipalities

Presenter

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AIM Network Executive Director

What is the purpose of asset management?

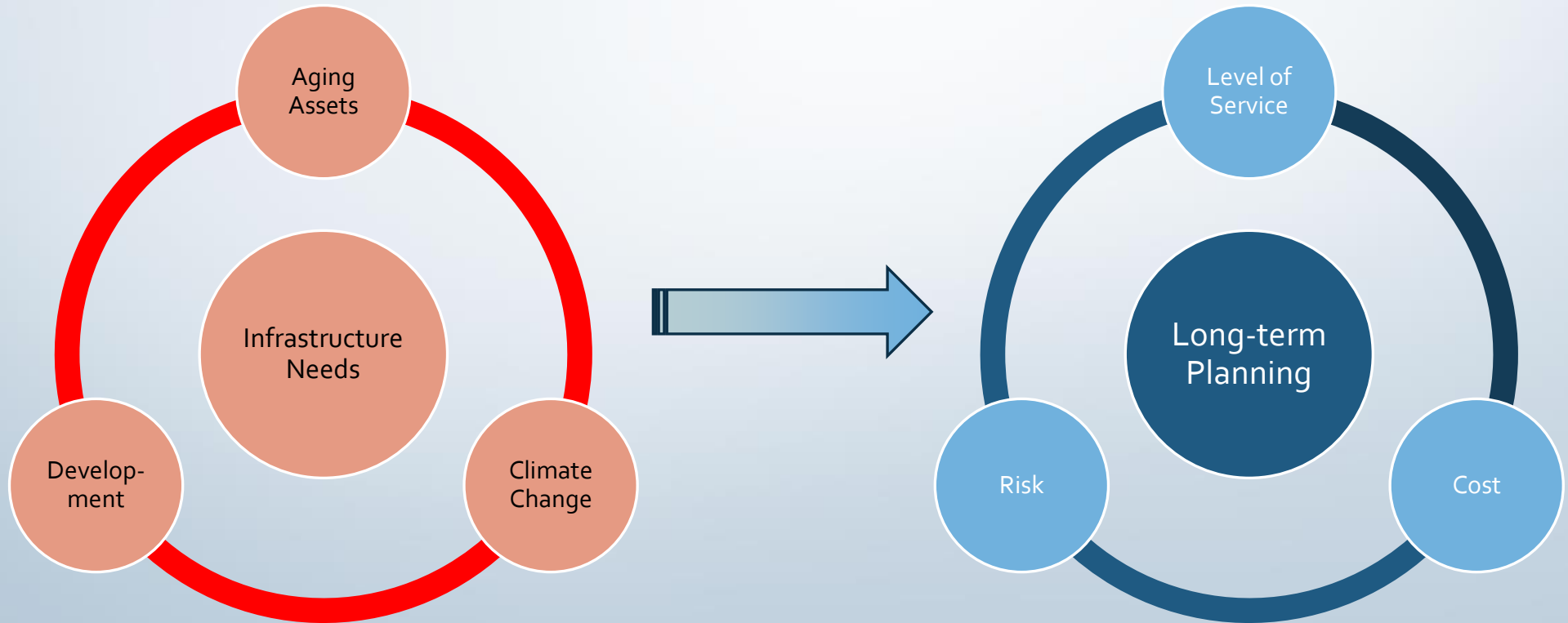
Municipalities exist to provide services:

- At an acceptable level of service
- At an acceptable cost
- At an acceptable level of risk



Why Asset Management Planning?

The goal is 'Sustainable Service Delivery'



Why Asset Management Planning?

We can't do everything all at once

Level of Service:

- What disruptions are acceptable, how often?
- How will this change over time?
- What is the cost (or savings) to increases (or decrease) LoS?

Risk:

- How likely is a disruption?
- What are the uncertainties?
- What is the consequence of that disruption?

Cost:

- What is the cost to maintain LoS and manage risk?

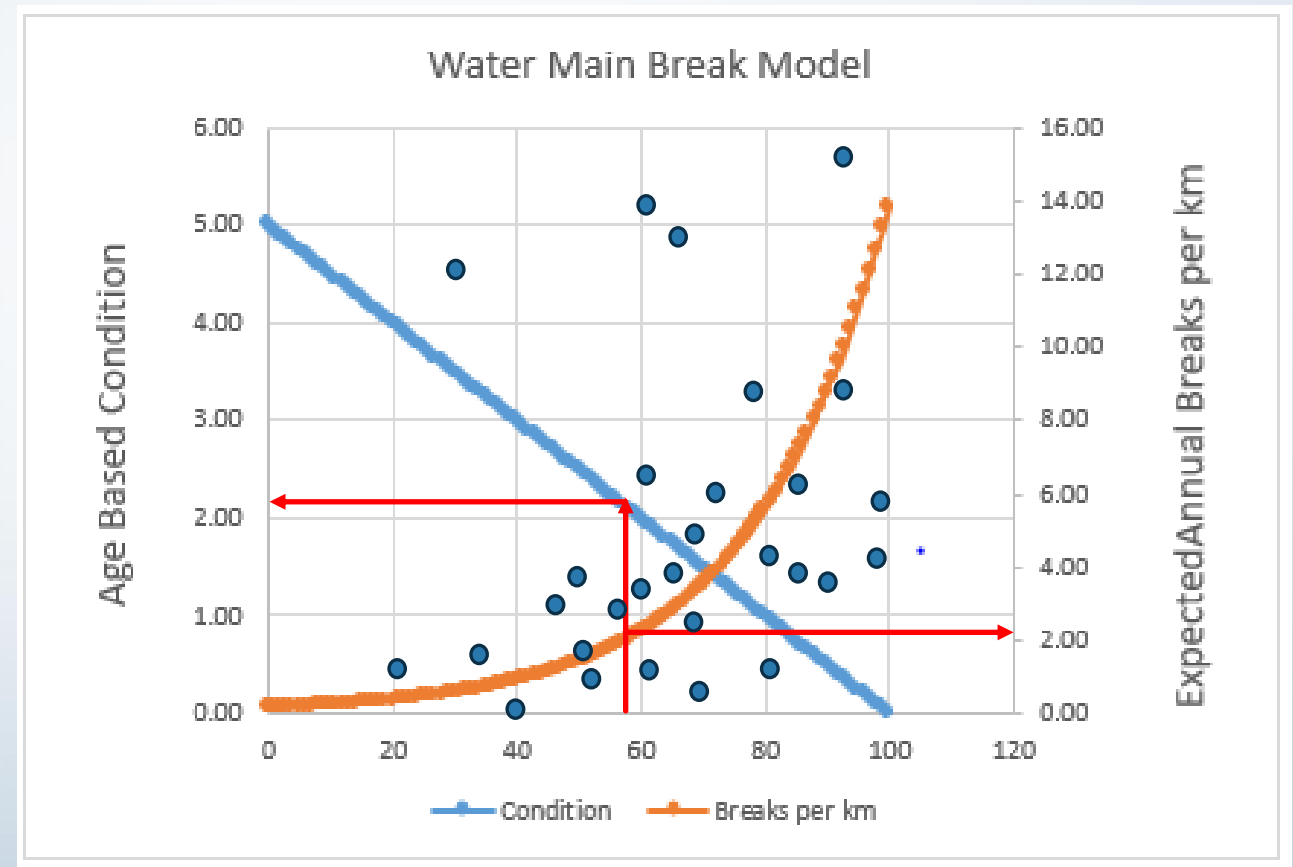
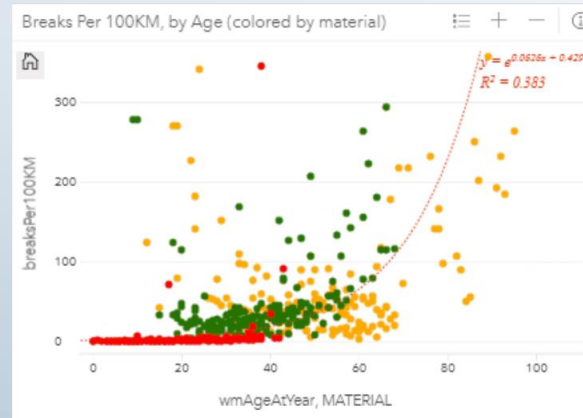
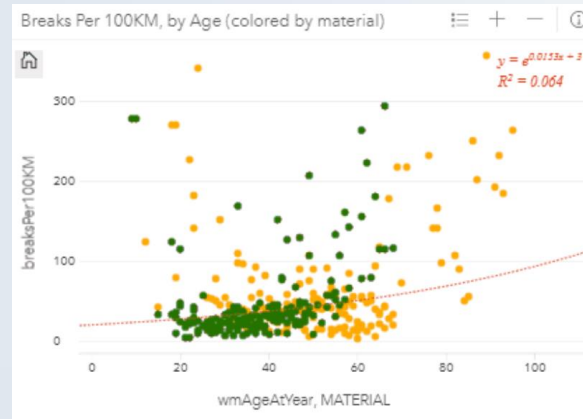


Asset Management is
communication to support
decisions

Watermain breaks per year

MATERIAL

- CI
- DI
- PVC

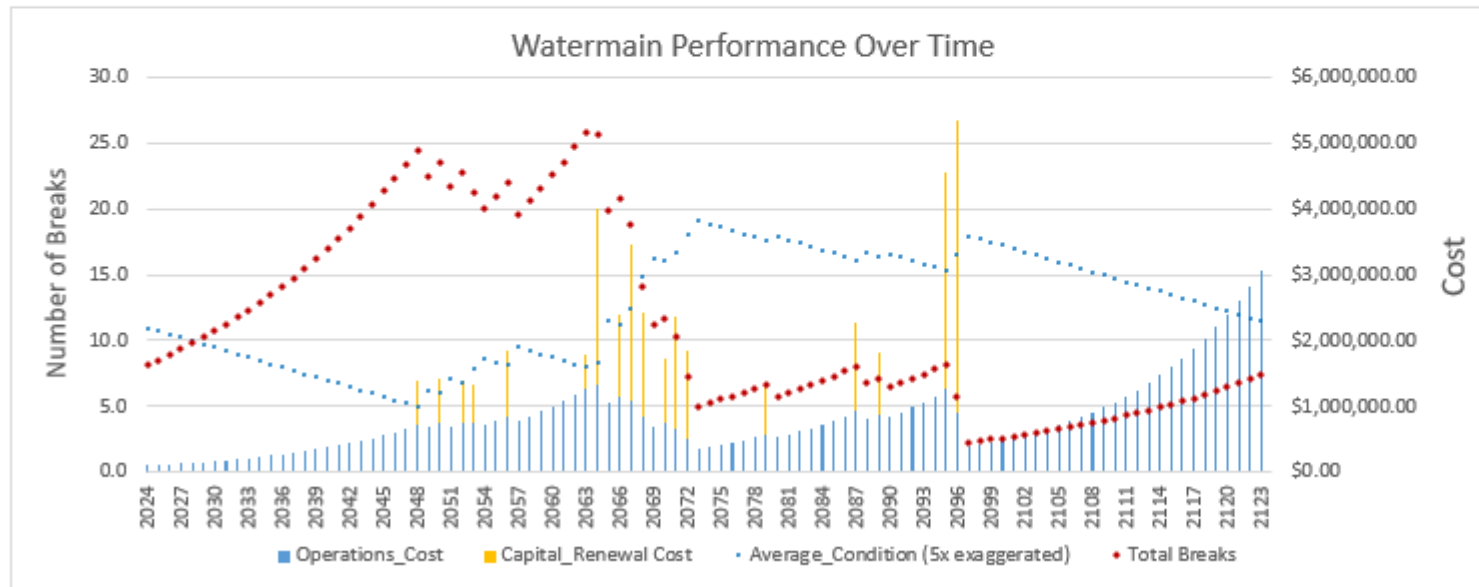


Data Source: *Analyzing watermain breaks in the Region of Peel*, Chaim Schwartz, ESRI Canada, 2020

We don't have enough money, what else is new?

	Totals		Annual	Totals		Annual	Total Investment
5 Year Budget	Capital Renewal	\$0.00		Operations	\$598,499.83		
5 Year Present Value		\$0.00	\$0.00		\$506,729.66	\$101,345.93	
100 Year Present Value		\$2,188,167.86	\$21,881.68		\$7,278,097.95	\$72,780.98	
Average Condition	2.5			Inflation Rate	3.60%		
Average Annual Breaks	11.2			Discount Rate	5.50%		

Watermain Performance Over Time



Replace at Age 100 Years
Average Cost of Break \$12000 per break

Assumptions Matter

	Totals	Annual	Totals	Annual	Total Investment
5 Year Budget	Capital Renewal	\$3,386,089.85	Operations	\$101,725.62	\$3,117,007.44 \$6,134,950.91
5 Year Present Value		\$3,027,879.83		\$89,127.61	
100 Year Present Value		\$5,599,360.20		\$535,590.71	
Average Condition	3.6		Inflation Rate	3.60%	
Average Annual Breaks	2.6		Discount Rate	5.50%	

Watermain Performance Over Time

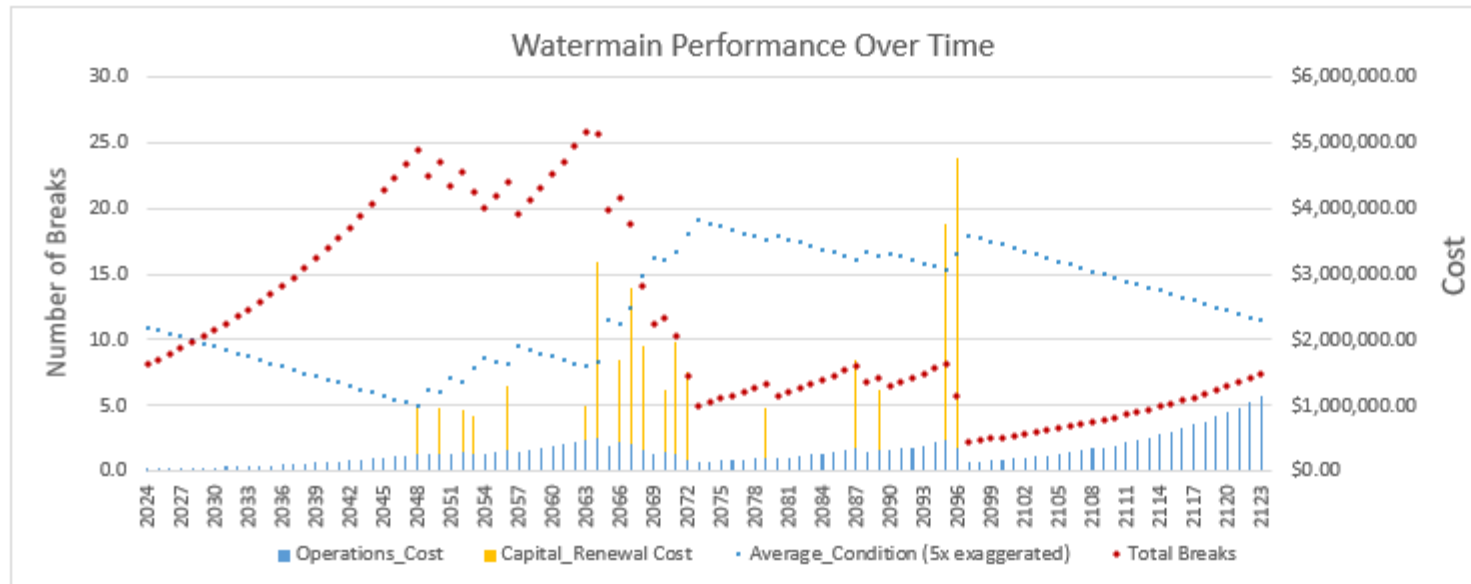
Replace at Age 60 Years

	Totals	Annual	Totals	Annual	Total Investment
5 Year Budget	Capital Renewal	\$0.00	Operations	\$224,437.44	\$190,023.62 \$4,917,454.59
5 Year Present Value		\$0.00		\$190,023.62	
100 Year Present Value		\$2,188,167.86		\$2,729,286.73	
Average Condition	2.5		Inflation Rate	3.60%	
Average Annual Breaks	11.2		Discount Rate	5.50%	

Watermain Performance Over Time

Replace at Age 100 Years

Average Cost of Break \$4500 per break



What do I need?

Inventory:

- What do I own, where is it, what condition is it in?
- How can the asset fail to provide a service?
- What is the likelihood of failure – age? run time?

Level of Service:

- What is my current service level?
- What is my target service level? Forecasted?

Risk:

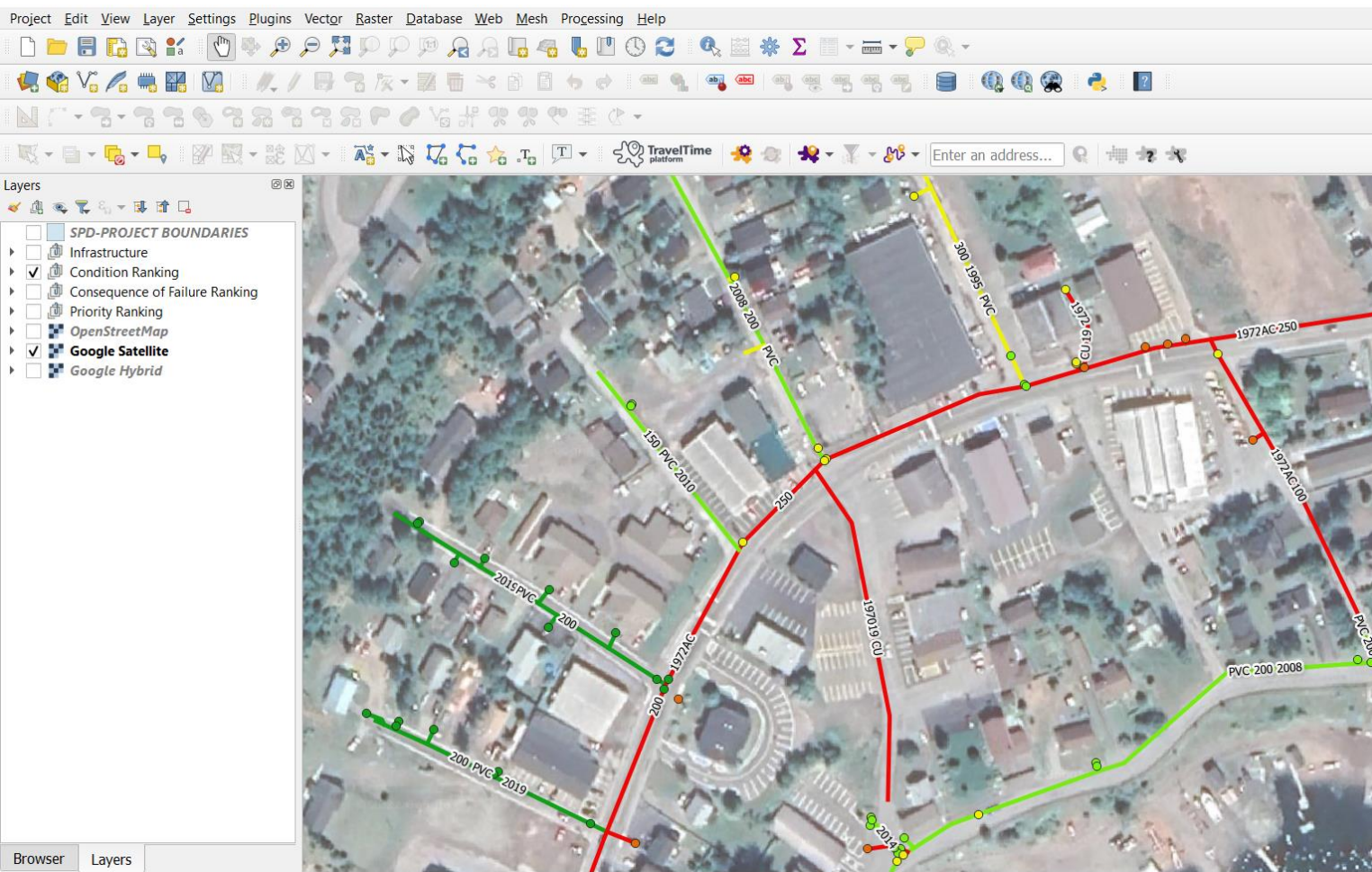
- How good is my information?
- What can influence failure (date of install, soil, age, chemistry)?
- How much can it vary?
- What is the consequence if forecast is wrong?

Cost:

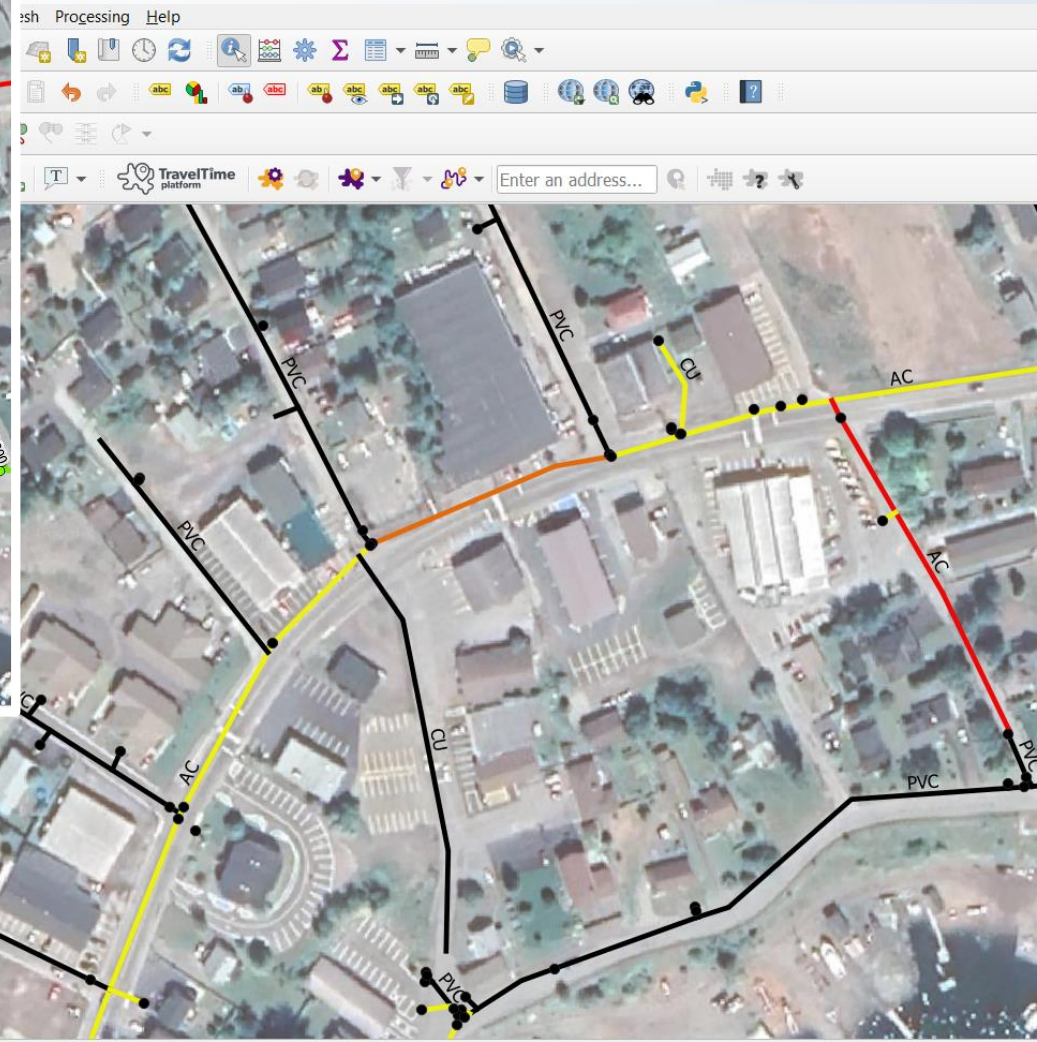
- Cost of operations and maintenance activities
- Cost of capital renewal
- Inflation and “cost of money” assumptions



QGIS – Mapping and Data Collection



- Location of assets
- Location and type of disruption
- Map to location, age, other data



AIM Technical Committee

- Manage AIM Network's free, open-source tools (follow NL data standards):
 - Capital replacement cost forecasting based on risk assessments
 - Facility inventory collection and costing
 - Level of service assessment (NEW: natural asset levels of service)
 - Climate vulnerability and risk assessment
 - Asset retirement obligation calculation
- Collect feedback from user groups on tools and decide on updates
- Advise on need for new tools and resources for AIM Executive



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