Canadian Network of Asset Managers
APPLIED CLIMATE ACTION COHORT

WORKSHOP NO. 4

2023

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This initiative is offered through the Municipal Asset Management Program, which is delivered by the Federation of Canadian Municipalities and funded by the Government of Canada.

SESSION 4: LONG-TERM FINANCIAL PLANNING AND CLIMATE CHANGE

LEARNING GOALS

After completing this workshop, you will be able to:

1. Identify how to use available information to estimate how climate change and climate action may impact asset investment needs and long-term financial planning strategies.
2. Reflect on the cohort training experience and complete the cohort training reporting requirements.
3. Identify your next steps for integrating climate considerations with asset management.

USING THIS WORKBOOK

LEARNING GOAL

Specific learning outcome to be achieved.

ACTIVITY

Individual or group exercises that provide practical learning opportunities.

GLOSSARY

Definitions of words and phrases used throughout the course.

RESOURCES

Additional helpful materials related to the topic.

MODULE A: INTRODUCTION

Welcome back to our last workshop on operationalizing climate change through asset management! This workshop is about bringing it all together, as we'll talk about long-term financial planning and give you space to plan out what's next for your organization beyond the cohort program.

WHAT IS IN SCOPE FOR THIS WORKSHOP?

WE WILL BE BRINGING TOGETHER WHAT WE'VE DISCUSSED SO FAR.

- What are the impacts of climate on our levels of service? What changes do we need to our assets to deliver the same level of service? Where might we adjust levels of service to be resilient to climate or reduce GHG emissions? Where do we need to acquire or build new assets to deliver new services?
- What are risks to our service delivery? What do we need to do to our assets to manage these risks?

These questions need to be answered in the context of costs, funding, and affordability. Today we will be bringing together the work we've done so far to understand the financial implications of climate change, which includes going back to revisit levels of service and risk.

WE WILL BE FOCUSING ON THE IMPACTS OF CLIMATE CHANGE ON YOUR LONG-TERM FINANCIAL PLAN, AIMING TO ANSWER THE FOLLOWING QUESTIONS:

- How might climate change and reducing our emissions impact our long-term capital costs for asset renewal and acquisition?
- How do long-term capital costs and funding requirements change under different scenarios for the future?
- What are the implications for operations and maintenance costs and funding? We will explore these qualitatively only. For example, what assumptions are we making about operations and maintenance in each scenario?
- What are the implications of our current funding levels on long-term sustainable service delivery?

Where do you fit in? Our assumption is that participants in this workshop will not be the ones developing the long-term financial plans, but that they will need to work with Finance to develop these plans. Participants do not need to be finance experts – this workshop is focused on equipping you to explore financial impacts of climate change and begin conversations with your finance colleagues to plan for sustainable levels of funding.

WHAT IS NOT IN SCOPE FOR THIS WORKSHOP?

- We will not be getting into details of how to develop a long-term financial plan, rather we will be focussing on how to integrate climate considerations.
- We will not be getting into quantitative analysis of operations and maintenance costs.
- We will not be focusing on revenue planning.

MODULE B: INTEGRATING LONG-TERM FINANCIAL PLANNING AND CLIMATE CHANGE

OVERVIEW OF LONG-TERM FINANCIAL PLANNING

Note: *The guide How to Write a Long Term Financial Plan for Asset Management, by Asset Management BC, is a great companion resource to this content.*

How-to-Write-A-Long-Term-Financial-Plan-for-AM-2023-Edition-FINAL.pdf (assetmanagementbc.ca)

WHAT IS A LONG-TERM FINANCIAL PLAN (LTFP)?

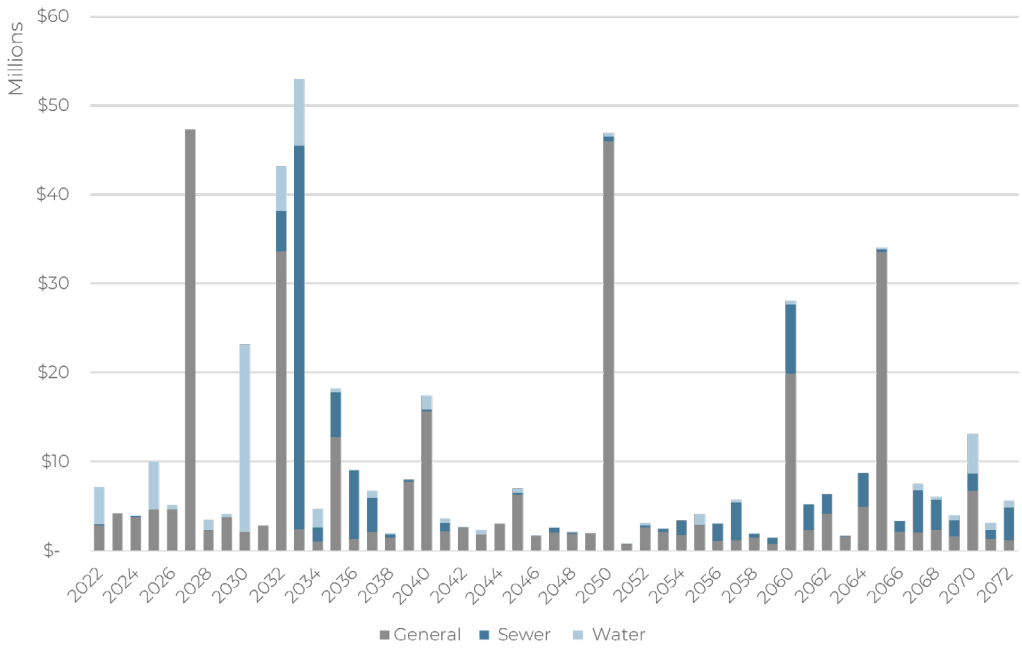
A long-term financial plan (LTFP) helps your organization to identify long-term financial trends and explore scenarios to inform decisions – these decisions can be about funding, levels of service, or risk.

Developing a LTFP involves projecting revenues, expenses, and other factors that have an impact on the organization's finances.

For purposes of this session, we're going to use a simplified version of the LTFP. We will be focussing only on changes to capital expenses related to existing assets, or any new assets that are needed to manage risk to climate change. This simplified version is sometimes called an Asset Renewal Forecast (ARF).

Here are some examples of long-term financial plans

District of Saanich: Financial Plan
City of Saint John: Long-Term Financial Plan
City of Calgary: Long Range Financial Plan
Village of Anmore: Financial Sustainability Plan
Revelstoke: Long-Term Financial Plan Report



Source: Asset Management Plan & Long-Term Financial Strategy, District of Central Saanich, 2022. Available: https://www.centralsaanich.ca/sites/default/files/uploads/documents/central_saanich_asset_management_plan_and_long_term_financial_strategy.pdf

If Finance in your organization maintains a detailed LTFP, information developed for the ARF will be an important input. If Finance does not maintain a detailed LTFP, you can still use the ARF as a tool to understand near and long-term financial impacts of climate change on service delivery. This can help with:

- Financial planning, by understanding theoretical costs and timing of asset renewal and replacement.
- Building broader awareness of the financial side of sustainable service delivery, and the connection between today's actions and implications for future generations.
- Communicating the business case of asset management and climate action (and integrating the two).
- Exploring various scenarios and finding a pathway to sustainable funding. What does this look like in your community's context?
- Prioritizing where further detail is needed and further work or studies are required (e.g., condition inspections, capacity modelling, etc.)

Consider: *what is the legacy being left to future generations? These are assets, not liabilities - the return on your investment is the service being delivered and what that does for your community today and for future generations. This is an important mindset shift that can have very significant intergenerational impacts on your community.*

WHAT IS THE LTFP NOT?

Neither the LTFP, nor the ARF, are a capital plan. The ARF does not include O&M costs.

WHAT DATA DO YOU NEED TO PREPARE THE ASSET RENEWAL FORECAST?

DATA	CRITICALITY	DEGREE OF ACCURACY REQUIRED
Material	Medium	Low accuracy required
Size and Location	Medium	Moderate accuracy required
Costing	High	Moderate accuracy required
Estimated Useful Life	Critical	Moderate accuracy required
Condition Assessments	Low	Low accuracy required

Source: Image adapted from How to Write a Long-Term Financial Plan for Asset Management, Asset Management BC, 2023.

Generating the ARF requires making lots of assumptions to supplement the data you have. This includes assumptions about:

- What assets do we own?
- What are assets made of? What size are they?
- What will assets cost to replace? How do we estimate replacement cost?
- How long assets will last?

Integrating climate considerations will require you to make further assumptions and estimates about:

- How will climate change impact your assets?
- What needs to be done to manage impacts to assets and services?
- What will it cost?
- When actions need to be taken?

You are never going to have perfect information about your assets. This is especially the case when we are trying to incorporate climate change considerations.

We don't need perfect information, but we need to be clear about what the limitations of our data are. It is important to understand what your assumptions are and how sensitive the results of the ARF are to the quality of your data. Not all data is equally important – the appropriate level of accuracy and completeness depends on what you're trying to achieve and the decisions you're trying to inform.

For example, in order to build awareness of long-term funding requirements and impacts of climate, high-level information is very appropriate. Focus on getting the right order of magnitude (and be clear about uncertainty when communicating with your audiences).

On the other hand, for near-term capital planning, you will want more detail to inform decisions about prioritization, financing, and cash flow.

Start where you are, with the data you have (including anecdotal data). You can use the results to understand where it will add value to improve the completeness or accuracy of the data.

INTEGRATING CLIMATE INTO THE ASSET REPLACEMENT FORECAST

To integrate climate change and climate action into your ARF, let's begin by looking at which data inputs to the ARF may be impacted by climate.

SMALL GROUP EXERCISE: Which data inputs are impacted by climate change and climate action?

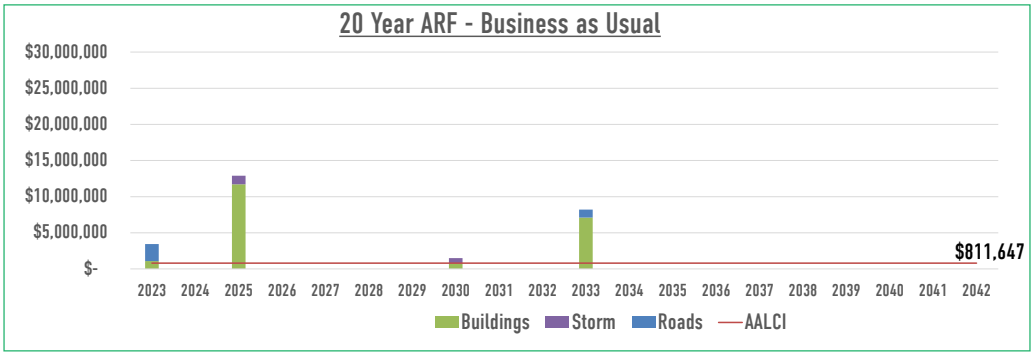
DATA	WILL THIS BE IMPACTED BY CHANGING CLIMATE OR ACTIONS TO REDUCE GHG EMISSIONS?	HOW WILL THIS DATA BE IMPACTED?
Material	Roads example: changing temperatures may require different asphalt mixes for resilience	Roads example: different asphalt mix may come with a different replacement cost
Size and Location		
Costing		
Estimated Useful Lives		
Condition Assessments		

WHAT IS THE IMPACT OF THESE CHANGING INPUTS ON OUR OVERALL RESULTS?

The ARF summarizes all the replacement needs of existing infrastructure, based on both known information and assumptions. Adjusting these inputs can change the forecast, and some of these inputs are more sensitive than others. Remember, the ARF is a tool for decision-making and does not provide you with the final plan for infrastructure renewal. The power of this tool is in running scenarios that can help you evaluate your assumptions and communicate the long-term implications of infrastructure decisions in financial terms.

To show how changing inputs can affect the forecast, here are a series of scenarios in a sample ARF for you to consider:

BASELINE SCENARIO



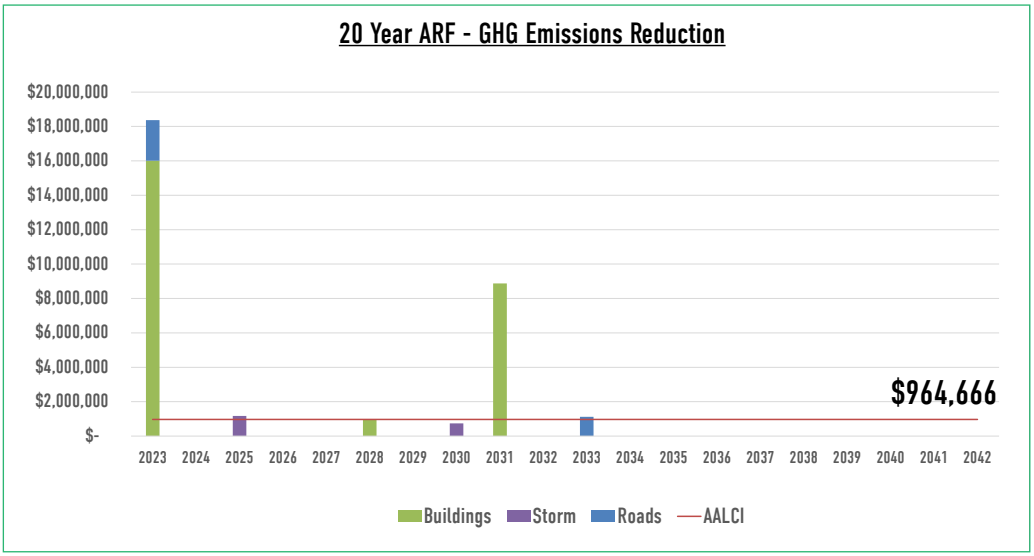
This is the baseline scenario that you can compare the following graphs against, to evaluate how changing inputs changes the forecast.

> **AALCI** = *Average Annual Lifecycle Investment, or the total renewal cost of an asset divided by its useful life. Adding the individual AALCI for all assets in your inventory together gives you the line shown on the graph above.*

SCENARIO 1: CONSIDER ACTIONS TO REDUCE GHG EMISSIONS

You may not be replacing assets like for like – this would impact replacement cost and estimated lifespan. This will most likely have the highest impact to buildings, fleet and equipment, mechanical equipment, and lighting. When compared to the Baseline Scenario, this scenario has assumed:

- 25% *increase* in building replacement costs
- 5% *decrease* in building useful life



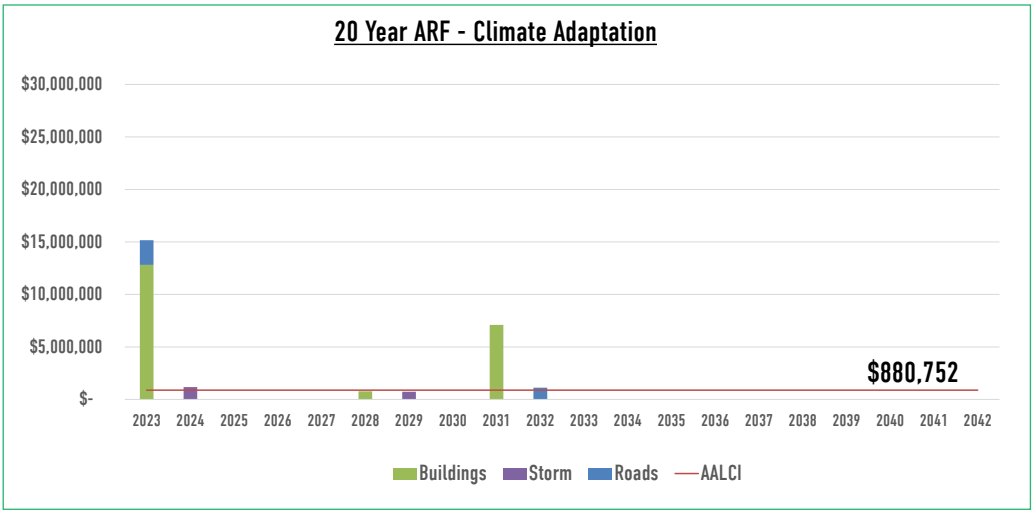
Reducing the useful life of buildings causes more buildings to be due for replacement sooner. This results in a backlog of infrastructure that has passed its useful life. Increasing backlog will often be followed by increasing reactive repairs or replacements. Reducing the useful life also increases the Annual Average Lifecycle Investment, which is further increased by increasing replacement costs.

SCENARIO 2: CONSIDER ACTIONS TO ADAPT TO CLIMATE CHANGE

Climate change may result in assets failing earlier than expected; therefore, reducing their expected useful life. Changing conditions may require replacing existing assets with different assets for climate resilience (e.g., different size, materials, other). Or you may need to add new services and assets, such as cooling stations, dykes, or pump stations. New assets will need to be included in the ARF. All of these scenarios wil impact replacement costs. When compared to the Baseline Scenario, this scenario has assumed:

- 5% *decrease* in building useful life
- 5% *decrease* in asphalt useful life
- 5% *decrease* in culvert useful life
- Addition of a $2M dyke

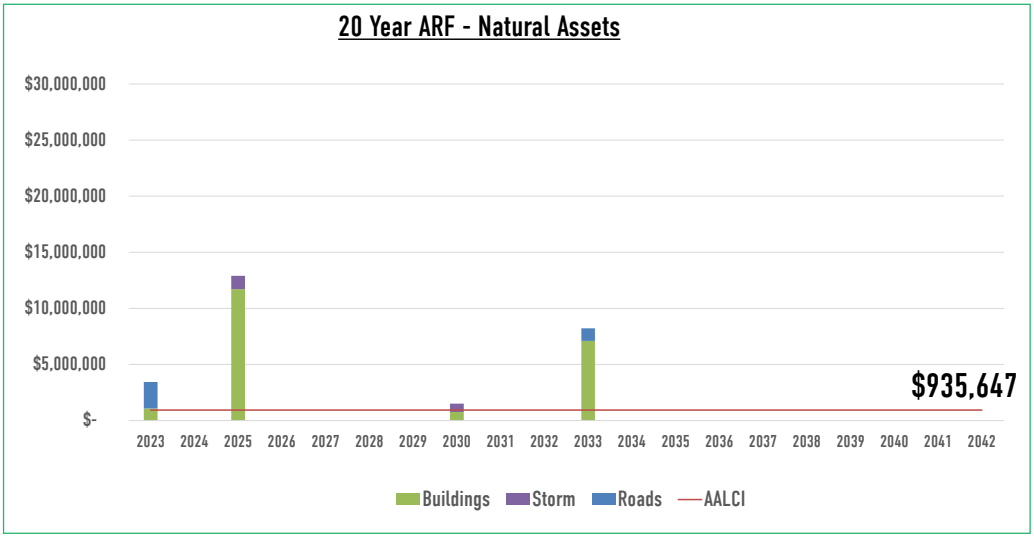
Reducing useful lives and adding new infrastructure to adapt to climate change means more infrastructure is due for replacement sooner, and the annual financial need for replacement increases. If this scenario was stretched out over 50 years, you would see more dramatic peaks and valleys of infrastructure replacement over time.



SCENARIO 3: INCLUDING NATURAL ASSETS

The costs of restoring natural assets will resemble adding new assets to your inventory with "renewal requirements" in the ARF. Additionally, the loss of natural assets can lead to the loss of core municipal services that would require replacement through an engineered alternative to deliver the same service – this would result in the potential requirement for new engineered assets to be included in the ARF. When compared to the Baseline Scenario, this scenario has assumed:

. Addition of $6.2M worth of stormwater ponds



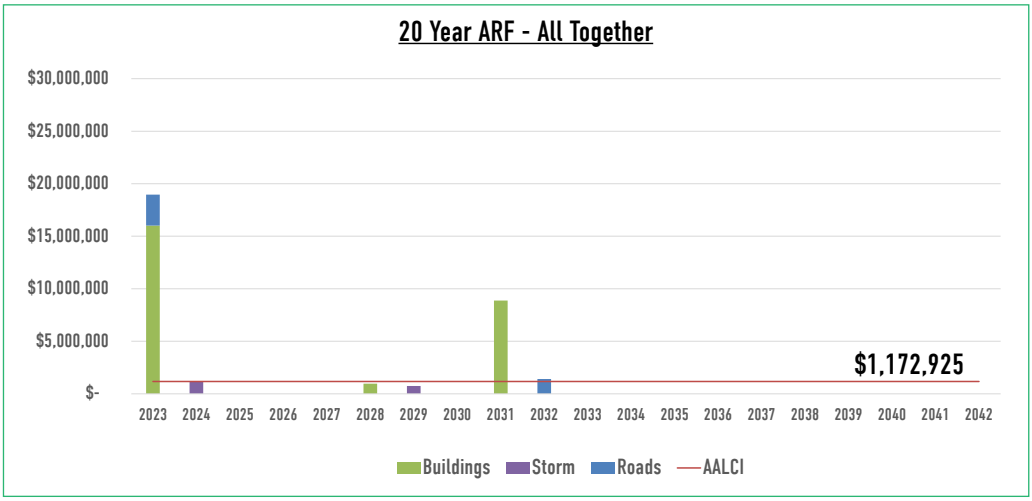
Adding stormwater ponds increases the value of the asset base as reflected in the Average Annual Life Cycle investment.

SCENARIO 4: PUTTING IT ALL TOGETHER

Evaluating the previous scenarios is helpful in demonstrating the sensitivity of the assumptions and inputs behind the ARF. It's also important to bring everything together to evaluate the additive impacts of GHG emissions reduction, climate adaptation, and including natural assets in financial terms. When compared to the Baseline Scenario, this scenario has assumed:

- 25% *increase* in building replacement costs
- 5% *decrease* in building useful life
- 5% *decrease* in asphalt useful life
- 5% *decrease* in culvert useful life
- Addition of a $2M dyke
- Addition of $6.2M worth of stormwater ponds

This scenario results in both increased backlog and increased Average Annual Lifecycle Investment.



MANAGING UNCERTAINTY WITH SCENARIO EVALUATION

One way we deal with uncertainty in our assumptions is to test out different scenarios to understand how sensitive our analysis is to our assumptions. How much does it matter if we get our assumptions wrong? Rather than trying to guess exactly what the future might look like (for example, exactly how much bigger will we need to make our culverts?), we can define a reasonable range of estimates (for example, we will likely need to make them 10% - 25% bigger) and see what the forecast looks like in each scenario.

SMALL GROUP EXERCISE: using the excel sheet provided, explore the impacts these data inputs on the ARF by testing out these different scenarios:

- Upsizing the storm system by 10% and 25% (assume direct relationship between size and cost, e.g. increase replacement cost by 10% and 25%)
- Reducing the useful life of roads by 15% and 30%
- Replacing buildings with low GHG emission version that costs 15% more
- Add a new _____ (asset) worth _____ (dollars) with a replacement life of _____ (years).

DEBRIEF

- What did you observe? What questions came up?
- What did you notice made the biggest difference to your overall ARF?
- Where might better data make the biggest improvement to your decision-making about long-term funding approach?
- How is each scenario connected to level of service or risk?
- The ARF only evaluates capital costs. How do you think O&M costs would be affected by these scenarios?
- What does the difference in the Average Annual Life Cycle Investment between scenarios tell you about long-term sustainability of services?

MODULE C: COLLECTING DATA-THE APPLICATION

WHERE DO YOU GET THE DATA YOU NEED TO CONSIDER CLIMATE IN YOUR LTFP? Some sources you might consider include using community specific data (e.g., climate change vulnerability assessments or modeling), or using general assumptions or estimates.

This is about understanding scenarios and sensitivity, not capital planning. High level information is often most appropriate. We are not trying (nor able) to predict the future.

You can look to climate action or adaptation plans, risk assessments, level of service frameworks or statements, or infrastructure plans for information. Think about the following prompts to identify useful information when scenario testing:

- Which projects are identified to manage risk, adjust levels of service, decrease GHG emissions/energy consumption?
- What assumptions can be made about other assets that are not covered in your studies or plans?

The Financial Accountability Office of Ontario (FAO) has released reports on how to assess public infrastructure impacts based on changes in extreme rainfall, extreme heat, and freeze-thaw cycles – these were qualitatively deemed to be the most financially relevant hazards.

Subject Matter Experts (SMEs) were consulted to quantify the impacts of hazard interactions on the infrastructure assets below to calculate climate-cost elasticity. The asset classes are based on the FAO's Provincial Infrastructure report.

The values in the table below are the median of the ranges determined during analysis. For information about the range of values, please refer to the report linked below.

ASSET	O&M COST ($)	SERVICE LIFE (YEARS)	RETROFIT COST ($)	RENEWAL COST ($)
BUILDINGS				
Buildings	+1.2%	-11%	+30.0%	+16.0%
LINEAR STORM AND WASTEWATER				
Stormwater culverts	+2.5%	0.0%	-	+85.0%
Stormwater ditches	+2.5%	0.0%	-	+74.0%
Stormwater pipes	+5.1%	0.0%	-	+75.0%
Wastewater sanitary force mains	+2.5%	-14.0%	-	+65.0%
Wastewater sewer pipes	+1.6%	0.0%	-	+49.0%
TRANSPORTATION				
Roads	+1.5%	-31.1%	+25.9%	+25.9%
Bridges	+1.3%	-2.6%	+7.5%	+6.7%
Large structural culverts	+2.5%	-31.3%	+58.9%	+25.1%
Transit engineering	+1.2%	-7.9%	+18.0%	+6.2%

Assumptions: 50th percentile climate projection, using a High Emissions (RCP 8.5) scenario

Table 1. Median Impacts to Public Infrastructure Assets in a High Emissions Climate Change Scenario (Ontario)

Reports for each asset class are available on the FAO webpage on Costing Climate Change Impacts to Public Infrastructure Project.

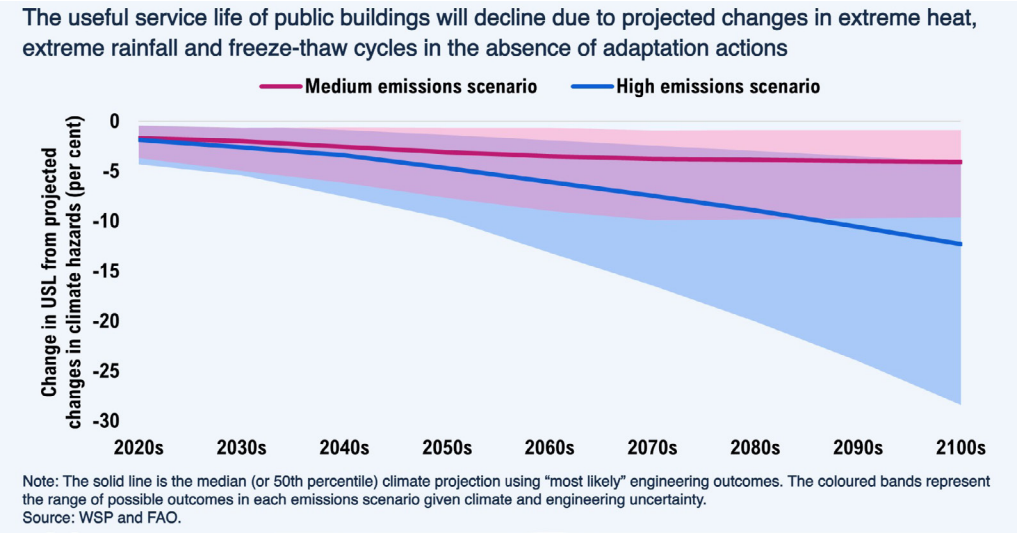
USING INFORMATION FROM DIFFERENT CONTEXTS

You may not have the same depth or breadth of information about your community as the FAO used to complete their assessment. You may be able to use the results of their analysis to plan for resilience in your community, with some considerations:

- Some climate impacts will be similar, while others will be different. It is up to you to use your best judgement in adapting assumptions.
- Information from other communities can help you build an asset replacement forecast that incorporates a range of impact.
- Communicating about the assumptions and how they were applied to your community is critical – it's important to be clear about assumptions and how they affect outputs that decision-makers rely on.

For example, the graph below from the FAO report shows the range of decrease in building useful life in two modeled climate change scenarios. While the climate impacts to your buildings may be different than assumed in the FAO analysis, these results can help you scope some initial scenarios:

- What happens to your asset replacement forecast if you reduce useful lives by 10%? 20%? 30%?
- How would this affect financial investment needs to maintain services? Is it dramatically different between 10% and 30%?



What data do you have that you could use to incorporate climate into your

Remember, information from other context can help you in determining the sensitivity of the inputs to your asset replacement forecast.

As climate changes around us, we do not have the luxury of boundless time and dollars that would be needed to complete an analysis like this for every community. Applying information from other contexts, while being mindful of assumptions and communication can help you to take first steps in articulating the business case for incorporating climate in infrastructure decisions. You can start with anecdotal information from your team and make headway from there!

REFLECTION

Who are the subject matter experts in your organization?

ARF and/or LTFP?

What are your next steps to developing or improving your ARF and/or LTFP?

MODULE D: COHORT WRAP-UP

COHORT REFLECTIONS

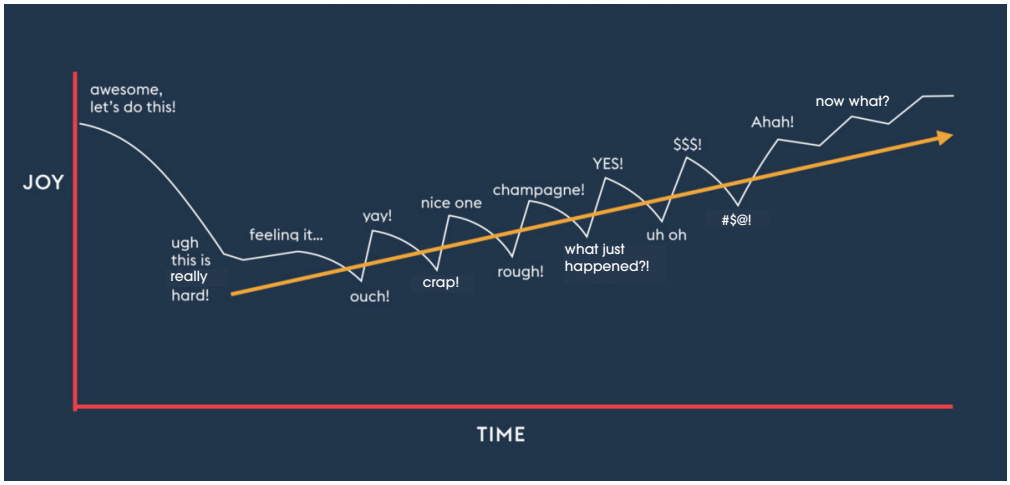
Over the past year, we have covered a wide range of topics to support you in applying climate change through asset management. These were complex topics to grapple with and required an adaptive approach! Here is a quick summary of what we covered:

WORKSHOP 1: INTRODUCTION TO THE APPLIED CLIMATE ACTION COHORT (OCTOBER 2022)	WORKSHOP 2: INTEGRATING CLIMATE CHANGE AND LEVELS OF SERVICE (DECEMBER 2022)	WORKSHOP 3: CLIMATE CHANGE AND RISK MANAGEMENT (APRIL 2023)	WORKSHOP 4: LONG-TERM FINANCIAL PLANNING AND CLIMATE CHANGE (SEPTEMBER 2023)
Core terms and principles of asset management and climate change Establishing goals, baseline, and a plan for the cohort program (3 scales)	Adaptive approach to complex problems Why integrate climate change and Levels of Service How to integrating climate change and levels of service (approach and application)	Case Study: Integrating Climate Change into Asset Management Risk Assessments in the City of Castlegar The four steps in risk management: assess risk, risk treatment, monitor and review A tale of two risk assessments (Kanaka Bar and Ministry of Transportation) Communicating/ consulting and risk management	Overview of long-term financial planning Integrating climate into the asset replacement forecast (ARF) Evaluating impacts of climate change in ARF scenarios

As we saw in workshop 2, part of the asset management mindset is to embrace a degree of uncertainty. An adaptive approach helps to build team resilience through complexity. There will always be a “Messy Middle” in an adaptive approach.

Now that you have completed the cohort with your team – where are you today?

THE MESSY MIDDLE



DISCUSS: As a team, reflect on your experience participating in this cohort. Here are some guiding questions to help along the way:

What content resonated with you the most?

What worked well for you in supporting your progress?

What didn't work so well?

BEYOND THE COHORT

Reflecting beyond this cohort, consider the following questions:

How can you keep building on what worked well for you in this cohort?

What supports do you need to continue that momentum?

How do you best stay in touch?

Do you have Ideas for CNAM (e.g., cohort connection/sharing at the upcoming conference?)

FEEDBACK SURVEY AND UPDATED AMRS

Please take some time to complete the feedback survey. Facilitators will provide you with the survey link.

THIS IS A REQUIRED ACTIVITY FOR ALL PARTICIPANTS!

Now that you have completed the cohort, return to the FCM's Asset Management Readiness Scale (AMRS) to re-evaluate your current asset management maturity. Complete the AMRS as teams. Remember that guidance is included with FCM's Asset Management Readiness Scale (AMRS) (here), along with the self assessment tool. The assessment is to be completed in excel (here).

Feel free to reflect back on the Climate Adaptation Maturity Scale and the Maturity Scale for Municipal GHG Emissions Reduction that we explored at the beginning of the cohort. Complete FCM's Climate Adaptation Maturity Scale (here) or FCM's Maturity Scale for Municipal GHG Emissions Reduction (here) to measure your progress.

THANK YOU!

We would like to extend our heartfelt gratitude to each and every one of you for being a part of the Applied Climate Action Cohort. The Applied Climate Action Cohort was a platform designed to empower you with the knowledge, tools, and strategies needed to navigate the ever-evolving landscape of climate change impacts. Your presence here signified your readiness to take on the critical task of preparing for the uncertain future and acting on adaptation and mitigation efforts. We are honored to have had you on board.