Asset Management: Industry Practices and Trends

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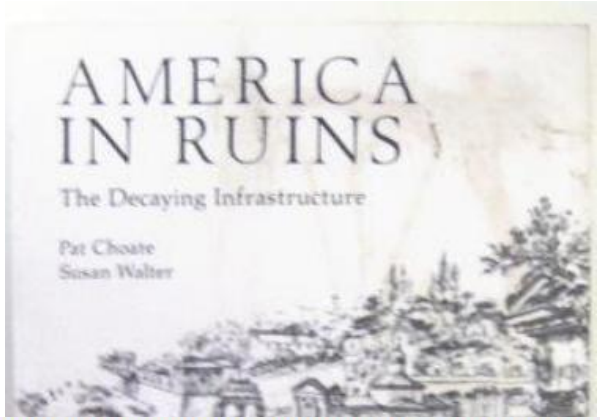
1 Canada's Asset Management Journey

A brief historical review

The journey started shortly after …

The publication in the USA of the book: ***America in Ruins: the Decaying Infrastructure*** by Pat Choate and Susan Walter in 1981



In Canada, it was the 1985 Federation of Canadian Municipalities Report **Municipal Infrastructure in Canada: *Physical Condition and Funding Adequacy*** that triggered the debate about infrastructure sustainability

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The past 20 years … significant progress

Starting circa 1994, and continues to date: tri-partite infrastructure funding programs

Funding of *InfraGuide* (2000) – NRC + FCM

National Guide to Sustainable Municipal Infrastructure
www.infraguide.ca

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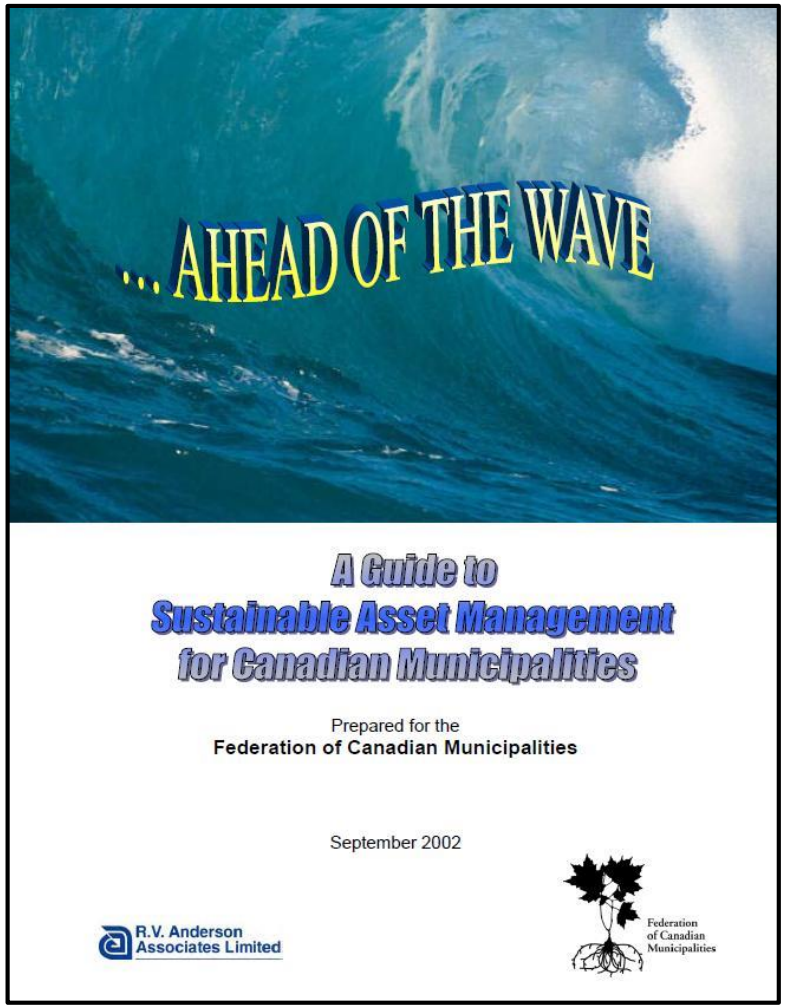
More Happening in the 2000's

The future of Canada's infrastructure is ever more present on the radar of all levels of government and associations

The "infrastructure deficit" number continues to grow

A new Federal Department created: **Infrastructure Canada**



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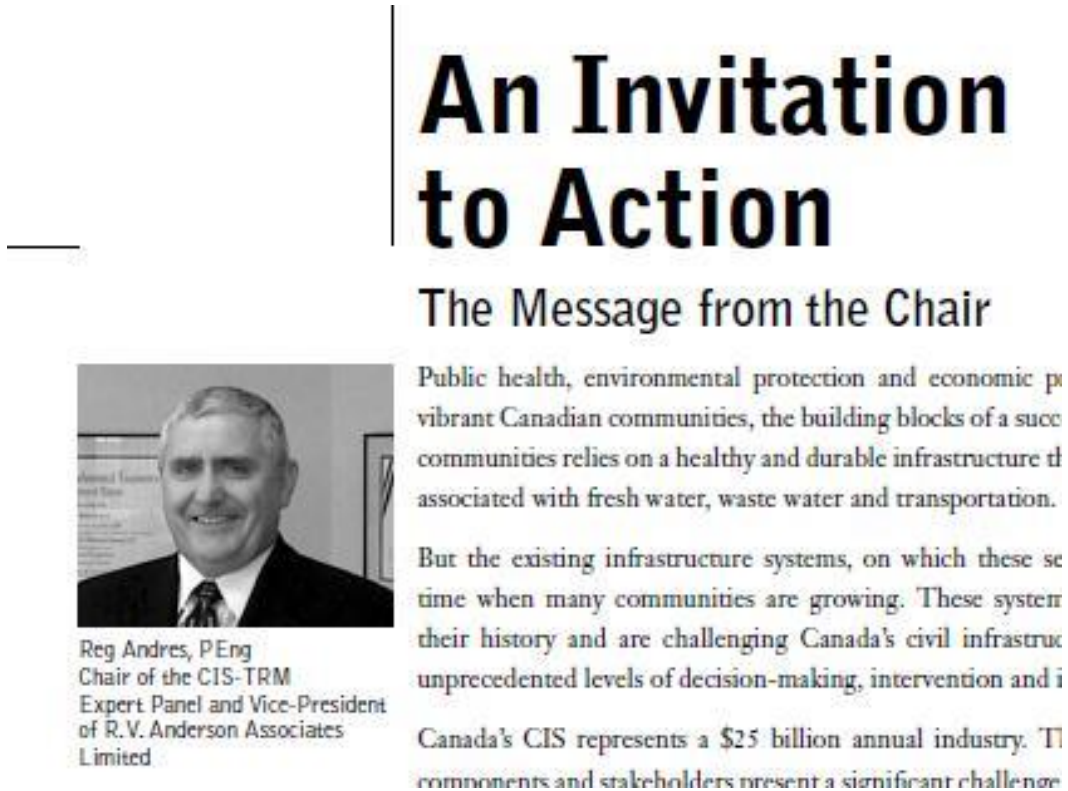
Where do we go then?

The 2003 CSCE CIS technology roadmap



An Invitation to Action

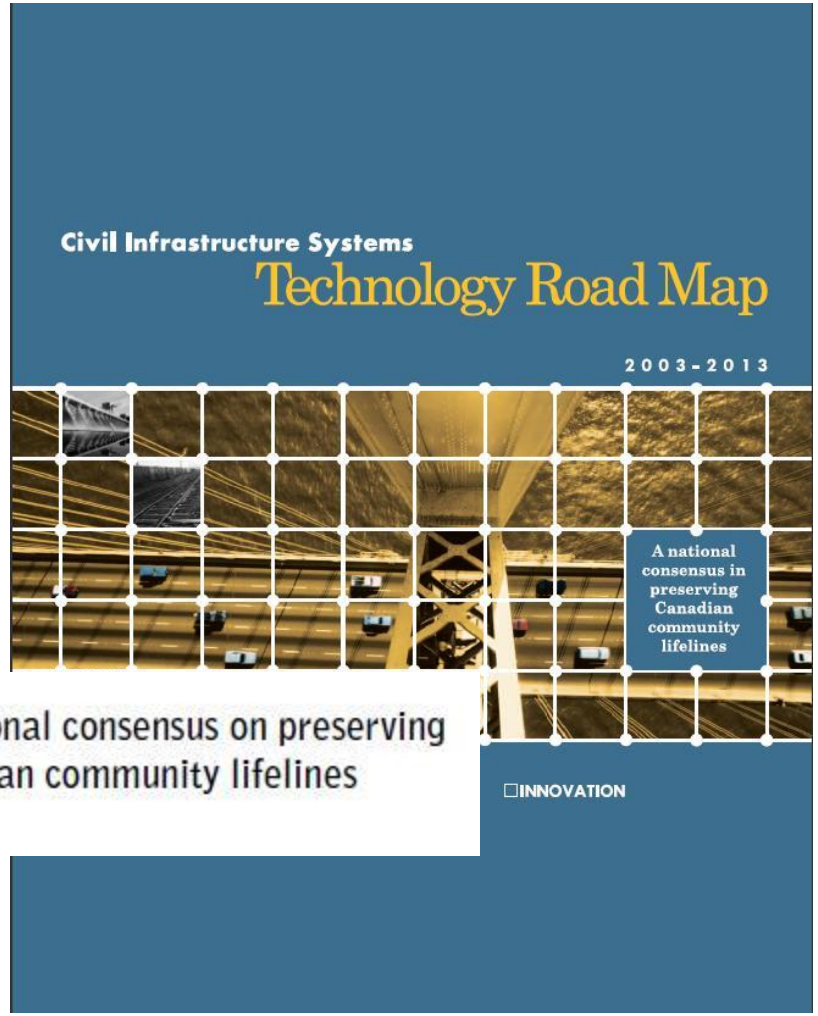
The Message from the Chair

Reg Andres, PEng
Chair of the CIS-TRM
Expert Panel and Vice-President
of R.V. Anderson Associates
Limited

Public health, environmental protection and economic p
vibrant Canadian communities, the building blocks of a succ
communities relies on a healthy and durable infrastructure th
associated with fresh water, waste water and transportation.

But the existing infrastructure systems, on which these se
time when many communities are growing. These system
their history and are challenging Canada's civil infrastruc
unprecedented levels of decision-making, intervention and i

Canada's CIS represents a $25 billion annual industry. Th
components and stakeholders present a significant challenge



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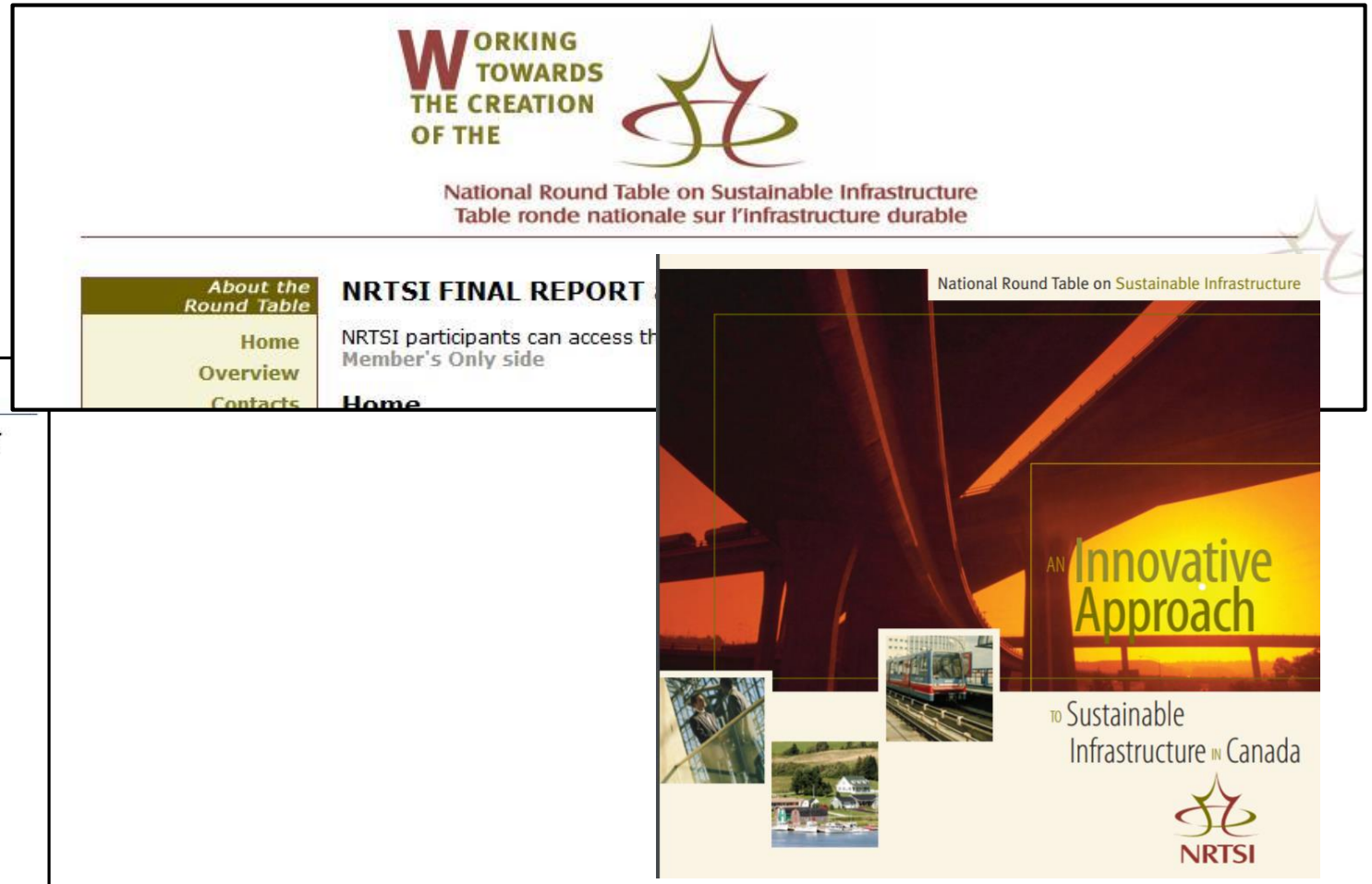
How do we get there?

2004 - 2010

2005 - 2007



https://engineerscanada.ca/public-policy/national-round-table-on-sustainable-infrastructure

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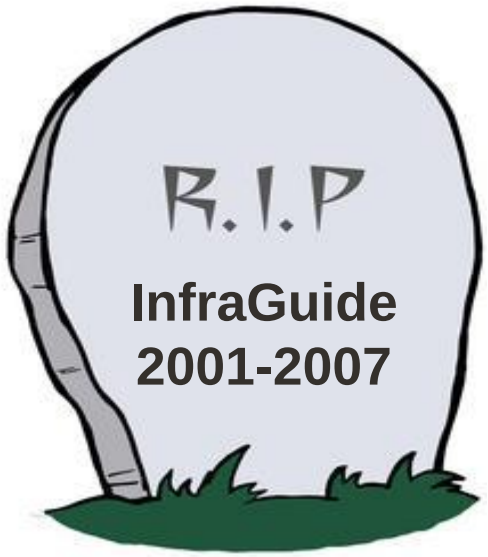
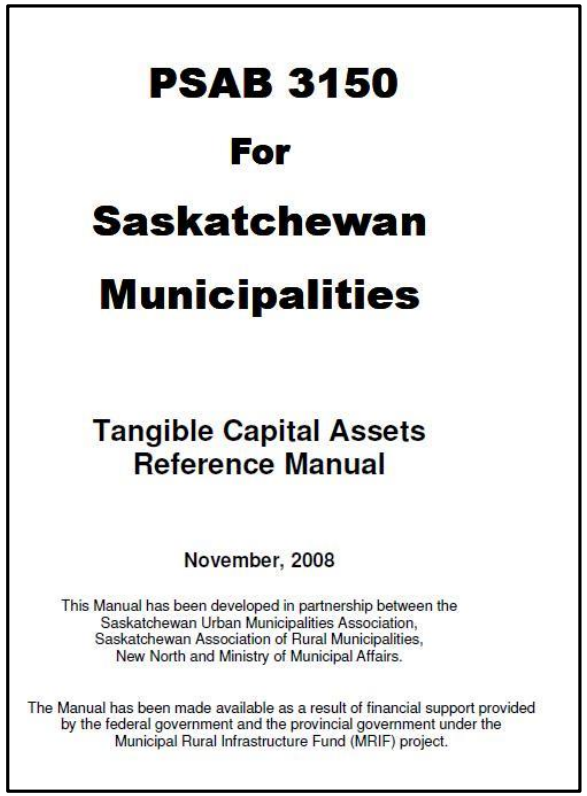
Meanwhile …

55 best practices and a network of 350 volunteers later …

… but, where the engineers left, the accountants picked up



National Asset Management Working Group (NAMWG)



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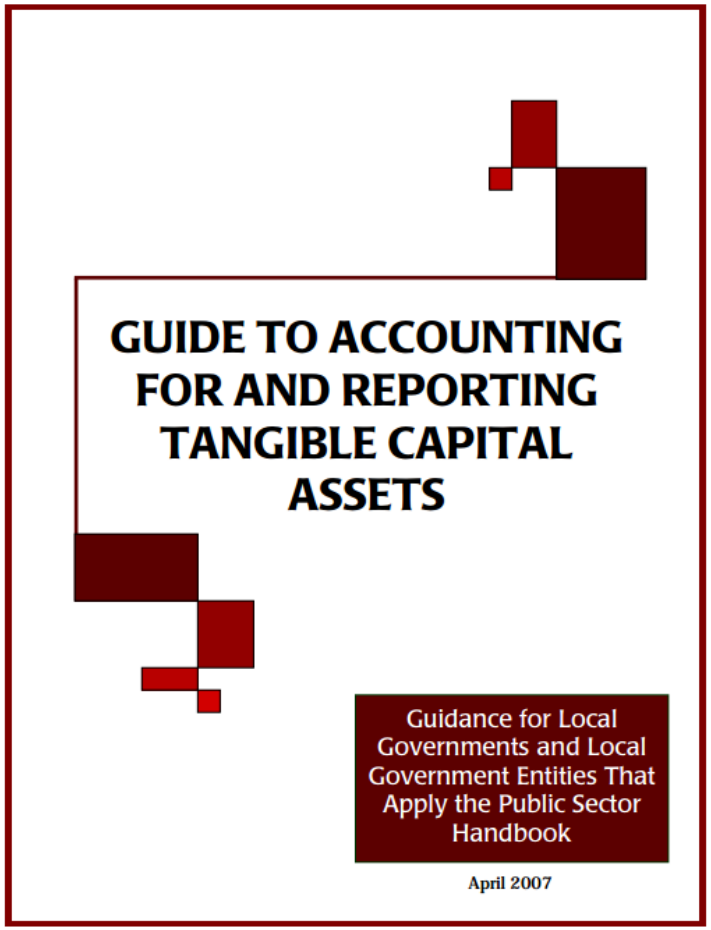
Asset Accounting versus Asset Management

TCA Reporting (PS 3150)	Asset Management

• Inventory
• Condition Assessment
• Residual Life Prediction
• Valuation (historical)
 	
• Financial reporting
	• Inventory
	• Condition Assessment
	• Residual Life Prediction
	• Valuation (replacement)
	• Intervention Plans (prioritization)
	• Infrastructure Needs:
	  • Future demand
	  • Levels of Service
	  • Regulatory requirements
	• Risk Management Plans
	• Investment Plans (Short, Medium and Long Term)



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The US, UK and AU have an Infrastructure Report Card …

What about us?

2012 – First Canadian Infrastructure Report Card – CCA, CSCE, CPWA and FCM sponsors

2016 – Expanded range of assets considered

CANADIAN INFRASTRUCTURE REPORT CARD

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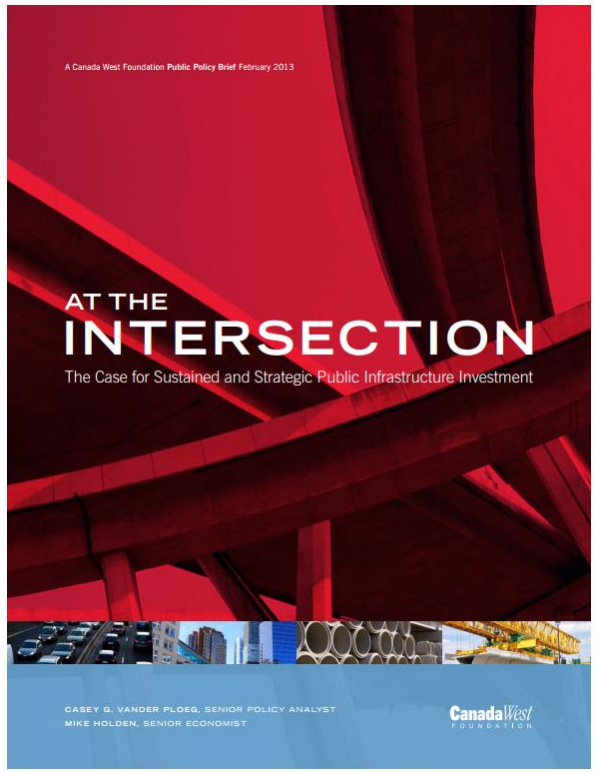
Awareness about infrastructure needs and benefits on the rise

Canada West Foundation – February 2013 report on linkages between investing in infrastructure and productivity



> Canada's governments should not hesitate to maintain a high level of investment in infrastructure. Sustained and strategic investment in public infrastructure is essential to Canada's long-term economic growth and is critical to the quality of life enjoyed by Canadians.

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The AM Planning Incentive in the Federal Gas Tax Program

Renewed Gas Tax Agreement

The Administrative Agreement on the Federal Gas Tax Fund in British Columbia (Agreement or GTA) took effect on April 1, 2014. The tripartite Agreement between Canada-British Columbia-UBCM replaced the 2005-2014 Agreement and provides the administrative framework for the delivery of federal Gas Tax funding to local governments and other recipients in British Columbia over ten years (2014-2024).

- Different requirements in other Provincial/Territorial agreements – focus on improving the AM state-of-practice

Are we there yet?

PSAB's PS3150 TCA reporting requirements are becoming part of the routine business processes of an increasing number of municipalities

The spirits of InfraGuide and NAMWG live on through regional and national initiatives:

YUKON ASSET MANAGEMENT COMMUNITY OF PRACTICE

CNAM Canadian Network of Asset Managers

AMOntario ASSET MANAGEMENT ONTARIO

CERIU

AM ASSET MANAGEMENT BC

IAMA INFRASTRUCTURE ASSET MANAGEMENT ALBERTA

AM-SK Asset Management Saskatchewan

ICSI Ontario Coalition for Sustainable Infrastructure

AIM network

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Brief International Perspective: are we really late starters?

1984-7 South Australian public sector '*True cost of services*' and '*Cost and timing of asset replacement*' reports (Dr. Penny Burns) resulting in a first, brief, government task force on Asset Management.

1993 First NSW Public Sector '***Total Asset Management Manual***'

1995 New Zealand Asset Management Support group (NAMS) established

2002 NAMS (AU, NZ) ***International Infrastructure Management Manual*** published

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2 Paradigm Shift

Managing assets to asset management … to managing the service

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Asset Management

Managing Assets in the context of Asset Management

Managing Assets (things you do to assets) can be done with or without a structured organizational strategy and context. An organization gains more value from **Managing Assets** within a context of organizational purpose and strategy that steers this activity (and becomes **Asset Management**).

Asset Management has a broader focus than **Managing Assets**, encompassing many organizational levels and applying to all functions or departments. The terms and concepts are explained in ISO 55000 'Asset Management', which shows how the application of broader Asset Management approaches can help you extract most value for stakeholders.

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Managing Assets	Asset Management
Your **colleagues** are focused on: • Asset data, location and condition assessment • Current KPIs • Department budget	Your **colleagues** are focused on: • Information supported decisions (strategic context and related to customer needs) • Strategies to select and exploit assets over their lifecycles to support business aims • Collaboration across departments to optimise resources allocated and activities
Your **stakeholders** are focused on: • Costs • Current performance • Response to failures / maintaining function	Your **stakeholders** are focused on: • Triple bottom line and value • Clarity of purpose of the organization • Focus on impact of activities on organization's objectives
Your **top management** is focused on: • Short term gain / loss • Departmental / individual performance • Savings, especially OPEX	Your **top management** is focused on: • Long term value for the organization • Developing competence and capability across workforce • Business risks understood and mitigated
Your **suppliers** are focused on: • Short term contracts and performance • Service level agreements are focused on contract specifications	Your **suppliers** are focused on: • Long term contracts and/or partnering relationships in support of client value and objectives • Understanding client strategy and needs in 5-10 years

Asset Management

Managing Assets in the context of Asset Management

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Old Paradigm – Asset Focus	New Paradigm: Service Focus
AM is a technical exercise that relies on engineering	AM is a strategic exercise that relies on engineers, but also requires strategic management, planning and financial professionals.
AM requires a software program	AM is not about the software, it is about the process of making decisions and software, GIS and/or spreadsheets might support that process, but it is not about "buying a tool"
Each department manages their assets and propose their budgets accordingly (i.e. buildings, roads, fleet etc. are all managed in silos)	Organizations manage their assets collectively and prioritize budgets accordingly (i.e. buildings, roads, fleet, etc. are all looked at together and prioritized in an integrated manner)
AM is a reactive response.	AM is proactive process that considers life-cycle costs and risks.

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Asset Management … What?

Do the RIGHT THING

… To the RIGHT ASSET …

… At the RIGHT TIME.

Resources
Services
Value
Sustainability
Protect investments

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Results Citizens Value - Costs =

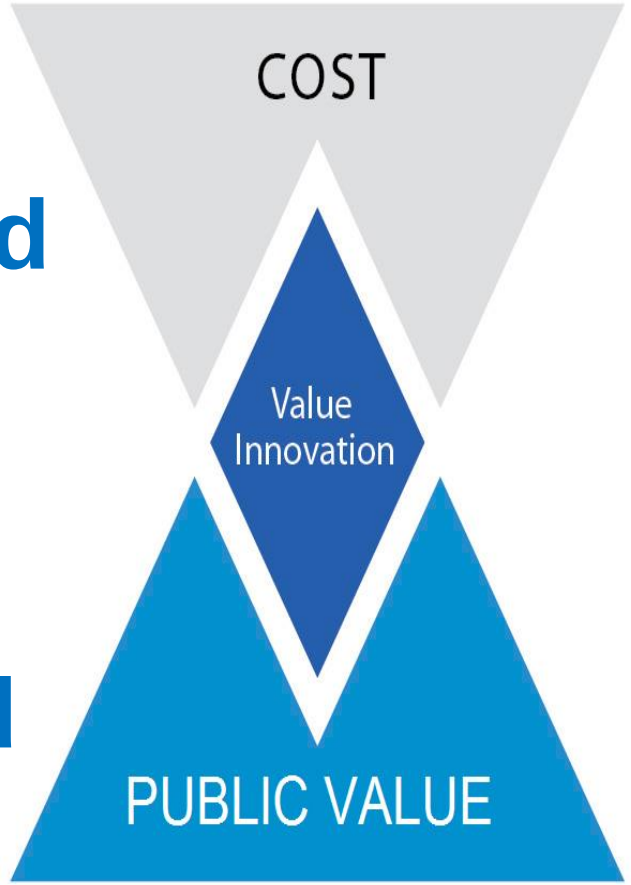
Value Surplus

Created when:

Affordability Maintained

and

Results are Maximized



Lean – Eliminates Waste

- Waste is any activity that **consumes** time, space or **resources** but **does not add value** to the product or service from the perspective of the customer.

- **Methodology**

Courtesy: Meridian Health Partners

LEAN & AM Interconnected

✓Customer Focused
✓Fact & Evidence Based
✓Manage Resources
✓Optimize Resources
✓Match Resources to Demand
✓Meet Customer Needs – Service Delivery
✓Creates Capacity & Savings & Improves Service

✓Key to Sustainability and Resiliency

“Spending the Right Money on the Right Resources at the Right Time”

How it All Connects

3 Need for Climate Change Risks Mitigation and Adaptation

What's happening?

Where?

When?

Why do we need to adapt?

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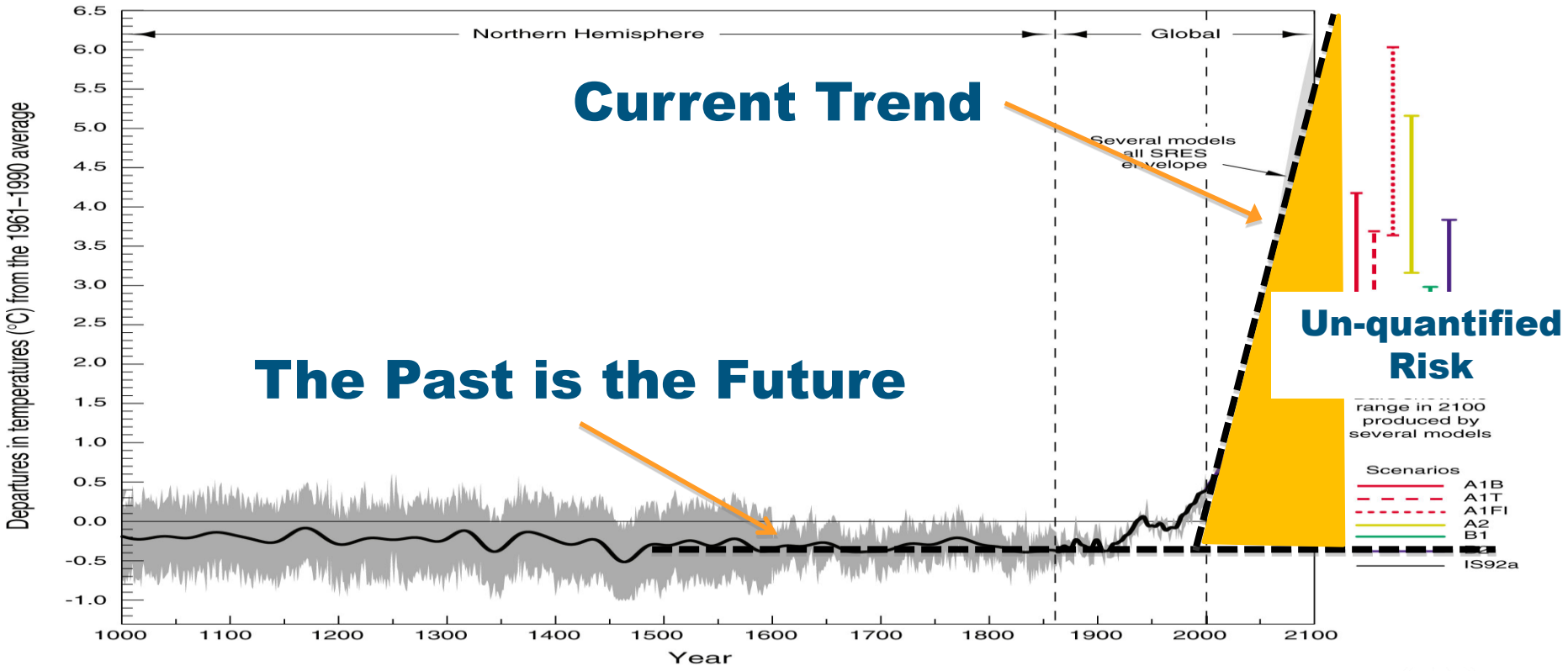
Infrastructure Vulnerability to Climate Changes

From planning, design, financing, operating and maintaining



Source: Engineers Canada

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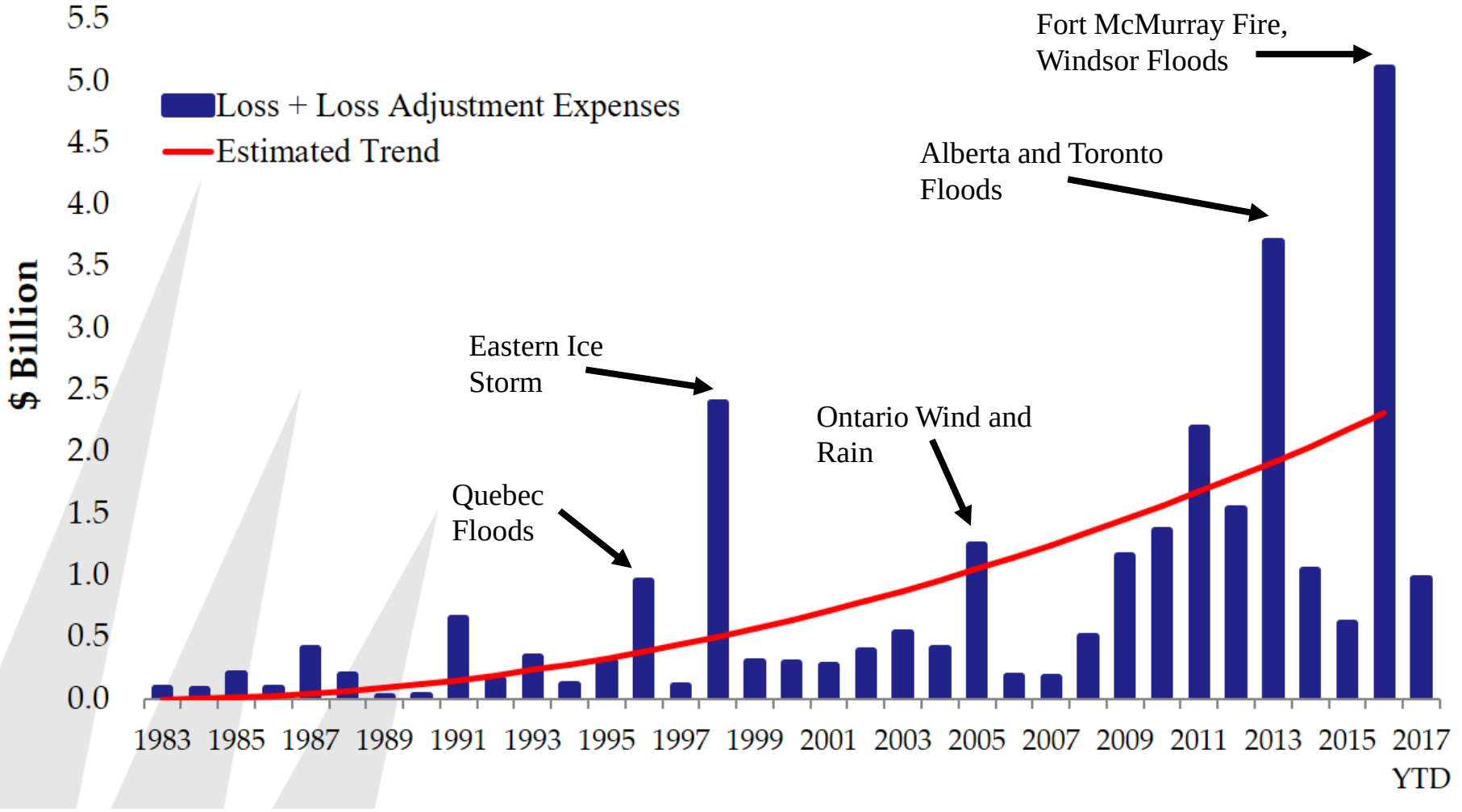
Catastrophic insured losses – Canada



Source: Insurance Bureau of Canada Facts Book, PCS, CatIQ, Swiss Re, Munich Re & Deloitte
Values in 2016 $ CAD

4 Policy and Regulations Trends

Environmental Assessments

Financial reports

Infrastructure Funding Programs

Design Guidelines

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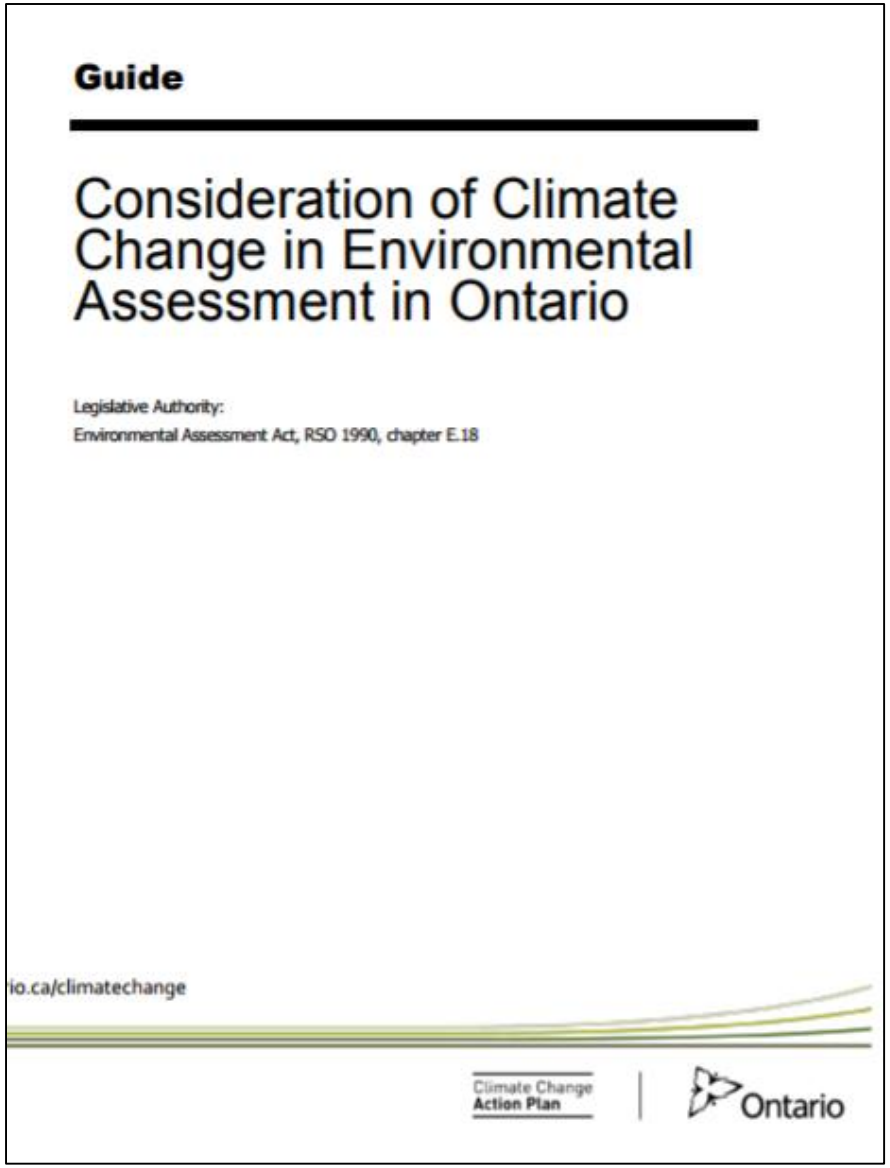
Example: Ontario

Considering the Effects of Climate on a Project

A number of environmental assessment principles are key to successful planning and approval under the Environmental Assessment Act. These principles form the foundation for the overall guidance of an environmental assessment process and provide direction when challenges present themselves.

One principle is that an environmental assessment consider all aspects of the environment including the interrelationships between various components of the environment. Environmental assessments typically evaluate a proposed project in terms of the effect that the project could have on the environment. Climate change requires that environmental assessments also consider the effects that the environment could have on the project. The purpose of the latter consideration from an environmental perspective is to identify any environmental effects which could be exacerbated by climate change leading to greater risk to the surrounding environment.

In applying this principle, a proponent should attempt to demonstrate how the effects of climate on a project can be incorporated into its environmental assessment, as the proposed project could be affected by changing climatic conditions.



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THE GLOBE AND MAIL

Canadian securities regulators to review climate change public disclosures

Canadian securities regulators to review climate change public disclosures

Declaration of Institutional Investors on Climate-Related Financial Risks

A call from the financial services industry for more disclosure to better manage the impact of climate change

Document signed by 30 institutions representing approximately CAD $1.2 trillion in assets under management with support in principle from 13 organizations

The Canadian Securities Administrators staff will consult investors and com
important information and report its findings upon completing the review.

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TORONTO
THE CANADIAN PRESS
MARCH 21, 2017

The regulators of Canada's stock markets are taking a fr
traded companies disclose the risks and financial effects
change.

MONTREAL, Oct. 26, 2017 /CNW Telbec/ - Thirty Canadian and international financial institutions and pension funds representing approximately CAD $1.2 trillion of assets under management today issued a joint *Declaration of Institutional Investors on Climate-Related Financial Risks,* calling on publicly traded companies in Canada to commit to enhanced disclosure on their exposure to climate change risks, and the measures they are taking to manage them. The Declaration is supported in principle by 13 organizations.

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Transport Canada National Trade Corridors Fund

Table 8 – Climate change adaptation and resilience assessment table

Question 1
Have you considered vulnerabilities associated with climate change and extreme weather events in your Proposal? If **yes**, was a specific methodology applied? (One example of a specific methodology is the Public Infrastructure Engineering Vulnerability Committee's (PIEVC) Engineering Protocol). If **no**, how did you determine that these risks did not warrant consideration?
Question 2
What sources of information were consulted (e.g., climate projections, experts, research/publications) and why? Please explain.
Question 3
Describe the extreme weather events and/or changes in climate variables that pose key risks to the project, and identify the associated vulnerabilities. What aspects of the proposed project were deemed to be most at risk from climate change and extreme weather events over the expected design life?

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Technical Circular T-06/15
Date: June 22, 2015
(Revised August 11, 2016)

To:

Executive Directors	Ministry Traffic & Highway Safety Engineers
Regional Directors	Ministry Environmental Engineers
Directors of Engineering Services	Ministry Electrical Engineers
District Managers, Transportation	Operations, Planning & Major Projects
Ministry Structural Engineers	BCMoTI Maintenance Contractors
Ministry Geotechnical Engineers	BCMoTI Design Consultants
Ministry Highway Design & Survey Engineers	Field Services Branch

Subject: Climate Change and Extreme Weather Event Preparedness and Resilience in Engineering Infrastructure Design

The BC Ministry of Transportation and Infrastructure is requiring engineering design work to evaluate and consider vulnerability associated with future climate change and extreme weather events and to include appropriate adaptation measures when feasible, for the design life of infrastructure. Vulnerability assessment methodologies, practice guidance, as well as engineering project examples, can be obtained from other agencies such as professional associations. Climate information can be obtained from climate resource providers.

resource providers.

This directive applies to all new projects, as well as rehabilitation and maintenance projects. In so doing, the Ministry will continue to provide a provincial transportation system that is resilient, reliable and efficient regardless of unfolding climate change and extreme weather events.

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DEVELOPING CLIMATE CHANGE–RESILIENT DESIGNS FOR HIGHWAY INFRASTRUCTURE IN BRITISH COLUMBIA (INTERIM)

APEGBC PROFESSIONAL PRACTICE GUIDELINES

V1.0

PREFACE

These interim guidelines apply only to highway infrastructure owned by the BC Ministry of Transportation and Infrastructure (BCMoTI). After a period of one year, it is expected these guidelines will be reviewed based on the experience gained in their application, and revised as appropriate.

These APEGBC Professional Practice Guidelines address the consideration of climate change and extreme weather event factors in the designs for BCMoTI highway infrastructure in British Columbia in order to promote climate resilience. The guidelines have been developed with support and partial funding from BCMoTI. Subject to Section 1.5 on the applicability of these guidelines, they identify the standard of practice to be followed when carrying out climate change–*resilient design* of highway infrastructure under the authority of BCMoTI, to promote functionality and reliability of provincial highway assets in BC.

ENGINEERS & GEOSCIENTISTS
BRITISH COLUMBIA

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5 Vulnerability and Risk Assessment

How?

What is the tool?
Who has used it?
Are there others?

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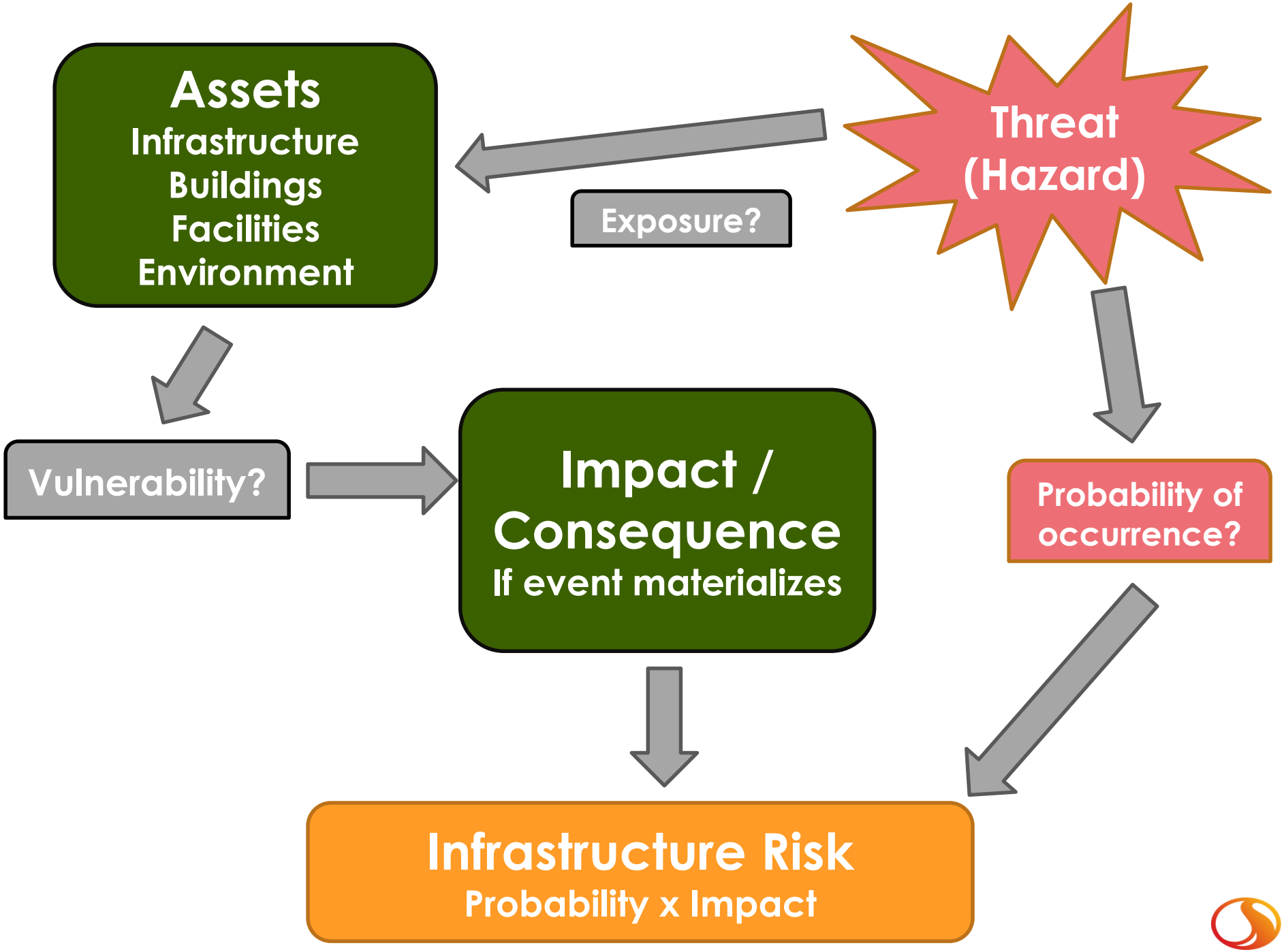
Assets
Infrastructure
Buildings
Facilities
Environment
Exposure?
Threat
(Hazard)
Vulnerability?
Impact /
Consequence
If event materializes
Probability of
occurrence?
Infrastructure Risk
Probability x Impact

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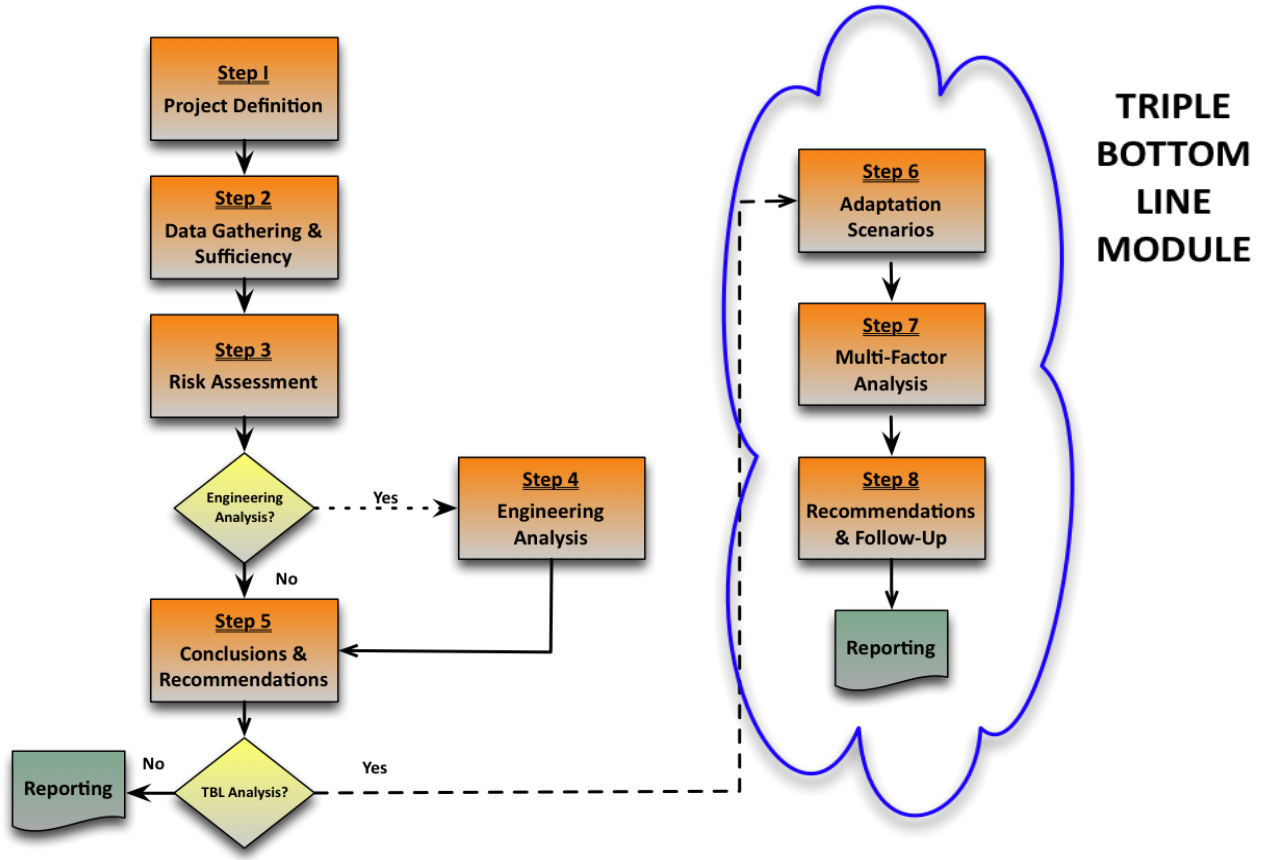
Engineers Canada Initiatives

- PIEVC Protocol (since 2008)
- Education – course syllabus (2013)
- Training: more than 50 workshops across Canada since 2008
- Model Guideline: Principles of CC Adaptation for Professional Engineers (2014)
- Infrastructure Resiliency Professional (IRP) Certification (Since June 2016)

PIEVC Protocol: A Risk Screening Tool

- Five step evaluation process
- A tool derived from standard risk management methodologies
- Intended for use by qualified engineering professionals
- Requires contributions from those with pertinent local knowledge and experience
- Focused on the principles of vulnerability and resiliency



Not a Theoretical Tool: Applied to 45+ Cases and Growing

- Water resources systems
- Storm & wastewater systems
- Roads & bridges
- Buildings (ICI, Universities, Hospital, Residential)
- Transportation infrastructure (rail, airports)
- Energy Infrastructure

And internationally:

- Costa Rica and Honduras
- Vietnam, Brazil and the Nile Basin to come

6 From an Asset Management Lens

The service
The lifecycle
Managing risks

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TCA Reporting (PS 3150)	Asset Management	Risk Management
Inventory	Inventory	Inventory
Condition Assessment (Physical Condition)	Condition Assessment (Physical Condition, Capacity, Functionality)	Condition Assessment (Physical Condition, Capacity, Functionality)
Residual Life Prediction	Residual Life Prediction	Residual Life Prediction
Valuation (Historical)	Valuation (Replacement)	Valuation (Replacement)
	Analysis: Needs: Capacity, Physical Condition, O&M Cost-Benefit	Analysis: Threats Exposure Vulnerability Risks
	Life-cycle Management Plans Additions and Upgrades Replacement and Refurbishment Operations and Maintenance Risk Management	
TCA Report	Investment Plan (Capital, O&M)	Risk Management plan
	Monitor, Report, Revise	Monitor, Report, Revise

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From Condition to Risk Indicators

Performance: Capacity, Condition & Functionality

- Functionality during and after an event

Risk Analysis

- Event-infrastructure interactions

Risk Management Plan

- Mitigate impacts; risk treatment

Key Performance and Risk Indicators

- Key Risk Indicators: forward looking - warning flags

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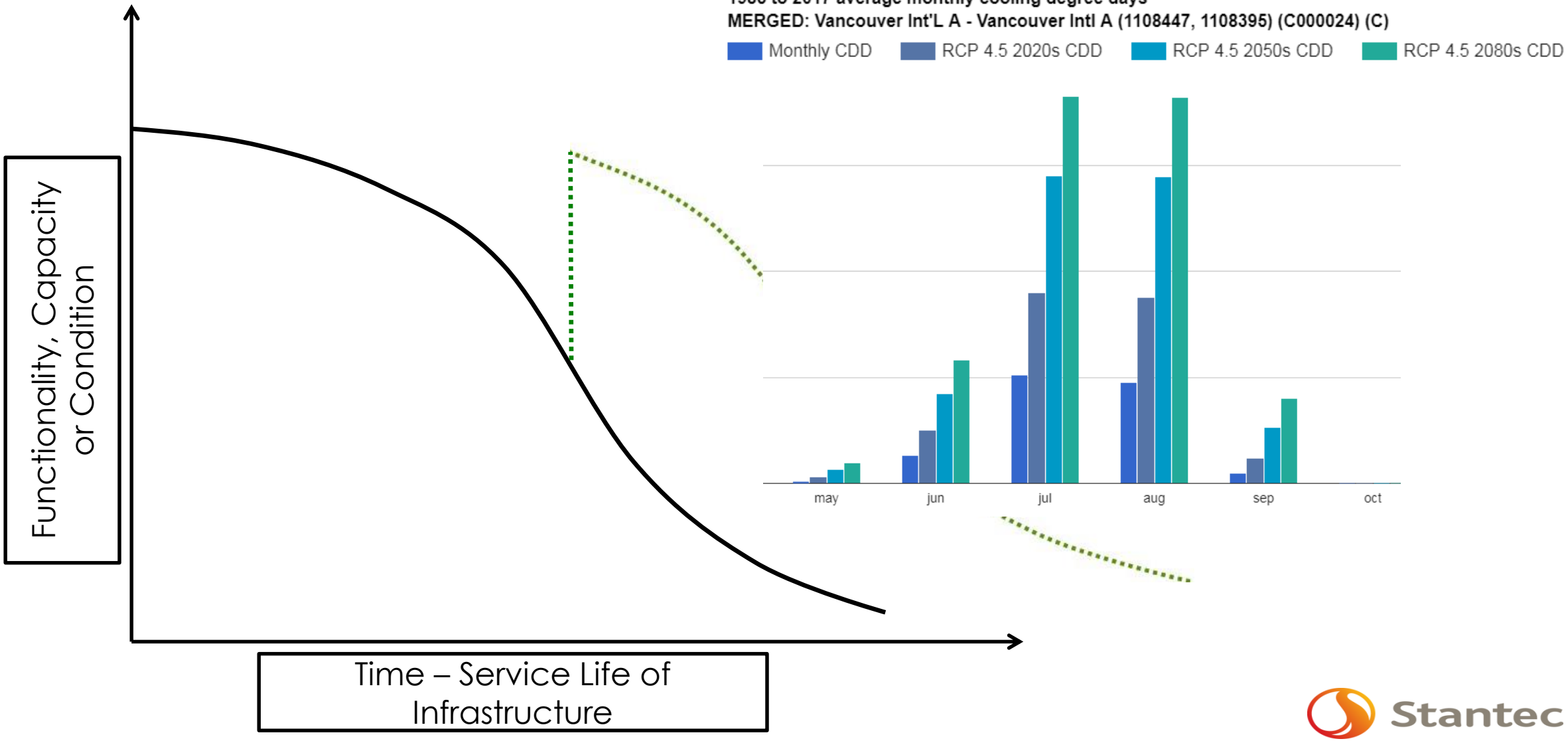
Example: HVAC system



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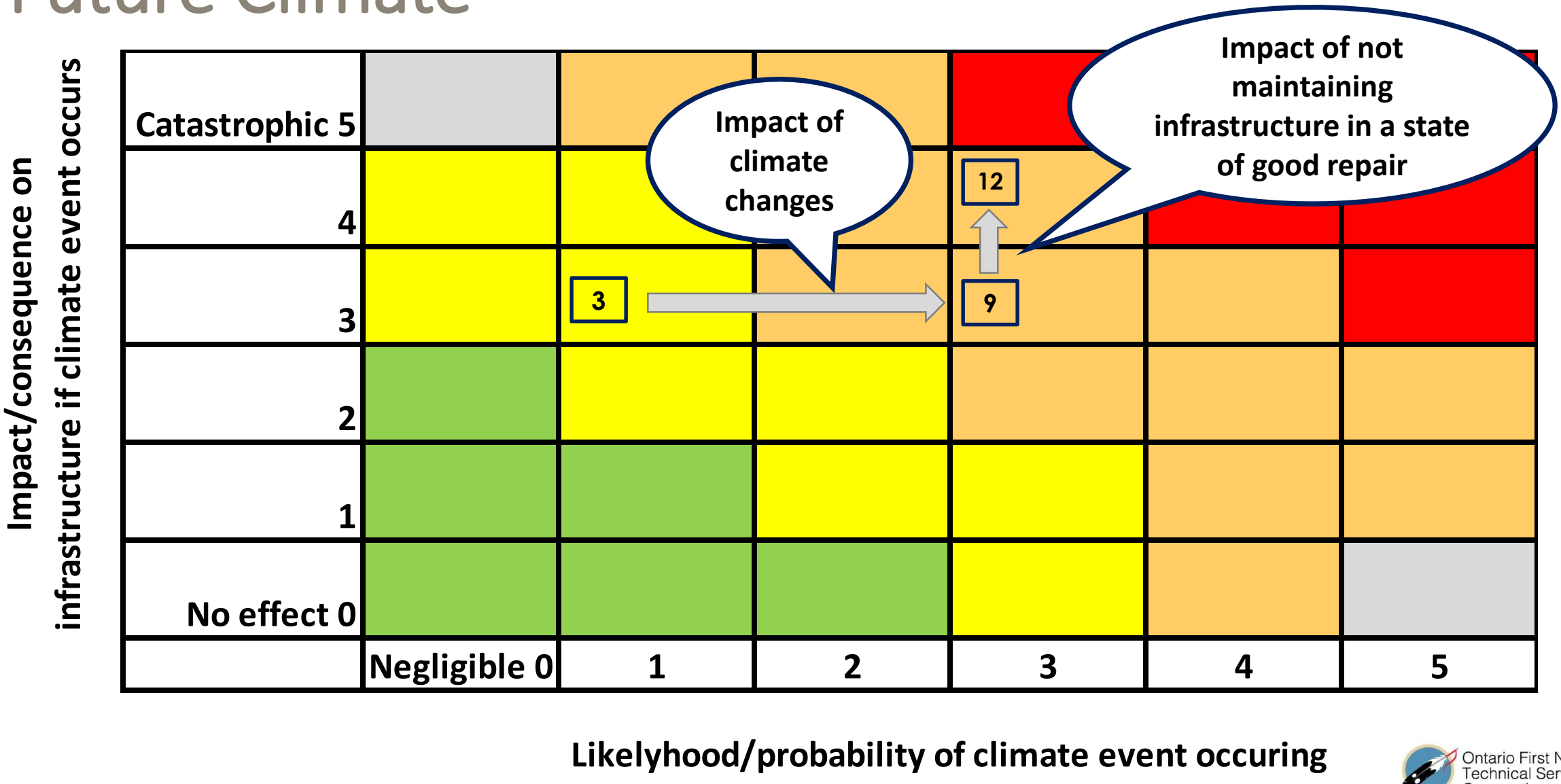
Future Climate



Ontario First Nations Technical Services Corporation

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7 In Conclusion

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Questions and Discussion

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