Level of Service and Risk

The Unsung Heroes of Asset Management

LADDERUP
Consulting Ltd.

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Today

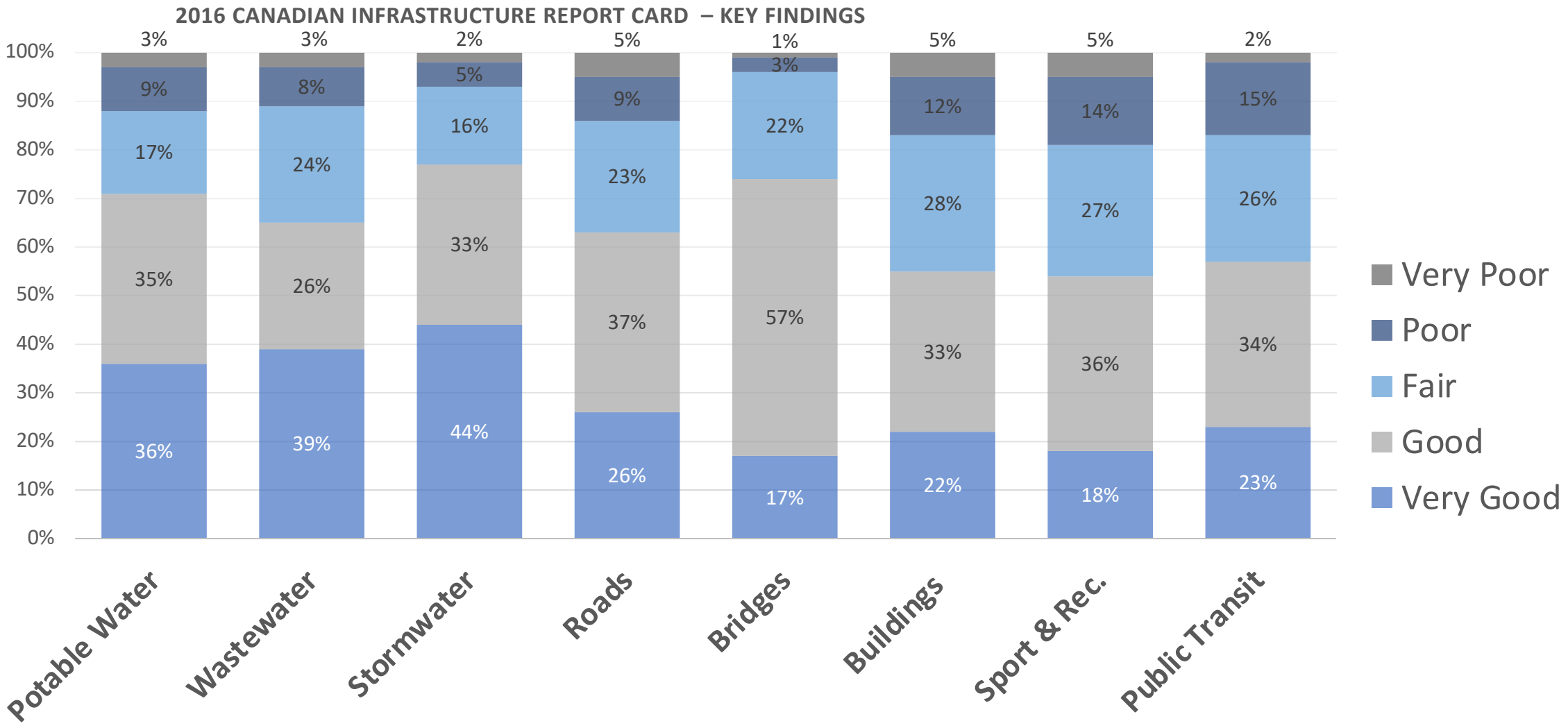
- Asset Management
- Risk
- Level of Service
- Bringing them Together

Polling!

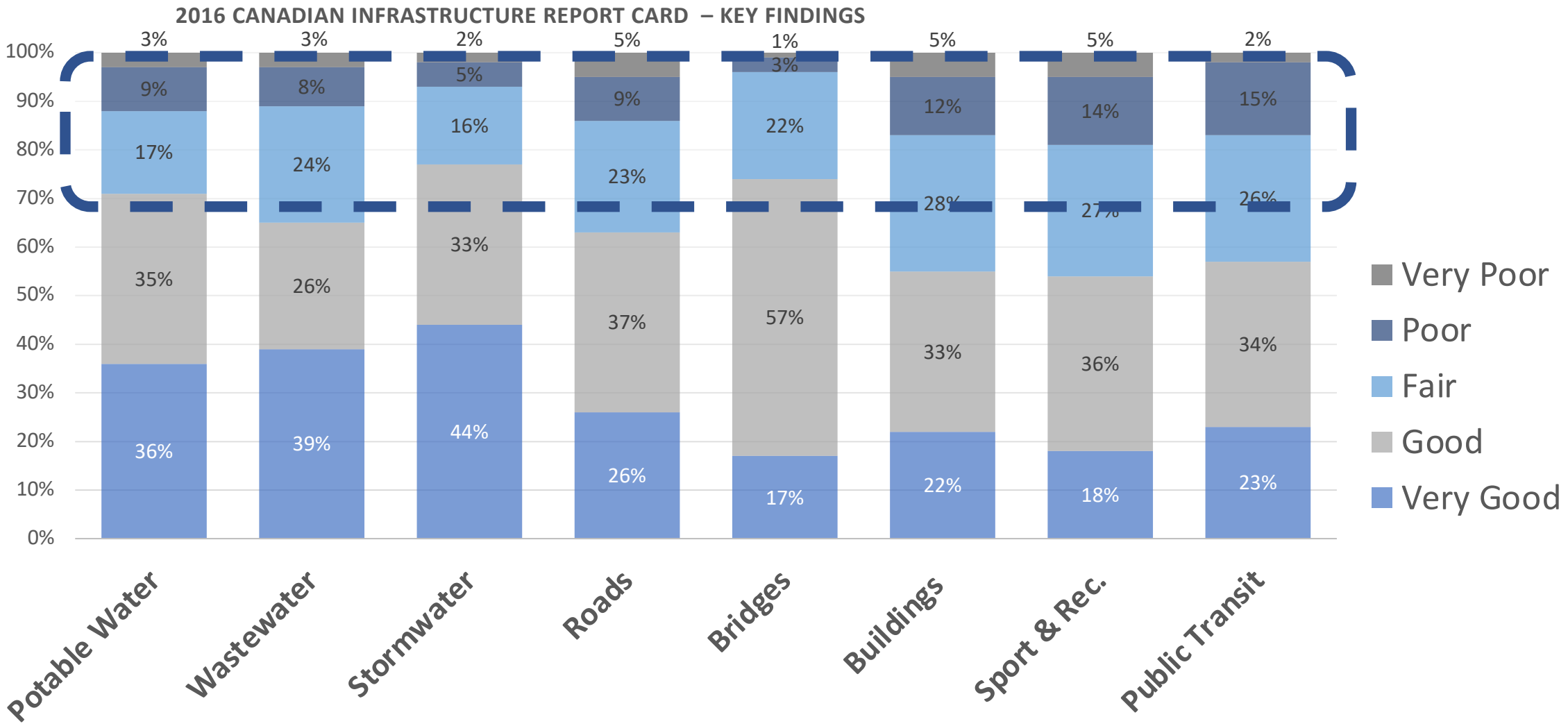
On your Phones

Text
“DORIANLUC”
to: 37607

Infrastructure in Canada



Infrastructure in Canada



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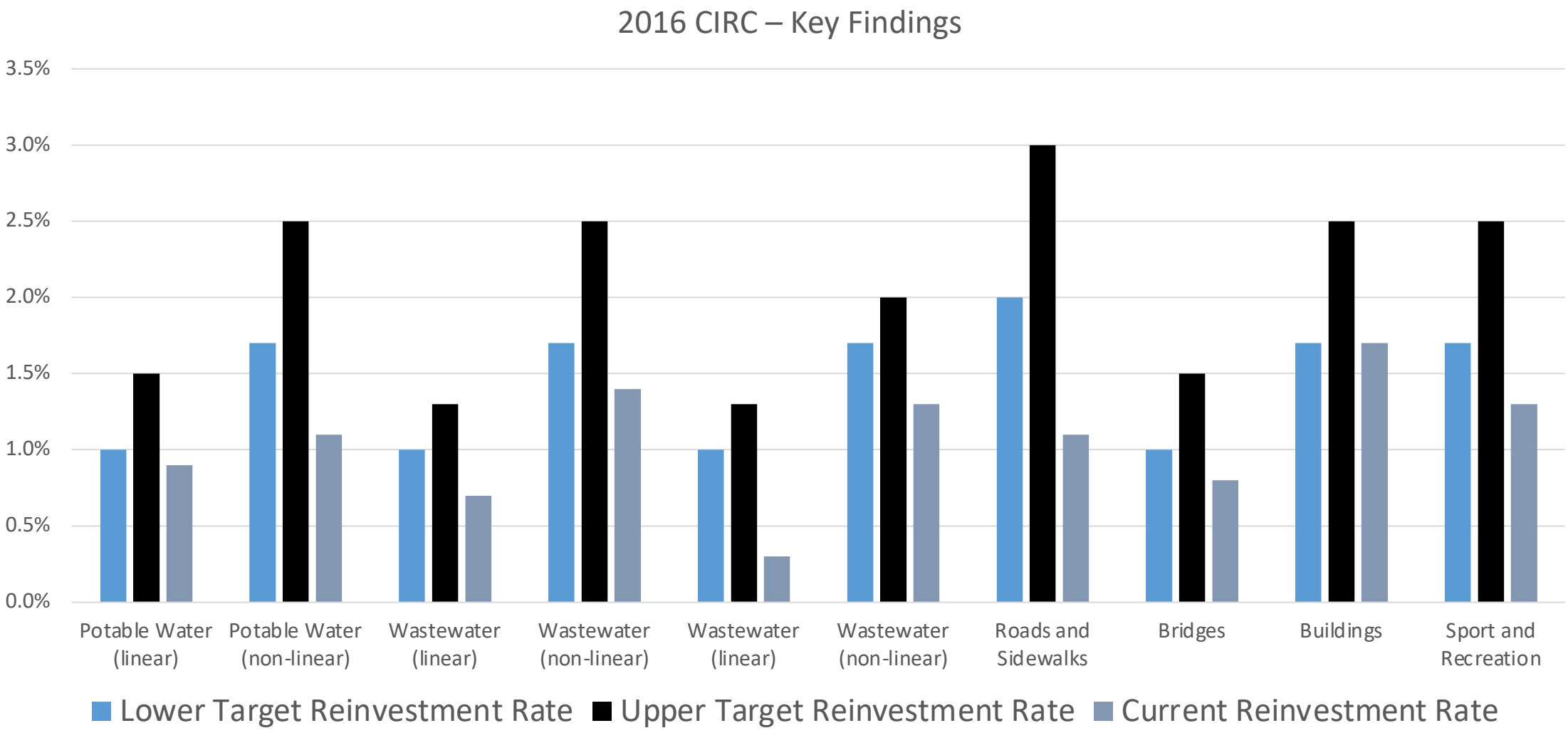
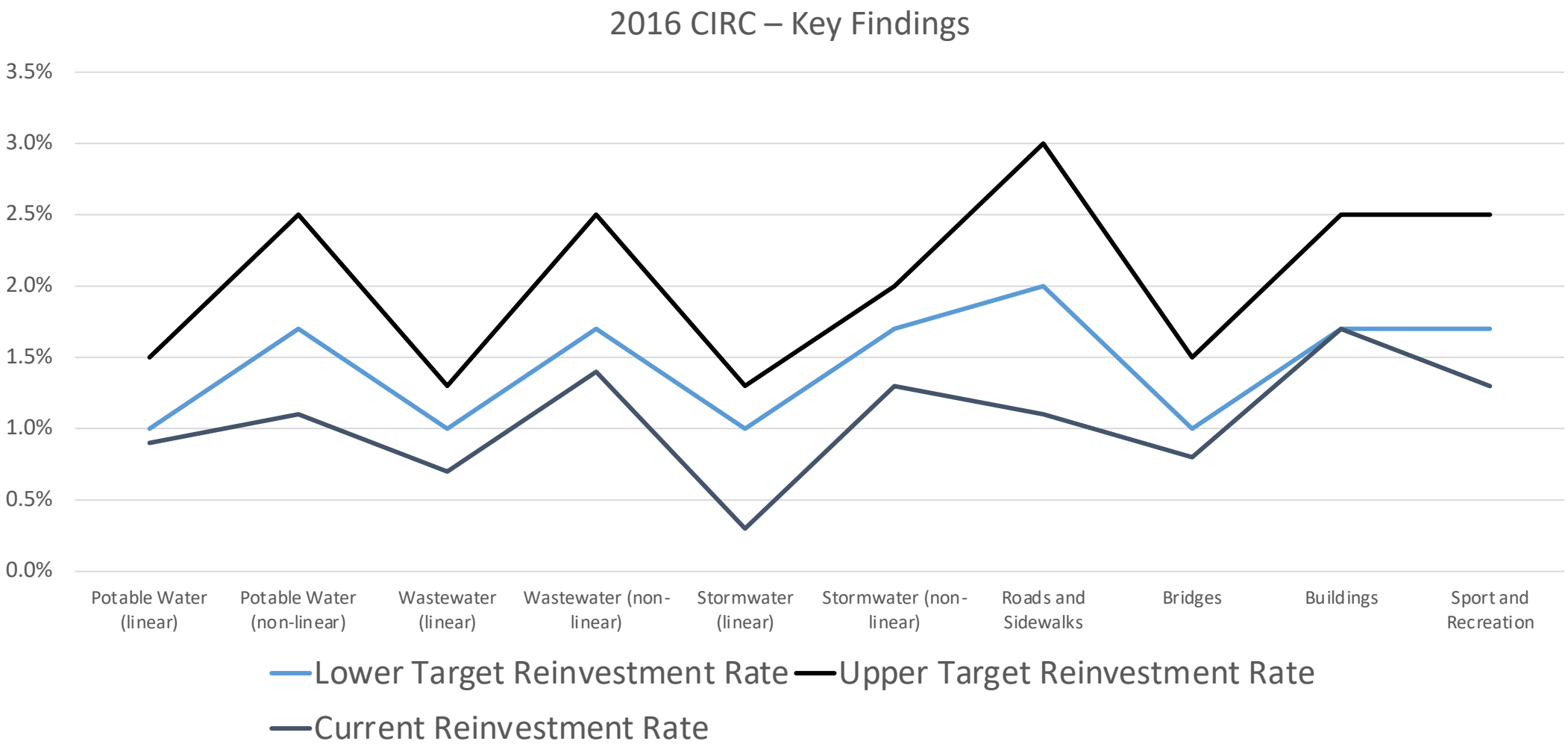


Infrastructure in Canada



Infrastructure in Canada

Infrastructure	Extrapolated Replacement Value of All Assets	Assets In Very Poor and Poor Condition	Asset In Fair Physical Condition	Anticipated Condition Based on Reported Reinvestment Levels (Improving, Stable, Declining)
Portable Water	$207 billion	$25 billion (12%)	$35 billion (17%)	Declining
Wastewater	$234 billion	$26 billion (12%)	$56 billion (24%)	Declining
Stormwater	$134 billion	$10 billion (7%)	$21 billion (16%)	Declining
Roads	$330 billion	$48 billion (15%)	$75 billion (23%)	Declining
Bridges	$50 billion	$2 billion (4%)	$11 billion (22%)	Declining
Buildings	$70 billion	$12 billion (17%)	$20 billion (28%)	Declining
Sport and Recreation Facilities	$51 billion	$9 billion (18%)	$14 billion (27%)	Declining
Transit	$57 billion	$9 billion (16%)	$15 billion (27%)	Unavailable
Total	$1.1 trillion	$141 billion (12%)	$247 billion (22%)	
Replacement Value per Household	$80,000	$10,000	$18,000	

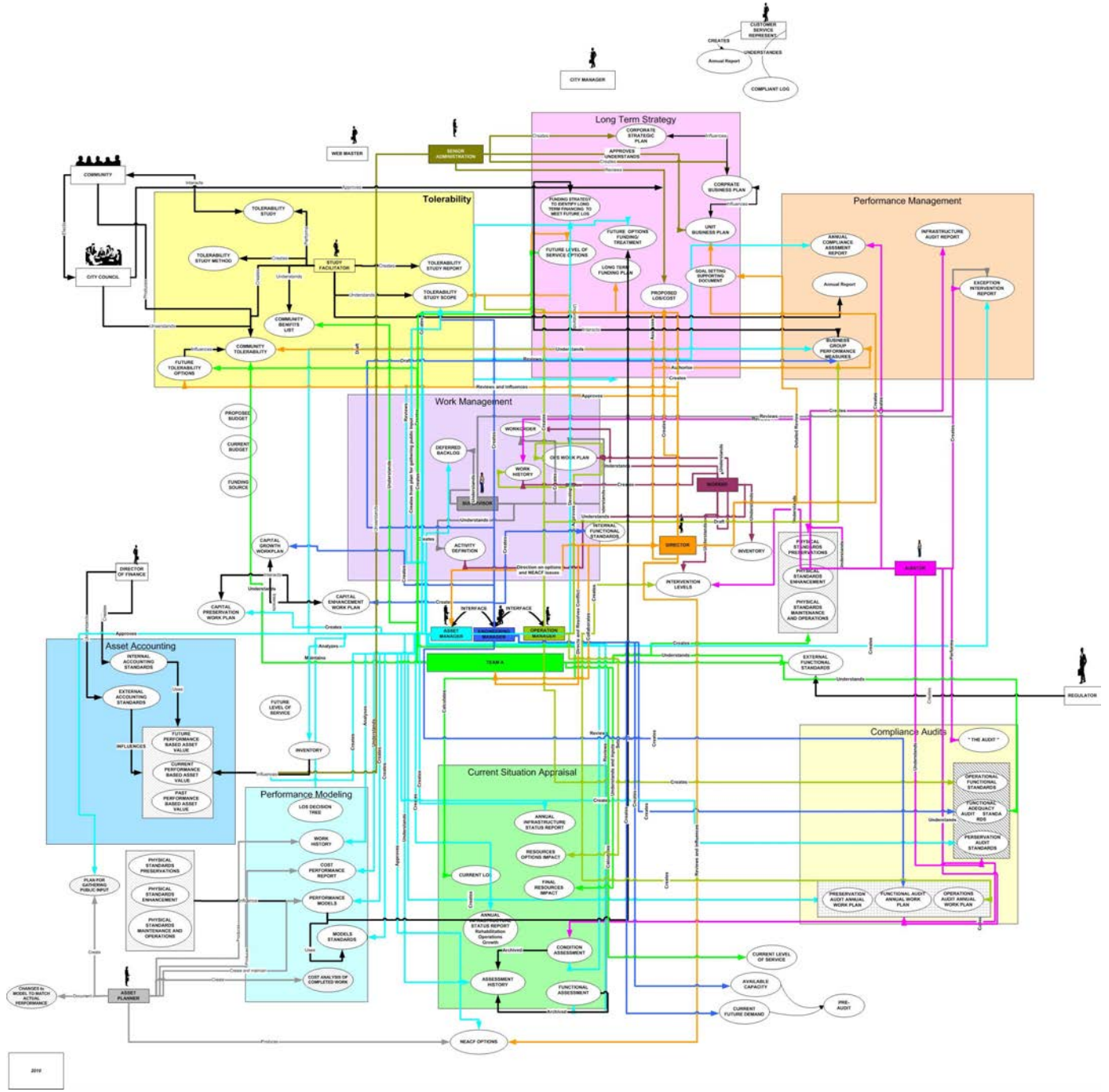
Asset Management

- 1990s in Canada
- InfraGuide
- Technology Road Map
- NAMWAG
- CNAM
- AM-SK

Asset Management

- Data
- Assets
- Deterioration Curves
- Reliability

- Complicated!



Asset Management

In Saskatchewan progress is tied to Gas Tax

4 Tiers of Municipalities

Targets for Progress

Date	Requirement
June 2018	Municipalities required to: • Get **educated** in asset management • Develop an Asset Management **policy and a strategy** • Develop an A**sset Register** for all asset classes
June 2019	Municipalities are required to: • Add the **current condition** of assets to the asset register • Document the desired **condition of assets** in their register Municipalities required to have a **progress check in** with council on the status the asset management plan.
June 2020	Municipalities to **identify funding gap** for completed assets
June 2022	Municipalities required to **report back to council** on monitoring and improving their asset management plan

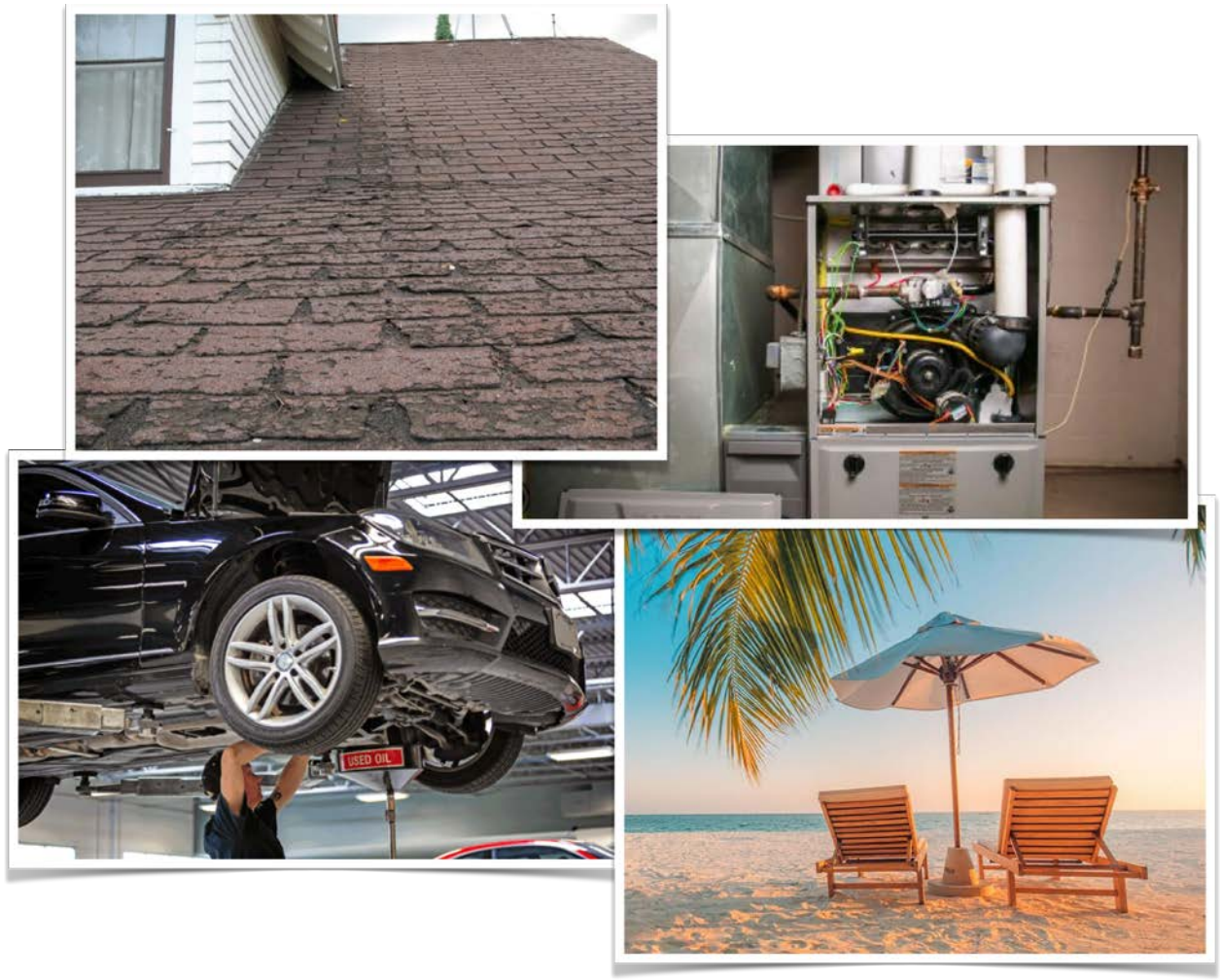
Asset Management

Asset Management

The ongoing process by which we manage our assets to ensure sustainable service delivery

Think of your own home:

- Replacing Shingles
- Servicing the furnace
- Changing Engine Oil
- Planning a Vacation



Asset Management

The seven key questions:

1. What do we own and where is it?
2. What is it worth?
3. What is its remaining service life?
4. What condition is it in?
5. What do we spend and what should we spend/invest?
6. What's the gap?
7. How do we get sustainable infrastructure, and how resilient is our infrastructure?

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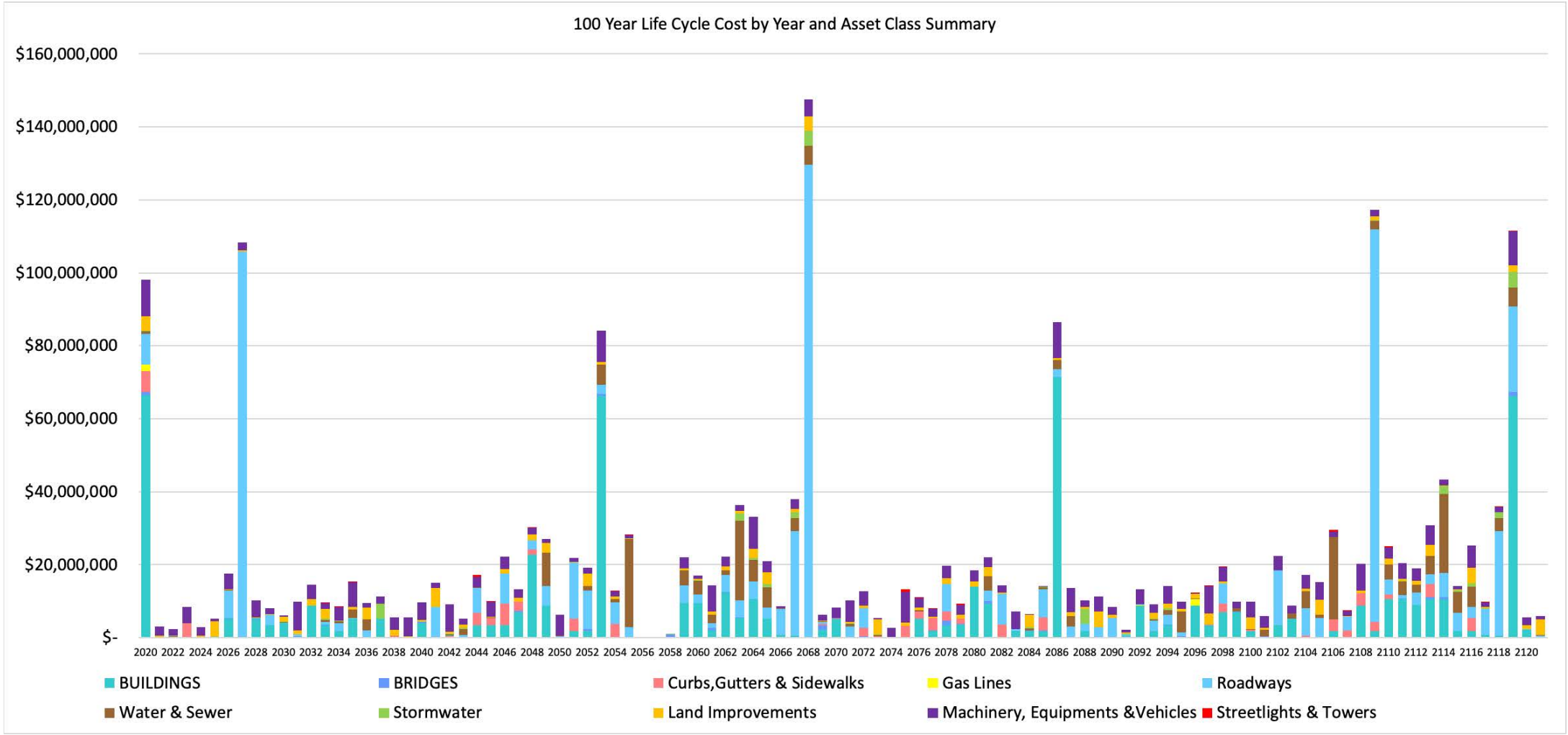
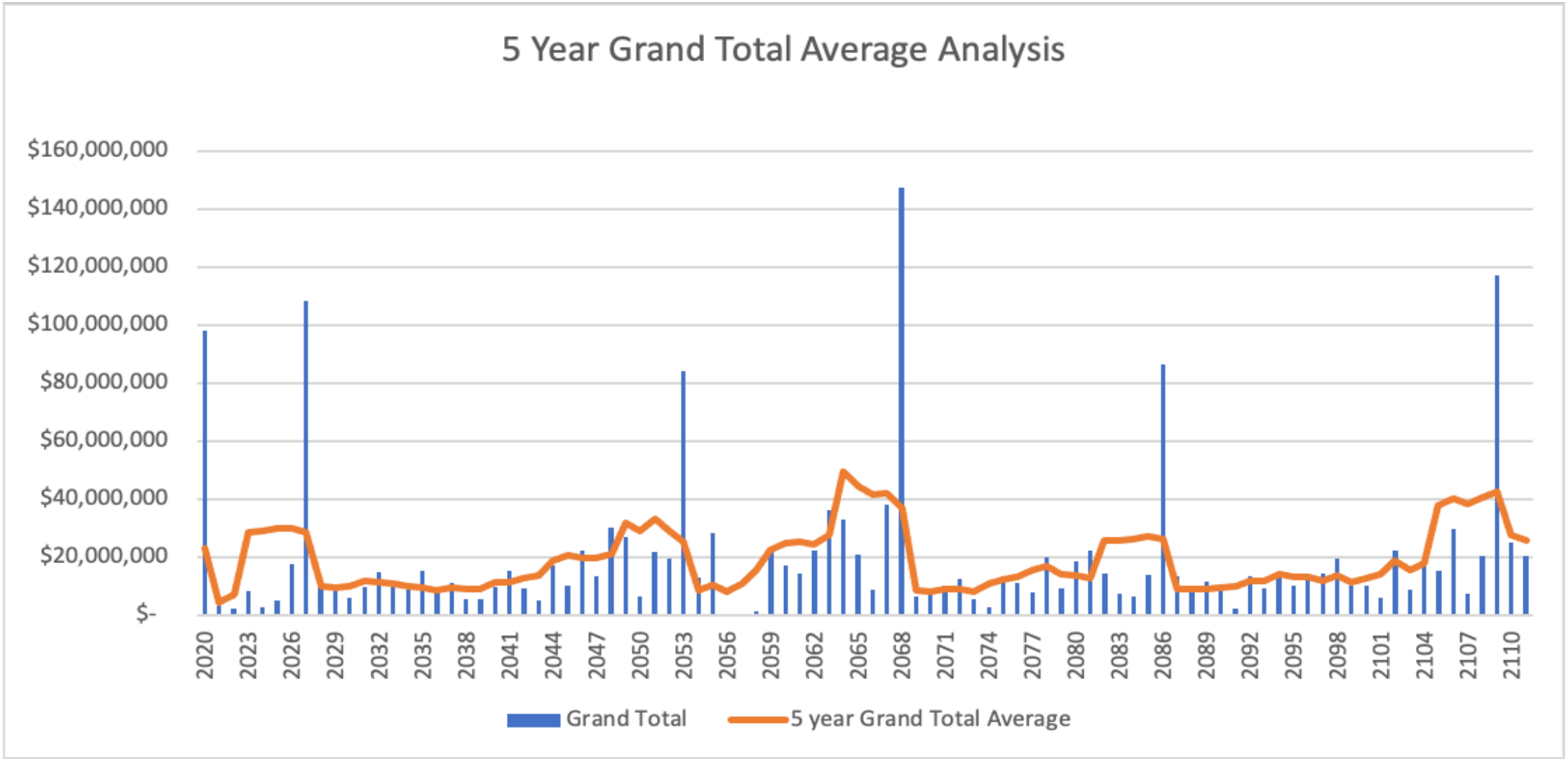
Inventory & Condition

Asset Management



Asset Management



Asset Management

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7. How do we get sustainable infrastructure, and how resilient is our infrastructure?

Level of Service

&

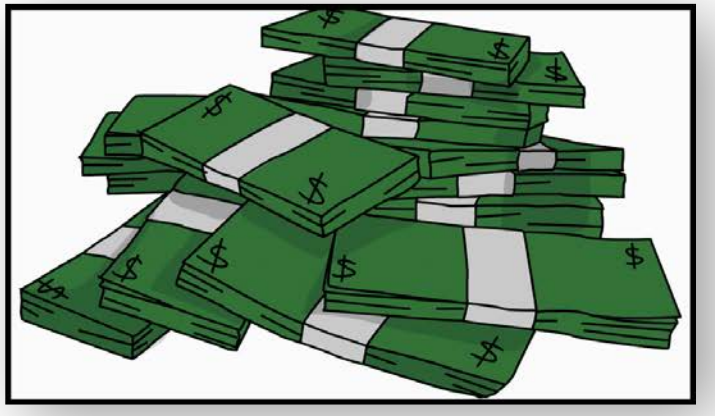
Risk

Asset Management

Risk

Customer Expectations

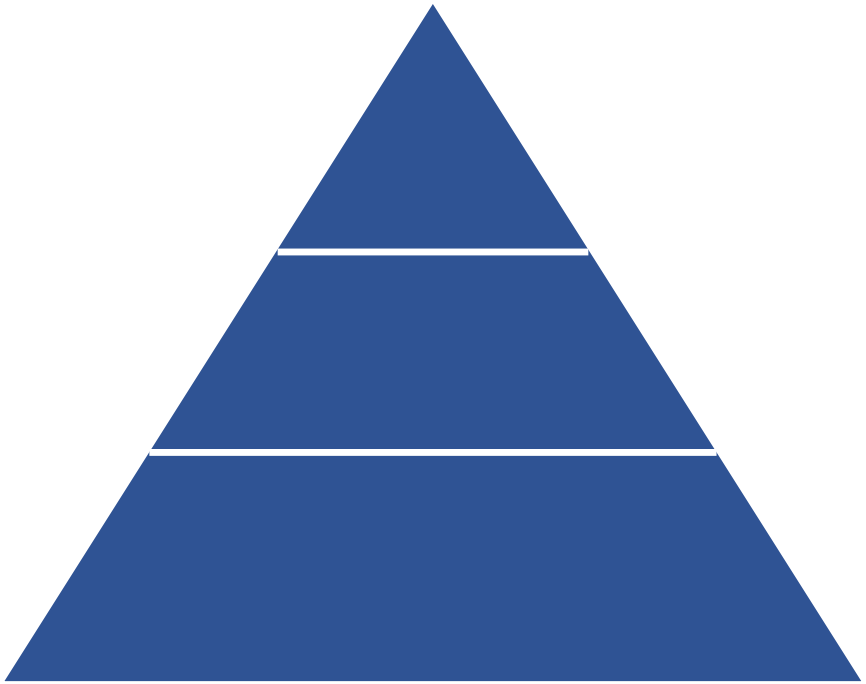
Level of Service



The "Service"

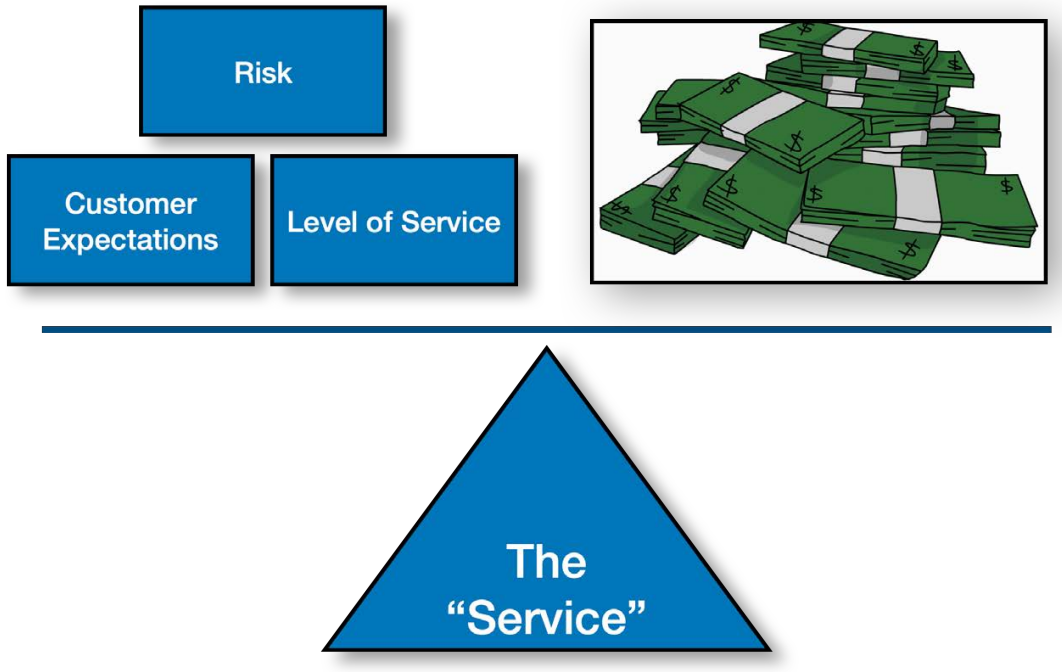
Asset Management

- Level of Service and Risk are at the heart of what we do (Service Delivery)
- Level of Service drives cost and creates the customer experience
- Risk determines our comfort and exposure to issues



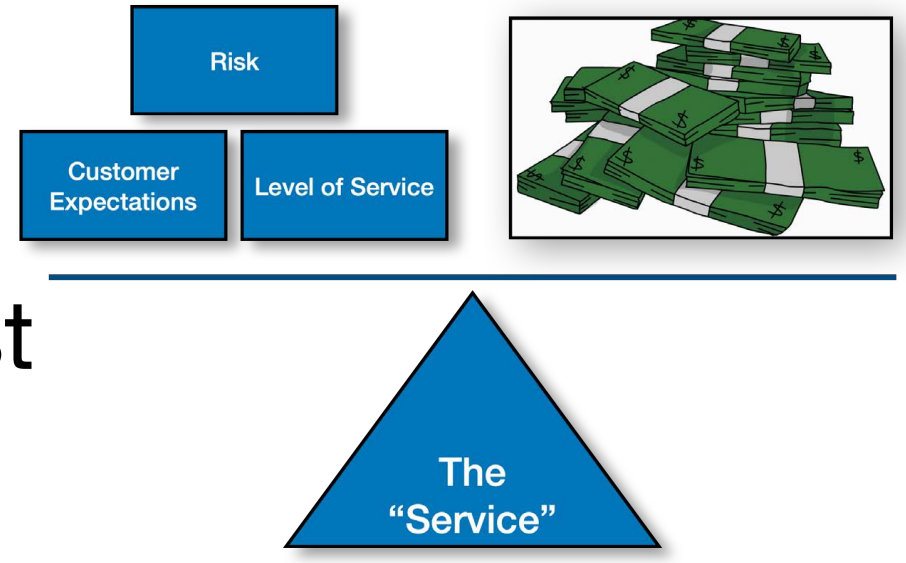
Asset Management

- But What about Cost?
- What happens to Cost when Risk and LOS change?
- Customer Expectations?
- Do they change equally?



Asset Management

- This is delicate balance between all 4
- If you move one (for more or less) the whole system is out of balance
- More Service = More Cost
- Less Risk = More Cost
- Higher Expectations = More Cost



Polling!

Q: Does your Municipality have an Asset Management Plan for your Water and Wastewater Utility?

Today's Workshop

Value Added Learning

Participate at Tables

Take this Value back to your Municipality

Level of Service

Level of Service

Customer Level of Service

Customer Perspective

Function/Condition/Capacity

Technical Level of Service

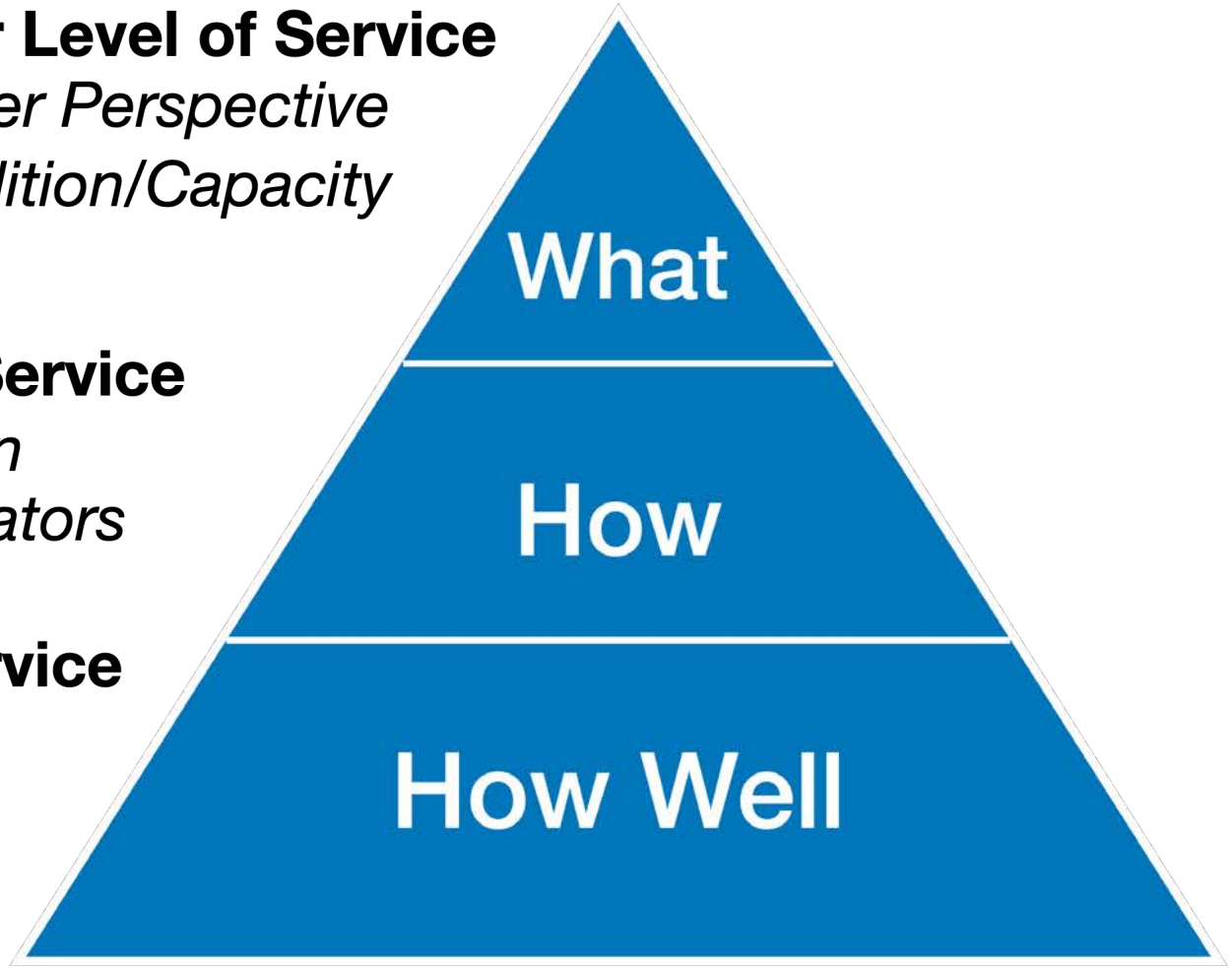
Program Design

Indicators

Operational Levels of Service

Efficiency

Benchmarks



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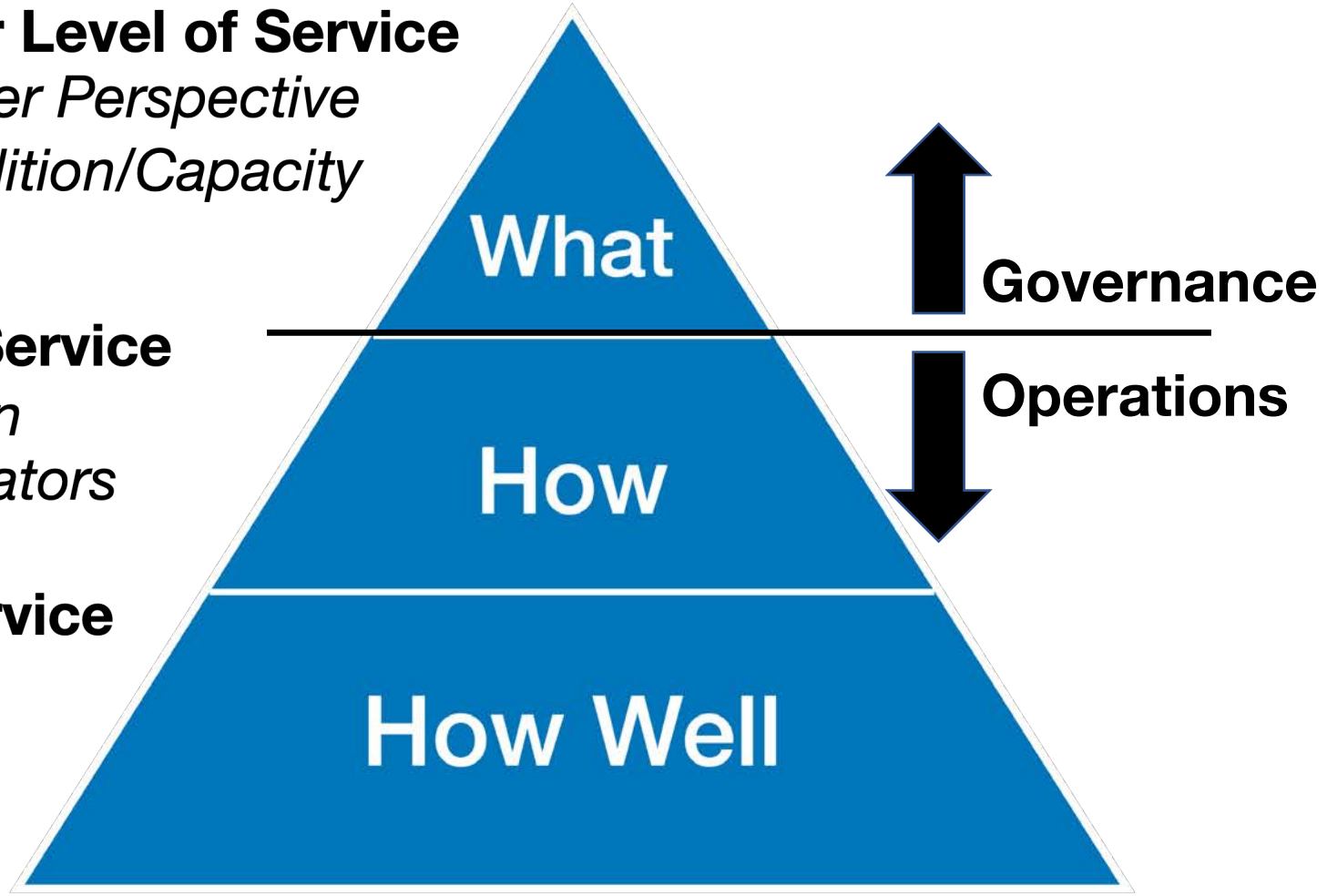

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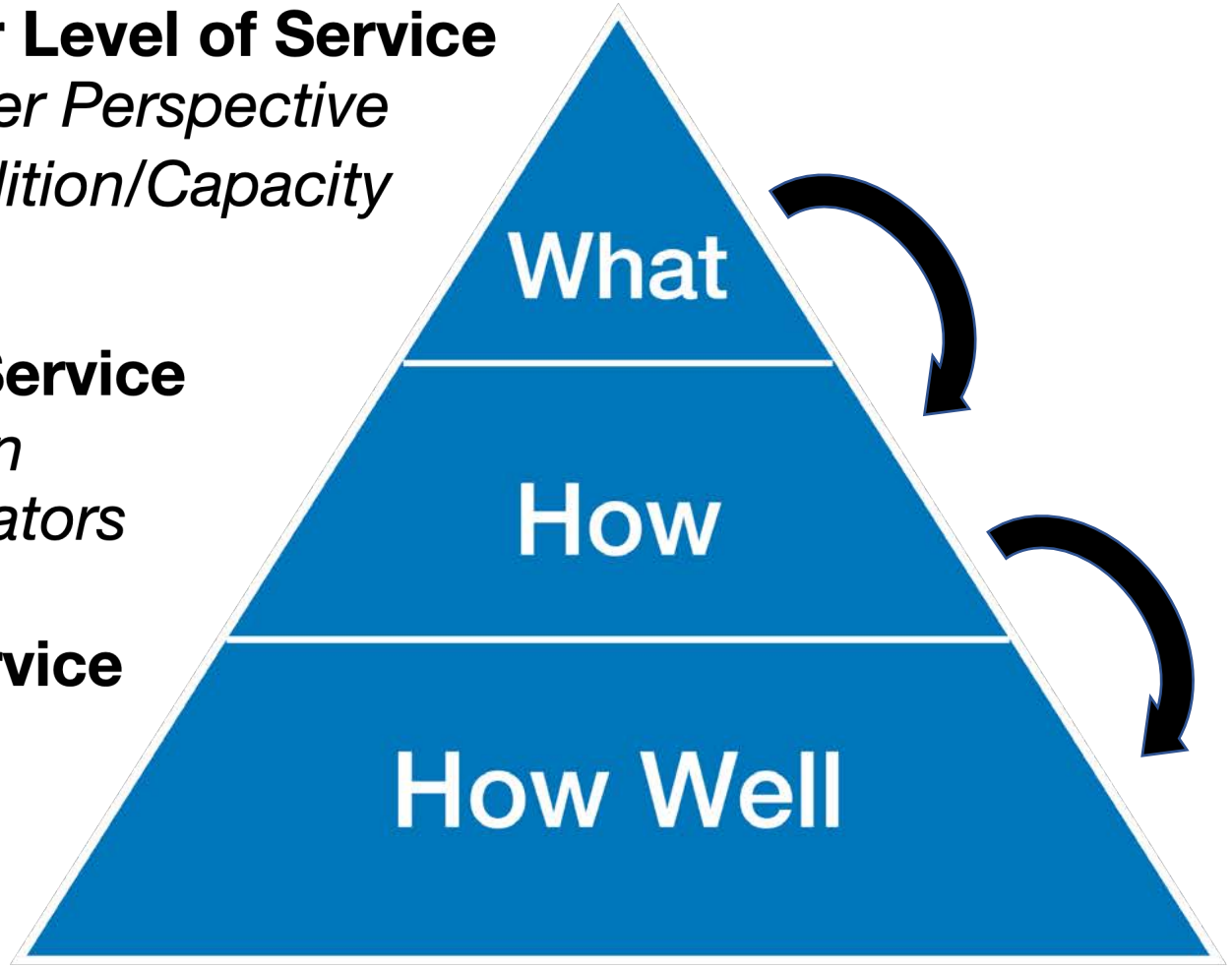

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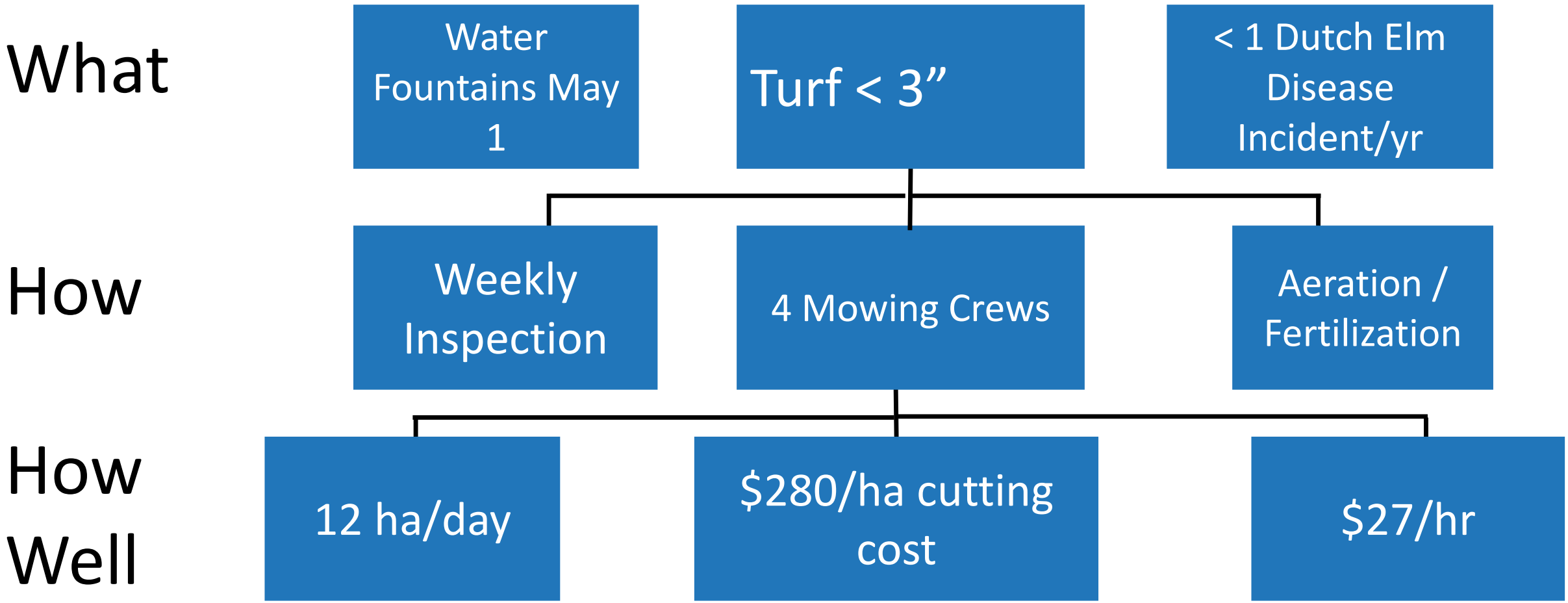
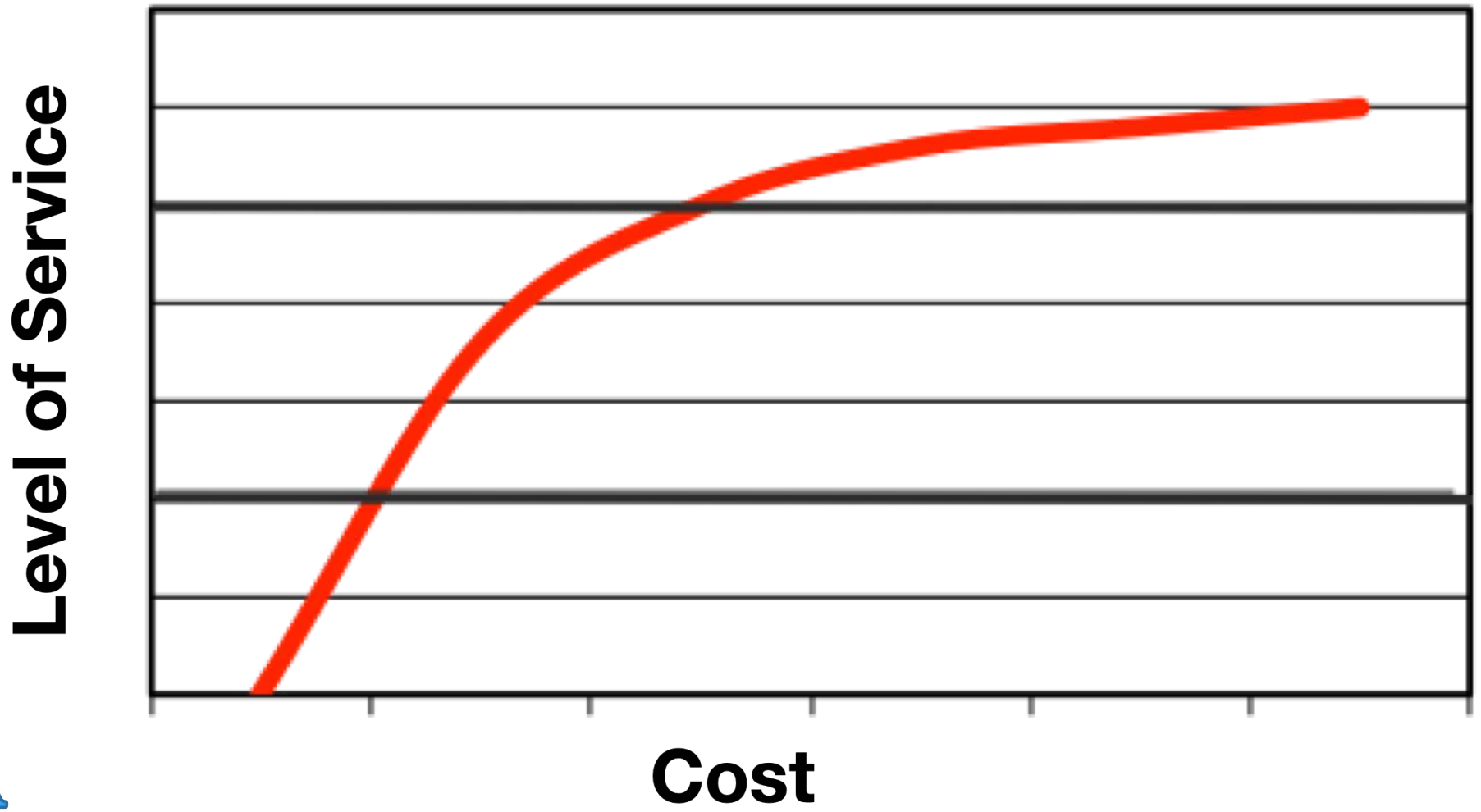


Level of Service



Polling!

Level of Service Exercises!

Level of Service

Level of Service

Level of Service

	1	2	3	4
Service	Poor	Not Bad	Better	Good

Level of Service

	1	2	3	4
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Is it really that Complicated?

Let’s try.

Level of Service

	1	2	3	4
Service	Poor	Not Bad	Good	Best
Service	Poor	Not Bad	Good	Best
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Level of Service

	1	2	3	4
Lead Program	No Program	Monitoring	Limited Mitigation	Full Remediation
Service	Poor	Not Bad	Good	Best
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Service	Poor	Not Bad	Good	Best
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Level of Service

	1	2	3	4
Lead Program	No Program	Monitoring	Limited Mitigation	Full Remediation
Main Flushing	None	Semi Annual Program	Annual Program	Unidirectional
Service	Poor	Not Bad	Good	Best
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Level of Service

	1	2	3	4
Lead Program	No Program	Monitoring	Limited Mitigation	Full Remediation
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Water Reliability	99.7%	95.95%	99.97%	100%
Service	Poor	Not Bad	Good	Best
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Level of Service

	1	2	3	4
Lead Program	No Program	Monitoring	Limited Mitigation	Full Remediation
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Water Reliability	99.7%	95.95%	99.97%	100%
Max Water Outage	48 hrs	30 hrs	18 hrs	8 hrs
Service	Poor	Not Bad	Good	Best

Level of Service

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Cross Connection	None	Informational	Random	Robust

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Cross Connection	None	Informational	Random	Robust

Level of Service

	1	2	3	4	
Lead Program	No Program	Monitoring	Limited Mitigation	Full Remediation	3
Main Flushing	None	Semi Annual Program	Annual Program	Unidirectional	2
Water Reliability	99.7%	95.95%	99.97%	100%	3
Max Water Outage	48 hrs	30 hrs	18 hrs	8 hrs	4
Cross Connection	None	Informational	Random	Robust	2
					2.8

Exercise!

Exercise – 10 Minutes

- At your Table!
- Pick 1 or 2 Services that you deliver
- Describe:
  - **Poor** Level of Service (#1)
  - **Best** Level of Service (#4)
  - **Not Bad** (#2) and **Good** (#3) Levels of Service

HINT: ***Good (#3)*** *should be* ***Standard*** *or* ***Regulatory Compliance***

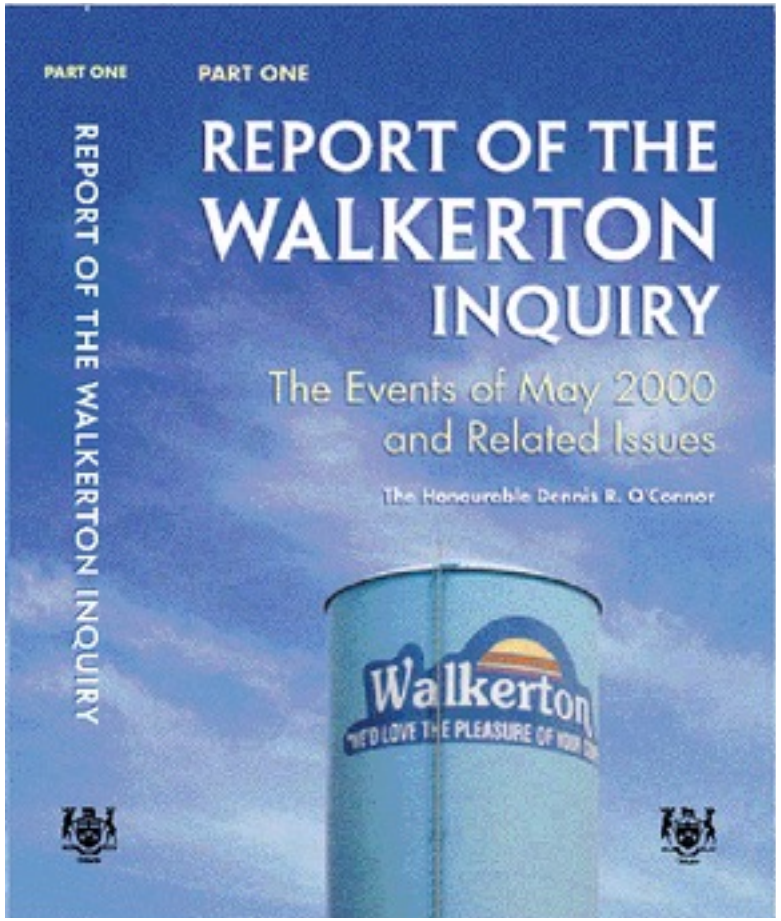
Risk

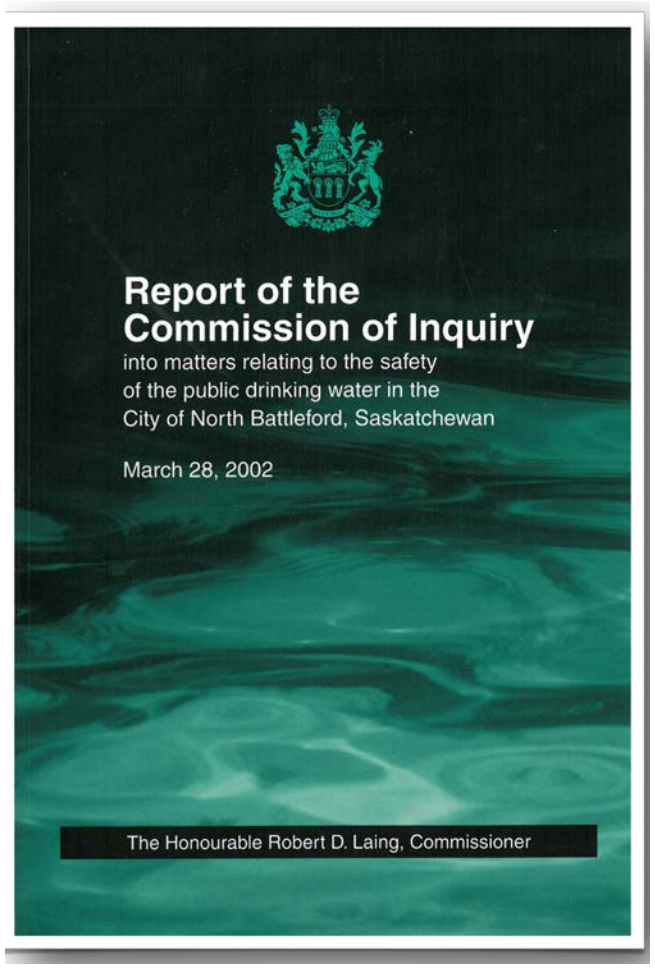
Risk Management

- **Proactive** method of assessing Risk
- Source, Treatment, Network & Customer Risks
- Risks can be **Mitigated**; or **Tolerated**
- Risk Management is a **Process**

- Risk is in the domain of **Governance**

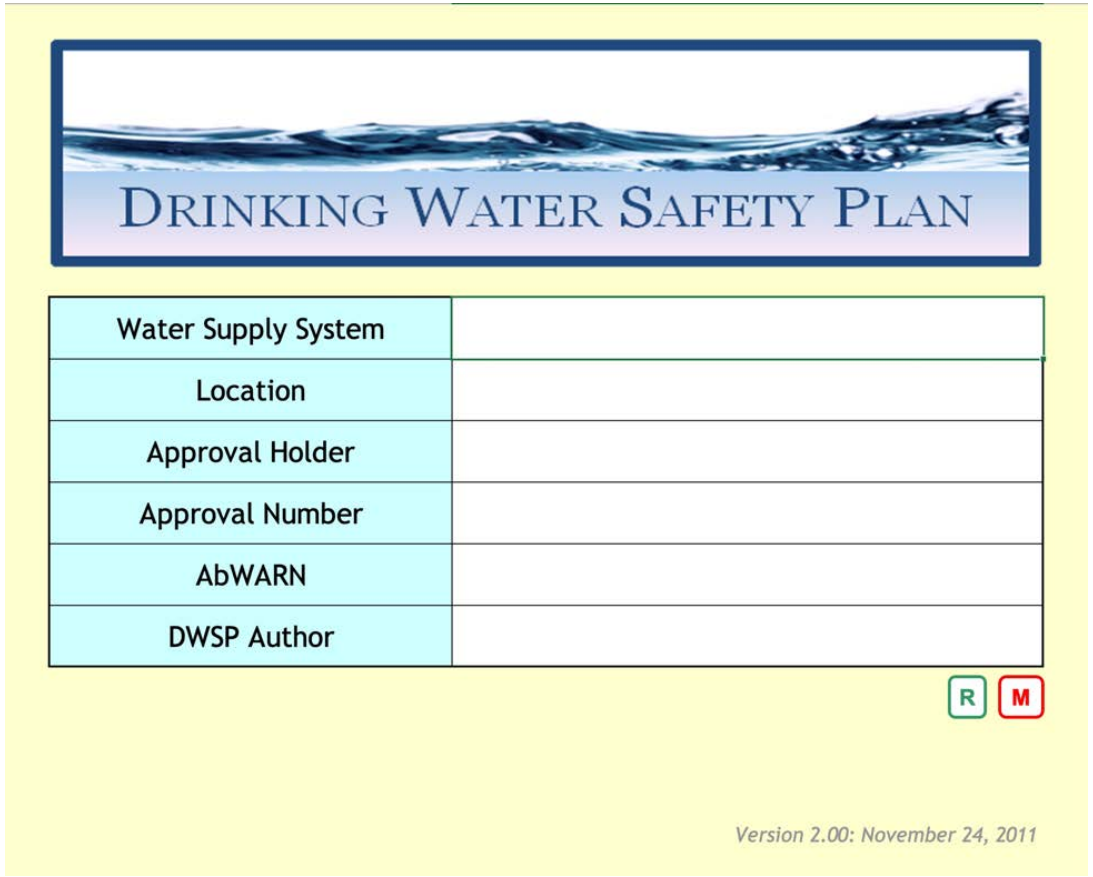
Risk Management





Risk Management - Basics

In Alberta:



http://www.environment.alberta.ca/apps/regulateddwq/dwsp.aspx

Risk Management - Basics

- *RISKS: Source, Treatment, Network & Customer*
- *Over 200 total across all 4*
- *Lightly Automated*
- *Great place to start*

ASWWA

DRINKING WATER SAFETY PLAN

Polling!

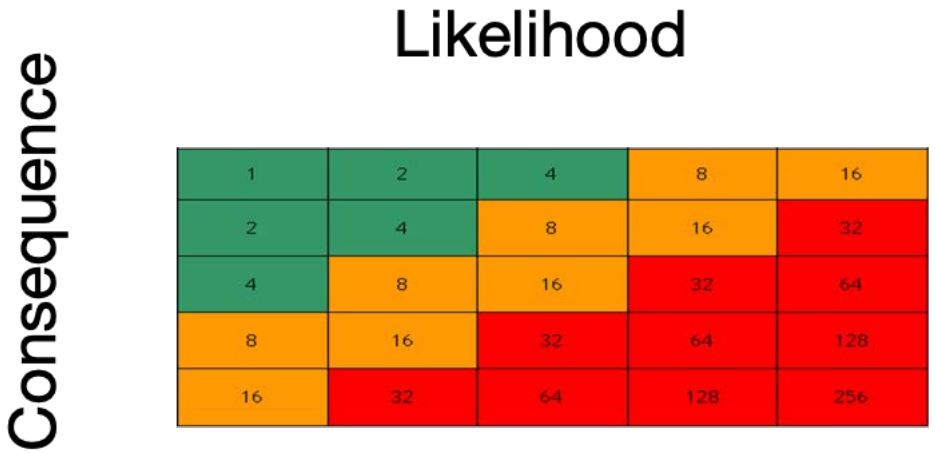
Q: Does your Water Utility have an active Risk Management approach?

Risk Management - Basics

Identify | What, When, Why?

Evaluate | Likelihood, Consequence, Risk

Treat | Options, Decision, Action

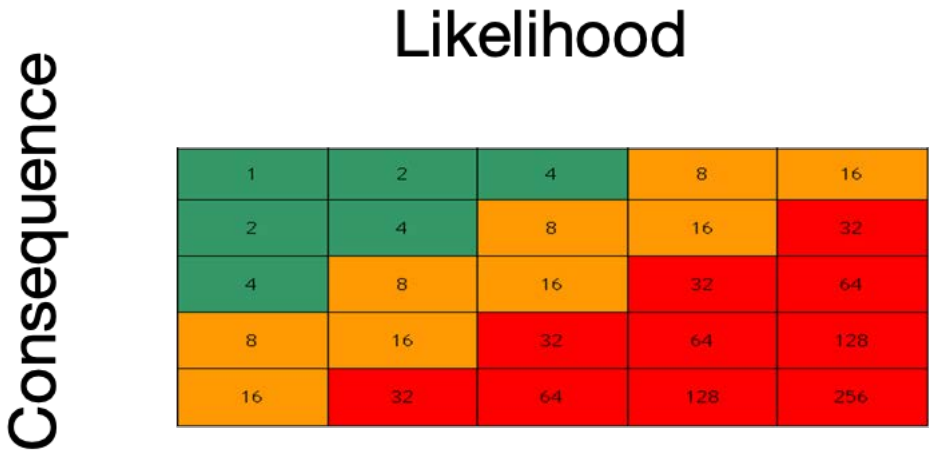


Risk Management - Basics

Risk = Likelihood x Consequence

Each Consequence has a different impacts

AB Drinking Water Safety Plan has a LOT of HIGH Risk



Risk Management - Basics

	Most Unlikely 1	Unlikely 2	Medium 4	Probable 8	Almost Certain 16
Likelihood	Conceivable but extremely small chance of happening in next 4-5 years	Is possible and cannot be ruled out in next 4-5 years.	As likely as not to happen in next 4-5 years.	Would be expected to happen in next 4-5 years but there is a small chance it may not.	Would be confident this will happen at least once in next 4-5 years

Likelihood

Consequence

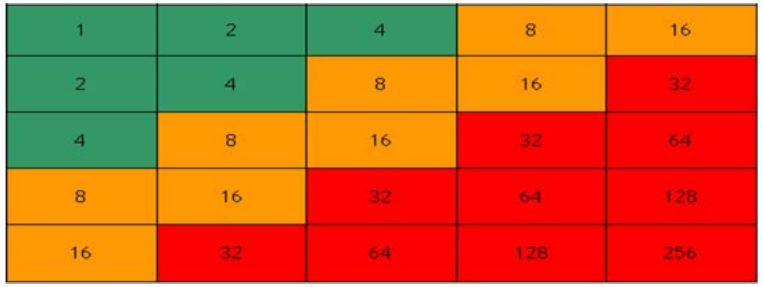
1	2	4	8	16
2	4	8	16	32
4	8	16	32	64
8	16	32	64	128
16	32	64	128	256

Risk Management - Basics

	Low - 1	2	Medium - 4	8	High - 16
Operational Consequence	System wide water interruption < 8 hrs	Localized aesthetic issue or interruption 8-12 hrs	Widespread aesthetic issue or interruption 12-24 hrs	Potential Illness or interruption >24 - 48 hrs	Actual illness or interruption >48 hrs

Likelihood

Consequence



Risk Management - Basics

	Consequence				
Likelihood	1	2	4	8	16
	2	4	8	16	32
	4	8	16	32	64
	8	16	32	64	128
	16	32	64	128	256

Risk = Likelihood x Consequence

Risk Management - Advanced

Safety – death; injury; illness;

Financial – assets; salary; budget

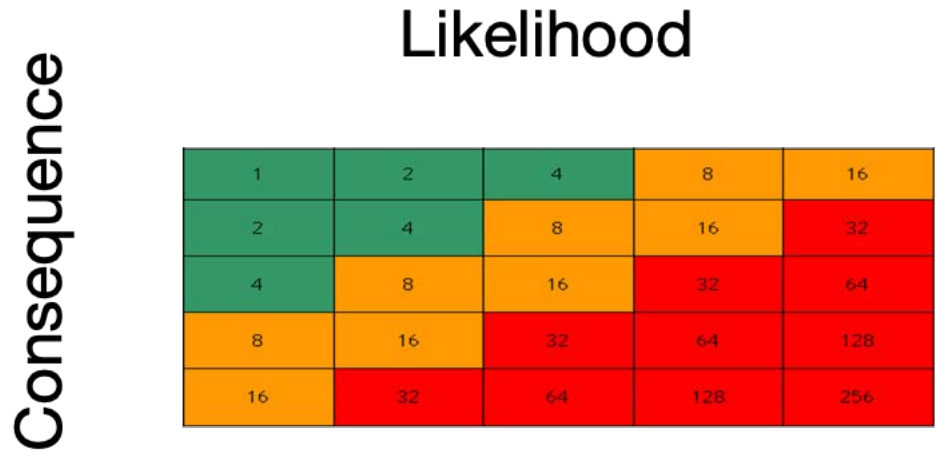
Environmental – snow, rain, drought, damage

Legal – lawsuits; complaints; legislation

Political – political response to social issues

Reputational – actual v perceived

Business Processes & Systems



Risk Management - Advanced

	Low - 1	2	Medium - 4	8	High - 16
Operational	System wide water interruption < 8 hrs	Localized aesthetic issue or interruption 8-12 hrs	Widespread aesthetic issue or interruption 12-24 hrs	Potential Illness or interruption >24 - 48 hrs	Actual illness or interruption >48 hrs
Financial	$5K	$50K	$100K	$250K	>$500K
Environmental	Minor impact requiring no mitigation	Minor impact requiring localized mitigation	Impact requiring clean up on and off site	Major impact requiring a significant clean up effort	Significant Environmental Damage

Risk Management - Advanced

	Low - 1	2	Medium - 4	8	High - 16
Legal	No legal repercussions	Written warning or notice to correct	Repercussions including Notice and Follow up	Significant legal repercussions including fines	Significant legal repercussions including criminal charges
Political	Minor Political impact	Impact requiring an informal briefing to political bodies	Impact requiring formal reporting to political bodies	Impact requiring 4 months of ongoing political engagement	Significant Political impact dominating the political agenda

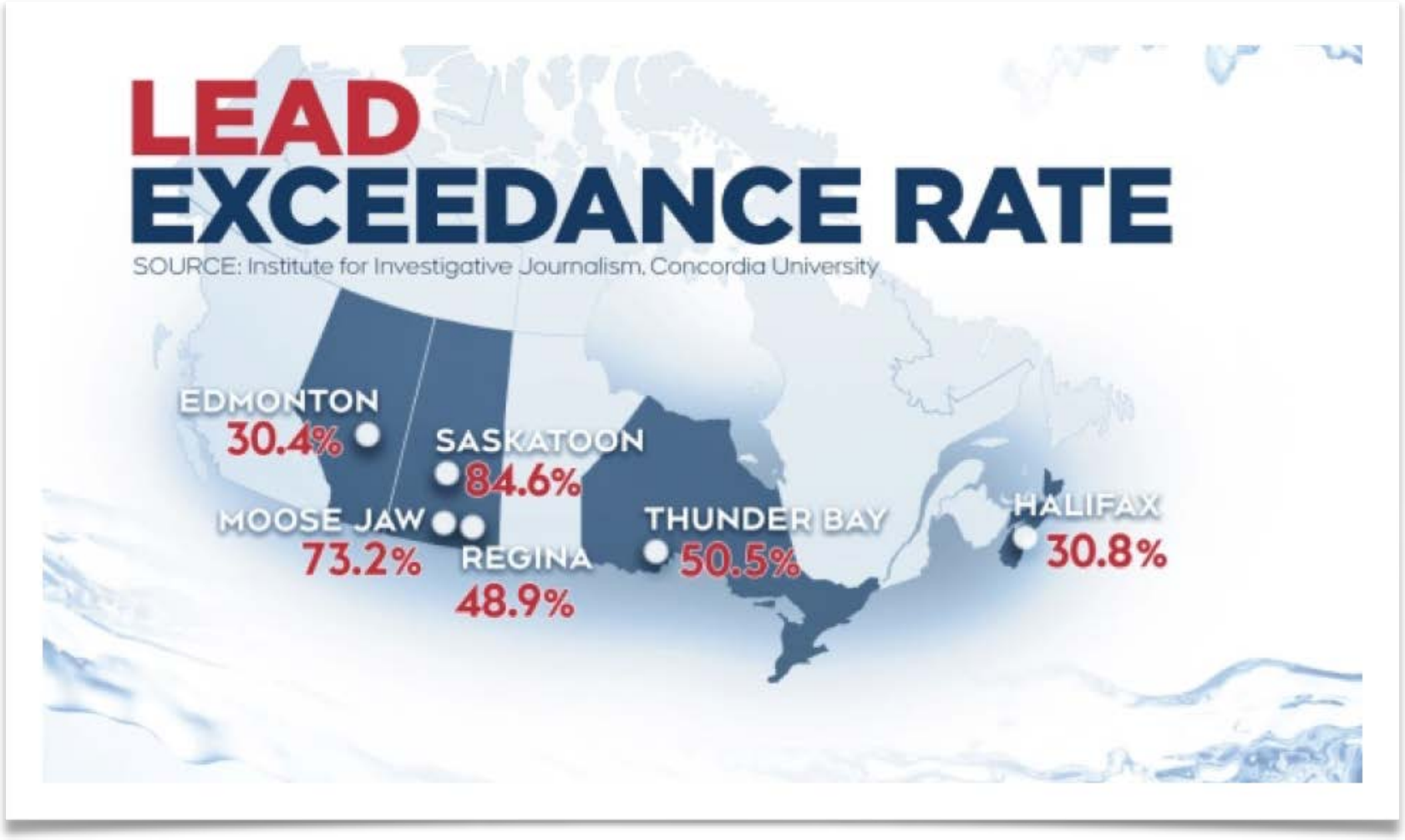
Risk Management - Advanced

	Low - 1	2	Medium - 4	8	High - 16
Reputational	Internal Review	Scrutiny required by internal committees or internal audit to prevent escalation.	Scrutiny required by clients or third parties etc.	Intense public, political and media scrutiny. E.g. front page headlines, TV, etc.	Legal action or Commission of inquiry or adverse national media.
Business Processes & Systems	Minor errors in systems or processes requiring corrective action, or minor delay without impact on overall schedule.	Policy procedural rule occasionally not met or services do not fully meet needs.	One or more key accountability requirements not met. Inconvenient but not client welfare threatening.	Strategies not consistent with business objectives. Tren ds show service is degraded.	Critical system failure, bad policy advice or ongoing non-compliance. Business severely affected.

Is it really that Complicated?

Let’s try.

Risk Management



Risk Management

What is the Likelihood of Lead Contamination in your Water System?

	Most Unlikely 1	Unlikely 2	Medium 4	Probable 8	Almost Certain 16
Likelihood	Conceivable but extremely small chance of happening in next 4-5 years	Is possible and cannot be ruled out in next 4-5 years.	As likely as not to happen in next 4-5 years.	Would be expected to happen in next 4-5 years but there is a small chance it may not.	Would be confident this will happen at least once in next 4-5 years

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Risk Management

Consequence	Likelihood	Consequence Impact Level	Risk Level
Operational	Medium (4)		

Risk Management

Consequence	Likelihood	Consequence Impact Level	Risk Level
Operational	Medium (4)	Potential Illness (8)	High (32)

Risk Management

Consequence	Likelihood	Consequence Impact Level	Risk Level
Operational	Medium (4)	Potential Illness (8)	High (32)
Financial	Medium (4)	>$500k+ (16)	High (64)

Risk Management

Consequence	Likelihood	Consequence Impact Level	Risk Level
Operational	Medium (4)	Potential Illness (8)	High (32)
Financial	Medium (4)	>$500k+ (16)	High (64)
Environmental	Medium (4)	Localized Mitigation (2)	Medium (8)

Risk Management

Consequence	Likelihood	Consequence Impact Level	Risk Level
Operational	Medium (4)	Potential Illness (8)	High (32)
Financial	Medium (4)	>$500k+ (16)	High (64)
Environmental	Medium (4)	Localized Mitigation (2)	Medium (8)
Legal	Medium (4)	Notice to Correct (2)	

Risk Management

Consequence	Likelihood	Consequence Impact Level	Risk Level
Operational	Medium (4)	Potential Illness (8)	High (32)
Financial	Medium (4)	>$500k+ (16)	High (64)
Environmental	Medium (4)	Localized Mitigation (2)	Medium (8)
Legal	Medium (4)	Notice to Correct (2)	Medium (8)
Political	Medium (4)	Formal Reporting (4)	Medium (16)

Risk Management

Consequence	Likelihood	Consequence Impact Level	Risk Level
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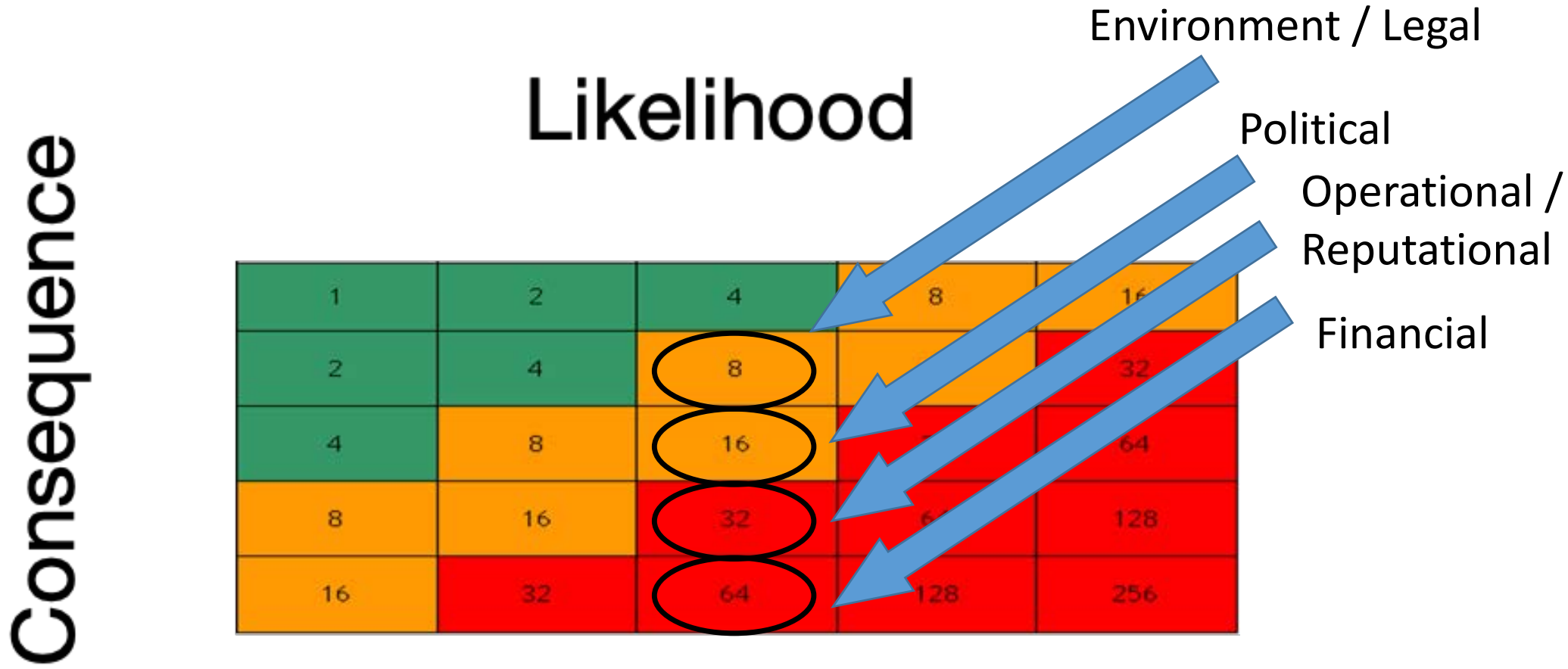
		OVERALL RISK	**HIGH**

Risk Management



Exercise!

Exercise – 10 Minutes

- At your Table!
- Pick 1 or 2 **Events** that might cause **RISK**
- Describe:
  - **Likelihood:** Most Unlikely → Almost Certain
  - **Consequence:** Low → Medium → High
  - **Total Risk #** and **Highest Category**

Exercise – 10 Minutes

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- Describe:
  - **Likelihood:** Most Unlikely → Almost Certain
  - **Consequence:** Low → Medium → High
  - **Total Risk #** and **Highest Category**

Exercise – 10 Minutes

	Consequence				
Likelihood	1	2	4	8	16
	2	4	8	16	32
	4	8	16	32	64
	8	16	32	64	128
	16	32	64	128	256

Exercise – 10 Minutes

Consequence	Low	Medium	High
Operational	Outage < 8 Hrs	Aesthetic issue or Interruption 12 < 24 Hrs	Illness or Interruption >24 Hrs
Financial	$5K	$100K	>$500K
Environmental	No Mitigation	On & Off Site Cleanup	Significant Mitigation
Legal	None	Notices & Follow-up	Criminal Charges
Political	Minor	Formal Reporting	Dominate the Agenda
Reputational	Internal Review	External Scrutiny	National Media

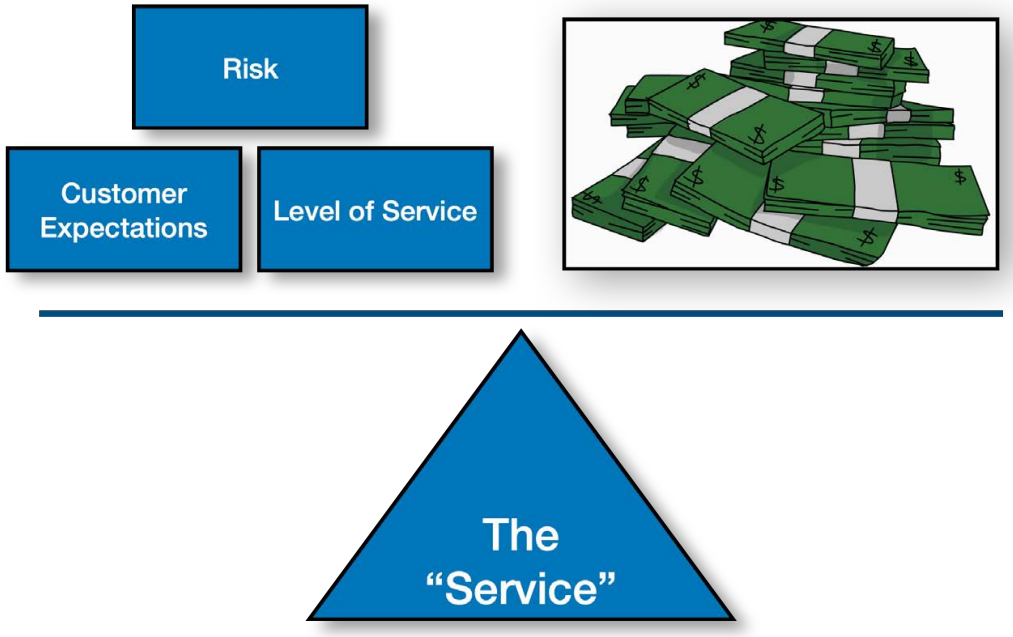
Risk & Level of Service Together

Putting it All Together

Risk & LOS are Connected

Changing LOS Changes Risk AND Cost

Look at them together



Putting it All Together

Why?

Because Level of Service & Risk belong to Council!

Putting it All Together

Why?

Council needs to Understand Significant Risks

Putting it All Together

Why?

Council sets Service Levels to meet needs and balance Risks

Putting it All Together

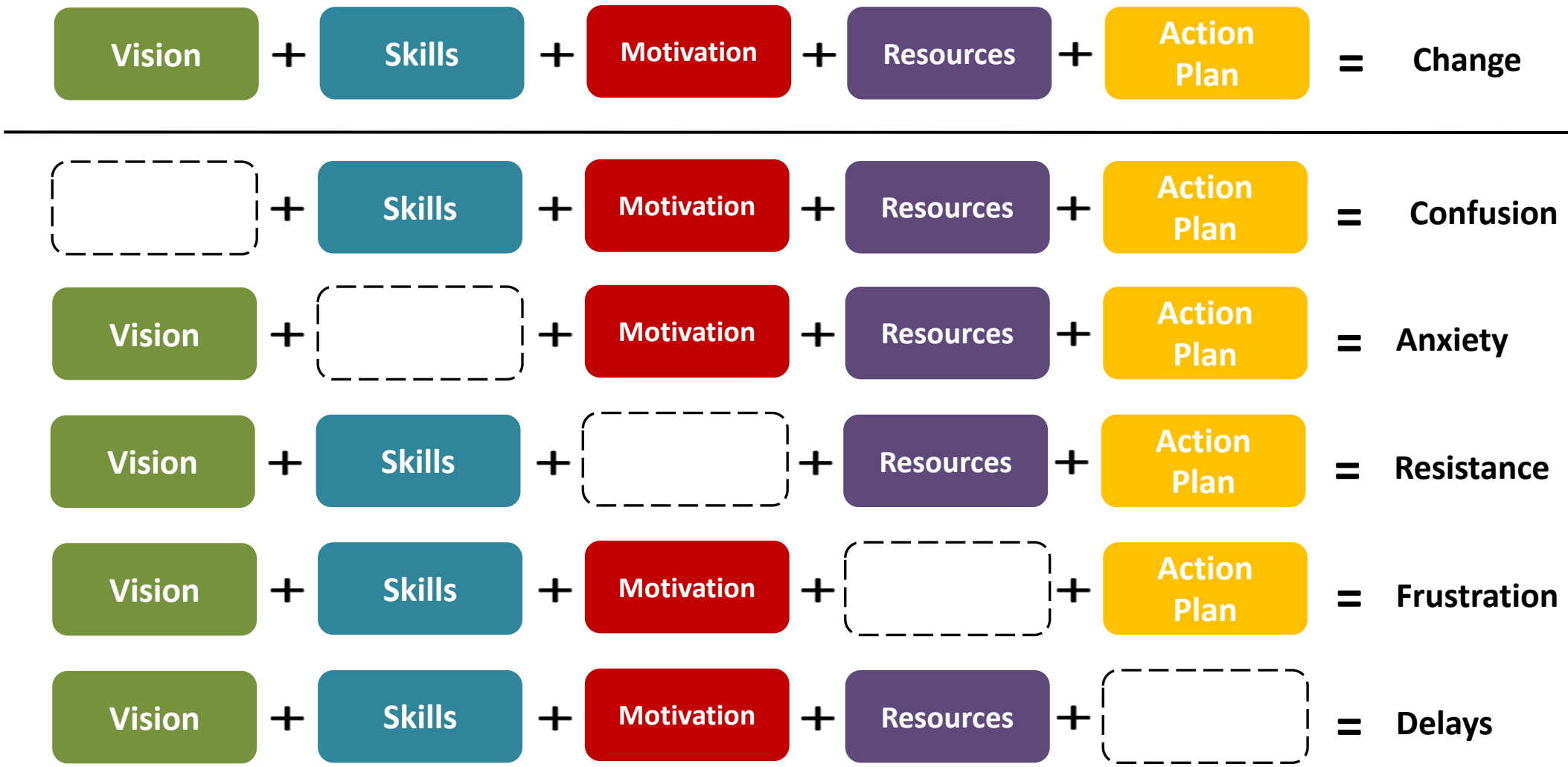
Why?

Level of Service + Risk = Cost

Putting it All Together

Category	Service	LOS				Risks		
Quality	Lead Program			3		64		
	Main Flushing Program		2			16		
	Cross Connection Program		2			8	32	1
Capacity	Max Duration of unplanned outages				4	2	8	
Condition	Water Uptime / Reliability			3		4		

Remember! Change Champions



Remember! 7 Questions!

1. What do we own and where is it?
2. What is it worth?
3. What is its remaining service life?
4. What condition is it in?
5. What do we spend and what should we spend/invest?
6. What's the gap?
7. How do we get sustainable infrastructure, and how resilient is our infrastructure?

Closing

Closing

- Services that the Customer sees
  - *Capacity, Condition, Quality*
- Level of Service
  - *Ranges from Poor to Best*
- Be Intentional About Risk
  - *Multi-Dimensional*
- Link them together to get Cost vs Risk

Thank you!

Questions?

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