

Advancing with Top-Notch Asset Management

Part I – Value Positioning and Governance

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Outline

- Context
 - Top Notch Asset Management
 - Asset value
 - Organizational framework
- How to ensure adequate value of the assets?
 - Service delivery and implementation strategies
 - Realize the asset value for the organization
- How can we improve AM in the era of disruptions?
 - Organizational and leadership aspects
 - Policy and governances
 - Adaptive measures and maturity
- Conclusions

Contexts - Top Notch Asset Management

- What is Top Notch Asset Management?
- Aligned with industry standards, policies and BPs
- Fulfilling Legislative requirements
- Appropriate for the organizations
- Addressing service levels, life cycle costs, vulnerability and risks
- Advanced tools and techniques – integrated, responsive and connected
- Proactive and informed investment decision making
- Service delivery excellences – sustainable, adaptive and resilient
- Innovations to improve quality of life



Modern Urban Infrastructure Network

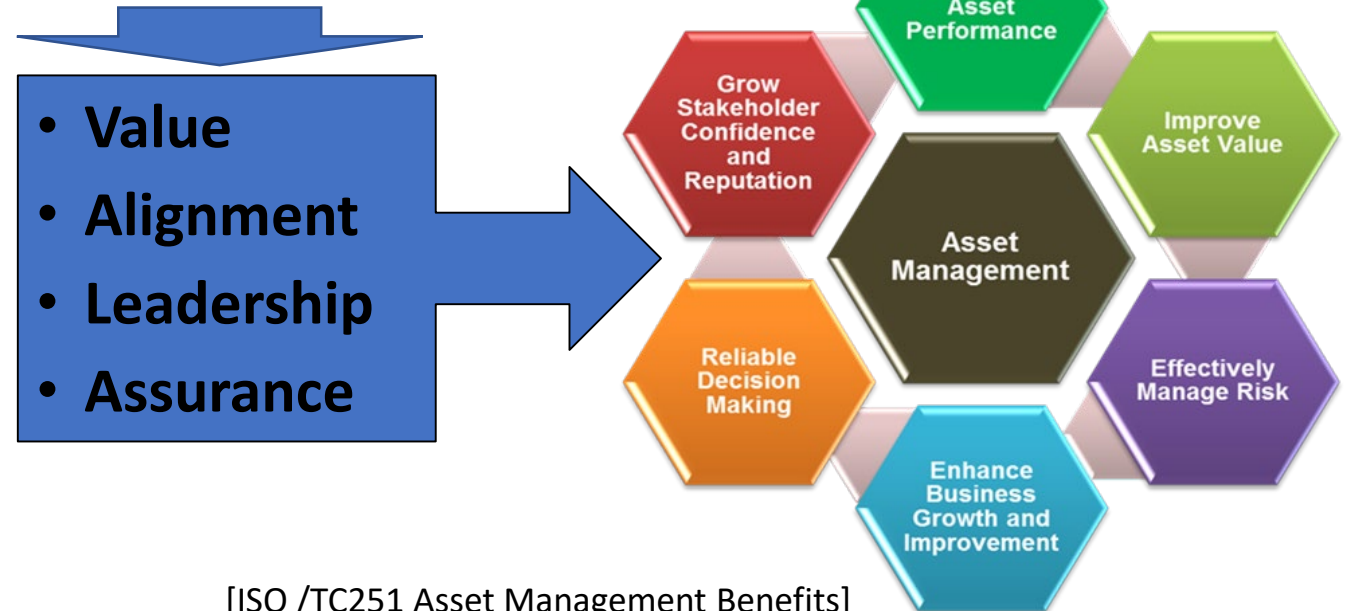


Infrastructure Connectivity (IEEE)

Top Notch Asset Management

- **“The coordinated activity of an organization to realise value from assets” – (ISO 55000)**
- Six Facets of AM
 - Strategy & Planning
 - AM Decision Making
 - Life Cycle Delivery
 - Asset Information
 - Organization & People
 - Risk & Review

Four Fundamentals of AM

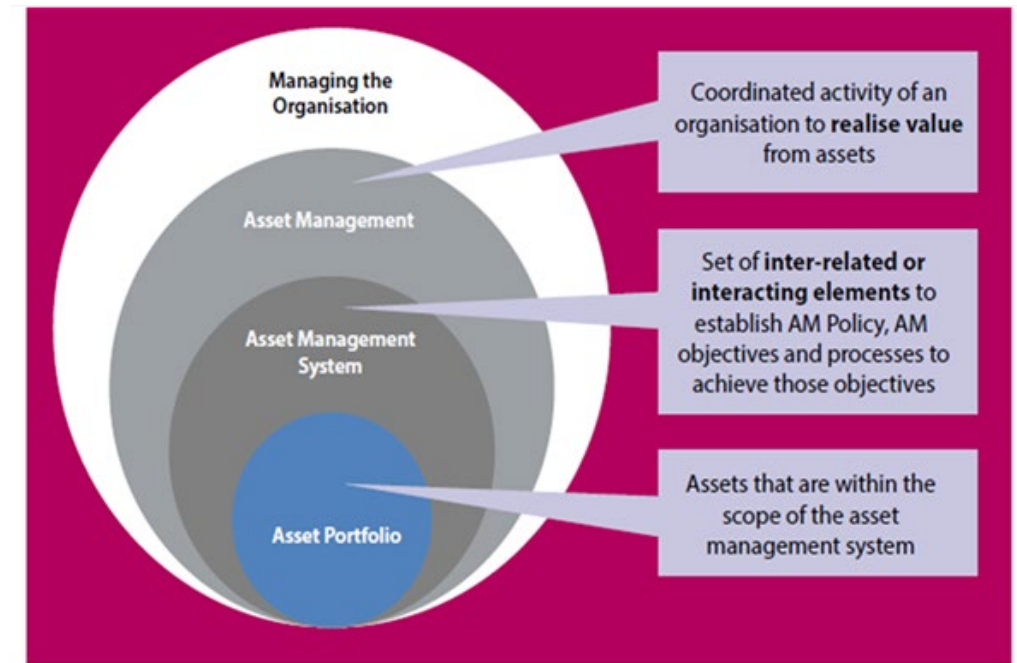


[ISO /TC251 Asset Management Benefits]

Asset Management Line-of-Sight

- Strong governance and accountability
 - Ensure organization's vision, mission and objectives
- Financial sustainability
 - Reduce CAPEX/OPEX and improve revenue
- Effective decision making (DM)
 - Asset risk and evidence based DM
 - Levels of service and demand forecasts
- Protect organization's reputation
 - Social responsibility
 - Regulatory compliances
 - Partnerships and innovations

Asset Management Line-of-Sight



[Source: ISO 55000 – 2014]

Asset Management and Organizational Need

Theoretical - ISO 55000 Contexts

- Organizational structure
- Leadership
- Planning
- Operations
- Support
- Performance evaluation
- Improvements

Influencer



- Size of the Organization
- Industry/Sector
- Services
- Diversity
- Culture
- Ownership
- Maturity

Practical – Key Organizational Needs

- Understanding of what council is setting out to do and achieve
- Clear line of sight from organizations to activities
- Necessary policy and processes to enable the activities
- Ensure that activities are achieving as per Council objectives

Value Positioning of Infrastructure Assets

- Asset valuation drivers
 - Reporting drivers (external) and Management drivers (internal)
- Challenges to value public assets
 - Managed by various jurisdictions and accountability is not always defined
 - Intangible in nature and lacking of appropriate tools and techniques
- Two concepts of value in an organization
 - Value Stream and Value Chain
 - Value Stream – lean operations and customer satisfaction
 - Value Chain - strategic activities to create values to the organization
- General asset valuation process
 - Cost based valuation
 - Market based valuation
 - Optimized depreciated value
- Asset value - Book value, Fair value, Historical value, Written down replacement cost, Current Replacement Value (CRV), Salvage value (SV), Optimized Replacement Cost (ORC) etc.

Asset Valuation Methodologies

- Cost based valuation
 - Reproduce equivalent assets as fair value
 - Does services can be values by costs?
 - Optimization for condition, services, performance, risk and lifecycle
- Market based valuation
 - Market trends
 - Economics
 - Discounted cash flow
 - Forecasted cash flow
 - Risk adjustment for internal rate of returns (IRR)

- Present Value (PV) method:

$$PV = FV \left[\frac{1}{(1+i)^n} \right]$$

Where, PV = present value, FV = future value of expenses,
n = number of years and i = discount rate

- Uniform annualized cost method:

$$A = PV \left\{ \frac{[i(1+i)^n]}{[(1+i)^n - 1]} \right\}$$

Where, A = end of year expenses, PV = present value,
n = number of years and i = discount rate

- **Discount Rate (i) = cc + fr + pi**
Actual opportunity cost of capital (cc)
Premium for risks for investment (fr)
Rate for inflation or deflation (pi)

PSAB and Capital Assets Valuation

PSAB Valuation

- Discounted reproduction cost
 - Same physical form
 - Time of acquisition and Inflation index
- Discounted replacement cost (DRC)
 - Replacing the asset in a different form
 - Same productive capacity
 - Time of acquisition and Inflation index
- Appraisal
 - Assessment of what an asset is worth
 - Based on its current age and condition
 - Time of acquisition and inflation index

Capital Asset Valuation

- Acquisition
 - Two methods to acquire – direct purchase and internal production (construction)
- Capitalization
 - When an asset is put in use
- In-service
 - Assets are subject to amortization based on their estimated useful life
- Retirement
 - Assets are disposed at the end of their service life or surplus to operational requirements. Assets gross value and amortization will be written-off

Asset Value in the Life Cycle

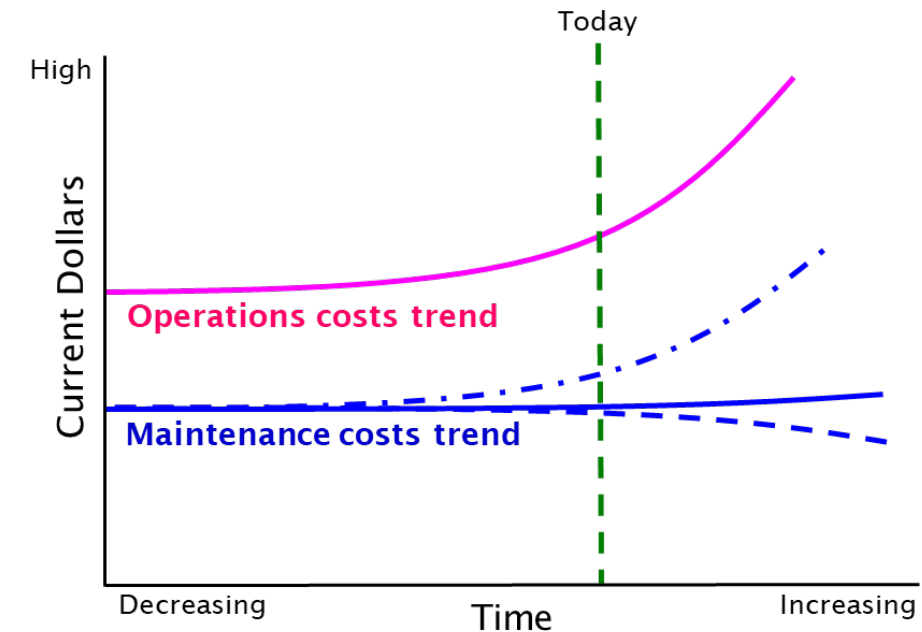
- Condition-based (CB) depreciation
 - Markov model, Fuzzy Neural Network

Costs of Acquisition

• LCC, Life Cycle Cost = Original cost
+ O&M costs
+ Rehab/Renewal costs
+ Decommissioning costs
– Salvage value

Costs of Ownership

Understanding trends and drivers



- LCC Considerations: Time horizon, discounting, risks and social costs

Asset Valuation for Bridges

- Asset Replacement Cost (ARC):

$$\text{ARC} = (\text{CRV} + \text{XX\% of CRV}) \times \text{Urban Factor}$$

- CRV (Current Replacement Value) is based on sq. m. of deck area for structure type:

- Rigid frame \$2,800
- Slab on concrete girder \$2,200
- Slab on steel girder \$2,400
- Post tensioned voided slab \$3,000
- Solid slab rail carrying \$4,000
- Pre-cast culvert \$1,400
- Corrugated steel pipe \$ 950
- Arch culvert \$2,000

- % of cost for administering the project
- Location cost factor

Bridge Sliding Scale Unit Price Formula

	Deck Area (m ²)	Unit Price (\$/m ²)
Min Area/Max Cost	100.00	4,500.00
Max Area/Min Cost	2,500.00	2,000.00
Slope	-	1.04167
Y-Intercept		4,604.17

Structure Priority Number Factors and Weightings

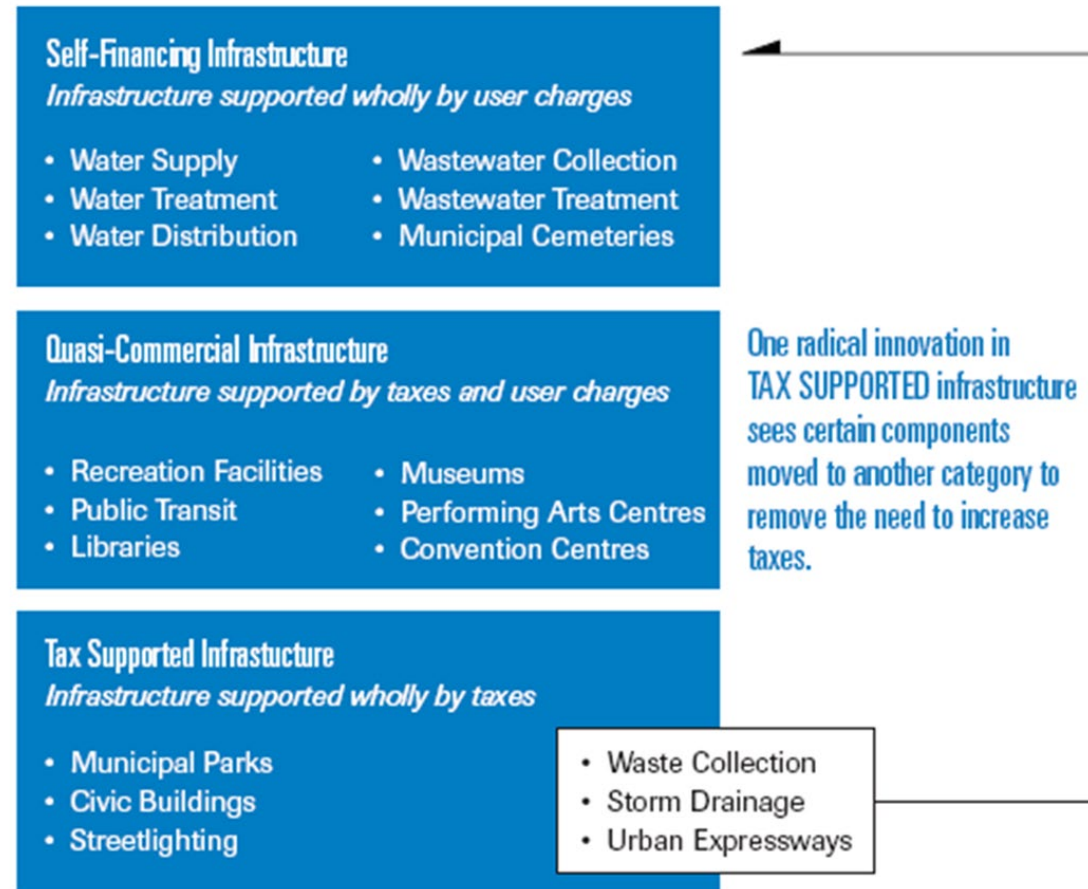
BCI	AA DT	CRV	Performance Deficiencies	Maintenance	Total Cost	Detour Length
50	10	15	5	5	5	10
Total						100

Report

Structure ID	Structure Name	Road Name	Rehab Cost
904002	McCRANEY CREEK		
907001	SIXTEEN MILE CREEK	LAKESHORE ROAD WEST	\$3,323,000
907004	SMITH-TRILLER VIADUCT	UPPER MIDDLE ROAD WEST	\$50,500
907002	WILLIAM ANDERSON BRIDGE	REBECCA STREET	\$1,585,000
999011	CNR GRADE SEPARATION	ROYAL WINDSOR DRIVE	\$107,500
907003	OLD MILL BRIDGE	SPEERS ROAD	\$83,650
817006	WEDGEWOOD CREEK EAST	GRAND BOULEVARD	\$461,500

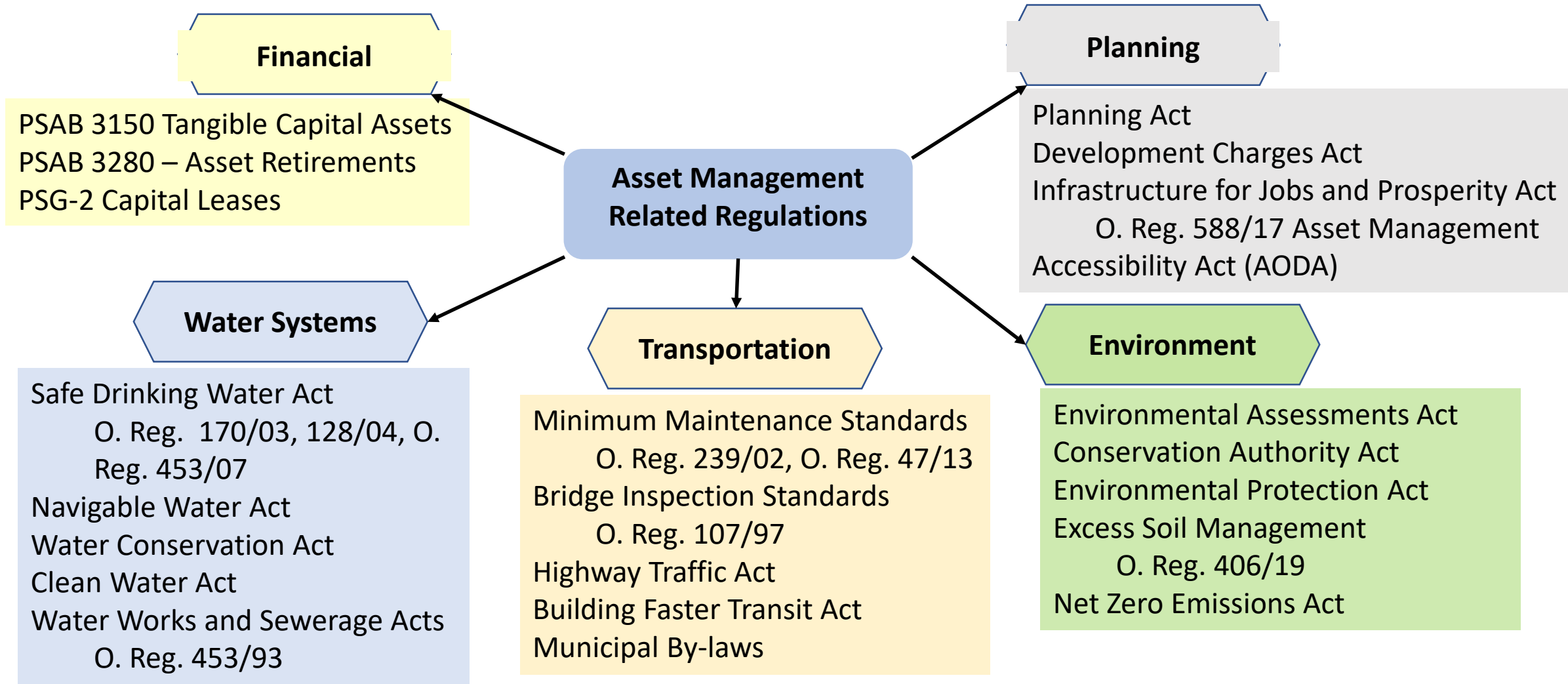
Value Positioning for Municipal Infrastructure

- Value increase or decrease with time
- How to reduce the asset ownership costs?
 - Design and construction (green options)
 - O&M costs input in the LCC optimization
 - Value engineering
 - Maximize asset utilizations
- Increasing value of the assets
 - Renewal/Reproduction of existing assets – possible zero optimization
 - Asset elimination and reinstatement - Surplus and Functionally Obsolete Assets
 - Physical obsolete - outdated design and functionality. Replace with new one
 - Intrinsic obsolete – not meeting safety code, unable to upgrade without significant cost. Complete reconstruction



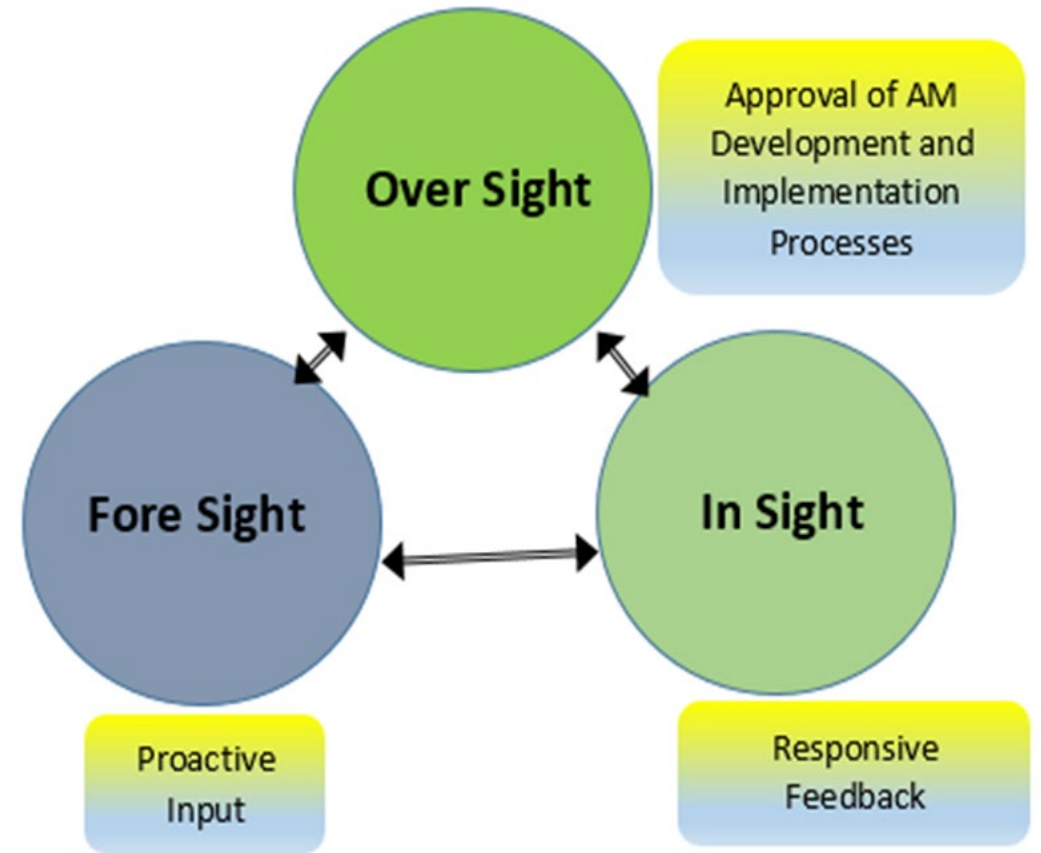
Source: Adapted from the US Federal Highway Administration *Innovative Finance Primer*.

AM Regulation and Standards



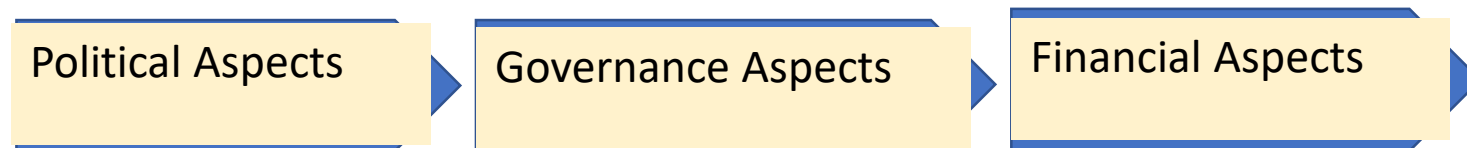
Municipal Service Integration – Line-of-Sights

- Strategic approach to integration
- Data and software needs
- Personnel and skills
- Policy and organizational structure
- Resource allocation
- Asset management within organizational culture
 - Communicate change
 - Gain commitment
 - Develop policy and procedures
 - Assign roles and responsibilities
 - Monitoring progress

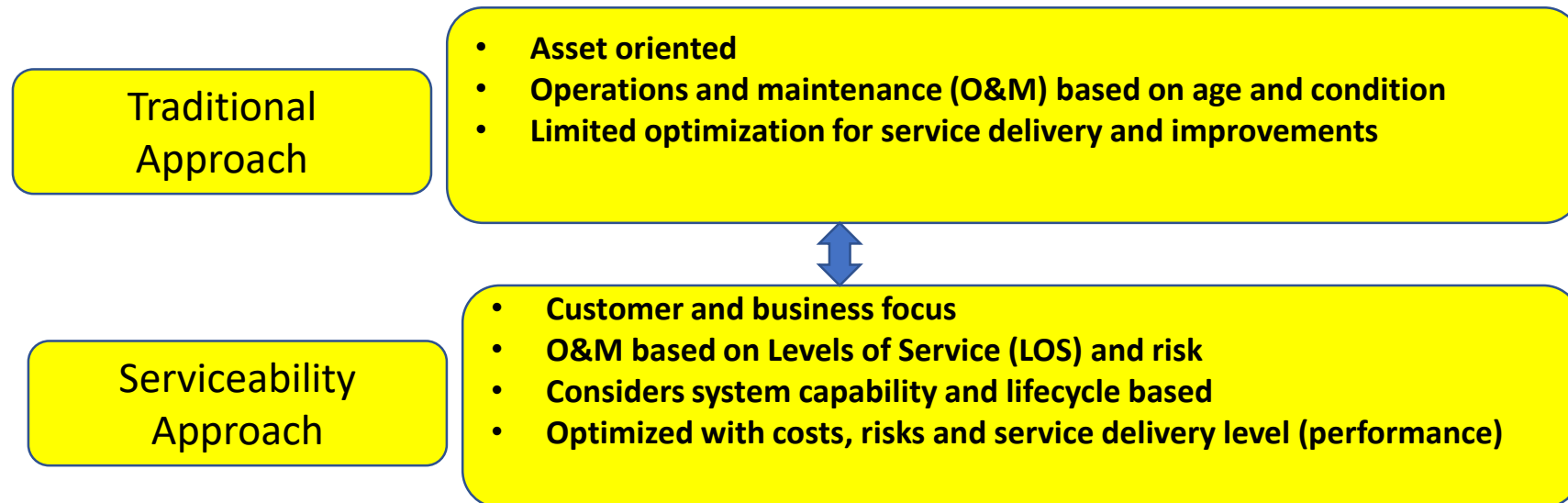


Service Delivery and Effectiveness

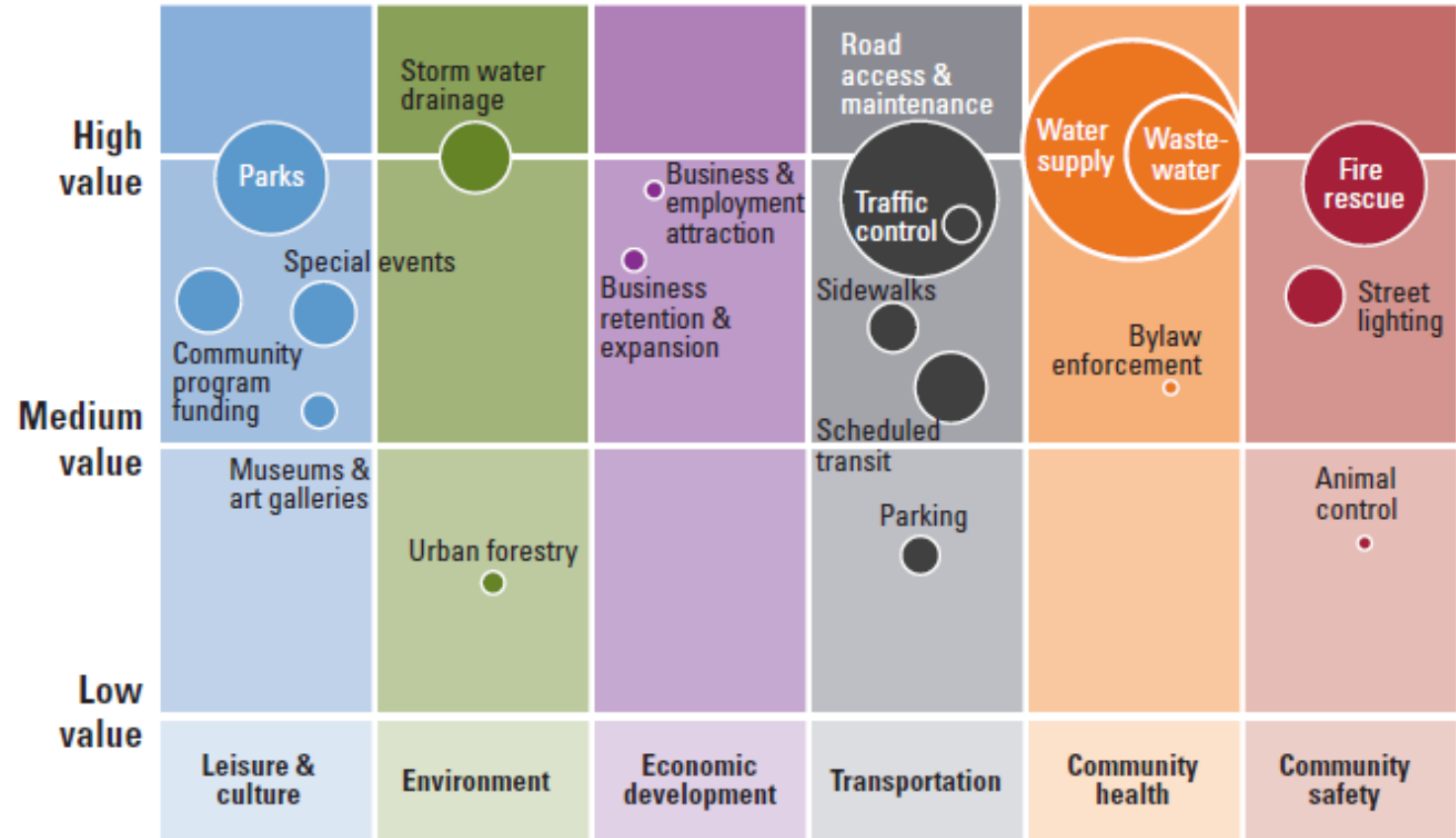
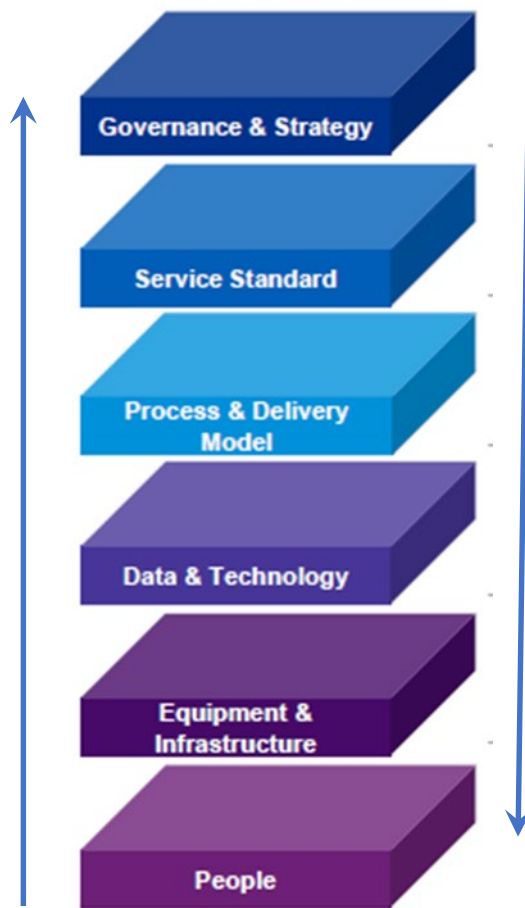
- Service delivery modes impacted by



- Service interruptions in the era of climate change and extended pandemic
- Asset management service excellences



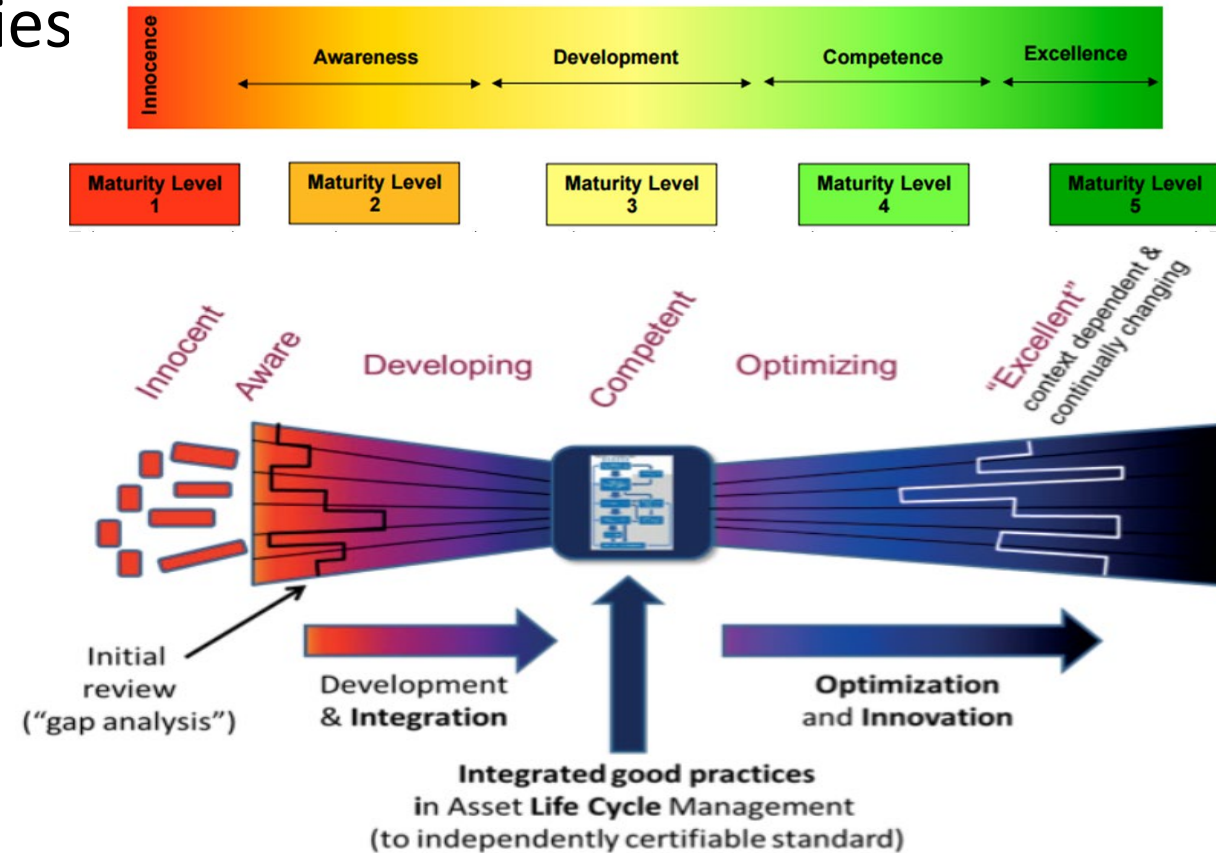
Service Domains and Costs Review



[Source: KPMG Report on Municipal Services]

Asset Management Maturity

- Federation of Canadian Municipalities
 - FCM – GMF – MAMP
 - Five competencies of AM maturity
 - Policy and governance
 - People and leadership
 - Data and information
 - Planning and decision-making
 - Contribution to AM practices
- Higher value assets
 - More risk exposure
 - Adaptation required



[Source: Institute of Asset Management (IAM)]

Concluding Remarks

- Organizations need strategic AM plan aligned with ISO 55000
- Self assessment of the maturity parameters in every steps
- Strategic policy and governance structure to implement AM culture
- Study needs for accuracy improvement for condition based valuation
- Consider adaptations for climate emergencies and other disruptions
- Implement top notch AM techniques and BPs. Journey continued...

Thank You