

ASSET MANAGEMENT 101

CT GIS Group

6/26/2020

Boulder Mountain Creative

- Woman-Owned Small Business
- Offices in Storrs, CT and Hillsboro, Oregon.
- BMC was inspired by TEDx and specializes at the intersection of Design and Technology.
- Boulder Mountain Creative specializes in the following services:
 - Asset Management
 - CMMS Implementation Support
 - GIS
 - Database Data Model Design
 - Technology Planning
 - Project Management



Juston Manville, MIAM

27 Years in Engineering Specific

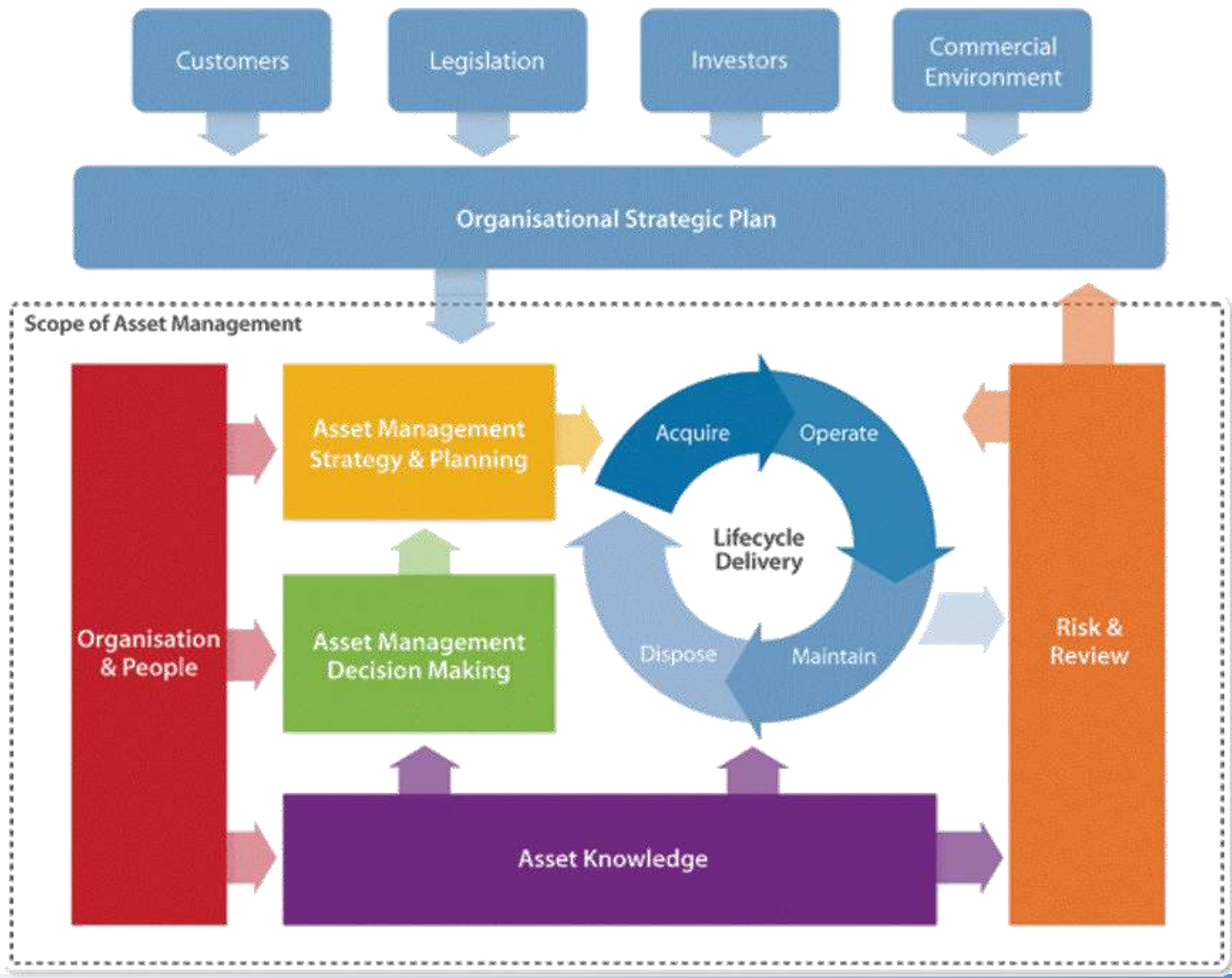
- Asset Management
- Systems Integration
- Compliance Reporting
- Pavement Management
- CIP Prioritization
- GIS



What is Asset Management?

“Coordinated activity of an organization to realize value from assets.”

(International Organization for Standardization (ISO) 55000:2014)



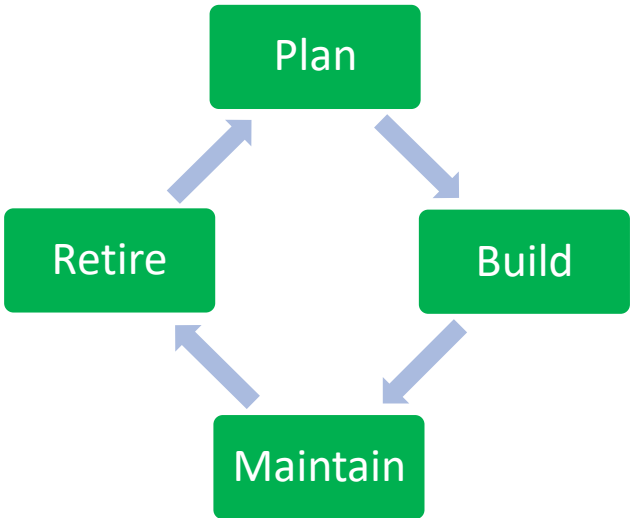
39 Areas of Asset Management

<i>Strategy & Planning</i>	Asset Management Policy
	Asset Management Strategy & Objectives
	Demand Analysis
	Strategic Planning
	Asset Management Planning
<i>Asset Management Decision-Making</i>	Capital Investment Decision-Making
	Operations & Maintenance Decision-Making
	Lifecycle Value Realisation
	Resourcing Strategy
	Shutdowns & Outage Strategy
<i>Lifecycle Delivery</i>	Technical Standards & Legislation
	Asset Creation & Acquisition
	Systems Engineering
	Configuration Management
	Maintenance Delivery
	Reliability Engineering
	Asset Operations
	Resource Management
	Shutdown & Outage Management
	Fault & Incident Response
	Asset Decommissioning & Disposal

<i>Asset Information</i>	Asset Information Strategy
	Asset Information Standards
	Asset Information Systems
	Data & Information Management
<i>Organisation & People</i>	Procurement & Supply Chain Management
	Asset Management Leadership
	Organisational Structure
	Organisational Culture
	Competence Management
<i>Risk & Review</i>	Risk Assessment & Management
	Contingency Planning & Resilience Analysis
	Sustainable Development
	Management of Change
	Asset Performance & Health Monitoring
	Asset Management System Monitoring
	Management Review, Audit & Assurance
	Asset Costing & Valuation
	Stakeholder Engagement

Strategy

People &
Process

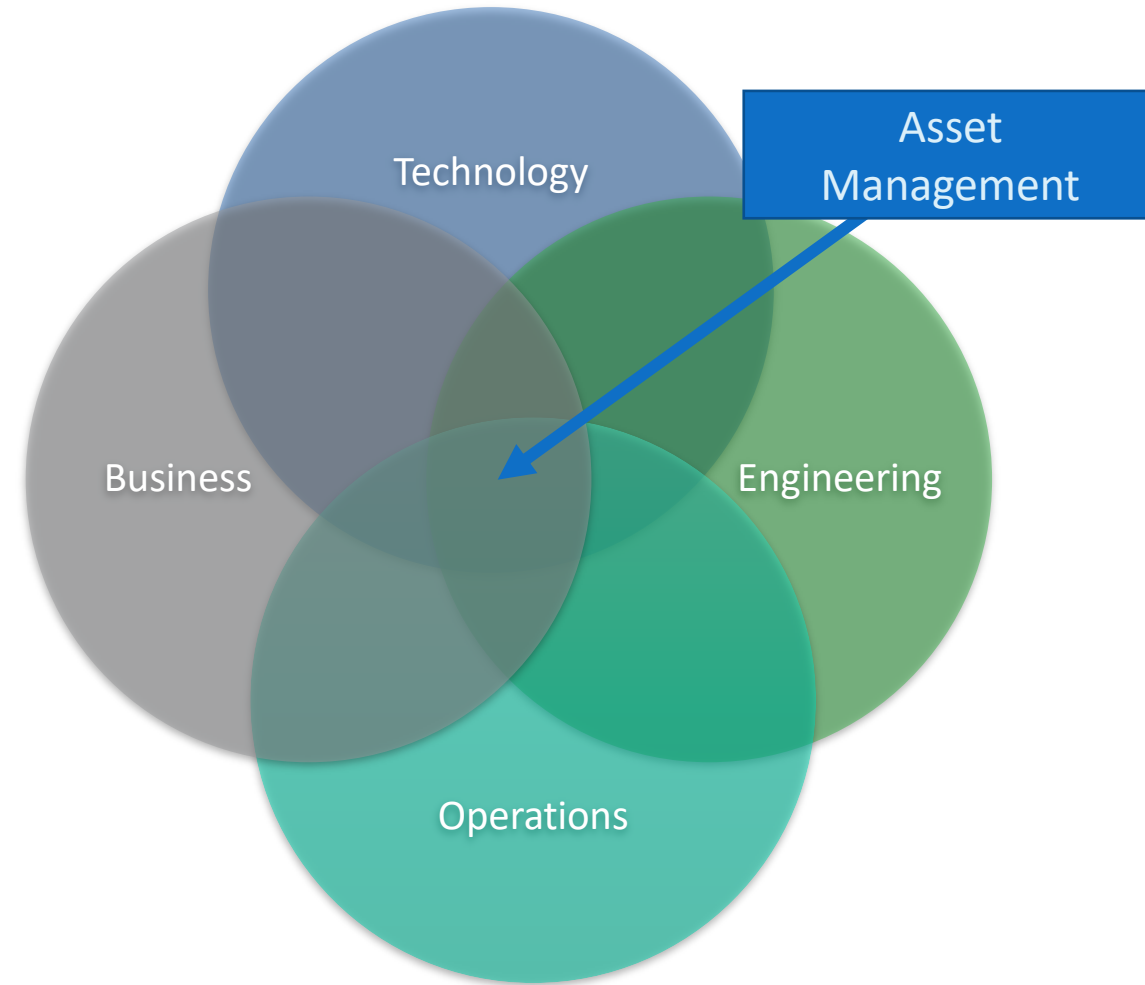


Risk & LOS

Asset Knowledge

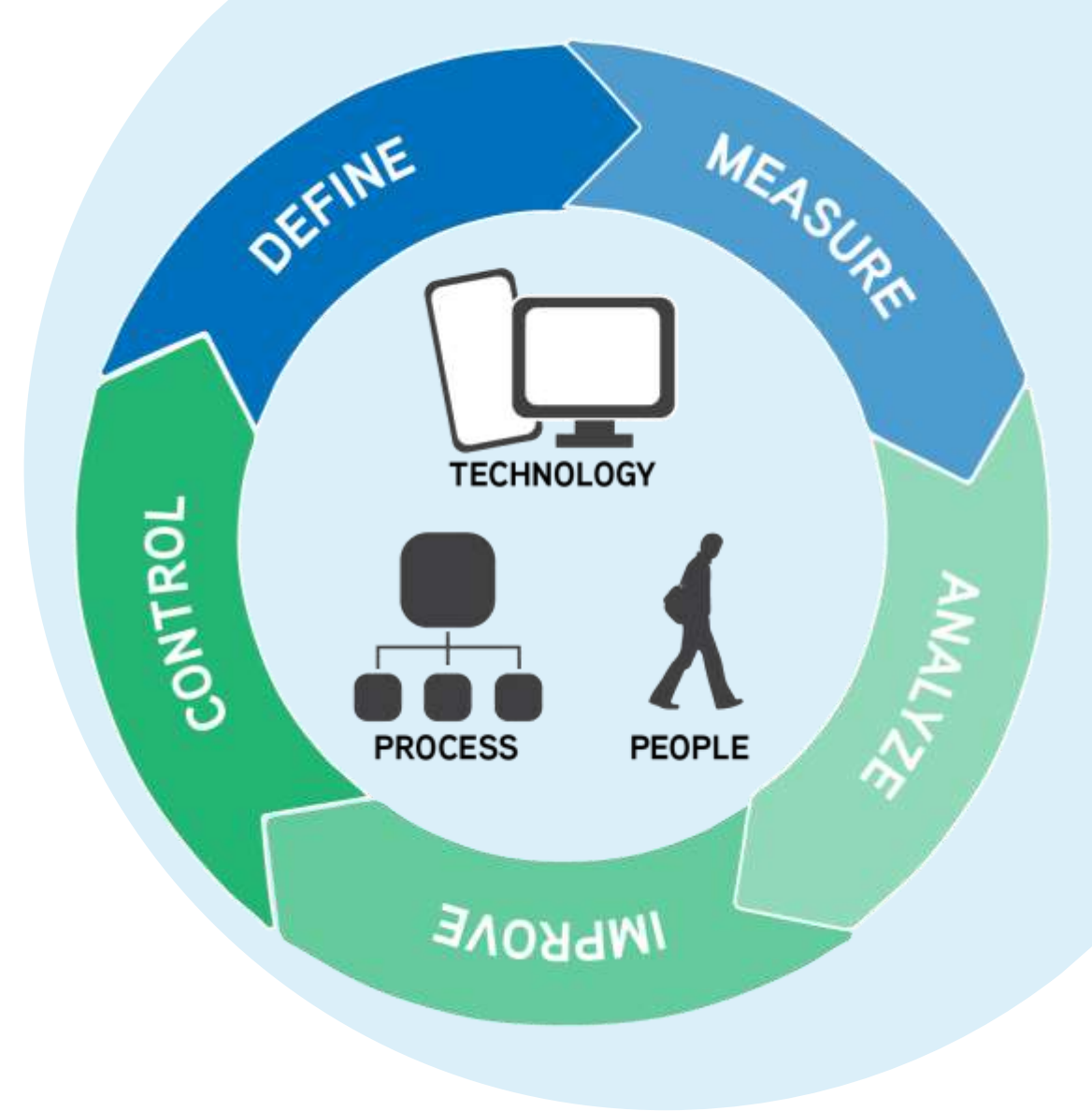
Asset Management Drivers

- Portfolio of aging and expensive assets
- Understanding future renewal expenditures
- Trade-off decisions between O&M (OpEX) and Capital (CapEX) → Total Expense (TOTEX)
- Need for optimal investment strategies – new and old
- Loss of institutional knowledge from retiring workforce aka “Knowledge Management”
- Need for efficient maintenance practices
- Lack of cross-department integration
- Technology inputs not informing outputs



Goals of a Robust AM Program

- **Improved financial performance:**
 - Return on investments and reducing costs
 - Preserve asset value without sacrificing the short or long-term objectives
- **Informed asset decisions:**
 - Data driven decision making to balance costs, risks, opportunities and performance
- **Demonstrated compliance:**
 - Transparently conform with legal, statutory and regulatory requirements
- **Improved efficiency and effectiveness:**
 - Review and improving processes, procedures and asset performance to improve efficiencies and effectiveness



An Asset Management approach balances effort with value !



Most effective use of money available



Problem-solving approach

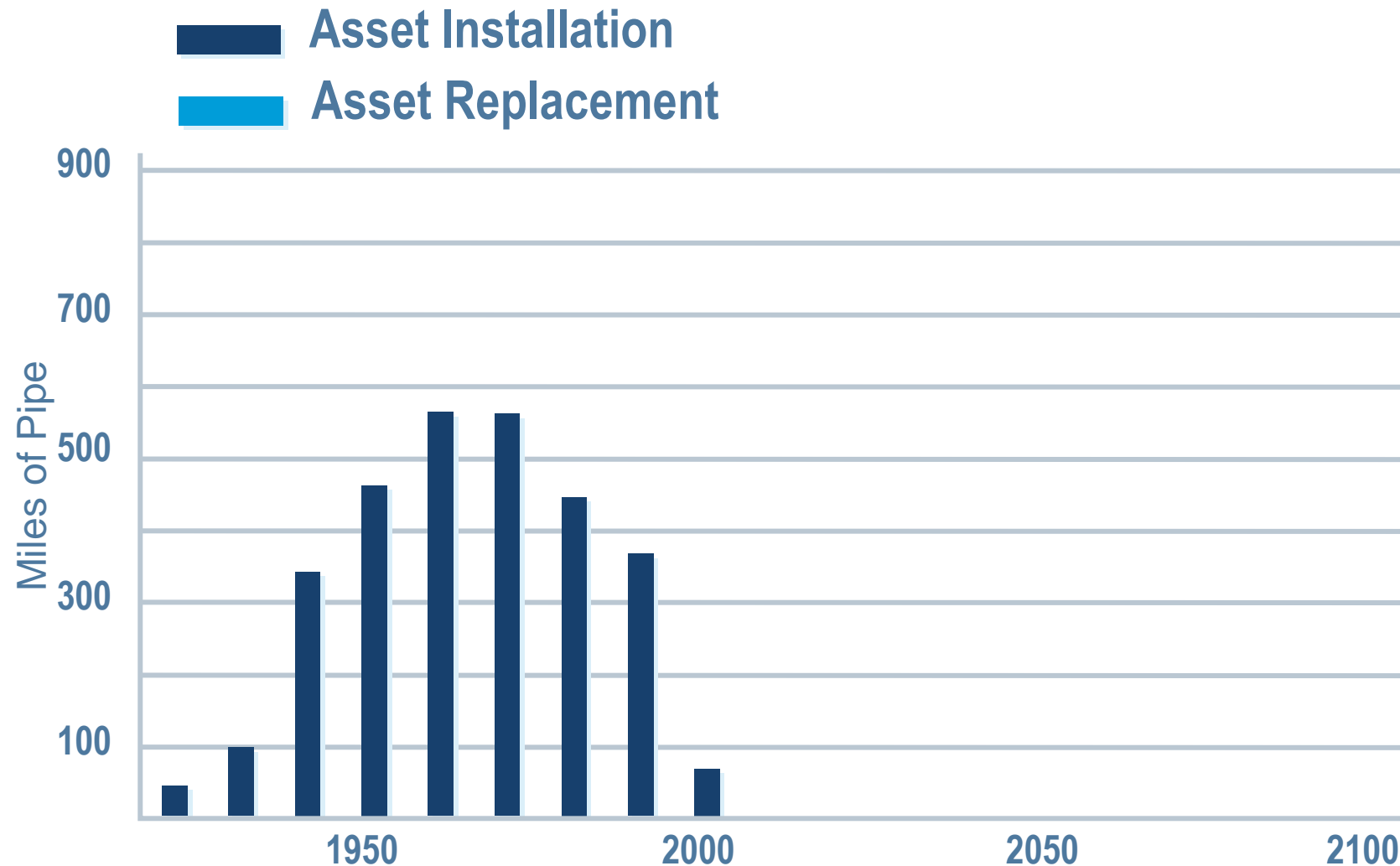


Knowledge transfer for long-term sustainability

Improved Financial Performance

“Give me six hours to chop down a tree and I will spend the first four hours sharpening the axe” – Abraham Lincoln

Forecasting Replacement Cost is a Key Part of Asset Planning



Replacement Year Depends on Remaining Useful Life



Philosophies That Guide Capital Funding

	Pros	Cons
Cash Reserves	<ul style="list-style-type: none">▪ Lower overall cost▪ Financial flexibility▪ Eases financial projections	<ul style="list-style-type: none">▪ Higher near-term rates▪ Disproportionate burden on existing customers▪ Need higher cash balances▪ Puts a premium on advance planning
Debt	<ul style="list-style-type: none">▪ Mitigates immediate rate impacts of capital investment▪ “Generational equity”▪ You get the money when you need it	<ul style="list-style-type: none">▪ Higher overall cost (interest)▪ Reduces financial flexibility▪ Debt is a useful tool in the toolbox, but <i>amount</i> of debt must be limited▪ Last resort

How Do You Want to Play Ball?



Options for Funding Capital Through Rates

- Do nothing
- Original-cost depreciation
- Replacement-cost depreciation
- Sinking fund (based on projected needs)

Asset Replacement Example

- Assumptions:

- \$1 million asset
- 40-year useful life
- 3% annual cost inflation
- 1% investment earnings rate

- Debt funding for costs that exceed resources:

- 4.5% interest rate
- 20-year repayment period

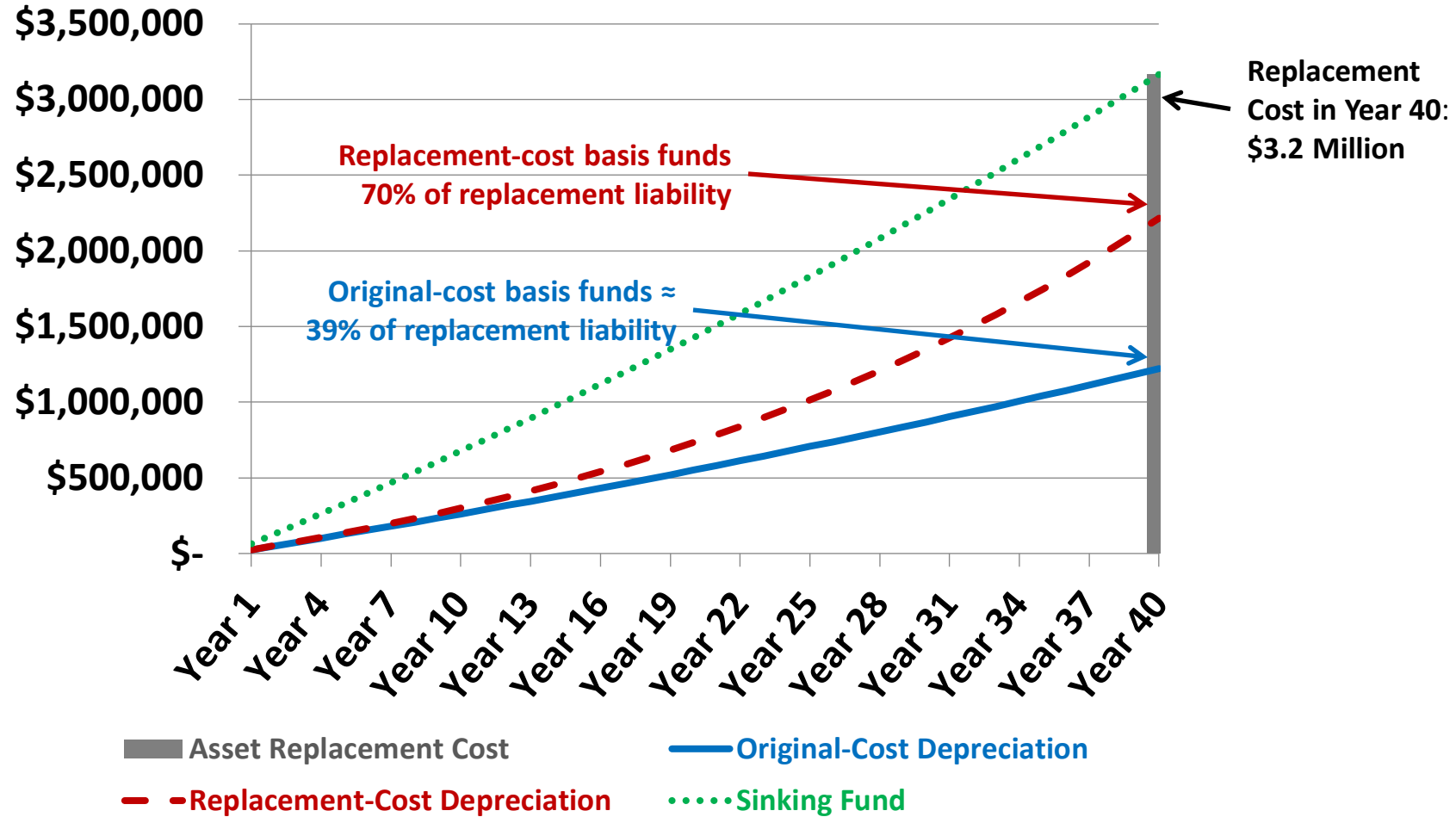
- We can choose to fund this replacement through rates based on:

- **Original-cost depreciation:** $\$1,000,000 / 40 \text{ years} = \$25,000 \text{ per year}$
- **Replacement-cost depreciation:** $\$25,000 \times (1.03)^{\text{Asset Age}} \text{ per year}$
- **Sinking funds:** $\$64,783 \text{ per year}$

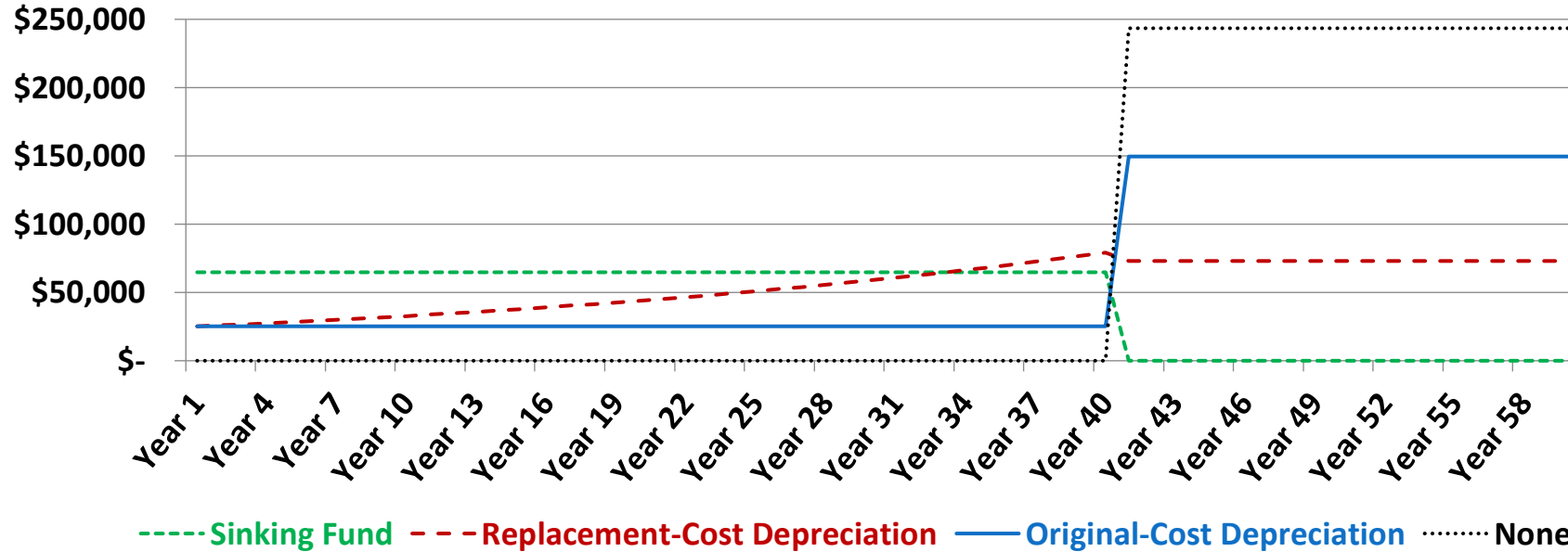
Annual transfers escalate with inflation,
ranging from \$25,000 - \$79,176 per year

Annual transfer needed to fully cover
projected replacement cost in projected
year of replacement

Funding for Asset Replacement



Annual Rate Funding for Replacement



System Reinvestment Policy

None

Original-Cost Depreciation

Replacement-Cost Depreciation

Sinking Fund

Total Funded From Rates

\$4,869,376

\$3,990,279

\$3,346,538

\$2,591,337

*Amount needed to fund
a \$3.2-million asset
replacement in Year 40*

Minimize Expenses Using Asset Management



Informed Asset Decisions

“Most of the world will make decisions by either guessing or using their gut. They will be either lucky or wrong.” – Suhail Doshi

Data Fundamentals

- **Strategy**

- Clear statement of objectives
- Data managed through asset lifecycle
- Decision making process outlined

- **Align goals:**

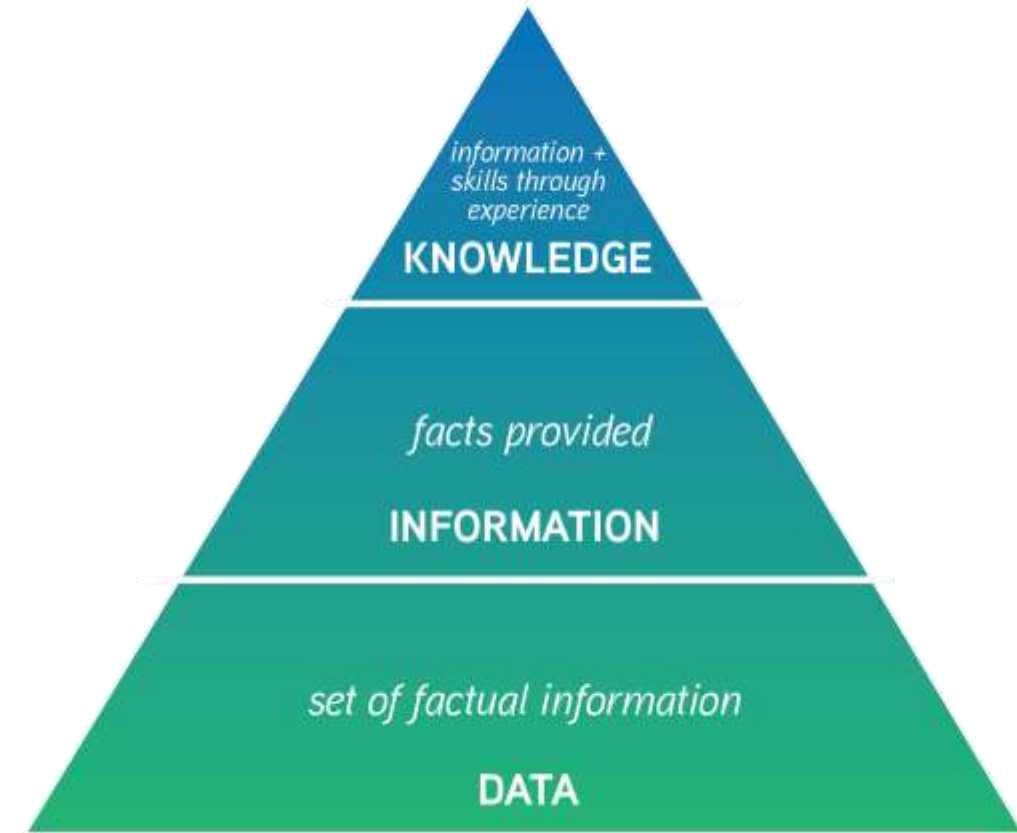
- Finance, information systems, engineering and operations

- **Leadership**

- Clearly defined roles and responsibilities
- Empower employees

- **Assurance**

- A process for monitoring and improvement



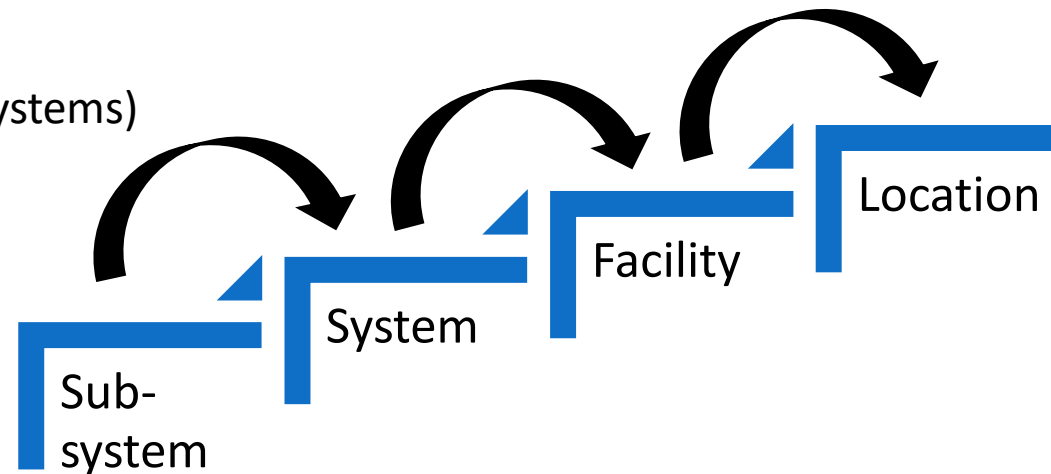
Asset Hierarchy Defined

A systematic and comprehensive listing of all assets in a logical, nested order that facilitates quick location of asset records and the rolling up of data from lower levels to higher or the drilling down from higher levels to lower. The hierarchy, when combined with unique identification numbers and relevant attribute data for each asset comprises an asset registry, is one of the most fundamental building blocks of an asset management program and system. ¹

WERF: <http://simple.werf.org/simple/media/AHT/howTo.html>

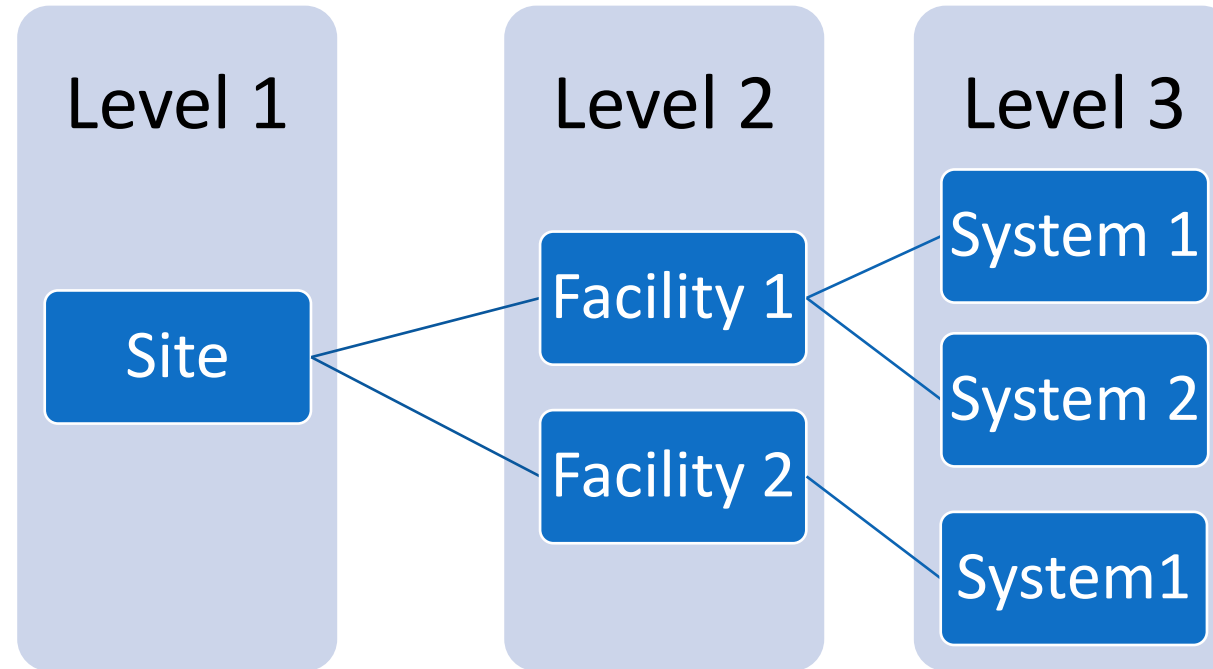
Asset Hierarchy

- Cost rolls up from part(s) to site(s)
- Condition rolls up from part(s) to site(s)
- Depth of the hierarchy needs to consider:
 - Level of asset for maintenance: maintenance managed item(s)
 - Information system(s) used:
 - GIS is shallow
 - Maximo can go 9 levels
 - PeopleSoft, Tyler Technologies (Finance Systems)
 - CAD / BISDM / ArcFM



Step 1: Organize the Layout

- Identify components and logic groupings
- Determine roll-up requirements
- Define the levels required for operations and maintenance (maintenance managed items)



Maintenance Managed Item (MMI)

- A maintainable unit is repaired by replacing a component or part
- A component is replaced upon failure, not repaired
- Low cost items could be tracked based on criticality:
 - Due to *indirect cost consequences*
 - Due to *safety*
 - Due to *theft*
 - Due to *Environmental Impact*

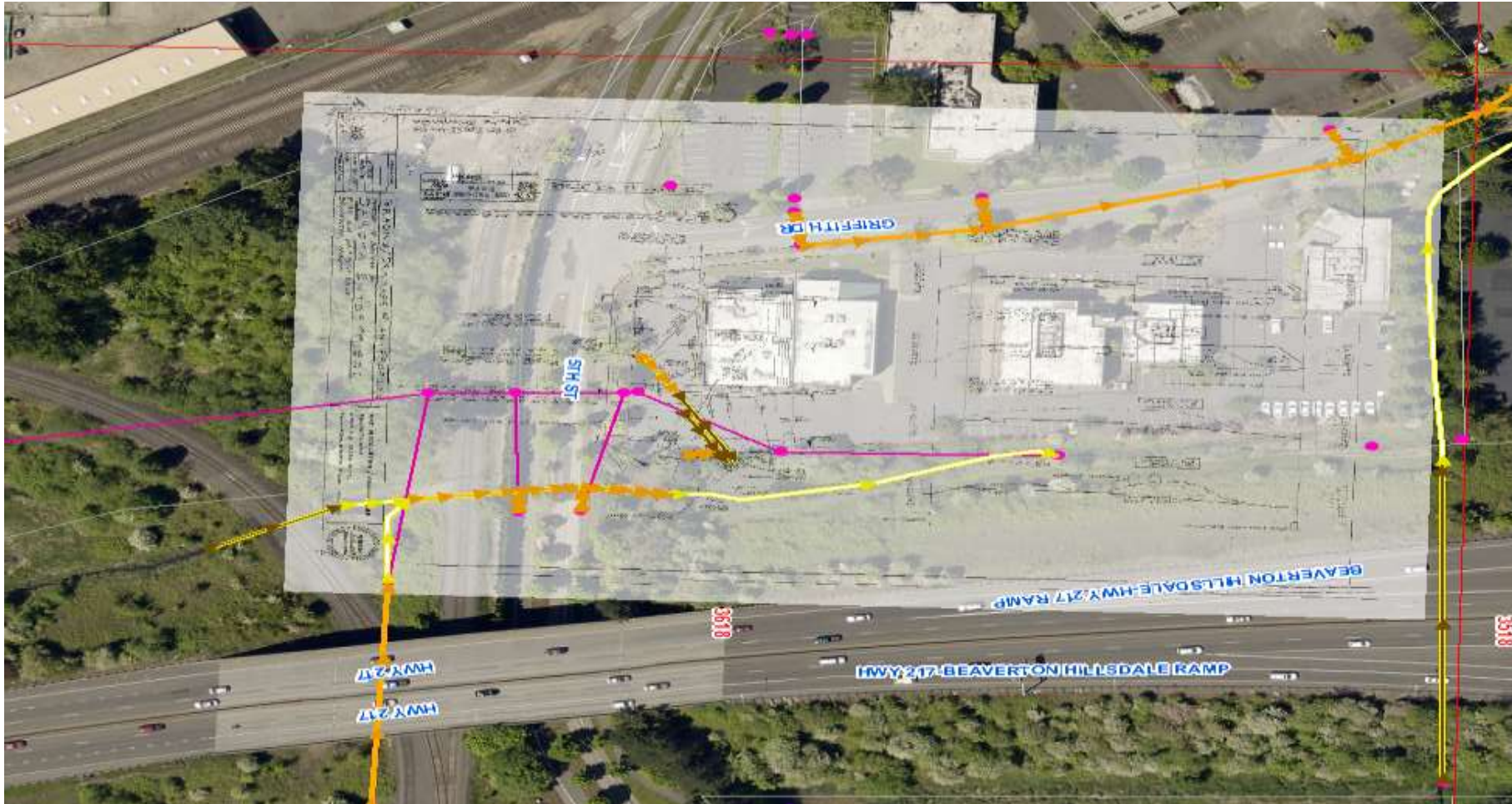
Step 2: Develop Asset Registry

- Asset Tags & Naming Conventions
 - *Unintelligent* (random, often sequential numbers)
 - *Semi-intelligent* (numbers that may indicate the type of asset, department, or responsible Business Unit and may identify its approximate location but then use an unintelligent sequential number for the balance of the number)
 - *Fully intelligent* (numbers that will have a detailed structure so that the number can indicate the general type of asset, the location, and whatever other attributes are deemed important)
- Document Data
 - Develop attributes of asset classes
 - Inventory and record tag IDs

Step 3: Load Data & Beyond

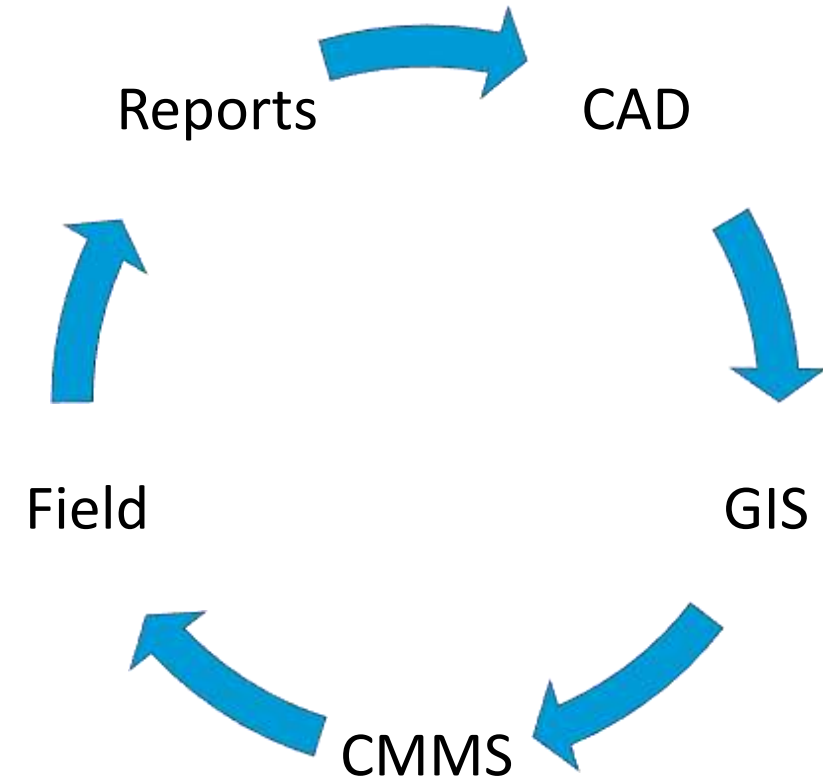
- Develop a strategy for testing and loading data
- Develop relationships with data collectors, end users and data stewards
 - Include all levels of the organization
 - Train data collectors, end users and data stewards on the goals of systems
 - Train end users in the use of systems
- Implement a change control process
 - Consider dependent systems:
 - Finance System
 - GIS
 - RCM Tools
 - Etc...

Data you can trust...

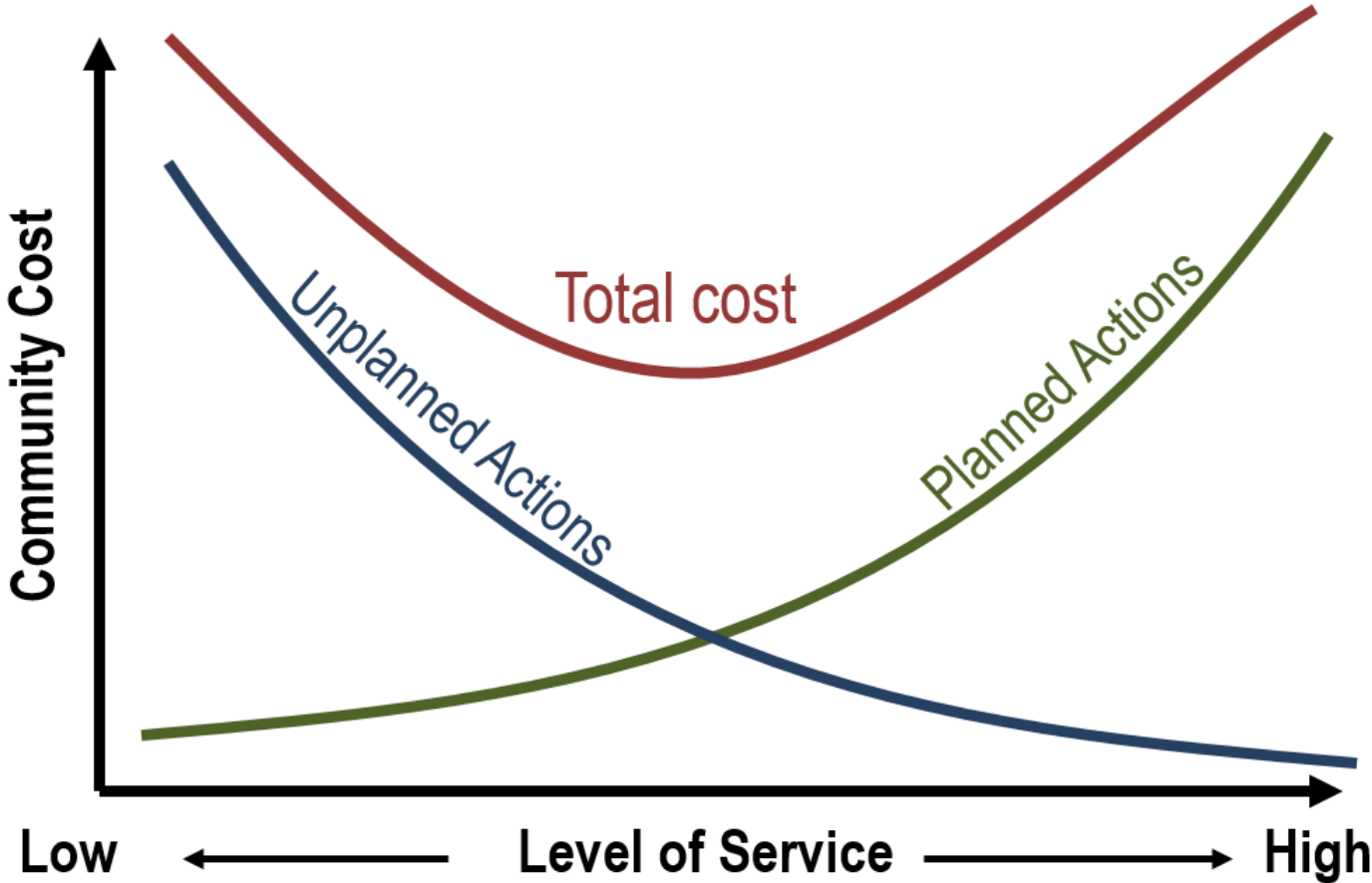


The Truth about Field Truth

- As-Built drawings are always correct ?
- Biggest gain in efficiencies
- Better data = better reporting
- High ROI
- Common Operating Picture



Good Data → Planned Actions → Lowest Cost

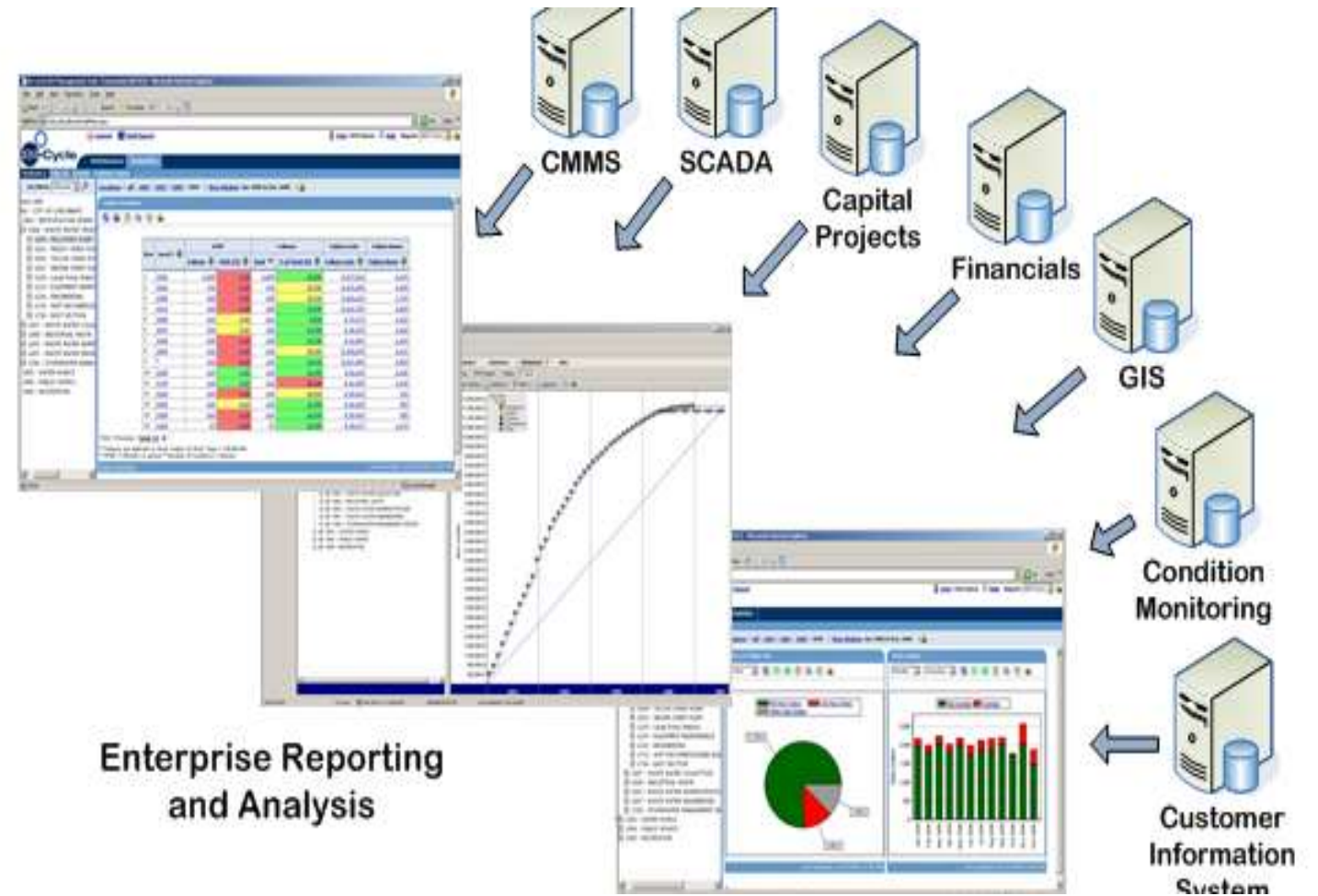


Demonstrated compliance

“All I want is compliance with my wishes, after reasonable discussion.”
— **Winston Churchill**

Good Data Keeps the Auditors Away

- GASB
- MS4
- NPDES
- TAMP

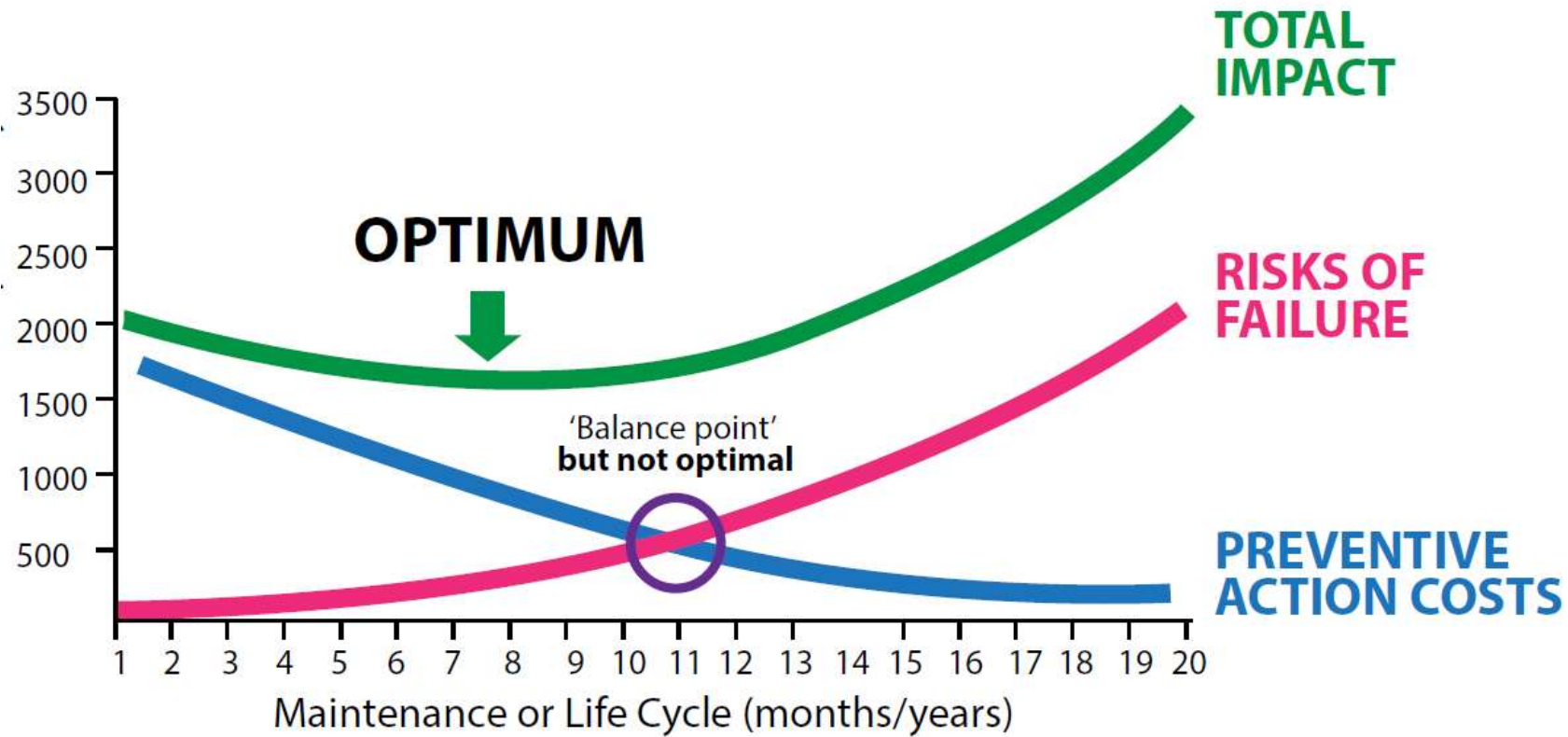


Improved Efficiency

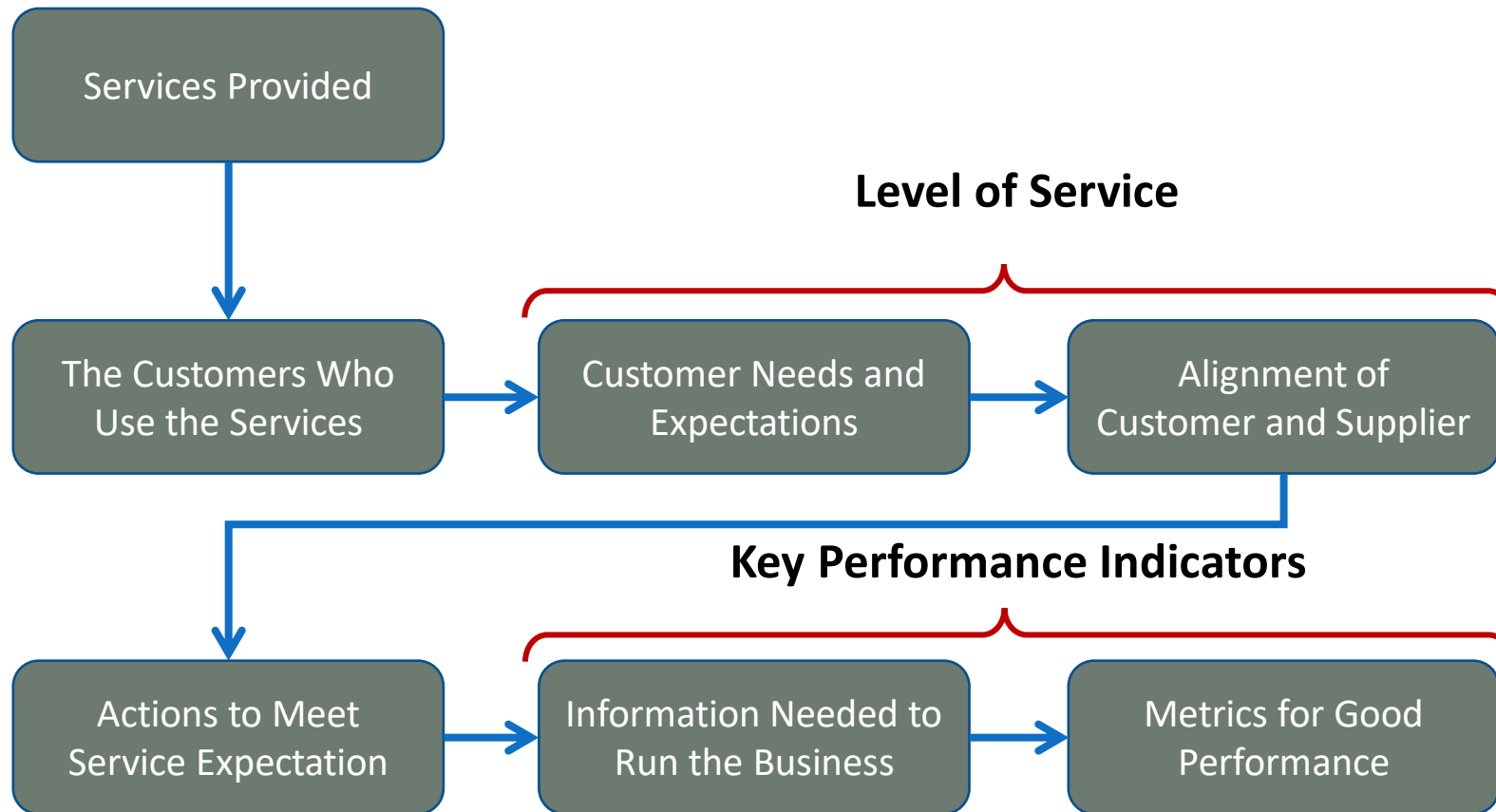
“Modern technology has become a total phenomenon for civilization, the defining force of a new social order in which efficiency is no longer an option but a necessity imposed on all human activity.”

— Jacques Ellul

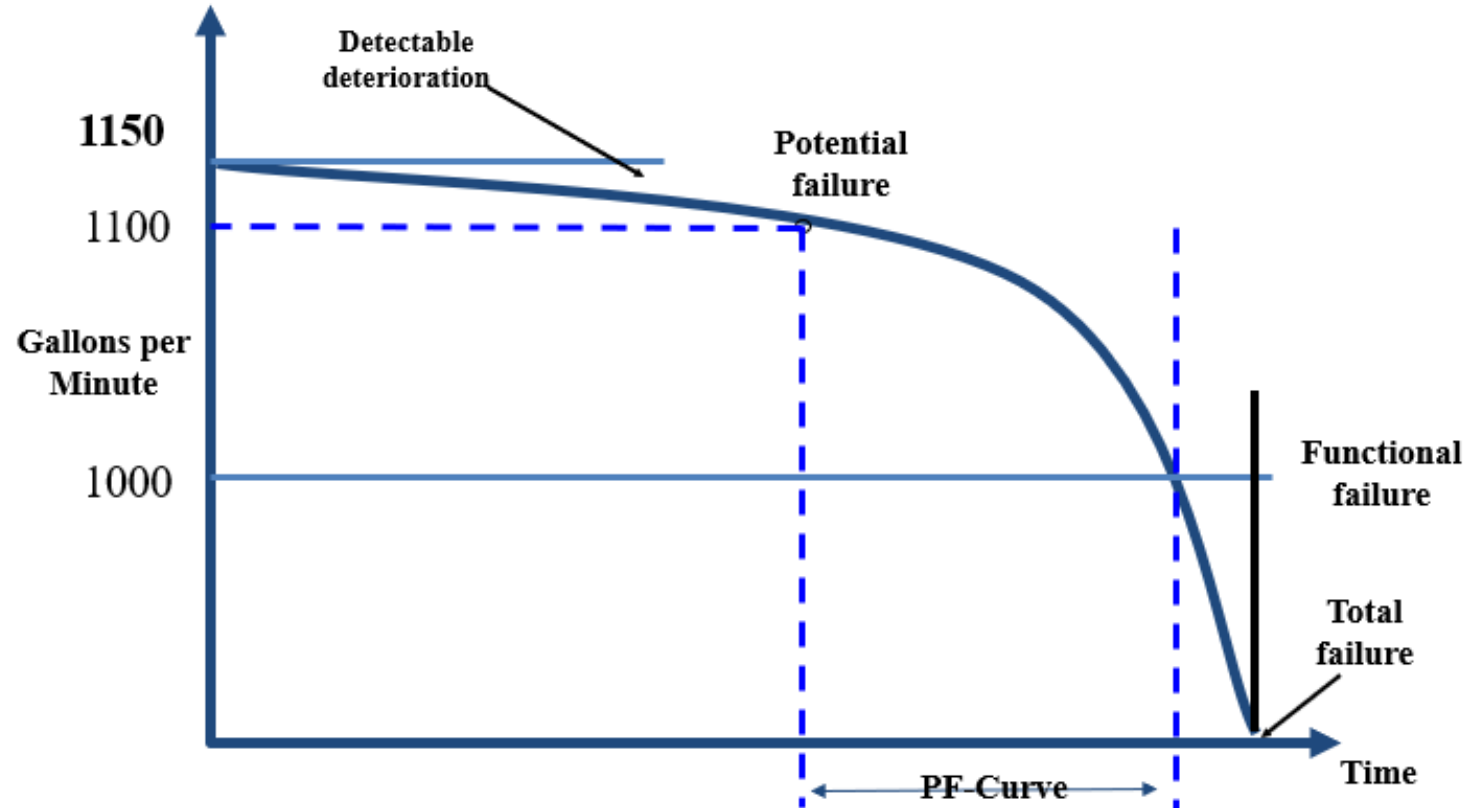
Levels of Service Drive Risk



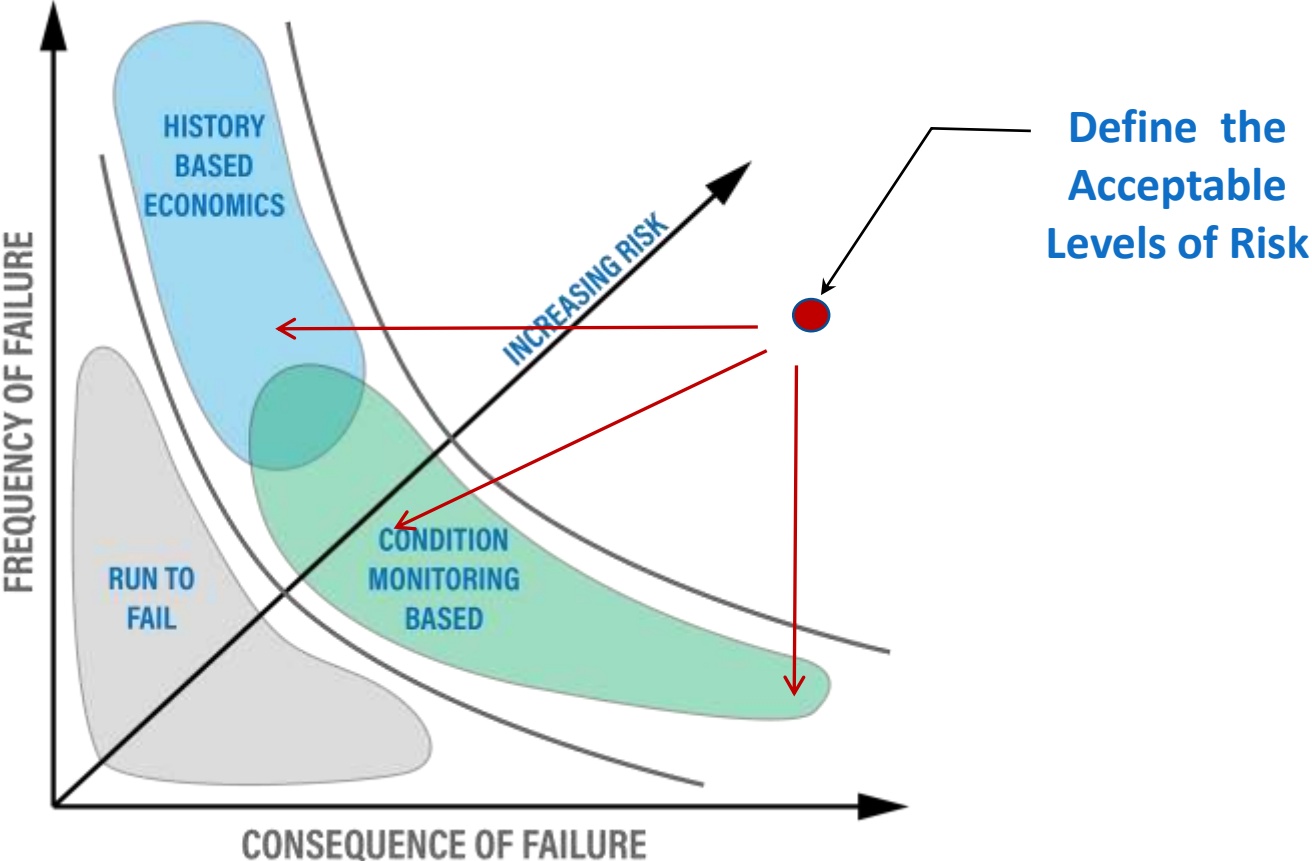
Levels of Service Drive Priorities



“A good place to be a pipe” - PWB



What risk are you willing to take....



Operational Efficiencies

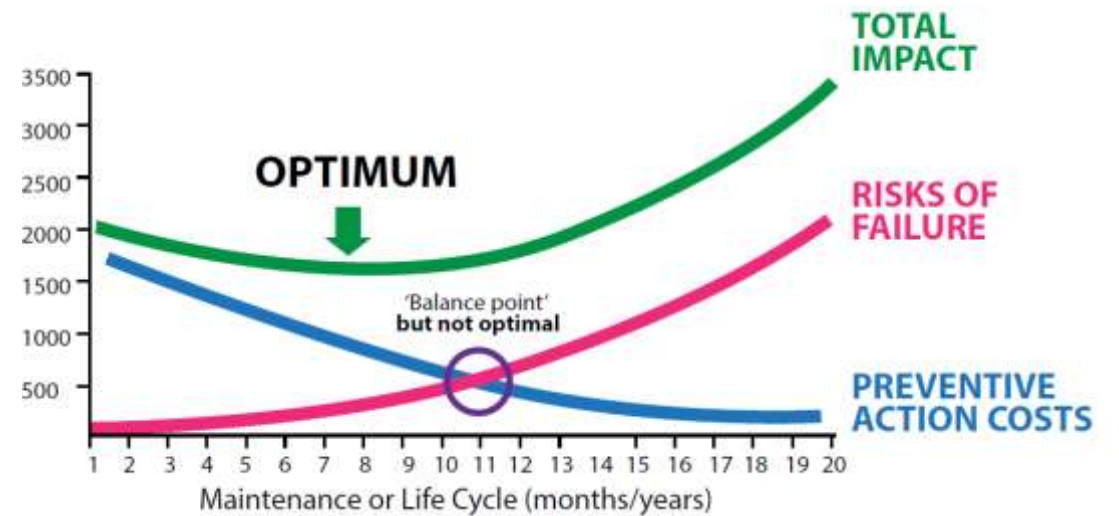
Capacity	Condition
A – No Future Issues	1 – New
B - Little Future Issues	2 - Good
C – At Capacity	3 - Fair
D - High Capacity Issue	4 - Poor
E – Major Capacity Issues	5 - Failed

Priority Rank with a Risk Map

		Condition Index	Condition Beta												
Condition Values	Poor	0 to 0.9	10	11	12	13	14	15	16	17	18	19	20	Risk Level Results (Map #) High 17 - 20	
		1 to 1.9	9	10	11	12	13	14	15	16	17	18	19		
		2 to 2.9	8	9	10	11	12	13	14	15	16	17	18		
	Fair	3 to 3.9	6	7	8	9	10	11	12	13	14	15	16	Medium-High 13 - 16	
		4 to 4.9	5	6	7	8	9	10	11	12	13	14	15		
		5 to 5.9	4	5	6	7	8	9	10	11	12	13	14		
		6 to 6.9	3	4	5	6	7	8	9	10	11	12	13		
	Good	7 to 7.9	2	3	4	5	6	7	8	9	10	11	12	Medium-Low 5 - 8	
		8 to 8.9	1	2	3	4	5	6	7	8	9	10	11		
		9 to 10	0	1	2	3	4	5	6	7	8	9	10		
	Consequence Beta		1	2	3	4	5	6	7	8	9	10			
	Risk Level		Low		Medium-Low		Medium		Medium-High		High				
													Consequence		

Key Asset Management Concepts Summary

1. Policy
2. Levels of Service
3. Failure Modes, Effects, and Criticality Analysis (FMECA) / Fault Tree
4. Lifecycle Costing
5. Risk Management
6. Condition Assessments
7. Business Case Evaluations
8. Optimized Renewals Decision Making (Asset Analytics)
9. Project Prioritization
10. Lifecycle Management Plans (Asset Management Plans)
11. Information Systems



Question or Comments?

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