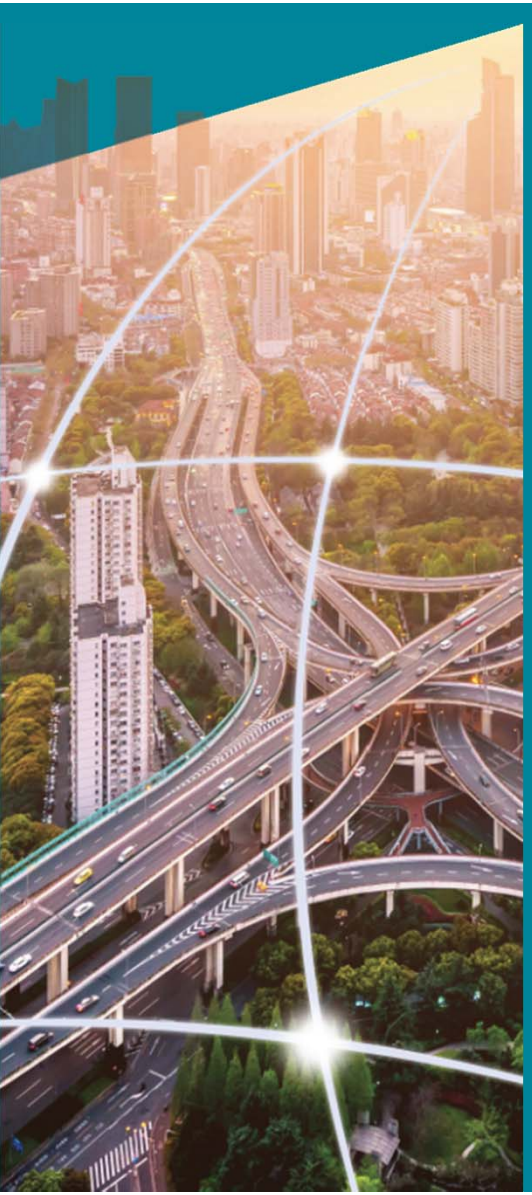


Stormwater Infrastructure Asset Management

Ed Singer, PE, MIAM

Asset Management Evangelist and
General Manager

14th Annual Regional Stormwater Conference

October 9th 2019

Agenda

- Managing Assets / Asset Management
  - ISO 55001
  - WERF
  - US EPA
- Asset Management System Framework
  - ISO 55001
  - Establishing Alignment
- Enabling Technology
  - Asset Register / Inventory
  - Life-Cycle Performance and Costing
  - System Performance
  - Life-Cycle Modeling
- Long-Term Strategic Planning
  - Asset Investment Planning
  - Digital Asset Management Plans

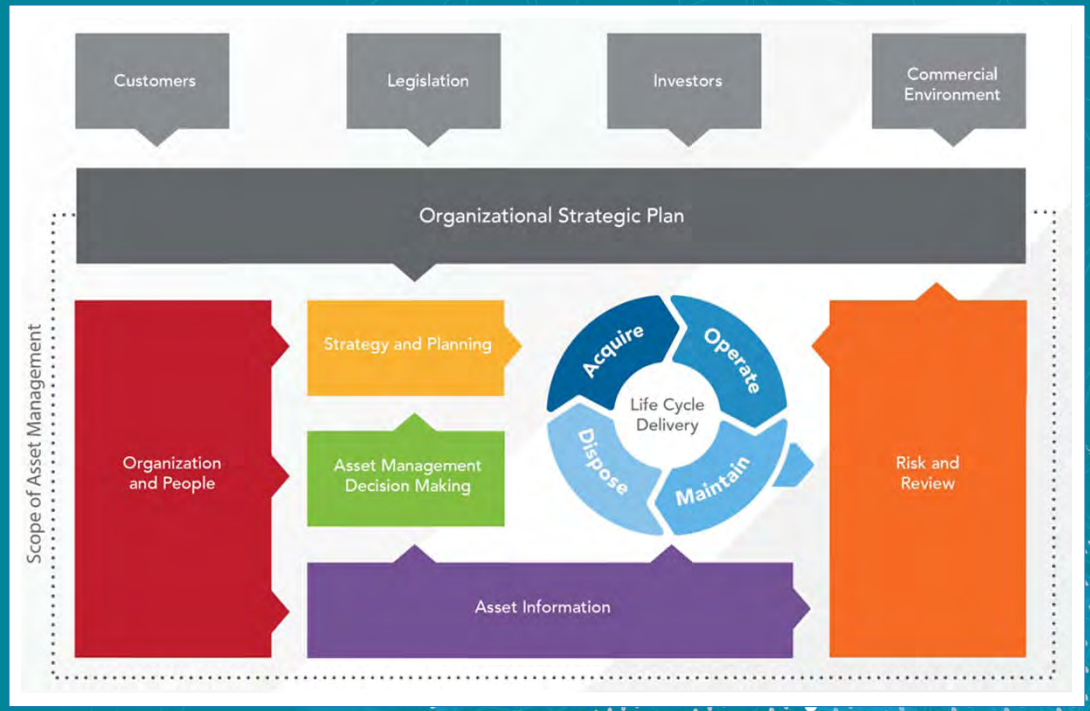
Managing Assets versus Asset Management (ISO 55001)

Managing Assets

- The things you do to assets
- Life-cycle delivery (O&M, CIP)

Asset Management

- Establishes alignment across the organization (Line of Sight)
- Focus is on delivering value
- Manages risk and optimizes life-cycle delivery

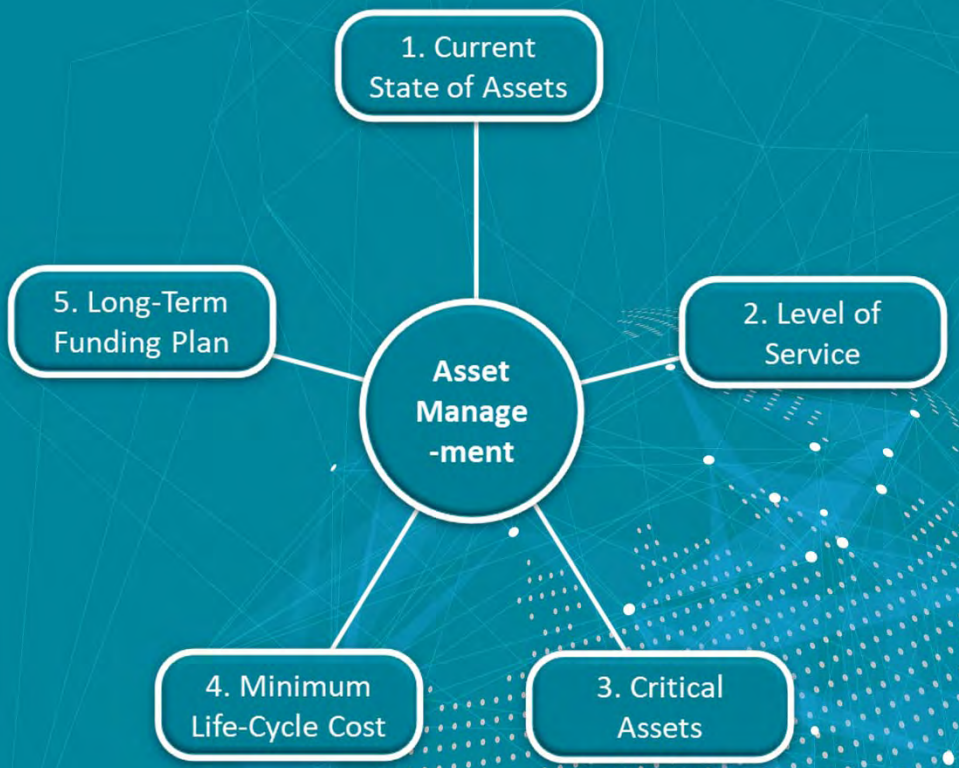


From the Anatomy of Asset Management – the IAM

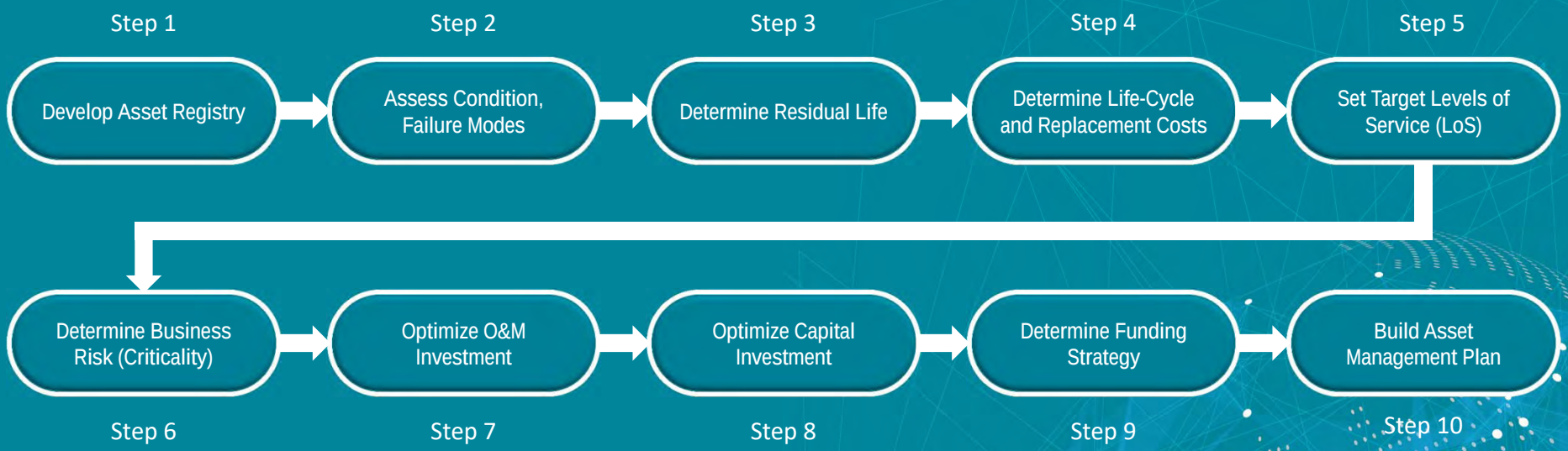
US EPA Components (Managing Assets)

What are the elements of asset management practice?

1. What is the current state of my assets?
2. What is my required “sustainable” level of service?
3. Which assets are critical to sustained performance?
4. What are my minimum life-cycle costs?
5. What is my best long-term funding strategy?

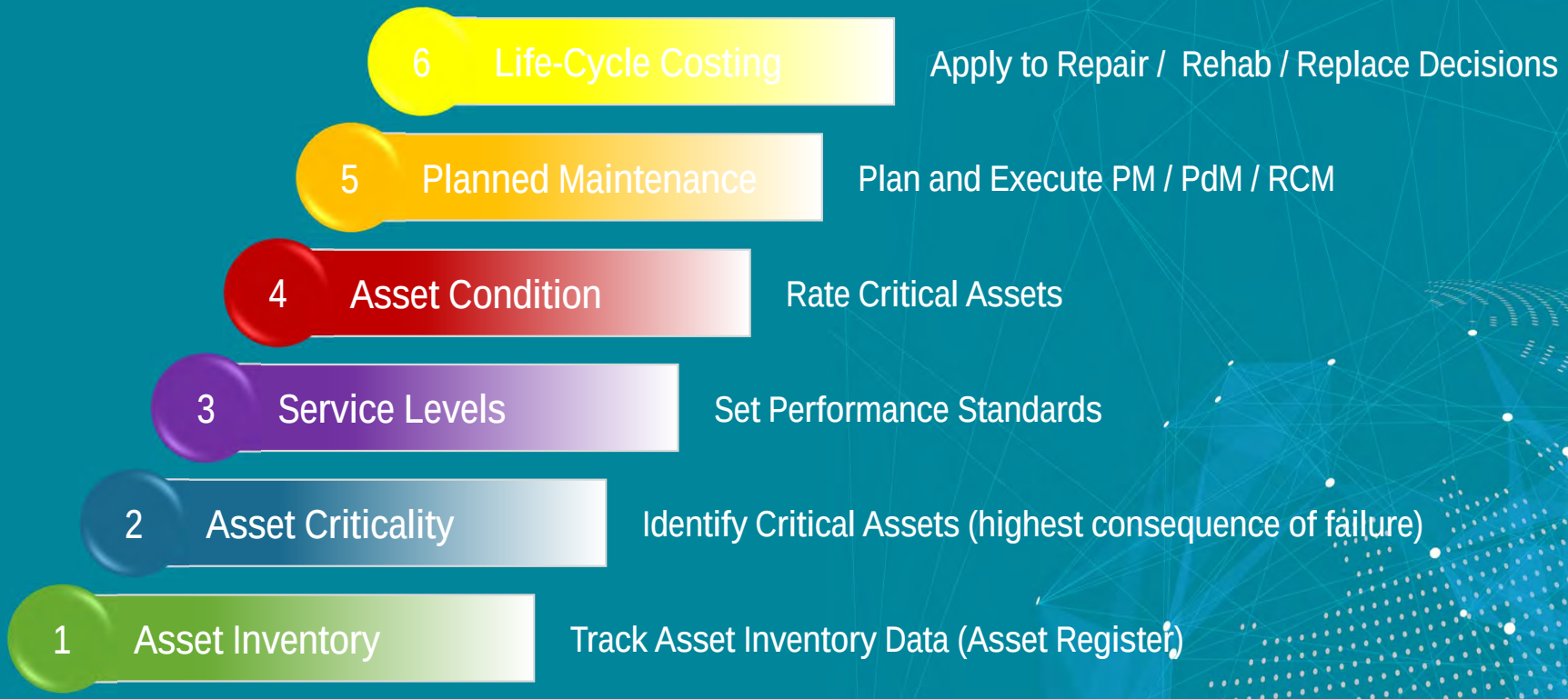


WERF Workflow (Managing Assets)



Ten Core Steps to Developing an Asset Management Plan - WERF SIMPLE

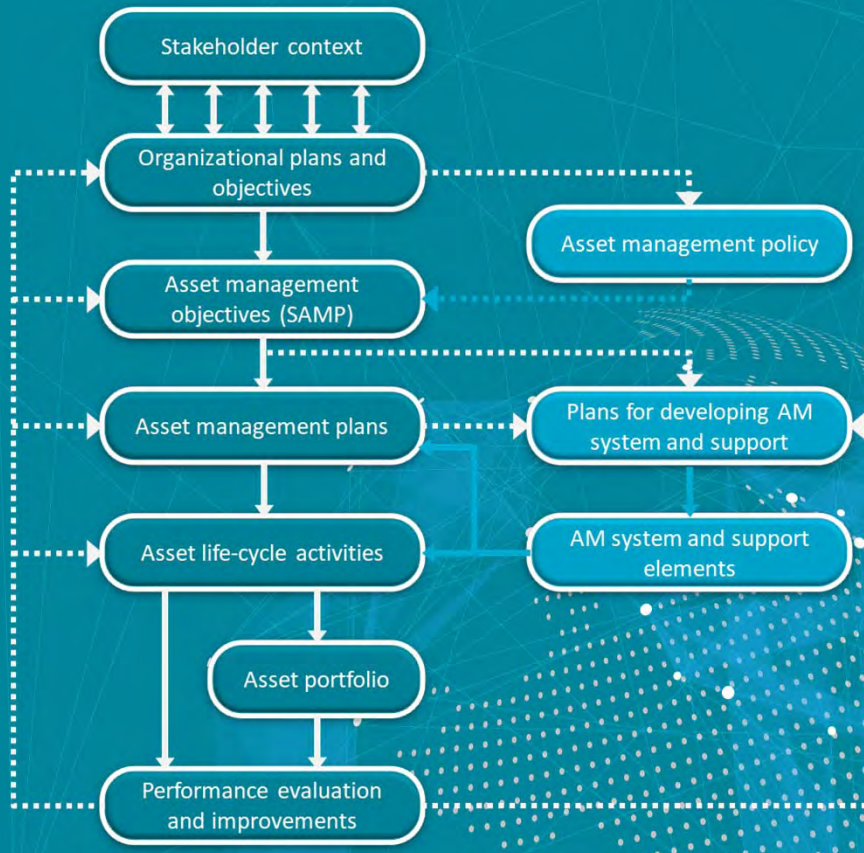
Asset Management Building Blocks (Managing Assets)



Asset Management Establishes Alignment

A good Asset Management Program should:

- Be strategically aligned with the organization's underlying strategy and objectives
- Be enterprise-wide, avoiding silos
- Apply to asset owners, managers, contractors, suppliers, customers, and regulators
- Balance cost, risk, and performance on varying timescales
- Apply to both tangible (physical) and intangible (i.e. public perception) assets



Asset Management System Framework

Asset Inventory

- GIS – Physical Asset Register
- ERP / CRM – Financial Asset Register

Life-Cycle Performance and Costing

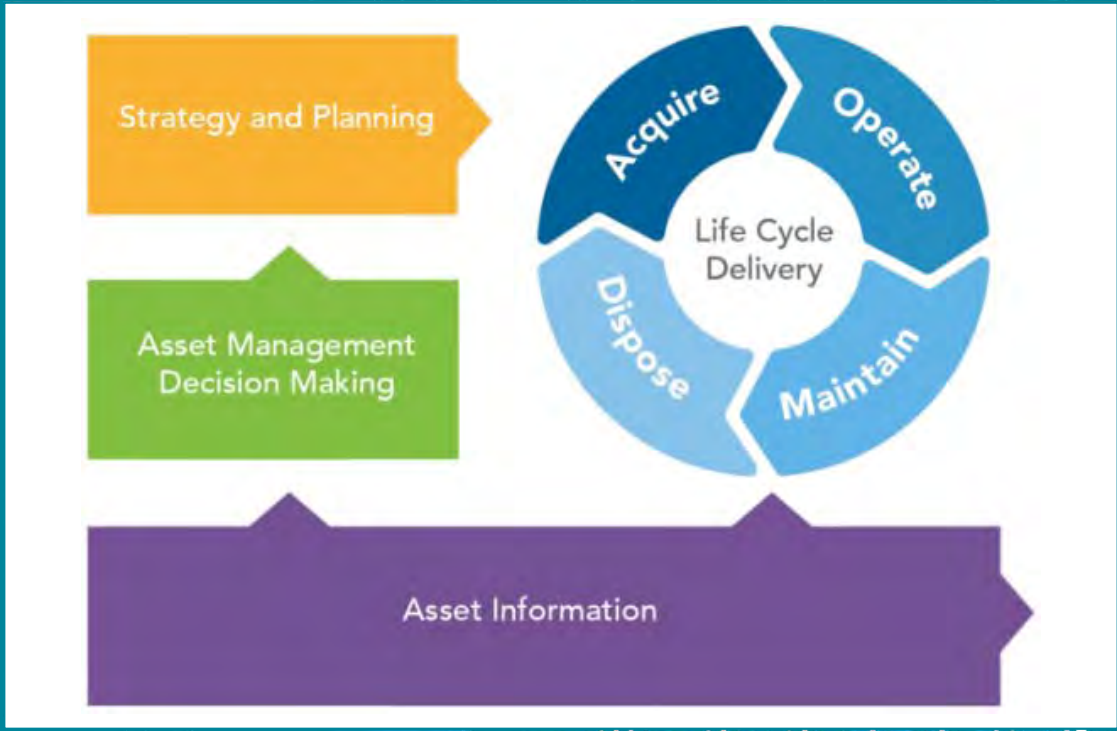
- Computerized Maintenance Management System

System Performance

- Engineering / Hydraulic Models

Long-Term Strategic Planning

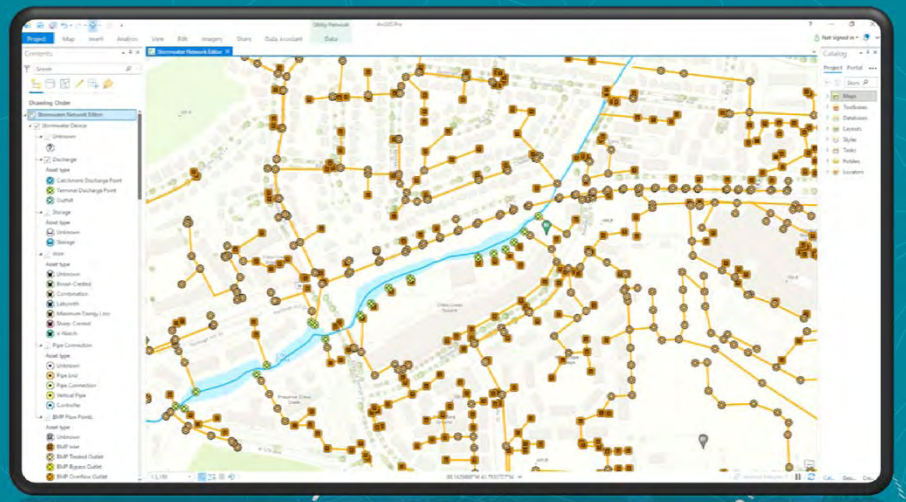
- Life-Cycle Performance Modeling



Asset Inventory (Asset Information)

A robust GIS should be the basis of any asset management system

- Asset register
- Integrate multiple business intelligence applications
- Enable business workflows
- SMART City benefits

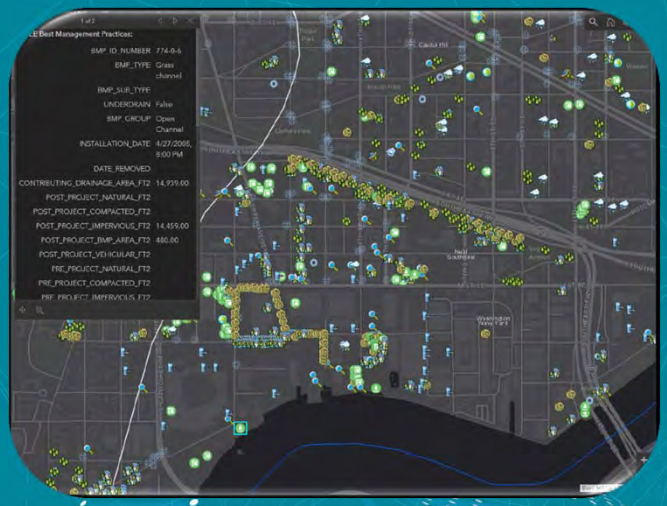


Asset Inventory (Asset Information)

GIS Features and Functions

- Business Workflows
  - Back office
  - Field services / mobile
  - Customer engagement
  - Dashboards (operational, management)
- Visualization
- Data Analytics
- System Integrations
  - CMMS
  - AMS
  - Mobile
  - Customer / Citizen engagement
  - Engineering models

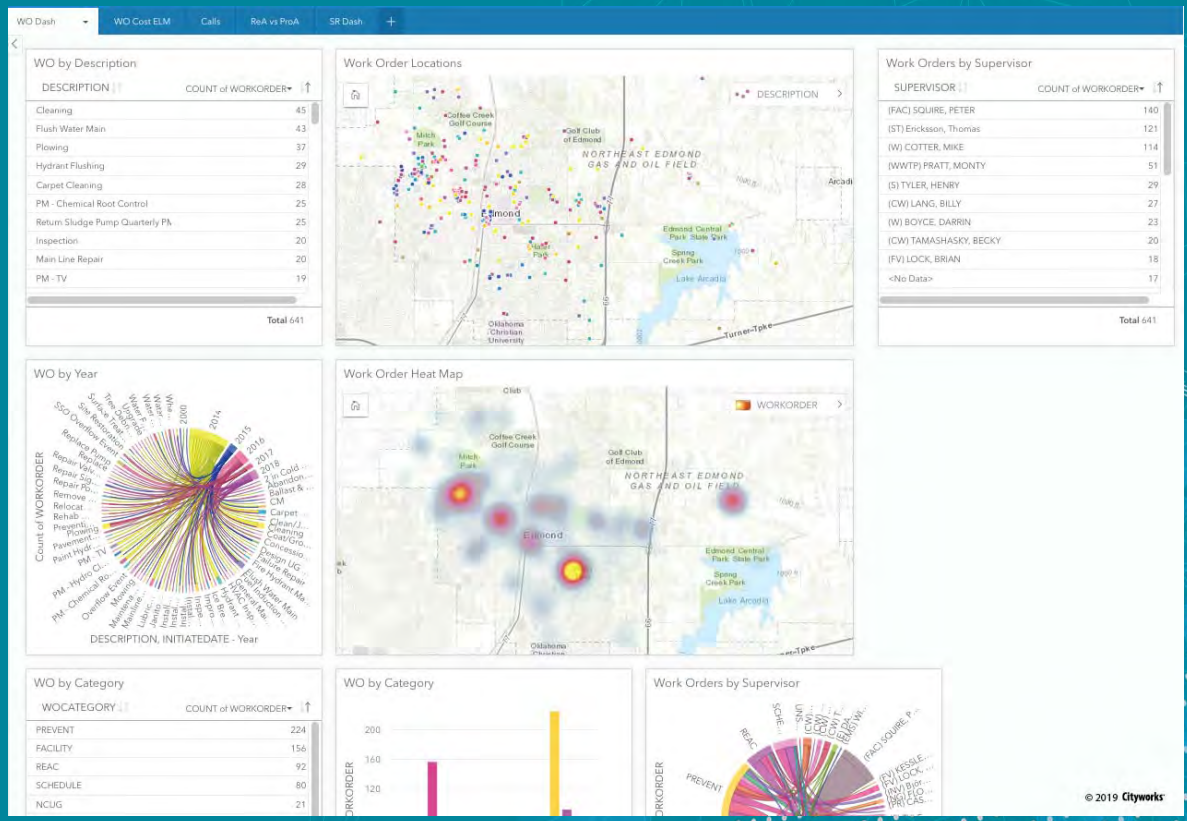
- Spatial Analysis
  - Land use
  - Land cover
  - Soils
  - Demographics
  - Etc.



Life-Cycle Performance and Costing (CMMS)

Work and Performance Management

- Citizen Service Requests
- Work Orders
- Inspections
- Life-Cycle Costing of Asset performance and maintenance
- Workflow Management
- Some asset management

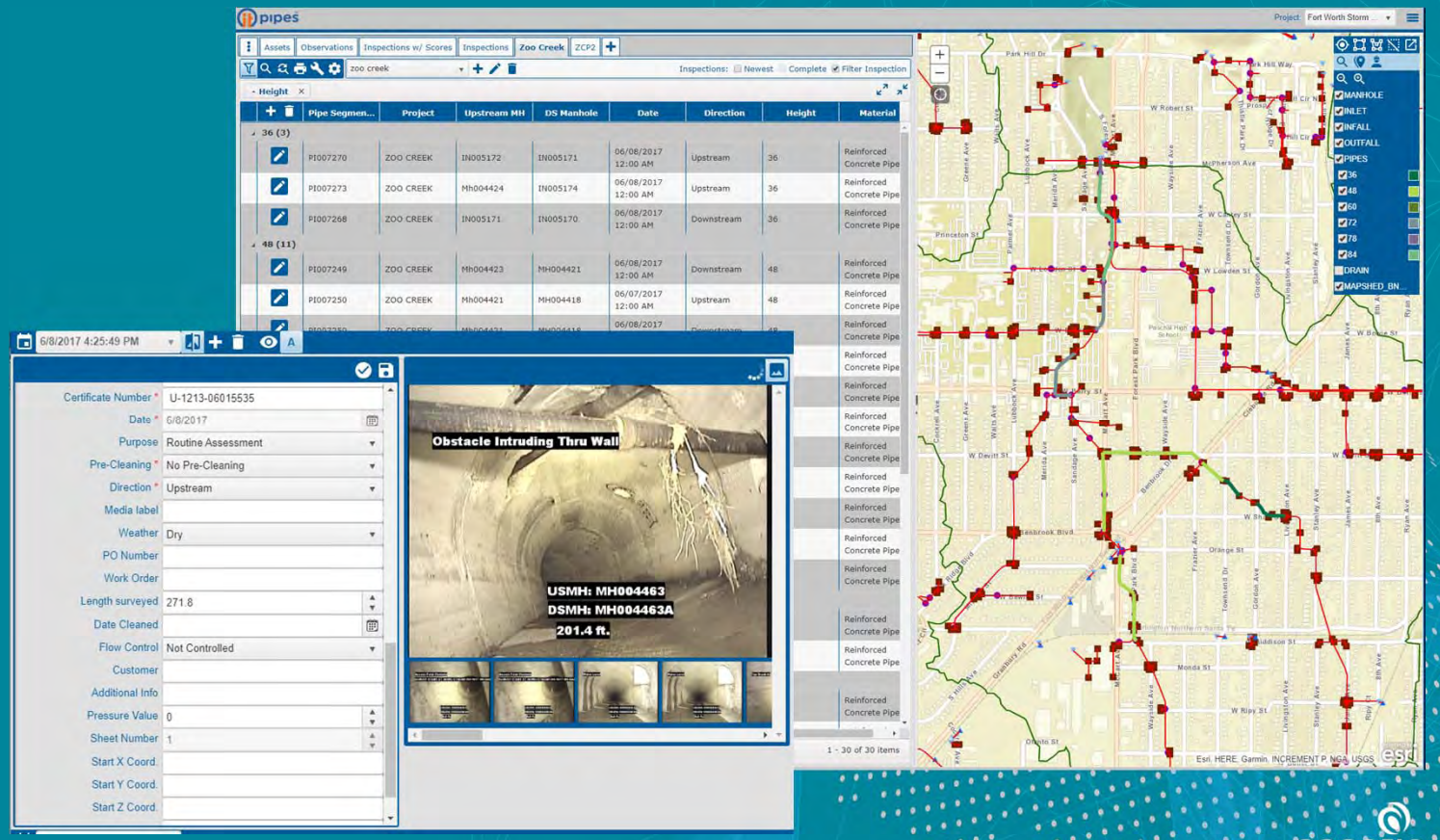


Life-Cycle Performance and Costing (CCTV)

Inspection / Condition Assessment

- NASSCO Standards
- Other Standards
- Inspection Programs
- Asset Criticality / Risk Management
- 12 – 36 Month O&M Plan

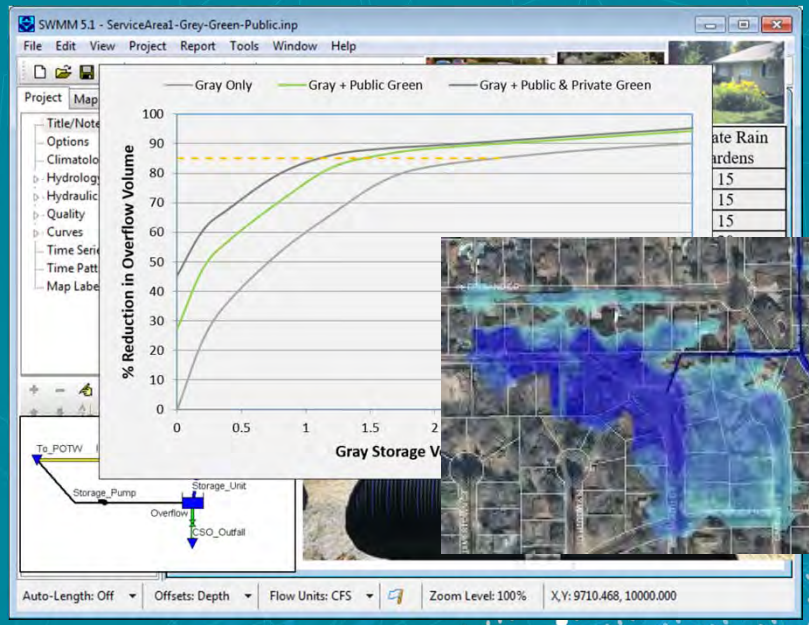
Condition data feeds other analysis systems and informs CIP strategies



Engineering Models (System Performance)

Stormwater Modeling

- HEC-HMS
- HEC-RAS
- EPA SWMM
- XPSWMM
- InfoICM
- PCSSWMM
- ICPRv3 &v4
- Hydraflow
- Civil 3DSSA
- InfoWorksSD
- MikeUrban
- GeoHECRAS



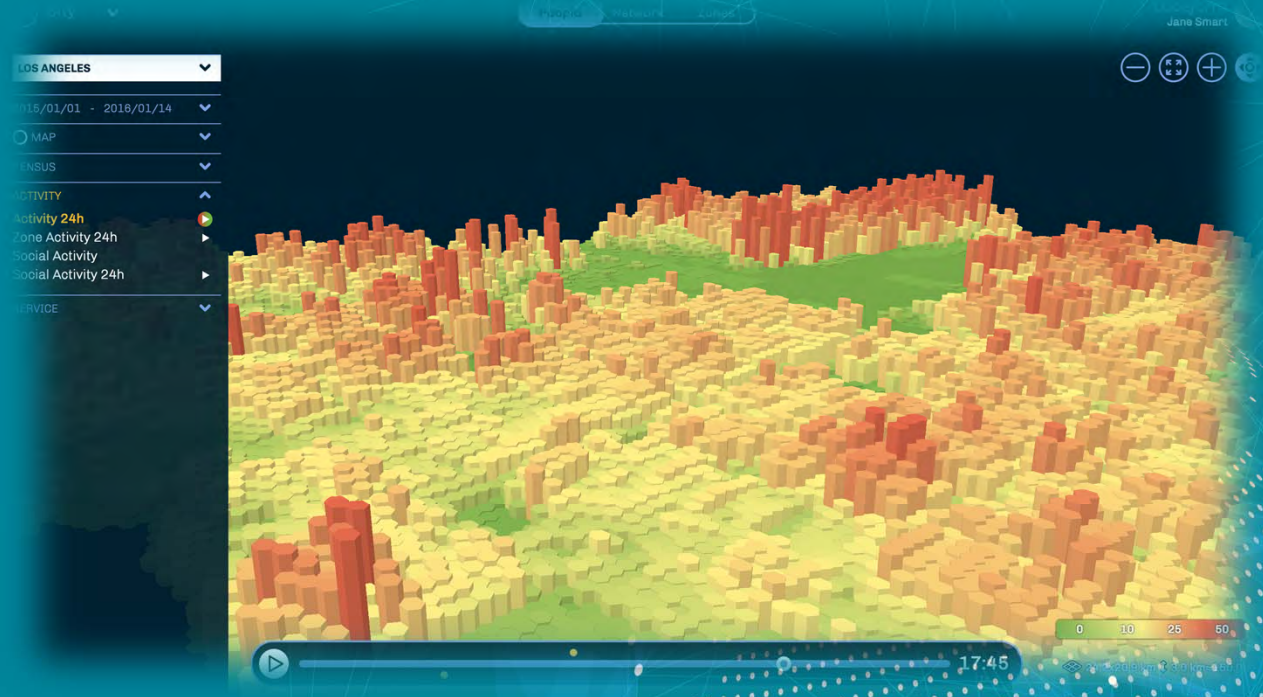
Engineering Models (Machine Learning / Artificial Intelligence)

AI / ML

- Recent significant technology advancements
- Beginning to be able to accurately predict failures – when, where, type

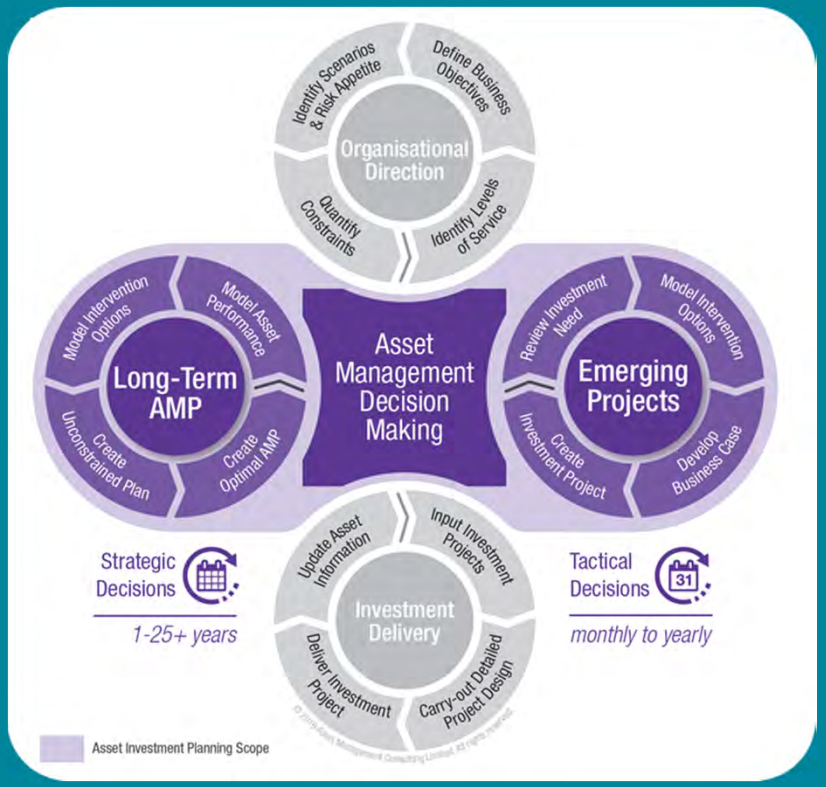
FRACTA

baseform



assetic

Life-Cycle Performance Modeling (Long-Term Strategic Planning)



assetic
www.assetic.com

COSMOTECH ASSET
www.cosmotech.com/solutions/asset

POWERPLAN
www.powerplan.com

copperleaf
www.copperleaf.com

deighton
www.deighton.com

SEAMS
AN ARCADIS COMPANY
www.seamsltd.com

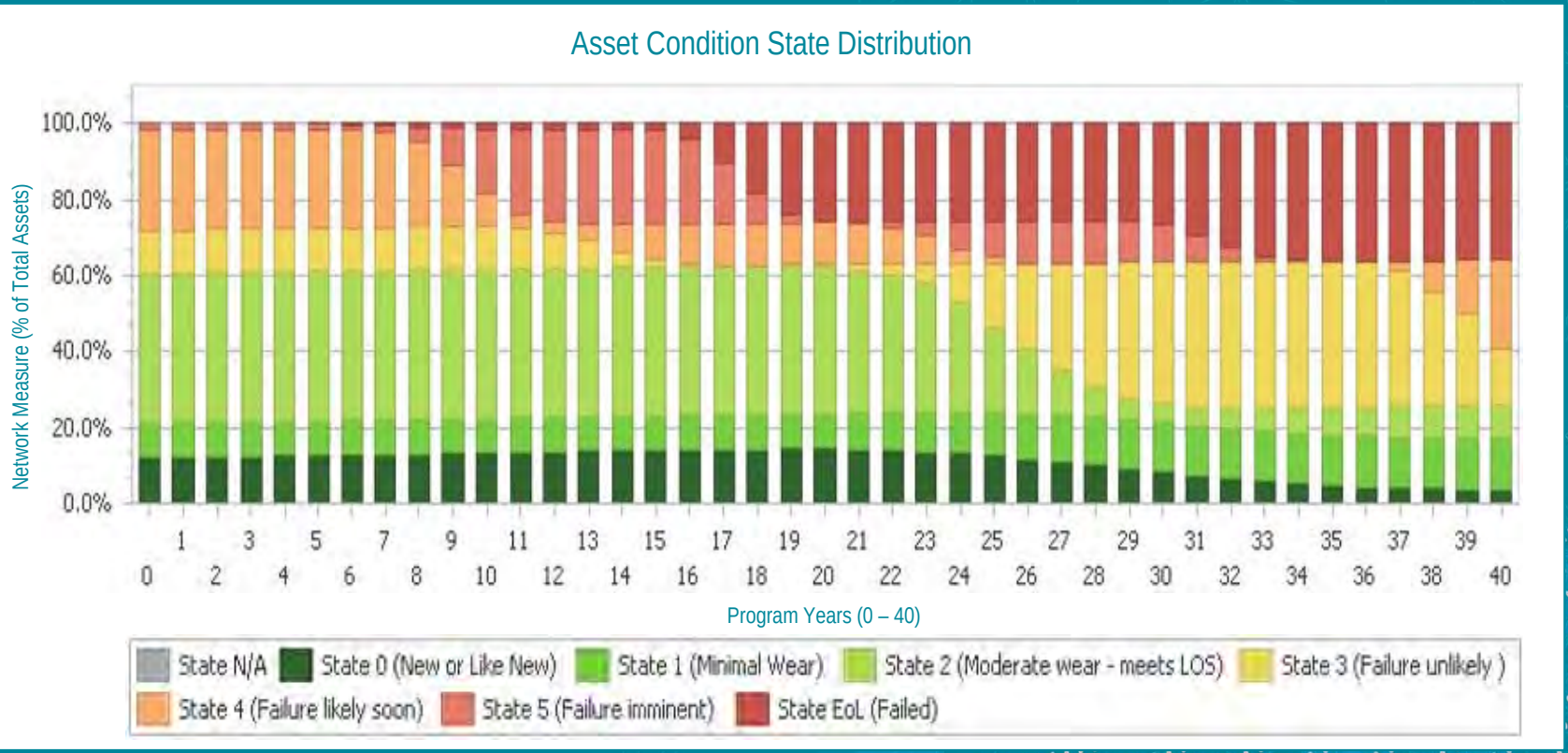
A Peek Into Your Future

- What will my asset stock look like (condition, performance) in 10, 15, 20 years?
- What level of funding is required for an established Level of Service?
- How will our service delivery be impacted by decreased funding?
- Etc.

Long-Term Strategic Planning

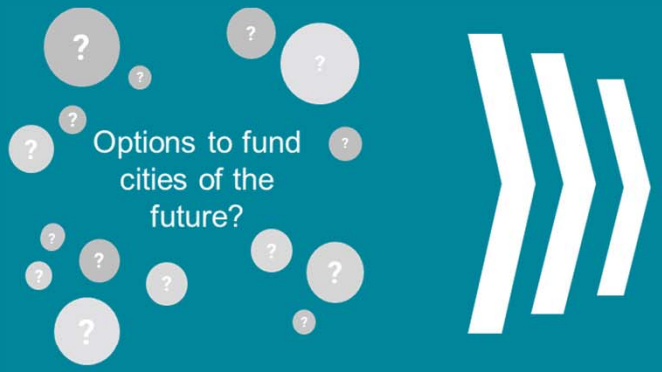
Current Budget

- ≈$100,000 annually
- No Strategy
- 40% system failure within 30 years



Asset Investment Planning Solutions (Decision Support Systems)

Infrastructure Managers Must Implement Strategic Asset Management to Optimize Performance of Existing Assets



Raise Taxes
- Unpopular
- Limited scope

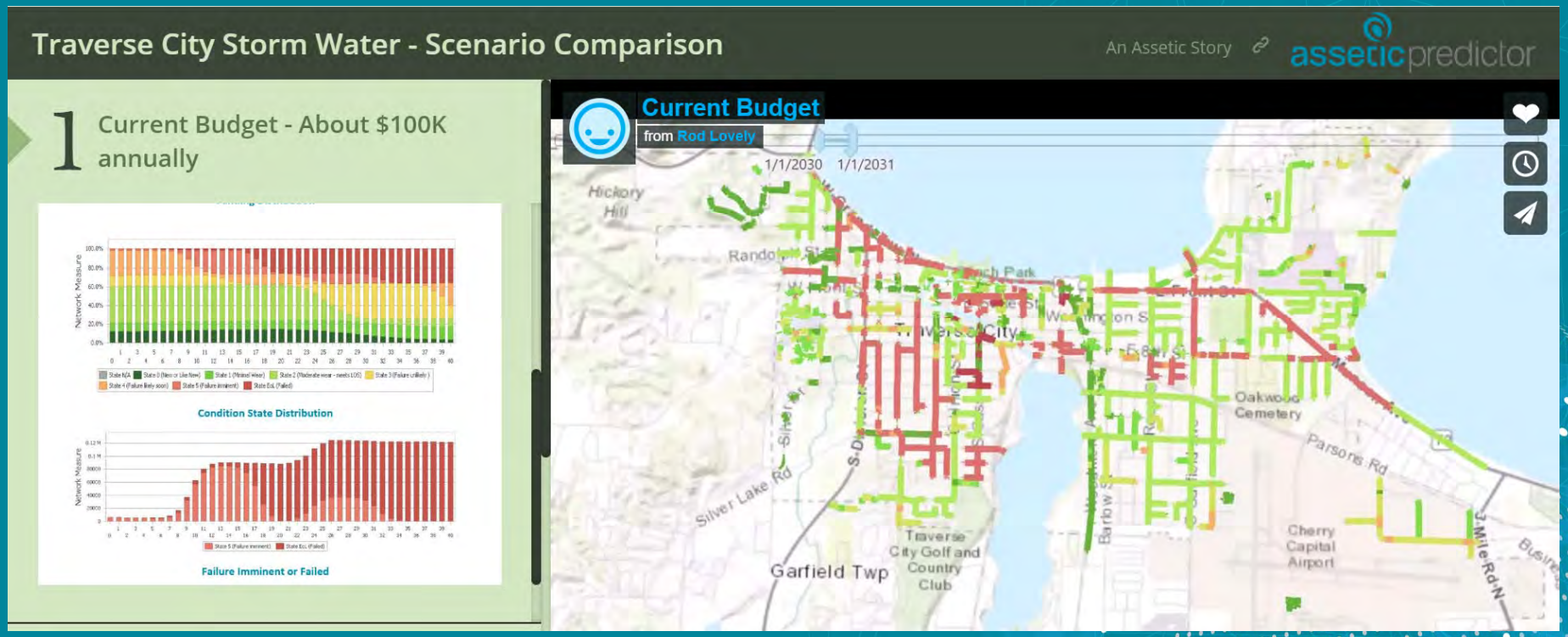
Borrow Funds
- Finite capacity
- Unsustainable

Reduce Services
- Unpopular
- Unsustainable
- Finite scope

Extend the life of existing assets by optimizing future spend

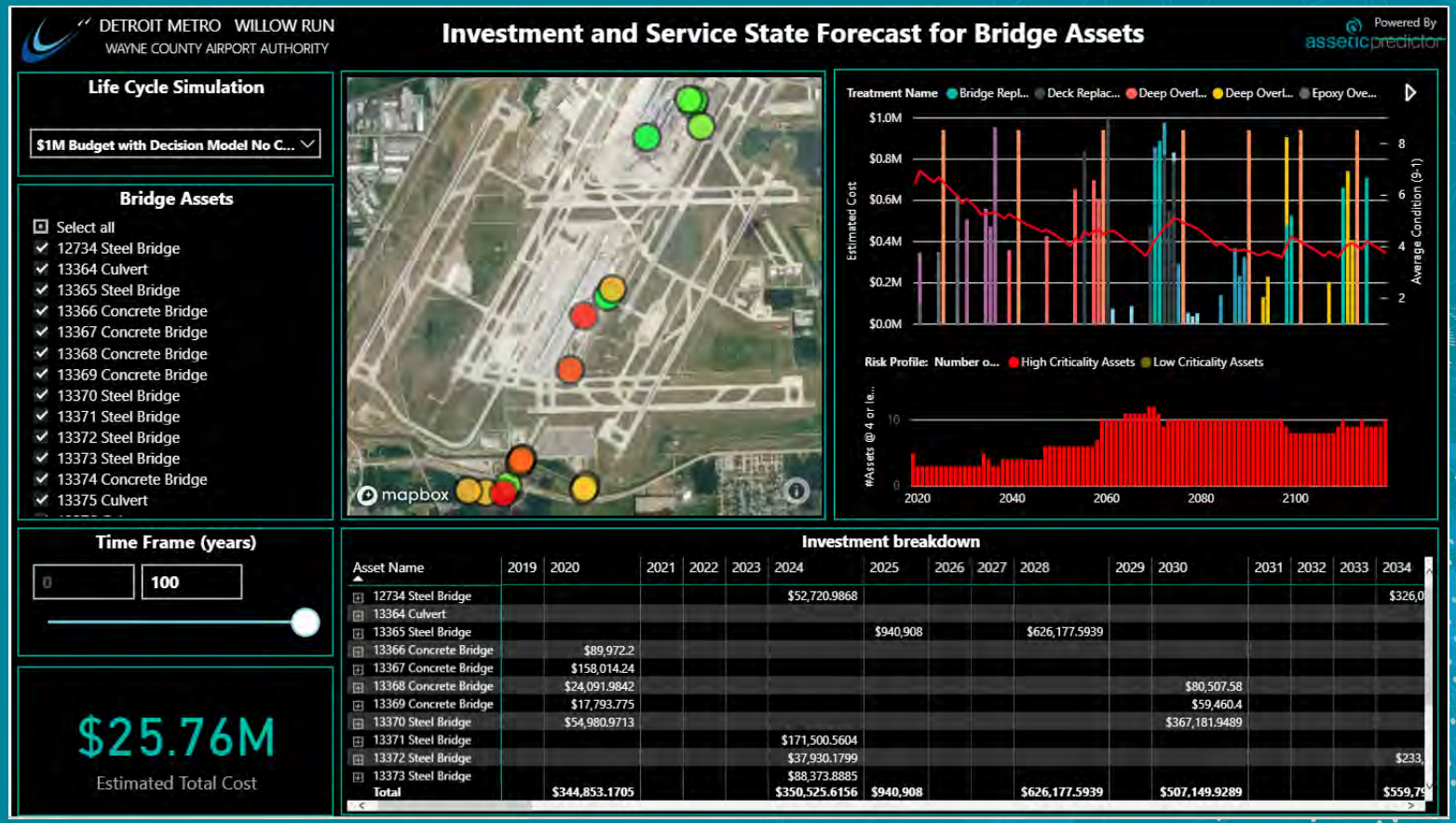
- Sustainably "do more with less"
- Increase performance, not investment
- Unlock hidden capital to fund the future

Decision Support – Long-Term Strategy



[Traverse City, Michigan - A Case Study]

Digital Asset Management Plans



Wrap-Up

Ed Singer, PE, MIAM

esinger@assetic.com
804.380.3079