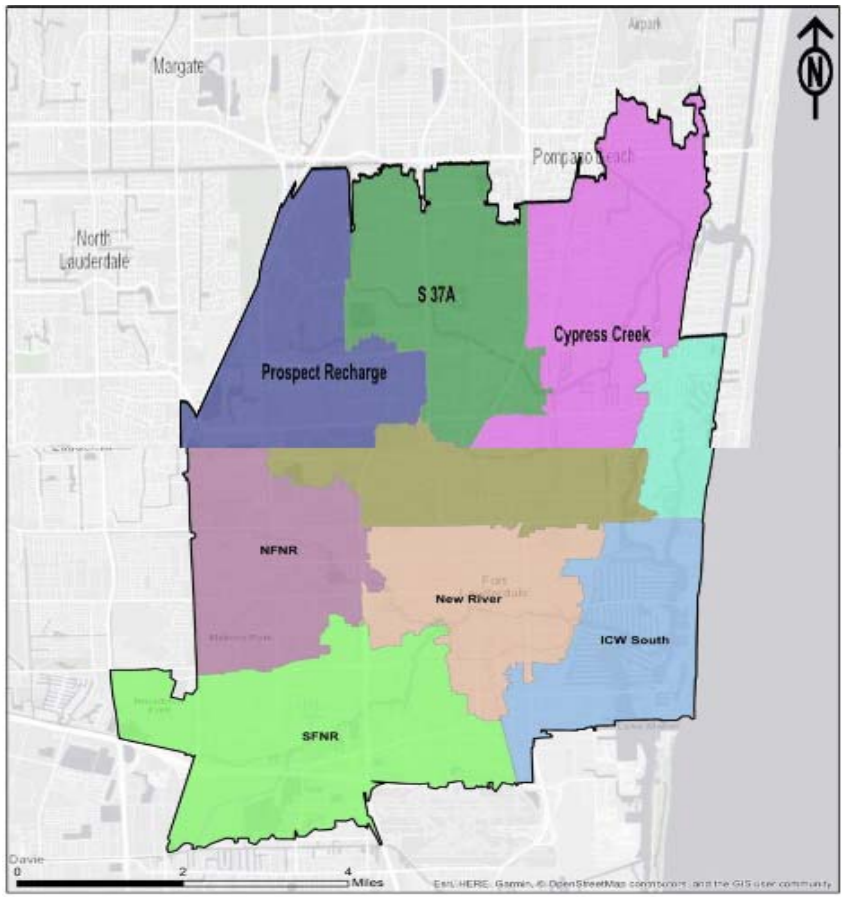
Optimizing Stormwater Resiliency: Right Budget, Right Assets, Right Time



Bob Munro, MBA, PMP, CMRP | GHD Advisory |

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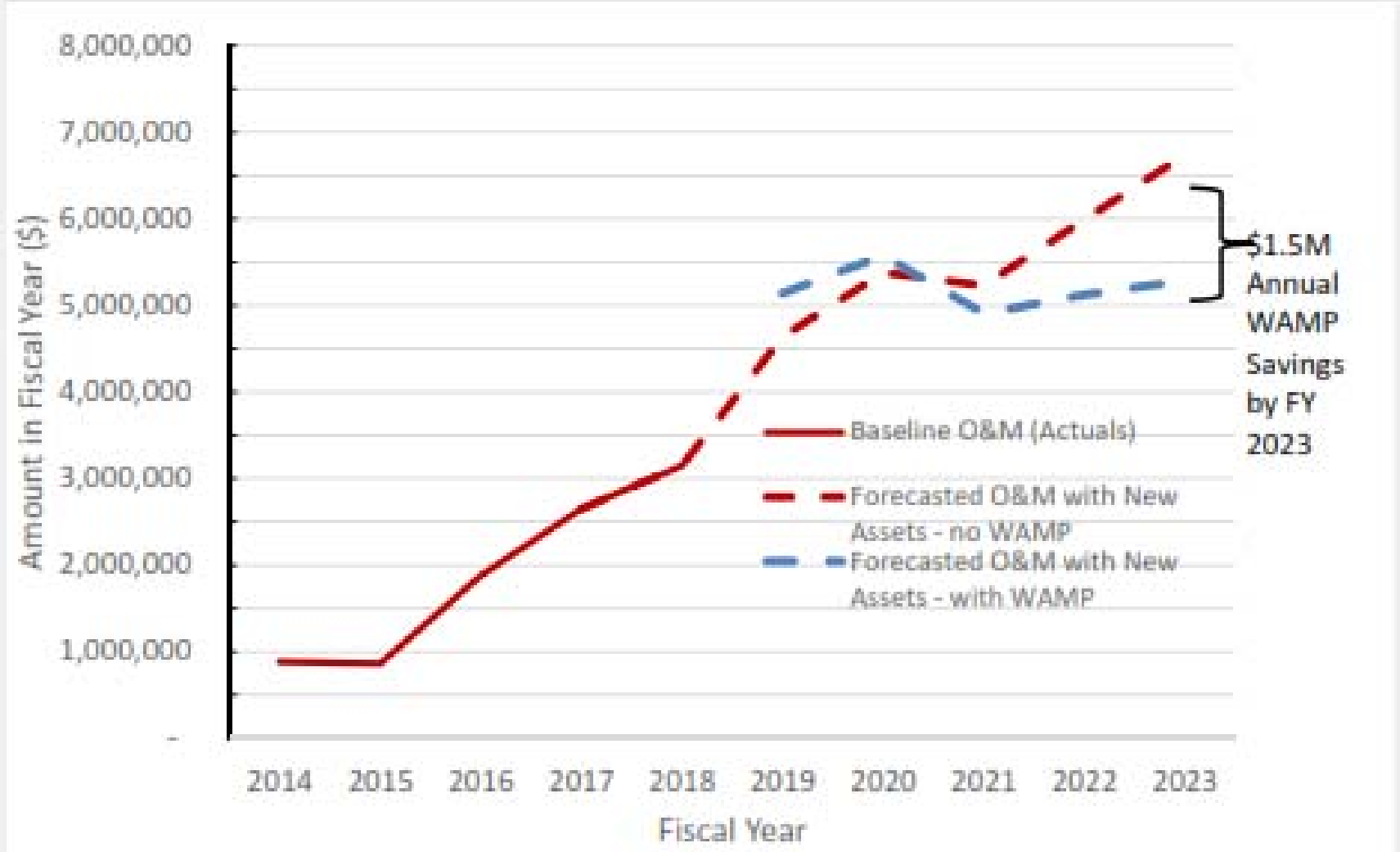
December 5, 2019

Approach to Developing A Resiliency Focused Stormwater Budget



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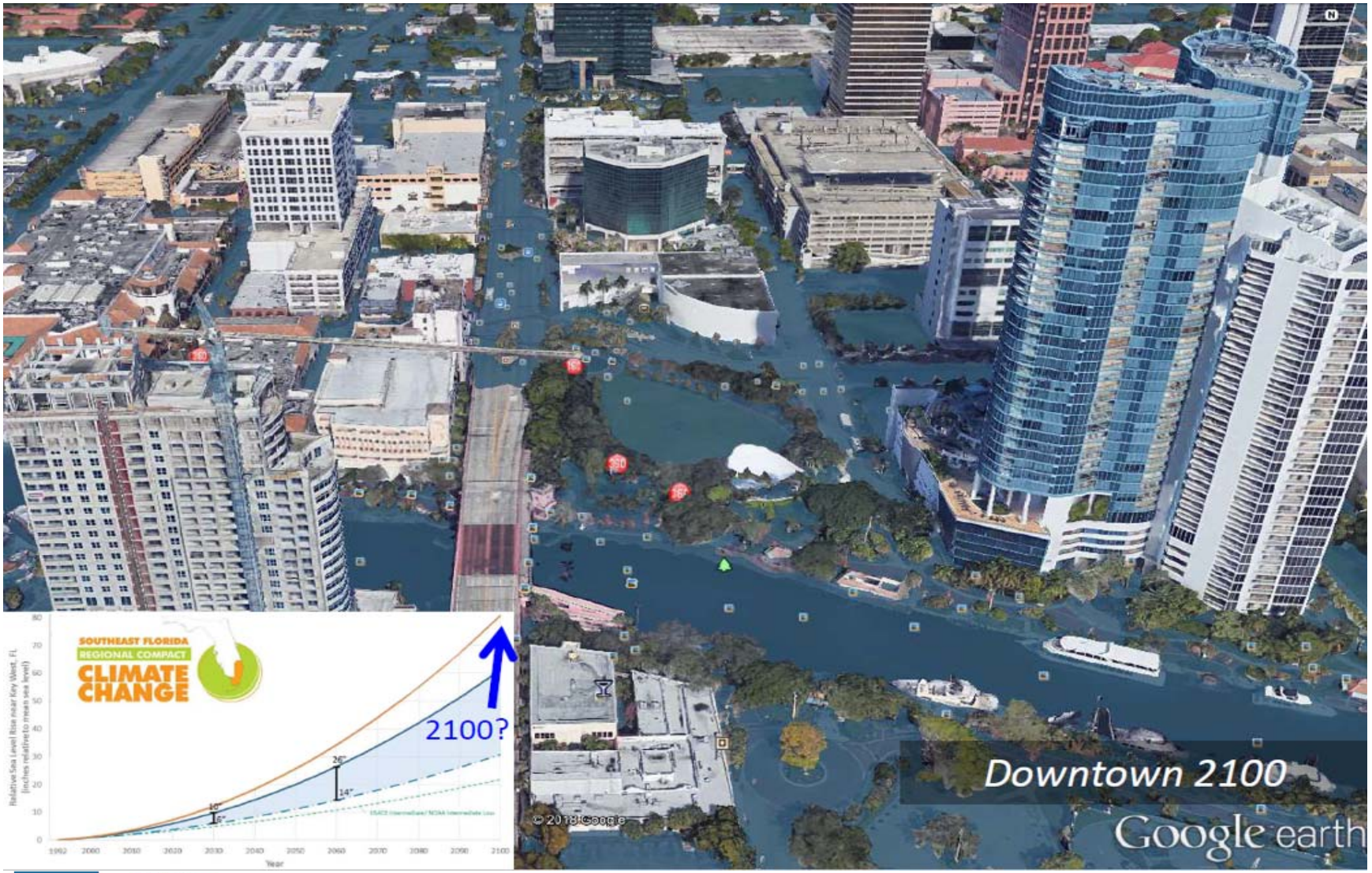
Why Resiliency? – To Prevent Turning Venice of America Into Atlantis of America !!!



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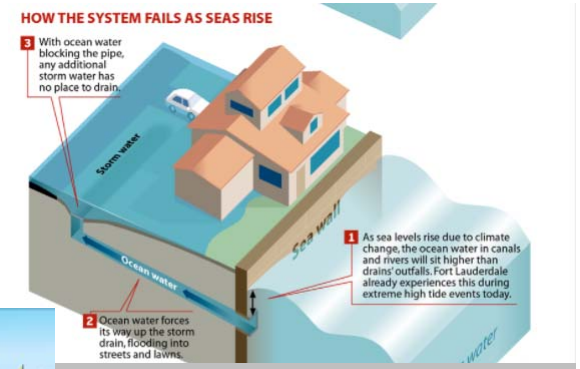
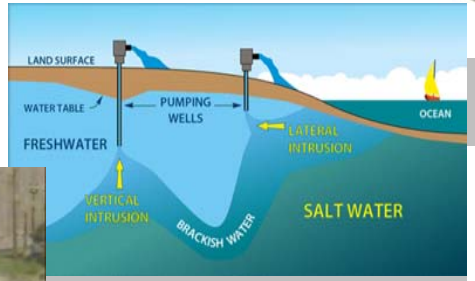
Why Do We Need a SMART Strategy here in Florida?

Environmental challenges require that the Water and Wastewater industry increase asset resiliency to environmental events that continue to increase in frequency and severity with potentially catastrophic consequences:



Salt water intrusion to the water supply



Stormwater flooding

Extreme weather events

'Today, the City of Fort Lauderdale and the surrounding South Florida region are areas considered among the most vulnerable to climate change in the world.'

Source: City of Fort Lauderdale: Why Resiliency Now

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All Impacted Communities will be expected to:

- Increase Resiliency to Environmental Changes
- Transform to a Resiliency Focused Organization
- Adapt to Digital Disruption
- **Find Ways To Pay For It With Minimal Impact to The Community**

At a rate of change faster than previously encountered.

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This Requires a SMART Asset Management Strategy?

A strategy that addresses each of these challenges holistically by assuring asset:

Sustainability

Maintainability

Availability

Reliability

Transformation

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And Developing the Right Budget to Fund it

The US EPA Methodology Seeks to Answer 2 Key Funding Questions

What are my best O&M and CIP investment strategies?

- What alternative management options exist?
- Which are the most feasible for my organization?

What is my best long-term funding strategy?

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US EPA Five Core Questions of Asset Management

1. **What is the current state of my assets?**
- What do I own?
- Where is it?
- What condition is it in? What is its performance?
- What is its remaining useful life?
- What is its remaining economic value?

2. **What is my required level of service (LOS)?**
- What is the demand for my services by my stakeholders?
- What do regulators require?
- What is my actual performance?

3. **Which assets are critical to sustained performance?**
- How does it fail? How can it fail?
- What is the likelihood of failure?
- What does it cost to repair?
- What are the consequences of failure?

4. **What are my best O&M and CIP investment strategies?**
- What alternative management options exist?
- Which are the most feasible for my organization?

5. **What is my best long-term funding strategy?**

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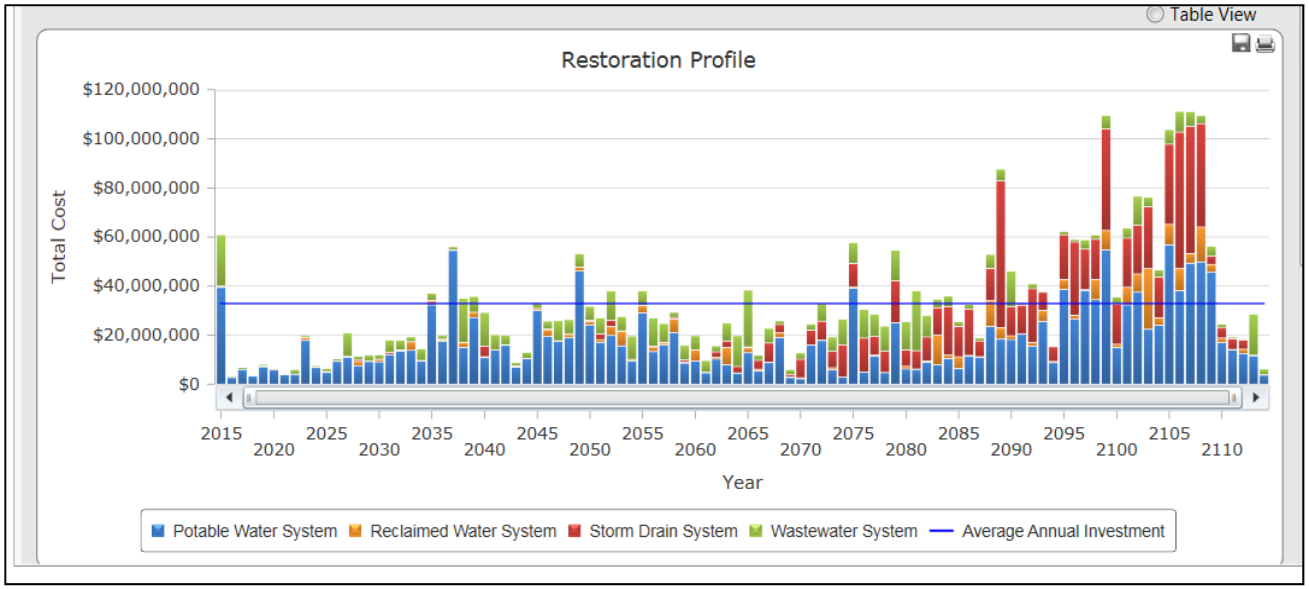
Asset Management Plan (AMP) addresses five key requirements

1. **Current State of the Assets**
2. **Infrastructure Improvement Plan**
3. **Business Improvement Plan**
4. **Capital and O&M Projection**
5. **Funding Plan**

The AMP tells the story…



Developing a Resiliency Focused Budget Relies on sound information from the AMP

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What is the Best O&M and CIP Strategy

1. What is the current state of my assets?

2. What is the required LoS?

System layout
Data hierarchy
Standards inventory

Condition assessment
Protocol
Rating methodologies

Expected life tables,
decay curves

Valuation, life cycle costing

Demand analysis
Balanced scorecard
Performance metrics

Develop asset registry

Assess conditions failure modes

Determine residual life

Determine life cycle and replacement costs

Set target Levels of Service (LoS)

Determine Business Risk ("Criticality")

Optimize O&M Investment

Optimize Capital Investment

Determine Funding Strategy

Build AM Plan

Failure mode and effects analysis
Business risk Exposure
Delphi technique

Root cause analysis
Reliability centered and Predictive maintenance
Optimized decision-making

Confidence level rating
Strategic validation
Optimized decision making

Renewal annuity

Asset management plan
Policies and strategies
Annual budget

3. Which assets are critical?

4. Best O&M and CIP strategy

5. Best funding strategy

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This Requires Optimized Renewal Decision Making?

A systematic search for lowest-cost renewal investment

Based on interaction of

- Cost trends (direct O&M, indirect)
- Condition trends (decay/survivor curve)
- Risk-consequence trends

Three major approaches

- Valued expert judgment
- Lowest projected average life-cycle cost per year of residual life
  - Operational costs
  - Risk-weighted, full economic costs
- Intervention factors; condition, performance, reliability, Business Risk Exposure, etc.

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Right Budget – Budget Must Consider Several Competing Factors

Drivers

- Level of Services – Both Increased and Decreased
- Risk Tolerance
- Changing Environmental Conditions
- Changing Regulations

Impacts

- Capital Improvements – Identified Replacements, Improvements and /or Additions to the existing infrastructure
- Operational Improvements. Changes to the way Operations manage and operate the assets
- Maintenance Improvements. Changes to improve the effectiveness and efficiency of the way assets are maintained
- Escalation. Annual expenditure cost increases such as labor and materials

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Budget Development **Requires 3 Key Sets of Data Using GIS and EAM Information**

Physical - What is the current state of my assets?

- What do I own?
- Where are they?
- What condition are they in?
- What is the remaining useful life?
- What is the remaining economic value?

Human - What is my required level of service (LOS)?

- What is the demand for my services by my stakeholders?
- What do regulators require?
- What is my actual performance?

Historical Information - Which assets are critical to sustained performance?

- What has it cost to Operate and Maintain/Repair?
- What are the financial consequences of failure?

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Investment Decision Rules

Which strategies are most cost effective here?

- Lowest average annual cost (PV*) is used to determine which strategies to use

When to change strategies?

- Lowest marginal cost is used to determine when to transition to the next strategy, or
- When an intervention point is triggered by interaction of “constraint” trend lines (maximum business risk exposure, minimum tolerable condition, etc.)

PV is Present Value

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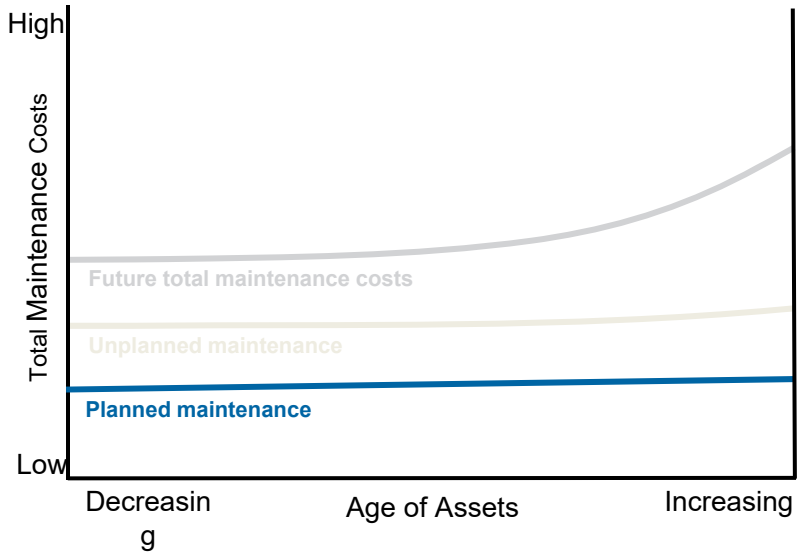
Determining Future Costs



ORDM is Optimized Renewal Decision-Making

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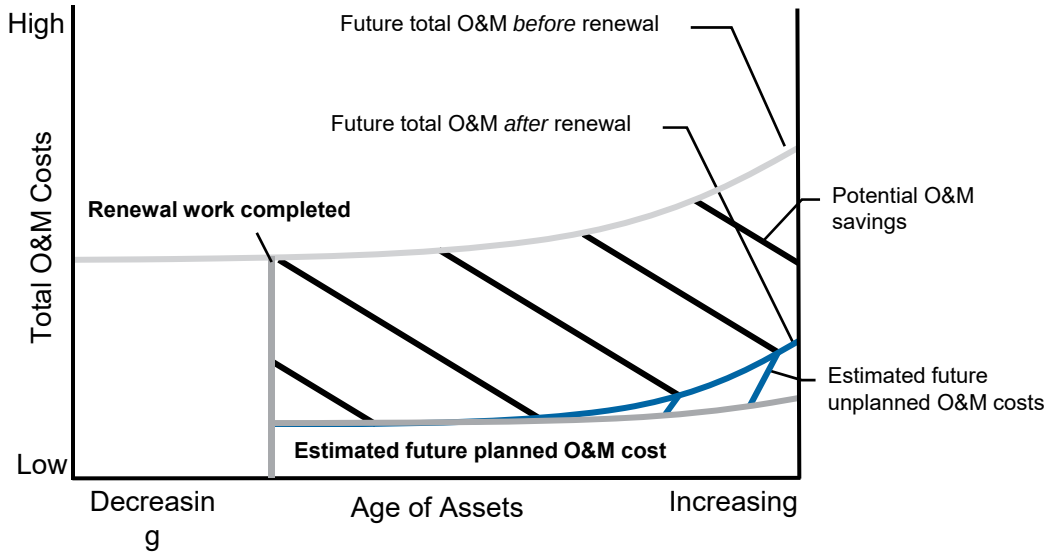
Determining Future Savings: Where Do They Come From?



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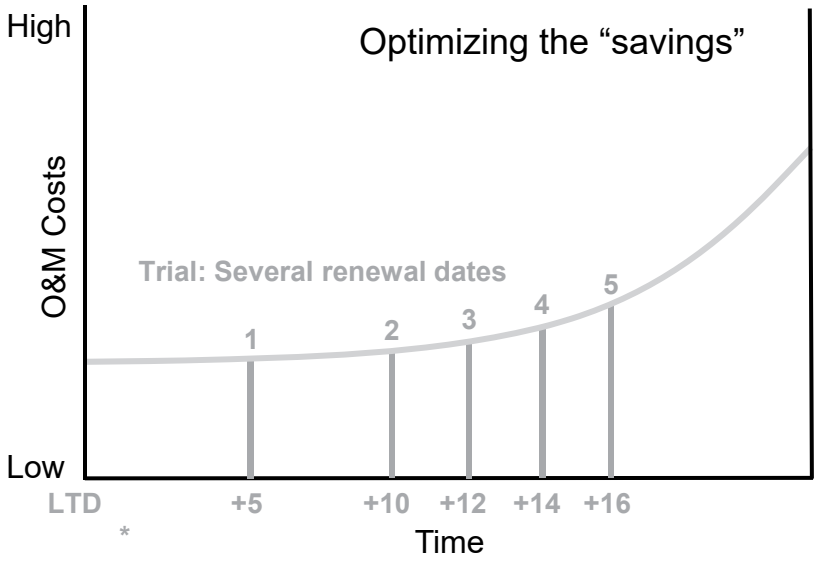
Right Time - Timing the Renewal



ORDM is Optimized Renewal Decision-Making, LTD is Life to Date

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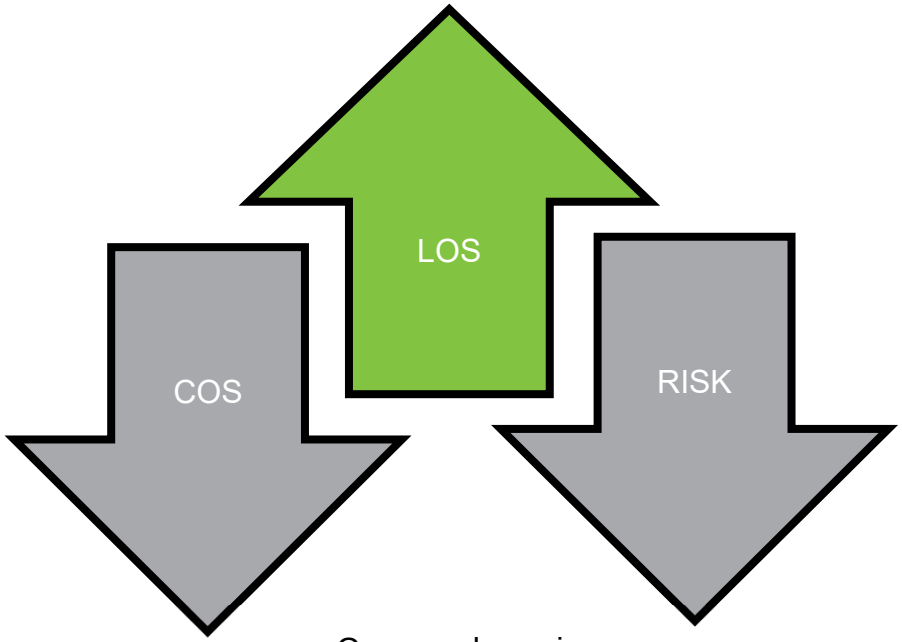
Right Assets - to Maximize Asset Repairs/Replacement:

- Right Asset
- Right Time
- Right Resources
- Optimal Level of Service (LOS)
- Lowest Cost of Service (COS)
- Lowest Risk (R)
- Greatest ROI



Comprehensive
Asset Management

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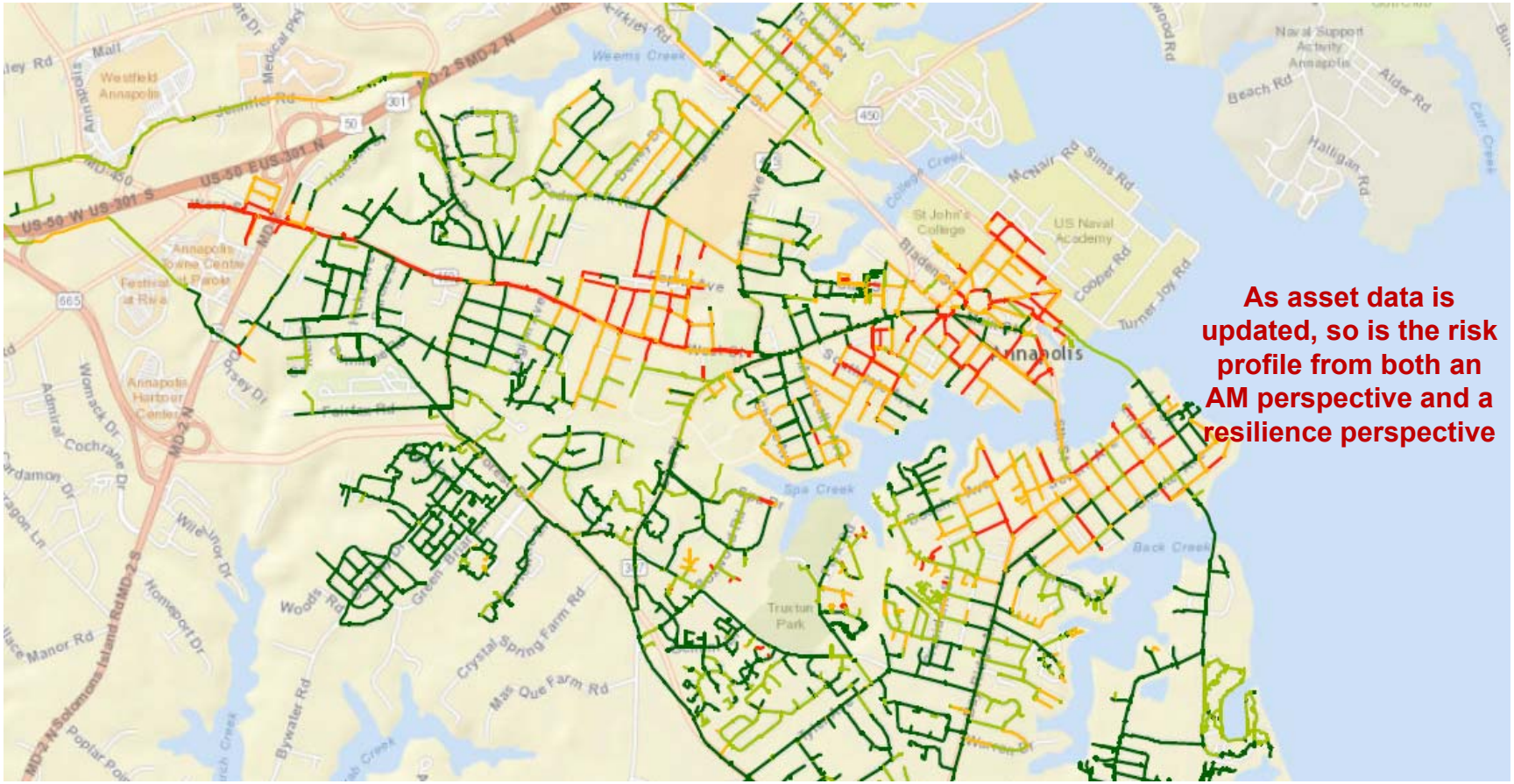
GIS Asset Tagging Helps Organizations Understand Their Risk Profile



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Summary

- Future Budgets Must Consider Resiliency Needs
- Budget Must Address both CAPEX and OPEX Needs
- Consider How Operations and Maintenance Can be Optimized to Reduce Financial Impacts

(Sustainability, Maintainability, Availability, Reliability, Transformation)

- What Critical Asset Should be Funded and When?
- What Training will be Needed to Transform to a Resiliency Focused Organization?

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Thank you

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Questions???