

# Asset Management & Stormwater Master Planning

May 2023



# Introductions

The background features a repeating pattern of white line-art cubes, each composed of three smaller cubes stacked together. The pattern is set against a smooth gradient background that transitions from a light green on the left to a teal on the right.



# David Perry, PE, CFM, Stormwater Senior Project Manager

- 25+ years of experience in stormwater management planning, design, permitting, and policy
- Municipal client focus grew out of previous employment by the City of Charlotte Storm Water Services group
- Led WithersRavenel stormwater practice in western NC for past 2 years

## Areas of Expertise

- **Watershed Master Planning**
- **Urban Stormwater Retrofit**
- **Culvert Replacement**



# Harold Weinbrecht, Local Government Asset Management Specialist

- Mayor of Cary, North Carolina since 2007
- Elected Official – 20 years
- Past Chairman of Capital Area Metropolitan Planning Organization
- Past President of Wake County Mayors Association

## Areas of Expertise

- **Government Relations**
- **Economic Development**



# Jon Mills, Strategic Asset Management Professional

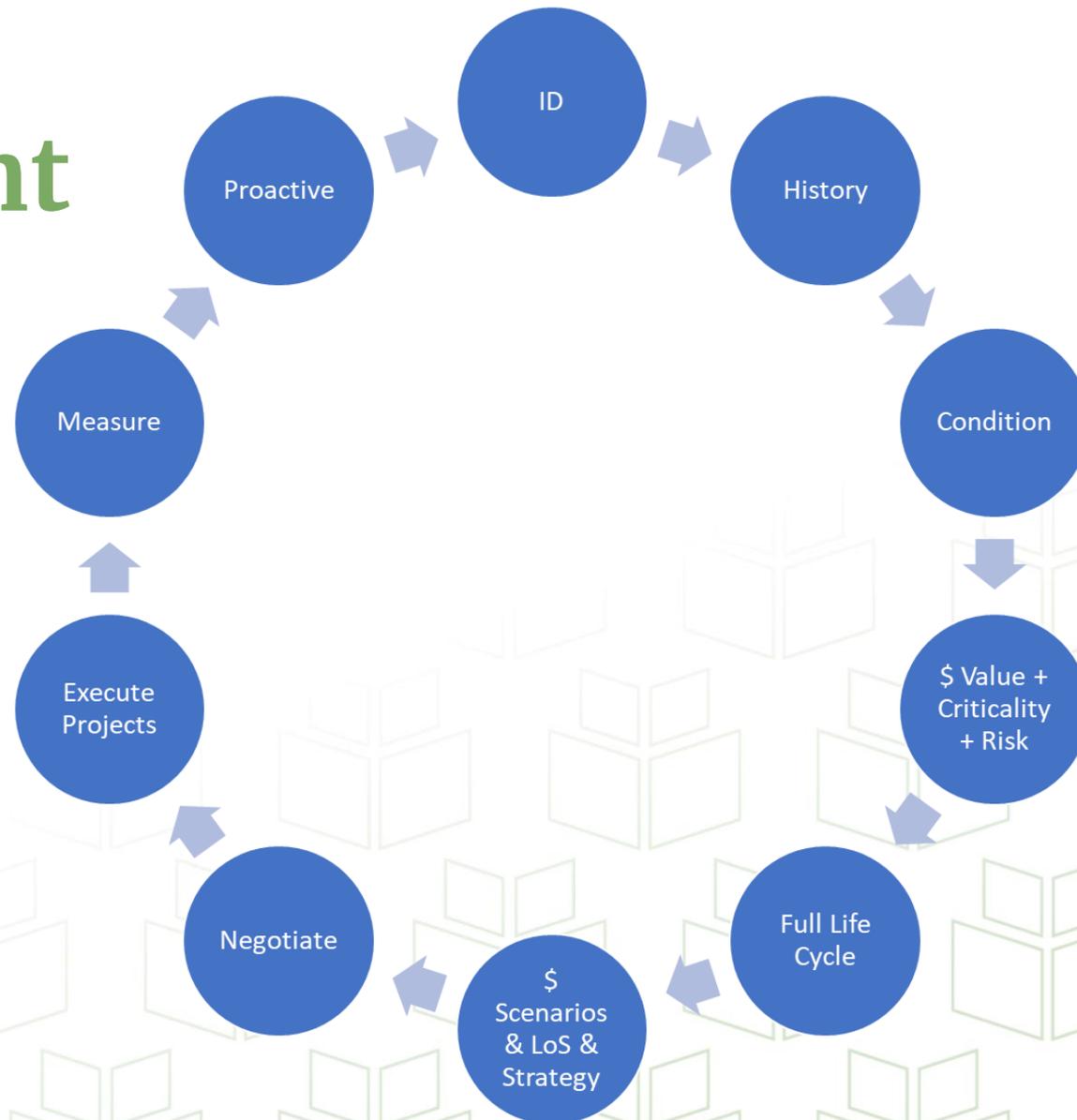
- 10+ years in local government asset management
- Partnered on asset technology projects with 200+ local government organizations
- Previous APWA board member in NC and FL

## Areas of Expertise

- **Asset Lifecycle Modeling**
- **Capital Funding Scenarios**
- **Asset Management Technology**

# What is *Asset Management*?

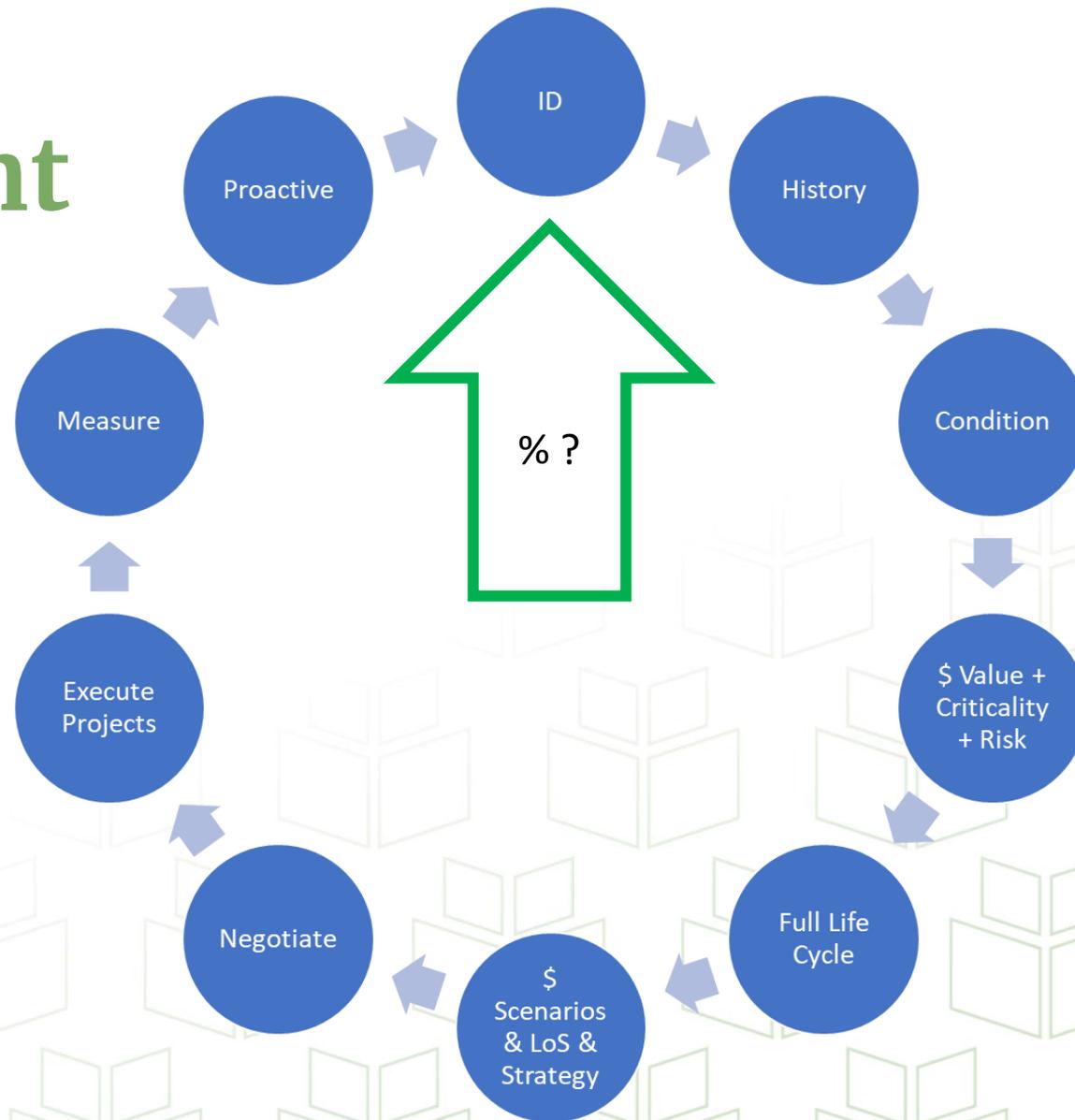
# Asset Management Process



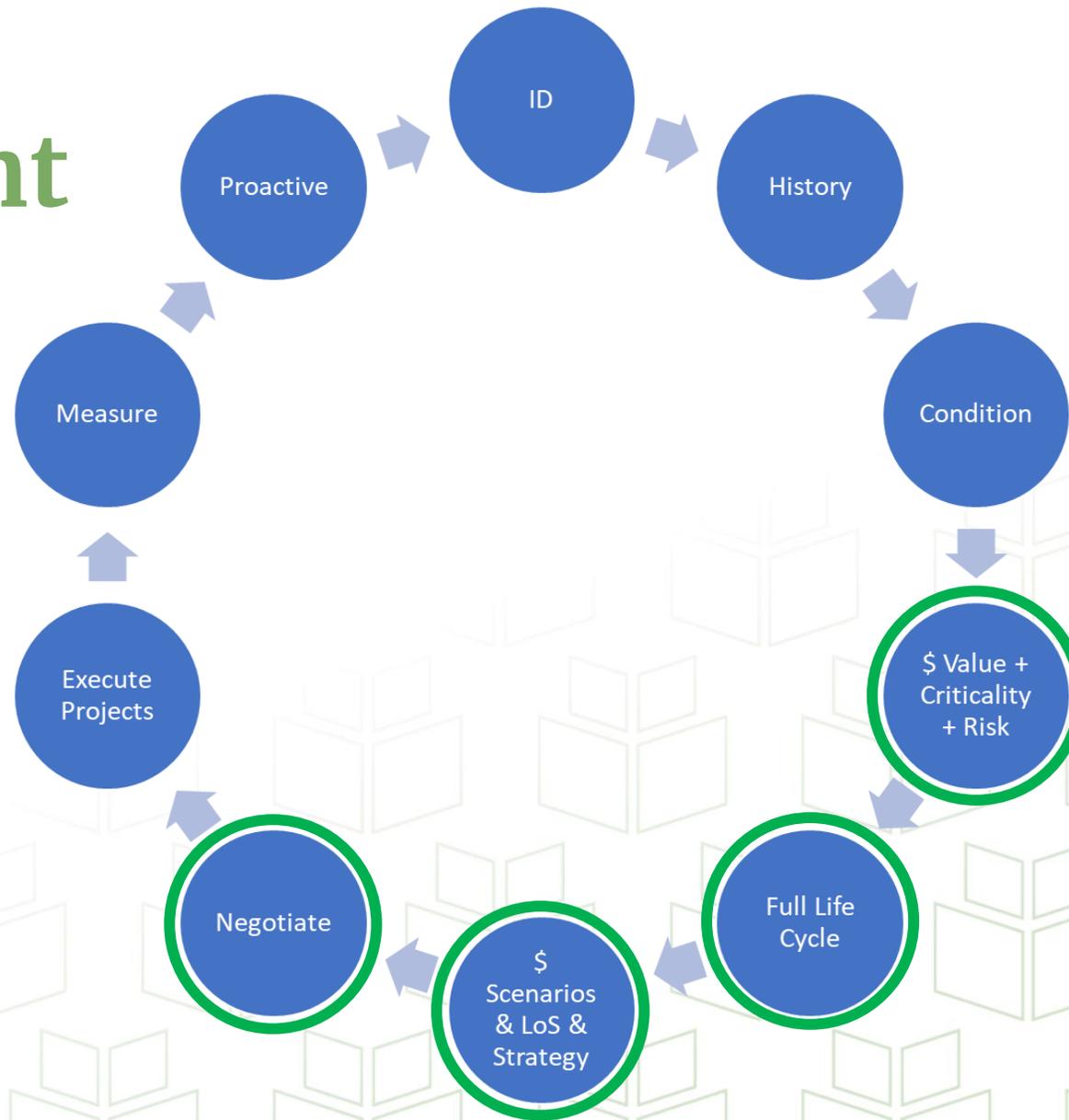
## EPA:

“Asset management is maintaining a desired level of service for what you want your assets to provide at the lowest life cycle cost.”

# Asset Management Process



# Asset Management Process



# Cary Flooding

- **Flooding - \$ hundreds of millions**
- **Downtown – initial focus - pilot**
- **Downtown undergoing revitalization**
- **Identified problems:**
  - Properties in floodplain
  - Clogged drains and culverts
  - Culverts on private property
  - Repaving over the apron



# Downtown Cary Flooding Issues



# Calculating Asset Risk

**Risk = Probability (LoF) X Severity (CoF)**

**LoF = Likelihood of Failure**

**CoF = Consequence of Failure**



# LoF Exercise

Max Score of 10

## Likelihood of Failure - Age

<10 = 0

10-30 = 1

30-50 = 2

50-70 = 4

**>70 = 6**

## Likelihood of Failure - Material

RCP = 0.5

DIP = 1

HDPE = 1

**CMP = 2**

## Likelihood of Failure – Past Work Orders

0-2 WO = 0

3-8 WO = 1

**>9 = 2**



# COF Exercise

## Max Score of 10

### Consequence of Failure – Economic, Average Daily Trips Impacted

<1,000 = 0

1,001-5,000 = 1

5,001-15,000 = 2

**> 15,001 = 3**

### Consequence of Failure – Flooding to Structures

< 5 = 0

6-20 = 1

21-34 = 2

35-50 = 3

**> 50 = 4**

### Consequence of Failure – Environmental

Moderate Ecosystems & Habitat Impact = 0.5

Moderate Water Quality Impact = 0.5

**Extensive Ecosystems & Habitat Impact = 1**

**Extensive Water Quality Impact = 1**

### Consequence of Failure – Medical / School / Essential Services

Not Impacted = 0

**Impacted = 1**



# Risk Matrix by Length of Pipe



## Performance Measures

*Likelihood of Failure (LOF)*

*Consequence of Failure (COF)*

*LOF\*COF = Risk*

## Composite Risk Score

*Linear Foot of Pipe*

## Rehabilitation / Replacement Options

*Cost of Treatment per Unit of Measure*

## Degradation Curve / Investment Needs

*Optimized Asset Management*

Minor ----- Catastrophic	10	2,432	1,685	1,952	865	903	329	465	323	814	1,652
	9	534	1,285	1,465	1,879	511	26,625	13,685	1,616	1,856	2,632
	8	8,386	9,564	60,652	6,352	1,115	20,008	15,748	364	1,032	428
	7	2,704	2,678	2,504	10,562	15,396	44,262	22,745	1,962	327	7,701
	6	3,027	4,965	5,783	3,587	2,469	10,222	220	11,022	423	20,150
	5	57,699	42,572	33,025	29,654	26,254	60,652	31,100	79,880	2,553	66,011
	4	162,489	145,896	126,933	87,352	73,978	82,587	34,820	65,217	4,357	41,505
	3	9,586	7,589	15,695	36,589	42,562	57,423	48,653	47,956	36,856	92,852
	2	1,025	2,015	5,602	3,569	6,987	10,568	12,748	15,685	11,356	10,659
	1	581	1,050	53	152	389	652	856	341	589	700
		1	2	3	4	5	6	7	8	9	10
		Rare ----- Likelihood of Failure ----- Almost Certain									

# Risk Matrix by Length of Pipe



Level of Service Composite Score  
By Linear Foot

Score of 36 = 16,458 LF

Medium = 10,222 LF

Significant = 6,236 LF

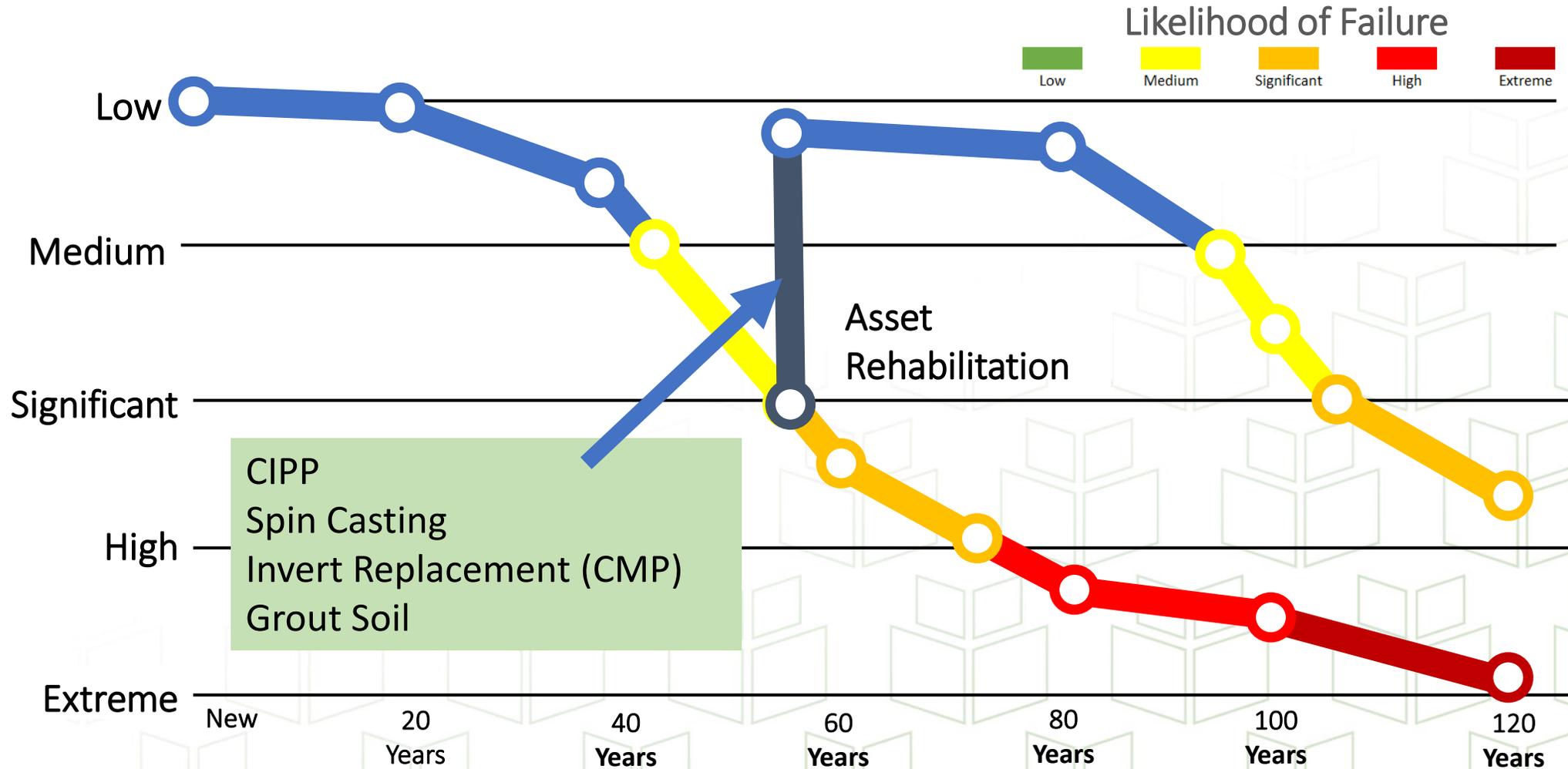
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# Cary's Opportunities

- **Future economic development**
- **Failure would hurt our goals of bringing more residents/businesses downtown**
- **Connect stormwater with asset development downtown**



# Asset Lifecycle

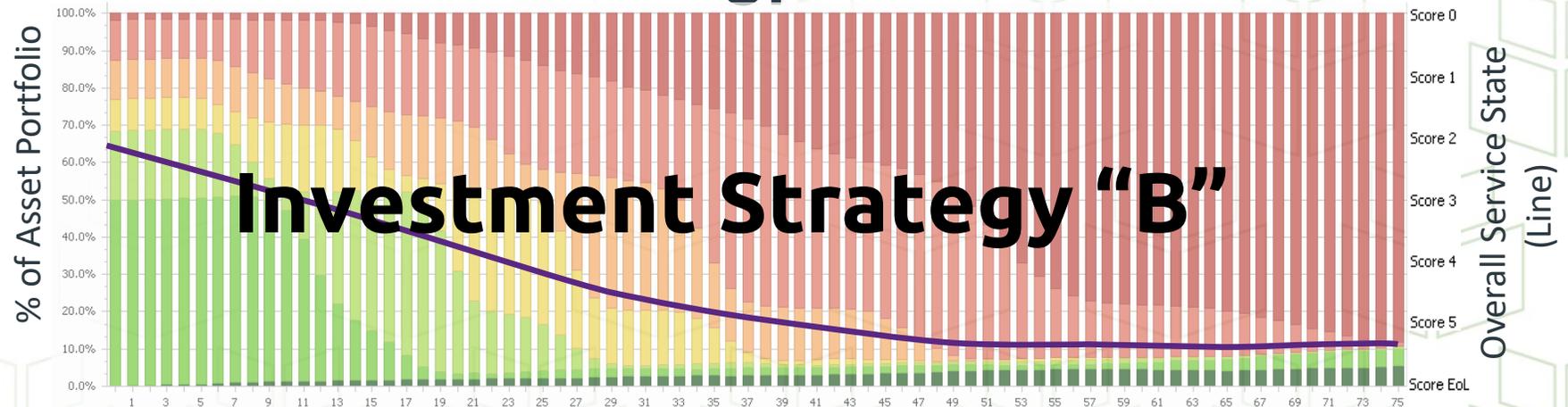


# Predicted State of Your Asset Portfolio

- Key
- New
  - Low Risk
  - Minimal Risk
  - Moderate Risk
  - Significant Risk
  - High Risk
  - Extreme



or



# Creative Solutions in Cary



# Cary Downtown Stormwater Mitigations



# Cary Downtown Stormwater Mitigations

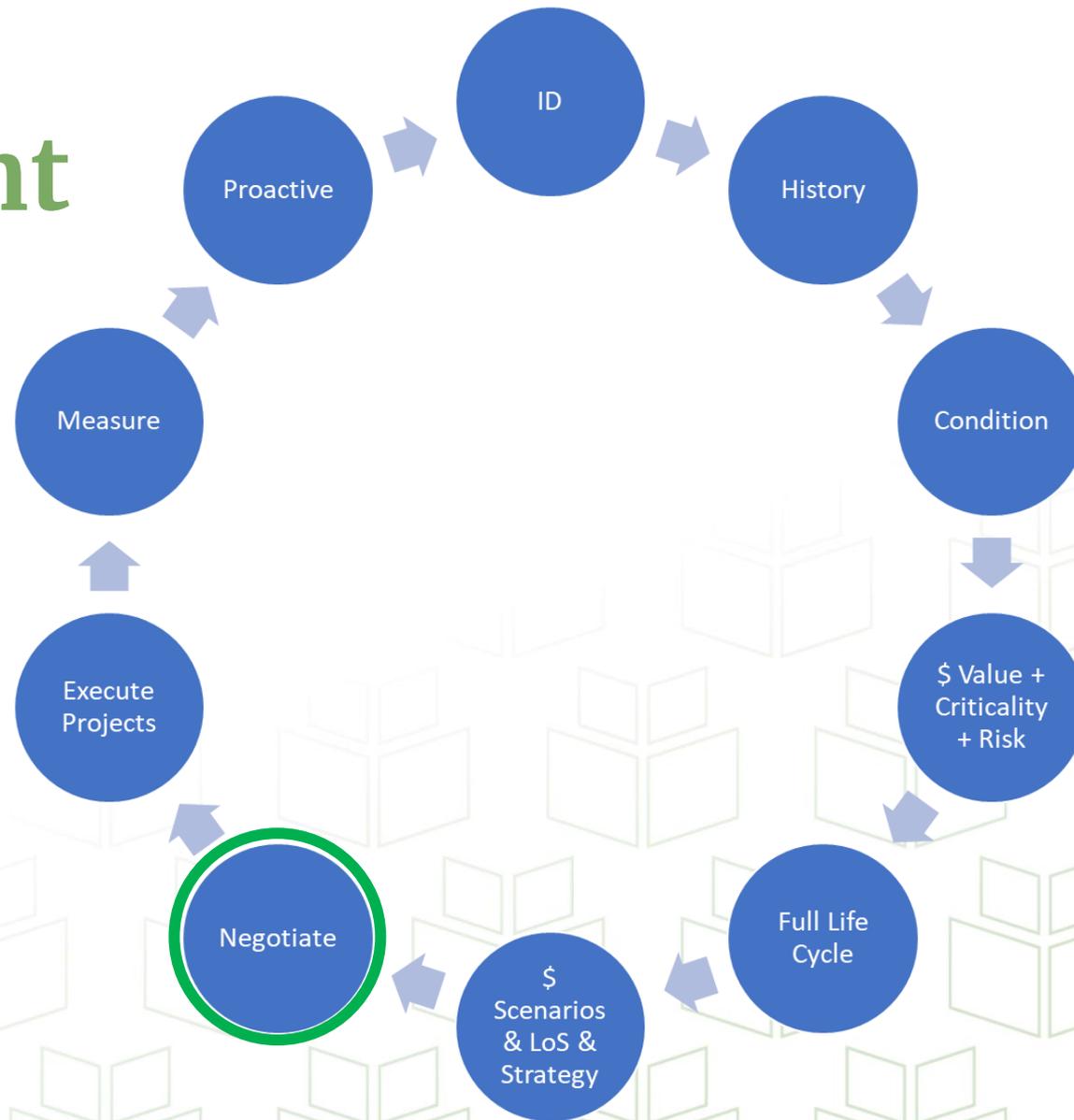


# Cary Downtown Stormwater Epilogue



- **Created Stormwater Working Group**
- **Installed Stream Floodwater Monitoring Devices**
- **Downtown Pilot Program To Be Used In Other Areas**
- **ROI**
- **Combine Rehab of Stormwater with Other Linear Assets**

# Asset Management Process



**ANY**  
**QUESTIONS?**  
THANK YOU.

