



# Linear System Integrity Program (LSIP)

*GLWA Board of Directors  
April 28, 2021*

*Suzanne Coffey, Chief Planning Officer  
Jody Caldwell, Asset Management Director*



**GLWA**  
*Great Lakes Water Authority*

# LSIP Presentation Agenda

1. Background
2. Key Objectives
3. Program Consultant
4. Discussion, Questions & Answers

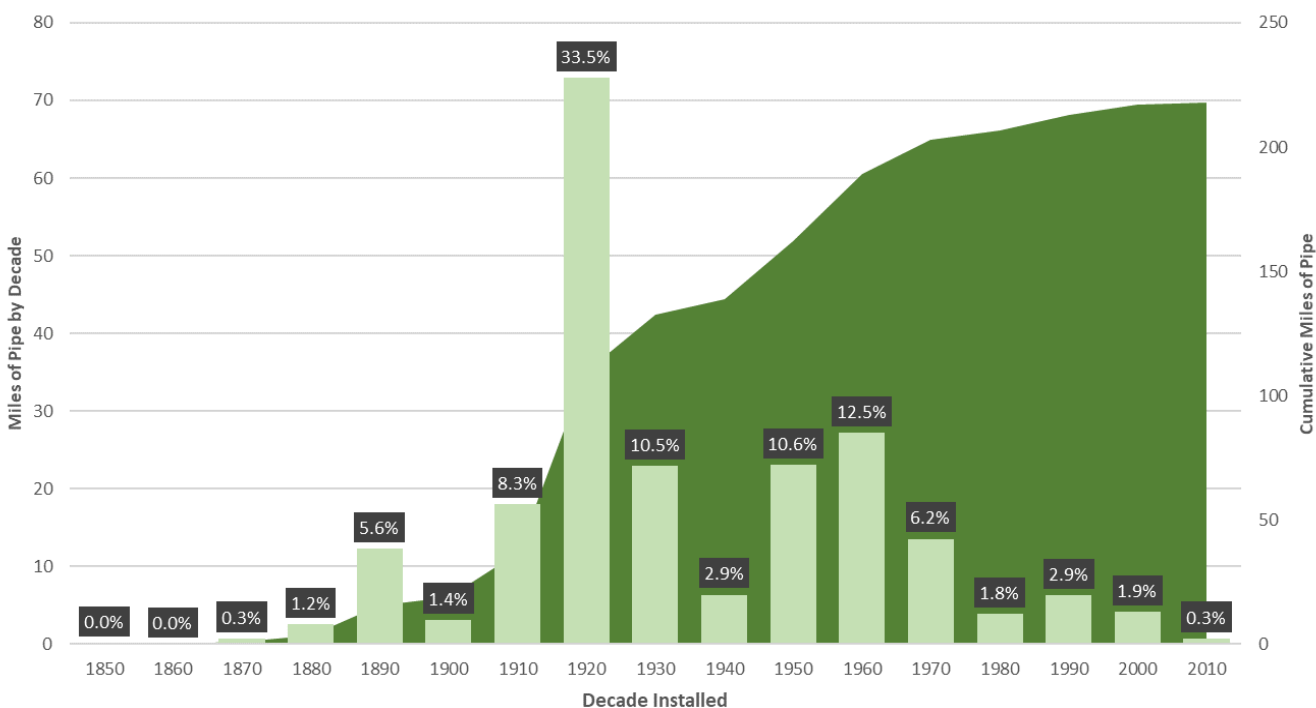
# BACKGROUND



# What is GLWA's Linear System?

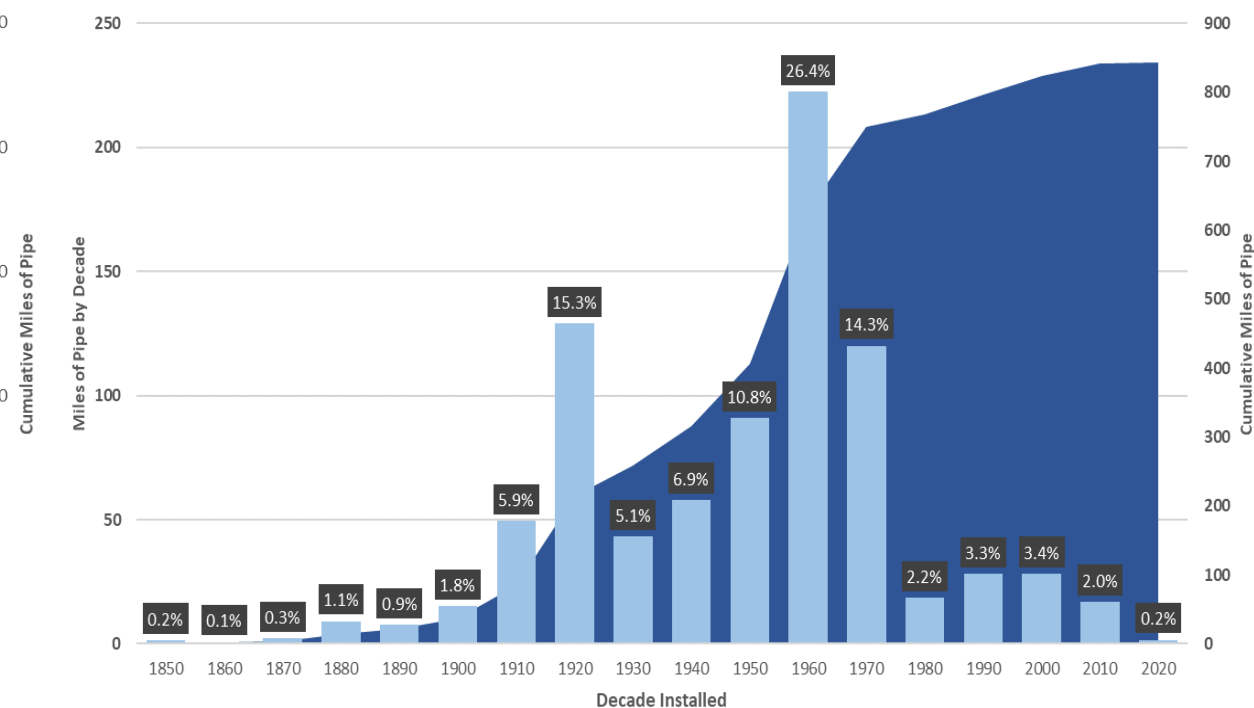
## Wastewater Collection System

- More than 200 Miles



## Water Transmission System

- More than 800 Miles



# Buried Pipeline Risk Management

- No more “bury-and-forget”
- Proactive management
- Risk-prioritized condition assessment
- Data provides “smart” surgical approach to renewal
- Minimizes life-cycle expenses



Pipeline Risk Management

# Linear System Integrity Program (LSIP)

- Newest asset management program
- Risk based approach for long-term, cyclical “program”
- Uses proven & emerging technology to assess condition of pipes to surgically identify pipe segments in need of renewal
- Water transmission main assessment is challenging
- Requires cross-functional collaboration



# Avoid & Reduce Transmission & Interceptor Failures



# The Bigger Picture

- Formalize and build upon linear system work since GLWA formation
- Sewer Interceptors:
  - 200 miles of condition assessment
  - 55 miles of condition assessment reinspection
  - 14 miles of targeted renewals and cleaning
- Water Transmission Mains:
  - Transmission main pipeline prioritization
  - Pilot projects for inspections and continuous monitoring
  - Renewal pilot including long-term monitoring
  - Investigations related to pipeline pressure impacts and failure modes



# KEY OBJECTIVES



# Key Objectives – Linear System Integrity Program (LSIP)



## Successful Linear System Management

Successful management, continuing to be affordable and sustainable



## Pipeline Risk Management

Scientifically defensible approach to pipeline risk management



## Lowest Lifecycle Cost

Use data to drive decision making to manage pipeline risk and optimize maintenance & renewal budgets

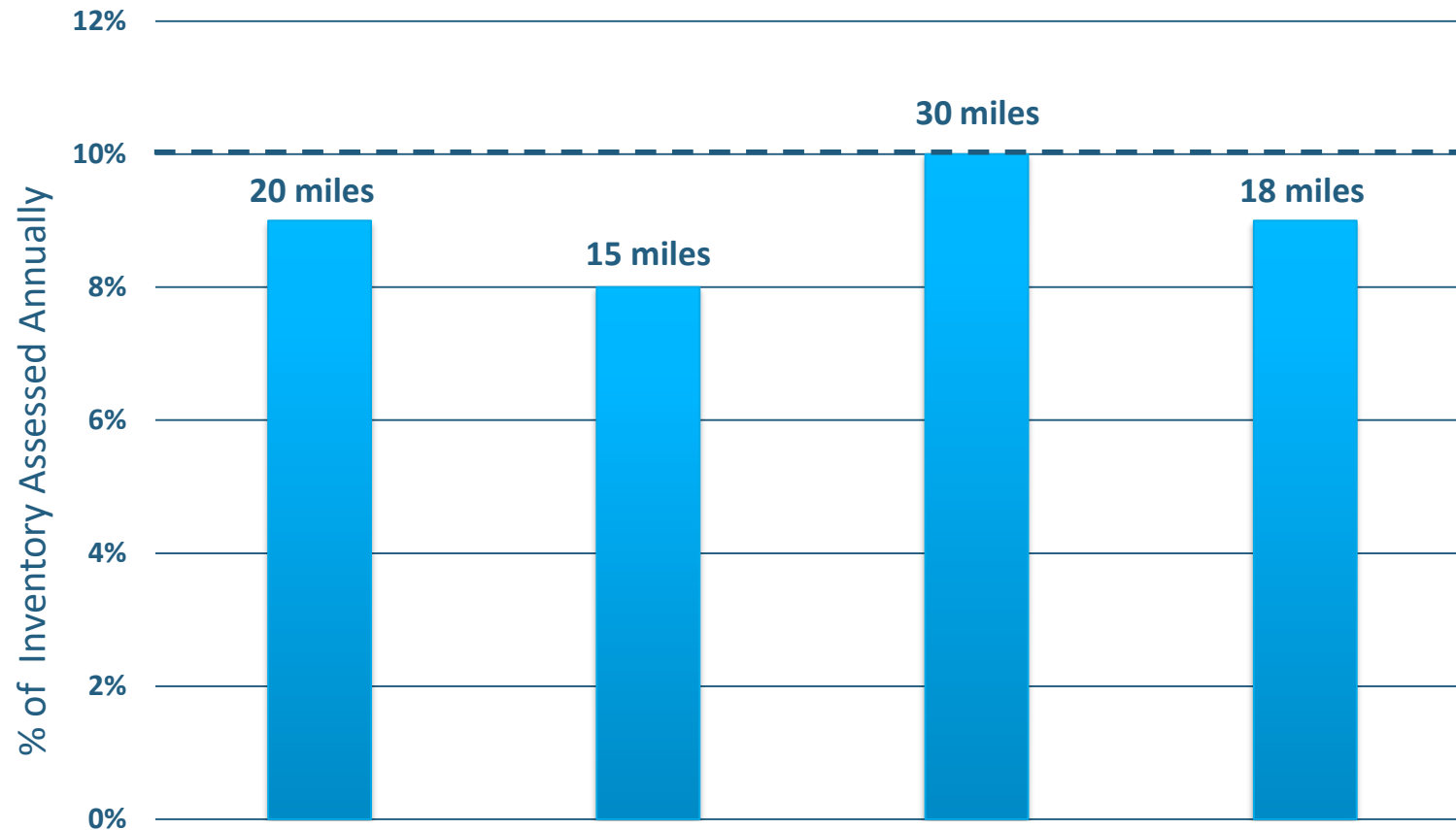
# What Does it Take to Be Successful?

- Leadership support
- Remain opportunistic & flexible
- Timely response for renewals
- Emergency preparedness



**Successful Linear  
System Management**

# What are Peer Utilities Doing?



Transmission Main Only



Successful Linear  
System Management

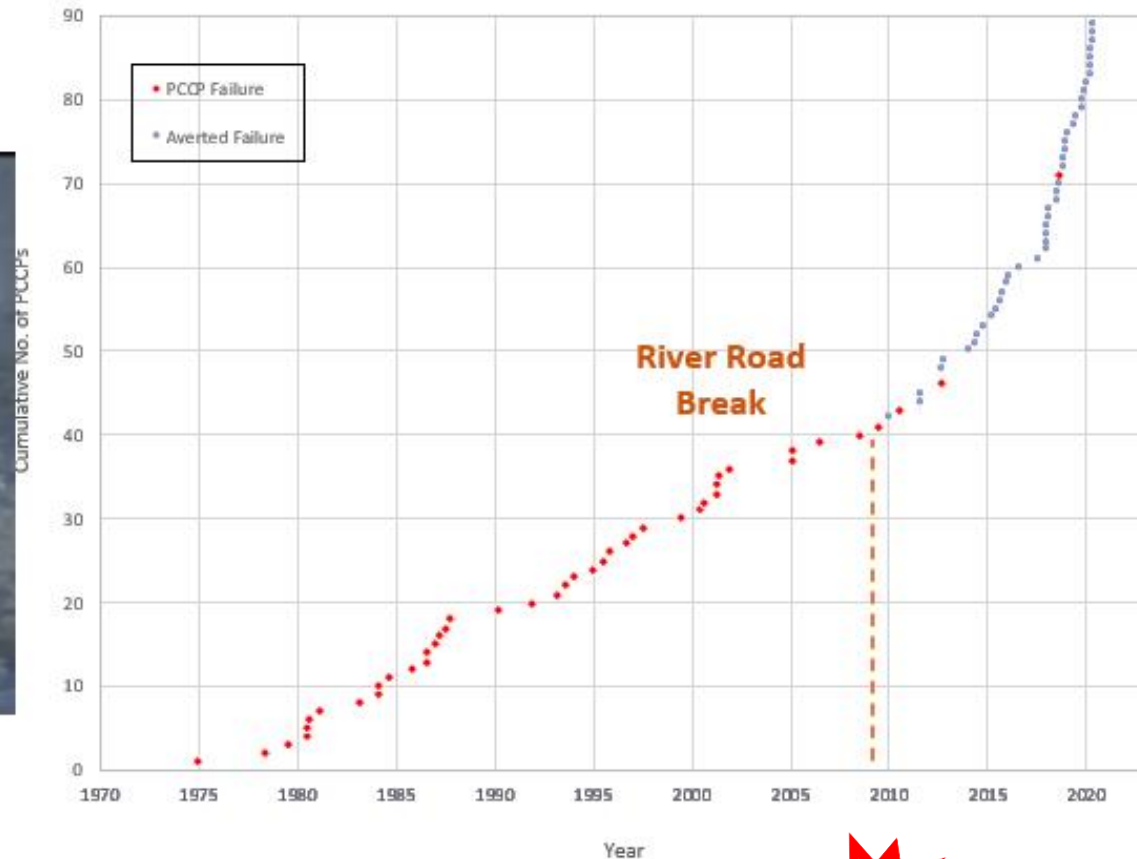
10% of GLWA's  
Transmission  
Main = 80+ Miles  
Annually



# Washington Suburban Sanitary Commission (WSSC) Case Study

## Prestressed Concrete Cylindrical Pipe (PCCP) Failure Chart

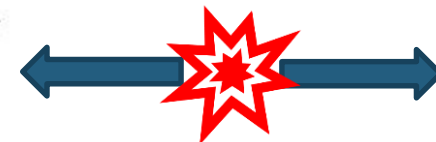
- PCCP Failures: 46
- PCCP Failures (Since 2010): 5\*
- Averted Failures: 44
- \*4 pipeline failures on non-monitored pipes



High Performance  
Linear System Management



1.1 Failures/Year



0.1 Failures/Year

# Pipeline Prioritization – Risk Based Approach

$$\text{RISK} = \text{PROBABILITY} \times \text{CONSEQUENCE}$$



Probability that a  
Failure Will Occur



Impact if a Failure  
Occurs

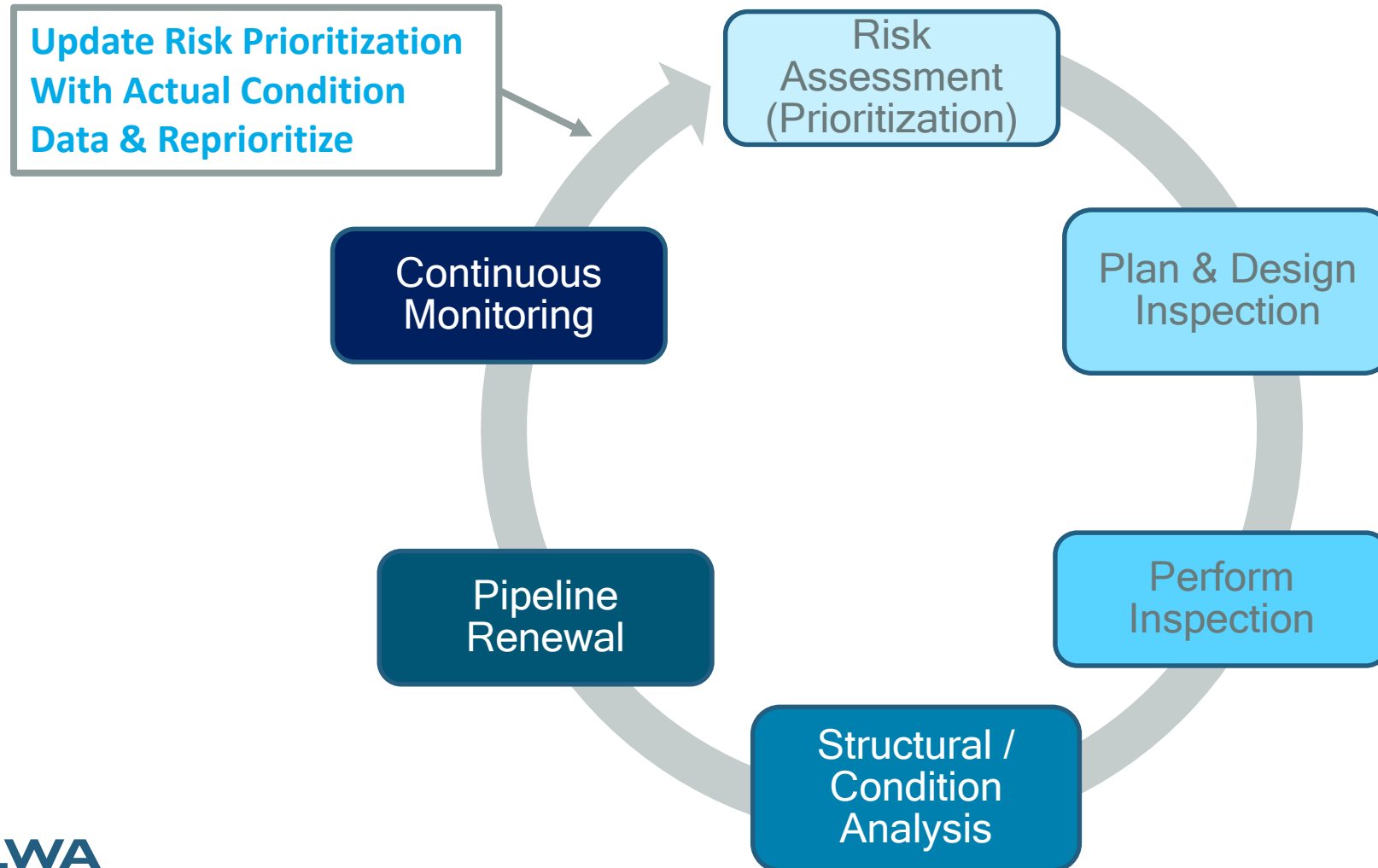


Pipeline Risk Management



Lowest Lifecycle Cost

# LSIP Program Cycle



Pipeline Risk Management



Lowest Lifecycle Cost

# How will GLWA Meet These Objectives?

With programmatic consultant assistance to:

- Standardize process and framework
- Plan each pipeline condition assessment
- Select technologies
- Issue task order
- Perform pipe condition assessment
- Identify renewal needs at the pipe segment level



**Successful Linear  
System Management**



**Pipeline Risk Management**



**Lowest Lifecycle Cost**



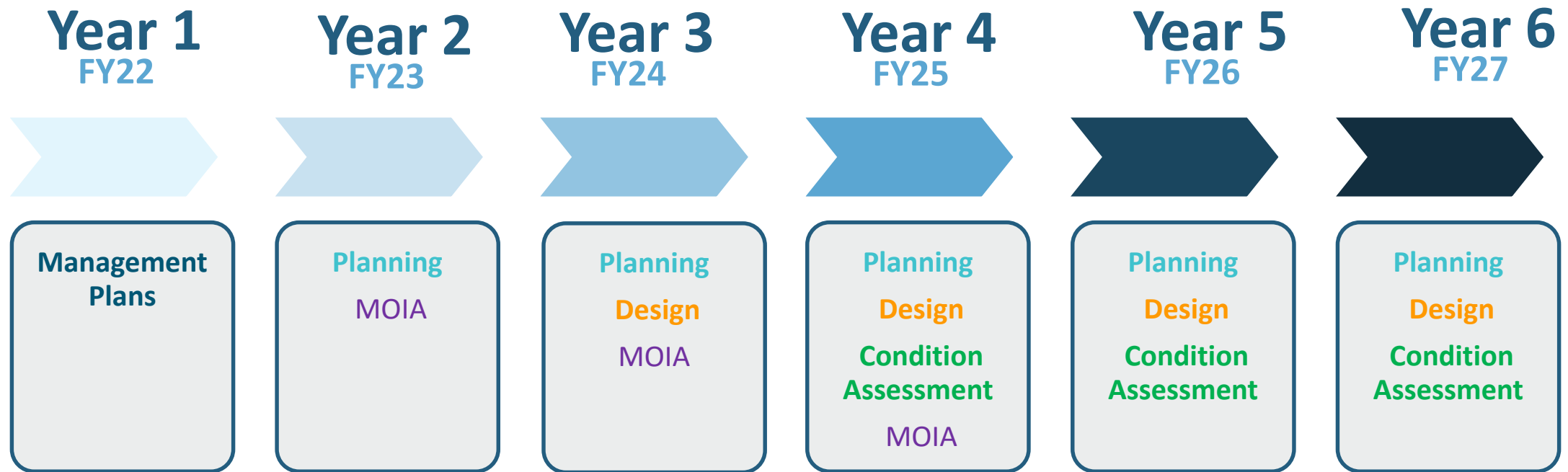
# PROGRAM CONSULTANT



# Proposed HDR LSIP Program Consultant (1902659)

- Program manager consultant: HDR
- Proposed six-year contract
- Majority of expenses budgeted through Task Order Assignments for water only
- Required CIP for water only
  - CIP 170600 – Water Transmission Main Asset Assessment Program
    - » Expenses included in proposed contract for access structure modifications and construction of in place sensors
  - Pipeline renewals are NOT part of this contract
    - » CIP 170400 – Water Transmission Improvement Program or Improvement & Extension fund will address urgent & emergency renewals

# Phased Approach to Condition Assessment



MOIA – Minimal Operational Impact Assessments, or small activities that do not disrupt operations (outside the pipe) and provide condition information

# LSIP RFP Status

## Status:

- Currently negotiating scope & fee with selected proposer
- Operation & Resource Committee consideration on May 12, 2021
- Board consideration on May 26, 2021
- Anticipating notice-to-proceed in July 2021



**Successful Linear  
System Management**



**Pipeline Risk Management**



**Lowest Lifecycle Cost**



# Key Objectives – Linear System Integrity Program (LSIP)



## Successful Linear System Management

Successful management, continuing to be affordable and sustainable



## Pipeline Risk Management

Scientifically defensible approach to pipeline risk management



## Lowest Lifecycle Cost

Use data to drive decision making to manage pipeline risk and optimize maintenance & renewal budgets



QUESTIONS?