

University of Maryland

# Project Management Symposium

*NEXT SESSION*

## Maximizing Project Success through Integrated Asset Management and Strategic Planning: Case Study DC Water

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Capital Improvement Program Specialist, DC Water



PROJECT MANAGEMENT  
CENTER FOR EXCELLENCE

A.J. CLARK SCHOOL OF ENGINEERING  
Civil & Environmental Engineering Department

*This session will be recorded.*

# Project Management Symposium

## Maximizing Project Success through Integrated Asset Management and Strategic Planning:

DC Water's Experience

Melsew and Hailu



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Civil & Environmental Engineering Department





# Acknowledgement

We acknowledge the contributions of various groups within DC Water, primarily Department of Engineering & Technical Services and Department of CIP Infrastructure Management.





# Learning Objectives

1. Understand the significance of Asset Management (AM) throughout the project lifecycle, specifically in project initiation, planning, and execution phases.
2. Recognize the importance of alignment to maximize the value derived from asset management.
3. Appreciate the role of collaboration, streamlined processes, and technology in assisting project managers in achieving strategic goals effectively.



# Introduction

- Strategic Planning in Capital Projects:
  - Identifies project goals aligned with organizational strategy and allocates resources efficiently to maximize project and asset value.
- Importance of AM:
  - Balances cost, risk, and performance to optimize asset lifecycle.
- Role of Project Manager:
  - Leads project execution aligned with strategic objectives.





# Introduction

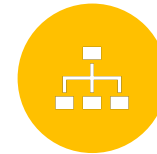
## Strategic Plan (SP) and Asset Management Plans (AMPs) in project planning & delivery:



Enhance operational efficiency and financial performance



Risk Management & Compliance



Alignment of Organizational strategy with operational objectives



Improve performance and delivery.



Meet or exceed Stakeholder Expectations



# Strategic Project Management

## Program and Project Management

- Selection of programs and Projects
- Allocation of resources
- Management of programs and projects

## Project Teams

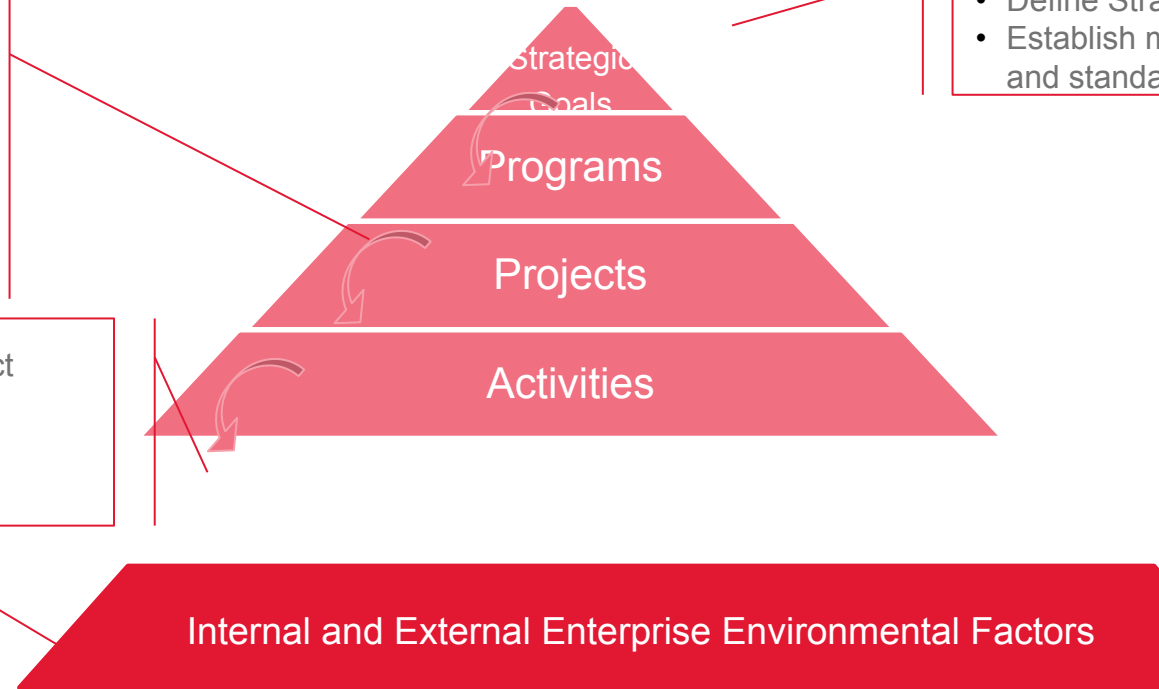
- Cross functional project teams
- Initiating projects
- Managing projects
- Delivering value

## Processes, Constraints and Tools

- Regulations
- Apps
- SOPs
- Guidelines
- Policies

## Executives

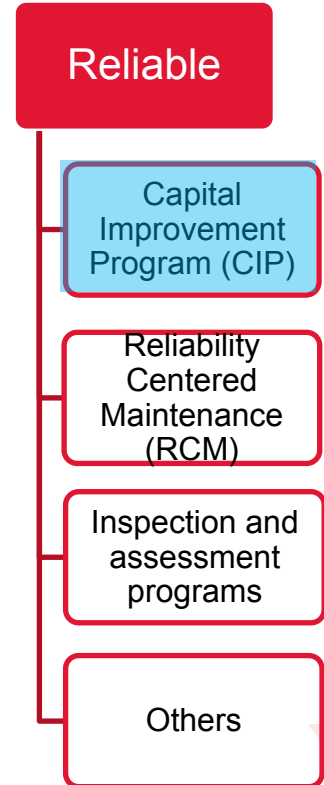
- Define Strategies
- Establish measures and standards



# Strategic Plan

Reliable Imperative states to

- Proactively plan and manage assets, in a risk-based manner
- Ensure the level of service that our customers need and that we strive to deliver
- Integrated enterprise-wide value-driven asset management plan to build resilience.

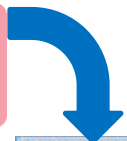
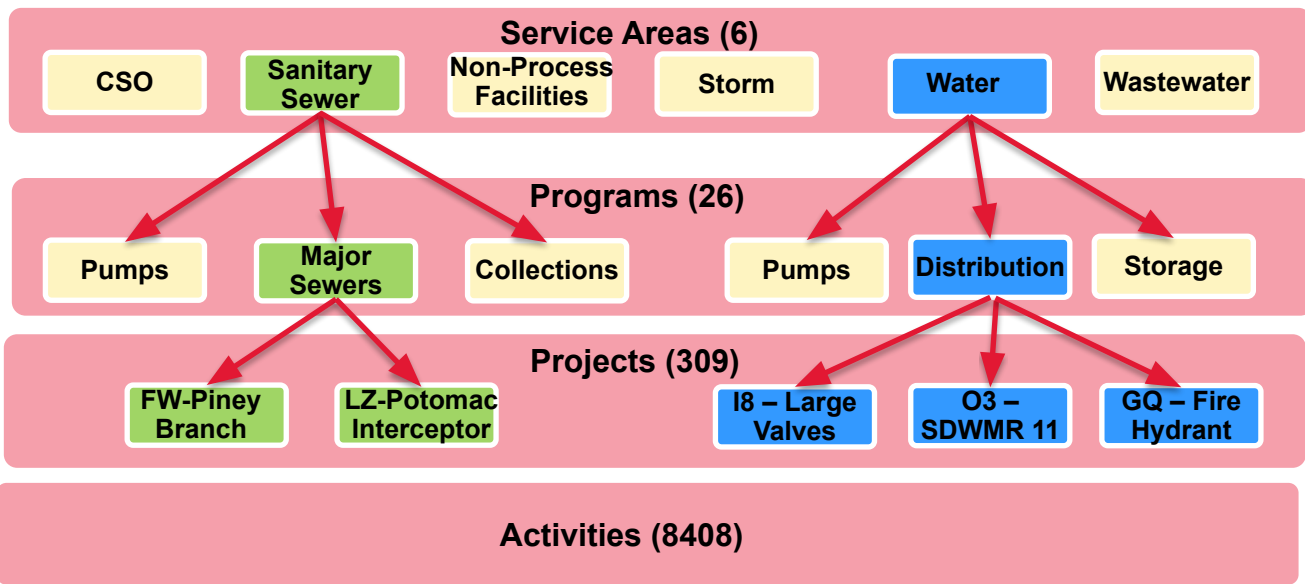






# Structure of the CIP

CIP



STATUS	Acti. Stat.	Bud Yr	Activity ID	Activity Name	Start	Finish
0000 Current WASA CIP					02-Jul-96 A	29-Mar-33
A - Non Process Facilities					01-Oct-06 A	17-Jun-23
B - Waste Water Treatment					02-Jul-96 A	29-Mar-33
BLP BLP - Liquid Processing Projects					02-Jul-96 A	29-Mar-33
BC00 Headworks Influent Structures					01-Mar-17 A	17-Jul-22
BC01 Headworks Influent Structures - RWWPS1					01-Aug-17	20-Mar-21
			BC44050000	Construction Procurement	23-Feb-19	22-Jul-19
			BC13150000	PDE during Construction	23-Feb-19	21-Feb-21
			BC13050000	Basic Design Procurement	01-Aug-17*	28-Nov-17
			BC13100000	Basic Design	29-Nov-17	22-Feb-19
			BC44110000	Construction	23-Jul-19	19-Jan-21



# Value Creation Framework

Business  
Processes



Technology



Enables

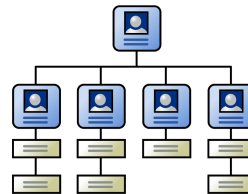
y

People



Executive  
Interaction

Organization



	People	Process	Technology
Strategic			
Tactical			
Operational			

Source: WRF



# Value Creation Framework

	People	Process	Technology
Strategic	CIP Committee Management	Strategic Planning CIP Planning	Spreadsheets Hydraulic Models AutoDesk Building Information Models
Tactical	Maintenance staff Schedulers/Planner Warehouse staff Planners Control System Techs	Business Case Evaluation CIP Prioritization Stage Gate & Change Management Project Management	Maximo GIS InfoAsset Planner Unifier
Operational	Operators	Operations and Real Time Control	SCADA Sensors Communications

\*Originally proposed by Cello Vitasovic (2015). Later adopted by WRF's Utility Assessment and Implementation Methodology Program



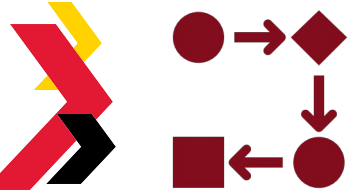
# People (Project Manager )

The PM shall be able to

- Communicate well
- Collaborate
- Lead and motivate
- Adapt to change
- Continuously improve



Source:  
[culturemonkey.io](https://culturemonkey.io)



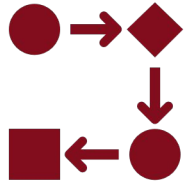
# Processes

- Are methods and practices used to complete project tasks. Includes standards, and procedures that guide how projects are initiated, planned, executed, monitored, and closed.
- Key aspects include:
  - Methodology that fits the project's needs.



Source: PMI

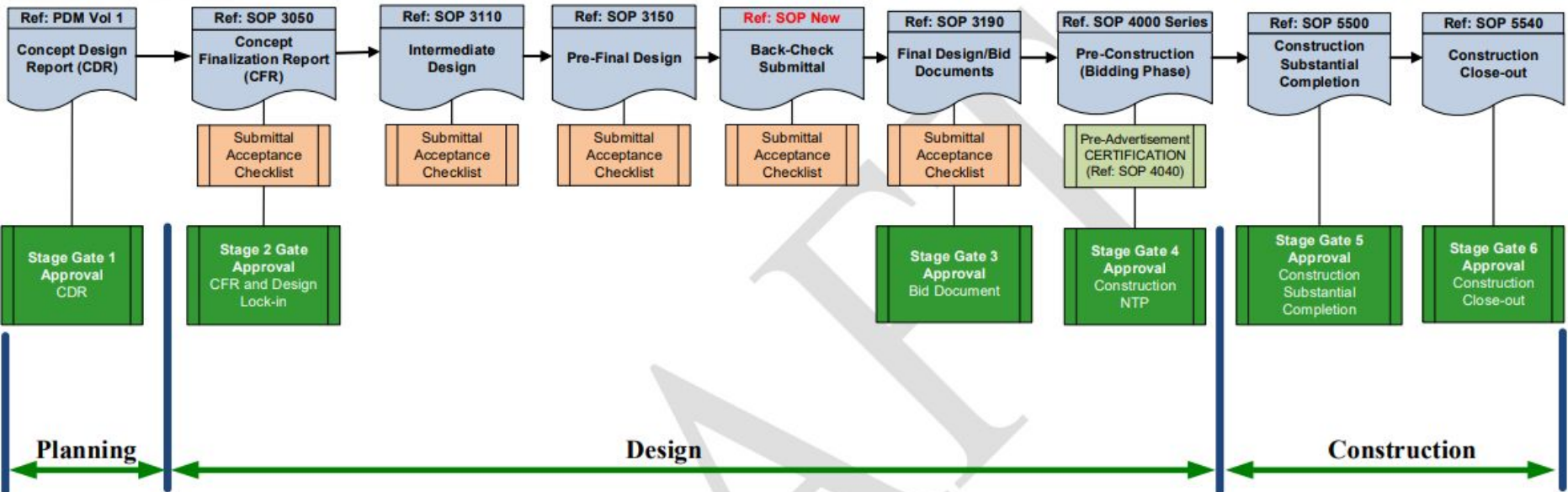




# Processes

## Stage Gate

Source: DC Water





# Technology

- Project managers leverage data and tools for informed decision-making.
- Engage stakeholders throughout the project lifecycle for alignment and support.
- Continuously assess and adjust project plans to meet strategic goals.





# Technology

Encompasses the tools and systems used to support and manage projects.

- Project Management Software
- Communication Tools
- Collaboration Platforms







# Technology

 GIS System of Records	 PCS	 SCADA	 Historian	 AMI	 CMMS/ Asset Management	 Water Distribution Hydraulic Model	 Collection System Hydraulic Model	 Asset Management	 Field Mobility App.
 Syrinx A Badger Meter Brand	 pure PICA Condition Assessment Data Sources	 Trimble   Utilities	 ArcGIS Insights	 AN aem BRAND Predictive Rainfall Model	 OSIsoft. is now part of AVEVA Transactional Database	 vertexone Customer Information System (CIS)	 AZURE DATA LAKE Cloud Storage and Analytics	 databricks Cloud- Data Computing, Analysis and ETL	
 SMARTCOVER IoT	 FIDO	 AUTODESK Revit Architectural Design Vertical	 Ravnur Inspection Video Platform	 PIPELOGIXR CCTV Inspection Management System	 P6 ORACLE Project and Program Controls	 Survey123 for ArcGIS ArcGIS Survey 123	 ORACLE ERP Cloud ERP System		





# The Importance of Asset Renewal



## Aging Infrastructure

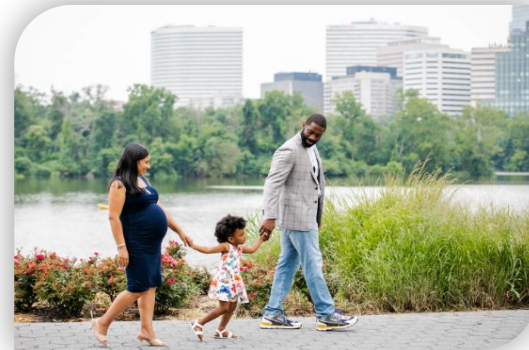
Aging pipes are a considerable risk. It leaves our systems vulnerable to

leaks and breaks when they reach the end of their service life.



## Regulatory Compliance

State and federal laws require us to keep our facilities in good running order.



## Protecting Public Health

Renewed assets ensure a secure and safe water infrastructure for our communities provided by us.

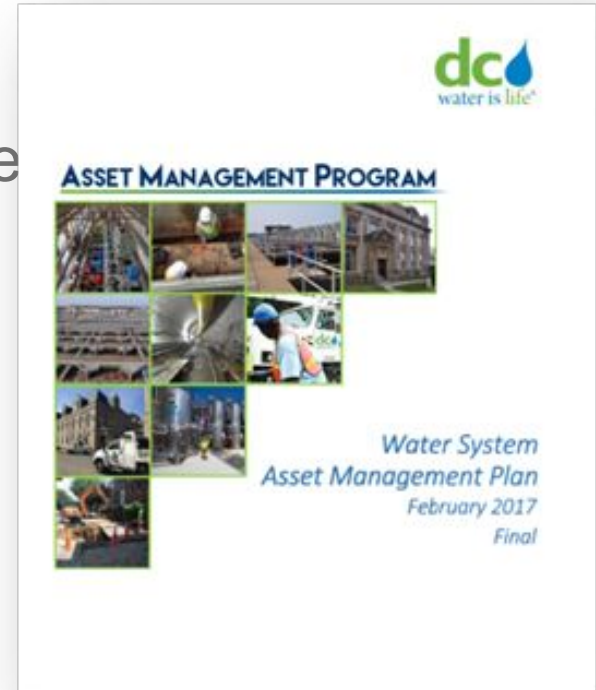
**DC Water's Mission: exceed expectations by providing high quality water services in a safe, environmentally friendly, and efficient manner.**



# Example Programs

- 1.5% of water main replacement per year
- 1% of sewer main renewal per year

Age (years)	Water	Sewer
Median age	79	89
Expected service life	115	110





# Prioritizing Asset Renewal to Minimize risk

- Our risk prioritization approach protects the community.



## Assessing Condition and Capacity

Assess asset conditions and conduct hydraulic modeling to determine assets condition and capacity.



## Evaluating Consequences

Determining the impact of a failure on our residents, businesses, and the environment.



## Probability Analysis

Calculating the likelihood of a failure based on condition, past incidents and future scenarios.



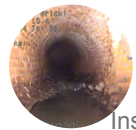
## Mitigating Risks

Using risk modeling, cost-benefit and equity analysis to prioritize renewal investments.



# Data Driven Process

## Input



Inspection  
Databases



Files



CMMS



Customer  
Input



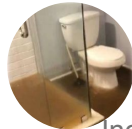
GIS Asset  
Databases



Operations



Reports



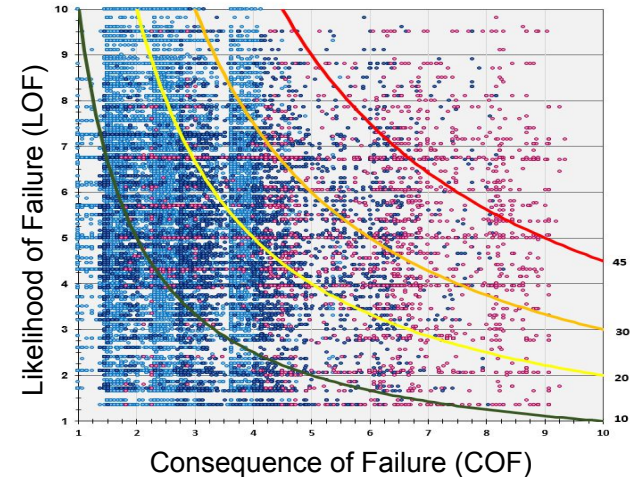
Incidents

## Analysis

Linear Asset  
Management Tool

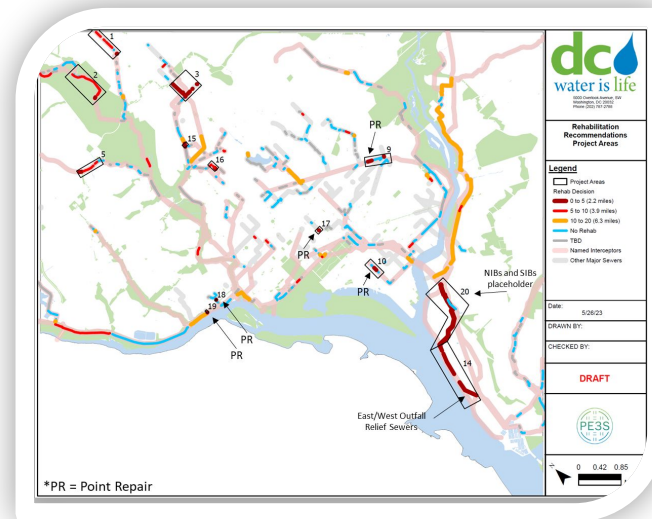
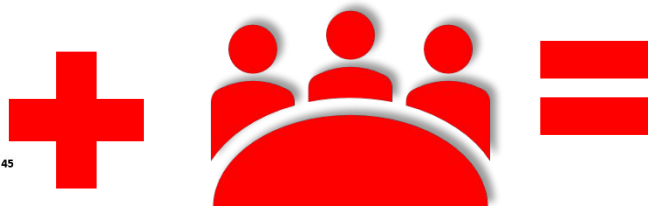
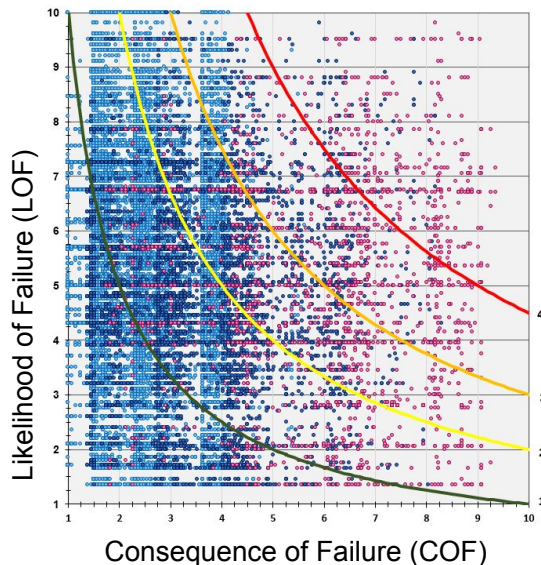
## Result

Consequence of Failure (COF) and Likelihood of Failure (LOF)  
Sewer- Diameter Distribution



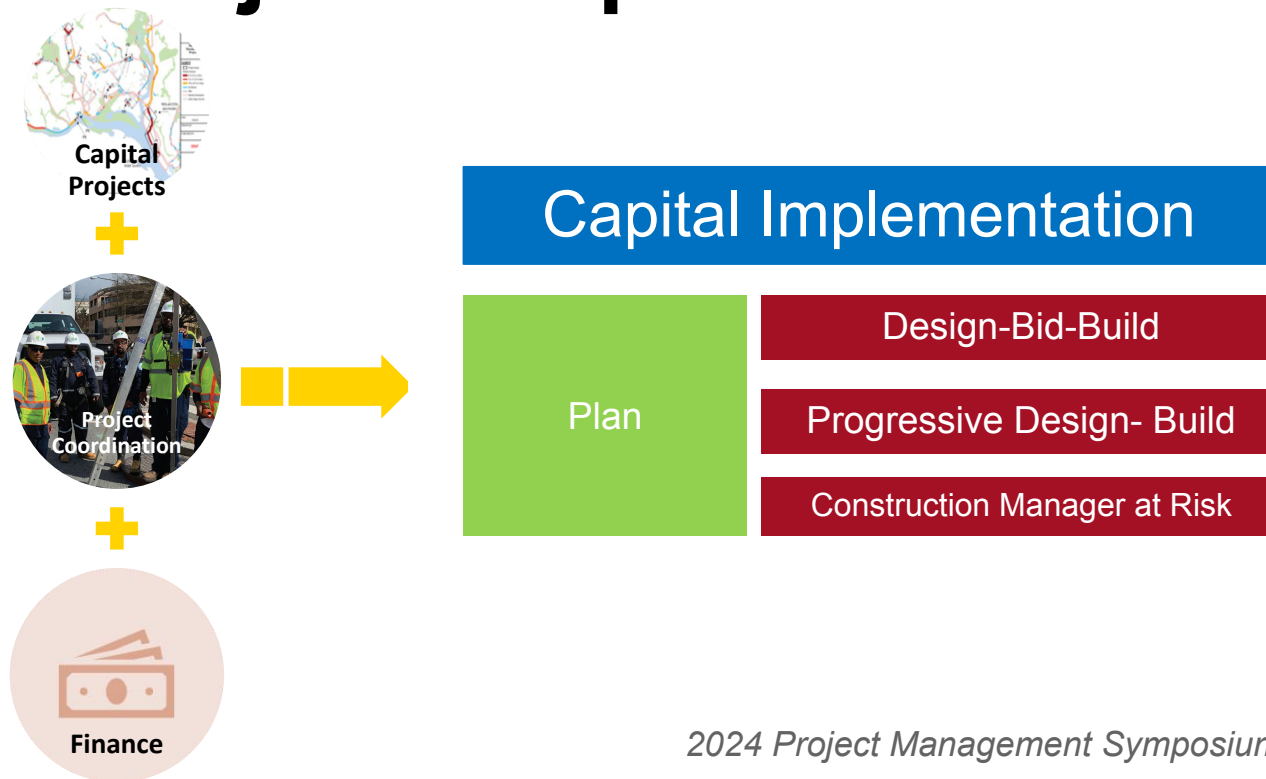
# PM Experience & Engineering Judgement

Consequence of Failure (COF) and Likelihood of Failure (LOF)  
Sewer- Diameter Distribution

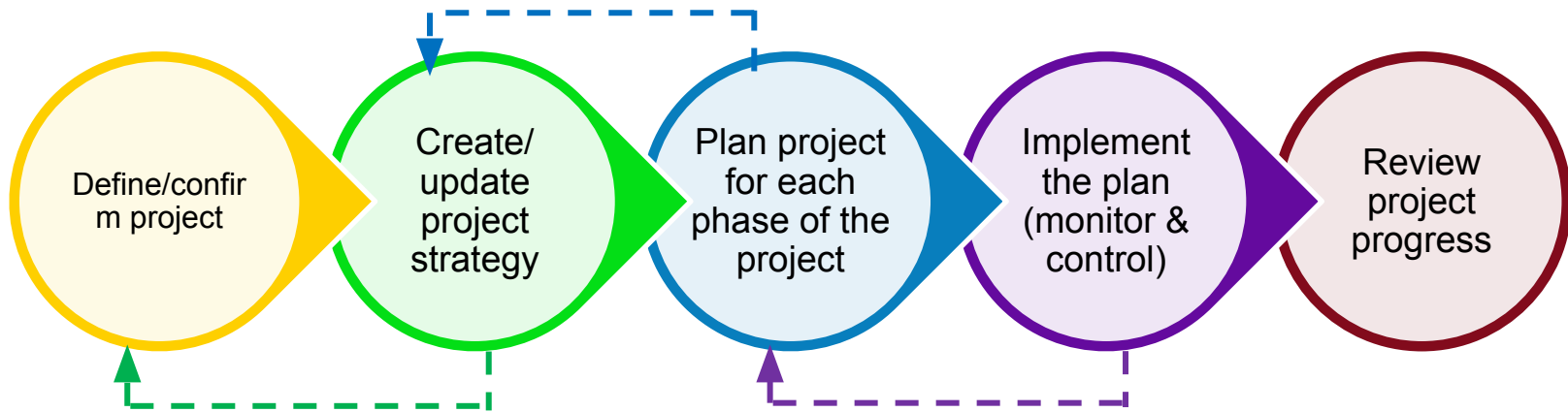




# Capital Projects Implementation Plan



# Project Management Process



Revise, when  
needed







# Best Practices to maximize Project Success



Establish clear objectives and goals



Data driven decision making



Lifecycle approach to managing assets



Risk management and contingency planning



Collaboration & stakeholder engagement



Compliance regulatory adherence



Performance metrics and KPIs



Continuous improvement



Regular review and reporting



# Metrics

- Mission:
  - Provide high quality water services in a safe, environmentally friendly, and efficient manner.
- Strategic Imperatives:





# Metrics

METRIC	TARGET	BLUEPRINT ALIGNMENT
CSS Structures Inspection	100%	Reliable; Resilient
MS4 Area Catch basins Cleaning/Inspections	100%	Reliable; Resilient
CSS Area Catch basins to Anacostia – Cleaning/Inspections	100%	Reliable; Resilient
Non-Anacostia CSS Area Catch Basins – Cleaning/Inspections	85%	Reliable; Resilient
Sewer Cleaning and Inspection (Miles)	>12	Reliable; Resilient
Sewer Backup (Investigation to Resolution)	>95%	Health, Safe and Well; Reliable
Sanitary Sewer Overflow	1.4 per 100 Miles	Health, Safe and Well; Reliable
Combined Sewer Overflow	0	Health, Safe and Well; Reliable
Firm Pumping Capacity Maintained	100%	Reliable; Resilient
Reactive Maintenance	<20%	Reliable; Resilient
Critical Asset Availability	95%	Reliable; Resilient

Program/  
Projects/Activities

Performance  
Goal: more  
than 12 miles  
per month

Alignment  
to Strategic  
Plan

Sewer Cleaning and Inspection  
(Miles)

>12

Reliable; Resilient





# Project Manager's KPIs

- Design and Construction Start Milestones
- Construction Substantial Completion Milestone
- Miles of pipes replaced or rehabilitated per year
- Miles of pipes inspected per year
- Schedule and Cost variance





# Dashboards

Power BI Apps

Home

Create

Browse

OneLake data hub

Apps

Metrics

Monitoring Hub

Deployment pipelines

Learn

Workspaces

My workspace

Power BI

Apps

Apps are collections of dashboards and reports in one easy-to-find place.

View Sort Filter by keyword Filter

**Local Sewer Rehab**  
Dashboard for viewing local sewer progress

Owner: Tyler Henderson  
1/11/24, 1:26:11 PM

**FY23-32\_CIP**  
Projection from FY23 to FY32 for the purp...

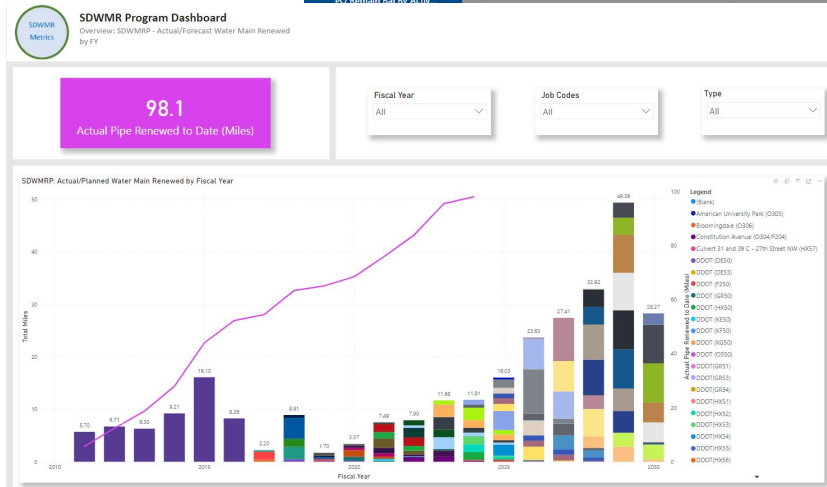
Owner: Zelalem Hailu  
6/13/22, 12:05:16 PM

**FY24 Detailed CIP Disbursement**  
CIP Disbursement for FY23 with Actuals to...

Owner: Zelalem Hailu  
12/28/23, 2:35:10 PM

**SDWMR Metrics**  
SDWMR Metrics Dashboard

Owner: Zelalem Hailu  
3/16/23, 2:15:19 PM





# SDWMMR Program Dashboard

Overview: SDWMMR - Actual/Forecast Water Main Renewed by FY

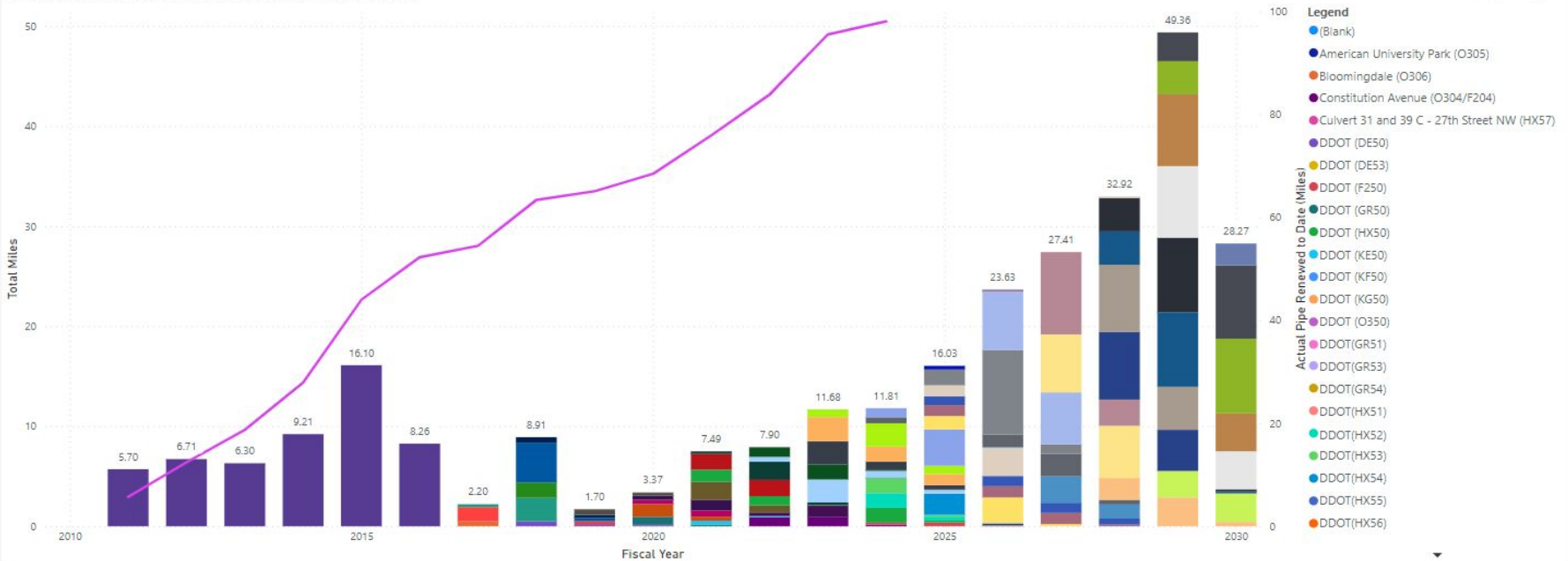
98.1  
Actual Pipe Renewed to Date (Miles)

Fiscal Year  
All

Job Codes  
All

Type  
All

SDWMMR: Actual/Planned Water Main Renewed by Fiscal Year





Power BI Apps

Home

Create

Browse

OneLake data hub

Apps

Metrics

Monitoring hub

Deployment pipelines

Workspaces

My workspace

Power BI

CP Spending Report 2024

## FY24 Detailed CIP Disbursement

Disbursement

FY24 CIP Detailed Disburs...

**By Service Area**

By Program

By Project

By Job

By Activity

Contract Summary

By Contract and Activity

By Manager

By PO Nr

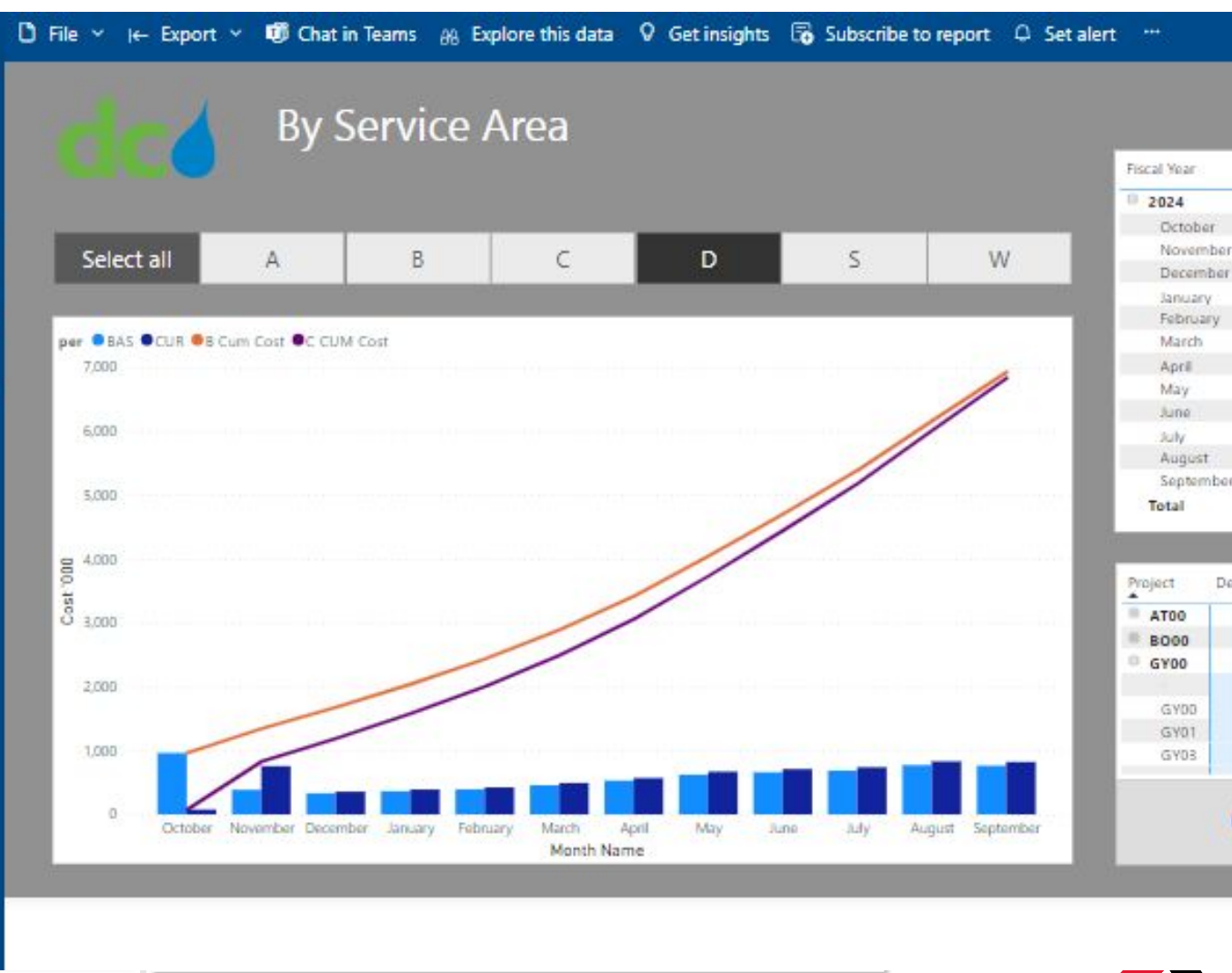
PO Remain Bal By Activ...

PO Remain Bal By PO#

Owner: Tyle 1/11/24, 1:2

FY24 Deta CIP Disburse

Owner: Zela 12/28/23, 2:



# Reporting

## Key Performance Indicators

Metric	Target/Service Level	Sept-23	Oct-23	Nov-23
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### Sewer Operations

Combined Sewer System (CSS) structures (all outfalls, regulators, tide gates) inspections	100%	100%	100%	100%	100%
* Municipal Separate Stormwater System (MS4) requirement to clean all catch basins in the MS4 Permit Area at least once annually (Jul 01- Jun 30)	14,700	168			
* Inspection of catch basins in the CSO Anacostia tributary area at least twice per year (Jan 1- Dec 31)	11,400	2381			
* NPDES Permit to Clean and Inspect 85% of 10,700 CSS Area C/B (Jan 1- Dec 31)	9,095	2651			
Miles per month Sewer Cleaning and Inspection to meet 1,400 Miles of Small Diameter (<12 inches) in 10Yr Cycle	>12	10.33			
Sewer Backup (Investigation to Resolution) Within 24 Hours Excluding Line Breaks	>95%	100%			

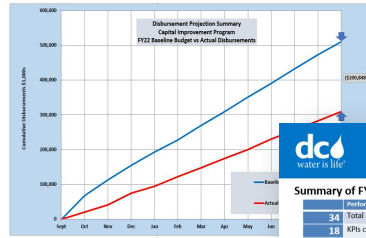
## CIP Quarterly Update

### FY22 CIP Disbursement Performance

The program disbursements through the end of the fiscal year compared with the approved FY22 baseline budget are shown in the chart (right).

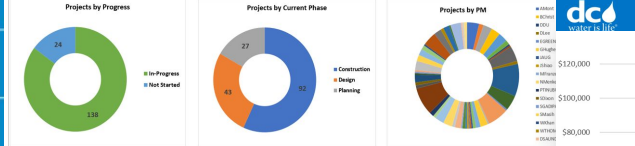
The fiscal year 2022 CIP disbursements were \$309M through the end of September 2022 compared to the approved baseline budget of \$510M.

Baseline projection for FY23 developed and action plan in place to better align the execution with the baseline.



## CIP FY23 Overview

- There are a total of 266 projects in the 10-year Capital Improvement Program, with 162 active in FY23
- The current FY23 forecast is \$386M, to be expended across 162 Projects, of which 138 are currently in-progress, and 24 are expected to commence in FY23
- Of the 162 projects, 27 are in the Planning/PM phase, 43 in Design/Procurement, and 92 in the Construction phase
- There are over 50 project managers overseeing each phase of multiple projects



There are a total of 62 committed Construction Contracts with forecast \$221.5M spending in FY23  
Total of 67 committed Agreements (Design/CM Services/BOAs/PM) with forecast \$111.9M spending in FY23  
Total of \$53M of forecast spending in FY23 remaining to be committed

## Schedule - Key Performance Indicators

Summary of FY22 Key Performance Indicators (KPIs):

Target	Actual
34	31
18	18
16	16

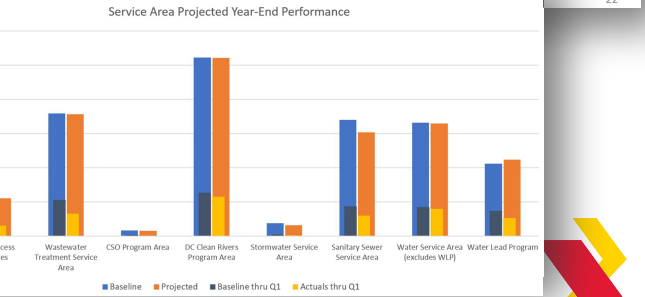
Q4 KPIs achieved within the 90-day threshold:

Job	Job Name	KPI type
J202	LDWM Replacement 3b	Design Start Milestone
KH01	Small Diameter Water Main Rehabilitation Z1	Design Start Milestone
NG05	Stormwater Pump Station Rehab - 1st and D	Construction Start Milestone

Q4 KPIs not achieved within the 90-day threshold:

Job	Delta	Comment
MC01	-802	Sewer System SCADA work was re-prioritized with a delayed start. Ongoing work resulted in modifications to the originally planned scope of work.
IB02	-152	Large Valve Replacements construction was not completed on time due to contractor delays.
F304	-162	SDWM Construction completion date was not met due to delays including DDOOT 1200 IF restriction.

## FY22 Performance by Service Area





# Conclusion: Integrating Strategies for Success

- SPs, AMPs & project execution are interconnected at strategic, tactical, & operational levels to effectively translate organizational goals into action.
- Integration and alignment across these levels enable organizations to optimize resources, manage risks, and achieve sustainable success.
- The project manager plays a key role in aligning projects with organizational goals.
- Effective integration of strategies ensures project sustainability and

# Maximizing project success requires the PM to

- Understand and solicit support from internal and external stakeholders.
- Manage knowledge to leverage collective expertise and information.
- Contribute to the unified information repository for assets throughout the organization.



# Questions?

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202.787.2045





# Evaluate Session

