

**Biosolids Digester Facilities Project
Installing Rebar Cage for Slurry Wall**

Overview of Project Controls System for Delivering a Mega Project in San Francisco

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Program Controls Manager

September 2023



San Francisco
**Water
Power
Sewer**

 **Project Controls
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Washington, DC - USA

San Francisco Public Utilities Commission

Water



Power



Sewer



Infrastructure: Mission, Roles, and Responsibilities

Mission:

To effectively plan and implement capital improvements to the Water, Wastewater and Power Systems of the SFPUC in order to continue to provide high quality utility services to our customers.

Roles and Responsibilities:

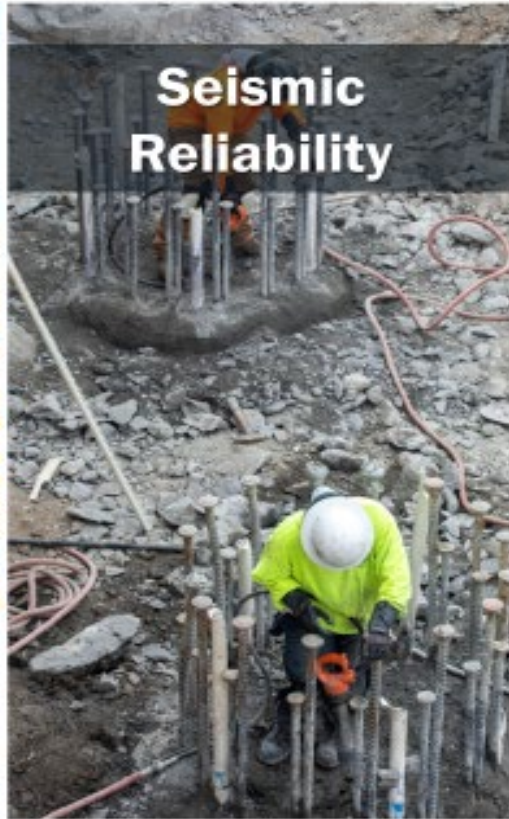
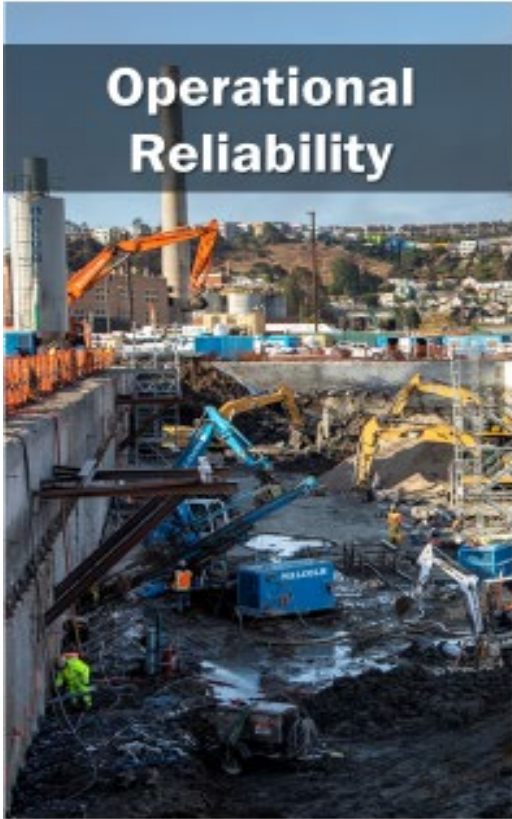
To manage the planning, design and construction of the capital programs of the SFPUC, as well as the repair and replacement of its water, wastewater and power enterprise facilities.



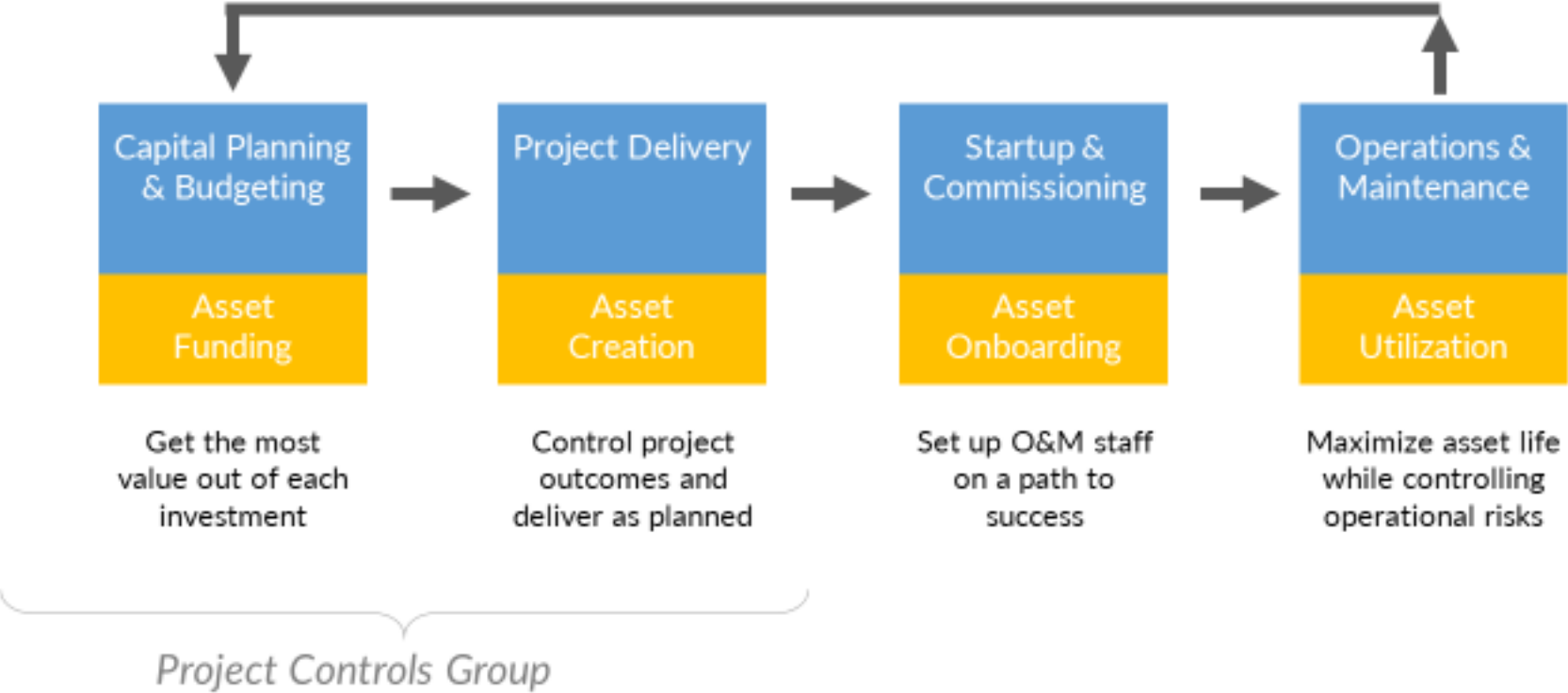
PROGRAM CONTROLS GROUP FUNCTION



Capital Plan – Project Drivers

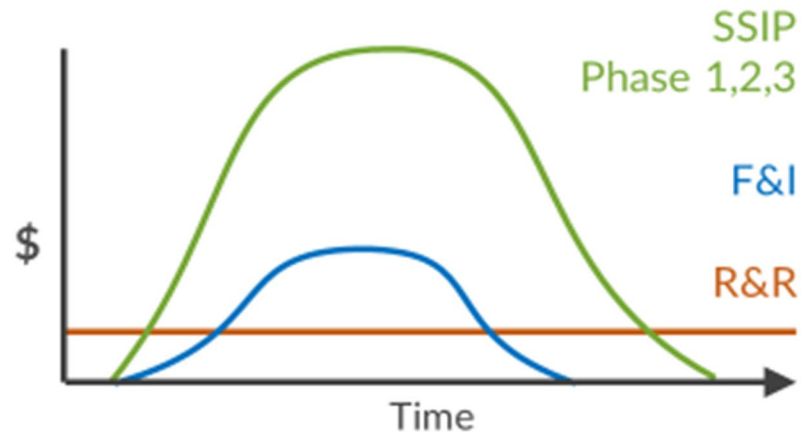


An integral part of the never-ending asset lifecycle

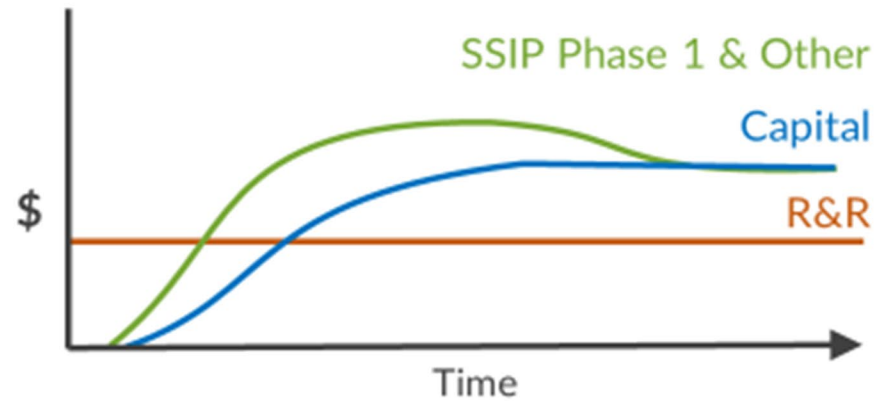


Move from a one-time large investment to a more sustainable strategic capital planning approach

One-time Large Investment
(previous)



Adaptive Management
(moving forward)



Sewer System Improvement Program (SSIP)

Facilities & Infrastructure (F&I)

Renewal and Replacement (R&R)

Capital Planning Strategy

Adaptively managed for sustainable delivery



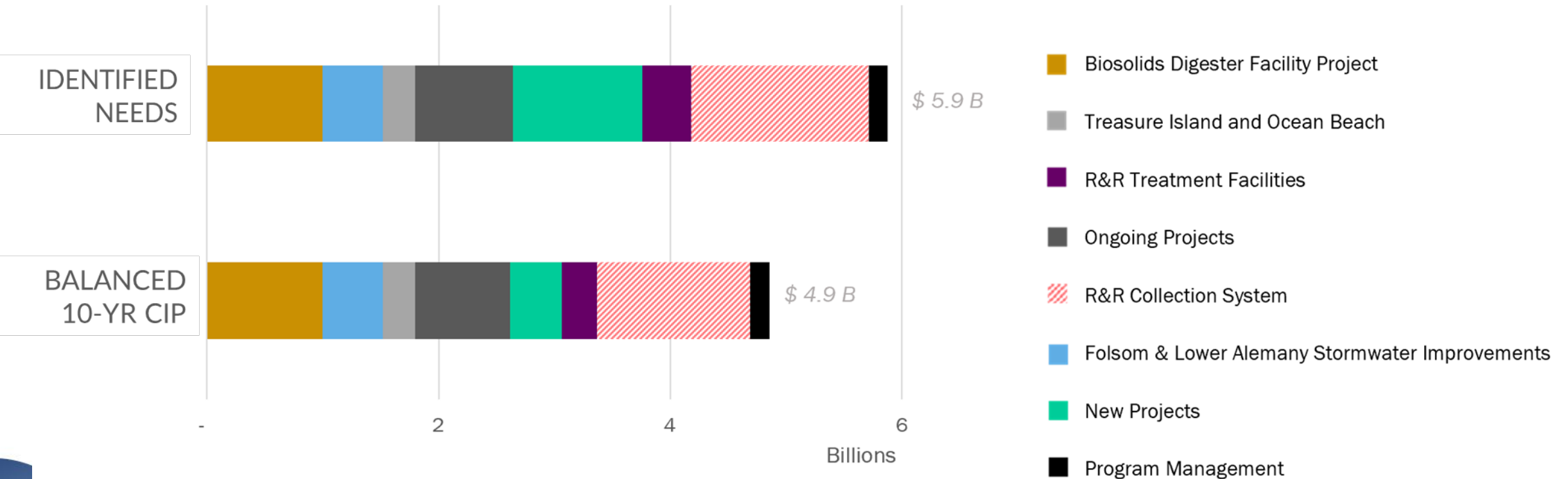
Capital Plan Deliverability Challenges

- Ensure projects could be initiated, implemented and received on schedule, within budget, and of high quality
- Performed in-depth Deliverability Reviews:
 - Inform capital planning / 10-Yr CIP budgets
 - Competing priorities
 - Identify resource and functional gaps
 - Enhance project delivery processes (across a project's lifecycle continuum) to best align with our asset management framework
- Affordability continues to be the major constraint on delivering routine investments needed in the system in the 10-Year CIP



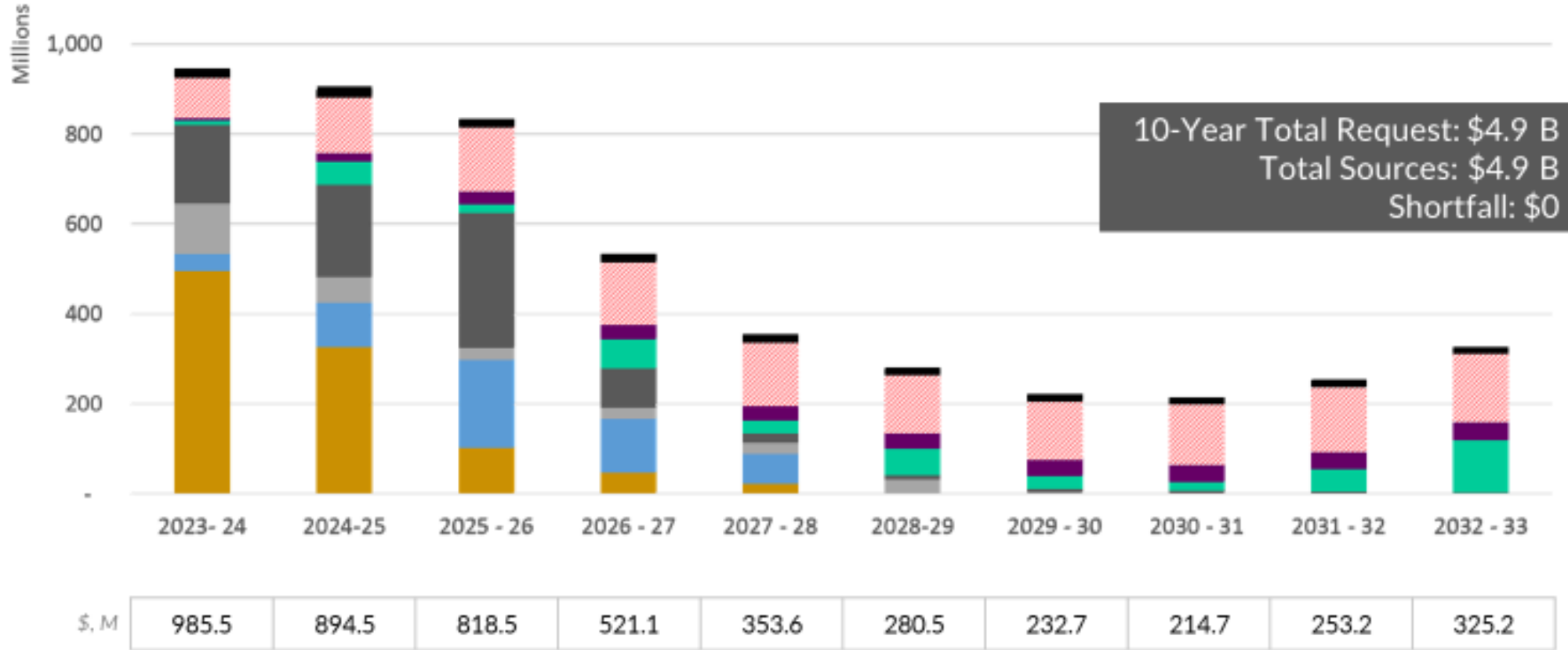
Prioritizing & Customer Affordability

Minimize rate increases while meeting additional projected regulatory requirements



Appropriation: FY 24-33 Capital Plan

■ BDFP
 ■ CAO (Folsom & Alemany)
 ■ TI & OB
 ■ Ongoing Projects
 ■ New Projects
 ■ R&R Treatment
 ■ R&R Collection
 ■ Program Mgmt



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SFPUC Capital Improvement Programs

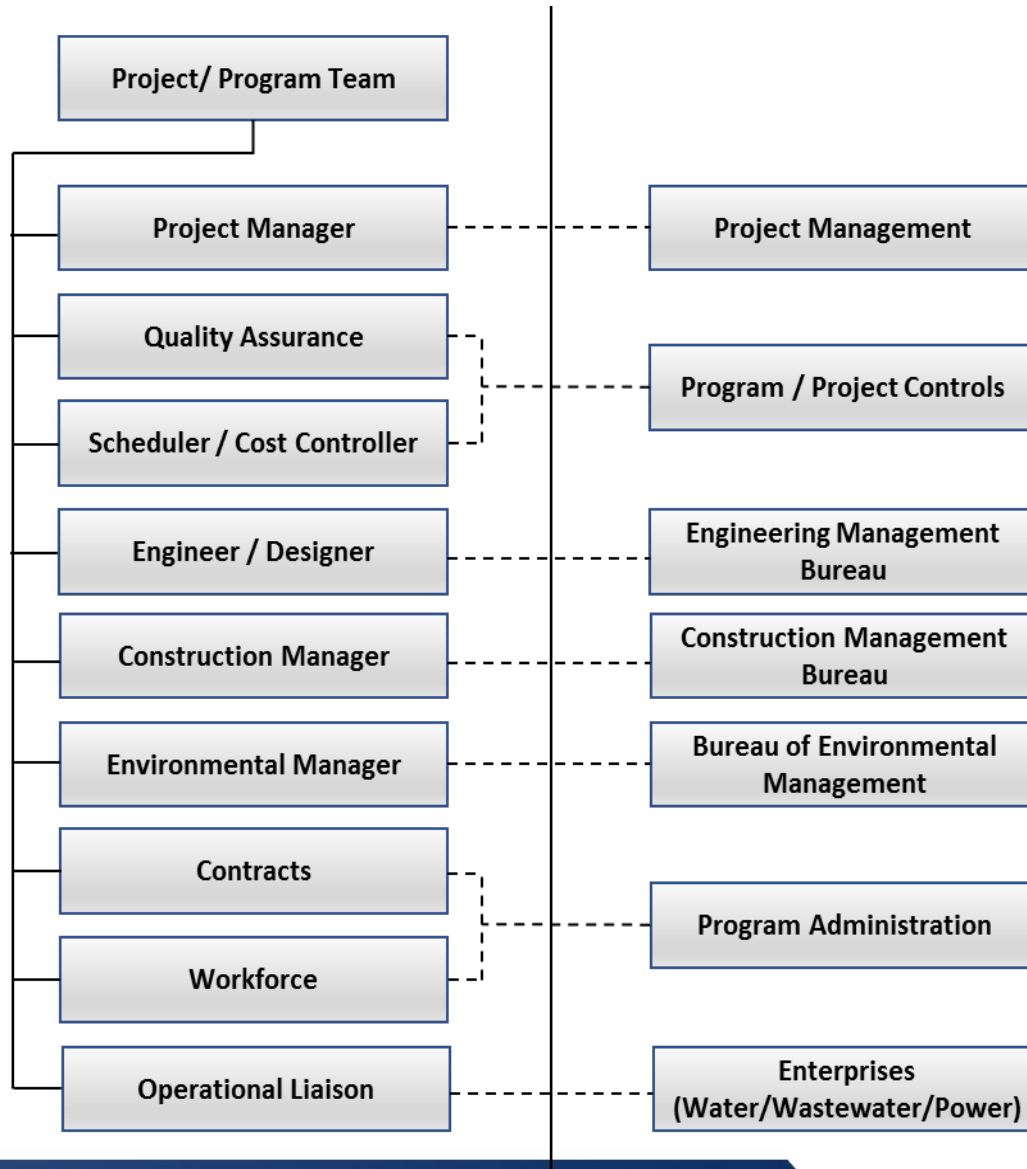
PROGRAM	COST	DURATION	BEGIN	END	COMPLETION STATUS
WSIP (Water System Improvement Program)	\$4.8 Billion	24 Years (4 Years Remaining)	2003	2027	97%
SSIP (Sewer System Improvement Program)	\$8.4 Billion	24 Years	2010	2034	Ongoing
Power	\$1.0 Billion	26 Years	2008	2034	Ongoing
EFWS (Emergency Firefighting Water System)	\$254 Million	Ongoing	--	--	Ongoing
HCIP (Hetchy Capital Improvement Program)	\$1.7 Billion	23 Years	2011	2034	Ongoing
Water Regional CIP and Repair & Replacement	\$2.1 Billion	28 Years	2006	2034	Ongoing
Water Local CIP and Repair & Replacement	\$2.3 Billion	31 Years	2003	2034	Ongoing
Wastewater Repair & Replacement and Spot Sewer Repair	\$171 Million/Yr	Ongoing	--	--	Ongoing



Project Delivery Approach

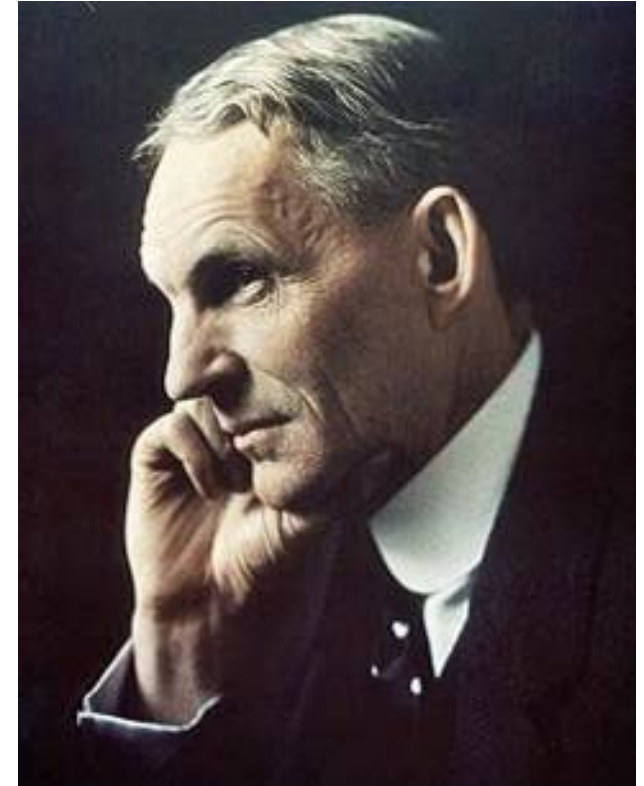


Project Team Matrix Approach

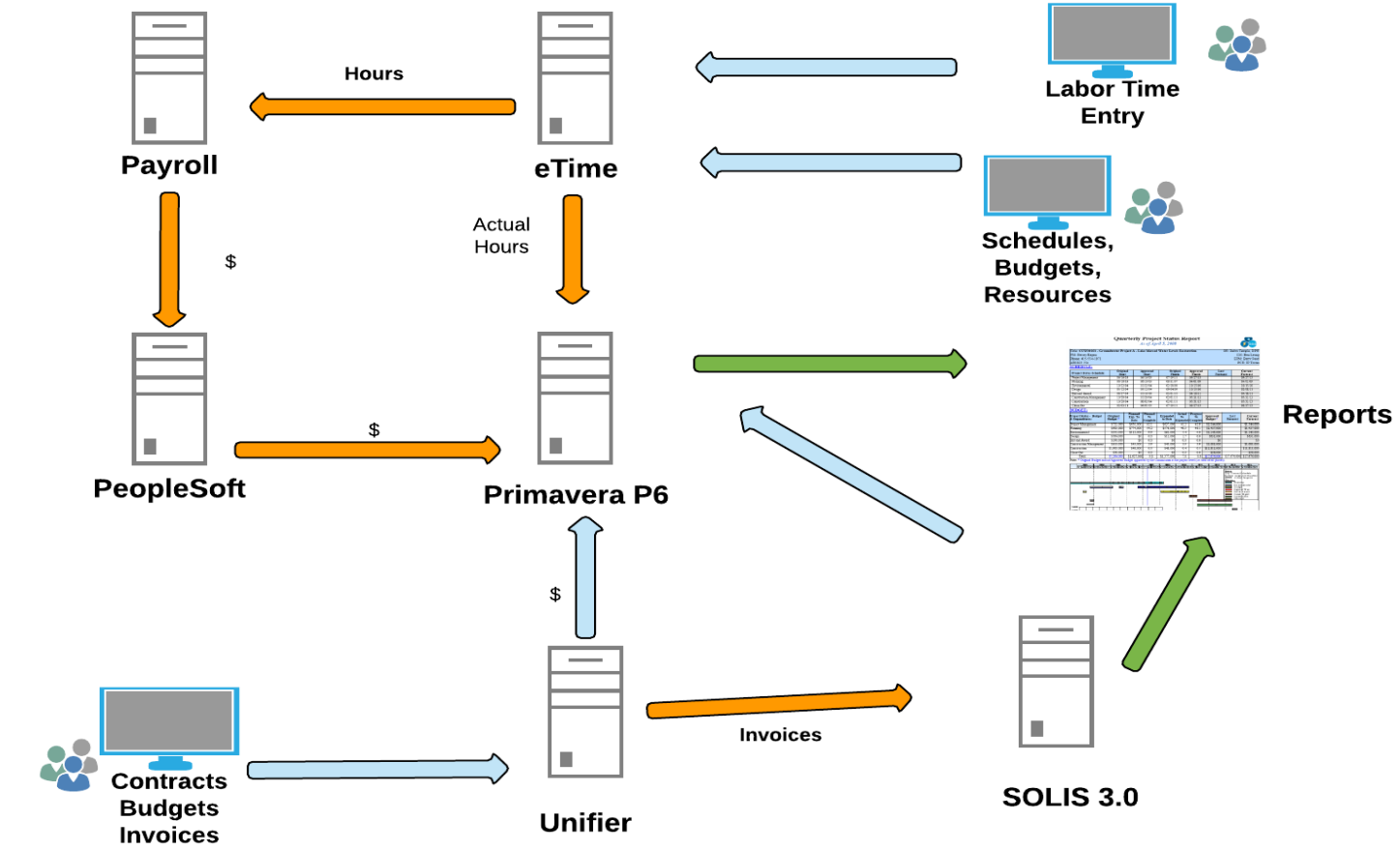


*“Coming together is a beginning.
Keeping together is progress.
Working together is success.”*

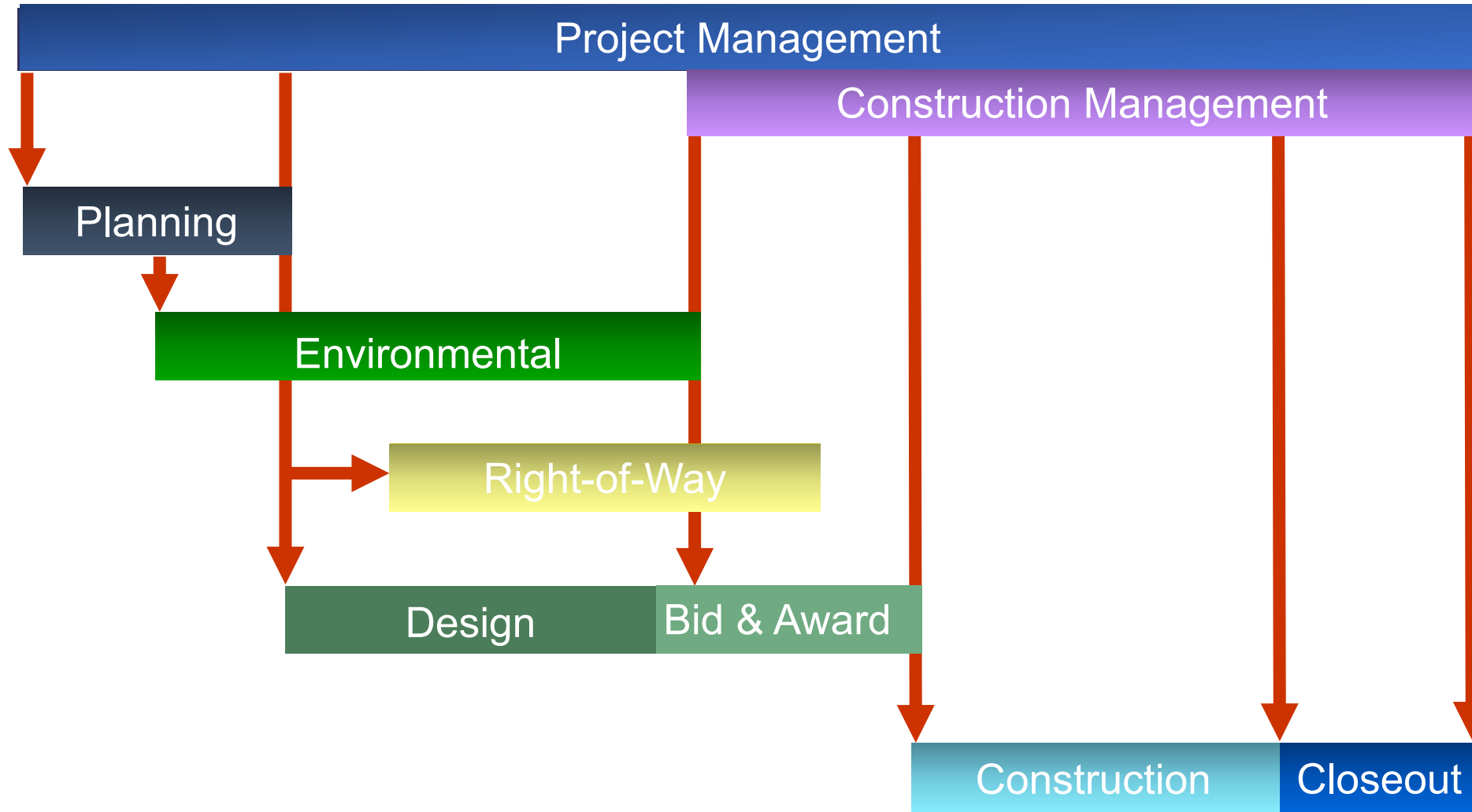
- Henry Ford



SFPUC Program Controls System



Project Phases

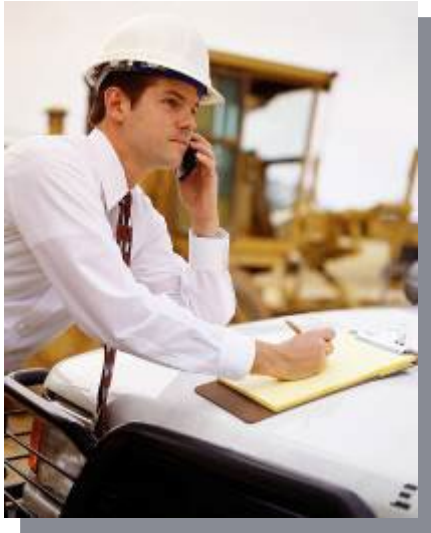


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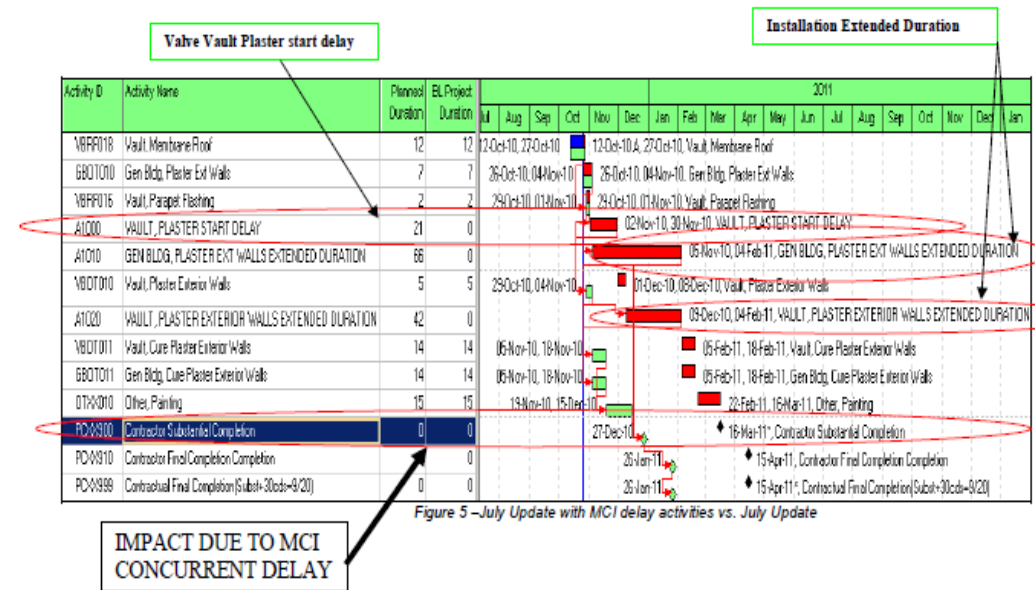
Cost and Schedule Controls



- Baseline Budget & Schedule
- Forecasting for all project phases
- Monitor progress vs. Baseline
- Analyze Critical Path activities
- Recommend corrective measures to mitigate delays
- Look-ahead schedules
- Shutdown schedules
- What-if Scenarios
- Close out

Construction Support – CPM Scheduling

- Review and Approve Baseline CPM Schedule
- Review Monthly Updated Schedule
- Recovery Schedules
- Time Impact Analysis
 - Submitted by Contractor to request time
 - Reviewed by PCE for merit

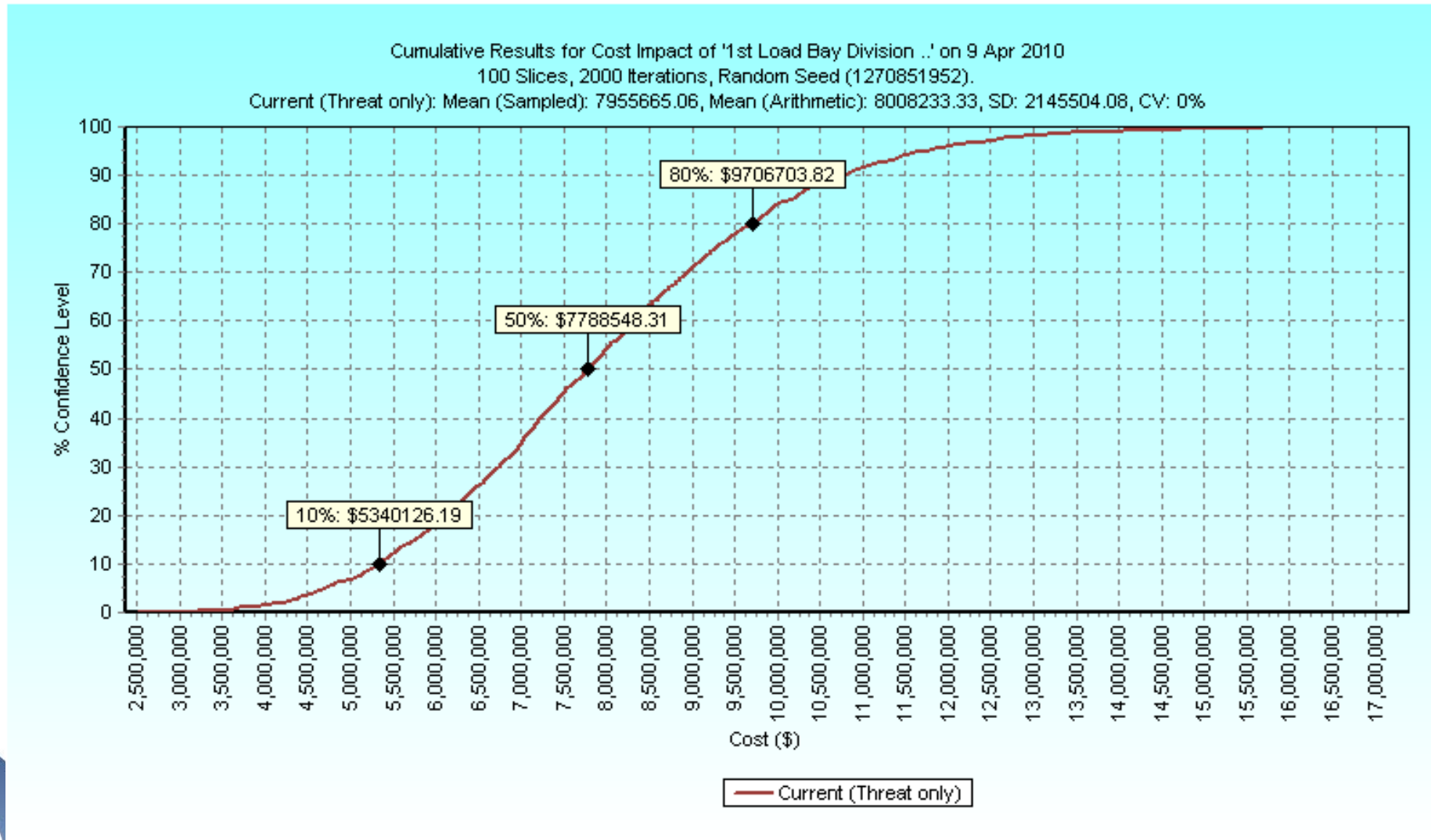


Change Management



- Controlling scope creep
- Baselines used to evaluate changes and Identify impacts
- Authority levels for change control – use of approval ladder
- Use of Change Control Board
- Tracking trends & change orders against contingencies during construction

Risk Analysis - 80% Confidence Level



Performance Measures

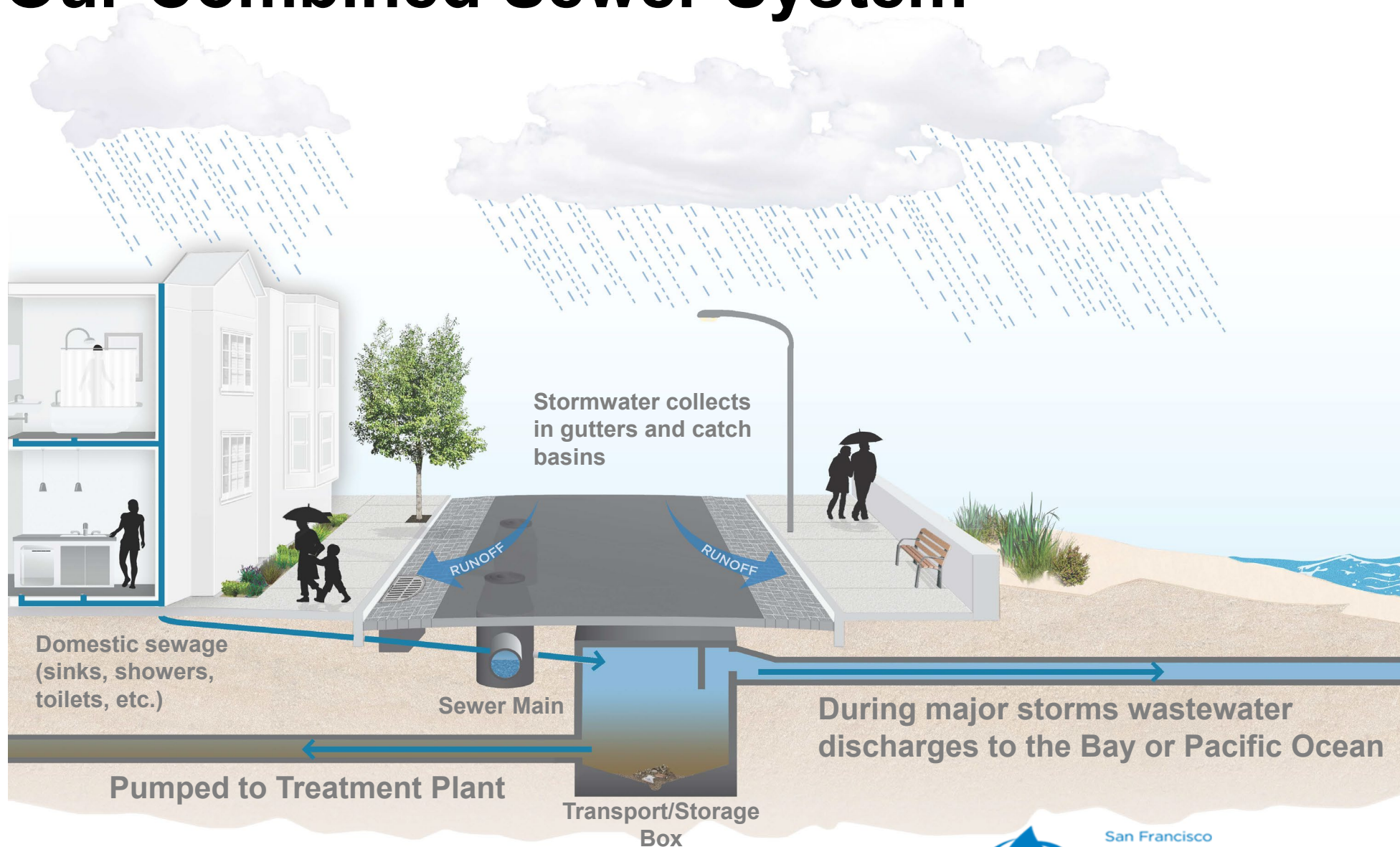
- Use of Earned Value Management (EVM) method
- Estimating of program's budget and schedule at completion
- Validation of PMs' assessment of their project budget and schedule status and forecasts at completion

Current Forecast At Completion	Estimate At Completion	Earned Value Cost	CPI	SPI
\$4,385,578	\$4,425,099	\$3,508,869	0.86	0.90
\$4,385,578	\$4,425,099	\$3,508,869	0.86	0.90
\$4,385,578	\$4,425,099	\$3,508,869	0.86	0.90
\$4,385,578	\$4,425,099	\$3,508,869	0.86	0.90
\$4,385,578	\$4,425,099	\$3,508,869	0.86	0.90
\$0	\$0	\$0	0.00	0.00
\$0	\$0	\$0	0.00	0.00
\$1,046,661	\$1,108,338	\$943,303	0.98	0.88
\$400,600	\$400,600	\$402,177	1.00	1.00
\$100,803	\$100,803	\$150,385	1.49	1.00
\$91,039	\$91,039	\$121,220	1.33	1.00
\$134,601	\$134,601	\$108,608	0.81	1.00
\$276,081	\$273,968	\$160,913	0.68	0.86
\$168,218	\$166,629	\$77,717	0.54	0.87
\$107,864	\$107,339	\$83,196	0.90	0.86

Sewer System Improvements



Our Combined Sewer System



Our Combined Sewer System

Legend

- Pump Stations
- Treatment Facilities
- ▬ Deep Water Outfalls
- ▬ Transport/Storage Structures
- ▬ Tunnels
- ▬ Force Mains
- ▬ Ridgeline
- ▬ Watershed Boundaries



North Point Wet Weather Facility



Oceanside Treatment Plant



Southeast Treatment Plant



SWOO



100-year-old system: 1,000 miles of pipes, 3 treatment plants and 27 pump stations

Wastewater Enterprise (WWE)

WWE operates and maintains
3 wastewater treatment plants,
1 wet-weather facility,
27 pump stations,
1,900 miles of sewer mains and laterals, and
25,000 catch basins to protect public health
and the environment.

WWE facilities process **70 million gallons per day (mgd)** of dry weather flows and have **575 mgd** of wet weather treatment capacity.



SSIP Levels of Service Goals

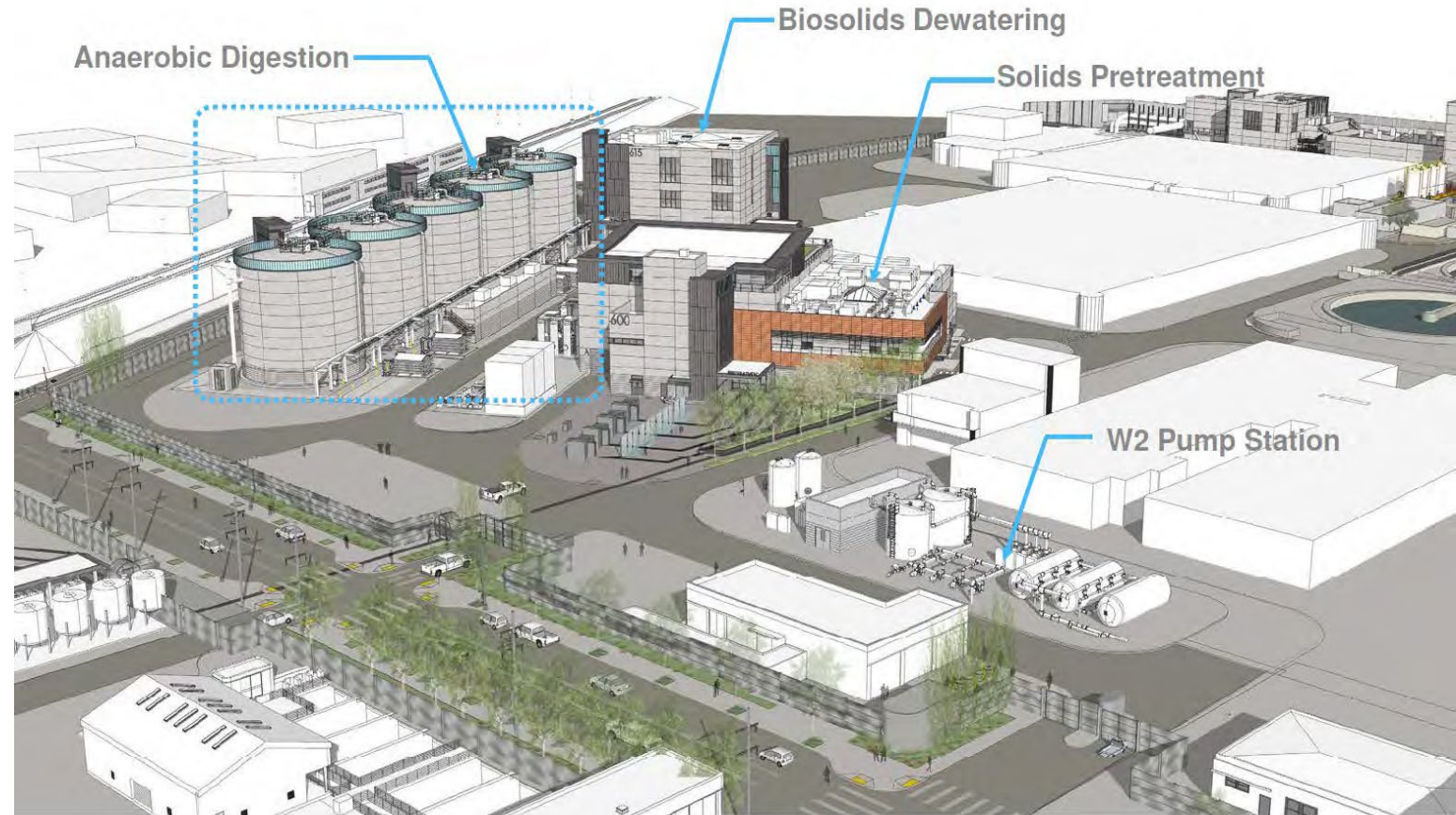
- Provide a Compliant, Reliable, Resilient, & Flexible System that can Respond to Catastrophic Events
- Integrate Green & Grey Infrastructure to Manage Stormwater
- Provide Benefits to Impacted Communities
- Modify the System to Adapt to Climate Change
- Achieve Economic & Environmental Sustainability
- Maintain Ratepayer Affordability

Biosolids Digester Facility Project



Delivery Approach and Key Features

- Delivery Approach: Construction Manager/ General Contractor (CM/GC)
- Replace and relocate the outdated existing solids treatment facilities with more reliable, efficient, and modern technologies
- Reduce Number of Digesters from 9 to 5
- Improve biosolids treatment quality from Class B to Class A for more beneficial uses
- Limit odors to within the Southeast Treatment Plant fence line
- World Class Facility



Project Status as of June 2021

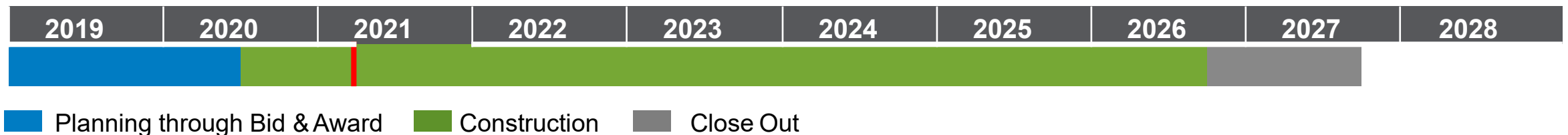
Project Cost: \$1,680.8M

Progress and Status:

- Completed Scope I, demolition and utility relocation of the existing infrastructure in 2021
- Scope II construction was in progress
- Bids came in higher than expected – SFPUC suspended bid procurement activities to reassess bidding and project delivery approach



Project Schedule:



Project Status as of October 2021

- Continued with Construction Manager/General Contractor (CM/GC) delivery approach
- Maintained latest CM/GC approach for scoping and competitive bidding of the work
- Coordinated with the contractor on bid strategy and estimated budget for remainder of project



Project Status as of March 2023

Project Cost: Increased from \$1,681M to \$2,373M

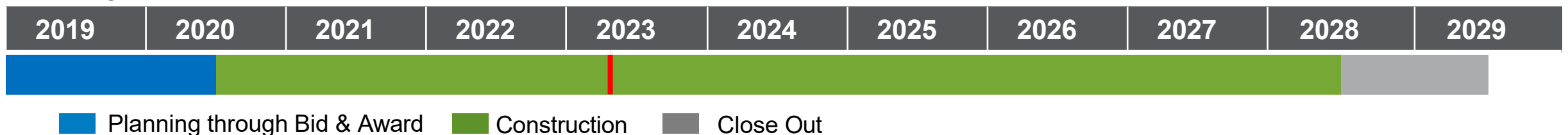
- Cost increased due to market conditions

Progress and Status:

- Completed piles.
- Construction of digester vessels were underway.
- Schedule extended by 23 months due to suspension of bidding activities in 2021, site logistics/construction sequencing and competitive bid procurement process.



Project Schedule:



Project Status as of June 2023

Project Cost: \$2,373M

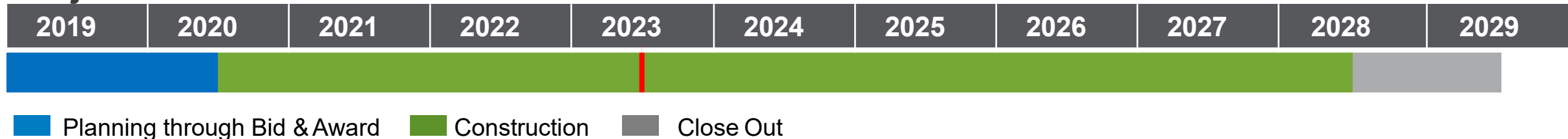
Progress and Status:

- Construction of the five digester vessels continues and concrete placement of upper basement decks and walls are in progress
- Construction of solids pretreatment building is continuing with the completion of the mat slab and waterproofing of the exterior walls
- Construction is underway at the biosolids dewatering building and ancillary facilities and utilities



Aerial drone view of digester tanks

Project Schedule:





June 7, 2023: Biosolids Digester Facilities Project: First digester core wall pour.





June 7, 2023: Biosolids Digester Facilities Project: First digester core wall pour. Worker signaling to crane operator -rebar lift.





Digester Tank No. 4 core wall pour in the early morning hours of July 19th, 2023.







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THANK YOU

