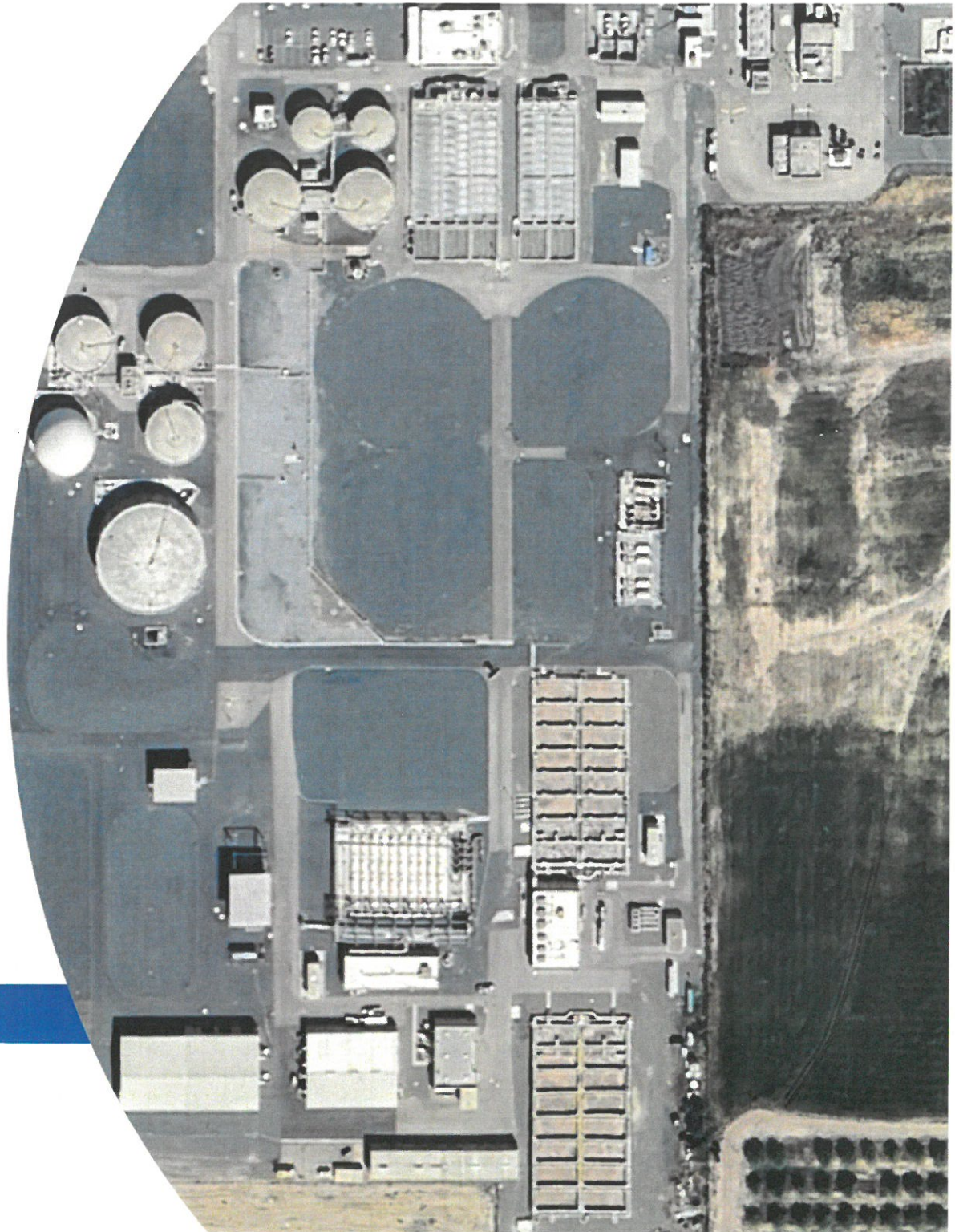


City of Visalia

Visalia Water Reclamation Facility

**Master Plan Update
Council Presentation**

6/17/2024



01

Background and Purpose

Project Background

- A biological process model was developed and calibrated to current WRF flows and loads.
- The Facility Plan (previous presentation) was the first step to determine the current condition and capacity of the WRF.
- This Master Plan Update is an effort using the biological process model along with growth projections to plan for future improvement projects required to support growth.
- This plan provides capital improvement projects for a 20-year planning horizon.



Figure 3.1 Visalia Water Reclamation Facility Current Process Flow Diagram

Site Overview

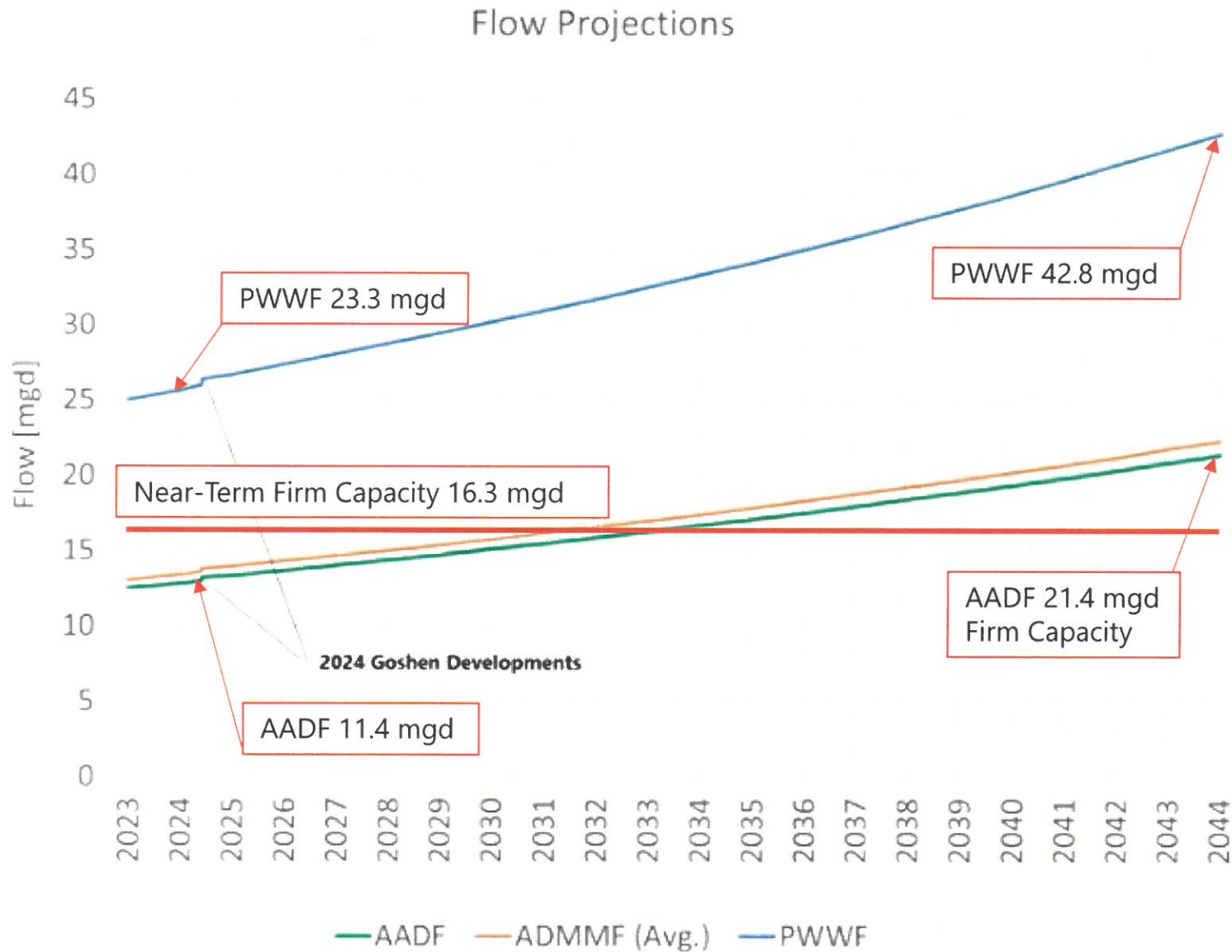


Figure 3.2 Existing Site Layout

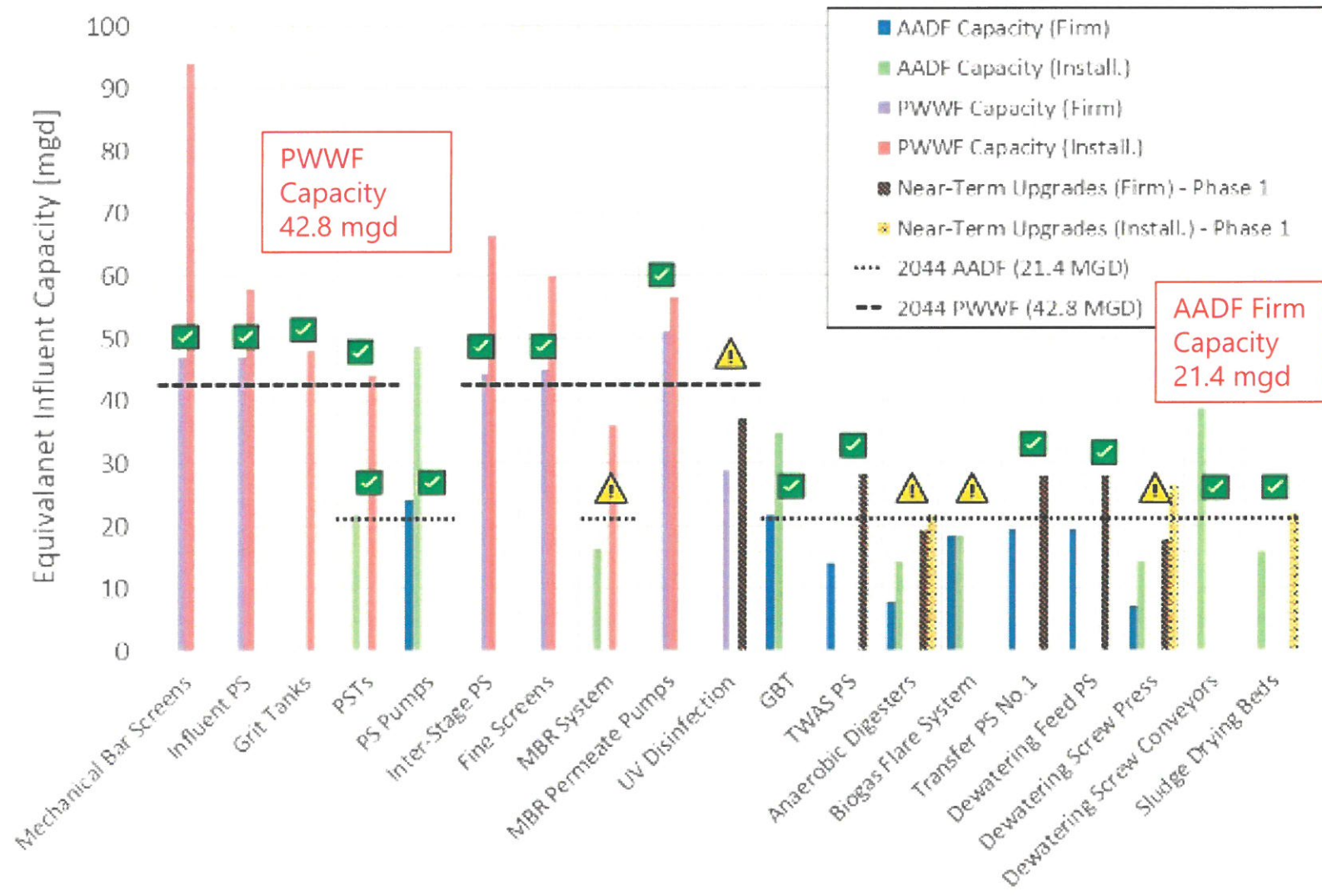
02

Long-Term Treatment Process Performance

2044 Flow Projections

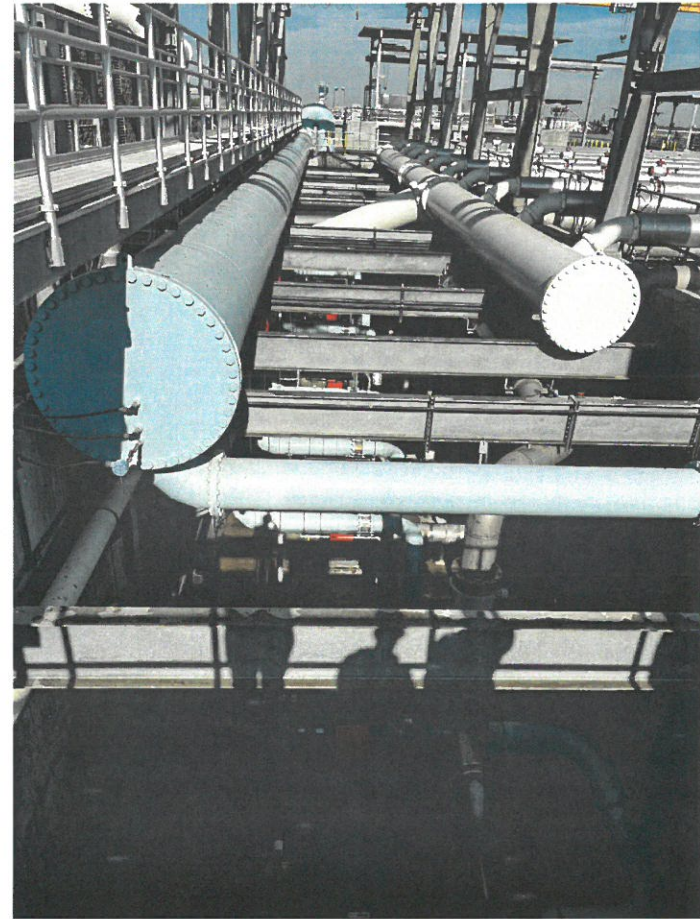


Unit Process Capacities



MBR System Improvements

- Improvement year 2031.
- Additional RAS Pump, Aeration Blower, Membrane cassettes, IMLR Pump Flow Capacity Increase, and Membrane Tank Upgrade
- Improvements required to provide adequate MBR capacity.



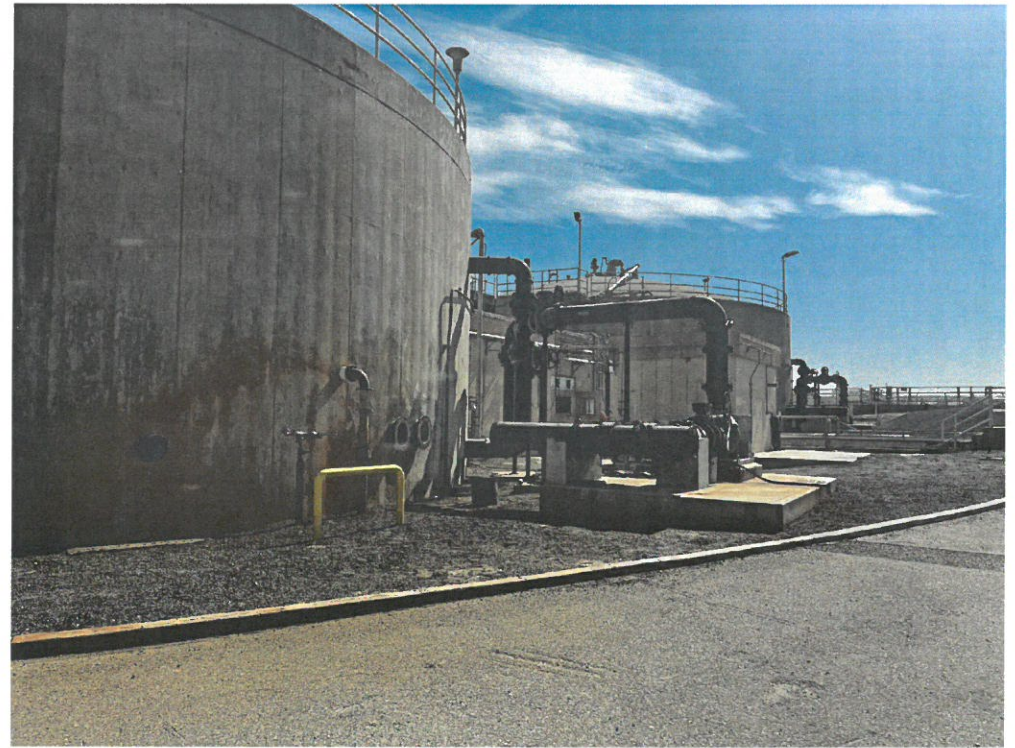
Ultraviolet (UV) Disinfection System Improvements

- Improvement year 2036
- Construct a third UV system channel with space for seven banks (6+1 spare) to provide needed disinfection of high flows.
- This includes necessary piping and electrical for implementation



Anaerobic Digestion Improvements

- Improvement year 2035
- Construct new Digester No. 10 1.94 MG capacity. Needed for proper hydraulic retention time and pathogen reduction
- Construct a sludge storage tank with 1.13 MG capacity. Allows for storage of sludge providing flexibility of solids handling.



Digester Gas Flare System Performance

- Improvement year 2035
- The project includes installing a higher capacity flare to provide for gas disposal when generator is down
- Upsize digester piping
- Bypass piping for the gas conditioning
- All associated appurtenances and electrical



Dewatering Capacity Enhancements

- Improvement year 2034
- Construct a 4th dewatering screw press to provide dewatering capacity
- All associated piping and electrical



CIP Schedule

Long-Term Projects CIP Schedule										Design				Bid/Award Contract				Construction/Startup																											
Project	Total Project Cost ⁽¹⁾⁽²⁾	Year																																											
		2028				2029				2030				2031				2032				2033				2034				2035				2036				2037				2038			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
Membrane Bioreactor Capacity Expansion	\$14,750,000																																												
UV Disinfection System Capacity Expansion	\$7,830,000																																												
Anaerobic Digestion Capacity Expansion	\$56,950,000																																												
Biogas Flare Capacity Expansion	\$7,000,000																																												
Dewatering Capacity Expansion	\$6,210,000																																												
Notes:																																													
(1) Total project cost includes total construction cost plus an assumed 25 percent for associated costs for engineering, legal, administrative, permitting, and construction management for implementing the project.																																													
(2) The costs are presented in 2024 dollars. Note that capital costs presented are for planning purposes. These costs do not include mid point escalation or bid market allowance.																																													

03

Regulatory Review

Regulatory Review

- WRF currently produces high quality effluent
- The City currently has 8 effluent disposal locations, including TID, farmland, and recycled water at the airport.
- Future regulations:
 - » CV-SALTS salinity and nitrate level in the groundwater basin
 - » Constituents of emerging concern (PFAS)
- Recycled water regulations:
 - » Non-potable reuse (currently permitted for)
 - » Indirect potable reuse (IPR)
 - » Direct potable reuse (DPR)
- Biosolids Regulations:
 - » Senate Bill 1383 and Assembly Bill 901
 - » Class B land application banned in Tulare County

04

Long-Term Capital Improvement Program

20-Year CIP Cost Table

Table 5.2 Total Project Capital Cost for Recommended Projects

Project	Cost ⁽¹⁾
MBR Capacity Expansion	\$14,750,000
UV Disinfection System Capacity Expansion	\$7,830,000
Anaerobic Digestion Capacity Expansion	\$56,950,000
Biogas Flare Capacity Expansion	\$7,000,000
Dewatering Capacity Expansion	\$6,210,000
Total	\$92,740,000

Notes:

- (1) The costs are presented in 2024 dollars. Note that capital costs presented are for planning purposes. These costs do not include mid-point escalation or bid market allowance. Current market conditions suggest large rates of cost escalation and high rates of variance in construction bidding. It is suggested that an escalation rate and bid market allowance be added to capital costing efforts as project development becomes more refined. Total project costs include factors for estimating contingency, sales tax, general conditions, and contractor overhead and profit as well as 25 percent allowance for engineering, legal, administration, and permitting costs.

R&R Cost Table

Table 5.3 R&R Costs for 20-Year Planning Horizon

Element	Cost
R&R Cost ⁽¹⁾	\$53,000,000
Annual R&R Cost First 2024-2034 ⁽²⁾	\$2,270,000
Annual R&R Cost Second 2034-2044 ⁽³⁾	\$3,030,000

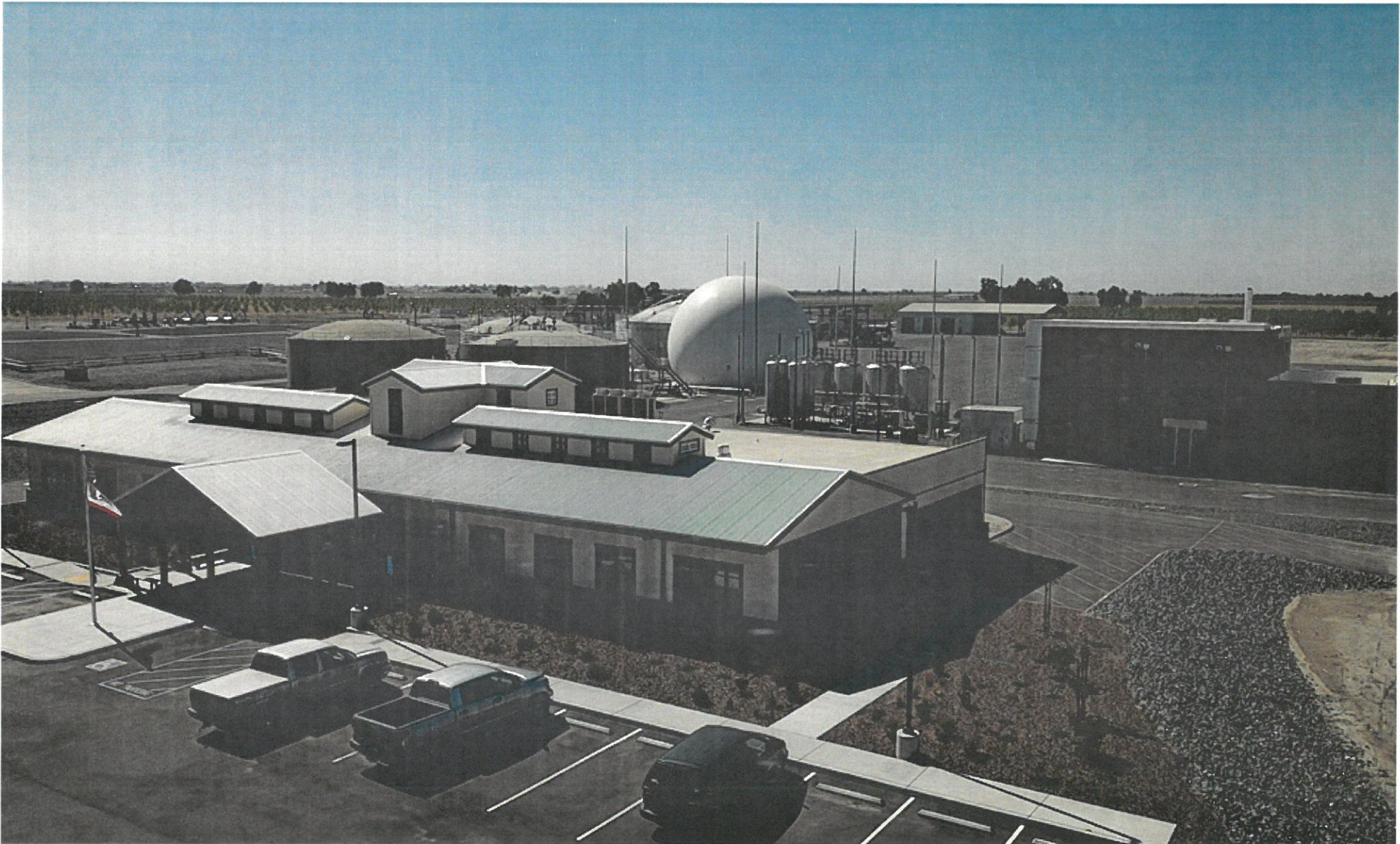
Notes:

- (1) Total R&R costs reflect 35 percent of the total project costs and are presented in 2024 dollars.
- (2) The annual R&R costs are based on 15 percent of the total capital project costs distributed across the first half of the planning horizon. This approach was used because a majority of the plant was upgraded approximately seven years ago, so it is expected that minimal R&R will be needed during the first half of the planning horizon.
- (3) The annual R&R costs are based on 20 percent of the total capital project costs distributed across the second half of the planning horizon. This approach was used because it is expected that more R&R projects will be needed in the second half of the planning horizon.

Master Plan Update Summary

- Near-Term and Long-Term projects are providing capacity to support City-wide residential and industrial growth, as well as the GCSD as currently projected.
- Completion of the Long-Term projects will bring the WRF firm capacity up to 21.4 MGD.
- Projects in excess of the planning horizon or growth rate shall be investigated further before implementing.
- Flow and loading data will be monitored on an ongoing basis to determine the need for further planning updates on an 8–10-year horizon.

Questions/Comments?



CIP Table

Table 5.4 Master Plan CIP

Project	Total Project Cost ⁽¹⁾	CIP Cost							
		2024	2025	2026	2027	2028	2029-2033	2034-2038	2039-2043
Near-Term Projects Costs									
TWAS Pump Replacements	\$630,000	\$630,000	-	-	-	-	-	-	-
Dewatering Capacity Expansion – Near Term	\$4,650,000	\$930,000	\$3,720,000	-	-	-	-	-	-
Sludge Drying Bed Capacity Expansion	\$10,350,000	\$2,070,000	\$5,520,000	\$2,760,000	-	-	-	-	-
Digester Dewatering Pond Addition	\$6,110,000	\$1,220,000	\$3,260,000	\$1,630,000	-	-	-	-	-
Anaerobic Digestion Capacity Expansion – Near Term	\$34,990,000	\$3,500,000	\$6,999,000	\$13,995,000	\$10,496,000	-	-	-	-
UV Disinfection System Capacity Expans on – Near -Term	\$2,010,000	-	\$400,000	\$1,610,000	-	-	-	-	-
Subtotal	\$58,740,000	\$8,350,000	\$19,899,000	\$19,995,000	\$10,496,000	-	-	-	-
Long-Term Projects Costs									
MBR System Capacity Expansion	\$14,750,000	-	-	-	-	\$1,967,000	\$12,783,000	-	-
UV Capacity Expansion – Long Term	\$7,830,000	-	-	-	-	-	\$523,000	\$7,307,000	-
Anaerobic Digestion Capacity Expansion – Long Term	\$56,950,000	-	-	-	-	-	\$30,916,000	\$26,034,000	-
Biogas Flare Capacity Expansion	\$7,000,000	-	-	-	-	-	\$1,400,000	\$5,600,000	-
Dewatering Capacity Expansion – Long Term	\$6,210,000	-	-	-	-	-	\$4,968,000	\$1,242,000	-
Subtotal	\$92,740,000	-	-	-	-	\$1,967,000	\$50,590,000	\$40,183,000	-
Studies and Predesign Activities									
Biosolids Master Plan	\$500,000.00	-	-	-	-	\$500,000.00	-	-	-
Biogas Master Plan	\$300,000.00	-	-	-	-	\$300,000.00	-	-	-
Facility/Master Plan Update	\$1,000,000.00	-	-	-	-	-	\$500,000.00	\$500,000.00	-
Grit Tanks	\$500,000.00	-	-	-	-	-	-	-	\$500,000.00
Primary Sedimentation Tanks	\$500,000.00	-	-	-	-	-	-	\$500,000.00	-
MBR System	\$1,000,000.00	-	-	-	-	-	-	\$1,000,000.00	-
UV Disinfection	\$500,000.00	-	-	-	-	-	-	\$500,000.00	-
Gravity Belt Thickeners	\$500,000.00	-	-	-	-	-	-	\$500,000.00	-
Anerobic Digestion	\$1,000,000.00	-	-	-	-	-	-	\$1,000,000.00	-
Sludge Drying Bed	\$500,000.00	-	-	-	-	-	-	\$500,000.00	-
Subtotal	\$6,300,000.00	-	-	-	-	\$800,000.00	\$500,000.00	\$4,500,000.00	\$500,000.00
Design/Construction									
Primary Sedimentation Tanks	\$32,000,000.00	-	-	-	-	-	-	-	\$32,000,000.00
MBR System	\$155,000,000.00	-	-	-	-	-	-	\$2,500,000.00	\$152,500,000.00
UV Disinfection	\$7,830,000.00	-	-	-	-	-	-	-	\$7,830,000.00
Gravity Belt Thickeners	\$22,000,000.00	-	-	-	-	-	-	-	\$22,000,000.00
Anerobic Digestion	\$56,950,000.00	-	-	-	-	-	-	\$8,136,000.00	\$48,814,000.00
Sludge Drying Bed	\$10,350,000.00	-	-	-	-	-	-	-	\$10,350,000.00
Subtotal	\$284,130,000.00	-	-	-	-	-	-	\$10,636,000.00	\$273,494,000.00
R&R Costs ⁽²⁾									
R&R	\$53,000,000	\$2,270,000	\$2,270,000	\$2,270,000	\$2,270,000	\$2,270,000	\$11,350,000	\$15,150,000	\$15,150,000
CIP Total	\$494,910,000.00	\$10,620,000.00	\$22,169,000.00	\$22,265,000.00	\$12,766,000.00	\$5,037,000.00	\$62,440,000.00	\$70,469,000.00	\$289,144,000.00

Notes:

TWAS - thickened waste activated sludge.

(1) The costs are presented in 2024 dollars. Note that capital costs presented are for planning purposes. These costs do not include mid-point escalation or bid market allowance. Current market conditions suggest large rates of cost escalation and high rates of variance in construction bidding. It is suggested that an escalation rate and bid market allowance be added to capital costing efforts as project development becomes more refined. Total project costs include factors for estimating contingency, sales tax, general conditions, and contractor overhead and profit as well as 25 percent allowance for engineering, legal, administration, and permitting.

(2) Total R&R costs reflect 35 percent of the total project costs.