ENCINA WASTEWATER AUTHORITY

FY 2014

ENCINA REMOTE FACILITIES

COMPREHENSIVE ASSET MANAGEMENT PLAN (R-CAMP)

"With a comprehensive asset management plan we remain steadfast in meeting our commitment to the EWA Mission"

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ENCINA REMOTE FACILITIES
COMPREHENSIVE ASSET MANAGEMENT PLAN
(R-CAMP)

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Encina Remote Facilities R-CAMP

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Abbreviations and Acronyms List

ABBREVIATIONS AND ACRONYMS

AHPS	Agua Hedionda Pump Station
ARV	Air Relief Valve
APCD	Air Pollution Control District
BCPS	Buena Creek Pump Station
BVPS	Buena Vista Pump Station
CA	Capital Acquisition, condition assessment
CCB	Chlorine Contact Basin
CMMS	Computerized Maintenance Management System
CIP	Capital Improvement Project or Clean-in-Place
CLS	Chlorine Solution
CPS	Combine Pumping Station
CRW	Colorado River Water
CS	Construction Services
CWRF	Carlsbad Water Reclamation Facility
D	Drain
E	Effluent
E-CAMP	EWPCF Comprehensive Asset Management Plan
EQ	Equalization
ES	Engineering Services
EWA	Encina Wastewater Authority
EWPCF	Encina Water Pollution Control Facility
FY	Fiscal Year
GMF	Granular Media Filtration
HVAC	Heating, Ventilation and Air Conditioning
IA	Instrument Air
IC	Internal Combustion
IMPR	Improved technology
IS	Information Systems
LA ENR CCI	Los Angeles Engineering News Record Construction Cost Index
MCC	Motor Control Center
MCU	Miscellaneous Control Upgrades
MF	Microfiltration
MIS	Management Information Systems
MjA	Major Asset Replacement
MPI	Miscellaneous Plant Improvements
MRO	Maintenance Repair and Operations Software
NG	Natural Gas
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OF	Overflow
PAR	Planned Asset Replacement
PD	Pumped Drainage
PM	Preventative Maintenance
PNL	panel

Abbreviations and Acronyms List

POL	Polyelectrolyte (Polymer)
RBPS	Raceway Basin Pump Station
RO	Reverse Osmosis
RW	Recycled Water
S	Study
SA	Service Air
SD	Sanitary Drain
SCADA	Supervisory Control and Data Acquisition
SDG&E	San Diego Gas and Electric
SE	Secondary Effluent
SFTY	Safety
TD	Tank Drain
TDS	total dissolved salts
TMP	transmembrane pressure
TP	Top Priority
UV	ultraviolet
VFD	Variable frequency drive

General Abbreviations

AHUs	air handling units
cfm	cubic feet per minute
CIPP	cured-in-place-piping
CISP	cast iron soil pipe
CPVC	chlorinated polyvinyl chloride
DIP, DI	ductile iron pipe
ft	feet or foot
FRP	fiberglass reinforced plastic
gpm	gallons per minute
hp	horsepower
hr	hour
KW	kilowatt
LF	lineal feet
max	maximum
mgd	million gallons per day
OSHA	Occupational Safety and Health Administration
ppm	parts per million
psi	pounds per square inch
PLC	programmable logic controller
PVC	polyvinyl chloride
RCP	reinforced concrete pipe
rpm	revolutions per minute
scfm	standard cubic feet per minute
sf	square feet
SSP	stainless steel pipe
STL	steel pipe

REMOTE FACILITIES
COMPREHENSIVE ASSET MANAGEMENT PLAN
(R-CAMP)

SECTION 1: EXECUTIVE SUMMARY

The Encina Wastewater Authority (EWA) is a public joint powers authority that is located in the Southern California City of Carlsbad that provides regulatory and wastewater treatment services to approximately 325,000 North San Diego County residents and industrial users. The EWA is owned by six member agencies that include: the City of Carlsbad, City of Vista, City of Encinitas, the Buena Sanitation District, the Leucadia Wastewater District, and the Vallecitos Water District.

There are four pump stations and one water recycling facility collectively referred to as "Remote Facilities" of EWA. EWA member agencies own the remote facilities and contract with EWA to operate and maintain these five facilities. The four pump stations convey raw wastewater to EWA's Encina Water Pollution Control Facility (EWPCF) and are the Buena Creek, Raceway Basin, Buena Vista and Agua Hedionda Pump Stations. The Carlsbad Water Recycling Facility provides further treatment of secondary effluent from the EWPCF to produce recycled water for use in the City of Carlsbad.

The R-CAMP is updated biennially prior to establishing the budget for the upcoming two fiscal years. The biennial update is utilized in planning capital rehabilitation projects with the consideration of anticipated changes in regulatory compliance, cost-saving opportunities and ongoing O&M requirements of the Remote Facilities. The implementation schedule is prepared after considering the project priority ranking and other factors, such as regulatory compliance deadlines and economy of scale.

The R-CAMP provides the EWA with the ability to forecast and schedule the replacement and/or rehabilitation of the Remote Facility major assets. The R-CAMP contains detailed supporting documents that provide an organized register of major assets, estimated useful life of each asset, and scheduled replacement or rehabilitation of each asset. The R-CAMP allows EWA to project future expenditures for capital improvement projects, in both the short and long term, and communicate the proposed improvements to the Member Agency Managers, EWA Board of Directors, and Encina Joint Advisory Committee.

The FY 2014 major asset register for all remote facilities includes roughly 192 assets, each with a replacement value of greater than $10,000. A total of sixty-three assets from the Buena Creek Pump Station, Buena Vista Pump Station, and Carlsbad Water Recycling Facility are approaching the end of their useful life and will require condition assessment in FY 2014. The Agua Hedionda Pump Station is scheduled to be rebuilt in 2013. Major Assets located Agua Hedionda Pump Station, which are approaching the end of their useful life, were not included in the asset list for condition assessment.

The R-CAMP process consists of:

- Maintaining asset registers
- Conducting condition assessments
- Conducting facility needs assessments
- Developing and maintaining needed project lists including cost estimates
- Prioritizing and scheduling needed capital projects

The complete list of completed and proposed capital improvement projects is found in Appendix B. Proposed projects are presented as follows:

- Table 1-1: Fifteen capital improvement and preventative maintenance projects
- Table 1-2: Eleven asset condition assessments
- Table 1-3: Four special studies and updates needed to support the R-CAMP program

Table 1-1: R-CAMP Project Priority Ranking Summary

Project Rank	Project No.	Project Title (highest score indicates highest priority)	Project Class(1)	Total Score (max 63)
1	P - 9.5.001	CWRF - Failsafe Pipeline	CIP	TP
2	P - 9.8.001	Remote Facilities - Security System	IMPR	TP
3	P - 9.1.004	RBPS - Redundant PLC	IMPR	25
4	P - 9.5.002	CWRF - MF Module Replacement	PAR	23
5	P - 9.1.002	RBPS - Asphalt Pavement Repair	Wear	19
6	P - 9.5.004	CWRF - RO Chem Feed System Modifications	IMPR	17
7	P - 9.1.001	RBPS - Containment Basin Repair	CIP	16
8	P - 9.3.001	BVPS - In-Channel Grinders	IMPR	14
9	P - 9.3.003	BVPS - Rehab Orig Forcemain Section over Creek	Age	12
10	P - 9.1.003	RBPS - Security	IMPR	9
11	P - 9.3.002	BVPS - Replace Bubbler System with Alt Tech	IMPR	8
12	P - 9.5.003	CWRF - RO Membrane Replacement	PAR	2
13	P - 9.4.001	BCPS - Modify Disch Valve Installation	CIP	1
14	P - 9.5.005	CWRF - EQ Basin Cover	CIP	1
15	P - 9.5.006	CWRF - CCT Cover	CIP	1
(1) CIP – Capital Improvement Projects; PAR – Planned Asset Replacement, CA – Capital Acquisition, MjA – Major Asset Replacement (≥$50K), MnA – Minor Asset Replacement (<$50K); IS = Information Systems; IMPR – Improved Technology, Wear, Age				
(2) TP – Top Priority Projects are not scored				
(3) PM – Ongoing Plant Maintenance Projects are not scored				
(4) Refer to Table 2-1, Project Numbering System				

Table 1-2: R-CAMP Condition Assessments (not associated with specific projects) Summary

Project No.	Project Title
CA - 9.9.101	RBPS - FY 2014 Assessments Triggered by Asset Age
CA - 9.9.102	RBPS - FY 2017 Assessments Triggered by Asset Age
CA - 9.9.103	RBPS - FY 2018 Assessments Triggered by Asset Age
CA - 9.9.302	BVPS - FY 2014 Assessments Triggered by Asset Age
CA - 9.9.303	BVPS - FY 2015 Assessments Triggered by Asset Age
CA - 9.9.304	BVPS - FY 2016 Assessments Triggered by Asset Age
CA - 9.9.401	BCPS - FY 2014 Assessments Triggered by Asset Age
CA - 9.9.402	BCPS - FY 2017 Assessments Triggered by Asset Age
CA - 9.9.403	BCPS - FY 2018 Assessments Triggered by Asset Age
CA - 9.9.502	CWRF - FY 2014 Assessments Triggered by Asset Age
CA - 9.9.503	CWRF - FY 2015 Assessments Triggered by Asset Age
(1) Refer to Table 2-1, Project Numbering System	

Table 1-3: R-CAMP Studies, Updates and Engineering Services Summary

Project No.	Project Title (highest score indicates highest priority)
S - 9.1.001	RBPS - Containment Basin Leakage Study
S - 9.5.002	CWRF - Microfiltration Module Replacement
S - 9.5.004	CWRF – RO Chem Feed System Modifications
ES - 9.8.001	R-CAMP Update (2015, 2017, every 2 years)

Five-year project, condition assessment, study and study update implementation scheduling is outlined in **Table 1-4.**

Table 1-4: R-CAMP Five-Year Program Scheduling with Cost Estimates

Project Rank (3)	Project No.	Project Name	Main Project Costs (1) (in 1000s)
Implementation Year 2014			
1	P - 9.5.001	CWRF - Failsafe Pipeline (additional)	$55
3	P - 9.1.004	RBPS - Redundant PLC	$135
4	P - 9.5.002	CWRF - MF Module Replacement	$356
-	Total	FY 2014 Condition Assessments	$120
-	Total	FY 2014 Studies and Services	$45
-	Total	FY 2014 Egr (Design, Constr Egr, Const Mgmt)	$229
		Total Fiscal Year 2014	**$ 940**

Implementation Year 2015			
5	P - 9.1.002	RBPS - Asphalt Pavement Repair	$283
6	P - 9.5.004	CWRF - RO Chemical System Modifications	$97
-	Total	FY 2015 Condition Assessments	$20
-	Total	FY 2015 Studies and Services	$70
-	Total	FY 2015 Egr (Design, Constr Egr, Const Mgmt)	$61
		Total Fiscal Year 2015	**$531**
Implementation Year 2016			
7	P - 9.1.001	RBPS - Containment Basin Repair	$115
-	Total	FY 2016 Condition Assessments	$10
-	Total	FY 2016 Studies and Services	$20
-	Total	FY 2016 Egr (Design, Constr Egr, Const Mgmt)	$115
		Total Fiscal Year 2016	**$260**
Implementation Year 2017			
8	P - 9.3.001	BVPS - In-Channel Grinders	$836
10	P - 9.1.003	RBPS - Security	$121
-	Total	FY 2017 Condition Assessments	$15
-	Total	FY 2017 Studies and Services	$40
-	Total	FY 2017 Egr (Design, Constr Egr, Const Mgmt)	$150
		Total Fiscal Year 2017	**$1,162**
Implementation Year 2018			
11	P - 9.3.002	BVPS - Rehab Original Force Main Section Over Creek	$118
-	Total	FY 2018 Condition Assessments	$30
-	Total	FY 2018 Studies and Services	$0
-	Total	FY 2018 Egr (Design, Constr Egr, Const Mgmt)	$40
		Total Fiscal Year 2018	**$188**
		Total Fiscal Year 2014-2018	**$3,081**

(1) For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs. Numbered Project Cost does not include condition assessment, study, const egr or const mgmt cost.
(2) TP – Top Priority Projects are not scored; PM – Ongoing Plant Maintenance Projects are not scored
(3) The schedule year for a project refers to the year construction starts.
(4) Refer to Section 7 for detailed costs associated with extension of staff, condition assessment, studies and engineering.
(5) Refer to Appendix D for detailed costs by project.

SECTION 2: INTRODUCTION

The Encina Wastewater Authority (EWA) is a public joint powers authority that is located in the Southern California City of Carlsbad and that provides regulatory and wastewater treatment services to approximately 325,000 North San Diego County residents and industrial users. EWA is owned by six member agencies that include: the City of Carlsbad, City of Vista, City of Encinitas, the Buena Sanitation District, the Leucadia Wastewater District, and the Vallecitos Water District.

2.1 Background

There are four pump stations and one water recycling facility collectively referred to as "Remote Facilities" of EWA. EWA member agencies own the remote facilities and contract with EWA to operate and maintain these five facilities. The four pump stations convey raw wastewater to EWA's Encina Water Pollution Control Facility (EWPCF) and are the Buena Creek, Raceway Basin, Buena Vista and Agua Hedionda Pump Stations. The Carlsbad Water Recycling Facility provides further treatment of secondary effluent from the EWPCF to produce recycled water for use in the City of Carlsbad.

The location of each remote facility is shown on **Figure 2-1** and a site plan of each facility is shown on **Figure 2-2** through **Figure 2-6**. Figures are located in **Appendix F.**

Addresses and a brief description of each facility are provided in the following:

- Raceway Basin Pump Station: 2685 So. Melrose Dr, Vista CA 92081
- Agua Hedionda Pump Station: Cabrillo Power Facility, 4600 Carlsbad Blvd, Carlsbad CA 9200
- Buena Vista Pump Station: 2140 Jefferson St, Carlsbad CA 92008
- Buena Creek Pump Station: 2080 So. Melrose Dr, Vista CA 92081
- Carlsbad Water Recycling Facility: 6220 Avenida Encinas, Carlsbad CA, 92011

2.1.1 Raceway Basin Pump Station

Owned by the City of Vista, the Raceway Basin Pump Station (RBPS) was replaced in 2007. The pump station conveys raw wastewater through the Buena Sanitation District's force main to the EWPCF.

Raceway Pump Station Profile	
Design Capacity	1.9 mgd
Average Daily Flow (2012)	0.35 to 0.6 mgd
Number and Capacity of Pumps	3 submersible pumps @ 1,350 gpm each
Pump Drives	VFD driven, 75 hp each, 1800 rpm max
Generator, Fuel	One standby generator, 24-hr fuel tank (400 gallons)
On-site storage	156,000 gallons emergency storage

2.1.2 Agua Hedionda Pump Station

Owned by the City of Vista (69.1%) and the City of Carlsbad (30.9%), the Agua Hedionda Pump Station (AHPS) was built in 1976, with major upgrades completed in 1989. The Agua Hedionda Pump Station is scheduled to be rebuilt in 2013. The pump station conveys flow to EWPCF. AHPS is located northeast of the SDG&E Power Plant, adjacent to the Agua Hedionda Lagoon in the City of Carlsbad.

Agua Hedionda Pump Station Profile	
Design Capacity	31 mgd
Average Daily Flow (2012)	10.3 mgd
Number and Capacity of Pumps	4 dry-pit pumps @ 7,200 gpm each
Pump Drives	Three pumps VFD driven, 100 hp each
Generator, Fuel	Two standby generators, 24-hr fuel tank
On-site storage	450,000 gallons emergency storage

2.1.3 Buena Vista Pump Station

Owned by the City of Vista (89.6%) and the City of Carlsbad (10.4%), the Buena Vista Pump Station (BVPS) pumps and piping were rebuilt in 1994. BVPS conveys flow to the EWPCF. The pump station is located adjacent to the Buena Vista Lagoon and Jefferson Street in the City of Carlsbad. The site is configured to provide emergency storage in and around the pump station.

Buena Vista Pump Station Profile	
Design Capacity	23.1 mgd
Average Daily Flow (2012)	4.5 to 5.0 mgd
Number and Capacity of Pumps	4 vertical dry-pit pumps @ 6,000 gpm each
Pump Drives	VFD driven, 300 hp each
Generator, Fuel	Two standby generators, 24-hr fuel tank
On-site storage	1,000,000 gallons emergency storage
Pump Station Characteristics	Dual force mains

2.1.4 Buena Creek Pump Station

Owned by the Buena Sanitation District, the Buena Creek Pump Station (BCPS) was constructed in 2002. This wastewater pump station is located in the Shadowridge community of the City of Vista. The pump station currently conveys wastewater to the EWPCF, but can be configured to also convey 1.16 mgd to the Shadowridge Reclamation Plant, which is currently not in service.

Buena Creek Pump Station Profile	
Design Capacity	8.8 mgd
Average Daily Flow (2012)	2.5 to 3.0 mgd
Number and Capacity of Pumps	5 dry-pit pumps @ 4,500 gpm each
Pump Drives	VFD driven, 125 hp each
Generator, Fuel	One standby generator, 24-hr fuel tank (800 gallons)
On-site storage	95,000 gallons emergency storage
Wetwell characteristics	Divided

2.1.5 Carlsbad Water Recycling Facility

Owned by the City of Carlsbad, the Carlsbad Water Recycling Facility (CWRF) construction was completed in 2005. The plant is situated adjacent to the EWPCF, which provides secondary effluent to the CWRF for recycling. The initial rated capacity of the CWRF is 4 mgd. This facility is equipped with granular media filters, microfilters, reverse osmosis treatment, and disinfection through dosage of sodium hypochlorite. Recycled water is stored in the two-compartment on-site facility with a total of 8 million gallons storage with a dual purpose of EWPCF wet weather storage and CWRF recycled water storage.

The plant began producing Title 22 recycled water in November 2005. During the first full year of operation, the CWRF distributed 165 million gallons (512 acre-feet) of recycled water throughout the City of Carlsbad. From July 2009 to June 2010, the distributed volume of recycled water increased to 430 million gallons (1,320 acre feet).

2.2 Purpose

The purpose of this asset management plan is to develop a comprehensive roadmap to address the Remote Facility infrastructure challenges. Owner-Agencies have invested significant resources in the Remote Facilities. The EWA places the highest importance on preserving asset reliability while protecting the health and safety of workers and the public.

The R-CAMP process maintains a current, organized register of major assets and associated estimated asset useful life remaining. This allows EWA to plan ongoing assessment and replacement of assets to realize full use of service life and to replace assets prior to the end of assessed useful life. We look to best management practice applications that will assist EWA in facing these rewarding challenges. The Fiscal Year 2014 R-CAMP addresses the emerging challenges and will continue to renew and extend EWA's commitment in maintaining a reliable and effective infrastructure. With a comprehensive asset management plan we remain steadfast in meeting our commitment to the EWA Mission:

> ***As an environmental leader, EWA provides sustainable and fiscally responsible wastewater services to the communities it serves while maximizing the use of alternative and renewable resources.***

2.3 CAMP Process Overview

2.3.1 History

In Fiscal Year 2008, EWA transitioned management of its EWPCF infrastructure from the former facility Master Plan Process to the EWPCF Comprehensive Asset Management Plan (E-CAMP) program. In Fiscal Year 2009, this program brought to the Remote Facilities through the initial development of the Remote Facilities Comprehensive Asset Management Plan (R-CAMP) program.

2.3.2 Capital Projects

The CAMP process results in a list of prioritized recommended improvement projects. Evaluation criteria are used to prioritize projects. The project evaluation criteria established in the Master Plan were brought forward and supplemented in the CAMP process. These criteria take into consideration the useful life of each physical asset and place high importance on safety, odor control, regulatory requirements, energy efficiency, plant capacity, cost efficiency and consequence of failure of assets.

The evaluation criteria established for the R-CAMP are identified in **Figure 2-1**.

Figure 2-1: R-CAMP Evaluation Criteria

Previously completed R-CAMP projects are listed in **Appendix A.** A new project numbering system was implemented in the FY 2013 E-CAMP, and a comprehensive list of past, current and future capital projects identified under this system are presented in **Appendix B**.

2.3.3 Asset Register

This document provides an organized register of major assets, estimated useful life of each asset, estimated replacement cost, and scheduled replacement or rehabilitation date of each asset. Major assets for Remote Facilities are defined as assets with a replacement cost of $10,000 or more. Minor assets, with values less than $10,000 are generally replaced or upgraded through preventative or corrective maintenance activities which the General Services Department tracks using the Computerized Maintenance Management System (CMMS). The Major Asset Register is found in **Appendix E**.

2.3.4 Condition Assessment

In FY 2011, EWA initiated a formal process to assess the condition of major assets nearing the end of their useful life. The condition assessment documents the current condition of each asset and recommends either extending the estimated useful life or defining a project to replace the aging assets.

2.3.5 CAMP Methodology

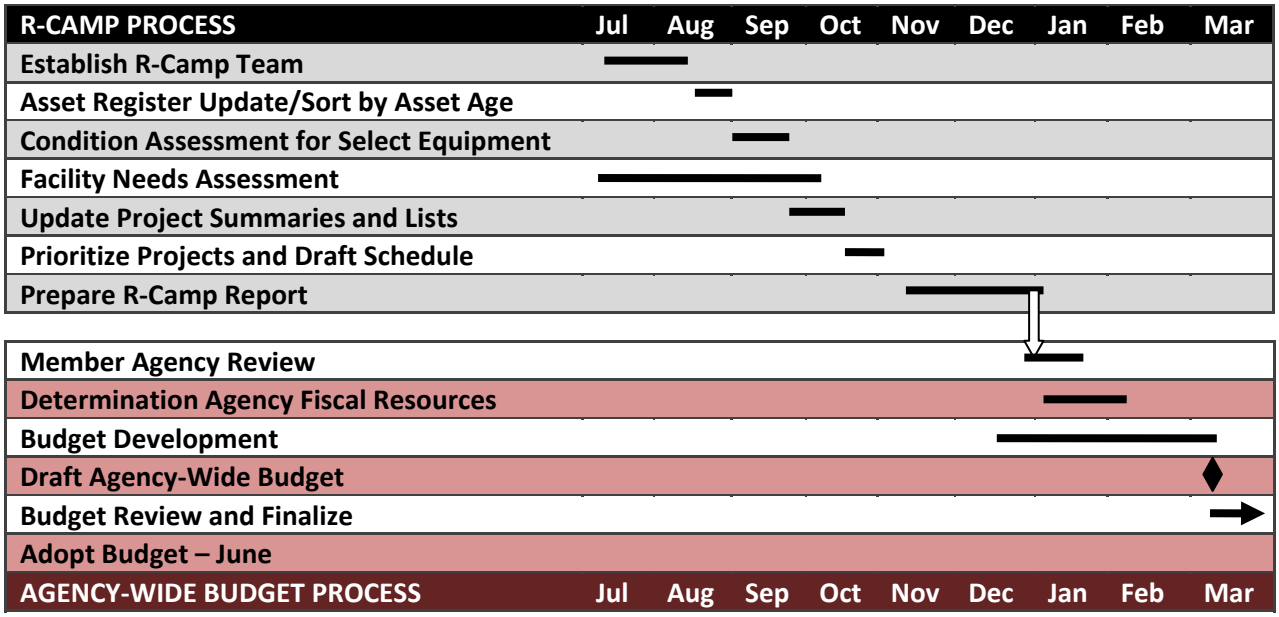
The R-CAMP program methodology is through the Task Elements outlined in **Figure 2-2.** A more detailed discussion of the CAMP methodology is found in **Appendix C**.

Figure 2-2: R-CAMP Task Elements

2.3.6 Schedule

A series of tasks is completed to update the R-CAMP, with the purpose of providing project definition, cost and prioritization for EWA's overall budget process, as illustrated in **Figure 2-3**.

Figure 2-3: Annual Update Milestones and Schedule



2.3.7 Project Numbering System

Projects are given unique numbers which relate to the appropriate plant process. Condition Assessments, Studies, Updates, Engineering Services and Other Services are also numbered in accordance with the project numbering system. Conceptual studies for specific projects will be designated with an "S" prefix followed by the same numerical designation as the project.

The project number consists of four segments, for example P-1.3.004:

- The first "prefix" is an alpha reference representing the phase of the improvement. In the example P-9.9.002, the letter "P" designates that it is a capital project construction or planned maintenance project. Other alpha abbreviations include: CA – Condition Assessment, S – Study (conceptual study specific to the project),
- The second segment is a one-digit number associated with the general area. In the example, the number 9 represents the Remote Facilities.
- The third segment is a one digit number associated with the specific site. In the example, the number 5 represents the Carlsbad Water Recycling Facility
- Fourth segment is a three digit sequential number for projects within the specific process.

The following is a summary of the general and specific project is presented in **Table 2-1**:

Table 2-1: Project Numbering System

P-1: Liquid Process Improvements (Refer to E-CAMP)
- P-1.1: Headworks
- P-1.2: Primary Treatment
- P-1.3: Secondary Treatment
- P-1.4: Effluent

P-2: Outfall (Refer to E-CAMP)
- P-2.1: Outfall

P-3: Solids Process Improvements (Refer to E-CAMP)
- P-3.1: Biosolids Thickening
- P-3.2: Biosolids Digestion
- P-3.3: Biosolids Dewatering and Drying

P-4: Energy Management (Refer to E-CAMP)
- P-4.1: Energy Management

P-5: General Improvements (Refer to E-CAMP)
- P-5.1: Odor Control
- P-5.2: Plant-Wide Systems
- P-5.3: Buildings
- P-5.4: Miscellaneous

P-6: Reserved for Future

P-7: Reserved for Future

P-8: Professional Services (Refer to E-CAMP)
- CA-8.1: Condition Assessments
- S-8.2: Studies and Updates
- S-8.3: E-CAMP Updates
- ES-8.4: Engineering Services
- OS-8.5: Other Services

P-9: Remote Facility Improvements
- P-9.1: Raceway Basin Pump Station
- P-9.2: Agua Hedionda Pump Station
- P-9.3: Buena Vista Pump Station
- P-9.4: Buena Creek Pump Station
- P-9.5: Carlsbad Water Recycling Facility
- P-9.6: Reserved for Future
- P-9.7: Reserved for Future
- P-9.8: Remote Facilities – General Projects
- P-9.9: Studies, Updates, Condition Assessments, R-CAMP Update

SECTION 3: CONDITION ASSESSMENTS SUMMARY

Condition assessments are triggered when an asset nears the end of its useful life or by staff observations of condition. For major assets, professional assistance is normally utilized to conduct a formal condition assessment. When a condition assessment is completed, either the assessed useful life is extended based on observation of estimated remaining service life assuming a cost effective level of maintenance, or a project is identified to replace or upgrade the asset. In this section, assets nearing the end of their assessed useful life are identified in subsection 3.1, with the associated project addressing asset upgrade referenced. In subsections 3.2 through 3.6, assets reaching the replacement year as listed in the Major Asset Register in Appendix E are scheduled for condition assessment.

3.1 Assets at End of Service Life, Project Pending

At the Agua Hedionda Pump Station, twenty-four assets have reached the end of useful life. Assessment of these assets is not planned as the assets will no longer be in use when the new pump station is constructed in the near term.

3.2 Condition Assessments – FY 2014

These projects will provide condition assessment of the EWA assets with nominal replacement date of FY 2018 or prior, as follows:

CA - 9.9.101 RBPS - FY 2014 Assessments Triggered by Asset Age

VFD-12002-000	VFD - Sewage Pump # 2
VFD-12003-000	VFD - Drive Sewage Pump # 3
8-WW-Buried	Pipe - Buried, 8" Sewer Force Main - DI, C-150
2-W	Pipe - Buried, 2" Water Supply Line, Sch 80 PVC 3' Cover, 452 LF
FENCE	Fence - 8' High Chain Link
VFD-12001-000	VFD - Sewage Pump # 1

CA - 9.9.302 BVPS - FY 2014 Assessments Triggered by Asset Age

M-9904-000	Motor- #4 Sewage Pump
PCP-9800-000	Panel-Pump Control
CKV-9901-000	Check Valve - Sewage Pump #1, 14"
CKV-9902-000	Check Valve - Sewage Pump #2, 14"
CKV-9904-000	Check Valve - Sewage Pump #4, 14"
V-9795-010	Plug Valve - Dip Force Main w/Restraint, 24"
V-9795-011	Plug Valve - Restrained Mech., 16"
V-9795-012	Plug Valve - Force Main, 16"
V-9795-041	Plug Valve - Forcemain, 24"
V-9961-000	Plug Valve - 20" F/M Isolation
V-9965-000	Plug Valve - 20" F/M Isolation
V-9970-000	Plug Valve - 20" F/M Isolation
PNL-9815-000	Panel-Grinder Level
PVL-9770-000	Tank-Hydropneumatic Tank
PNL-9820-000	Panel - Barscreen Control PNL

SWP-9901-000	Panel-Seal Water-#1 Sewage Pump
SWP-9902-000	Panel-Seal Water-#2 Sewage Pump
SWP-9904-000	Panel-Seal Water-#4 Sewage Pump
SWP-9905-000	Panel-Seal Water-#5 Sewage Pump
HU-9820-000	Hydraulic Unit-Grinder
CKV-9905-000	Check Valve - Sewage Pump #5, 14"
M-9905-000	Motor-#5 Sewage Pump
ATS-9801-000	Switch-Auto Transfer SW-#1 Gen.
M-9901-000	Motor-#1 Sewage Pump
ATS-9803-00B	Autotransfer Switch
FENCE	Fence
SLG-9980-000	Sluice Gate-Wet Well
MBA-9900-000	Main Breaker, MCC-1
MBB-9900-000	Main Breaker, MCC-2
MBT-9900-000	Main Tie Breaker, BVPS
MME-9750-000	Door-Roll-Up (Generator Room)
PAVEMENT	Pavement - Asphalt
PNL-9830-000	Control Panel for Surge Tank
PVL-9830-000	Surge Tank - Forcemain
G-9801-000	Engine, Emergency Generator #1 / 750KW
G-9802-000	Engine, Emergency Generator #2 / 750 KW
C-9750-000	Crane-Chain Hoist (Generator Room)
M-9902-000	Motor-#2 Sewage Pump

CA - 9.9.401 BCPS - FY 2014 Assessments Triggered by Asset Age

M-11010-000	Motor - #1 Sewage Pump
M-11020-000	Motor - #2 Sewage Pump
M-11030-000	Motor - #3 Sewage Pump
M-11040-000	Motor - #4 Sewage Pump
M-11050-000	Motor - #5 Sewage Pump
FE-11020-000	Flow Meter - Encina Forcemain 14"
VFD-11010-000	VFD - #1, Sewage Pump
VFD-11020-000	VFD - #2, Sewage Pump
VFD-11030-000	VFD - #3, Sewage Pump
VFD-11040-000	VFD - #4, Sewage Pump
VFD-11050-000	VFD - #5, Sewage Pump
AE-11010-000	Gas Analyzer Dry Well
T-11000-000	Surge Tank, Encina Forcemain
V-11200-C01	Plug Valve - 24" Force Main
PNL-11000-000	Control Panel - PLC

CA - 9.9.502 CWRF - FY 2014 Assessments Triggered by Asset Age

THICKENER	Thickener System
M-0906-1	Auto Strainer # 1 - MF
M-0906-2	Auto Strainer # 2 -MF

3.3 Condition Assessments – FY 2015

These projects will provide condition assessment of the EWA assets with nominal replacement date of FY 2019, as follows:

CA - 9.9.303 BVPS FY 2015 Assessments Triggered by Asset Age

VFD-9901-000	Panel - VFD, #1 Sewage Pump Motor
VFD-9902-000	Panel - VFD, #2 Sewage Pump Motor
VFD-9904-000	Panel - VFD, #4 Sewage Pump Motor 2019
VFD-9905-000	Panel - VFD, #5 Sewage Pump Motor
PNL-9880-000	Wet Well Control Panel

CA - 9.9.503 CWRF FY 2015 Assessments Triggered by Asset Age

2" PVC Pipe	Pipe - 2" PVC Chemical Piping
1" PVC Pipe	Pipe - 1" PVC Water Piping

3.4 Condition Assessments – FY 2016

This project will provide condition assessment of the EWA assets with nominal replacement date of FY 2020, as follows:

CA - 9.9.304 BVPS FY 2016 Assessments Triggered by Asset Age

PNL-9800-000	Panel-Wet Well Bubbler

3.5 Condition Assessments – FY 2017

This project will provide condition assessment of the EWA assets with nominal replacement date of FY 2021, as follows:

CA - 9.9.102 RBPS FY 2017 Assessments Triggered by Asset Age

GDR-12000-000	Channel Grinder

CA - 9.9.402 BCPS FY 2017 Assessments Triggered by Asset Age

GDR-11020-000	Channel Grinder Unit #2

3.6 Condition Assessments – FY 2018

This project will provide condition assessment of the EWA assets with nominal replacement date of FY 2022, as follows:

CA - 9.9.103 RBPS FY 2018 Assessments Triggered by Asset Age

ATS-12000-000	Automatic Transfer Switch
P-12002-000	Pump - #2 Sewage Pump, Submersible, 75 HP
P-12003-000	Pump - #3 Sewage Pump, Submersible, 75 HP
PLC-12000-000	PLC

CA - 9.9.403 BCPS FY 2018 Assessments Triggered by Asset Age

P-11010-000	Pump - #1, Sewage
ATS-11000-000	Automatic Transfer Switch
AC PAVING	Pavement - AC
FENCE	Fence - 8' High Chain Link Fence
G-11000-000	Emergency Standby Generator / 500 KW
ORF-11000-000	Odor Control Unit -Bio-Filter

SECTION 4: STUDIES AND UPDATES

4.1 Studies

Maintaining Remote facilities requires studies to provide planning information. A description of "Conceptual Studies" related to complex capital projects that have been prioritized to be funded in the near term are provided in subsection 4.1.1. In subsection 4.1.2, descriptions of "Special Studies" are provided. Special Studies are studies addressing general Remote facilities issues. "Study Updates" are described in subsection 4.1.3.

4.1.1 Conceptual Studies

Conceptual Studies are numbered corresponding to an associated capital project. A description of each study that has been identified for completion within the next fiscal year as well as other key studies is presented as follows:

S – 9.1.001 RBPS - Containment Basin Leakage Study

The containment basin at the Raceway Basin Pump Station continuously fills with ground water despite not having ground water relief valves installed inside the basin. The water comes through cracks (failure points) in the concrete structure. This study will identify and evaluate rehabilitation and replacement options.

Figure S-9.1.001
Raceway Basin Pump Station
Containment Basin

S - 9.5.002 CWRF – MF Module Replacement

The Carlsbad Water Recycling Facility is designed to treat 4 mgd of flow. From the EWPCF, 3 mgd is pumped to the granular media filters, and 1 mgd is pumped to the MF/RO system. Discounting backwash and side streams, approximately 3.85 mgd of recycled water is produced. The City of Carlsbad is in the process of contracting for the expansion of granular media treatment capacity as the demand for recycled water exceeds the current supply during peak summer months. However, during the winter months, the treatment process is not operated for periods because demand for recycled water is very low.

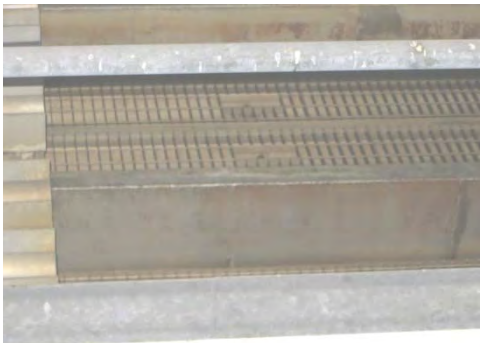


Figure S-9.5.002
Carlsbad Water Recycling Facility
MF Modules

The original design included MF/RO treatment for the removal of TDS but may also be used to meet annual limits for iron and manganese. In 2010 and 2011, the annual average TDS in the product water was 697 ppm and 974 ppm respectively. The TDS values were very low throughout the year and did not exceed the 1,100 ppm annual average limit for any given monthly average value. The operations also met the annual limits for iron and manganese. The RO system was exercised for maintenance purposes, but operation for treatment purposes was not required.

The Microfiltration (MF) system has been reported to produce less product water since the initial start-up. Because the recycled water demand exceeds production during peak summer months, the maximum output of the MF system is needed to maximize the use of the CWRF. There are several potential factors that can contribute to the drop in productivity: restriction in flow to the MF system, insufficient pumping capacity, a restriction of flow impeding pump output, or irreversible fouling in the membranes.

EWA has undertaken steps to improve productivity. The strainers feeding the MF system have been inspected and appear to be functioning properly and one of the two extractor pumps has been replaced. The second extractor pump has not been inspected yet but staff believes that it is functioning properly. The microfiltration system is designed to maintain a Transmembrane Pressure (TMP) in the range of 5 to 20 psi. Both membrane systems currently operate below this range with Basin No. 1 operating at 2.1 psi and basin No. 2 at 1.4 psi which suggests that that the membranes can be pushed harder. As a reference the Orange County Water District operates with a TMP of between 10-12 psi with the same membrane. It is unclear whether EWA has the capability to operate at a higher TMP to increase productivity but this is discussed further below. Data on the water quality is also under evaluation to determine if there are other indicators of a drop in performance such as the historical turbidity values and flux rates.

The membranes accumulate suspended solids and turbidity and are backwashed to remove the particles that have collected on the membrane surface to keep the TMP in the proper range. Backwashing occurs every 20 to 60 minutes and lasts from 1 to 2 minutes. Compressed air is also used to dislodge solids from the outside of the membrane surface. Biofouling and scale eventually impede the passage of filtrate through the membranes and a chemical cleaning, clean in place (CIP), of the hollow fibers is required to restore filter efficiency. The CIP system is comprised of caustic (high pH) solution or citric acid (low pH) and will remove scale and restore membrane operating condition to the design condition. As the membranes age, membrane performance will decline and possibly water quality would deteriorate from fiber breakage and seal failures which if they occur would indicate a need for replacement.

For microfiltration membranes replacement typically occurs after 7 to 10 years of operation. The microfiltration membranes at the CWRF were placed in service in 2005 and have been operational for 7 years. Since the MF units have not been in continuous service during this operational period, the remaining useful life could be extended beyond the typical service life. It is recommended that the EWA staff perform a visual inspection of the membranes and the seals to determine the integrity of the system. Depending on the results of this inspection, analysis of the water quality and operational data, EWA would be better equipped to determine the timing for replacement. EWA has undertaken steps to improve productivity, but the results of this study may allow the deferral of this expenditure.

Before committing to replacing the membranes, further investigation is recommended to determine the remaining useful service life. First the flow meters should be calibrated to confirm proper readings. Next the feed pumps at the clearwell should be confirmed to be capable of delivering the maximum capacity of the MF design criteria. The extractor pumps should be verified that they are meeting the design output standards. It has been reported that the extractor pumps were capable of flowing at 500 gpm each. The extractor pump on the MF No. 1 currently flows at 260 gpm and MF No. 2 at 340 gpm, representing a drop of 46% and 30% respectively. The run of pipe from the extractor pumps to the MF break tank is relatively short but should be inspected to determine if there is scale formation that could be impeding flow.

Flow testing involves seeing how much capacity each membrane basin can produce. The extractor pumps are configured to pump flow from either basin so it is recommended to shut down Basin No. 2 and remove the strainer internals and use both extractor pumps to pump flow out of basin No. 1. Both pumps should be started at 50% speed and ramped up until the basin level starts to drop. Operate under a steady state mode for an hour and collect data on TMP values and water quality data. Repeat this investigation on Basin No.2 and shut down Basin No. 1 and remove the strainer. This will help determine if the membranes have the potential for a higher capacity or whether the feed and product hydraulics are operating properly or if the extractor pumps are undersized.

If the membranes do not have additional capacity and it has been confirmed that the flux has dropped 30-50%, then it is an indication that replacement could be needed if the extra capacity is needed, which cannot be made up with the granular media filters. If these results from these analyses prove that the feed and the product hydraulics are not limiting factors, then an autopsy of the membrane may be useful in determining whether they can be cleaned and also provide some insight to the remaining useful life.

In summary, the MF Module replacement study will coordinate with staff to achieve:

- Additional field inspection to assess system component impact on production
- Evaluation of operational and maintenance data
- Flow testing of membranes
- Life cycle analysis of membrane replacement, with consideration of granular media filter expansion project currently underr design
- Provide recommendations for replacement schedule of MF Modules

S - 9.5.004 CWRF – RO Chem Feed System Modifications

Figure S-9.5.004a
Carlsbad Water Recycling Facility
Sulfuric Acid Feed System

Sulfuric acid has been used at many RO facilities in Southern California. The primary purpose of sulfuric acid feed is to reduce the potential of inorganic fouling or scale formation due to the relatively high inorganic content of source waters, based on Colorado River Water (CRW) being the principal source water for the region. The Metropolitan Water District has recently made revisions to their delivery system and now San Diego receives water that is comprised of both State Water Project water and CRW, whereas previously San Diego received primarily CRW.

Figure S-9.5.004b
Carlsbad Water Recycling Facility
Sulfuric Acid Storage Tank

Since this change in source water, the need for sulfuric acid in RO feed waters is questionable. At the San Diego Water Purification Facility, the RO system has operated successfully for over one year without the need for sulfuric acid. Other operating systems rely soley on the threshold inhibitor to mitigate fouling or scale formation. The current control system is written to require sulfuric acid feed as a permissive for the operation of the RO system.

The CWRF sulfuric acid system has required temporary modifications from the original installation including modifications to the feed point and double containment of feed piping to prevent exposure to the chemical. If the system is to remain in operation, a safety assessment is recommended to determine if additional modifications are needed. The storage tank was recently coated, and ongoing maintenance is required to maintain the system. Sulfuric acid is a highly corrosive chemical that requires careful handling during delivery and use, as contact with the chemical can cause severe burns and tissue damage.

The purpose of this study is to identify and compare options for the sulfuric acid storage and feed system. These options include:

- Additional safety modifications, if needed.
- Convert the system to an alternative chemical feed.
- Decommission the storage and feed system, reprogram to allow the RO system to operate without the chemical feed, with provisions for recommissioning if source water characteristics change in the future. Identify mothballing requirements.
- Decommission and remove the storage and feed system, reprogram to allow the RO system to operate without chemical feed.
- This study will also provide recommendations on the decommissioning of the RO system.

4.1.2 Special Studies

Special studies focus on Organizational or Facility-Wide planning needs. There is no special study identified for Remote facilities at this time.

4.1.3 Study Updates

Study updates provide current planning information for Authority work that evolves over time. There is no study update identified for Remote facilities at this time.

4.2 Other Professional Services

Engineering Services projects complete tasks to support the function of EWA, but do not include construction of facilities.

4.2.1 Engineering Services

ES - 9.8.001 R-CAMP Update

The R-CAMP is updated every two years. EWA managers solicit input from staff to determine needs that have surfaced since the previous update. New projects are defined and all projects are ranked and prioritized. Projects completed during the previous two fiscal years are also documented. A five year plan is presented for consideration during the budget process.

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SECTION 5: PROJECT IDENTIFICATION

This section provides project background, description, justification and project delivery information for potential projects that have been identified through the R-CAMP process. The purpose of this section is to provide an organized reference for R-CAMP projects both that are recommended for funding in the next five years and for potential future projects. In general, more detail has been developed for the projects that are anticipated for implementation in near term. A more conceptual description is provided for projects currently planned for implementation beyond the next five years.

R-CAMP projects are developed based on a needs assessment, triggered by either asset age or EWA staff observations. Needs based on asset age are assessed through a condition assessment of the equipment, which determines the assessed useful life remaining and considers the criticality of the equipment. Some staff observations result in a project with design criteria in which the Agency management team reaches consensus during the R-CAMP process, and these projects are added to the list. These projects include a design phase prior to the project implementation phase. Others require a special study to address an issue or concern that is identified, which will identify a specific R-CAMP project.

5.1 Raceway Basin Pump Station Projects

The following projects were identified for the Raceway Basin Pump Station.

Figure P-9.1.001
Raceway Basin Pump Station
Emergency Containment Basin

P - 9.1.001 RBPS - Containment Basin Repair

Background
The purpose of the containment basin at Raceway Basin Pump Station is to contain sewage flow during an emergency interruption of pumping. The containment basin has a storage capacity of approximately 140,000 gallons. The basin continuously fills with ground water such that the full capacity of the emergency storage capacity may not be available during a pump station outage. Groundwater enters through cracks in the existing concrete structure. For budgetary purposes it is assumed that the basin will be rehabilitated.

Description
- Design and construct the containment basin repairs.

Justification
The containment basin is a facility critical to contain the sewage flow during emergency conditions such as sewage overflow due to the equipment or power outage, or peak flows from increased collection system infiltration and inflow during storm events. The containment basin at current condition will not be able to contain the design sewage storage volume during an emergency event.

Project Delivery
Traditional Design – Bid - Construct

P - 9.1.002 RBPS - Asphalt Pavement Repair

Background

The Raceway Basin Pump Station was rebuilt in 2007, but did not include pavement work on the access road to the station, nor the pavement at the station. The access road pavement is in poor condition, including damage resulting from construction activities. The station site area pavement is also in need of a pavement crack repairs and a seal coat.

Figure P-9.1.002a
Raceway Basin Pump Station
Asphalt Pavement at Station

Description

- Repair cracks in pavement.
- Seal pavement at pump station.
- Repave access road.
- Stage pavement repair to maintain access.

Figure P-9.1.002b
Raceway Basin Pump Station
Asphalt Pavement Access Road

Justification

Access to the pump station is required for operation and maintenance, as well as emergencies. Poor pavement condition may limit access and may cause damage to vehicles accessing the facility.

Project Delivery

Traditional Design – Bid - Construct

Figure P-9.1.002c
Raceway Basin Pump Station
Asphalt Pavement Access Road

P - 9.1.003 RBPS - Security

Background

The Raceway Basin Pump Station is equipped with a standard chain link fence. Evidence of intruders entering the site for the purpose of vandalism and attempted theft has been observed. It is recommended that site security improvements be implemented including more effective fencing and surveillance camera installation.

Figure P-9.1.003
Raceway Basin Pump Station
Existing Fence

Description

- Enhance existing chain link fence.
- Installation of surveillance cameras, conduit, wiring and panel on site. Surveillance equipment would be compatible with new EWA system-wide system with wireless communications at remote facilities.

Justification

Increased security will reduce potential for vandalism and interference with pump station operations.

Project Delivery

Traditional Design – Bid - Construct

P - 9.1.004 RBPS - Redundant PLC

Background

The Raceway Basin Pump Station is controlled by a single PLC. The control of the pumps and monitoring of wetwell level are critical to the normal operation of the station and to emergency condition response. EWA has adopted a philosophy of providing redundant PLCs at remote pump stations to provide backup and reliability. Redundant PLCs have been phased in to EWA remote facilities, with Raceway Basin Pump Station being the last to be equipped as such.

Figure P-9.1.004
Raceway Basin Pump Station
PLC Units

Description

- Install redundant PLC at pump station.
- Wiring and controls to integrate the redundant PLC.

Justification

Provision of a redundant PLC will provide backup to the PLC in case of PLC failure. Without this backup, the existing PLC may fail and cause a spill at the lift station, which can be harmful to the environment and will result in fines.

Project Delivery

Traditional Design – Bid - Construct

5.2 Agua Hedionda Pump Station Projects

The replacement of the Agua Hedionda Pump Station is currently under design and construction completion is projected for late 2013.

5.3 Buena Vista Pump Station Projects

The following projects were identified for the Buena Vista Pump Station.

P - 9.3.001 BVPS - In-Channel Grinders

Background

The Buena Vista Pump Station is equipped with a single bar screen that discharges into a grinder. This system removes screenings, grinds them and returns them to the flow. The system is maintenance intensive. For normal operation, the flush water system must be maintained. During peak flows, the bar screen may be overwhelmed, bind up, trip and flood the wetwell. Staff must respond to reset the bar screen and clean up the wetwell.

Figure P-9.3.001
Buena Vista Pump Station
Bar Screen

Because the system is only equipped with one grinder, staff must remove screenings manually when the grinder is out of service. This involves entry to the wetwell, heavy lifting and screenings handling. All other remote pump stations are equipped with in-channel grinders which perform very well, provide better reliability, and require less maintenance.

Description

- Reconfigure the channel for two in-line grinders.
- Install redundant in-line grinders.
- Demolish the flush water system.
- Construction sequence planning will be required.

Justification

The proposed project will reduce maintenance and increase facility safety. The current system requires maintenance of the flush water system, bar screen, and grinder, all of which have relatively high requirements. The proposed in-channel grinder is less time-consuming to maintain. The in-channel grinder will also reduce staff exposure to hazards during bar screen trip, wetwell entry, heavy lifting and screening removal.

Project Delivery

Traditional Design – Bid - Construct

P - 9.3.002 BVPS - Replace Bubbler System with Alt Tech

Background

The Buena Vista Pump Station is currently equipped with a bubbler system for level monitoring. The bubbler system is more complicated to operate and maintain than newer technologies such as pressure transducers. The bubbler system requires operation of duty and backup compressors, backup compressed air system, and other monitoring and controls.

Description

- Provide new pressure transducer type level monitoring system.
- Demolish existing bubbler system and appurtenant equipment.
- Wiring and controls.

Justification

Replacing the bubbler system with a newer technology will reduce maintenance requirements.

Project Delivery

Traditional Design – Bid - Construct

Figure P-9.3.002
Buena Vista Pump Station
Bubbler System

P - 9.3.003 BVPS - Rehab Orig Forcemain Section over Creek

Background

In 2012, the City installed a redundant force main and surge tank at the Buena Vista Pump Station. This project also rehabilitated portions of the existing force main with the intent of providing a redundant system to facilitate assessment and maintenance of the conveyance system. The portion of the existing force main passing over the creek was not rehabilitated. This project would assess and rehabilitate the portion of the original force main that passes over the creek.

Figure P-9.3.003a
Buena Vista Pump Station
Original Forcemain over Creek

Description

- Assess the original force main that passes over the creek.
- Rehabilitate the force main as needed.

Figure P-9.3.003b
Buena Vista Pump Station
Corrosion on existing Forcemain

Justification

The Buena Vista Pump Station discharge force main is a critical facility that requires periodic assessment, cleaning and potential repairs. The original force main facilitates the maintenance of the redundant force main, and avoids the cost and risk associated with bypass pumping.

Project Delivery

Traditional Design – Bid - Construct

P - 9.3.007 BVPS – Security Fence Modifications

Background
The Buena Vista Pump Station electrical room entrance at the upper level is secured by an iron gate equipped with barbed wire. However, the configuration of the adjacent wall facilitates intruder access to the facility.

Description
- Provide razor wire or other security measures to improve security at the upper gate.

Justification
Improved security will reduce the potential for vandalism at the pump station.

Project Delivery
Traditional Design – Bid – Construct

Figure P-9.3.007
Buena Vista Pump Station
Security Fence Modifications

5.4 Buena Creek Pump Station Projects

The following projects were identified for the Buena Creek Pump Station.

P - 9.4.001 BCPS - Modify Disch Valve Installation

Background
The Buena Creek pump discharge piping is configured with 8-inch and 12-inch piping and valves, to allow for pump isolation and varied operating modes. Six of the plug valves are configured such that under normal or primary modes of operation, the seating side of the valve is on the unseated side of the system.

Description

- Remove six plug valves and reinstall with seating side of valve on seated side of system.

Justification
Modification would be consistent with manufacturer's recommendation. However, the current installation appears to be functional.

Project Delivery
Traditional Design – Bid - Construct

Figure P-9.4.001a
Buena Creek Pump Station
Pump Room Overview

Figure P-9.4.001b
Buena Creek Pump Station
8-inch Discharge Plug Valve

5.5 Carlsbad Water Recycling Facility

Five projects were identified for the Carlsbad Water Recycling Facility.

P-9.5.001 CWRF - Failsafe Pipeline

Background

Recycled water produced at the CWRF is required by permit not to exceed a maximum turbidity level and to maintain a minimum chlorine residual concentration. Upon plant startup, system startup and other abnormal operating conditions, recycled water from the chlorine contact basin (CCB) may be "Off-Spec" that is not meeting the turbidity or chlorine residual levels required to meet recycled water quality requirements.

Figure P-9.5.001a and b
Carlsbad Water Recycling Facility
Chlorine Contact Basin

In addition, if CCB effluent becomes off-spec, without piping to divert the recycled water away from the recycled water storage basin, correction of high turbidity or low chlorine residual must be accomplished while the CCB is out of service and often requires partial drainage and refill of the CCB.

The existing CCB is configured with one 4-inch drain pipeline connection. The CCB has a capacity of approximately 336,600 gallons and takes between 15 to 20 hours to drain.

Upon high turbidity or low chlorine residual, the proposed piping and valve modifications would automatically divert "off-spec" recycled water (RW) away from the recycled water storage and distribution system. Recycled water would be diverted to the Flow Equalization Basin Feedwell, where it would be conveyed to the Encina Water Pollution Control Facility (EWPCF) Combined Pump Station (CPS) wetwell. From the CPS wetwell, the flow is conveyed to the Aeration Basins. It is noted that the rapid draining of full volume of the CCB may cause an overflow at the EWPCF facilities, and failsafe pipe sizing to limit flow, modifications at the EWPCF and/or operational procedures may be required to manage the diverted flows.

A second improvement will provide a means to drain the chlorine contact basin within six hours for maintenance or to divert off-spec flow temporarily as needed to facilitate expeditious resolution of operational issues and return to recycled water production. The modifications will also include a tee for connection to the future CCT planned for the expansion project.

The system modifications proposed include the following:

Description

- Core drill and install a 14-inch diameter CCB effluent failsafe pipeline to connect the effluent channel of the CCB to the 14-inch overflow from the solids thickener.
- Check valve on failsafe pipeline to prevent backflow of thickener overflow into CCB.
- Core drill and install a connection between the CCB and the CCB effluent channel for CCB draining.
- Automated control valve to automatically divert flow equipped with motor operator.
- For the purpose of this design budget, it is assumed that resolution of potential overflow issues at the EWPCF resulting from rapid drain of the CCB will be resolved through operational procedures or through pipeline size selection to limit flow.

Justification

Installation of the 14-inch failsafe piping with automated control valve will avoid exceedence of permit requirements. This piping will divert flow away from the recycled water storage and distribution system, and will allow EWA staff to take corrective action if there is a high turbidity or low chlorine residual without having to take the CCB out of service. The new gate between the CCB and the CCB effluent channel will significantly reduce the time required to drain the CCB after the 14-inch failsafe pipeline has been installed.

Project Delivery

Traditional Design – Bid - Construct

P-9.5.002 CWRF - Microfiltration Module Replacement

Background

The Carlsbad Water Recycling Facility, placed in service in 2005, is designed to treat 4 mgd of flow. From the EWPCF, 3 mgd is pumped to the granular media filters, and 1 mgd is pumped to the "MF/RO" system. The City of Carlsbad is in the process of contracting for the expansion of granular media treatment capacity as the demand for recycled water exceeds the current supply during peak summer months. However, during the winter months, the treatment process is not operated for periods because demand for recycled water is low.

Figure P-9.5.002
Carlsbad Water Recycling Facility
MF Modules

Over time membrane performance will decline and replacement of the membranes is necessary. For microfiltration (MF) membranes this typically occurs after 7 to 10 years of operation. Because the MF system is generally not operated in the winter months, it is anticipated that the useful life of the membranes may be longer than the normal. However, the MF system has seen a drop in production since the initial start-up. There are several potential factors that can contribute to the drop in productivity: restriction in flow to the MF system, insufficient pumping capacity, a restriction of flow impeding pump output, or irreversible fouling in the membranes. EWA has undertaken steps to identify and correct system deficiencies that may contribute to the reduced production, in order to maximize the service life of the MF membranes. Study P-9.5.002 includes steps to test the system and the membranes to verify replacement is recommended at this time. Refer to Section 4.1.1 of this R-CAMP for a more detailed description of this facility and the recommended study.

Description

The project will consist of replacement of the MF membranes, preferably in the off-peak system for recycled water. The Replacement project will include:

- Procure hardware as needed in accordance with manufacturer's recommendations.
- Rental of lifting equipment, as needed.
- Remove the existing MF filter modules from Basin No. 1 and dispose the filter modules.
- Replace 84 MF filter modules from Basin No. 1.
- Remove the existing MF filter modules from Basin No. 2 and dispose the filter modules.
- Replace 84 MF filter modules from Basin No. 2.
- Provide necessary maintenance services to the MF Filter System.

Justification

The field investigations should be conducted first to determine if there is more service life in the membranes before changing out the membranes. If the decline in the performance of the MF filters cannot be corrected then replacement of the membranes is necessary to maintain energy and water production efficiency.

Project Delivery

In-House procurement of parts and in-house installation.

P-9.5.003 CWRF - Reverse Osmosis Membrane Replacement

Figure P-9.5.003
Carlsbad Water Recycling Facility
Reverse Osmosis Modules

Background

The existing Reverse Osmosis (RO) system is equipped with two trains of 250 gpm capacity RO system. Each RO train is equipped with 10 pressure vessel arrays. The RO system is designed to operate at a pump discharge pressure of 260 psi. Sulfuric acid and a threshold inhibitor are added to reduce scale formation from inorganic constituents.

The RO system was included in the design of the CWRF to achieve a TDS concentration in the final effluent below 1,000 mg/L. Currently, the TDS concentration of the secondary effluent is at or below 1,000 mg/L so that RO treatment is not needed for TDS reduction. However, the RO system can be operated to produce water quality that will comply with the annual average limits on manganese and iron. Typically, RO is only operated if these monthly averages creep up and put compliance with the annual average calculation in jeopardy. The RO system is also exercised once a month which takes two days of labor for two staff positions.

Over time, RO membranes can become fouled from inorganic and/or organic matter. A Clean in Place (CIP) chemical cleaning is used to remove inorganic/organic matter from the membrane to restore the design flux rate. After many years of operation the RO membranes reach a point of irreversible fouling and recovery will decline. At this point replacement of the membranes is recommended to maintain energy and water production efficiency. For RO membranes this typically occurs after 5 to 7 years of operation. Because the RO system is operated very infrequently, it is anticipated that the useful life of the CWRF membranes may be longer.

In general, the condition of the RO equipment is good. It is recommended that the EWA staff verify conductivity on each vessel and perform a visual inspection, last performed in 2009, of the RO membranes, the seals and spacers to determine the integrity of the system. In addition to visual inspection, an autopsy of the membrane may be useful in determining the remaining useful life.

Another consideration to be conducted in a future study is whether the Carlsbad plant can meet the water quality requirements without the need for decarbonation. The use of the decarbonator creates an energy usage and maintenance need. With the product water being blended back in with the granular media filtration (GMF) product water there does not appear to be a need to operate the decarbonator, which is typically used to stabilize the RO permeate and prevent corrosion in the distribution system. However, there should be plenty of alkalinity in the GMF product to stabilize the water so the need for decarbonation should be studied further.

Description

- Replace 10 membrane vessels from Train No. 1.
- Replace 10 membrane vessels from Train No. 2.

Justification

It does not appear at this time that the RO membranes need to be replaced. It may be prudent to pursue approval to relax the standard for iron and manganese similar to what other agencies in north San Diego have done. If the standard can be revised, it may offer the opportunity to decommission the RO system unless there is a goal to meet a lower TDS value. Over time, there will be a decline in the performance of the RO membranes that can result in higher TDS concentrations in the effluent. The replacement of the membranes may then be necessary to maintain water quality goals and energy and water production efficiency.

Project Delivery

In-House procurement of parts and services.

P - 9.5.004 CWRF – RO Chem Feed System Modifications

Figure P-9.5.004a
Carlsbad Water Recycling Facility
Sulfuric Acid Feed System

Background

The CWRF RO system is equipped with a sulfuric acid storage and feed system. The primary purpose of sulfuric acid feed is to reduce the potential of inorganic fouling or scale formation due to the relatively high inorganic content of source waters, based on Colorado River Water (CRW) being the principal source water for the region. The Metropolitan Water District has recently made revisions to their delivery system and now San Diego receives water that is comprised of both State Water Project water and CRW, whereas previously San Diego received primarily CRW.

pH Adjustment System

Since this change in source water, the need for sulfuric acid in RO feed waters is questionable. Study S-9.5.004 is planned to evaluate alternatives to maintaining the sulfuric acid storage and feed system. Based on the results of this study, a project will be recommended. The range of options may include implementation of permanent safety improvements or the decommissioning of the existing system.

Description

Implement the recommendations of study S-9.5.004, which may include:

- Additional safety modifications, if needed.
- Convert the system to an alternative chemical feed.
- Decommission the storage and feed system, reprogram to allow the RO system to operate without the chemical feed, with provisions for recommissioning if source water characteristics change in the future.
- Decommission and remove the storage and feed system, reprogram to allow the RO system to operate without chemical feed.
- This study will also provide recommendations on the decommissioning of the RO system.

Justification

Change in source water negates the need for sulfuric acid but this should be demonstrated over a period of time. Maintaining the system requires labor and resources, and decommissioning may be justified by cost savings. It may be advantageous to abandon tank but leave in place in case source water changes again, or if it becomes needed because of some localized inorganic fouling.

Project Delivery

In-house implementation may be possible, or traditional design – bid – construct if recommended improvements are more extensive.

P - 9.5.005 CWRF - EQ Basin Cover

Background

The Combined Flow Equalization and Recycled Water Storage Basin provides a total of eight million gallons of storage capacity and is divided into two compartments. This facility is uncovered, which may raise concerns of algae growth, chlorine degradation, and introduction of wind-transported debris into the stored recycled water.

Description

This project would provide a cover for the EQ Basin. Prior to design, a study is recommended to determine options, advantages and disadvantages.

Justification

Currently, EWA staff is not aware of significant issues with the current basins without covers, although City staff has mentioned the potential for issues. This project may be justified in the future but consideration should also be given to address access limitations if covers are installed.

Project Delivery

Traditional Design – Bid - Construct

Figure P-9.5.005
Carlsbad Water Recycling Facility
EQ Basin

P - 9.5.006 CWRF - CCB Cover

Background
The Chlorine Contact Basin (CCB) is an open tank that provides chlorine contact to the filtered water prior to conveyance to the recycled water storage and distribution system.

Figure P-9.5.006
Carlsbad Water Recycling Facility
EQ Basin

Description
This project would provide a cover for the CCB. Prior to design, a study is recommended to determine options, advantages and disadvantages.

Justification
Currently, EWA staff is not aware of significant issues with the current CCB without a cover, although City staff has mentioned the potential for issues, such as the degradation of chlorine residual from ultraviolet (UV) degradation. This project may be justified in the future but consideration should also be given to address access limitations if covers are installed.

Project Delivery
Traditional Design – Bid - Construct

5.8 Remote Facilities – General Projects

Installation of a security system is a safety-related project that has been identified for all the remote facilities. The description of the project is as follows.

P-9.8.001 Remote Facilities – Security System

Background
The remote facilities are unmanned facilities, subject to theft, vandalism, potential to interfere with operations, and occupancy of site by unauthorized personnel. Installation of an intrusion detection system has been proposed to notify EWA immediately when detected, to allow prevention of theft or damage, or correction of interference with operations. EWA personnel have identified options including a video monitoring system or plant intrusion system.

Description
Provide a site security system to detect intrusion at remote facilities and to notify EWA personnel.

Justification
The site security system is proposed to provide a safer working environment for the remote facility operation teams and to prevent costly repairs that may be caused by intruders.

Project Delivery
In-House procurement of parts and services.

SECTION 6: PROJECT PRIORITY RANKING

Proposed R-CAMP projects are first screened based on Safety, Assessed Condition or Regulatory Compliance. Projects required to maintain a safe working environment, to prevent eminent equipment failure in the next two years, and to maintain regulatory compliance are designated "Top Priority" (TP). Certain major assets, such as emergency generators, undergo regularly scheduled contracted major maintenance to preserve asset functionality. These projects are designated "Preventative Maintenance" (PM). TP and PM projects are recommended for near-term funding. Remaining projects are prioritized as described in this section.

The project prioritization process utilizes the established evaluation categories and assigns a weighted value between 1 and 6 with 1 being the lowest importance and 6 being the highest importance. Each project is rated utilizing the seven evaluation categories with priority value assignment ranging from 0 to 3 with 1 representing low relevance, 2 representing medium relevance and 3 representing high relevance. If a specific evaluation category bears no relevance to the project, the project is assigned a rating of 0.

The resulting priority score for each project is determined as the product of the category weight value and the priority value assigned. The composite score for each project is the sum of its priority scores in each evaluation category. Recommendation of project implementation is based on each project's composite score. The priority project rating can vary from year to year based on specific circumstances at the EWPCF in that particular year.

Figure 6-1 presents the Priority Ranking System used, and Table 6-1 provides the scoring of the FY 2014 potential projects.

Figure 6-1: Priority Project Ranking System

EVALUATION CATEGORY	CATEGORY WEIGHT (1 = Lowest Priority)
Safety	Top Priority
Assessed Asset Useful Life reached within 2 years	Top Priority
Regulatory Compliance	Top Priority
Consequence of Failure	6
Odor Control	5
Energy Efficiency	4
Cost Efficiency	3
Assessed Asset Useful Life	2
Organizational Efficiency	1

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Table 6-1: Scoring of the FY 2014 Potential Projects

Project No.	Capital Project	Year Constr.	Total Score	Sfty TP Yes/ No	AUL TP Yes/ No	Reg TP Yes/ No	6 cnsq fail	5 Odor Cntrl	4 Engy Eff	3 Cost Eff	2 A Use Life	1 Org Eff
							6	5	4	3	2	1
1. Buena Creek Pump Station												
P - 9.4.001	BCPS - Modify Disch Valve Installation	>2019	1	No	No	No	0	0	0	0	0	1
CA - 9.9.401	BCPS - FY 2014 Assessments Triggered by Asset Age	2014	-	-	-	-	-	-	-	-	-	-
CA - 9.9.402	BCPS - FY 2017 Assessments Triggered by Asset Age	2017	-	-	-	-	-	-	-	-	-	-
CA - 9.9.403	BCPS - FY 2018 Assessments Triggered by Asset Age	2018	-	-	-	-	-	-	-	-	-	-
2. Buena Vista Pump Station												
P - 9.3.001	BVPS - In-Channel Grinders	2017	14	No	No	No	0	0	1	1	2	3
P - 9.3.003	BVPS - Rehab Orig Forcemain Section over Creek	2018	12	No	No	No	1	0	0	0	2	2
P - 9.3.002	BVPS - Replace Bubbler System with Alt Tech	>2019	8	No	No	No	0	0	0	2	0	2
CA - 9.9.302	BVPS - FY 2014 Assessments Triggered by Asset Age	2014	-	-	-	-	-	-	-	-	-	-
CA - 9.9.303	BVPS - FY 2015 Assessments Triggered by Asset Age	2015	-	-	-	-	-	-	-	-	-	-
CA - 9.9.304	BVPS - FY 2016 Assessments Triggered by Asset Age	2016	-	-	-	-	-	-	-	-	-	-
3. Carlsbad Water Reclamation Facility												
P - 9.5.006	CWRF - CCT Cover	>2019	1	No	No	No	0	0	0	0	0	1
P - 9.5.005	CWRF - EQ Basin Cover	>2019	1	No	No	No	0	0	0	0	0	1
P - 9.5.001	CWRF - Failsafe Pipeline	2014	TP	No	No	Yes	1	0	2	3	3	0
P - 9.5.002	CWRF - MF Module Replacement	2014	23	No	No	No	1	0	1	2	2	3
P - 9.5.004	CWRF - RO Chem Feed System Modifications	2015	17	No	No	No	1	0	0	2	1	3
P - 9.5.003	CWRF - RO Membrane Replacement	>2019	2	No	No	No	0	0	0	0	1	0

Project No.	Capital Project	Year Constr.	Total Score	Sfty TP Yes/ No	AUL TP Yes/ No	Reg TP Yes/ No	6 cnsq fail	5 Odor Cntrl	4 Engy Eff	3 Cost Eff	2 A Use Life	1 Org Eff
							6	5	4	3	2	1
CA - 9.9.502	CWRF - FY 2014 Assessments Triggered by Asset Age	2014	-	-	-	-	-	-	-	-	-	-
CA - 9.9.503	CWRF - FY 2015 Assessments Triggered by Asset Age	2015	-	-	-	-	-	-	-	-	-	-
S - 9.5.002	CWRF - Microfiltration Module Replacement	-	-	-	-	-	-	-	-	-	-	-
S - 9.5.004	CWRF - RO Chemical System Modifications	-	-	-	-	-	-	-	-	-	-	-
4. Raceway Basin Pump Station												
P - 9.1.002	RBPS - Asphalt Pavement Repair	2015	19	No	No	No	1	0	0	2	2	3
P - 9.1.001	RBPS - Containment Basin Repair	2016	16	No	No	No	1	0	0	2	1	2
P - 9.1.004	RBPS - Redundant PLC	2014	25	No	No	No	2	0	0	2	2	3
P - 9.1.003	RBPS - Security (Razor Wire and Camera)	2017	9	No	No	No	1	0	0	0	0	3
CA - 9.9.101	RBPS - FY 2014 Assessments Triggered by Asset Age	2014	-	-	-	-	-	-	-	-	-	-
CA - 9.9.102	RBPS - FY 2017 Assessments Triggered by Asset Age	2017	-	-	-	-	-	-	-	-	-	-
CA - 9.9.103	RBPS - FY 2018 Assessments Triggered by Asset Age	2018	-	-	-	-	-	-	-	-	-	-
S - 9.1.001	RBPS - Containment Basin Leakage Study	-	-	-	-	-	-	-	-	-	-	-
General												
P - 9.8.001	Remote Facilities - Security System	2016	TP	Yes	No	No	1	0	0	1	1	1
ES - 9.8.001	R-CAMP Update (2015, 2017, every 2 years)	-	-	-	-	-	-	-	-	-	-	-

SECTION 7: RECOMMENDED PROJECT IMPLEMENTATION SCHEDULE & COST SUMMARY

The Recommended Project Implementation Schedule and Cost Summary for FY 2014 through FY 2018 are presented on the following pages. This schedule is based on project priority ranking. These tables present each phase of projects scheduled for funding, as well as condition assessments, special studies, and engineering services.

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Table 7-1: FY 2014 EWA Capital Improvement Program

FY 2014 Multi-Year Projects

2014		Condition Assessments Proposed Budget	Studies and Services Proposed Budget	Design Proposed Budget	Construction Proposed Budget	Construction Engineering Proposed Budget	Construction Management Proposed Budget	Total by Project Element	Total Project Budget
Liquid Process Improvements									**$ 2,474,000**
P - 1.1.006	GRS Isolation Improvements	$ -	$ 11,000	$ -	$ -	$ -	$ -	$ 11,000	
P - 1.1.008	GRS Rehab	$ -	$ 15,000	$ -	$ -	$ -	$ -	$ 15,000	
P - 1.1.009	Influent Flow Metering Installation	$ -	$ -	$ -	$ 152,000	$ 10,000	$ 10,000	$ 172,000	
P - 1.1.010	Influent Pipeline Rehab with 2012 Major Rehab	$ -	$ -	$ -	$ 1,839,000	$ 85,000	$ 140,000	$ 2,064,000	
P - 1.2.006	PSB Struct and Mech Rehab	$ 52,000	$ 75,000	$ -	$ -	$ -	$ -	$ 127,000	
P - 1.2.010	PSB Scum Pipeline	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ 10,000	
P - 1.3.006	Secondary Polymer System Replacement	$ -	$ -	$ 60,000	$ -	$ -	$ -	$ 60,000	
P - 1.3.014	SCs 1 - 4 Inf and Eff Gate Replacement	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ 15,000	
Outfall									**$ 89,000**
P - 2.1.005	Sea Outfall Bathymetric Survey - External	$ -	$ -	$ 10,000	$ 64,000	$ 5,000	$ 10,000	$ 89,000	
Solids Process Improvements									**$ 4,701,000**
P - 3.2.001	Biofuel Receiving Facilities	$ -	$ -	$ 273,000	$ 1,972,000	$ -	$ 105,000	$ 2,350,000	
P - 3.2.009	Digester 4 - Interior Coating	$ -	$ -	$ 20,000	$ 317,000	$ 10,000	$ 20,000	$ 367,000	
P - 3.2.010	Digesters 5 and 6 - Interior Coating	$ -	$ -	$ 30,000	$ 778,000	$ 10,000	$ 30,000	$ 848,000	
P - 3.3.002	Pellet Storage Facility Improvements	$ -	$ -	$ 33,000	$ 502,000	$ 19,000	$ 32,000	$ 586,000	
P - 3.3.009	Drying Safety Upgrades (1)	$ -	$ -	$ 126,000	$ -	$ -	$ -	$ 126,000	
P - 3.3.010	Drying Building Coded Locks	$ -	$ -	$ -	$ 46,000	$ -	$ -	$ 46,000	
P - 3.3.012	RTO Media Replacement	$ -	$ -	$ -	$ 97,000	$ -	$ 30,000	$ 127,000	
P - 3.3.014	RTO Flush Drain Relocation	$ -	$ -	$ -	$ 126,000	$ 10,000	$ 30,000	$ 166,000	
P - 3.3.019	Centrifuge Drive Replacement	$ -	$ 20,000	$ -	$ -	$ -	$ -	$ 20,000	
P - 3.3.020	Dryer Drum Rehabilitation	$ -	$ 10,000	$ -	$ 55,000	$ -	$ -	$ 65,000	
Energy Management									**$ 1,130,000**
P - 4.1.004	NG Dilution Equipment Servicing	$ -	$ -	$ -	$ 137,000	$ 10,000	$ -	$ 147,000	
P - 4.1.006	Cogeneration Engine In-Frame Overhaul	$ -	$ -	$ -	$ 415,000	$ -	$ -	$ 415,000	
P - 4.1.013	Cogen Bldg Floor Repair	$ -	$ -	$ 20,000	$ 50,000	$ 15,000	$ -	$ 85,000	
P - 4.1.020	Net Metering	$ -	$ 18,000	$ 25,000	$ 400,000	$ 20,000	$ 20,000	$ 483,000	
General Improvements									**$ 2,460,000**
P - 5.1.004	Odor Monitoring Facilities	$ -	$ 10,000	$ 32,000	$ 492,000	$ 18,000	$ -	$ 552,000	
P - 5.1.005	HW/GRT/PSB Odor Control	$ -	$ 40,000	$ -	$ -	$ -	$ -	$ 40,000	
P - 5.1.008	ORF III Chemical Feed System Improvements	$ -	$ -	$ 40,000	$ -	$ -	$ -	$ 40,000	
P - 5.2.001	Natural Gas Pipeline Replacement	$ -	$ -	$ -	$ 651,000	$ 35,000	$ 42,000	$ 728,000	
P - 5.2.002	High Risk & Critical Asset Rehabilitation	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ 15,000	
P - 5.2.004	3WLC Strainer Replacement	$ -	$ -	$ -	$ 235,000	$ 35,000	$ 30,000	$ 300,000	
P - 5.2.010	3WHP Pump Control Improvements	$ -	$ -	$ 30,000	$ -	$ -	$ -	$ 30,000	
P - 5.2.012	Site Security Facilities	$ -	$ 20,000	$ -	$ -	$ -	$ 40,000	$ 60,000	
P - 5.2.017	Service Air and Instrument Air Piping Repairs	$ 5,000		$ -	$ -	$ -	$ -	$ 5,000	
P - 5.2.024	Extreior Asset Corrosion Control	$ -	$ 50,000	$ 40,000	$ -	$ -	$ -	$ 90,000	

Table 7-1: FY 2014 EWA Capital Improvement Program

FY 2014 Multi-Year Projects

2014		Condition Assessments	Studies and Services	Design	Construction	Construction Engineering	Construction Management	Total	Total
		Proposed Budget	Proposed Budget	Proposed Budget	Proposed Budget	Proposed Budget	Proposed Budget	by Project Element	Project Budget
P - 5.2.025	Tech Master Plan Recommended Improvements	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ 50,000	
P - 5.2.026	Plant Waste Stream Rerouting	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ 20,000	
P - 5.3.002	Operations Building Air Intake Relocation	$ -	$ -	$ 20,000	$ 149,000	$ 10,000	$ -	$ 179,000	
P - 5.3.006	Secondary Scum Pit Roof Removal	$ -	$ -	$ 40,000	$ 141,000	$ 10,000	$ 20,000	$ 211,000	
P - 5.3.008	Roof Access Safety Facilities	$ -	$ -	$ 20,000	$ 110,000	$ 10,000	$ -	$ 140,000	
Professional Services (not associated with specific projects)									**$ 419,000**
CA - 8.1.002	Fire Main Supply	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ 10,000	
CA - 8.1.003	FY 2014 Asset Condition Assessments - EWPCF	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ 10,000	
ES - 8.4.002	Extension of Staff Engineering Services	$ -	$ 137,000	$ -	$ -	$ -	$ -	$ 137,000	
ES - 8.4.008	Electronic O&M Manual and Document Mgmt	$ -	$ 120,000	$ -	$ -	$ -	$ -	$ 120,000	
ES - 8.4.009	Map Underground Piping > 12-inch	$ -	$ 25,000	$ -	$ -	$ -	$ -	$ 25,000	
ES - 8.4.010	Research and Development Services	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ 50,000	
OS - 8.5.001	Legal and Misc Services	$ -	$ 12,000	$ -	$ -	$ -	$ -	$ 12,000	
ES - 8.3.002	E-CAMP Update	$ -	$ 55,000	$ -	$ -	$ -	$ -	$ 55,000	
Remote Facility Major Plant Rehabilitation: General Improvements (refer to the R-CAMP)									**$ 940,000**
CA - 9.9.001	FY 2014 Condition Assessments - Remote Facilities	$ 120,000	$ -	$ -	$ -	$ -	$ -	$ 120,000	
P - 9.1.002	RBPS - Asphalt Pavement Repair	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	
P - 9.1.004	RBPS - Redundant PLC	$ -	$ -	$ 20,000	$ 135,000	$ 10,000	$ 30,000	$ 195,000	
P - 9.5.001	CWRF - Failsafe Pipeline (additional)	$ -	$ -	$ 60,000	$ 55,000	$ 15,000	$ 30,000	$ 160,000	
P - 9.5.002	CWRF - MF Module Replacement	$ -	$ 20,000	$ 10,000	$ 356,000	$ 14,000	$ -	$ 400,000	
P - 9.5.004	CWRF - RO Chem System Mods	$ -	$ 25,000	$ 20,000	$ -	$ -	$ -	$ 45,000	
	Sub-Totals FY 2014 Multi-Year Projects	**$ 257,000**	**$ 763,000**	**$ 949,000**	**$ 9,274,000**	**$ 351,000**	**$ 619,000**	**$ 12,213,000**	**$ 12,213,000**
	Less Alternative Funding Projects	$ -	$ -	$ 273,000	$ 1,972,000	$ -	$ 105,000	$ 2,350,000	$ 2,350,000
	Total FY 2014 Funded by MA	**$ 257,000**	**$ 763,000**	**$ 676,000**	**$ 7,302,000**	**$ 351,000**	**$ 514,000**	**$ 9,863,000**	**$ 9,863,000**

Table 7-2: FY 2015 EWA Capital Improvement Program

FY 2015 Multi-Year Projects

2015		Condition Assessments Proposed Budget	Studies and Services Proposed Budget	Design Proposed Budget	Construction Proposed Budget	Construction Engineering Proposed Budget	Construction Management Proposed Budget	Total by Project Element	Total Project Budget
Liquid Process Improvements									**$ 5,052,000**
P - 1.1.005	Grit and Screenings Handling Facility Rehab (1)	$ -	$ -	$ 485,000	$ -	$ -	$ -	$ 485,000	
P - 1.1.006	GRS Isolation Improvements	$ -	$ -	$ 50,000	$ 766,000	$ 28,000	$ 49,000	$ 893,000	
P - 1.1.008	GRS Rehab	$ -	$ -	$ 50,000	$ 350,000	$ 35,000	$ 50,000	$ 485,000	
P - 1.2.006	PSB Struct and Mech Rehab (1)	$ -	$ -	$ 400,000	$ 2,000,000	$ 180,000	$ 300,000	$ 2,880,000	
P - 1.2.009	PE Pipeline Rehab	$ -	$ 60,000	$ -	$ -	$ -	$ -	$ 60,000	
P - 1.2.010	PSB Scum Pipeline	$ -	$ -	$ 30,000	$ 69,000	$ 10,000	$ 30,000	$ 139,000	
P - 1.3.013	SC Concrete Cracking Prevention	$ 10,000	$ 30,000	$ 50,000	$ -	$ -	$ -	$ 90,000	
P - 1.3.014	SCs 1 - 4 Inf and Eff Gate Replacement	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	
Outfall									**$ 71,000**
P - 2.1.002	Sea Outfall Maintenance and Inspection - External	$ 71,000	$ -	$ -	$ -	$ -	$ -	$ 71,000	
Solids Process Improvements									**$ 2,200,000**
P - 3.3.002	Pellet Storage Facility Improvements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
P - 3.3.007	Centrifuges Major Maint	$ 30,000	$ -	$ -		$ -		$ 30,000	
P - 3.3.009	Drying Safety Upgrades (2)	$ -	$ -	$ -	$ 1,955,000	$ 71,000	$ 124,000	$ 2,150,000	
P - 3.3.019	Centrifuge Drive Replacement	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	
Energy Management									**$ 4,593,000**
P - 4.1.003	Cogen Engine Catalyst	$ -	$ -	$ 14,000	$ 103,000	$ -	$ 10,000	$ 127,000	
P - 4.1.006	Cogeneration Engine In-Frame Overhaul	$ -	$ -	$ -	$ 415,000	$ -	$ -	$ 415,000	
P - 4.1.015	Gas Conditioning Facilities	$ -	$ -	$ 468,000	$ 3,387,000	$ -	$ 196,000	$ 4,051,000	
General Improvements									**$ 847,000**
P - 5.1.002	ORF I Carbon Replacement	$ -	$ -	$ -	$ 138,000	$ -	$ -	$ 138,000	
P - 5.1.005	HW/GRT/PSB Odor Control	$ -	$ -	$ 40,000	$ -	$ -	$ -	$ 40,000	
P - 5.2.006	3WLC Intertie to 3WHP System	$ -	$ -	$ 30,000	$ -	$ -	$ -	$ 30,000	
P - 5.2.002	High Risk & Critical Asset Rehabilitation	$ -	$ 28,000	$ -	$ -	$ -	$ -	$ 28,000	
P - 5.2.008	Underground Piping Rehabilitation - Multi-Phase	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ 50,000	
P - 5.2.010	3WHP Pump Control Improvements	$ -	$ -	$ -	$ 71,000	$ 30,000	$ 30,000	$ 131,000	
P - 5.2.012	Site Security Facilities	$ -	$ -	$ 40,000	$ -	$ -	$ -	$ 40,000	
P - 5.2.017	Service Air and Instrument Air Piping Repairs	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ 10,000	
P - 5.2.024	Exterior Asset Corrosion Control	$ -	$ -	$ -	$ 200,000	$ 20,000	$ 30,000	$ 250,000	
P - 5.3.025	Tech Master Plan Recommended Improvements	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	
P - 5.2.026	Plant Waste Stream Rerouting	$ -	$ 30,000	$ 50,000	$ -	$ -	$ -	$ 80,000	

Table 7-2: FY 2015 EWA Capital Improvement Program

FY 2015 Multi-Year Projects

2015		Condition Assessments Proposed Budget	Studies and Services Proposed Budget	Design Proposed Budget	Construction Proposed Budget	Construction Engineering Proposed Budget	Construction Management Proposed Budget	Total by Project Element	Total Project Budget
Engineering Services (not associated with specific projects)									**$ 718,000**
CA - 8.1.004	FY 2015 Asset Condition Assessments - EWPCF	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ 50,000	
CA - 8.1.005	Underground Structures - Part 1	$ 200,000	$ -	$ -	$ -	$ -	$ -	$ 200,000	
ES - 8.4.003	Extension of Staff Engineering Services	$ -	$ 66,000	$ -	$ -	$ -	$ -	$ 66,000	
ES - 8.4.008	Electronic O&M Manual and Document Mgmt	$ -	$ 120,000	$ -	$ -	$ -	$ -	$ 120,000	
OS - 8.5.001	Legal and Misc Services	$ -	$ 12,000	$ -	$ -	$ -	$ -	$ 12,000	
S - 8.2.003	Biosolids Management Business Plan Update	$ -	$ 180,000	$ -	$ -	$ -	$ -	$ 180,000	
S - 8.2.004	Comprehensive Energy Rates Study	$ -	$ 35,000	$ -	$ -	$ -	$ -	$ 35,000	
ES - 8.3.003	E-CAMP Update	$ -	$ 55,000	$ -	$ -	$ -	$ -	$ 55,000	
Remote Facility Major Plant Rehabilitation: General Improvements (refer to the R-CAMP)									**$ 531,000**
P - 9.1.001	RBPS - Containment Basin Repair	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	
P - 9.1.002	RBPS - Asphalt Pavement Repair	$ -	$ -	$ -	$ 283,000	$ 11,000	$ 30,000	$ 324,000	
P - 9.3.001	BVPS - In-Channel Grinders	$ -	$ 30,000	$ -	$ -			$ 30,000	
P - 9.5.004	CWRF - RO Chem System Mods	$ -	$ -	$ -	$ 97,000	$ -	$ -	$ 97,000	
CA - 9.9.002	FY 2015 Condition Assessments - Remote Facilities	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ 20,000	
ES - 9.8.001	R-CAMP Update (2015, 2017, etc)	$ -	$ 40,000	$ -	$ -	$ -	$ -	$ 40,000	
	Sub-Totals FY 2015 Multi-Year Projects	**$ 431,000**	**$ 696,000**	**$ 1,817,000**	**$ 9,834,000**	**$ 385,000**	**$ 849,000**	**$ 14,012,000**	**$ 14,012,000**
	Less Alternative Funding Projects	$ -	$ -	$ 482,000	$ 3,490,000	$ -	$ 206,000	$ 4,178,000	$ 4,178,000
	Total FY 2015 Funded by MA	**$ 431,000**	**$ 696,000**	**$ 1,335,000**	**$ 6,344,000**	**$ 385,000**	**$ 643,000**	**$ 9,834,000**	**$ 9,834,000**

Table 7-3: FY 2016 EWA Capital Improvement Program

FY 2016 Multi-Year Projects

2016		Condition Assessments Proposed Budget	Studies and Services Proposed Budget	Design Proposed Budget	Construction Proposed Budget	Construction Engineering Proposed Budget	Construction Management Proposed Budget	Total by Project Element	Total Project Budget
Liquid Process Improvements									**$ 6,801,000**
P - 1.1.005	Grit and Screenings Handling Facility Rehab (2)	$ -	$ -	$ -	$ 3,300,000	$ 135,000	$ 235,000	$ 3,670,000	
P - 1.2.006	PSB Struct and Mech Rehab (2)	$ -	$ -	$ -	$ 2,000,000	$ -	$ -	$ 2,000,000	
P - 1.2.009	PE Pipeline Rehab	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ 100,000	
P - 1.3.006	Secondary Polymer System Replacement	$ -	$ -	$ 60,000	$ 306,000	$ 40,000	$ 30,000	$ 436,000	
P - 1.3.012	AB DO Probe Replacement	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ 20,000	
P - 1.3.013	SC Concrete Cracking Prevention	$ -	$ -	$ -	$ 224,000	$ 10,000	$ 30,000	$ 264,000	
P - 1.3.014	SCs 1 - 4 - Inf and Eff Gate Replacement	$ -	$ -	$ -	$ 270,000	$ 11,000	$ 30,000	$ 311,000	
Outfall									**$ 75,000**
P - 2.1.004	Sea Outfall Ballast Restoration	$ -	$ 75,000	$ -	$ -	$ -	$ -	$ 75,000	
Solids Process Improvements									**$ 381,000**
P - 3.3.007	Centrifuges Major Maint	$ -	$ 30,000	$ -	$ -	$ -	$ -	$ 30,000	
P - 3.3.012	RTO Media Replacement	$ -	$ -	$ -	$ 97,000	$ -	$ 30,000	$ 127,000	
P - 3.3.019	Centrifuge Drive Replacement	$ -	$ -	$ -	$ 200,000	$ 9,000	$ 15,000	$ 224,000	
Energy Management									**$ 2,072,000**
P - 4.1.001	Cogen Communications Redundancy	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ 10,000	
P - 4.1.005	Cogeneration Engine Top-End Overhaul	$ -	$ -	$ -	$ 209,000	$ -	$ -	$ 209,000	
P - 4.1.008	Cogen Engine 5	$ -	$ -	$ 150,000	$ 1,503,000	$ 100,000	$ 100,000	$ 1,853,000	
General Improvements									**$ 1,712,000**
P - 5.1.005	HW/GRT/PSB Odor Control	$ -	$ -	$ -	$ 443,000	$ 17,000	$ 30,000	$ 490,000	
P - 5.1.008	ORF III Chemical Feed System Improvements	$ -	$ -	$ -	$ 280,000	$ 20,000	$ 30,000	$ 330,000	
P - 5.2.002	High Risk & Critical Asset Rehabilitation	$ -	$ -	$ 93,000	$ -	$ -	$ -	$ 93,000	
P - 5.2.006	3WLC Intertie to 3WHP System	$ -	$ -	$ -	$ 51,000	$ 10,000	$ 20,000	$ 81,000	
P - 5.2.012	Site Security Facilities	$ -	$ -	$ -	$ 400,000	$ 20,000	$ 40,000	$ 460,000	
P - 5.2.017	Service Air and Instrument Air Piping Repairs	$ -	$ -	$ 20,000	$ 198,000	$ 10,000	$ 30,000	$ 258,000	

Table 7-3: FY 2016 EWA Capital Improvement Program

FY 2016 Multi-Year Projects

	2016	Condition Assessments Proposed Budget	Studies and Services Proposed Budget	Design Proposed Budget	Construction Proposed Budget	Construction Engineering Proposed Budget	Construction Management Proposed Budget	Total by Project Element	Total Project Budget
Engineering Services (not associated with specific projects)									**$ 397,000**
CA - 8.1.006	FY 2016 Asset Condition Assessments - EWPCF	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ 100,000	
CA - 8.1.007	Underground Structures - Part 2	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ 100,000	
CA - 8.1.008	Bridges	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ 10,000	
ES - 8.4.004	Extension of Staff Engineering Services	$ -	$ 70,000	$ -	$ -	$ -	$ -	$ 70,000	
OS - 8.5.001	Legal and Misc Services	$ -	$ 12,000	$ -	$ -	$ -	$ -	$ 12,000	
S - 8.2.005	Wastewater Characterization Study	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ 50,000	
ES - 8.3.004	E-CAMP Update	$ -	$ 55,000	$ -	$ -	$ -	$ -	$ 55,000	
Remote Facility Major Plant Rehabilitation: General Improvements (refer to the R-CAMP)									**$ 260,000**
P - 9.1.001	RBPS - Containment Basin Repair	$ -	$ -	$ -	$ 115,000	$ 10,000	$ 30,000	$ 155,000	
P - 9.1.003	RBPS - Security (Razor Wire and Cameras)	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	
P - 9.3.001	BVPS - In-Channel Grinders	$ -	$ -	$ 55,000	$ -	$ -	$ -	$ 55,000	
P - 9.3.003	BVPS - Rehab Orig Forcemain Section over Creek	$ -	$ 20,000	$ -	$ -	$ -	$ -	$ 20,000	
CA - 9.9.003	FY 2016 Condition Assessments - Remote Facilities	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ 10,000	
	Sub-Totals FY 2016 Multi-Year Projects	**$ 240,000**	**$ 322,000**	**$ 498,000**	**$ 9,596,000**	**$ 392,000**	**$ 650,000**	**$ 11,698,000**	**$ 11,698,000**
	Less Alternative Funding Projects	$ -	$ -	$ 150,000	$ 1,503,000	$ 100,000	$ 100,000	$ 1,853,000	$ 1,853,000
	Total FY 2016 Funded by MA	**$ 240,000**	**$ 322,000**	**$ 348,000**	**$ 8,093,000**	**$ 292,000**	**$ 550,000**	**$ 9,845,000**	**$ 9,845,000**

Table 7-4: FY 2017 EWA Capital Improvement Program

FY 2017 Multi-Year Projects

2017		Condition Assessments Proposed Budget	Studies and Services Proposed Budget	Design Proposed Budget	Construction Proposed Budget	Construction Engineering Proposed Budget	Construction Management Proposed Budget	Total by Project Element	Total Project Budget
Liquid Process Improvements									**$ 5,009,000**
P - 1.1.005	Grit and Screenings Handling Facility Rehab	$ -	$ -	$ -	$ 3,415,000	$ 138,000	$ 240,000	$ 3,793,000	
P - 1.2.009	PE Pipeline Rehab	$ -	$ -	$ -	$ 859,000	$ 50,000	$ 50,000	$ 959,000	
P - 1.3.003	AB Selector Implementation and Cover Replacement	$ -	$ -	$ 40,000	$ -	$ -	$ -	$ 40,000	
P - 1.3.004	AB Mechanical Rehabilitation and RAS Pump Addition	$ -	$ -	$ 40,000	$ -	$ -	$ -	$ 40,000	
P - 1.3.005	AB Nos. 1,2 and 3 Diffuser Membrane Replacement	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ 10,000	
P - 1.3.007	SCs 5 and 6 Mech Rehab	$ -	$ -	$ 115,000	$ -	$ -	$ -	$ 115,000	
P - 1.3.010	WAS Pipeline Replacement	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ 20,000	
P - 1.3.012	AB DO Probe Replacement	$ -	$ -	$ 32,000	$ -	$ -	$ -	$ 32,000	
Outfall									**$ 171,000**
P - 2.1.002	Sea Outfall Maintenance and Inspection - External	$ 71,000	$ -	$ -	$ -	$ -	$ -	$ 71,000	
P - 2.1.004	Sea Outfall Ballast Restoration	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ 100,000	
Solids Process Improvements									**$ 225,000**
P - 3.1.002	DAFT System Replacement	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ 100,000	
P - 3.1.003	TWAS Pipeline Replacement	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ 10,000	
P - 3.3.007	Centrifuges Major Maint	$ -	$ -	$ 50,000		$ -	$ -	$ 50,000	
P - 3.3.008	Dryer Major Maint	$ -	$ 10,000	$ 55,000	$ -	$ -	$ -	$ 65,000	
Energy Management		$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 229,000**
P - 4.1.001	Cogen Communication Redundancy	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	
P - 4.1.005	Cogeneration Engine Top-End Overhaul	$ -	$ -	$ -	$ 209,000	$ -	$ -	$ 209,000	
General Improvements									**$ 3,021,000**
P - 5.1.002	ORF I Carbon Replacement	$ -	$ -	$ -	$ 138,000	$ -	$ -	$ 138,000	
P - 5.2.002	High Risk & Critical Asset Rehabilitation	$ -	$ -	$ -	$ 846,000	$ 40,000	$ 40,000	$ 926,000	
P - 5.2.017	Service Air and Instrument Air Piping Repairs	$ -	$ -	$ -	$ 198,000	$ 10,000	$ 30,000	$ 238,000	
P - 5.2.019	Plant Beautification	$ -	$ -	$ 20,000	$ 205,000	$ 10,000	$ 30,000	$ 265,000	
P - 5.2.021	Climate Control at MCCs	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ 30,000	
P - 5.2.025	Tech Master Plan Recommended Improvements	$ -	$ -	$ 92,000	$ 1,000,000	$ 52,000	$ 90,000	$ 1,234,000	
P - 5.2.026	Plant Waste Stream Rerouting	$ -	$ -	$ -	$ 150,000	$ 10,000	$ 30,000	$ 190,000	
Engineering Services (not associated with specific projects)									**$ 181,000**
CA - 8.1.009	FY 2017 Asset Condition Assessments - EWPCF	$ 40,000	$ -	$ -	$ -	$ -	$ -	$ 40,000	
ES - 8.4.005	Extension of Staff Engineering Services	$ -	$ 74,000	$ -	$ -	$ -	$ -	$ 74,000	
OS - 8.5.001	Legal and Misc Services	$ -	$ 12,000	$ -	$ -	$ -	$ -	$ 12,000	
ES - 8.3.005	E-CAMP Update	$ -	$ 55,000	$ -	$ -	$ -	$ -	$ 55,000	
Remote Facility Major Plant Rehabilitation: General Improvements (refer to the R-CAMP)									**$ 1,162,000**
CA - 9.9.004	FY 2017 Condition Assessments - Remote Facilities	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ 15,000	
ES - 9.8.001	R-CAMP Update (2015, 2017, etc)	$ -	$ 40,000	$ -	$ -	$ -	$ -	$ 40,000	
P - 9.1.003	RBPS - Security	$ -	$ -	$ -	$ 121,000	$ 10,000	$ 30,000	$ 161,000	
P - 9.3.001	BVPS - In-Channel Grinders	$ -	$ -	$ -	$ 836,000	$ 30,000	$ 60,000	$ 926,000	
P - 9.3.003	BVPS - Rehab Orig Forcemain Section over Creek	$ -	$ -	$ 20,000		$ -	$ -	$ 20,000	
	Sub-Totals FY 2017 Multi-Year Projects	**$ 186,000**	**$ 301,000**	**$ 584,000**	**$ 7,977,000**	**$ 350,000**	**$ 600,000**	**$ 9,998,000**	**$ 9,998,000**

Table 7-5: FY 2017 EWA Capital Improvement Program

FY 2018 Multi-Year Projects

	2018	Condition Assessments Proposed Budget	Studies and Services Proposed Budget	Design Proposed Budget	Construction Proposed Budget	Construction Engineering Proposed Budget	Construction Management Proposed Budget	Total by Project Element	Total Project Budget
Liquid Process Improvements									**$ 6,031,000**
P - 1.2.002	Primary Sludge Pumping Upgrades	$ 25,000	$ 50,000	$ -	$ -	$ -	$ -	$ 75,000	
P - 1.3.003	AB Selector and Cover Replacement (Part 1)	$ -	$ -	$ -	$ 1,391,000	$ 139,000	$ 242,000	$ 1,772,000	
P - 1.3.004	AB Rehabilitation and RAS Pump Addition (Part 1)	$ -	$ -	$ -	$ 1,592,000	$ 65,000	$ 112,000	$ 1,769,000	
P - 1.3.007	SCs 5 and 6 Mech Rehab	$ -	$ -	$ -	$ 1,587,000	$ 65,000	$ 112,000	$ 1,764,000	
P - 1.3.010	WAS Pipeline Replacement	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	
P - 1.3.012	AB DO Probe Replacement	$ -	$ -	$ -	$ 442,000	$ 18,000	$ 31,000	$ 491,000	
P - 1.3.015	AB Flow Eq Feed and Return Pipeline Rehab	$ -	$ 20,000	$ 50,000				$ 70,000	
P - 1.4.004	EPS Pipe Lining and Abandoned Pipe Coating Repair	$ -	$ 20,000	$ 20,000	$ -	$ -	$ -	$ 40,000	
Outfall									**$ 773,000**
P - 2.1.004	Sea Outfall Ballast Restoration	$ -	$ -	$ -	$ 673,000	$ 50,000	$ 50,000	$ 773,000	
Solids Process Improvements									**$ 1,786,000**
P - 3.1.002	DAFT System Replacement	$ -	$ -	$ 276,000	$ -	$ -	$ -	$ 276,000	
P - 3.1.003	TWAS Pipeline Replacement	$ -	$ -	$ 60,000	$ -	$ -	$ 40,000	$ 100,000	
P - 3.2.004	Sludge Screening Facility	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ 100,000	
P - 3.3.007	Centrifuges Major Maint	$ -	$ -	$ -	$ 300,000	$ 10,000	$ 10,000	$ 320,000	
P - 3.3.008	Dryer Major Maint	$ -	$ -	$ -	$ 753,000	$ 31,000	$ 54,000	$ 838,000	
P - 3.3.012	RTO Media Replacement	$ -	$ -	$ -	$ 97,000	$ -	$ 30,000	$ 127,000	
P - 3.3.018	Centrate Pipeline Replacement	$ -	$ 25,000	$ -	$ -	$ -	$ -	$ 25,000	
Energy Management									**$ 491,000**
P - 4.1.001	Cogen Communications Redundancy	$ -	$ -	$ -	$ 192,000	$ 10,000	$ 30,000	$ 232,000	
P - 4.1.005	Cogeneration Engine Top-End Overhaul	$ -	$ -	$ -	$ 209,000	$ -	$ -	$ 209,000	
P - 4.1.017	Annunciator Panels Replacement - Power Building	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ 25,000	
P - 4.1.019	Chilled Water and Hot Water Systems	$ - $ -	$ 25,000 $ -	$ - $ -	$ -	$ -	$ -	$ 25,000	
General Improvements									**$ 601,000**
P - 5.2.002	High Risk & Critical Asset Rehabilitation (2)	$ -	$ -	$ -	$ 306,000	$ 40,000	$ 40,000	$ 386,000	
P - 5.2.008	Underground Piping Rehabilitation - Multi-Phase	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	
P - 5.2.011	1W Pipeline Replacement	$ -	$ -	$ 30,000	$ -	$ -	$ -	$ 30,000	
P - 5.2.016	2W System Upgrades	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	
P - 5.2.021	Climate Control at MCCs	$ -	$ 60,000	$ -	$ -	$ -	$ -	$ 60,000	
P - 5.3.003	Construction Office Upgrade	$ -	$ 25,000	$ -	$ -	$ -	$ -	$ 25,000	
Engineering Services (not associated with specific projects)									**$ 175,000**
CA - 8.1.010	FY 2018 Asset Condition Assessments - EWPCF	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ 30,000	
ES - 8.4.005	Extension of Staff Engineering Services	$ -	$ 78,000	$ -	$ -	$ -	$ -	$ 78,000	
OS - 8.5.001	Legal and Misc Services		$ 12,000					$ 12,000	
ES - 8.3.005	E-CAMP Update	$ -	$ 55,000	$ -	$ -	$ -	$ -	$ 55,000	
Remote Facility Major Plant Rehabilitation: General Improvements (refer to the R-CAMP)									**$ 188,000**
CA - 9.9.005	FY 2018 Condition Assessments - Remote Facilities	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ 30,000	
P - 9.3.003	BVPS - Rehab Orig Forcemain Section over Creek	$ -	$ -	$ -	$ 118,000	$ 10,000	$ 30,000	$ 158,000	
	Sub-Totals FY 2018 Multi-Year Projects	**$ 85,000**	**$ 370,000**	**$ 711,000**	**$ 7,660,000**	**$ 438,000**	**$ 781,000**	**$ 10,045,000**	**$ 10,045,000**

Appendix A

Historical Project List

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HISTORICAL REMOTE FACILITIES PROJECTS

FISCAL YEAR 2013 PROJECTS

Projects selected for implementation during FY 2013 are listed below. These projects have been completed unless otherwise noted.

1. BVPS – Dual Force main and second Surge Tank (By the City of Carlsbad)
2. BVPS – Replaced Annunciator Panel (By EWA General Services)
3. CWRF – Granular Media Filters, Added Sand Media
4. BCPS – Generator Access Platform
5. AHPS – New Pump Station Design

FISCAL YEAR 2009-2012 PROJECTS

Projects selected for implementation during FY 2009-2011 are listed below. These projects have been completed unless otherwise noted.

1. CWRF – Control System Upgrade (CWRF-1)

Appendix B

Comprehensive Project List

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Group	Project No.	Capital Project *(Blue, Italics Text Indicates Project Completed or ~~Eliminated~~)*	FY Project Added to R-CAMP	Year Constr
9.1 Raceway Basin Pump Station				
RBPS	P - 9.1.001	RBPS - Containment Basin Repair	before 2013	2016
RBPS	P - 9.1.002	RBPS - Asphalt Pavement Repair	2014	2015
RBPS	P - 9.1.003	RBPS - Security	2014	2017
RBPS	P - 9.1.004	RBPS - Redundant PLC	2014	2014
~~RBPS~~	*~~P - 9.1.005~~*	*~~RBPS - Coating Odor Tower Piping - PAR~~*	*~~2014~~*	PAR
9.2 Agua Hedionda Pump Station				
9.3 Buena Vista Pump Station				
BVPS	P - 9.3.001	BVPS - In-Channel Grinders	2014	2017
BVPS	P - 9.3.002	BVPS - Replace Bubbler System with Alt Tech	2014	>2019
BVPS	P - 9.3.003	BVPS - Rehab Orig Forcemain Section over Creek	2014	2018
~~BVPS~~	*~~P - 9.3.004~~*	*~~BVPS - Pavement Seal - PAR~~*	*~~2014~~*	*PAR*
~~BVPS~~	*~~P - 9.3.005~~*	*~~BVPS - Coat Interior of Original Surge Tank - PAR~~*	*~~2014~~*	*PAR*
~~BVPS~~	*~~P - 9.3.006~~*	*~~BVPS - Pump Programming Modifications - PAR~~*	*~~2014~~*	*PAR*
~~BVPS~~	*~~P - 9.3.007~~*	*~~BVPS - Security Fence Modifications - PAR~~*	*~~2014~~*	*PAR*
9.4 Buena Creek Pump Station				
BCPS	P - 9.4.001	BCPS - Modify Disch Valve Installation	2014	>2019
~~BCPS~~	*~~P - 9.4.002~~*	*~~BCPS - Corrosion Repair and Coating - PAR~~*	*~~2014~~*	*PAR*
~~BCPS~~	*~~P - 9.4.003~~*	*~~BCPS - Replace Engine Silencers - PAR~~*	*~~2014~~*	*PAR*
9.5 Carlsbad Water Recycling Facility				
CWRF	P - 9.5.001	CWRF - Failsafe Pipeline	before 2013	2014
CWRF	P - 9.5.002	CWRF - MF Module Replacement	before 2013	2014
CWRF	P - 9.5.003	CWRF - RO Membrane Replacement	2014	>2019
CWRF	P - 9.5.004	CWRF - RO Chem Feed System Modifications	2014	2015
CWRF	P - 9.5.005	CWRF - EQ Basin Cover	2014	>2019
CWRF	P - 9.5.006	CWRF - CCT Cover	2014	>2019
9.6 Reserved for Future				
9.7 Reserved for Future				
9.8 Remote Facilities - General Projects				
General	P - 9.8.001	Remote Facilities - Security System	before 2013	2016
9.9 Studies, Updates, Condition Assessments, R-CAMP Update				
RBPS	CA - 9.9.101	RBPS - FY 2014 Assessments Triggered by Asset Age	2014	-

Group	Project No.	Capital Project *(Blue, Italics Text Indicates Project Completed or ~~Eliminated~~)*	FY Project Added to R-CAMP	Year Constr
RBPS	CA - 9.9.102	RBPS - FY 2017 Assessments Triggered by Asset Age	2014	-
RBPS	CA - 9.9.103	RBPS - FY 2018 Assessments Triggered by Asset Age	2014	-
BVPS	CA - 9.9.301	BVPS - Surge Tank Interior CA	before 2013	-
BVPS	CA - 9.9.302	BVPS - FY 2014 Assessments Triggered by Asset Age	before 2013	-
BVPS	CA - 9.9.303	BVPS - FY 2015 Assessments Triggered by Asset Age	2014	-
BVPS	CA - 9.9.304	BVPS - FY 2016 Assessments Triggered by Asset Age	2014	-
BCPS	CA - 9.9.401	BCPS - FY 2014 Assessments Triggered by Asset	2014	-
BCPS	CA - 9.9.402	BCPS - FY 2017 Assessments Triggered by Asset	2014	-
BCPS	CA - 9.9.403	BCPS - FY 2018 Assessments Triggered by Asset	2014	-
CWRF	*CA - 9.9.501*	*CWRF - GMF Piping and Chemical Systems CA*	*before 2013*	*-*
CWRF	CA - 9.9.502	CWRF - FY 2014 Assessments Triggered by Asset	2014	-
CWRF	CA - 9.9.503	CWRF - FY 2015 Assessments Triggered by Asset	2014	-
RBPS	S - 9.1.001	RBPS - Containment Basin Leakage Study	before 2013	-
CWRF	S - 9.5.002	CWRF - Microfiltration Module Replacement	2014	-
CWRF	S - 9.5.004	CWRF - RO Chem System Modifications	2014	-
General	ES - 9.8.001	R-CAMP Update (2015, 2017, every 2 years)	before 2013	-

Appendix C

EWA Comprehensive Asset Management Plan Methodology

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Appendix C: EWA COMPREHENSIVE ASSET MANAGEMENT PLAN METHODOLOGY

C.1 Background

The Encina Water Pollution Control Facility (EWPCF) has a successful history of asset management through its Master Plan of Rehabilitation and Major Improvement Projects (Master Plan). Originally developed in 1993, the Master Plan became the vehicle to communicate to the EWA Board of Directors the future EWPCF infrastructure improvements and the anticipated resources required for implementation. The Master Plan for the EWPCF utilized a comprehensive ranking system that included seven evaluation categories to determine infrastructure rehabilitation and replacement needs. Those evaluation categories were:

1. Replacement Required
2. Maintain Plant Rated Capacity
3. Cost Efficiency
4. Improve Safety and Working Environment
5. Improve Odor Control
6. Compliance with Regulatory Requirements
7. Improve Energy Efficiency

Each evaluation category was appropriately weighted to an established level of importance ranging from 1 to 10 with 1 being the lowest importance and 10 being the highest importance

C.2 Introduction to the Comprehensive Master Plan (CAMP) Process

This appendix outlines the EWA's approach and basic framework behind the Remote Facilities Comprehensive Asset Management (R-CAMP) process. The CAMP process was developed from the previous Master Plan process, incorporating project needs identification based on asset-based inventory and ongoing condition assessment triggered by approaching of the end of useful life.

EWA developed an initial major asset registry which was used as a basis for the CAMP process. The CAMP process consists of seven unique task elements that provide staff and consultant with a logical framework of progression from beginning to its ultimate conclusion with final publishing and distribution of the R-CAMP update.

The R-CAMP is updated biennially prior to establishing the budget for the upcoming two fiscal years. While the R-CAMP is independent of the budgeting process, it is used as a reference in developing one, five and twenty year capital budgets. The biennial update is utilized in planning capital rehabilitation projects with the consideration of anticipated changes in regulatory compliance, cost-saving opportunities, available funding and ongoing O&M requirements of the Remote Facilities.

The implementation schedule is prepared only after considering the project priority ranking and other factors, such as regulatory compliance deadlines and economy of scale. Typical scheduling of project phases includes:

- Condition Assessment
- Feasibility Study
- Design

- Bid and Construction

Typically the condition assessment is completed at least two years prior to reaching the estimated end of useful life of major assets. A feasibility study or in-kind replacement is scheduled when the asset is confirmed to be nearing the end of its useful life. The study and design phases will consider conventional and alternative delivery methods including design-build (DB), design-build-operate (DBO), design-build-own-operate (DBOO), etc. Construction for projects with design phase of eight months or more is typically scheduled for the year after the design phase.

At the beginning of each fiscal year, the approved R-CAMP projects are initiated. If the cost of implementing an approved project during a fiscal year exceeds the budgeted amount, or if the project is not started in its respective fiscal year, the project can then be re-evaluated for priority ranking and implementation in the following fiscal year.

The R-CAMP is primarily focused on rehabilitation and improvements needed for the existing facilities. Projects considered in the R-CAMP are those needed to maintain the existing facilities, reduce operating costs, meet regulatory requirements, improve odor control, improve plant safety or improve energy efficiency. The R-CAMP also plans for condition assessment, facility studies and other capital plan updates.

Implementation of the R-CAMP is through the following Task Elements:

- Task Element 1 – Define Asset Classes
- Task Element 2 – Develop Asset Inventory
- Task Element 3 – Determine Useful Life
- Task Element 4 – Complete Condition Assessment of Assets Nearing the End of Useful Life
- Task Element 5 – Determine Priority Projects
- Task Element 6 – Estimate Project Costs
- Task Element 7 – Establish Project Implementation Schedule

The EWA budgeting process includes several designations to group capital projects. These are referenced in R-CAMP project summary tables and are described as follows:

- Capital Improvement Projects (CIP): Improvement projects that increase or maintain system capacity. The EWA budgeting process defines Capital Improvement Projects as those valued greater than $20,000. Projects valued between $20,000 and $50,000 will generally not be included in the R-CAMP.
- Planned Asset Replacement (PAR): Asset replacement projects extend the useful life of facilities. The EWA budgeting process defines PAR projects as those valued greater than $20,000. Projects valued between $20,000 and $50,000 will generally not be included in the R-CAMP.
- Capital Acquisition (CA): New assets or facility repair projects valued greater than $2,000 but less than $20,000.
- Major Assets (MjA): Assets valued greater than $50K
- Minor Assets (MnA): Assets valued less than $50K
- Information Systems (IS)
- Improved Technology (IMPR)

The R-CAMP contains detailed supporting documents that provide an organized listing of major assets, estimated useful life of each asset, and scheduled replacement or rehabilitation of each asset. Through the R-CAMP, EWA staff project future expenditures for capital improvement projects, in both the short and long term, and communicates proposed improvements to the Member Agencies and EWA Board of Directors. Discussion of each Task Element occurs in the subsequent paragraphs.

C.3 Major Asset Register

Asset classification within the R-CAMP effectively organizes Remote Facility assets according to functionality. The R-CAMP includes five unique asset classifications that are categorized as follows.

STRUCTURE	MECHANICAL	ELECTRICAL & INSTRUMENTATION	PIPING	MISCELLANEOUS
- Buildings	- Pumps	- Motor Control	- Above Ground	- Fencing
- Pavement	- Barscreens	- Switchgear	- Below Ground	- Etc.
- Tanks	- Air Handling Units	- SCADA	- 4" and Larger	
- Storm Drains	- Slide Gates	- Control Panels	- Critical Piping	
- Vaults	- Collectors	- Electrical Panels	- Etc.	
- Etc.	- Etc.	- Etc.		

C.3.1 Asset Classification

The cornerstone of the EWA's R-CAMP is an accurate inventory of the Remote Facility assets placed in its appropriate asset classification. Assets currently inventoried for each of the Remote Facilities can be found in the **Appendices**. **Appendix D** contains the Major Asset Register Profile that includes assets with a replacement value greater than $10,000.

While only asset rehabilitation projects greater than $50,000 are to be included in this R-CAMP, we have included those assets less than $50,000 based on the strong likelihood that identical assets placed in service at the same time will be combined for replacement or rehabilitation at the end of their useful lives. Combination of these assets would most likely exceed the $50,000 threshold.

In addition, the Remote Facility asset inventory will be reviewed biennially to account for in-house rehabilitation efforts of staff.

Information that is provided in the asset register includes:

- Asset ID
- Asset Description
- Asset Classification
- Asset Location
- Asset Installation Date
- Last Rehabilitation Date of Asset
- Estimated Asset Useful Life
- Estimated Asset Replacement Date
- Estimated Replacement Cost

C.3.2 Asset Useful Life Expectancy

Asset useful life expectancy is an estimation of how long an asset is expected to function in its environment. It is not an exact science. Assets utilized in the wastewater pumping and recycled water processes are generally recognized as "severe-duty" assets routinely exposed to a wide variety of harmful elements. Additionally, facilities located in close proximity to the ocean are subject to corrosive effects of the salt. Asset useful life estimates for the Remote Facilities were determined through in-house staff consultation, benchmarking other wastewater treatment facilities and conducting online research. Useful life estimates of specific assets are adjusted as recommended in the condition assessment process.

Once asset useful life estimations were determined they were placed in the R-CAMP Major Asset Register and Minor Asset Register are used as a basis of rehabilitation or replacement budgeting. As assets near the end of their estimated useful life, a condition assessment is completed to determine if the estimated useful life should be adjusted or if replacement of the asset should be scheduled. **Table C-1** lists general asset useful life initial estimates utilized for the Remote Facilities.

Table C-1: General Asset Useful Life Estimates

Asset	Useful Life (years)	Asset	Useful Life (years)
Actuator	15	Air Conditioner	15
Air Drier	10	Air Handling Units	20
AC Pavement	20	Bar Screens	20
Blowers – MF System	20	Building, Structure	50
Compressed Air	15	Control Panel	15
Electric Conduit, Wiring, and Fixtures	25	Electric Switch Gear	20
Electrical Switch – Alarm	10	Electrical Tie Breaker	20
Fan	25	Fence	10
Filter – Granular Media Filter	25	Filter – Micro Filter	25
Gates - Flap gate	20	Gates - Slide Gate	20
Gates – Sluice Gate, Stainless Steel	30	Gates - Sluice Gate, Cast Iron	20
General Distribution Panel (Power Bldg)	20	Generator, Standby	20

Grit Dewatering Screw Pump	20	Grinder, Channel	15
Hydraulic Unit - Grinder	15	Hydraulic Unit – Bar Screens	20
Instrumentation Analyzers, Flow Meters, Level Sensors	5	Instrumentation Controls	15
Instrumentation Conductivity Meter	10	Level Sensor, Level Transmitter, Level Transducer	7
Lighting, Yard	15	Main Switchgear	30
Motor, Pump – less than 50 hp	5	Motor, Pump – 50 hp or Larger	10
Motor Control Centers	40	Piping - Ductile Iron, Exposed	30
Piping - Ductile Iron, Underground	40	Piping - PVC, Exposed	15
Piping - PVC, Underground	35	Piping - RCP, Underground, Sewers, Storm Drains	50
Piping - Stainless Steel, Exposed	30	Piping - Steel, Underground	30
Pump - Less than 50 hp	10	Pumps - 50 hp to 149 hp (larger pumps may be rebuilt rather than replaced)	15
Pump – 150 hp and Greater (larger pumps may be rebuilt rather than replaced)	20	Structures – Concrete	50
Strainer – Auto	10	Tank – Chemical Storage	15
Tank – Decarborator Tank	15	Tank – Hydropneumatic	15
Tank – Polymer Mixing	15	Tank – Water Air Break	15
Tank – Raw Polymer Storage	15	Tank – Surge Tank	15
Valves - Air Release Valves	10	Valves – Backflow Preventer Valves	10
Valves - Butterfly Valves	20	Valves – Plug Valves	15
Valves – Check Valves	15	Valves – Light Duty	25
Valves – Raw Wastewater	15	Valves – Sludge	15
VFDs	10		

C.4 Condition Assessment

It is critical that the EWA has a clear understanding of the condition of its infrastructure and how it is performing. All management decisions leading to the replacement and rehabilitation of the Remote Facility assets revolve around these two aspects. Not knowing the current condition or performance level of an asset may lead to the premature failure of the asset, which leaves the EWA with only one option: to replace the asset on an emergency basis – usually the most expensive option in the asset management chain.

The unforeseen failure of an asset can have significant consequences that constitute a business risk or potential loss to the EWA. By conducting regular condition assessments and monitoring asset performance, rehabilitation strategies can be updated and refined, and ultimate replacement schedules can be determined more accurately. Condition assessment allows the EWA to understand the remaining life of the Remote Facility assets. This fundamental understanding drives future expenditure patterns.

In FY 2011, EWA initiated a formal condition assessment process for the EWPCF major assets. This process is anticipated to be implemented in 2013 at the remote facilities. The condition assessment documents the current condition of each asset and recommends one of the following:

1) For assets in with remaining useful life, the estimated useful life is extended.
2) Assets with end of useful life projected in the near term, in-kind replacement or replacement as part of a facility upgrade may be recommended.
    a) In-kind replacement is recommended when the equipment technology remains suitable and cost-effective for continued service.
    b) Equipment replacement with newer technology may be recommended. The R-CAMP may include a study to evaluate options and recommend a project to upgrade the facility.

C.5 Priority Project Assignment

Priority project assignment utilizes the established evaluation categories and assigns a weighted value between 1 and 10 with 1 being the lowest importance and 10 being the highest importance. Each project is rated utilizing the seven evaluation categories with priority value assignment ranging from 0 to 3 with 1 representing low relevance, 2 representing medium relevance and 3 representing high relevance. If a specific evaluation category bears no relevance to the priority project it is assigned a 0 rating.

The resulting priority score for each category is determined through the product of the category weight number and the priority value rating. The composite score for each project is the sum of its priority scores in each evaluation category. Recommendation of project implementation is based on each project's composite score.

The priority project rating can vary from year to year based on specific circumstances at the Remote Facilities in that particular year. The evaluation categories with assigned weights and priority ratings are outlined in the subsequent Priority Project Ranking Methodology **Figure C-2**.

Figure C-2: Priority Project Ranking Methodology

EVALUATION CATEGORY	CATEGORY WEIGHT (1 = Lowest Priority)
Safety	Top Priority
Assessed Asset Useful Life reached within 2 years	Top Priority
Regulatory Compliance	Top Priority
Consequence of Failure	6
Odor Control	5
Energy Efficiency	4
Cost Efficiency	3
Assessed Asset Useful Life	2
Organizational Efficiency	1

Evaluation Category Discussion

The following paragraphs describe each prioritization category and the scoring process. First, projects are screened for applicability of the first three categories. If a project receives a "yes" score for these categories, it is classified as a "top priority" project and is recommended for funding in the near term. If a project receives a "no" score for these categories, it is then scored for the following categories.

Safety

The safety category is used to assess improvements needed to maintain a safe working environment for facility personnel. If a project will significantly reduce the risk of an accident occurring or will significantly improve the working environment then it would screen as a safety project.

Assessed Useful Life

The asset useful life evaluation category addresses the need to replace an existing asset that is within two years of the end of its assessed useful life.

Regulatory Compliance

The regulatory compliance evaluation category is used to assess the relative impact of a project and its ability to comply with current or anticipated regulatory requirements such as:

- Effluent discharge criteria
- Air pollution control rules and regulations
- Regulation for storage and handling of hazardous material
- Storm water regulations
- OSHA and other safety regulations

A project would be identified as a top priority project based on regulatory compliance if there is a high level of risk of non-compliance with established regulatory criteria.

Consequence of Failure

The consequence of failure category is used to determine the criticality of an asset. Some assets are more critical than other assets in maintaining the plant capacity, having higher risk of a failure or an accident occurring, or having higher impacts on the ability to comply with regulatory requirements. These critical assets should be managed and/or maintained to a greater degree than less critical assets because of the probability of a failure occurring and the resulting consequences of that failure.

Odor Control

The odor control evaluation category is used to assess whether a project has a significant effect on improving odor control at the EWPCF. In order for an odor source to be rated, it must be noticeable to odor receptors beyond the EWPCF plant boundary.

Energy Efficiency

The energy efficiency evaluation category is used to assess the energy effectiveness of each project. Energy effectiveness can be realized through a reduction of energy usage and costs resulting from the implementation of a project. If a project significantly reduces the EWPCF energy requirements or increases the capability to meet on-site energy demands it would receive a higher rating.

Cost Efficiency

The cost efficiency evaluation category is used to assess the cost effectiveness of each project. Cost effectiveness can be realized through a reduction of operational costs resulting from the implementation of a project. In addition, if a project has a relatively short payback period then it would be designated as cost effective and receive a higher rating.

Assessed Useful Life

The assessed useful life category is used to assess projects related to aging assets. If an asset is within five years of assessed useful life, it will score higher in this category.

Organizational Efficiency

The organizational efficiency evaluation category is used to assess the improvement in safety and working environment for the EWPCF plant personnel if the project is implemented. If a project will improve organizational efficiency by creating a more positive working environment, it receives a high rating.

C.6 Cost Control Considerations

For implementation of each R-CAMP project, the following issues should be considered to control project costs:

1. Where practical, projects should be combined into a single construction contract. This would reduce the volume of contract documents, contract management costs, construction inspection costs, EWA staff time and the general contractor's overhead and supervision costs.

2. Pre-purchase major assets to eliminate Contractor mark-up.

3. Bid projects at the beginning of the fiscal year if bidding climate is favorable.

4. Design and bid similar projects together. This will allow EWA to obtain a favorable bid for multiple units of each asset. O&M costs would be reduced due to simplified training of personnel and a smaller amount of parts inventory.

Appendix D

Project Cost Tables

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Appendix D - Table of Contents

Project 9.1.001

RBPS - Containment Basin Repair

Main Project Type	
New Facility	
Facility Rehabilitation	X
Major Maintenance	
Asset Replacement	
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Jan-11
Estimate Update	Oct-12
Const Year	2016

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Rehab Surface Area, Shotcrete, 4-in [3]	2,200	SF	$ 15	$ 32,450	50%	$ 16,225	$ 48,675
Construction sequencing	1	LS	$ 7,000	$ 7,000	0%	$ -	$ 7,000

Subtotal				**$ 56,000**
Contractor Overhead & Profit @			27%	$ 16,000
Shipping Rate	40%	of total is shipped @	15%	$ 4,000
Sales Tax	50%	of total is taxed @	7.75%	$ 3,000
Project Contingency @			40%	$ 32,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 111,000**
ENR CCI Corresponding to Year of Estimate			10000	
ENR CCI Corresponding to CAMP Report Year			10283	1.028
Total Main Project Cost (CAMP Report Year)				**$ 115,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.1.001 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.1.001 CS	Conceptual Study	0.0%	$ -	20%	$ -	$ -	$10,000	not reqd
9.1.001 DS	Design	8.0%	$ 6,320	15%	$ 948	$ 8,000	$20,000	$ 20,000
9.1.001 EDC	Engr During Construction	4.5%	$ 3,555	15%	$ 533	$ 5,000	$10,000	$ 10,000
9.1.001 CM	Construction Mgt	7.5%	$ 5,925	20%	$ 1,185	$ 8,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 175,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Cost estimate based on installation of new liner of shotcrete on extg basin.

Project 9.1.002

RBPS - Asphalt Pavement Repair

Main Project Type	
New Facility	
Facility Rehabilitation	X
Major Maintenance	
Asset Replacement	
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Oct-12
Estimate Update	Oct-12
Const Year	2015

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Main PS Area - Joint seal cracks (4)	300	LF	$ 4.00	$ 1,200	20%	$ 240	$ 1,440
Main PS Area - Re-seal pavement (4)	2,560	SF	$ 0.85	$ 2,176	40%	$ 870	$ 3,046
PS Access Road - Re-pave (4)	11,760	SF	$ 9.00	$ 105,840	15%	$ 15,876	$ 121,716
Construction staging (4)	1	LS	$ 10,000	$ 10,000	0%	$ -	$ 10,000
AC Berm (5)	1,000	LF	$ 10	$ 10,000	0%	$ -	$ 10,000

Subtotal				**$ 147,000**
Contractor Overhead & Profit @		27%		$ 40,000
Shipping Rate	40% of total is shipped @	15%		$ 9,000
Sales Tax	50% of total is taxed @	7.75%		$ 6,000
Project Contingency @		40%		$ 81,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 283,000**
ENR CCI Corresponding to Year of Estimate			10283	
ENR CCI Corresponding to CAMP Report Year			10283	1.000
Total Main Project Cost (CAMP Report Year)				**$ 283,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.1.002 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.1.002 CS	Conceptual Study	0.0%	$ -	20%	$ -	$ -	$10,000	not reqd
9.1.002 DS	Design	8.0%	$ 16,160	15%	$ 2,424	$ 19,000	$20,000	$ 20,000
9.1.002 EDC	Engr During Construction	4.5%	$ 9,090	15%	$ 1,364	$ 11,000	$10,000	$ 11,000
9.1.002 CM	Construction Mgt	7.5%	$ 15,150	20%	$ 3,030	$ 19,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 344,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Cost estimate based on EWA Post Phase V bid results and RS Means values.
4. Unit Costs based on EWPCF Phase V Improvements Project FY 2013
5. Cost from San Diego County Pump Works Manual, April 2011

Project 9.1.003

RBPS - Security

Main Project Type	
New Facility	
Facility Rehabilitation	
Major Maintenance	
Asset Replacement	
Special Study	X

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Oct-12
Estimate Update	Oct-12
Const Year	2017

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Enhanced Security Fence Modifications (Existing Fence = 250 L	500	LF	$ 4.85	$ 2,425	100%	$ 2,425	$ 4,850
Surveillance video monitoring system and installation							
Video camaras (2)	5	EA	$ 5,000	$ 25,000	100%	$ 25,000	$ 50,000
Wireless communications (3)	1	LS	$ 5,000	$ 5,001	25%	$ 1,250	$ 6,251

Subtotal				**$ 62,000**
Contractor Overhead & Profit @		27%		$ 17,000
Shipping Rate	40% of total is shipped @	15%		$ 4,000
Sales Tax	50% of total is taxed @	7.75%		$ 3,000
Project Contingency @		40%		$ 35,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 121,000**
ENR CCI Corresponding to Year of Estimate			10283	
ENR CCI Corresponding to CAMP Report Year			10283	1.000
Total Main Project Cost (CAMP Report Year)				**$ 121,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.1.003 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.1.003 CS	Conceptual Study	0.0%	$ -	20%	$ -	$ -	$10,000	not reqd
9.1.003 DS	Design	8.0%	$ 6,880	15%	$ 1,032	$ 8,000	$20,000	$ 20,000
9.1.003 EDC	Engr During Construction	4.5%	$ 3,870	15%	$ 581	$ 5,000	$10,000	$ 10,000
9.1.003 CM	Construction Mgt	7.5%	$ 6,450	20%	$ 1,290	$ 8,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 181,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Razor Wire Fence cost estimate based on 2012 RS Means Values
3. Costs based on quotes from manufacturers

Project 9.1.004

RBPS - Redundant PLC

Main Project Type	
New Facility	
Facility Rehabilitation	
Major Maintenance	
Asset Replacement	
Special Study	X

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Oct-12
Estimate Update	Oct-12
Const Year	2014

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
AB Processor/Memory	2	EA	$ 5,000	$ 10,000	100%	$ 10,000	$ 20,000
AB ControlLogix Chassis	2	EA	$ 500	$ 1,000	100%	$ 1,000	$ 2,000
AB Power Supply	2	EA	$ 1,000	$ 2,000	100%	$ 2,000	$ 4,000
AB Ethernet Interface Module	2	EA	$ 2,500	$ 5,000	100%	$ 5,000	$ 10,000
AB Ethernet Adapter Module	2	EA	$ 600	$ 1,200	100%	$ 1,200	$ 2,400
AB ControlLogix System	1	EA	$ 10,000	$ 10,000	100%	$ 10,000	$ 20,000
Sequencing	1	LS	$ 10,000	$ 10,000	0%	$ -	$ 10,000

Subtotal				**$ 69,000**
Contractor Overhead & Profit @		27%		$ 19,000
Shipping Rate	40% of total is shipped @	15%		$ 5,000
Sales Tax	50% of total is taxed @	7.75%		$ 3,000
Project Contingency @		40%		$ 39,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 135,000**
ENR CCI Corresponding to Year of Estimate			10283	
ENR CCI Corresponding to CAMP Report Year			10283	1.000
Total Main Project Cost (CAMP Report Year)				**$ 135,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.1.004 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.1.004 CS	Conceptual Study	0.0%	$ -	20%	$ -	$ -	$10,000	not reqd
9.1.004 DS	Design	8.0%	$ 7,680	15%	$ 1,152	$ 9,000	$20,000	$ 20,000
9.1.004 EDC	Engr During Construction	4.5%	$ 4,320	15%	$ 648	$ 5,000	$10,000	$ 10,000
9.1.004 CM	Construction Mgt	7.5%	$ 7,200	20%	$ 1,440	$ 9,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 195,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Cost estimate will be further defined after the scope of work is identified.
4. Unit costs provided by EWA, based on quote from OneSource, dated 4/5/2012

Project 9.3.001

BVPS - In-Channel Grinder

Main Project Type	
New Facility	
Facility Rehabilitation	
Major Maintenance	
Asset Replacement	X
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Nov-12
Estimate Update	Nov-12
Const Year	2017

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
In-Channel Grinder	2	EA	$ 75,000	$ 150,000	50%	$ 75,000	$ 225,000
Stop plates	4	EA	$ 5,000	$ 20,000	50%	$ 10,000	$ 30,000
Channel modifications	1	LS	$ 40,000	$ 40,000	0%	$ -	$ 40,000
Construction sequencing	1	LS	$ 100,000	$ 100,000	0%	$ -	$ 100,000
Electrical and Controls	1	LS	$ 40,000	$ 40,000	0%	$ -	$ 40,000

Subtotal				**$ 435,000**
Contractor Overhead & Profit @		27%		$ 118,000
Shipping Rate	40% of total is shipped @	15%		$ 27,000
Sales Tax	50% of total is taxed @	7.75%		$ 17,000
Project Contingency @		40%		$ 239,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 836,000**
ENR CCI Corresponding to Year of Estimate			10283	
ENR CCI Corresponding to CAMP Report Year			10283	1.000
Total Main Project Cost (CAMP Report Year)				**$ 836,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.3.001 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	Completed
9.3.001 CS	Conceptual Study	0.0%	$ -	20%	$ -	$ -	$10,000	$ 30,000
9.3.001 DS	Design	8.0%	$ 47,760	15%	$ 7,164	$ 60,000	$20,000	$ 60,000
9.3.001 EDC	Engr During Construction	4.5%	$ 26,865	15%	$ 4,030	$ 31,000	$10,000	$ 30,000
9.3.001 CM	Construction Mgt	7.5%	$ 44,775	20%	$ 8,955	$ 54,000	$30,000	$ 54,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 1,010,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Cost estimate based on quote provided by Misco on Muffin Monster Channel Grinder Model 2410 in Nov 2012.

Project 9.3.002

BVPS - Replace Bubbler System with Alt Tech

Main Project Type	
New Facility	
Facility Rehabilitation	
Major Maintenance	
Asset Replacement	X
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Nov-12
Estimate Update	Nov-12
Const Year	> 2019

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Submersible Level Transducer and Transmitter (4)	1	EA	$ 3,000	$ 3,000	50%	$ 1,500	$ 4,500
Electrical and Controls	1	LS	$ 5,000	$ 5,000	0%	$ -	$ 5,000

Subtotal				**$ 10,000**
Contractor Overhead & Profit @			27%	$ 3,000
Shipping Rate	40%	of total is shipped @	15%	$ 1,000
Sales Tax	50%	of total is taxed @	7.75%	$ 1,000
Project Contingency @			40%	$ 6,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 21,000**
ENR CCI Corresponding to Year of Estimate			10283	
ENR CCI Corresponding to CAMP Report Year			10283	1.000
Total Main Project Cost (CAMP Report Year)				**$ 21,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.3.002 CA	Condition Assessment	1.5%	$ 225	20%	$ 45	$ 1,000	$5,000	not reqd
9.3.002 CS	Conceptual Study	2.5%	$ 275	20%	$ 55	$ 1,000	$10,000	not reqd
9.3.002 DS	Design	8.0%	$ 1,200	15%	$ 180	$ 2,000	$20,000	$ 10,000
9.3.002 EDC	Engr During Construction	4.5%	$ 675	15%	$ 101	$ 1,000	$10,000	$ 10,000
9.3.002 CM	Construction Mgt	7.5%	$ 1,125	20%	$ 225	$ 2,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 71,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Cost estimate will be further defined after the scope of work is identified.
4. Quote 10/2012

Project 9.3.003

BVPS - Rehab Orig Forcemain Section over Creek

Main Project Type	
New Facility	
Facility Rehabilitation	X
Major Maintenance	
Asset Replacement	
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Nov-12
Estimate Update	Nov-12
Const Year	2018

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Rehab Orig forcemain section over Creek (assumed 500 LF of 12" FM) (Scope of improvement to be determined after evaluation is complete.)	500	LS	$ 120	$ 60,000	Incld.	$ -	$ 60,000

Subtotal				**$ 60,000**
Contractor Overhead & Profit @		27%		$ 17,000
Shipping Rate	40% of total is shipped @	15%		$ 4,000
Sales Tax	50% of total is taxed @	7.75%		$ 3,000
Project Contingency @		40%		$ 34,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 118,000**
ENR CCI Corresponding to Year of Estimate			10283	
ENR CCI Corresponding to CAMP Report Year			10283	1.000
Total Main Project Cost (CAMP Report Year)				**$ 118,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.3.003 CA	Condition Assessment	1.5%	$ 1,260	20%	$ 252	$ 2,000	$5,000	not reqd
9.3.003 CS	Conceptual Study	2.5%	$ 1,450	20%	$ 290	$ 2,000	$10,000	not reqd
9.3.003 DS	Design	8.0%	$ 6,720	15%	$ 1,008	$ 8,000	$20,000	$ 20,000
9.3.003 EDC	Engr During Construction	4.5%	$ 3,780	15%	$ 567	$ 5,000	$10,000	$ 10,000
9.3.003 CM	Construction Mgt	7.5%	$ 6,300	20%	$ 1,260	$ 8,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 178,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Cost estimate will be further defined after the scope of work is identified.

Project 9.4.001

BCPS - Modify Disch Valve Installation

Main Project Type	
New Facility	
Facility Rehabilitation	X
Major Maintenance	
Asset Replacement	
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Nov-12
Estimate Update	Nov-12
Const Year	>2019

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Modification of Discharge Valve	6	EA	$ 250	$ 1,500		$ 4,000	$ 5,500

Subtotal				**$ 6,000**
Contractor Overhead & Profit @			27%	$ 2,000
Shipping Rate	40%	of total is shipped @	15%	$ 1,000
Sales Tax	50%	of total is taxed @	7.75%	$ 1,000
Project Contingency @			40%	$ 4,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 14,000**
ENR CCI Corresponding to Year of Estimate			10000	
ENR CCI Corresponding to CAMP Report Year			10283	1.028
Total Main Project Cost (CAMP Report Year)				**$ 15,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.4.001 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.4.001 CS	Conceptual Study	2.5%	$ 200	20%	$ 40	$ 1,000	$10,000	not reqd
9.4.001 DS	Design	8.0%	$ 800	15%	$ 120	$ 1,000	$20,000	$ 10,000
9.4.001 EDC	Engr During Construction	4.5%	$ 450	15%	$ 68	$ 1,000	$10,000	$ 10,000
9.4.001 CM	Construction Mgt	7.5%	$ 750	20%	$ 150	$ 1,000	$30,000	$ 10,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 45,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Scope will be further defined after study of the project needs is complete.

Project 9.5.001

CWRF - Failsafe Pipeline

Main Project Type	
New Facility	X
Facility Rehabilitation	
Major Maintenance	
Asset Replacement	
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Jan-11
Estimate Update	Aug-12
Const Year	2014

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Core Drill 14" hole to inside wall of CCB eff. Channel	1	LS	$ 3,000	$ 3,000	50%	$ 1,500	$ 4,500
Core Drill 14" hole to outside wall of CCB eff. Channel	1	LS	$ 3,000	$ 3,000	50%	$ 1,500	$ 4,500
14" check valve	1	LS	$ 6,000	$ 6,000	50%	$ 3,000	$ 9,000
Excavation Extg Piping Connection & Backfill	150	CY	$ 30	$ 4,500	0%	$ -	$ 4,500
AC Pavement Replacement and Disposal	320	SF	$ 32	$ 10,240	0%	$ -	$ 10,300
Curbs and Gutter Replacement	20	LF	$ 32	$ 640	50%	$ 320	$ 1,000
New DI 14" piping	60	LF	$ 80	$ 4,800	50%	$ 2,400	$ 7,200
14" x 14" tee	1	EA	$ 1,100	$ 1,100	50%	$ 550	$ 1,700
14" Butterfly Valve for Flow Control, suitable for MO	1	EA	$ 3,800	$ 3,800	50%	$ 1,900	$ 5,700
14" elbow	1	EA	$ 1,000	$ 1,000	50%	$ 500	$ 1,500
Precast vault with hatch (4'x6.5'x8' depth)	1	EA	$ 8,000	$ 8,000	50%	$ 4,000	$ 12,000
Standard Motor Operator	1	EA	$ 10,000	$ 10,000	50%	$ 5,000	$ 15,000
Computer Program Update	1	EA	$ 10,000	$ 10,000	0%	$ -	$ 10,000
Carry Over from FY 2013	1	LS	$ (62,380)	$ (62,380)	0%	$ -	$ (62,400)
Subtotal							**$ 25,000**
Contractor Overhead & Profit @				27%			$ 7,000
Shipping Rate	40%	of total is shipped @		15%			$ 2,000
Sales Tax	50%	of total is taxed @		7.75%			$ 1,000
Project Contingency @				40%			$ 14,000
Total Main Project Cost (Year of Estimate or Estimate Update)							**$ 49,000**
ENR CCI Corresponding to Year of Estimate				9200			
ENR CCI Corresponding to CAMP Report Year				10283		1.118	
Total Main Project Cost (CAMP Report Year)							**$ 55,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.5.001 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.5.001 CS	Conceptual Study	0.0%	$ -	20%	$ -	$ -	$10,000	in R-CAMP
9.5.001 DS	Design	38.5%	$ 13,475	15%	$ 2,021	$ 16,000	$20,000	$ 60,000
9.5.001 EDC	Engr During Construction	10.0%	$ 3,500	15%	$ 525	$ 5,000	$10,000	$ 15,000
9.5.001 CM	Construction Mgt	7.5%	$ 2,625	20%	$ 525	$ 4,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 160,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
2. Cost estimate based on RS Means.

Project 9.5.002

CWRF - Microfiltration Filters Replacement

Main Project Type	
New Facility	
Facility Rehabilitation	
Major Maintenance	
Asset Replacement	X
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Nov-12
Estimate Update	Nov-12
Const Year	2014

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Replace MF Filters[3]	168	EA	$ 1,100	$ 184,800	0%	$ -	$ 185,000
Crane Rental	5	Day	$ 1,000	$ 5,000	0%	$ -	$ 5,000
Misc Materials	1	LS	$ 1,000	$ 1,000	0%	$ -	$ 1,000

Subtotal				**$ 191,000**
Contractor Overhead & Profit @		27%		$ 52,000
Shipping Rate	10% of total is shipped @	15%		$ 3,000
Sales Tax	50% of total is taxed @	7.75%		$ 8,000
Project Contingency @		40%		$ 102,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 356,000**
ENR CCI Corresponding to Year of Estimate			10283	
ENR CCI Corresponding to CAMP Report Year			10283	1.000
Total Main Project Cost (CAMP Report Year)				**$ 356,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.5.002 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.5.002 CS	Conceptual Study	0.0%	$ -	20%	$ -	$ -	$10,000	$ 20,000
9.5.002 DS	Design	0.0%	$ -	15%	$ -	$ -	$20,000	$ 10,000
9.5.002 EDC	Engr During Construction	4.5%	$ 11,430	15%	$ 1,715	$ 14,000	$10,000	$ 14,000
9.5.002 CM	Construction Mgt	7.5%	$ 19,050	20%	$ 3,810	$ 23,000	$30,000	not reqd
Total Project Cost (Present Value in 2012 Dollars)								**$ 400,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Cost estimate based on Quote received from Memcor Products, Siemens Water Tech Corp. on January 2008. MF unit contains 2 basins, with 84 modules each. No outside engineering assistance needed. Assume EWA installed.

Project 9.5.003

CWRF - Reverse Osmosis Membrane Replacement

Main Project Type	
New Facility	
Facility Rehabilitation	
Major Maintenance	
Asset Replacement	X
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Jan-11
Estimate Update	Nov-12
Const Year	>2019

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
Replace RO Membrane Elements	210	EA	$ 500	$ 105,000	50%	$ 52,500	$ 158,000

Subtotal				**$ 158,000**
Contractor Overhead & Profit @		27%		$ 43,000
Shipping Rate	50% of total is shipped @	15%		$ 12,000
Sales Tax	50% of total is taxed @	7.75%		$ 7,000
Project Contingency @		40%		$ 88,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 308,000**
ENR CCI Corresponding to Year of Estimate			10000	
ENR CCI Corresponding to CAMP Report Year			10283	1.028
Total Main Project Cost (CAMP Report Year)				**$ 317,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.5.002 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	Not Applicable
9.5.002 CS	Conceptual Study	0.0%	$ -	20%	$ -	$ -	$10,000	$ 15,000
9.5.002 DS	Design	0.0%	$ -	15%	$ -	$ -	$20,000	$ 10,000
9.5.002 EDC	Engr During Construction	4.5%	$ 9,900	15%	$ 1,485	$ 12,000	$10,000	$ 12,000
9.5.002 CM	Construction Mgt	7.5%	$ 16,500	20%	$ 3,300	$ 20,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 384,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Cost estimate based on CWRF preliminary design report, O&M cost estimates for RO membrane elements.

Project 9.5.004

CWRF - RO Chem System Modifications

Main Project Type	
New Facility	
Facility Rehabilitation	X
Major Maintenance	
Asset Replacement	
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Nov-12
Estimate Update	Nov-12
Const Year	2015

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
pH Adjustment System Modifications (Scope of improvement to be determined after evaluation is complete.)	1	LS	$ -	$ -		$ -	$ 50,000
Subtotal							**$ 50,000**
Contractor Overhead & Profit @			27%				$ 14,000
Shipping Rate	40%	of total is shipped @	15%				$ 3,000
Sales Tax	50%	of total is taxed @	7.75%				$ 2,000
Project Contingency @			40%				$ 28,000
Total Main Project Cost (Year of Estimate or Estimate Update)							**$ 97,000**
ENR CCI Corresponding to Year of Estimate				10283			
ENR CCI Corresponding to CAMP Report Year				10283		1.000	
Total Main Project Cost (CAMP Report Year)							**$ 97,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.5.004 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.5.004 CS	Conceptual Study	2.5%	$ 1,175	20%	$ 235	$ 2,000	$10,000	$ 25,000
9.5.004 DS	Design	12.0%	$ 8,280	15%	$ 1,242	$ 10,000	$20,000	$ 20,000
9.5.004 EDC	Engr During Construction	4.5%	$ 3,105	15%	$ 466	$ 4,000	$10,000	$ 10,000
9.5.004 CM	Construction Mgt	7.5%	$ 5,175	20%	$ 1,035	$ 7,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 182,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Scope will be further defined after study of the project needs is complete.

Project 9.5.005

CWRF - EQ Basin Cover

Main Project Type	
New Facility	
Facility Rehabilitation	X
Major Maintenance	
Asset Replacement	
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Mar-09
Estimate Update	Nov-12
Const Year	>2019

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
FRP covers for both compartments of EQ basin (EQ Basin Length 188' x Width 123' x 2 compartments)	46248	SF	$ 32	$ 1,479,936	38%	$ 554,976	$ 2,034,912

Subtotal				**$ 2,035,000**
Contractor Overhead & Profit @		27%		$ 550,000
Shipping Rate	40% of total is shipped @	15%		$ 123,000
Sales Tax	50% of total is taxed @	7.75%		$ 79,000
Project Contingency @		40%		$ 1,115,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 3,902,000**
ENR CCI Corresponding to Year of Estimate			9799	
ENR CCI Corresponding to CAMP Report Year			10283	1.049
Total Main Project Cost (CAMP Report Year)				**$ 4,095,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.5.005 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.5.005 CS	Conceptual Study	2.5%	$ 46,675	20%	$ 9,335	$ 57,000	$10,000	$ 30,000
9.5.005 DS	Design	12.0%	$ 334,440	15%	$ 50,166	$ 385,000	$20,000	$ 60,000
9.5.005 EDC	Engr During Construction	4.5%	$ 125,415	15%	$ 18,812	$ 145,000	$10,000	$ 20,000
9.5.005 CM	Construction Mgt	7.5%	$ 209,025	20%	$ 41,805	$ 251,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 4,235,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Scope will be further defined after study of the project needs is complete. Cost based on quote provided by Endurocomposites for FRP Cover System on March 2009

Project 9.5.006

CWRF - CCT Cover

Main Project Type	
New Facility	
Facility Rehabilitation	X
Major Maintenance	
Asset Replacement	
Special Study	

Key Dates	
CAMP Report	Jan-14
Initial Estimate	Mar-09
Estimate Update	Nov-12
Const Year	>2019

Main Project Cost[1]	Quantity No.	Units	Material Cost Unit Cost	Material Cost Total	Labor Cost % of Mat'l	Labor Cost Total	Total Cost
Project Task Elements							
FRP covers for both compartments of EQ basin (CCT Length 150' x Width 36')	5400	SF	$ 32	$ 172,800	38%	$ 64,800	$ 237,600

Subtotal				**$ 238,000**
Contractor Overhead & Profit @		27%		$ 65,000
Shipping Rate	40% of total is shipped @	15%		$ 15,000
Sales Tax	50% of total is taxed @	7.75%		$ 10,000
Project Contingency @		40%		$ 132,000
Total Main Project Cost (Year of Estimate or Estimate Update)				**$ 460,000**
ENR CCI Corresponding to Year of Estimate			9799	
ENR CCI Corresponding to CAMP Report Year			10283	1.049
Total Main Project Cost (CAMP Report Year)				**$ 483,000**

Project Phases Cost		Rate[2]	Amount	Contingency		Subtotal	Minimum	Total
9.5.006 CA	Condition Assessment	0.0%	$ -	20%	$ -	$ -	$5,000	not reqd
9.5.006 CS	Conceptual Study	2.5%	$ 5,550	20%	$ 1,110	$ 7,000	$10,000	$ 20,000
9.5.006 DS	Design	12.0%	$ 39,360	15%	$ 5,904	$ 46,000	$20,000	$ 46,000
9.5.006 EDC	Engr During Construction	4.5%	$ 14,760	15%	$ 2,214	$ 17,000	$10,000	$ 17,000
9.5.006 CM	Construction Mgt	7.5%	$ 24,600	20%	$ 4,920	$ 30,000	$30,000	$ 30,000
Total Project Cost (Present Value in 2012 Dollars)								**$ 596,000**

Notes:

1. For most projects Main Project cost is construction cost, however Main Project Cost could be bypass pumping or similar costs.
2. Percent of Total Main Project Cost.
3. Scope will be further defined after study of the project needs is complete. Cost based on quote provided by Endurocomposites for FRP Cover System on March 2009.

Appendix E

Major Asset Register

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Table E-1: Carlsbad Water Reclamation Facility Major Asset List												
Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	Nominal Useful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008)	Cost to Replace @ LA ENR (Oct 2012)	Cost Total @ 15% O&P and 20% Cont
										9224	10283	
187	THICKENER	THICKENER SYSTEM	Mech	2003		15			2018	$183,000	$201,900	$278,600
208	M-0906-1	AUTO STRAINER # 1 - MF	Mech	2003		15			2018	$20,000	$22,100	$30,500
209	M-0906-2	AUTO STRAINER # 2 -MF	Mech	2003		15			2018	$20,000	$22,100	$30,500
									Subtotal for Projects Requiring Replacement in next 5 years (prior to 2018)			$339,600
236	2" PVC PIPE	PIPE - 2" PVC CHEMICAL PIPING	Mech	2004		15			2019	$7,350	$8,200	$11,300
237	1" PVC PIPE	PIPE - 1" PVC WATER PIPING	Mech	2004		15			2019	10720	$11,900	$16,400
1	RO	RO SYSTEM	Mech	2003		20			2023	$1,300,000	$1,434,000	$1,978,900
87	FE/FIT-0907-001	FLOW METER - MF FEED, 10"	Ele/Inst	2005	2008	15		Added 3/10/08	2023	$8,000	$8,900	$12,300
									Subtotal for Projects Requiring Replacement in next 6 to 10 years (2019 to 2023)			$2,018,900
223	ORNA. FENCE	FENCE - ORNAMENTAL (FRONT SIDE)	Struc	2004		20			2024	$15,675	$17,300	$23,900
219	AS PAVEMENT	PAVEMENT - ASHPHALT	Struc	2004		20			2024	$99,400	$109,700	$151,400
220	CURBS	CURBS & GUTTER REPLACEMENT	Struc	2004		20			2024	$42,224	$46,600	$64,300
222	FENCE	FENCE - 8' HIGH CHAIN	Struc	2004		20			2024	$30,600	$33,800	$46,600
84	MF	MICROFILTER SYSTEM	Mech	2003		30		Containerized PROACT CMF-S Unit, 8' wx 40' l x 9.5' h, with 84 modules, 2 CMF-S cells, Backwash storage, CIP tanks	2033	$1,650,000	$1,820,000	$2,511,600
									Sub-total of Projects Requiring Replacement in next 11 to 20 years (2024 to 2033)			$2,797,800
135	GMF	GMF SYSTEM	Mech	2005		30			2035	$600,000	$661,900	$913,400
234	10" PVC PIPE	PIPE - BURIED, 10" PVC WATER	Mech	2004		35			2039	$97,600	$107,700	$148,600
235	6" PVC PIPE	PIPE - BURIED, 6" PVC PIPING	Mech	2004		35			2039	$33,060	$36,500	$50,400
224	36" DI PIPE	PIPE - BURIED, 36" DIP	Mech	2004		40			2044	$149,800	$165,300	$228,100
225	30" DI PIPE	PIPE - BURIED, 30" DIP	Mech	2004		40			2044	$228,500	$252,100	$347,900
227	18" DI PIPE	PIPE - BURIED, 18" DIP	Mech	2004		40			2044	$154,850	$170,900	$235,800
228	16" DI PIPE	PIPE - BURIED, 16" DIP	Mech	2004		40			2044	$101,700	$112,200	$154,800
229	14" DI PIPE	PIPE - BURIED, 14" DIP	Mech	2004		40			2044	$105,000	$115,900	$159,900
230	12" DI PIPE	PIPE - BURIED, 12" DIP	Mech	2004		40			2044	$100,200	$110,600	$152,600
231	8" DI PIPE	PIPE- BURIED, 8" DIP	Mech	2004		40			2044	$130,000	$143,400	$197,900
232	4" DI PIPE	PIPE - BURIED, 4" DIP	Mech	2004		40			2044	$14,500	$16,000	$22,100
218	CCB	CHLORINE CONTACT BASIN	Struc	2004		50			2054	$626,250	$690,800	$953,300

Table E-1: Carlsbad Water Reclamation Facility Major Asset List												
Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	Nominal Useful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008)	Cost to Replace @ LA ENR (Oct 2012)	Cost Total @ 15% O&P and 20% Cont
										9224	10283	
233	18" RCP PIPE	PIPE - BURIED, 18" REINFORCED CONCRETE PIPING	Mech	2004		50			2054	$163,000	$179,800	$248,100
221	CWRF	PAVEMENT - CONCRETE, + POLES & ROOFS	Struc	2004		50			2054	$655,800	$723,400	$998,300
											Subtotal for Projects Requiring Replacement in more than 20 years (past 2034)	$4,811,200
											TOTAL COST	$9,967,500

Table E-2: Buena Creek Pump Station Major Asset List												
Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	NominalUseful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008) 9224	Cost to Replace @ LA ENR (Oct 2012) 10283	Cost Total @ 15% O&P and 20% Cont
2	M-11010-000	MOTOR - #1 SEWAGE PUMP	Elec/Inst	2002		10			2012	$30,000	$33,100	$45,700
3	M-11020-000	MOTOR - #2 SEWAGE PUMP	Elec/Inst	2002		10			2012	$30,000	$33,100	$45,700
4	M-11030-000	MOTOR - #3 SEWAGE PUMP	Elec/Inst	2002		10			2012	$30,000	$33,100	$45,700
5	M-11040-000	MOTOR - #4 SEWAGE PUMP	Elec/Inst	2002		10			2012	$30,000	$33,100	$45,700
6	M-11050-000	MOTOR - #5 SEWAGE PUMP	Elec/Inst	2002		10			2012	$30,000	$33,100	$45,700
16	FE-11020-000	FLOW METER - ENCINA FORCEMAIN 14"	Elec/Inst	2002		10		Flow Tube Data; Cal #0944704104109157005; Model 8705TSA140C1W0N0; S/N 0870080246; Trace # 556171	2012	$14,000	$15,500	$21,400
65	VFD-11010-000	VFD - #1, SEWAGE PUMP BCPS	Elec/Inst	2002		10			2012	$31,000	$34,200	$47,200
66	VFD-11020-000	VFD - #2, SEWAGE PUMP BCPS	Elec/Inst	2002		10			2012	$31,000	$34,200	$47,200
67	VFD-11030-000	VFD - #3, SEWAGE PUMP BCPS	Elec/Inst	2002		10			2012	$31,000	$34,200	$47,200
68	VFD-11040-000	VFD - #4, SEWAGE PUMP BCPS	Elec/Inst	2002		10			2012	$31,000	$34,200	$47,200
69	VFD-11050-000	VFD - #5, SEWAGE PUMP BCPS	Elec/Inst	2002		10			2012	$31,000	$34,200	$47,200
14	AE-11010-000	GAS ANALYZER DRY WELL	Elec/Inst	2002	2006	10			2016	$9,000	$9,930	$13,700
25	T-11000-000	SURGE TANK, ENCINA FORCEMAIN	MECH	2002		15		National Building No. 8127	2017	$90,000	$99,300	$137,000
48	V-11200-C01	PLUG VALVE - 24" FORCE MAIN	MECH	2002		15		24" Plug Valve	2017	$22,800	$25,200	$34,800
70	PNL-11000-000	CONTROL PANEL - PLC (BCPS)	Elec/Inst	2002		15		Panel Manufactured by Kota Electric in San Diego	2017	$67,500	$74,500	$102,800
											Sub-total of Projects Requiring Replacement in next 5 years (prior to 2018)	**$774,200**
72	GDR-11020-000	CHANNEL GRINDER UNIT #2	MECH	2002	2006	15		Spare Unit in Warehouse	2021	$82,000	$90,500	$124,900
7	P-11010-000	PUMP - #1, SEWAGE	MECH	2002		20			2022	$40,000	$44,200	$61,000
64	ATS-11000-000	AUTOMATIC TRANSFER SWITCH	Elec/Inst	2002	2007	15			2022	$24,500	$27,100	$37,400
52	AC PAVING	PAVEMENT - AC	STRUC	2002		20			2022	$24,500	$27,100	$37,400
53	FENCE	FENCE - 8' HIGH CHAIN LINK	STRUC	2002		20			2022	$11,000	$12,200	$16,800
77	G-11000-000	EMERGENCY STANDBY GENERATOR / 500 KW	Elec/Inst	2002		20		765 HP, 1800 RPM	2022	$125,000	$137,900	$190,300
82	ORF-11000-000	ODOR CONTROL UNIT -BIO-FILTER	MECH	2002		20		MODULAR P600 produce has been discontinued and requested the replacement cost by similar unit.	2022	$100,000	$110,400	$152,400
71	GDR-11010-000	CHANNEL GRINDER UNIT #1	MECH	2002	2008	15		Spare Unit in Warehouse	2023	$82,000	$90,500	$124,900
											Sub-total of Projects Requiring Replacement in next 6 to 10 years (2019 to 2023)	**$745,100**

Table E-2: Buena Creek Pump Station Major Asset List												
Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	NominalUseful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008)	Cost to Replace @ LA ENR (Oct 2012)	Cost Total @ 15% O&P and 20% Cont
										9224	10283	
8	P-11020-000	PUMP - #2, SEWAGE	MECH	2002	2007	20			2027	$40,000	$44,200	$61,000
9	P-11030-000	PUMP - #3, SEWAGE	MECH	2002	2008	20			2028	$40,000	$44,200	$61,000
10	P-11040-000	PUMP - #4, SEWAGE	MECH	2002	2008	20			2028	$40,000	$44,200	$61,000
11	P-11050-000	PUMP - #5, SEWAGE	MECH	2002	2008	20			2028	$40,000	$44,200	$61,000
62	12" WW-UNBURIED	PIPE - EXPOSED, 12" WW FORCEMAIN, DIP	MECH	2002		30			2032	$55,000	$60,665	$83,700
											Sub-total of Projects Requiring Replacement in next 11 to 20 years (2024 to 2033)	**$327,700**
56	24" WW-BURIED	PIPE - BURIED, 24" WW FORCEMAIN, DIP	MECH	2002		40			2042	$20,000	$22,060	$30,400
57	18" WW-BURIED	PIPE - BURIED, 18" INFLUENT/OVERFLOW WW PIPELINE, DIP	MECH	2002		40			2042	$25,000	$27,575	$38,100
58	14" WW-BURIED	PIPE - BURIED, 14" EXCESS EFFLUENT WW PIPELINE, DIP	MECH	2002		40			2042	$38,000	$41,914	$57,800
59	12" WW-BURIED	PIPE - BURIED, 12" WW FORCEMAIN, DIP	MECH	2002		40			2042	$24,000	$26,472	$36,500
60	8"-WW-BURIED	PIPE - BURIED, 8" WW SOLID LINE, DIP	MECH	2002		40			2042	$30,000	$33,090	$45,700
1	MCC-11000-000	MOTOR CONTROL PANEL	Elec/Inst	2002		40		Serial Numbers: P334809, P334810,P334811,P333202,P333203, P333204, P333205, P333206, P334803	2042	$75,000	$82,726	$114,200
54	BASIN	BASIN - OVERFLOW	STRUC	2002		50			2052	$25,000	$27,575	$38,100
83	BLD-11000-000	BUILDING - BUENA CREEK PUMP STATION	STRUC	2002		50		2080 South Melrose	2052	$556,800	$614,154	$847,500
84	WET WELL	BUILDING - WET WELL	STRUC	2002		50			2052	$2,479,444	$2,734,844	$3,774,100
											Subtotal of Projects Requiring Replacement in Over 20 years (past 2034)	**$4,982,400**
											TOTAL COST	**$6,829,400**

Table E-3: Raceway Pump Station Major Asset List

Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	Nominal Useful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008)	Cost to Replace @ LA ENR (Oct 2012)	Cost Total @ 15% O&P and 20% Cont
										9224	10283	
43	VFD-12002-000	VFD - SEWAGE PUMP # 2 RWPS	Elec/Inst	2007		10			2017	$26,400	$29,200	$40,296
44	VFD-12003-000	VFD - DRIVE SEWAGE PUMP # 3 RWPS	Elec/Inst	2007		10			2017	$26,400	$29,200	$40,296
47	8-WW-Buried	PIPE - BURIED, 8" SEWER FORCE MAIN - DI, C-150, RWPS	Mech	2007		10			2017	$13,000	$14,400	$19,872
52	2-W	PIPE - BURIED, 2" WATER SUPPLY LINE, SCH 80 PVC 3' COVER, 452 LF, RWPS	Mech	2007		10			2017	$10,000	$11,100	$15,318
53	FENCE	FENCE - 8' HIGH CHAIN LINK, RWPS	Struc	2007		10			2017	$8,200	$9,100	$12,558
42	VFD-12001-000	VFD - SEWAGE PUMP # 1, RWPS	Elec/Inst	2007	2008	10			2018	$26,400	$29,200	$40,296
									Sub-total of Projects Requiring Replacement in next 5 years (prior to 2018)			**$168,636**
14	GDR-12000-000	CHANNEL GRINDER, RWPS	Mech	2006		15			2021	$60,000	$66,200	$91,400
1	ATS-12000-000	AUTOMATIC TRANSFER SWITCH , RWPS	Elec/Inst	2007		15			2022	$10,000	$11,100	$15,300
20	P-12001-000	PUMP - #1 SEWAGE PUMP, SUBMERSIBLE, 75 HP, RWPS	Mech	2007	2008	15		75 HP	2023	$40,000	$44,200	$61,000
21	P-12002-000	PUMP - #2 SEWAGE PUMP, SUBMERSIBLE, 75 HP, RWPS	Mech	2007		15		75 HP	2022	$40,000	$44,200	$61,000
22	P-12003-000	PUMP - #3 SEWAGE PUMP, SUBMERSIBLE, 75 HP, RWPS	Mech	2007		15		75 HP	2022	$40,000	$44,200	$61,000
24	PLC-12000-000	PLC, RWPS	Elec/Inst	2007		15			2022	$10,000	$11,100	$15,300
									Sub-total of Projects Requiring Replacement in next 6 to 10 years (2019 to 2023)			**$305,000**
19	ORF-12000-000	ODOR CONTROL SCRUBBER SYSTEM, LOW-FLOW, RWPS	Mech	2005		20		Asset added 2/22/08 JK	2025	$26,000	$28,700	$39,600
25	SLG-12009-000	SLUICE GATE - WET WELL GRINDER SIDE, 16", RWPS	Mech	2007		20		Sub Survace Valve with Can	2027	$10,000	$11,100	$15,300
26	SLG-12010-000	SLUICE GATE - WET WELL BAR RACK SIDE, 16", RWPS	Mech	2007		20		Sub Survace Valve with Can	2027	$10,000	$11,100	$15,300
54	AC PAVING	PAVEMENT, AC - PUMP STATION SITE, RWPS	Struc	2007		20			2027	$17,000	$18,800	$25,900
9	E-12000-000	ENGINE - EMERGENCY STANDBY GENERATOR, RWPS	Elec/Inst	2007		20			2027	$115,000	$126,900	$175,100
									Sub-total of Projects Requiring Replacement in next 11 to 20 years (2024 to 2033)			**$271,200**
18	MCC-12001-000	MOTOR CONTROL CENTER, RWPS	Elec/Inst	2005		40			2045	$20,000	$22,100	$30,500
3	BLD-12000-000	BUILDING-RACEWAY PUMP STATION	Struc	2007		50			2057	$68,000	$75,100	$103,600
28	STR-12001-000	EMERGENCY OVERFLOW STORAGE POND, RWPS	Struc	2007		50			2057	$25,000	$27,600	$38,100
29	STR-12003-000	WET WELL, RWPS	Struc	2007		50			2057	$43,000	$47,500	$65,600
									Sub-total of Projects Requiring Replacement in over 20 years (past 2034)			**$237,800**
									TOTAL COST			**$982,636**

Table E-4: Buena Vista Pump Station Major Asset List

Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	NominalUseful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008) 9224	Cost to Replace @ LA ENR (Oct 2012) 10283	Cost Total @ 15% O&P and 20% Cont
19	M-9904-000	MOTOR- #4 SEWAGE PUMP	Elec/Inst	1996		10		HP300, VOLTS 460, Frame 449TC, Design B, Type P, RPM 1185, AMPS 341, HZ 60	2006	$30,000	$33,500	$46,200
43	PCP-9800-000	PANEL-PUMP CONTROL	Elec/Inst	1995		15		TESCO, Updated: 4/07 JF	2010	$29,800	$33,300	$46,000
62	CKV-9901-000	CHECK VALVE - SEWAGE PUMP #1, 14"	Mech	1995		15		Updated 4/07, Added to PM Schedule 5/7/07.	2010	$10,000	$11,200	$15,500
63	CKV-9902-000	CHECK VALVE - SEWAGE PUMP #2, 14"	Mech	1995		15		Updated 4/07, Added to PM Schedule 5/7/07.	2010	$10,000	$11,200	$15,500
64	CKV-9904-000	CHECK VALVE - SEWAGE PUMP #4, 14"	Mech	1995		15		Updated 4/07	2010	$10,000	$11,200	$15,500
66	V-9795-010	PLUG VALVE - DIP FORCE MAIN W/RESTRAINT, 24"	Mech	1995		15		Valmatic 24" Plug Valve	2010	$22,800	$25,500	$35,200
67	V-9795-011	PLUG VALVE - RESTRAINED MECH., 16"	Mech	1995		15		Valmatic 16" PLUG VALVE + 24"-16" Reducer	2010	$10,500	$11,800	$16,300
68	V-9795-012	PLUG VALVE - FORCE MAIN, 16"	Mech	1995		15		Valmatic	2010	$10,500	$11,800	$16,300
69	V-9795-041	PLUG VALVE - FORCEMAIN, 24"	Mech	1995		15		Valmatic	2010	$22,800	$25,500	$35,200
79	V-9961-000	PLUG VALVE - 20" F/M ISOLATION	Mech	1995		15		Valmatic	2010	$11,500	$12,900	$17,800
80	V-9965-000	PLUG VALVE - 20" F/M ISOLATION	Mech	1995		15		Valmatic	2010	$11,500	$12,900	$17,800
81	V-9970-000	PLUG VALVE - 20" F/M ISOLATION	Mech	1995		15		Valmatic	2010	$11,500	$12,900	$17,800
109	PNL-9815-000	PANEL-GRINDER LEVEL	Elec/Inst	1996		15		UPADTED 4/07	2011	$21,000	$23,500	$32,400
118	PVL-9770-000	TANK-HYDROPNEUMATIC TANK	Mech	1996		15		Levure Welding & Manufacturing, Long Beach, CA; Capacity: 646 CUFT, WP. 125 PSI	2011	$8,700	$9,700	$13,400
146	PNL-9820-000	PANEL - BARSCREEN CONTROL PNL	Elec/Inst	1996		15		Updated 4/07	2011	$29,800	$33,300	$46,000
58	SWP-9901-000	PANEL-SEAL WATER-#1SEWAGE PUMP	Mech	1996		15			2011	$29,800	$33,300	$46,000
59	SWP-9902-000	PANEL-SEAL WATER-#2SEWAGE PUMP	Mech	1996		15			2011	$29,800	$33,300	$46,000
60	SWP-9904-000	PANEL-SEAL WATER-#4 SEWAGE PUMP	Mech	1996		15			2011	$29,800	$33,300	$46,000
61	SWP-9905-000	PANEL-SEAL WATER-#5 SEWAGE PUMP	Mech	1996		15			2011	$29,800	$33,300	$46,000
117	HU-9820-000	HYDRAULIC UNIT-GRINDER	Mech	1996		15		MDL: H3-10.7N3D02EP0X3386C, SER K17G79, 30 GALL TNK, PMP FLOW 10.7 GPM, MAX PRESS 2600 PSI, PARKER FLUID POWER SYST,UPDATED: 4/07 JF	2011	$9,000	$10,100	$13,900
65	CKV-9905-000	CHECK VALVE - SEWAGE PUMP #5, 14"	Mech	1996		15		Updated 4/07	2011	$10,000	$11,200	$15,500
20	M-9905-000	MOTOR- #5 SEWAGE PUMP	Elec/Inst	1996	2003	10		HP300, VOLTS 460, Frame 449TC, Design B, Type P, RPM 1185, AMPS 341, HZ 60	2013	$30,000	$33,500	$46,200

Table E-4: Buena Vista Pump Station Major Asset List

Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	NominalUseful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008) 9224	Cost to Replace @ LA ENR (Oct 2012) 10283	Cost Total @ 15% O&P and 20% Cont
125	ATS-9801-000	SWITCH-AUTO TRANSFER SW-#1 GEN.	Elec/Inst	1994		20		BOM NUMBER: 48796; ATS/CP STYLE : 7A; AMPS: 1200; VOLTAGE: 480; PHASE: 3	2014	$29,000	$32,400	$44,700
17	M-9901-000	MOTOR- #1 SEWAGE PUMP	Elec/Inst	1996	2004	10		HP300, VOLTS 460, Frame 449TC, Design B, Type P, RPM 1185, AMPS 341, HZ 60	2014	$30,000	$33,500	$46,200
128	ATS-9803-00B	AUTOTRANSFER SWITCH	Elec/Inst	1994		20			2014	$29,000	$32,400	$44,700
91	FENCE	FENCE	Struc	1995		20			2015	$10,800	$12,100	$16,700
122	SLG-9980-000	SLUICE GATE-WET WELL	Mech	1995		20		36" x 36" Sluice Gate	2015	$15,000	$16,800	$23,200
138	MBA-9900-000	MAIN BREAKER, MCC-1	Elec/Inst	1995		20		Series: K HORIZ: 1200 VERT:300 NO:J889053 BUS RATED 600 VOLTAC 3 PHASE, UPDATED: 4/07 JF	2015	$8,050	$9,000	$12,400
139	MBB-9900-000	MAIN BREAKER, MCC-2	Elec/Inst	1995		20		Series: K HORIZ: 1200 VERT:300 NO:J892670 BUS RATED 600 VOLTAC 3 PHASE	2015	$8,050	$9,000	$12,400
140	MBT-9900-000	MAIN TIE BREAKER, BVPS	Elec/Inst	1995		20		Series: K HORIZ: 1200 VERT: NO:J704855 BUS RATED 600 VOLTAC 3 PHASE	2015	$8,050	$9,000	$12,400
163	MME-9750-000	DOOR-ROLL-UP (GENERATOR RM)	Mech	1995		20			2015	$8,100	$9,100	$12,600
92	PAVEMENT	PAVEMENT - ASPHALT	Struc	1995		20			2015	$31,800	$35,500	$49,000
110	PNL-9830-000	CONTROL PANEL FOR SURGE TANK	Elec/Inst	2001		15		Updated 4/07	2016	$29,800	$33,300	$46,000
120	PVL-9830-000	SURGE TANK - FORCEMAIN	Mech	2001		15		Updated: 4/07 JF	2016	$86,000	$95,900	$132,300
132	G-9801-000	ENGINE, EMERGENCY GENERATOR #1 / 750KW	Elec/Inst	1996		20		Prior to changing the hour meter for any reason, notify APCD	2016	$130,000	$145,000	$200,100
133	G-9802-000	ENGINE, EMERGENCY GENERATOR #2 / 750 KW	Elec/Inst	1996		20		Prior to changing the hour meter for any reason, notify APCD	2016	$130,000	$145,000	$200,100
148	C-9750-000	CRANE-CHAIN HOIST (GENERATOR RM)	Mech	1996		20		UPDATED 4/07	2016	$10,000	$11,200	$15,500
18	M-9902-000	MOTOR- #2 SEWAGE PUMP	Elec/Inst	1996	2007	10		HP300, VOLTS 460, Frame 449TC, Design B, Type P, RPM 1185, AMPS 341, HZ 60	2017	$30,000	$33,500	$46,200
								Sub-total of Projects Requiring Replacement in next 5 years (Prior to 2018)				**$1,561,000**
100	VFD-9901-000	PANEL - VFD, #1 SEWAGE PUMP MOTOR	Elec/Inst	1995	2009	10			2019	$46,000	$51,300	$70,800
101	VFD-9902-000	PANEL - VFD, #2 SEWAGE PUMP MOTOR	Elec/Inst	1995	2009	10			2019	$46,000	$51,300	$70,800
102	VFD-9904-000	PANEL - VFD, #4 SEWAGE PUMP MOTOR	Elec/Inst	1995	2009	10			2019	$46,000	$51,300	$70,800
103	VFD-9905-000	PANEL - VFD, #5 SEWAGE PUMP MOTOR	Elec/Inst	1995	2009	10			2019	$46,000	$51,300	$70,800
147	PNL-9880-000	WET WELL CONTROL PANEL	Elec/Inst	1996	2004	15			2019	$29,800	$33,300	$46,000

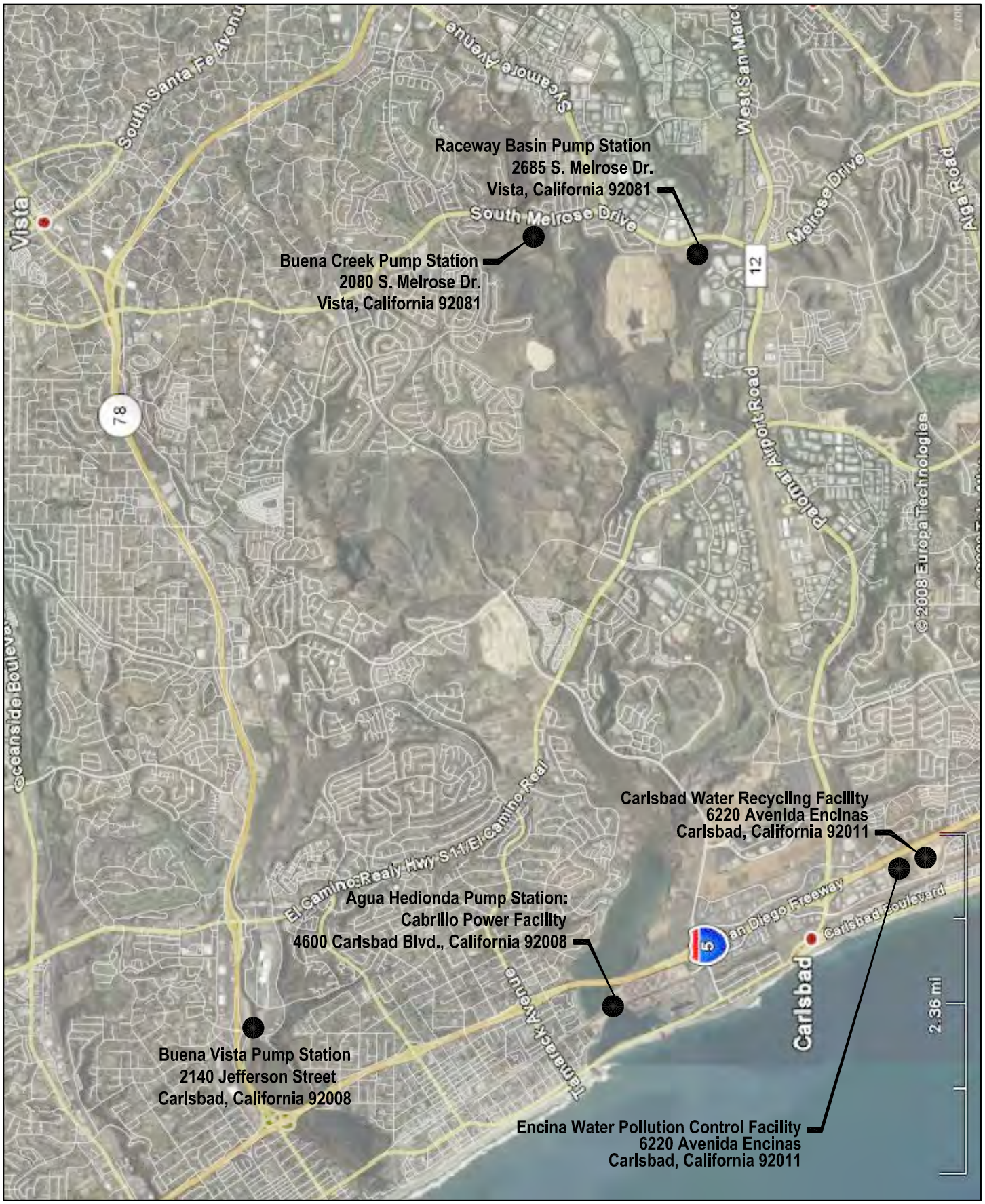
Table E-4: Buena Vista Pump Station Major Asset List

Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	NominalUseful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008) 9224	Cost to Replace @ LA ENR (Oct 2012) 10283	Cost Total @ 15% O&P and 20% Cont
108	PNL-9800-000	PANEL-WET WELL BUBBLER	Elec/Inst	1995	2005	15		TESCO,3434 52ND AVE,SACRAMENTO, CA 95823, 916-395-8800, ENCLOSURE:TYPE 3R &12, UPDATED: 4/07 JF	2020	$65,000	$72,500	$100,100
116	GDR-9820-000	GRINDER-@B.V	Mech	1996	2008	15			2023	$55,200	$61,600	$85,000
											Sub-total of Projects Requiring Replacement in next 6 to 10 years (2019 to 2023)	$231,100
160	SCR-9815-000	BARSCREEN #1	Mech	1996	2004	20			2024	$278,000	$310,000	$427,800
161	HU-9815-000	HYDRAULIC UNIT- BARSCREEN	Mech	1996	2004	20		Model :PU10138, SER: 122069, A&L MFG HYD INC.	2024	$12,000	$13,400	$18,500
88	14" WW BURIED	PIPE - EXPOSED, 14" DIP	Mech	1995		30			2025	$22,000	$24,600	$33,900
89	20" WW BURIED	PIPE- EXPOSED, 20" DIP	Mech	1995		30			2025	$12,300	$13,800	$19,000
126	ATS-9802-000	SWITCH-AUTO TRANSFER SW.- #2 GEN	Elec/Inst	1994	2006	20		BOM NUMBER: 48796; ATS/CP STYLE : 7A; AMPS: 1200; VOLTAGE: 480; PHASE: 3	2026	$29,000	$32,400	$44,700
127	ATS-9803-00A	AUTOTRANSFER SWITCH	Elec/Inst	1994	2006	20		BOM NUMBER: 427144; ATS/CP STYLE : NON AUTOAMPS: 1200; VOLTAGE: 480; PHASE: 3	2026	$29,000	$32,400	$44,700
23	P-9904-000	PUMP - #4 SEWAGE	Mech	1995	2006	20			2026	$58,000	$64,700	$89,300
24	P-9905-000	PUMP - #5 SEWAGE	Mech	1995	2007	20			2027	$58,000	$64,700	$89,300
21	P-9901-000	PUMP - #1 SEWAGE	Mech	1995	2008	20			2028	$58,000	$64,700	$89,300
22	P-9902-000	PUMP - #2 SEWAGE	Mech	1995	2008	20			2028	$58,000	$64,700	$89,300
104	AE-9772-000	DETECTOR-GAS/OXYGEN ALARM UNIT (BVPS)	Elec/Inst	1996	2008	20			2028	$8,100	$9,100	$12,600
83	8" STORM DRAIN BURIED	PIPE - BURIED, 8" PVC STORM DRAIN PIPING	Mech	1995		35			2030	$18,200	$20,300	$28,000
84	12" STORM DRAIN BURIED	PIPE - BURIED, 12" PVC STORM DRAIN PIPING	Mech	1995		35			2030	$12,000	$13,400	$18,500
82	4" P. DRAIN BURIED	PIPE - BURIED, 4" PVC PIPING PERFORATED DRAIN	Mech	1995		35			2030	$19,250	$21,500	$29,700
											Sub-total of Projects Requiring Replacement in next 11 to 20 years (2024 to 2033)	$1,034,600
85	16" WW BURIED	PIPE - BURIED, 16" DIP	Mech	1995		40			2035	$43,200	$48,200	$66,500
86	24" WW BURIED	PIPE - BURIED, 24" DIP	Mech	1995		40			2035	$9,000	$10,100	$13,900
95	30" WW BURIED	PIPE - BURIED, 30" DIP	Mech	1995		40			2035	$11,250	$12,600	$17,400
141	MCC-9800-A00	MOTOR CONTROL CENTER-#A	Elec/Inst	1995		40			2035	$58,000	$64,700	$89,300
142	MCC-9800-B00	MOTOR CONTROL CENTER-#B	Elec/Inst	1995		40			2035	$58,000	$64,700	$89,300
94	WETWELL	BUILDING-WETWELL	Struc	1995		50			2045	$100,000	$111,500	$153,900
164	STR-9790-000	STRUCTURE - VAULT FOR FLOW METER	Struc	1995		50		Valmatic	2045	$10,000	$11,200	$15,500
165	BLD-9750-000	BUILDING-BUENA VISTA PUMP STA.	Struc	1995		50			2045	$1,200,000	$1,337,900	$1,846,300
											Subtotal of Projects Requiring Replacement in over 20 years (past 2034)	**$2,292,100**
											TOTAL COST	**$5,118,800**

Table E-5: Agua Hedionda Pump Station Major Asset List

Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	NominalUseful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008) 9224	Cost to Replace @ LA ENR (Oct 2012) 10283	Cost Total @ 15% O&P and 20% Cont
83	SLG-9710-000	SLUICE GATE-INFLUENT CHANNEL (48" x 48")	Mech	1976		20		New AHPS under const.	1996	$23,000	$25,400	$35,100
42	M-9630-000	MOTOR-#3 SEWAGE PUMP, AHPS	Elec/Inst	1986		10		New AHPS under const.	1996	$25,000	$27,600	$38,100
28	LS-9500-000	SWITCH-SEAL WATER PUMP START/STOP, AHPS	Elec/Inst	1988		10		New AHPS under const.	1998	$18,750	$20,700	$28,600
43	M-9640-000	MOTOR-#4 SEWAGE PUMP, AHPS	Elec/Inst	1988		10		New AHPS under const.	1998	$25,000	$27,600	$38,100
111	8' FENCE	FENCE - CHAIN LINK FENCE, 8' HIGH, AHPS	Struc	1988		10		New AHPS under const.	1998	$16,600	$18,400	$25,400
65	LCP-9720-000	PANEL-BARSCREEN LEVEL CONTROLLER, AHPS	Elec/Inst	1988		15		New AHPS under const.	2003	$40,900	$45,200	$62,400
66	PNL-9720-000	PANEL-BARSCREEN CONTROLLER, AHPS	Elec/Inst	1988		15		New AHPS under const.	2003	$29,800	$32,900	$45,400
84	CKV-9610-000	CHECK VALVE - #1 SEWAGE PUMP, AHPS	Mech	1988		15		New AHPS under const.	2003	$12,000	$13,300	$18,400
85	CKV-9620-000	CHECK VALVE - #2 SEWAGE PUMP, AHPS	Mech	1988		15		New AHPS under const.	2003	$12,000	$13,300	$18,400
86	CKV-9630-000	CHECK VALVE - #3 SEWAGE PUMP, AHPS	Mech	1988		15		New AHPS under const.	2003	$12,000	$13,300	$18,400
87	CKV-9640-000	CHECK VALVE - #4 SEWAGE PUMP, AHPS	Mech	1988		15		New AHPS under const.	2003	$12,000	$13,300	$18,400
15	GCP-9500-000	PANEL-GENERATOR MONITORING, AHPS	Elec/Inst	1988		15		New AHPS under const.	2003	$7,900	$8,800	$12,100
32	PNL-9504-000	PANEL-TELEMETRY TRANSMITTER, AHPS	Elec/Inst	1990		15		New AHPS under const.	2005	$27,900	$30,800	$42,500
33	PNL-9600-000	PANEL-PUMP CONTROL, AHPS	Elec/Inst	1990		15		New AHPS under const.	2005	$74,300	$82,000	$113,200
40	M-9610-000	MOTOR-#1 SEWAGE PUMP, AHPS	Elec/Inst	1976	1997	10		New AHPS under const.	2007	$25,000	$27,600	$38,100
29	MBA-9700-A00	MAIN BREAKER - # A, AHPS	Elec/Inst	1988		20		New AHPS under const.	2008	$8,050	$8,900	$12,300
41	M-9620-000	MOTOR-#2 SEWAGE PUMP, AHPS	Elec/Inst	1988	1998	10		New AHPS under const.	2008	$25,000	$27,600	$38,100
7	G-9702-000	GENERATOR-#2 / 300 KW, AHPS	Elec/Inst	1990		20		Prior to changing the hour meter for any reason, notify APCD. New AHPS under constr.	2010	$67,000	$74,000	$102,100
11	ATS-9702-000	SWITCH-AUTO TRANSFER SWITCH-#2 GENERATOR, AHPS	Elec/Inst	1990		20		Serial #: 995928 New AHPS under const.	2010	$24,500	$27,100	$37,400
12	ATS-9703-000	SWITCH-AUTO TRANSFER SWITCH - #2 GENERATOR, AHPS	Elec/Inst	1990		20		Asset created after annual service 8/14/07 JK, Voltac:480, Serial Number: 995927-2, AMPS :800 New AHPS under const.	2010	$24,500	$27,100	$37,400
49	VFD-9620-000	VARIABLE FREQUENCY DRIVE - #2 SEWAGE PUMP, AHPS	Elec/Inst	2001		10		Horiz: 800 Vert: 300NO: N647382 Series :L Bus Rated 600 Voltac 3 Phase Updated: 4/07 JF New AHPS under const.	2011	$46,000	$50,800	$70,100
50	VFD-9630-000	VARIABLE FREQUENCY DRIVE - #3, SEWAGE PUMP, AHPS	Elec/Inst	2001		10		New AHPS under const.	2011	$46,000	$50,800	$70,100
51	VFD-9640-000	VARIABLE FREQUENCY DRIVE - #4, SEWAGE PUMP, AHPS	Elec/Inst	2001		10		New AHPS under const.	2011	$46,000	$50,800	$70,100
48	VFD-9610-000	VARIABLE FREQUENCY DRIVE - #1 SEWAGE PUMP, AHPS	Elec/Inst	1997		15		Series: M Horiz: 800 Vert: 300 No:P997868 Bus Rated 600 Voltage 3 Phase. New AHPS under const.	2012	$46,000	$50,800	$70,100
99	BLD-9500-000	BUILDING-AQUA HEDIONDA PUMP STATION, AHPS	Struc	1966		50		New AHPS under const.	2016	$180,000	$198,600	$274,100

Table E-5: Agua Hedionda Pump Station Major Asset List												
Item No.	Asset ID	Asset Description	Asset Class	Install Year	Last Refurb or Replace Date (Year)	NominalUseful Life (Years)	Assessed Useful Life (Years)	Comments	Replace Date (Year)	Estimated Replace Cost Book Value (May 2008)	Cost to Replace @ LA ENR (Oct 2012)	Cost Total @ 15% O&P and 20% Cont
										9224	10283	
105	18" WW	PIPE - WW PIPE, 18" INSIDE PUMP STATION, AHPS	Struc	1988		30		Ductile Iron. New AHPS under const.	2018	$26,560	$29,300	$40,400
											Sub-total of Projects Requiring Replacement in next 5 years (Prior to 2018)	**$1,374,800**
30	MBT-9700-T00	BREAKER - MAIN TIE, AHPS	Elec/Inst	1990	2001	20		New AHPS under const.	2021	$8,050	$8,900	$12,300
68	GDR-9730-000	GRINDER - AHPS	Mech	1988	2006	15		New AHPS under const.	2021	$90,000	$99,300	$137,000
70	PNL-9730-000	PANEL-GRINDER CONTROL	Elec/Inst	1988	2007	15		New AHPS under const.	2022	$43,100	$47,600	$65,700
63	SCR-9720-000	BARSCREEN-INFLUENT CHANNEL, AHPS	Mech	1988	2003	20		New AHPS under const.	2023	$285,000	$314,400	$433,900
											Sub-total of Projects Requiring Replacement in next 6 to 10 years (2019 to 2023)	**$648,900**
44	P-9610-000	PUMP-#1 SEWAGE, AHPS	Mech	1976	2005	20		Frane: 447 VP. New AHPS under const.	2025	$82,000	$90,500	$124,900
46	P-9630-000	PUMP-#3 SEWAGE, AHPS	Mech	1988	2005	20		Frame: 447 VP, Total Head: 32.7 Type: Impeller / Stage Diameter 17". New AHPS under const.	2025	$82,000	$90,500	$124,900
1	G-9701-000	GENERATOR-#1 / 300 KW, AHPS	Elec/Inst	2006		20		Prior to changing the hour meter for any reason, notify APCD. New AHPS under const.	2026	$67,000	$74,000	$102,100
5	ATS-9701-000	SWITCH-AUTO TRANSFER SWITCH-#1 GENERATOR, AHPS	Elec/Inst	2006		20		Serial # : 995927-1, CAT # : E940380097X, Amps:800, Voltage: 480. New AHPS under const.	2026	$24,500	$27,100	$37,400
6	ATS-9700-000	SWITCH-AUTO TRANSFER SWITCH - #1 GENERATOR, AHPS	Elec/Inst	2006		20		RUSSELECTRIC, MODEL: RMT- 1002BE, MODEL: RMT- 1002BE. New AHPS under const.	2026	$24,500	$27,100	$37,400
47	P-9640-000	PUMP-#4 SEWAGE, AHPS	Mech	1986	2008	20		Frame: 447 VP, Total Head: 32.7 Type: Impeller / Stage Diameter 17", New AHPS under const.	2028	$82,000	$90,500	$124,900
45	P-9620-000	PUMP-#2 SEWAGE, AHPS	Mech	1988	2008	20		Frame: 447 VP, Total Head: 32.7 Type: Impeller / Stage Diameter 17". New AHPS under const.	2028	$82,000	$90,500	$124,900
31	MCC-9640-000	MOTOR CONTROL CENTER-MISC EQUIPMENT,	Elec/Inst	1990		40		New AHPS under const.	2030	$60,500	$66,800	$92,200
											Sub-total of Projects Requiring Replacement in next 11 to 20 years (2024 to 2033)	**$768,700**
102	STR-WETWELL	STRUCTURE - WET WELL, AHPS	Struc	1988		50		New AHPS under const.	2038	$48,000	$53,000	$73,100
100	BLD-9700-000	BUILDING-GENERATOR, AHPS	Struc	1988		50		New AHPS under const.	2038	$83,600	$92,300	$127,400
101	STR-9740-000	STRUCTURE-OVERFLOW BASIN, AHPS	Struc	1988		50		New AHPS under const.	2038	$243,000	$268,100	$370,000
											Subtotal of Projects Requiring Replacement in over 20 years (past 2034)	**$570,500**
											TOTAL COST	**$3,362,900**



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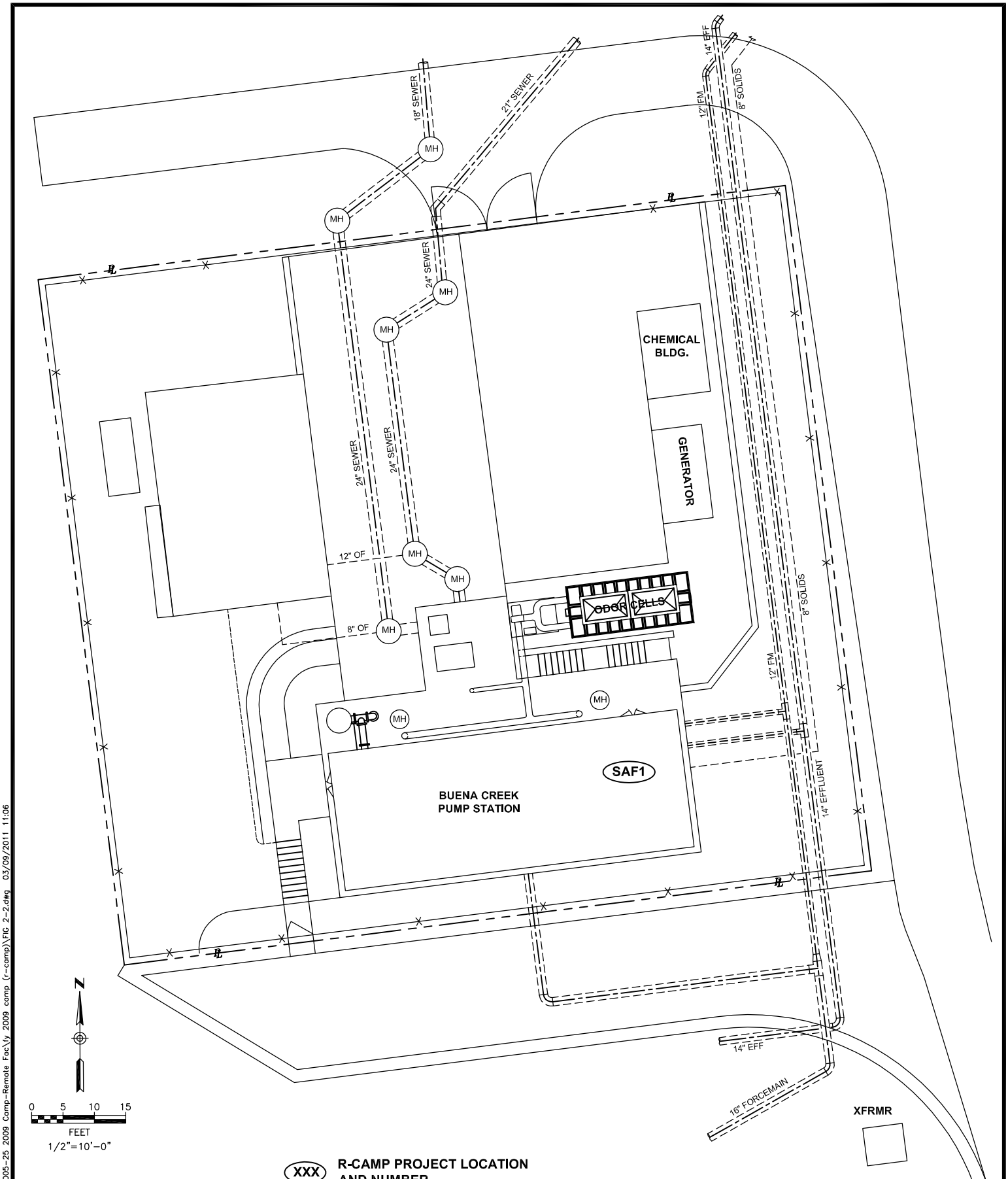
EWA REMOTE FACILITIES CAMP
REMOTE FACILITY LOCATIONS
FIGURE 2-1

PRINTED: Wed, 09 Mar 2011 – 10:24am P:\0305 – ENCINA\005-25 2009 CAMP-REMOTE FAC\FY 2009 CAMP (R-CAMP)\FIG 2-1.DWG



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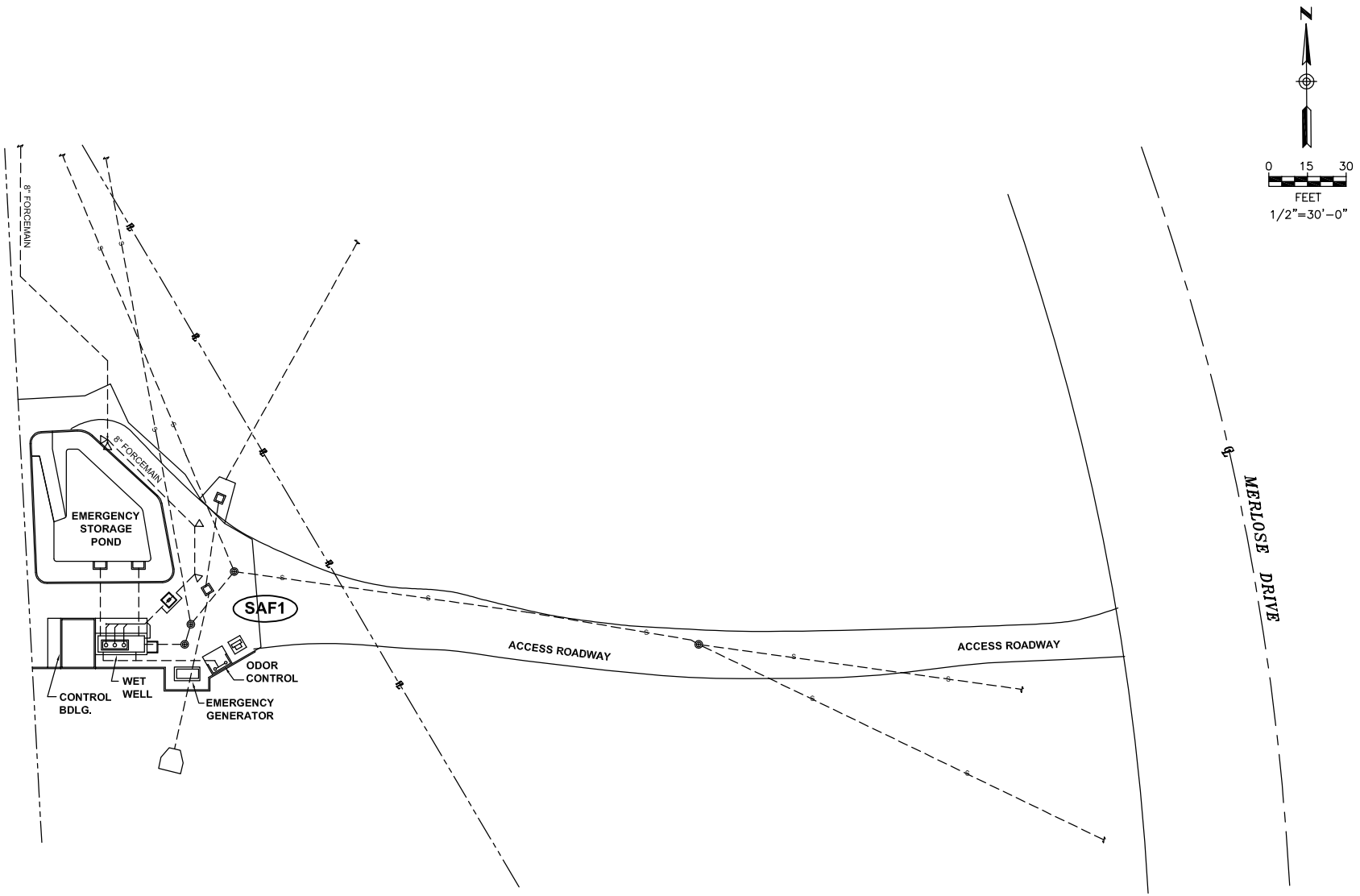
EWA REMOTE FACILITIES CAMP
BUENA CREEK PUMP STATION
FIGURE 2-2

P:\0305 - Encina\005-25 2009 Camp-Remote Fac\fy 2009 camp (r-camp)\FIG 2-2.dwg 03/09/2011 11:06

PRINTED: Wed, 09 Mar 2011 - 11:06am P:\0305 - ENCINA\005-25 2009 CAMP-REMOTE FAC\FY 2009 CAMP (R-CAMP)\FIG 2-2.DWG



XXX R-CAMP PROJECT LOCATION AND NUMBER

RMC Water & Environment

EWA REMOTE FACILITIES CAMP
RACEWAY BASIN PUMP STATION
FIGURE 2-3

P:\0305 - ENCINA\005-25 2009 CAMP-REMOTE FAC\FY 2009 CAMP (R-CAMP)\FIG 2-3.DWG
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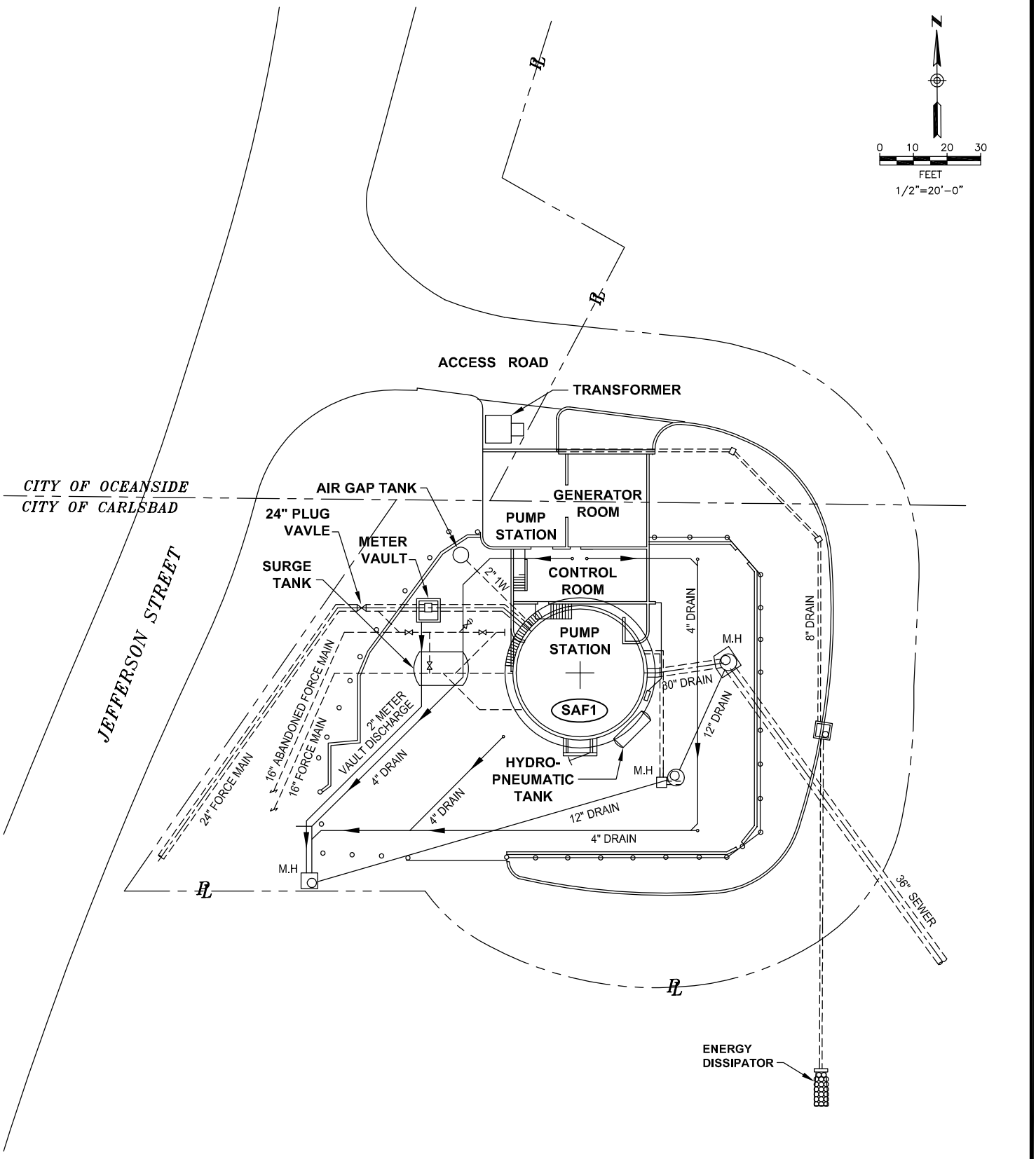

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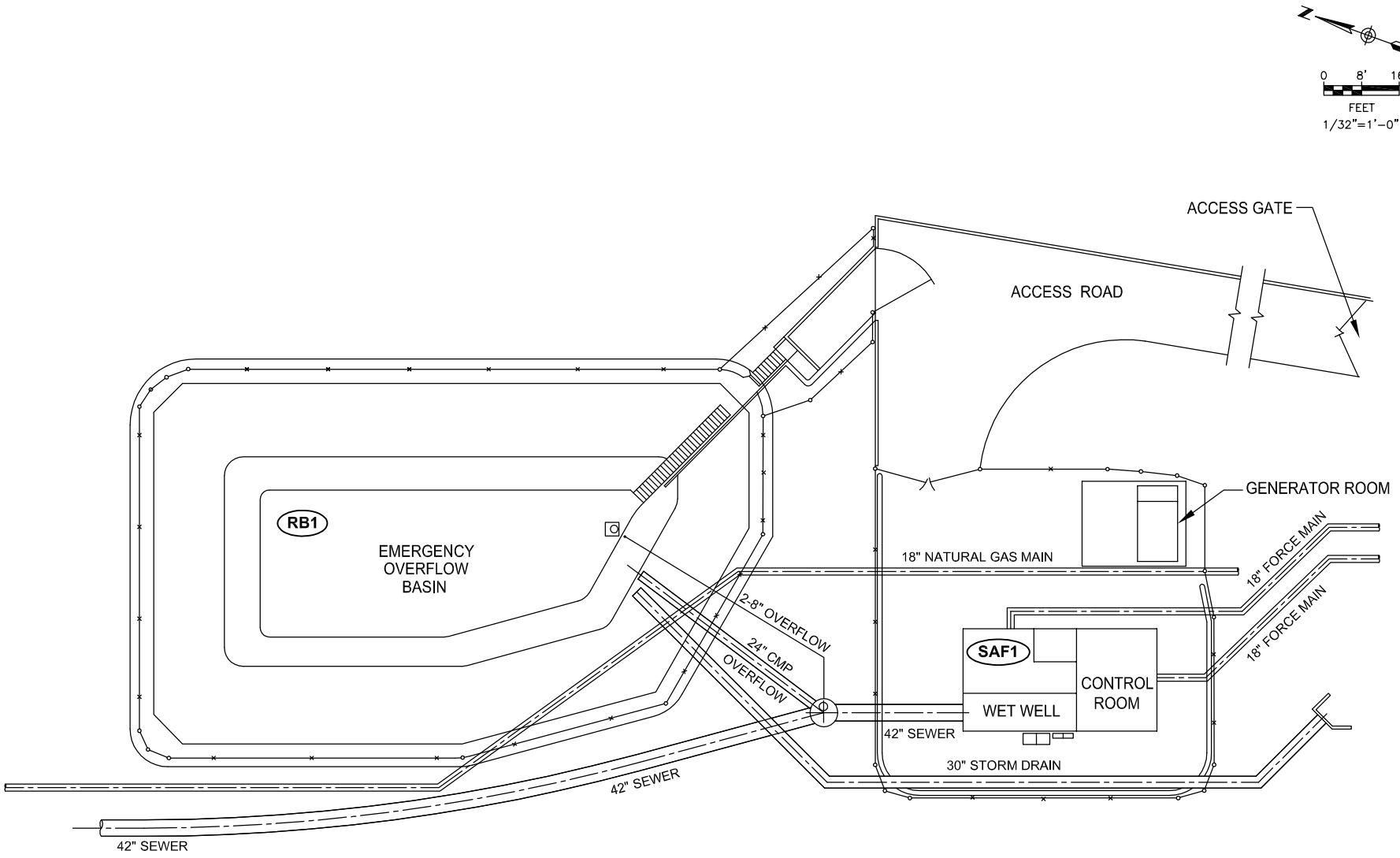
EWA REMOTE FACILITIES CAMP
BUENA VISTA PUMP STATION
FIGURE 2-4

PRINTED: Wed, 09 Mar 2011 – 11:04am P:\0305 – ENCINA\005-25 2009 CAMP-REMOTE FAC\FY 2009 CAMP (R-CAMP)\FIG 2-4 REV2-NC.DWG



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EWA REMOTE FACILITIES CAMP
AGUA HEDIONDA PUMP STATION
FIGURE 2-5

P:\0305 - ENCINA\005-25 2009 CAMP-REMOTE FAC\FY 2009 CAMP (R-CAMP)\FIG 2-5 REV2-NC.DWG
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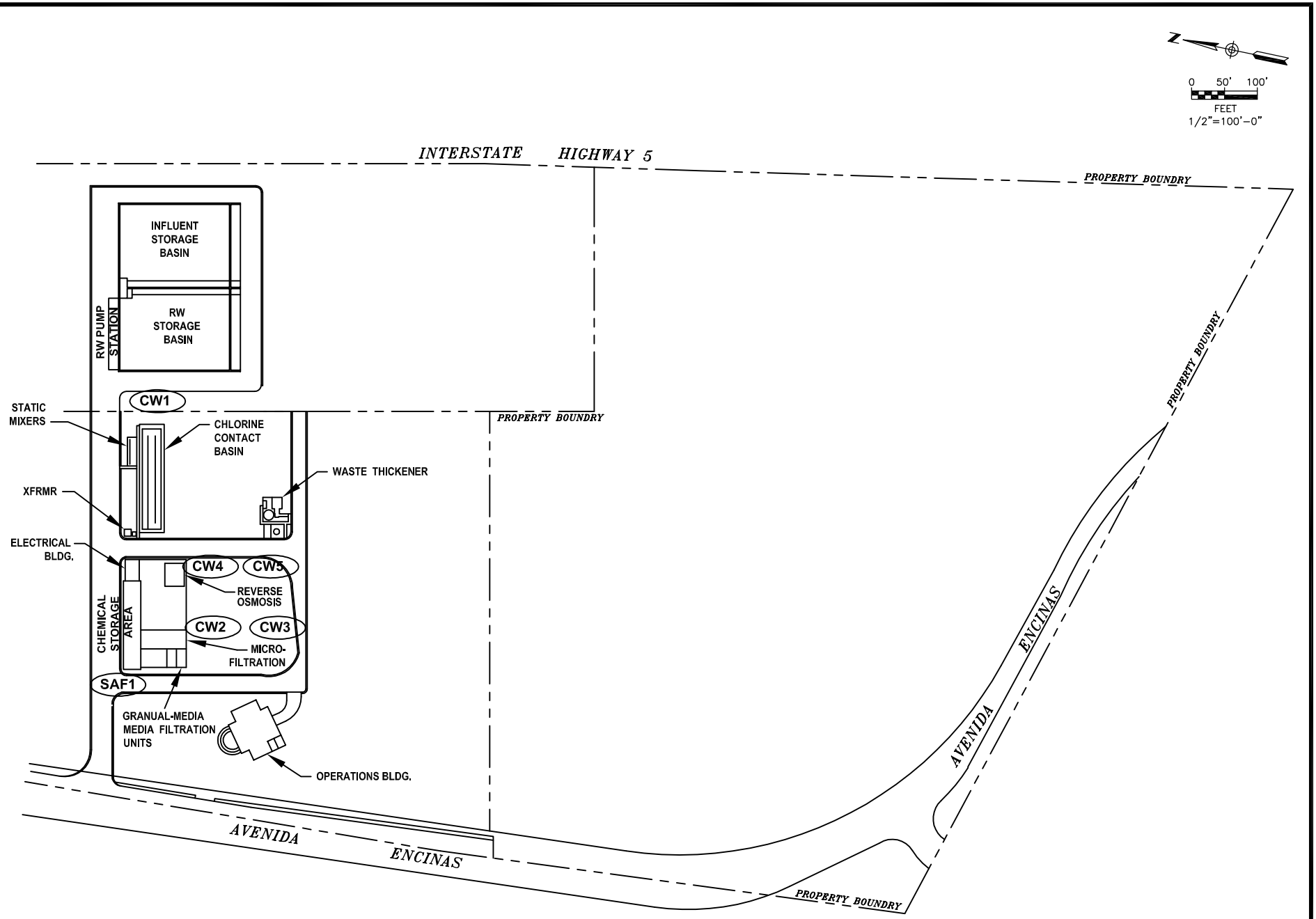

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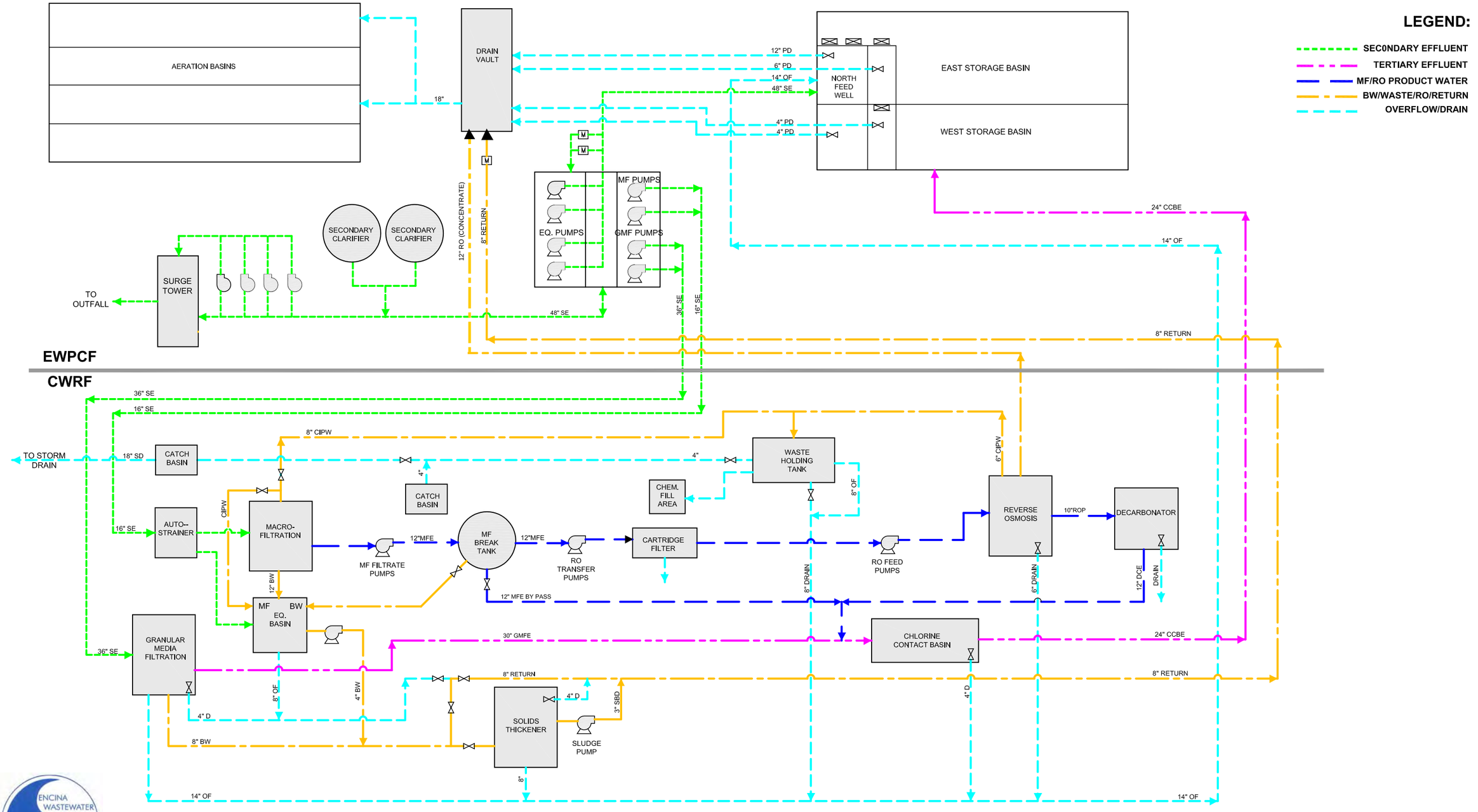
EWA REMOTE FACILITIES CAMP
CARLSBAD WRF SITE PLAN
FIGURE 2-6



ENCINA WASTEWATER AUTHORITY
Serving North San Diego County

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CARLSBAD
WATER RECLAMATION FACILITY
PROCESS FLOW DIAGRAM

D:\w3\Projects\Encina-energy (005-28)\FLOW DIAGRAM.dwg 07/29/2008 14:19