

**Serving:**

Anaheim

Brea

Buena Park

Cypress

Fountain Valley

Fullerton

Garden Grove

Huntington Beach

Irvine

La Habra

La Palma

Los Alamitos

Newport Beach

Orange

Placentia

Santa Ana

Seal Beach

Stanton

Tustin

Villa Park

County of Orange

Costa Mesa  
Sanitary District

Midway City  
Sanitary District

Irvine Ranch  
Water District

Yorba Linda  
Water District



## Orange County Sanitation District

10844 Ellis Avenue, Fountain Valley, CA 92708

714.962.2411 • [www.ocsd.com](http://www.ocsd.com)

February 26, 2020

### **NOTICE OF MEETING**

#### OPERATIONS COMMITTEE ORANGE COUNTY SANITATION DISTRICT

**Wednesday, March 4, 2020 – 5:00 P.M.**

Administration Building  
10844 Ellis Avenue  
Fountain Valley, California 92708  
[WWW.OCSD.COM](http://WWW.OCSD.COM)

A regular meeting of the Operations Committee of the Orange County Sanitation District will be held at the above location, date, and time.

***Our Mission:** To protect public health and the environment by providing effective wastewater collection, treatment, and recycling.*

<b>OPERATIONS COMMITTEE MEETING DATE</b>	<b>BOARD MEETING DATE</b>
03/04/20	03/25/20
04/01/20	04/22/20
05/06/20	05/27/20
06/03/20	06/24/20
07/01/20	07/22/20
<b>AUGUST DARK</b>	08/26/20
09/02/20	09/23/20
10/07/20	10/28/20
11/04/20	<b>11/18/20 *</b>
12/02/20	<b>12/16/20 *</b>
<b>JANUARY DARK</b>	01/27/21
02/03/21	02/24/21

***\* Meeting will be held on the third Wednesday of the month***

**ORANGE COUNTY SANITATION DISTRICT**  
**BOARD OF DIRECTORS**  
**Complete Roster**

Effective 02/19/2020

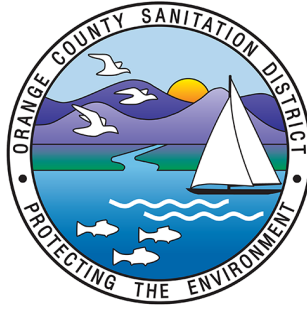
<b>AGENCY/CITIES</b>	<b>ACTIVE DIRECTOR</b>	<b>ALTERNATE DIRECTOR</b>
Anaheim	Lucille Kring	Denise Barnes
Brea	Glenn Parker	Cecilia Hupp
Buena Park	Fred Smith	Connor Traut
Cypress	Mariellen Yarc	Stacy Berry
Fountain Valley	Steve Nagel	Patrick Harper
Fullerton	Jesus J. Silva	Jan Flory
Garden Grove	Steve Jones	John O'Neill
Huntington Beach	Erik Peterson	Lyn Semeta
Irvine	Christina Shea	Anthony Kuo
La Habra	Tim Shaw	Rose Espinoza
La Palma	Peter Kim	Nitesh Patel
Los Alamitos	Richard Murphy	Dean Grose
Newport Beach	Brad Avery	Joy Brenner
Orange	Mark Murphy	Kim Nichols
Placentia	Chad Wanke	Ward Smith
Santa Ana	Cecilia Iglesias	David Penaloza
Seal Beach	Sandra Massa-Lavitt	Schelly Sustarsic
Stanton	David Shawver	Carol Warren
Tustin	Allan Bernstein	Chuck Puckett
Villa Park	Robert Collacott	Chad Zimmerman

**Sanitary/Water Districts**

Costa Mesa Sanitary District	James M. Ferryman	Bob Ooten
Midway City Sanitary District	Andrew Nguyen	Margie L. Rice
Irvine Ranch Water District	John Withers	Douglas Reinhart
Yorba Linda Water District	Brooke Jones	Phil Hawkins

**County Areas**

Board of Supervisors	Doug Chaffee	Donald P. Wagner
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**Orange County Sanitation District  
OPERATIONS COMMITTEE  
Regular Meeting Agenda  
Wednesday, March 4, 2020 - 5:00 PM  
Board Room  
Administration Building  
10844 Ellis Avenue  
Fountain Valley, CA 92708  
(714) 593-7433**

**ACCOMMODATIONS FOR THE DISABLED:** Meeting Rooms are wheelchair accessible. If you require any special disability related accommodations, please contact the Orange County Sanitation District Clerk of the Board's office at (714) 593-7433 at least 72 hours prior to the scheduled meeting. Requests must specify the nature of the disability and the type of accommodation requested.

**AGENDA POSTING:** In accordance with the requirements of California Government Code Section 54954.2, this agenda has been posted outside the main gate of the Sanitation District's Administration Building located at 10844 Ellis Avenue, Fountain Valley, California, and on the Sanitation District's website at [www.ocsd.com](http://www.ocsd.com) not less than 72 hours prior to the meeting date and time above. All public records relating to each agenda item, including any public records distributed less than 72 hours prior to the meeting to all, or a majority of the Board of Directors, are available for public inspection in the office of the Clerk of the Board.

**AGENDA DESCRIPTION:** The agenda provides a brief general description of each item of business to be considered or discussed. The recommended action does not indicate what action will be taken. The Board of Directors may take any action which is deemed appropriate.

**MEETING AUDIO:** An audio recording of this meeting is available within 24 hours after adjournment of the meeting. Please contact the Clerk of the Board's office at (714) 593-7433 to request the audio file.

**NOTICE TO DIRECTORS:** To place items on the agenda for a Committee or Board Meeting, the item must be submitted in writing to the Clerk of the Board: Kelly A. Lore, MMC, (714) 593-7433 / [klore@ocsd.com](mailto:klore@ocsd.com) at least 14 days before the meeting.

**FOR ANY QUESTIONS ON THE AGENDA, BOARD MEMBERS MAY CONTACT STAFF AT:**

General Manager: Jim Herberg, [jherberg@ocsd.com](mailto:jherberg@ocsd.com) / (714) 593-7300  
Asst. General Manager: Lorenzo Tyner, [lttyner@ocsd.com](mailto:lttyner@ocsd.com) / (714) 593-7550  
Asst. General Manager: Rob Thompson, [rthompson@ocsd.com](mailto:rthompson@ocsd.com) / (714) 593-7310  
Director of Human Resources: Celia Chandler, [cchandler@ocsd.com](mailto:cchandler@ocsd.com) / (714) 593-7202  
Director of Engineering: Kathy Millea, [kmillea@ocsd.com](mailto:kmillea@ocsd.com) / (714) 593-7365  
Director of Environmental Services: Lan Wiborg, [lwiborg@ocsd.com](mailto:lwiborg@ocsd.com) / (714) 593-7450



**CALL TO ORDER****PLEDGE OF ALLEGIANCE****DECLARATION OF QUORUM:****PUBLIC COMMENTS:**

*If you wish to address the Committee on any item, please complete a Speaker's Form (located at the table outside of the Board Room) and submit it to the Clerk of the Board or notify the Clerk of the Board the item number on which you wish to speak. Speakers will be recognized by the Chairperson and are requested to limit comments to three minutes.*

**REPORTS:**

*The Committee Chairperson and the General Manager may present verbal reports on miscellaneous matters of general interest to the Directors. These reports are for information only and require no action by the Directors.*

**CONSENT CALENDAR:**

*Consent Calendar Items are considered to be routine and will be enacted, by the Committee, after one motion, without discussion. Any items withdrawn from the Consent Calendar for separate discussion will be considered in the regular order of business.*

**1. APPROVAL OF MINUTES****[2020-937](#)****RECOMMENDATION:**

Approve Minutes of the Regular Meeting of the Operations Committee held on February 5, 2020.

**Originator:** Kelly Lore

**Attachments:** [Agenda Report](#)  
[02-05-2020 Operations Committee Minutes](#)

**2. HEADWORKS EXPLOSIVE GAS MONITORING SYSTEMS AT PLANT NOS. 1 AND 2, PROJECT NO. FE18-11****[2019-632](#)****RECOMMENDATION:** Recommend to the Board of Directors to:

- A. Receive and file Bid Tabulation and Recommendation for Headworks Explosive Gas Monitoring Systems at Plant Nos. 1 and 2, Project No. FE18-11;
- B. Ratify withdrawal of low bid from RP Controls at its request due to an inadvertent bid error and omission made by RP Controls and its equipment supplier regarding the contract design requirements and return of its bid security as allowed under Public Contract Code §5100 et seq.;

C. Award Construction Contract to Baker Electric, Inc. for Headworks Explosive Gas Monitoring Systems at Plant Nos. 1 and 2, Project No. FE18-11, for a total amount not to exceed \$223,984; and

D. Approve a contingency of \$22,398 (10%).

**Originator:** Kathy Millea

**Attachments:** [Agenda Report](#)  
[FE18-11 Final Contract Agreement and Exhibit A](#)

**3. ELECTRICAL POWER DISTRIBUTION SYSTEM IMPROVEMENTS, [2019-789](#)**  
**PROJECT NO. J-98**

RECOMMENDATION: Recommend to the Board of Directors to:

A. Approve a Professional Services Agreement with Schweitzer Engineering Laboratories Engineering Services (Schweitzer) to provide final design, programming, testing, commissioning, and training for a load-shedding system and electrical power protective relay system for Electrical Power Distribution System Improvements, Project No. J-98, for a total amount not to exceed \$1,296,878; and

B. Approve a contingency of \$129,687 (10%).

**Originator:** Kathy Millea

**Attachments:** [Agenda Report](#)  
[J-98 Professional Services Agreement](#)

**4. REDHILL RELIEF SEWER RELOCATION AT STATE ROUTE 55, [2020-910](#)**  
**PROJECT NO. FE18-13**

RECOMMENDATION: Recommend to the Board of Directors to:

Approve Utility Agreement No. OCSD-1005 between the Orange County Sanitation District and the Orange County Transportation Authority agreeing to specific terms, conditions, and funding obligations regarding the relocation and protection of the Redhill Relief Sewer at State Route 55 in the City of Santa Ana.

**Originator:** Kathy Millea

**Attachments:** [Agenda Report](#)  
[FE18-13 Utility Agreement No. OCSD-1005](#)

**NON-CONSENT:****5. OCEAN OUTFALL CONDITION ASSESSMENT AND SCOPING STUDY, [2019-629](#)  
PROJECT NO. PS18-09**

RECOMMENDATION: Recommend to the Board of Directors to:

A. Approve a Professional Services Agreement with Carollo Engineers, Inc. to provide engineering services for the Ocean Outfall Condition Assessment and Scoping Study, Project No. PS18-09, for an amount not to exceed \$2,744,000; and

B. Approve a contingency of \$274,400 (10%).

**Originator:** Kathy Millea

**Attachments:** [Agenda Report](#)  
[PS18-09 Professional Services Agreement - Carollo](#)

**6. ORANGE COUNTY SANITATION DISTRICT ASSET MANAGEMENT PROGRAM [2020-871](#)**

RECOMMENDATION:

Receive and file the Orange County Sanitation District Asset Management Program report.

**Originator:** Kathy Millea

**Attachments:** [Agenda Report](#)  
[Final Asset Management Report](#)

**INFORMATION ITEMS:****7. ORANGE COUNTY SANITATION DISTRICT - ENVIRONMENTAL SERVICES [2020-927](#)**

RECOMMENDATION:

Information Item.

**Originator:** Lan Wiborg

**Attachments:** [Agenda Report](#)

**DEPARTMENT HEAD REPORTS:****OTHER BUSINESS AND COMMUNICATIONS OR SUPPLEMENTAL AGENDA ITEMS, IF ANY:****BOARD OF DIRECTORS INITIATED ITEMS FOR A FUTURE MEETING:**

At this time Directors may request staff to place an item on a future agenda.

**ADJOURNMENT:**

The next Operations Committee meeting is scheduled for Wednesday, April 1, 2020 at 5:00 p.m.



# Orange County Sanitation District

Administration Building  
10844 Ellis Avenue  
Fountain Valley, CA 92708  
(714) 593-7433

## OPERATIONS COMMITTEE

### Agenda Report

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**File #:** 2020-937

**Agenda Date:** 3/4/2020

**Agenda Item No:** 1.

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**FROM:** James D. Herberg, General Manager  
Originator: Kelly A. Lore, Clerk of the Board

**SUBJECT:**

#### APPROVAL OF MINUTES

#### GENERAL MANAGER'S RECOMMENDATION

#### RECOMMENDATION:

Approve Minutes of the Regular Meeting of the Operations Committee held on February 5, 2020.

#### BACKGROUND

In accordance with the Board of Directors Rules of Procedure, an accurate record of each meeting will be provided to the Directors for subsequent approval at the following meeting.

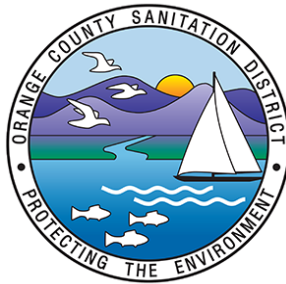
#### RELEVANT STANDARDS

- Resolution No. OCSD 19-19

#### ATTACHMENT

*The following attachment(s) are included in hard copy and may also be viewed on-line at the OCSD website ([www.ocsd.com](http://www.ocsd.com)) with the complete agenda package:*

- Minutes of the Operations Committee meeting held February 5, 2020



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## **CALL TO ORDER**

A regular meeting of the Operations Committee was called to order by Committee Chair Bob Collacott on Wednesday, February 5, 2020 at 5:03 p.m. in the Administration Building. Director Kring led the Flag Salute.

## **DECLARATION OF QUORUM:**

A quorum was declared present, as follows:

**PRESENT:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**STAFF PRESENT:** Rob Thompson, Assistant General Manager; Lorenzo Tyner, Assistant General Manager; Celia Chandler, Director of Human Resources; Kathy Millea, Director of Engineering; Lan Wiborg, Director of Environmental Services; Kelly Lore, Clerk of the Board; Tanya Chong; Daisy Covarubbias; Raul Cuellar; Don Cutler; Rhea DeGuzman; Mike Dorman; Brian Engelyn; Dean Fisher; Al Garcia; Larry Johnson; Josh Martinez; Riaz Moinuddin; Jeff Mohr; Wally Ritchie; Don Stokes; Todd Waltz; Eros Yong; and Ruth Zintzun.

**Others Present:** Brad Hogin, General Counsel; Austin Mejia, Supervisor Chaffee's office; Cherylle Barrido, Brown and Caldwell; and Bob Ooten, Alternate Director (CMSD).

## **PUBLIC COMMENTS:**

None.

## **REPORTS:**

General Manager Jim Herberg and Chair Collacott did not provide a report.

## **CONSENT CALENDAR:**

### **1. APPROVAL OF MINUTES**

[\*\*2019-786\*\*](#)

**Originator:** Kelly Lore

MOVED, SECONDED, AND DULY CARRIED TO:

Approve Minutes of the Regular Meeting of the Operations Committee held on December 4, 2019.

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**2. CAPITAL IMPROVEMENT PROGRAM CONTRACT PERFORMANCE REPORT** [2019-858](#)

**Originator:** Kathy Millea

MOVED, SECONDED, AND DULY CARRIED TO: Recommend to the Board of Directors to:

Receive and file the Capital Improvement Program Contract Performance Report for the period ending December 31, 2019.

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**3. WESTMINSTER BOULEVARD FORCE MAIN REPLACEMENT, PROJECT NO. 3-62** [2019-806](#)

**Originator:** Kathy Millea

MOVED, SECONDED, AND DULY CARRIED TO: Recommend to the Board of Directors to:

Approve a Sewer Relocation Agreement between the Orange County Sanitation District and the Midway City Sanitary District.

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

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4. **PLANT NO. 2 DEWATERING CENTRIFUGE SPARE ROTATING ASSEMBLY AND GEARBOX** [2019-703](#)

**Originator:** Rob Thompson

MOVED, SECONDED, AND DULY CARRIED TO: Recommend to the Board of Directors to:

A. Approve a Sole Source Purchase Order contract for the procurement of one spare rotating assembly and gearbox for the Alfa Laval Centrifuges, Model ALDEC G3-125, for an amount not to exceed \$435,756, plus applicable sales tax and shipping; and

B. Approve a contingency of \$43,576 (10%).

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

5. **ON CALL PLANT NO. 1 & PLANT NO. 2 MEDIUM VOLTAGE CABLE TESTING SERVICES (MP-320)** [2020-867](#)

**Originator:** Rob Thompson

MOVED, SECONDED, AND DULY CARRIED TO: Recommend to the Board of Directors to:

A. Approve a three-year service contract with Halco Service Corp. for assessment and testing of Plant No.1 and Plant No. 2 medium voltage cables per Specification No. S-2019-1107BD, for a total amount not to exceed \$491,655; and

B. Approve a contingency of \$73,748 (15%).

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None



**6. COOPERATIVE PROCUREMENT WITH W.W. GRAINGER** [2020-868](#)

**Originator:** Rob Thompson

MOVED, SECONDED, AND DULY CARRIED TO: Recommend to the Board of Directors to:

Approve a Blanket Purchase Order with W.W. Grainger, Inc. for the purchase of maintenance tools and supplies, in accordance with Ordinance No. OCSD-52, Section 2.03(B): Cooperative Procurement; for the period beginning March 1, 2020 through February 28, 2021, with two one-year renewal options, for a total amount not to exceed \$275,000 per year.

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**7. PLANT NO. 1 PURCHASE OF PROGRESSIVE CAVITY PUMP REPLACEMENT PARTS** [2020-878](#)

**Originator:** Rob Thompson

MOVED, SECONDED, AND DULY CARRIED TO: Recommend to the Board of Directors to:

A. Approve a Sole Source Purchase Order to Cortech Engineering for the purchase of eight Seepex pump rotors and one stator for the sludge thickening and dewatering facility, for a total amount not to exceed \$216,210, plus applicable sales tax and shipping; and

B. Approve a contingency of \$21,620 (10%).

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**8. PLANT NO. 2 KNIFE GATE VALVE REPLACEMENT FOR TRUCKLOADING** [2020-879](#)

**Originator:** Rob Thompson

MOVED, SECONDED, AND DULY CARRIED TO:

A. Approve a Sole Source Purchase Order to CS-AMSCO for the procurement of 12 Dezurik replacement knife gate valves along with their mounting components for the Plant No. 2 Truckloading Facility, for a total amount not to exceed \$148,032 plus applicable sales tax and shipping; and

B. Approve a contingency of \$14,803 (10%).

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**9. QUARTERLY ODOR COMPLAINT REPORT**

[2020-876](#)

**Originator:** Rob Thompson

MOVED, SECONDED, AND DULY CARRIED TO:

Receive and file the Fiscal Year 2019/20 Second Quarter Odor Complaint Report.

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**NON-CONSENT:**

**10. ELECTRICAL POWER DISTRIBUTION SYSTEM IMPROVEMENTS, PROJECT NO. J-98**

[2019-627](#)

**Originator:** Kathy Millea

Director of Engineering Kathy Millea introduced Project Manager Todd Waltz who provided a PowerPoint presentation regarding project elements including: Plant No. 1 load shedding, arc flash reduction, and replacement of obsolete equipment at Plant No. 2. Mr. Waltz provided information regarding the consultant selection and negotiation process and responded to questions from the Committee.

MOVED, SECONDED, AND DULY CARRIED TO: Recommend to the Board of Directors to:

A. Approve a Professional Design Services Agreement with Brown and Caldwell to provide engineering services for the Electrical Power Distribution System Improvements, Project No. J-98, for an amount not to exceed \$2,240,000; and

B. Approve a contingency of \$224,000 (10%).

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**11. FLEET PURCHASE OF ONE MEDIUM-DUTY SERVICE BODY TRUCK** [2019-859](#)

**Originator:** Rob Thompson

Assistant General Manager Rob Thompson introduced Maintenance Manager Don Stokes who provided a PowerPoint presentation regarding Fleet Services including statistics of OCSD's fleet, description of aging vehicles, fleet management strategies, and replacement criteria. Mr. Stokes and Mr. Thompson responded to questions from the Committee.

MOVED, SECONDED, AND DULY CARRIED TO:

A. Approve a Purchase Order to National Auto Fleet Group for the purchase of one New/Unused 2020 Ford Super Duty F-550 Truck with Maintainer Service Body and Short Tower Crane using Sourcewell (formerly National Joint Powers Alliance) Cooperative Contract No. 120716-NAF, for a total amount of \$158,142 plus freight; and

B. Approve a contingency of \$7,907 (5%).

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**12. FLEET PURCHASE OF ONE SEDAN, SIX LIGHT-DUTY TRUCKS, AND THREE VANS** [2020-888](#)

**Originator:** Rob Thompson

MOVED, SECONDED, AND DULY CARRIED TO: Recommend to the Board of Directors to:

- A. Approve a Purchase Order to National Auto Fleet Group for the purchase of one new/unused Toyota Prius sedan, three new/unused F150 trucks, three new/unused F250 Utility Body trucks, one new/unused Transit Connect Van, and two new/unused Transit Cargo Vans using Sourcewell (formerly National Joint Powers Alliance) Cooperative Contract No. 120716-NAF, for a total amount of \$357,312 plus freight; and
- B. Approve a contingency of \$17,866 (5%).

**AYES:** Robert Collacott, Doug Chaffee, Brooke Jones, Lucille Kring, Sandra Massa-Lavitt, Fred Smith, David Shawver, John Withers and Stacy Berry (Alternate)

**NOES:** None

**ABSENT:** Brad Avery, Allan Bernstein, Steve Jones, Tim Shaw and Jesus Silva

**ABSTENTIONS:** None

**INFORMATION ITEMS:**

**13. ORANGE COUNTY SANITATION DISTRICT RESERVES AND INVESTMENT POLICIES**

[2020-880](#)

**Originator:** Lorenzo Tyner

Assistant General Manager Lorenzo Tyner announced that a series of Budget related information presentations would be provided each month. He introduced Controller Wally Ritchie who provided a PowerPoint presentation regarding OCSD's reserves and investments. Mr. Ritchie and Mr. Tyner responded to questions from the Committee regarding amount of reserves, accountability, and audit details.

ITEM RECEIVED AND FILED AS AN:

Information Item.

**DEPARTMENT HEAD REPORTS:**

None.

**CLOSED SESSION:**

None.

**OTHER BUSINESS AND COMMUNICATIONS OR SUPPLEMENTAL AGENDA ITEMS, IF ANY:**

Board Chair Shawver reported on his recent attendance at the CASA Winter Conference. The Committee requested that Director of Environmental Services Lan Wiborg provide information regarding one of the pilot programs that was discussed at the conference at a future meeting.

**BOARD OF DIRECTORS INITIATED ITEMS FOR A FUTURE MEETING:**

Director Brooke Jones requested a presentation regarding PFAS at the March meeting.

**ADJOURNMENT:**

Chair Collacott declared the meeting adjourned at 5:59 p.m. to the meeting to be held on Wednesday, March 4, 2020 at 5:00 p.m.

Submitted by:

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Kelly A. Lore, MMC  
Clerk of the Board



# Orange County Sanitation District

Administration Building  
10844 Ellis Avenue  
Fountain Valley, CA 92708  
(714) 593-7433

## OPERATIONS COMMITTEE

### Agenda Report

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**File #:** 2019-632

**Agenda Date:** 3/4/2020

**Agenda Item No:** 2.

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**FROM:** James D. Herberg, General Manager  
Originator: Kathy Millea, Director of Engineering

**SUBJECT:**

**HEADWORKS EXPLOSIVE GAS MONITORING SYSTEMS AT PLANT NOS. 1 AND 2, PROJECT NO. FE18-11**

**GENERAL MANAGER'S RECOMMENDATION**

RECOMMENDATION: Recommend to the Board of Directors to:

- A. Receive and file Bid Tabulation and Recommendation for Headworks Explosive Gas Monitoring Systems at Plant Nos. 1 and 2, Project No. FE18-11;
- B. Ratify withdrawal of low bid from RP Controls at its request due to an inadvertent bid error and omission made by RP Controls and its equipment supplier regarding the contract design requirements and return of its bid security as allowed under Public Contract Code §5100 et seq.;
- C. Award Construction Contract to Baker Electric, Inc. for Headworks Explosive Gas Monitoring Systems at Plant Nos. 1 and 2, Project No. FE18-11, for a total amount not to exceed \$223,984; and
- D. Approve a contingency of \$22,398 (10%).

**BACKGROUND**

Headworks facilities at Orange County Sanitation District (Sanitation District) Plant Nos. 1 and 2 remove large pieces of trash and debris that would otherwise damage downstream treatment equipment. On occasion, combustible gas or hydrocarbon vapor in the incoming wastewater accumulates in the Headworks building. These gases pose a danger to staff and facilities if their concentration exceeds their lower explosive limit.

**RELEVANT STANDARDS**

- Comply with California Public Contract Code Section 20103.8, award construction contract to lowest responsive, responsible bidder
- Commitment to safety & reducing risk in all operations

**PROBLEM**

Explosive gases can accumulate in the Headworks and would not be detected.

**PROPOSED SOLUTION**

Award a Construction Contract for Headworks Explosive Gas Monitoring Systems at Plant Nos. 1 and 2, Project No. FE18-11, to install explosive gas monitoring systems at each plant. This system will provide an early warning of a potential hazard, such as combustible liquid that may have been discharged into the collections system.

**TIMING CONCERNS**

The resolution of this risk will be delayed.

**RAMIFICATIONS OF NOT TAKING ACTION**

The risk of explosive gases not being detected will continue.

**PRIOR COMMITTEE/BOARD ACTIONS**

N/A

**ADDITIONAL INFORMATION**

The Sanitation District advertised for bids for Headworks Explosive Gas Monitoring Systems at Plant Nos. 1 and 2, Project No. FE18-11, on October 29, 2019 and November 5, 2019. Three sealed bids were received on December 18, 2019. A summary of the bid opening follows:

Engineer's Estimate	\$ 129,117
<u>Bidders</u>	<u>Amount of Bid</u>
RP Controls	\$ 152,000
Baker Electric, Inc.	\$ 223,984
Mehta Mechanical Company, Inc. dba MMC, Inc.	\$ 284,000

The low bidder, RP Controls, requested to withdraw its bid due to an inadvertent bid mistake and omission made by bidder and its equipment supplier regarding the design requirements for instrumentation panels. RP Controls initiated contact with the Sanitation District within four business days from the opening of the bids to voice its concern regarding a miscommunication it had with the supplier of the instrumentation panels for this project. Staff recommends withdrawal of RP Controls bid as allowed under Public Contracting Code §5100 et seq.

After the evaluation of the bids by the Evaluation Team, the second lowest bidder, Baker Electric, Inc., was deemed the lowest responsive, responsible bidder. The Contractor selection was conducted in accordance with the Sanitation District's adopted policies and procedures.

Sanitation District staff communicated with Baker Electric and analyzed its bid price relative to the Sanitation District's estimate and design requirements. The difference between the engineer's estimate and Baker Electric, Inc. is \$94,867. The cost difference is due to the following reasons:

1. Cost increases for electrical and instrumentation labor resulting from the latest labor negotiations with the labor unions which were not contemplated in the Sanitation District's original estimate.
2. Staff underestimated the costs for two control panels and associated commissioning costs.
3. Staff underestimated the costs for mechanical work and installation costs for the gas monitoring systems.

Staff recommends awarding a construction contract to Baker Electric, Inc. for Headworks Explosive Gas Monitoring Systems at Plant Nos. 1 and 2, Project No. FE18-11, for a total amount not to exceed \$223,984.

## **CEQA**

The project is exempt from CEQA under the Class 1 and Class 3 categorical exemptions set forth in California Code of Regulations Sections 15301 and Section 15303. Section 15301 exempts from CEQA projects involving minor alteration of existing facilities and no expansion of use or capacity and Section 15303 exempts from CEQA installation of small new equipment and facilities in small structures. A Notice of Exemption will be filed with the OC Clerk-Recorder after the Sanitation District's Board of Directors approval of the construction contract.

## **FINANCIAL CONSIDERATIONS**

This request complies with authority levels of the Sanitation District's Purchasing Ordinance. This item has been budgeted (Budget Update, FY 2019-20, Appendix A, Page A-8, Small Construction Projects Program, Project M-FE) and the budget is sufficient for the recommended action.

## **ATTACHMENT**

*The following attachment(s) may be viewed on-line at the OCSD website ([www.ocsd.com](http://www.ocsd.com)) with the complete agenda package:*

- Construction Contract

SP:dm



**PART A**  
**CONTRACT AGREEMENT**

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CONTRACT AGREEMENT  
ORANGE COUNTY SANITATION DISTRICT

**PROJECT NO. FE18-11**

**HEADWORKS EXPLOSIVE GAS MONITORING SYSTEM AT PLANT NO. 1 AND NO. 2**

THIS AGREEMENT is made and entered into, to be effective, this March 25, 2020, by and between Baker Electric, Inc., hereinafter referred to as "CONTRACTOR" and the Orange County Sanitation District, hereinafter referred to as "OCSD".

WITNESSETH

That for and in consideration of the promises and agreements hereinafter made and exchanged, OCSD and CONTRACTOR agree as follows:

**SECTION – 1      GENERAL CONDITIONS**

CONTRACTOR certifies and agrees that all the terms, conditions and obligations of the Contract Documents as hereinafter defined, the location of the job site, and the conditions under which the Work is to be performed have been thoroughly reviewed, and enters into this Contract based upon CONTRACTOR's investigation of all such matters and is in no way relying upon any opinions or representations of OCSD. It is agreed that this Contract represents the entire agreement. It is further agreed that the Contract Documents are each incorporated into this Contract by reference, with the same force and effect as if the same were set forth at length herein, and that CONTRACTOR and its Subcontractors, if any, will be and are bound by any and all of said Contract Documents insofar as they relate in any part or in any way, directly or indirectly, to the Work covered by this Contract.

A. Contract Documents Order of Precedence

"Contract Documents" refers to those documents identified in the definition of "Contract Documents" in the General Conditions – Definitions.

1. In the event of a conflict between one Contract Document and any of the other Contract Documents, the provisions in the document highest in precedence shall be controlling. The order of precedence of the Contract Documents is as follows:
  - a. Supplemental Agreements – the last in time being the first in precedence
  - b. Addenda issued prior to opening of Bids – the last in time being the first in precedence
  - c. Contract Agreement
  - d. Permits and other regulatory requirements
  - e. Special Provisions
  - f. General Conditions (GC)
  - g. Notice Inviting Bids and Instruction to Bidders
  - h. Geotechnical Baseline Report (GBR), if attached as a Contract Document
  - i. Plans and Specifications – in these documents the order of precedence shall be:
    - i. Specifications (Divisions 01-17)
    - ii. Plans
    - iii. General Requirements (GR)
    - iv. Standard Drawings and Typical Details
  - j. CONTRACTOR's Bid
2. In the event of a conflict between terms within an individual Contract Document, the conflict shall be resolved by applying the following principles as appears applicable:
  - a. Figured dimensions on the Contract Documents shall govern. Dimensions not specified shall be as directed by the ENGINEER. Details not shown or specified shall be the same as similar parts that are shown or specified, or as directed. Full-size details shall take precedence over scale Drawings as to

shape and details of construction. Specifications shall govern as to material and workmanship.

- b. The Contract Documents calling for the higher quality material or workmanship shall prevail. Materials or Work described in words, which so applied, have a well known technical or trade meaning shall be deemed to refer to such recognized standards. In the event of any discrepancy between any Drawings and the figures thereon, the figures shall be taken as correct.
- c. Scale Drawings, full-size details, and Specifications are intended to be fully complementary and to agree. Should any discrepancy between Contract Documents come to the CONTRACTOR's attention, or should an error occur in the efforts of others, which affect the Work, the CONTRACTOR shall notify the ENGINEER, in writing, at once. In the event any doubts or questions arise with respect to the true meaning of the Contract Documents, reference shall be made to the ENGINEER whose written decision shall be final. If the CONTRACTOR proceeds with the Work affected without written instructions from the ENGINEER, the CONTRACTOR shall be fully responsible for any resultant damage or defect.
- d. Anything mentioned in the Specifications and not indicated in the Plans, or indicated in the Plans and not mentioned in the Specifications, shall be of like effect as if indicated and mentioned in both. In case of discrepancy in the Plans or Specifications, the matter shall be immediately submitted to OCSD's ENGINEER, without whose decision CONTRACTOR shall not adjust said discrepancy save only at CONTRACTOR's own risk and expense. The decision of the ENGINEER shall be final.

In all matters relating to the acceptability of material, machinery or plant equipment; classifications of material or Work; the proper execution, progress or sequence of the Work; and quantities interpretation of the Contract Documents, the decision of the ENGINEER shall be final and binding, and shall be a condition precedent to any payment under the Contract, unless otherwise ordered by the Board of Directors.

**B. Definitions**

Capitalized terms used in this Contract are defined in the General Conditions, Definitions. Additional terms may be defined in the Special Provisions.

**SECTION – 2 MATERIALS AND LABOR**

CONTRACTOR shall furnish, under the conditions expressed in the Plans and Specifications, at CONTRACTOR'S own expense, all labor and materials necessary, except such as are mentioned in the Specifications to be furnished by OCSD, to construct and complete the Project, in good workmanlike and substantial order. If CONTRACTOR fails to pay for labor or materials when due, OCSD may settle such claims by making demand upon the Surety to this Contract. In the event of the failure or refusal of the Surety to satisfy said claims, OCSD may settle them directly and deduct the amount of payments from the Contract Price and any amounts due to CONTRACTOR. In the event OCSD receives a stop payment notice from any laborer or material supplier alleging non-payment by CONTRACTOR, OCSD shall be entitled to deduct all of its costs and expenses incurred relating thereto, including but not limited to administrative and legal fees.

**SECTION – 3 PROJECT**

The Project is described as:

**PROJECT NO. FE18-11**

**HEADWORKS EXPLOSIVE GAS MONITORING SYSTEM AT PLANT NO. 1 AND NO. 2**

#### **SECTION – 4 PLANS AND SPECIFICATONS**

The Work to be done is shown in a set of Plans and Specifications entitled:

##### **PROJECT NO. FE18-11**

##### **HEADWORKS EXPLOSIVE GAS MONITORING SYSTEM AT PLANT NO. 1 AND NO. 2**

Said Plans and Specifications and any revision, amendments and addenda thereto are attached hereto and incorporated herein as part of this Contract and referred to by reference.

#### **SECTION – 5 TIME OF COMMENCEMENT AND COMPLETION**

CONTRACTOR agrees to commence the Project within 15 calendar days from the date set forth in the "Notice to Proceed" sent by OCSD, unless otherwise specified therein and shall diligently prosecute the Work to completion within two hundred forty (240) calendar days from the date of the "Notice to Proceed" issued by OCSD, excluding delays caused or authorized by OCSD as set forth in Sections 7, 8, and 9 hereof, and applicable provisions in the General Conditions.

The time for completion includes five (5) calendar days determined by OCSD likely to be inclement weather when CONTRACTOR will be unable to work.

#### **SECTION – 6 TIME IS OF THE ESSENCE**

Time is of the essence of this Contract. As required by the Contract Documents, CONTRACTOR shall prepare and obtain approval of all shop drawings, details and samples, and do all other things necessary and incidental to the prosecution of CONTRACTOR's Work in conformance with an approved construction progress schedule. CONTRACTOR shall coordinate the Work covered by this Contract with that of all other contractors, subcontractors and of OCSD, in a manner that will facilitate the efficient completion of the entire Work and accomplish the required milestone(s), if any, by the applicable deadline(s) in accordance with Section 5 herein. OCSD shall have the right to assert complete control of the premises on which the Work is to be performed and shall have the right to decide the time or order in which the various portions of the Work shall be installed or the priority of the work of subcontractors,

and, in general, all matters representing the timely and orderly conduct of the Work of CONTRACTOR on the premises.

#### **SECTION – 7      EXCUSABLE DELAYS**

CONTRACTOR shall only be excused for any delay in the prosecution or completion of the Project as specifically provided in General Conditions, “Extensions for Delay”, and the General Requirements, “By CONTRACTOR or Others – Unknown Utilities during Contract Work”. Extensions of time and extra compensation arising from such excusable delays will be determined in accordance with the General Conditions, “Extension of Time for Delay” and “Contract Price Adjustments and Payments”, and extensions of time and extra compensation as a result of incurring undisclosed utilities will be determined in accordance with General Requirements, “By CONTRACTOR or Others – Unknown Utilities during Contract Work”. OCSD’s decision will be conclusive on all parties to this Contract.

#### **SECTION – 8      EXTRA WORK**

The Contract Price as set forth in Section 11, includes compensation for all Work performed by CONTRACTOR, unless CONTRACTOR obtains a Change Order signed by a designated representative of OCSD specifying the exact nature of the Extra Work and the amount of extra compensation to be paid all as more particularly set forth in Section 9 hereof and the General Conditions, “Request for Change (Changes at CONTRACTOR’s Request)”, “OWNER Initiated Changes”, and “Contract Price Adjustments and Payments”.

In the event a Change Order is issued by OCSD pursuant to the Contract Documents, OCSD shall extend the time fixed in Section 5 for completion of the Project by the number of days, if any, reasonably required for CONTRACTOR to perform the Extra Work, as determined by OCSD’s ENGINEER. The decision of the ENGINEER shall be final.



## **SECTION – 9      CHANGES IN PROJECT**

OCSD may at any time, without notice to any Surety, by Change Order, make any changes in the Work within the general scope of the Contract Document, including but not limited to changes:

1. In the Specifications (including Drawings and designs);
2. In the time, method or manner of performance of the Work;
3. In OCSD-furnished facilities, equipment, materials, services or site; or
4. Directing acceleration in the performance of the Work.

No change of period of performance or Contract Price, or any other change in the Contract Documents, shall be binding until the Contract is modified by a fully executed Change Order.

All Change Orders shall be issued in accordance with the requirements set forth in the General Conditions, "Request for Change (Changes at CONTRACTOR's Request)" and "OWNER Initiated Changes".

## **SECTION – 10      LIQUIDATED DAMAGES FOR DELAY**

Liquidated Damages shall be payable in the amounts and upon the occurrence of such events or failure to meet such requirements or deadlines as provided in the Special Provisions, "Liquidated Damages and Incentives."

## **SECTION – 11      CONTRACT PRICE AND METHOD OF PAYMENT**

- A. OCSD agrees to pay and the CONTRACTOR agrees to accept as full consideration for the faithful performance of this Contract, subject to any additions or deductions as provided in approved Change Orders, the sum of Two Hundred Twenty Three Thousand Nine Hundred Eighty-Four Dollars (\$223,984) as itemized on the Attached Exhibit "A".

Upon satisfaction of the conditions precedent to payment set forth in the General Requirements, Additional General Requirements and General Conditions (including but

not limited to Sections entitled “Mobilization Payment Requirements” and “Payment Itemized Breakdown of Contract Lump Sum Prices”), there shall be paid to the CONTRACTOR an initial Net Progress Payment for mobilization. OCSD shall issue at the commencement of the job a schedule which shows:

1. A minimum of one payment to be made to the CONTRACTOR for each successive four (4) week period as the Work progresses, and
2. The due dates for the CONTRACTOR to submit requests for payment to meet the payment schedule.

After the initial Net Progress Payment, and provided the CONTRACTOR submits the request for payment prior to the end of the day required to meet the payment schedule, the CONTRACTOR shall be paid a Net Progress Payment on the corresponding monthly payment date set forth in the schedule.

Payments shall be made on demands drawn in the manner required by law, accompanied by a certificate signed by the ENGINEER, stating that the Work for which payment is demanded has been performed in accordance with the terms of the Contract Documents, and that the amount stated in the certificate is due under the terms of the Contract.

Payment applications shall also be accompanied with all documentation, records, and releases as required by the Contract, Exhibit A, Schedule of Prices, and General Conditions, “Payment for Work – General”. The Total amount of Progress Payments shall not exceed the actual value of the Work completed as certified by OCSD’s ENGINEER. The processing of payments shall not be considered as an acceptance of any part of the Work.

- B. As used in this Section, the following defined terms shall have the following meanings:

1. **“Net Progress Payment”** means a sum equal to the Progress Payment less the Retention Amount and other qualified deductions (Liquidated Damages, stop payment notices, etc.).
2. **“Progress Payment”** means a sum equal to:
  - a. the value of the actual Work completed since the commencement of the Work as determined by OCSD;
  - b. plus the value of material suitably stored at the worksite, treatment plant or approved storage yards subject to or under the control of OCSD since the commencement of the Work as determined by OCSD;
  - c. less all previous Net Progress Payments;
  - d. less all amounts of previously qualified deductions;
  - e. less all amounts previously retained as Retention Amounts.
3. **“Retention Amount”** for each Progress Payment means the percentage of each Progress Payment to be retained by OCSD to assure satisfactory completion of the Contract. The amount to be retained from each Progress Payment shall be determined as provided in the General Conditions –“Retained Funds; Substitution of Securities.”

## **SECTION – 12 SUBSTITUTION OF SECURITIES IN LIEU OF RETENTION OF FUNDS**

Pursuant to Public Contract Code Section 22300 et seq., the CONTRACTOR may, at its sole expense, substitute securities as provided in General Conditions – “Retained Funds; Substitution of Securities.”

## **SECTION – 13 COMPLETION**

Final Completion and Final Acceptance shall occur at the time and in the manner specified in the General Conditions, “Final Acceptance and Final Completion”, “Final Payment” and Exhibit A - Schedule of Prices.

Upon receipt of all documentation, records, and releases as required by the Contract from the CONTRACTOR, OCSD shall proceed with the Final Acceptance as specified in General Conditions.

#### **SECTION – 14     CONTRACTOR’S EMPLOYEES COMPENSATION**

A.    Davis-Bacon Act:

CONTRACTOR will pay and will require all Subcontractors to pay all employees on said Project a salary or wage at least equal to the prevailing rate of per diem wages as determined by the Secretary of Labor in accordance with the Davis-Bacon Act for each craft or type of worker needed to perform the Contract. The provisions of the Davis-Bacon Act shall apply only if the Contract is in excess of Two Thousand Dollars (\$2,000.00) and when twenty-five percent (25%) or more of the Contract is funded by federal assistance. If the aforesaid conditions are met, a copy of the provisions of the Davis-Bacon Act to be complied with are incorporated herein as a part of this Contract and referred to by reference.

B.    General Prevailing Rate:

OCSD has been advised by the State of California Director of Industrial Relations of its determination of the general prevailing rate of per diem wages and the general prevailing rate for legal holiday and overtime Work in the locality in which the Work is to be performed for each craft or type of Work needed to execute this Contract, and copies of the same are on file in the Office of the ENGINEER of OCSD. The CONTRACTOR agrees that not less than said prevailing rates shall be paid to workers employed on this public works Contract as required by Labor Code Section 1774 of the State of California. Per California Labor Code 1773.2, OCSD will have on file copies of the prevailing rate of per diem wages at its principal office and at each job site, which shall be made available to any interested party upon request.

C. Forfeiture for Violation:

CONTRACTOR shall, as a penalty to OCSD, forfeit Two Hundred Dollars (\$200.00) for each calendar day or portion thereof for each worker paid (either by the CONTRACTOR or any Subcontractor under it) less than the prevailing rate of per diem wages as set by the Director of Industrial Relations, in accordance with Sections 1770-1780 of the California Labor Code for the Work provided for in this Contract, all in accordance with Section 1775 of the Labor Code of the State of California.

D. Apprentices:

Sections 1777.5, 1777.6, 1777.7 of the Labor Code of the State of California, regarding the employment of apprentices are applicable to this Contract and the CONTRACTOR shall comply therewith if the prime contract involves Thirty Thousand Dollars (\$30,000.00) or more.

E. Workday:

In the performance of this Contract, not more than eight (8) hours shall constitute a day's work, and the CONTRACTOR shall not require more than eight (8) hours of labor in a day from any person employed by him hereunder except as provided in paragraph (B) above. CONTRACTOR shall conform to Article 3, Chapter 1, Part 7 (Section 1810 et seq.) of the Labor Code of the State of California and shall forfeit to OCSD as a penalty, the sum of Twenty-five Dollars (\$25.00) for each worker employed in the execution of this Contract by CONTRACTOR or any Subcontractor for each calendar day during which any worker is required or permitted to labor more than eight (8) hours in any one calendar day and forty (40) hours in any one week in violation of said Article. CONTRACTOR shall keep an accurate record showing the name and actual hours worked each calendar day and each calendar week by each worker employed by CONTRACTOR in connection with the Project.

F. Registration; Record of Wages; Inspection:

CONTRACTOR shall comply with the registration requirements of Labor Code Section 1725.5.

Pursuant to Labor Code Section 1771.4, the Work is subject to compliance monitoring by the California Department of Industrial Relations. CONTRACTOR shall maintain accurate payroll records and shall submit payroll records to the Labor Commissioner pursuant to Labor Code Section 1771.4(a)(3). Penalties for non-compliance with the requirements of Section 1776 may be deducted from progress payments per Section 1776.

CONTRACTOR shall comply with the job site notices posting requirements established by the Labor Commissioner per Title 8, California Code of Regulations Section 16461(e).

**SECTION – 15 SURETY BONDS**

CONTRACTOR shall, before entering upon the performance of this Contract, furnish Bonds approved by OCSD's General Counsel – one in the amount of one hundred percent (100%) of the Contract amount, to guarantee the faithful performance of the Work, and the other in the amount of one hundred percent (100%) of the Contract amount to guarantee payment of all claims for labor and materials furnished. As changes to the Contract occur via approved Change Orders, the CONTRACTOR shall assure that the amounts of the Bonds are adjusted to maintain 100% of the Contract Price. This Contract shall not become effective until such Bonds are supplied to and approved by OCSD. Bonds must be issued by a Surety authorized by the State Insurance Commissioner to do business in California. The Performance Bond shall remain in full force and effect through the warranty period, as specified in Section 19 below. All Bonds required to be submitted relating to this Contract must comply with California Code of Civil Procedure Section 995.630. Each Bond shall be executed in the name of the Surety insurer under penalty of perjury, or the fact of execution of each Bond shall be duly acknowledged before an officer authorized to take and certify acknowledgments, and either one of the following conditions shall be satisfied:

- A. A copy of the transcript or record of the unrevoked appointment, power of attorney, by-laws, or other instrument, duly certified by the proper authority and attested by the seal of the insurer entitling or authorizing the person who executed the Bond to do so for and on behalf of the insurer, is on file in the Office of the County Clerk of the County of Orange; or
- B. A copy of a valid power of attorney is attached to the Bond.

## **SECTION – 16 INSURANCE**

CONTRACTOR shall purchase and maintain, for the duration of the Contract, insurance against claims for injuries to persons, or damages to property which may arise from or in connection with the performance of the Work hereunder, and the results of that Work by CONTRACTOR, its agents, representatives, employees, or Subcontractors, in amounts equal to the requirements set forth below. CONTRACTOR shall not commence Work under this Contract until all insurance required under this Section is obtained in a form acceptable to OCSD, nor shall CONTRACTOR allow any Subcontractor to commence Work on a subcontract until all insurance required of the Subcontractor has been obtained. CONTRACTOR shall maintain all of the foregoing insurance coverages in force through the point at which the Work under this Contract is fully completed and accepted by OCSD pursuant to the provisions of the General Conditions, "Final Acceptance and Final Completion". Furthermore, CONTRACTOR shall maintain all of the foregoing insurance coverages in full force and effect throughout the warranty period, commencing on the date of Final Acceptance. The requirement for carrying the foregoing insurance shall not derogate from the provisions for indemnification of OCSD by CONTRACTOR under Section 17 of this Contract. Notwithstanding nor diminishing the obligations of CONTRACTOR with respect to the foregoing, CONTRACTOR shall subscribe for and maintain in full force and effect during the life of this Contract, inclusive of all changes to the Contract Documents made in accordance with the provisions of the General Conditions, "Request for Change (Changes at CONTRACTOR's Request)" and/or "OWNER Initiated

Changes”, the following insurance in amounts not less than the amounts specified. OCSD reserves the right to amend the required limits of insurance commensurate with the CONTRACTOR’s risk at any time during the course of the Project. No vehicles may enter OCSD premises/worksites without possessing the required insurance coverage.

CONTRACTOR’s insurance shall also comply with all insurance requirements prescribed by agencies from whom permits shall be obtained for the Work and any other third parties from whom third party agreements are necessary to perform the Work (collectively, the “Third Parties”), The Special Provisions may list such requirements and sample forms and requirements from such Third Parties may be included in an attachment to the General Requirements. CONTRACTOR bears the responsibility to discover and comply with all requirements of Third Parties, including meeting specific insurance requirements, that are necessary for the complete performance of the Work. To the extent there is a conflict between the Third Parties’ insurance requirements and those set forth by OCSD herein, the requirement(s) providing the more protective coverage for both OCSD and the Third Parties shall control and be purchased and maintained by CONTRACTOR.

A. Limits of Insurance

1. General Liability: One Million Dollars (\$1,000,000) per occurrence and a general aggregate limit of Two Million Dollars (\$2,000,000) for bodily injury, personal injury and property damage. Coverage shall include each of the following:
  - a. Premises-Operations.
  - b. Products and Completed Operations, with limits of at least One Million Dollars (\$1,000,000) per occurrence and a general aggregate limit of Two Million Dollars (\$2,000,000) which shall be in effect at all times during the warranty period set forth in the Warranty section herein, and as set forth in the General Conditions, “Warranty (CONTRACTOR’s Guarantee)”, plus any additional



extension or continuation of time to said warranty period that may be required or authorized by said provisions.

- c. Broad Form Property Damage, expressly including damage arising out of explosion, collapse, or underground damage.
- d. Contractual Liability, expressly including the indemnity provisions assumed under this Contract.
- e. Separation of Insured Clause, providing that coverage applies separately to each insured, except with respect to the limits of liability.
- f. Independent CONTRACTOR's Liability.

To the extent first dollar coverage, including defense of any claim, is not available to OCSD or any other additional insured because of any SIR, deductible, or any other form of self insurance, CONTRACTOR is obligated to assume responsibility of insurer until the deductible, SIR or other condition of insurer assuming its defense and/or indemnity has been satisfied.

CONTRACTOR shall be responsible to pay any deductible or SIR.

- g. If a crane will be used, the General Liability insurance will be endorsed to add Riggers Liability coverage or its equivalent to cover the usage of the crane and exposures with regard to the crane operators, riggers and others involved in using the crane.
- h. If divers will be used, the General Liability insurance will be endorsed to cover marine liability or its equivalent to cover the usage of divers.

2. Automobile Liability: The CONTRACTOR shall maintain a policy of Automobile Liability Insurance on a comprehensive form covering all owned, non-owned, and hired automobiles, trucks, and other vehicles providing the following minimum limits of liability coverage:

Either (1) a combined single limit of One Million Dollars (\$1,000,000) and a general aggregate limit of One Million Dollars (\$1,000,000) for bodily injury, personal injury and property damage;

Or alternatively, (2) One Million Dollars (\$1,000,000) per person for bodily injury and One Million Dollars (\$1,000,000) per accident for property damage.

3. **Umbrella Excess Liability:** The minimum limits of general liability and automobile liability insurance required, as set forth above, shall be provided for either in a single policy of primary insurance or a combination of policies of primary and umbrella excess coverage. Excess liability coverage shall be issued with limits of liability which, when combined with the primary insurance, will equal the minimum limits for general liability and automobile liability.
4. **Drone Liability Insurance:** If a drone will be used, drone liability insurance must be maintained by CONTRACTOR in the amount of One Million Dollars (\$1,000,000) in a form acceptable by OCSD.
5. **Worker's Compensation/Employer's Liability:** CONTRACTOR shall provide such Worker's Compensation Insurance as required by the Labor Code of the State of California, including employer's liability with a minimum limit of One Million Dollars (\$1,000,000) per accident for bodily injury or disease. If an exposure to Jones Act liability may exist, the insurance required herein shall include coverage with regard to Jones Act claims.

Where permitted by law, CONTRACTOR hereby waives all rights of recovery by subrogation because of deductible clauses, inadequacy of limits of any insurance policy, limitations or exclusions of coverage, or any other reason against OCSD, its or their officers, agents, or employees, and any other contractor or subcontractor performing Work or rendering services on behalf of OCSD in connection with the

planning, development and construction of the Project. In all its insurance coverages related to the Work, CONTRACTOR shall include clauses providing that each insurer shall waive all of its rights of recovery by subrogation against OCSD, its or their officers, agents, or employees, or any other contractor or subcontractor performing Work or rendering services at the Project. Where permitted by law, CONTRACTOR shall require similar written express waivers and insurance clauses from each of its Subcontractors of every tier. A waiver of subrogation shall be effective as to any individual or entity, even if such individual or entity (a) would otherwise have a duty of indemnification, contractual or otherwise, (b) did not pay the insurance premium, directly or indirectly, and (c) whether or not such individual or entity has an insurable interest in the property damaged.

6. Limits are Minimums: If CONTRACTOR maintains higher limits than the minimums shown in this Section, OCSD requires and shall be entitled to coverage for the higher limits maintained by the CONTRACTOR.

B. Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to and approved by OCSD. At the option of OCSD, either: the Insurer shall reduce or eliminate such deductibles or self-insured retentions as respects OCSD, its Directors, officers, agents, CONSULTANTS, and employees; or CONTRACTOR shall provide a financial guarantee satisfactory to OCSD guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

C. Other Insurance Provisions

1. Each such policy of General Liability Insurance and Automobile Liability Insurance shall be endorsed to contain, the following provisions:

- a. OCSD, its Directors, officers, agents, CONSULTANTS, and employees, and all public agencies from whom permits will be obtained, and their Directors, officers, agents, and employees are hereby declared to be additional insureds under the terms of this policy, but only with respect to the operations of CONTRACTOR at or from any of the sites of OCSD in connection with this Contract, or acts and omissions of the additional insured in connection with its general supervision or inspection of said operations related to this Contract.
  - b. Insurance afforded by the additional insured endorsement shall apply as primary insurance, and other insurance maintained by OCSD shall be excess only and not contributing with insurance provided under this policy.
2. Each insurance policy required herein shall be endorsed to state that coverage shall not be cancelled by either party, except after thirty (30) days prior written notice by certified mail, return receipt requested, and that coverage shall not be cancelled for non-payment of premium except after ten (10) days prior written notice by certified mail, return receipt requested. Should there be changes in coverage or an increase in deductible or SIR amounts, CONTRACTOR undertakes to procure a manuscript endorsement from its insurer giving 30 days prior notice of such an event to OCSD, or to have its insurance broker/agent send to OCSD a certified letter describing the changes in coverage and any increase in deductible or SIR amounts. The certified letter must be sent Attention: Risk Management and shall be received not less than twenty (20) days prior to the effective date of the change(s). The letter must be signed by a Director or Officer of the broker/agent and must be on company letterhead, and may be sent via e-mail in pdf format.

3. Coverage shall not extend to any indemnity coverage for the active negligence of any additional insured in any case where an agreement to indemnify the additional insured would be invalid under California Civil Code Section 2782(b).
4. If required by a public agency from whom permit(s) will be obtained, each policy of General Liability Insurance and Automobile Liability Insurance shall be endorsed to specify by name the public agency and its legislative members, officers, agents, CONSULTANTS, and employees, to be additional insureds.

D. Acceptability of Insurers

Insurers must have an "A-", or better, Policyholder's Rating, and a Financial Rating of at least Class VIII, or better, in accordance with the most current A.M. Best Rating Guide. OCSD recognizes that State Compensation Insurance Fund has withdrawn from participation in the A.M. Best Rating Guide process. Nevertheless, OCSD will accept State Compensation Insurance Fund for the required policy of worker's compensation insurance, subject to OCSD's option, at any time during the term of this Contract, to require a change in insurer upon twenty (20) days written notice. Further, OCSD will require CONTRACTOR to substitute any insurer whose rating drops below the levels herein specified. Said substitution shall occur within twenty (20) days of written notice to CONTRACTOR by OCSD or its agent.

E. Verification of Coverage

CONTRACTOR shall furnish OCSD with original certificates and mandatory endorsements affecting coverage. Said policies and endorsements shall conform to the requirements herein stated. All certificates and endorsements are to be received and approved by OCSD before Work commences. OCSD reserves the right to require complete, certified copies of all required insurance policies, including endorsements, affecting the coverage required by these Specifications at any time.

F. Subcontractors

CONTRACTOR shall be responsible to establish insurance requirements for any Subcontractors hired by CONTRACTOR. The insurance shall be in amounts and types reasonably sufficient to deal with the risk of loss involving the Subcontractor's operations and work. OCSD and any public agency issuing permits for the Project must be named as "Additional Insured" on any General Liability or Automobile Liability policy obtained by a Subcontractor. The CONTRACTOR must obtain copies and maintain current versions of all Subcontractors' policies, Certificate of Liability and mandatory endorsements effecting coverage. Upon request, CONTRACTOR must furnish OCSD with the above referenced required documents.

G. Required Forms and Endorsements

1. Required ACORD Form

- a. Certificate of Liability                      Form 25

2. Required Insurance Services Office, Inc. Endorsements (when alternative forms are shown, they are listed in order of preference)

In the event any of the following forms are cancelled by Insurance Services Office, Inc. (ISO), or are updated, the ISO replacement form or equivalent must be supplied.

- a. Commercial General Liability                      Form CG-0001 10 01
- b. Additional Insured Including                      Form CG-2010 10 01 **and**  
Products-Completed Operations                      Form CG-2037 10 01
- c. Waiver of Transfer of Rights of                      Form CG-2404 11 85; **or**  
Recovery Against Others to Us/  
Waiver of Subrogation                      Form CG-2404 10 93

3. Required State Compensation Insurance Fund Endorsements

- a. Waiver of Subrogation                      Endorsement No. 2570
- b. Cancellation Notice                      Endorsement No. 2065

4. Additional Required Endorsements

a. Notice of Policy Termination

Manuscript Endorsement

**SECTION – 17 RISK AND INDEMNIFICATION**

All Work covered by this Contract done at the site of construction or in preparing or delivering materials to the site shall be at the risk of CONTRACTOR alone. CONTRACTOR shall save, indemnify, defend, and keep OCSD and others harmless as more specifically set forth in General Conditions, "General Indemnification".

**SECTION – 18 TERMINATION**

This Contract may be terminated in whole or in part in writing by OCSD in the event of substantial failure by the CONTRACTOR to fulfill its obligations under this Agreement, or it may be terminated by OCSD for its convenience provided that such termination is effectuated in a manner and upon such conditions set forth more particularly in General Conditions, "Termination for Default" and/or "Termination for Convenience", provided that no termination may be effected unless proper notice is provided to CONTRACTOR at the time and in the manner provided in said General Conditions. If termination for default or convenience is effected by OCSD, an equitable adjustment in the price provided for in this Contract shall be made at the time and in the manner provided in the General Conditions, "Termination for Default" and "Termination for Convenience".

**SECTION – 19 WARRANTY**

The CONTRACTOR agrees to perform all Work under this Contract in accordance with the Contract Documents, including OCSD's designs, Drawings and Specifications.

The CONTRACTOR guarantees for a period of at least one (1) year from the date of Final Acceptance of the Work, pursuant to the General Conditions, "Final Acceptance and Final Completion" that the completed Work is free from all defects due to faulty materials, equipment or workmanship and that it shall promptly make whatever adjustments or corrections which may

be necessary to cure any defects, including repairs of any damage to other parts of the system resulting from such defects. OCSD shall promptly give notice to the CONTRACTOR of observed defects. In the event that the CONTRACTOR fails to make adjustments, repairs, corrections or other work made necessary by such defects, OCSD may do so and charge the CONTRACTOR the cost incurred. The CONTRACTOR's warranty shall continue as to any corrected deficiency until the later of (1) the remainder of the original one-year warranty period; or (2) one year after acceptance by OCSD of the corrected Work. The Performance Bond and the Payment Bond shall remain in full force and effect through the guarantee period.

The CONTRACTOR's obligations under this clause are in addition to the CONTRACTOR's other express or implied assurances under this Contract, including but not limited to specific manufacturer or other extended warranties specified in the Plans and Specifications, or state law and in no way diminish any other rights that OCSD may have against the CONTRACTOR for faulty materials, equipment or Work.

## **SECTION – 20    ASSIGNMENT**

No assignment by the CONTRACTOR of this Contract or any part hereof, or of funds to be received hereunder, will be recognized by OCSD unless such assignment has had prior written approval and consent of OCSD and the Surety.

## **SECTION – 21    RESOLUTION OF DISPUTES**

OCSD and the CONTRACTOR shall comply with the provisions of California Public Contract Code Section 20104 et. seq., regarding resolution of construction claims for any Claims which arise between the CONTRACTOR and OCSD, as well as all applicable dispute and Claims provisions as set forth in the General Conditions and as otherwise required by law.

## **SECTION – 22    SAFETY & HEALTH**

CONTRACTOR shall comply with all applicable safety and health requirements mandated by federal, state, city and/or public agency codes, permits, ordinances, regulations, and laws, as



well as these Contract Documents, including but not limited to the General Requirements, Section entitled "Safety" and Exhibit B OCSD Safety Standards.

## **SECTION – 23    NOTICES**

Any notice required or permitted under this Contract shall be sent by certified mail, return receipt requested, at the address set forth below. Any party whose address changes shall notify the other party in writing.

TO OCSD:                      Orange County Sanitation District  
10844 Ellis Avenue  
Fountain Valley, California 92708-7018  
Attn: Clerk of the Board

Copy to:                      Orange County Sanitation District  
10844 Ellis Avenue  
Fountain Valley, California 92708-7018  
Attn: Construction Manager

Bradley R. Hugin, Esquire  
Woodruff, Spradlin & Smart  
555 Anton Boulevard  
Suite 1200  
Costa Mesa, California 92626

TO CONTRACTOR:        Baker Electric, Inc.  
1298 Pacific Oaks Place  
Escondido, CA 92029

Copy to:                      George England  
Baker Electric, Inc.  
1298 Pacific Oaks Place  
Escondido, CA 92029

IN WITNESS WHEREOF, the parties hereto have executed this Contract Agreement as the date first hereinabove written.

CONTRACTOR: Baker Electric, Inc.  
1298 Pacific Oaks Place  
Escondido, CA 92029

By \_\_\_\_\_

\_\_\_\_\_  
Printed Name

Its \_\_\_\_\_

CONTRACTOR's State License No. 161756 (Expiration Date – 08/31/2021)

OCSD: Orange County Sanitation District

By \_\_\_\_\_

David John Shawver  
Board Chairman

By \_\_\_\_\_

Kelly A. Lore  
Clerk of the Board

By \_\_\_\_\_

Ruth Zintzun  
Purchasing & Contracts Manager

**EXHIBIT A**  
**SCHEDULE OF PRICES**

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# **EXHIBIT A**

## **SCHEDULE OF PRICES**

### **EXA-1 BASIS OF COMPENSATION**

CONTRACTOR will be paid the Contract Price according to the Schedule of Prices, and all other applicable terms and conditions of the Contract Documents.

### **EXA-2 PROGRESS PAYMENTS**

Progress payments will be made in accordance with all applicable terms and conditions of the Contract Documents, including, but not limited to:

1. Contract Agreement – Section 11 – “Contract Price and Method of Payment;”
2. General Conditions – “Payment – General”;
3. General Conditions – “Payment – Applications for Payment”;
4. General Conditions – “Payment – Mobilization Payment Requirements;”
5. General Conditions – “Payment – Itemized Breakdown of Contract Lump Sum Prices”;
6. General Conditions – “Contract Price Adjustments and Payments”;
7. General Conditions – “Suspension of Payments”;
8. General Conditions – “OCSD’s Right to Withhold Certain Amounts and Make Application Thereof”; and
9. General Conditions – “Final Payment.”

### **EXA-3 RETENTION AND ESCROW ACCOUNTS**

#### **A. Retention:**

OCSD shall retain a percentage of each progress payment to assure satisfactory completion of the Work. The amount to be retained from each progress payment shall be determined as provided in General Conditions – “Retained Funds; Substitution of Securities”. In all contracts between CONTRACTOR and its Subcontractors and/or Suppliers, the retention may not exceed the percentage specified in the Contract Documents.

B. Substitution of Securities:

CONTRACTOR may, at its sole expense, substitute securities as provided in General Conditions – “Retained Funds; Substitution of Securities.” Payment of Escrow Agent:

In lieu of substitution of securities as provided above, the CONTRACTOR may request and OCSD shall make payment of retention earned directly to the escrow agent at the expense of the CONTRACTOR. At the expense of the CONTRACTOR, the CONTRACTOR may direct the investment of the payments into securities consistent with Government Code §16430 and the CONTRACTOR shall receive the interest earned on the investments upon the same terms provided for in this article for securities deposited by the CONTRACTOR. Upon satisfactory completion of the Contract, the CONTRACTOR shall receive from the escrow agent all securities, interest and payments received by the escrow agent from OCSD, pursuant to the terms of this article. The CONTRACTOR shall pay to each Subcontractor, not later than twenty (20) calendar days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each Subcontractor, on the amount of retention withheld to ensure the performance of the Subcontractor. The escrow agreement used by the escrow agent pursuant to this article shall be substantially similar to the form set forth in §22300 of the California Public Contract Code.

C. Release of Retention:

Upon Final Acceptance of the Work, the CONTRACTOR shall submit an invoice for release of retention in accordance with the terms of the Contract.

D. Additional Deductibles:

In addition to the retentions described above, OCSD may deduct from each progress payment any or all of the following:

1. Liquidated Damages that have occurred as of the date of the application for progress payment;
2. Deductions from previous progress payments already paid, due to OCSD's discovery of deficiencies in the Work or non-compliance with the Specifications or any other requirement of the Contract;
3. Sums expended by OCSD in performing any of the CONTRACTOR'S obligations under the Contract that the CONTRACTOR has failed to perform, and;
4. Other sums that OCSD is entitled to recover from the CONTRACTOR under the terms of the Contract, including without limitation insurance deductibles and assessments.

The failure of OCSD to deduct any of the above-identified sums from a progress payment shall not constitute a waiver of OCSD's right to such sums or to deduct them from a later progress payment.

#### **EXA-4 STOP PAYMENT NOTICE**

In addition to other amounts properly withheld under this article or under other provisions of the Contract, OCSD shall retain from progress payments otherwise due the CONTRACTOR an amount equal to one hundred twenty-five percent (125%) of the amount claimed under any stop payment notice under Civil Code §9350 et. seq. or other lien filed against the CONTRACTOR for labor, materials, supplies, equipment, and any other thing of value claimed to have been furnished to and/or incorporated into the Work; or for any other alleged contribution thereto. In addition to the foregoing and in accordance with Civil Code §9358 OCSD may also satisfy its duty to withhold funds for stop payment notices by refusing to release funds held in escrow pursuant to public receipt of a release of stop payment notice executed by a stop payment notice claimant, a stop payment notice release bond, an order of a court of competent jurisdiction, or other evidence satisfactory to OCSD that the CONTRACTOR has resolved such claim by settlement.

#### **EXA-5 PAYMENT TO SUBCONTRACTORS**

##### **Requirements**

1. The CONTRACTOR shall pay all Subcontractors for and on account of Work performed by such Subcontractors, not later than seven (7) days after receipt of each progress payment as required by the California Business and Professions Code §7108.5. Such payments to Subcontractors shall be based on the measurements and estimates made pursuant to article progress payments provided herein.
2. Except as specifically provided by law, the CONTRACTOR shall pay all Subcontractors any and all retention due and owing for and on account of Work performed by such Subcontractors not later than seven (7) days after CONTRACTOR'S receipt of said retention proceeds from OCSD as required by the California Public Contract Code §7107.

#### **EXA-6 PAYMENT OF TAXES**

Unless otherwise specifically provided in this Contract, the Contract Price includes full compensation to the CONTRACTOR for all taxes. The CONTRACTOR shall pay all federal, state, and local taxes, and duties applicable to and assessable against any Work, including but not limited to retail sales and use, transportation, export, import, business, and special taxes. The CONTRACTOR shall ascertain and pay the taxes when due. The CONTRACTOR will maintain auditable records, subject to OCSD reviews, confirming that tax payments are current at all times.

## **EXA-7 FINAL PAYMENT**

After Final Acceptance of the Work, as more particularly set forth in the General Conditions, "Final Acceptance and Final Completion", and after Resolution of the Board authorizing final payment and satisfaction of the requirements as more particularly set forth in General Conditions – "Final Payment", a final payment will be made as follows:

1. Prior to Final Acceptance, the CONTRACTOR shall prepare and submit an application for Final Payment to OCSD, including:
  - a. The proposed total amount due the CONTRACTOR, segregated by items on the payment schedule, amendments, Change Orders, and other bases for payment;
  - b. Deductions for prior progress payments;
  - c. Amounts retained;
  - d. A conditional waiver and release on final payment for each Subcontractor (per Civil Code Section 8136);
  - e. A conditional waiver and release on final payment on behalf of the CONTRACTOR (per Civil Code Section 8136);
  - f. List of Claims the CONTRACTOR intends to file at that time or a statement that no Claims will be filed,
  - g. List of pending unsettled claims, stating claimed amounts, and copies of any and all complaints and/or demands for arbitration received by the CONTRACTOR; and
  - h. For each and every claim that resulted in litigation or arbitration which the CONTRACTOR has settled, a conformed copy of the Request for Dismissal with prejudice or other satisfactory evidence the arbitration is resolved.
2. The application for Final Payment shall include complete and legally effective releases or waivers of liens and stop payment notices satisfactory to OCSD, arising out of or filed in connection with the Work. Prior progress payments shall be subject to correction in OCSD's review of the application for Final Payment. Claims filed with the application for Final Payment must be otherwise timely under the Contract and applicable law.
3. Within a reasonable time, OCSD will review the CONTRACTOR'S application for Final Payment. Any recommended changes or corrections will then be forwarded to the CONTRACTOR. Within ten (10) calendar days after receipt of recommended changes from OCSD, the CONTRACTOR will make the changes, or list Claims that will be filed as a result of the changes, and shall submit the revised application for Final Payment. Upon



acceptance by OCSD, the revised application for Final Payment will become the approved application for Final Payment.

4. If no Claims have been filed with the initial or any revised application for Final Payment, and no Claims remain unsettled within thirty-five (35) calendar days after Final Acceptance of the Work by OCSD, and agreements are reached on all issues regarding the application for Final Payment, OCSD, in exchange for an executed release, satisfactory in form and substance to OCSD, will pay the entire sum found due on the approved application for Final Payment, including the amount, if any, allowed on settled Claims.
5. The release from the CONTRACTOR shall be from any and all Claims arising under the Contract, except for Claims that with the concurrence of OCSD are specifically reserved, and shall release and waive all unreserved Claims against OCSD and its officers, directors, employees and authorized representatives. The release shall be accompanied by a certification by the CONTRACTOR that:
  - a. It has resolved all Subcontractors, Suppliers and other Claims that are related to the settled Claims included in the Final Payment;
  - b. It has no reason to believe that any party has a valid claim against the CONTRACTOR or OCSD which has not been communicated in writing by the CONTRACTOR to OCSD as of the date of the certificate;
  - c. All warranties are in full force and effect, and;
  - d. The releases and the warranties shall survive Final Payment.
6. If any claims remain open, OCSD may make Final Payment subject to resolution of those claims. OCSD may withhold from the Final Payment an amount not to exceed one hundred fifty percent (150%) of the sum of the amounts of the open claims, and one hundred twenty-five percent (125%) of the amounts of open stop payment notices referred to in article entitled stop payment notices herein.
7. The CONTRACTOR shall provide an unconditional waiver and release on final payment from each Subcontractor and Supplier providing Work under the Contract (per Civil Code Section 8138) and an unconditional waiver and release on final payment on behalf of the CONTRACTOR (per Civil Code Section 8138) within thirty (30) days of receipt of Final Payment.

#### **EXA-8 DISCOVERY OF DEFICIENCIES BEFORE AND AFTER FINAL PAYMENT**

Notwithstanding OCSD's acceptance of the application for Final Payment and irrespective of whether it is before or after Final Payment has been made, OCSD shall not be precluded from subsequently showing that:

1. The true and correct amount payable for the Work is different from that previously accepted;

2. The previously-accepted Work did not in fact conform to the Contract requirements, or;
3. A previous payment or portion thereof for Work was improperly made.

OCSD also shall not be stopped from demanding and recovering damages from the CONTRACTOR, as appropriate, under any of the foregoing circumstances as permitted under the Contract or applicable law.

## ATTACHMENT 1 – CERTIFICATION FOR REQUEST FOR PAYMENT

I hereby certify under penalty of perjury as follows:

That the claim for payment is in all respects true, correct; that the services mentioned herein were actually rendered and/or supplies delivered to OCSD in accordance with the Contract.

I understand that it is a violation of both the federal and California False Claims Acts to knowingly present or cause to be presented to OCSD a false claim for payment or approval.

A claim includes a demand or request for money. It is also a violation of the False Claims Acts to knowingly make use of a false record or statement to get a false claim paid. The term "knowingly" includes either actual knowledge of the information, deliberate ignorance of the truth or falsity of the information, or reckless disregard for the truth or falsity of the information. Proof of specific intent to defraud is not necessary under the False Claims Acts. I understand that the penalties under the Federal False Claims Act and State of California False Claims Act are non-exclusive, and are in addition to any other remedies which OCSD may have either under contract or law.

I hereby further certify, to the best of my knowledge and belief, that:

1. The amounts requested are only for performance in accordance with the Specifications, terms, and conditions of the Contract;
2. Payments to Subcontractors and Suppliers have been made from previous payments received under the Contract, and timely payments will be made from the proceeds of the payment covered by this certification;
3. This request for progress payments does not include any amounts which the prime CONTRACTOR intends to withhold or retain from a Subcontractor or Supplier in accordance with the terms and conditions of the subcontract; and
4. This certification is not to be construed as Final Acceptance of a Subcontractor's performance.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

## **ATTACHMENT 2 – SCHEDULE OF PRICES**

See next pages for Bid Submittal Forms: Baker Electric, Inc.

BF-14 SCHEDULE OF PRICES, Page 1 - 2

**BF-14 SCHEDULE OF PRICES**

**INSTRUCTIONS**

**A. General**

For Unit Prices, it is understood that the following quantities are approximate only and are solely for the purpose of estimating the comparison of Bids, and that the actual value of Work will be computed based upon the actual quantities in the completed Work, whether they be more or less than those shown. CONTRACTOR's compensation for the Work under the Contract Documents will be computed based upon the lump sum amount of the Contract at time of award, plus any additional or deleted costs approved by OCSD via approved Change Orders, pursuant to the Contract Documents.

Bidder shall separately price and accurately reflect costs associated with each line item, leaving no blanks. Any and all modifications to the Bid must be initialed by an authorized representative of the Bidder in accordance with the Instructions to Bidders, Preparation of Bid.

Bidders are reminded of Instruction to Bidders, Discrepancy in Bid Items, which, in summary, provides that the total price for each item shall be based on the Unit Price listed for each item multiplied by the quantity; and the correct Total Price for each item shall be totaled to determine the Total Amount of Bid.

All applicable costs including overhead and profit shall be reflected in the respective unit costs and the TOTAL AMOUNT OF BID. The Bid price shall include all costs to complete the Work, including profit, overhead, etc., unless otherwise specified in the Contract Documents. All applicable sales taxes, state and/or federal, and any other special taxes, patent rights or royalties shall be included in the prices quoted in this Bid.

**B. Basis of Award**

AWARD OF THE CONTRACT WILL BE MADE ON THE BASIS OF THE LOWEST RESPONSIVE AND RESPONSIBLE BID.

**Note 1:** Base Bid. Includes all costs necessary to furnish all labor, materials, equipment and services for the construction of the Project per the Contract Documents.

Bid Submitted By: Baker Electric, Inc.

(Name of Firm)

**EXHIBIT A**  
**SCHEDULE OF PRICES**

**BASE BID ITEMS** (Refer to Note 1 in the Instructions):

Item No.	Description	Unit of Measurement	Approx Qty		Unit Price		Extended Price
1.	Mobilization, initial progress payment for all fees, labor, materials and equipment required for mobilization, staging area, surety bonds, and other activities in conformance with the Contract Documents, for the lump sum amount of ...	Lump Sum				= \$	10,000.00
2.	Furnish all labor, materials and equipment necessary for the completion of the Contract Work, except for the Work specified for Bid Item 1, in conformance with the Contract Documents, for a lump sum price of...	Lump Sum				= \$	213,984.00

**TOTAL AMOUNT OF BID (BASIS OF AWARD)**

**\$ 223,984.00**



## OPERATIONS COMMITTEE

### Agenda Report

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**File #:** 2019-789

**Agenda Date:** 3/4/2020

**Agenda Item No:** 3.

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**FROM:** James D. Herberg, General Manager  
Originator: Kathy Millea, Director of Engineering

**SUBJECT:**

**ELECTRICAL POWER DISTRIBUTION SYSTEM IMPROVEMENTS, PROJECT NO. J-98**

**GENERAL MANAGER'S RECOMMENDATION**

**RECOMMENDATION:** Recommend to the Board of Directors to:

- A. Approve a Professional Services Agreement with Schweitzer Engineering Laboratories Engineering Services (Schweitzer) to provide final design, programming, testing, commissioning, and training for a load-shedding system and electrical power protective relay system for Electrical Power Distribution System Improvements, Project No. J-98, for a total amount not to exceed \$1,296,878; and
- B. Approve a contingency of \$129,687 (10%).

**BACKGROUND**

The electrical distribution systems at Plant Nos. 1 and 2 are critical to ensure power supply to all Orange County Sanitation District (Sanitation District) plant facilities at all times. The electrical distribution system includes distribution centers, power buildings, and electrical rooms throughout the plants. These facilities use switchgear and automatic transfer switches to distribute Southern California Edison (SCE), Central Generation System (Central Generation), and standby generator power.

**RELEVANT STANDARDS**

- 24/7/365 treatment plant reliability

**PROBLEM**

Plant No. 1 does not have an automated load-shedding system in place. In the event of an SCE outage, electrical maintenance staff at Plant No. 1 must reconfigure the electrical system located throughout the plant. If non-critical loads are not switched off in time, Central Generation is unable to maintain the load and shuts down. After a shutdown, staff must manually initiate restarting of equipment in a particular sequence to avoid overloading of the Central Generation. This is a time-consuming and inefficient means of operating the electrical distribution system, particularly during emergency events.

Plant No. 2 is in the process of adding an automated load-shedding system to much of the plant under a separate project. Electrical Power Distribution System Improvements, Project No. J-98, will extend the load-shedding system to the remainder of Plant No. 2.

Implementation of load-shedding and protective relaying systems requires specific expertise in programming, high-speed network design, and configuration to guarantee the system performance. Timing and system performance are essential to quickly shed loads before Central Generation is overloaded and to reduce arc flash hazards using high speed relay-to-relay communications. The load-shedding controller also has proprietary logic at the core of its function that only Schweitzer can configure.

## **PROPOSED SOLUTION**

Award a Professional Services Agreement to Schweitzer to provide qualified staff with extensive experience in designing, programming, configuring, testing, and commissioning load-shedding and protective device systems.

## **TIMING CONCERNS**

The Professional Services Agreement is required to complete final network and communications design and detailed drawings for use by the professional design services consultant on the project and programming, and factory testing of the load-shedding system for the project construction contract. A delay in issuing this Professional Services Agreement may impact the schedule and costs of the project.

## **RAMIFICATIONS OF NOT TAKING ACTION**

If no action is taken, a load-shedding system could not be implemented. The electrical distribution system at Plant No. 1 would remain vulnerable to SCE outages causing disruption of service to process areas.

## **PRIOR COMMITTEE/BOARD ACTIONS**

March 2018 - Authorized staff to specify Schweitzer Engineering Laboratories as the sole source provider for current and future projects, equipment, materials, and services for electrical power system protective relays and load-shedding systems at Plant Nos. 1 and 2.

## **ADDITIONAL INFORMATION**

In 2018, the Board approved Schweitzer as the sole source provider for load-shedding and protective relay systems for projects such as this. The first of these sole source agreements was issued to Schweitzer under Outfall Low Flow Pump Station, Project No. J-117B, to implement a load-shedding system at Plant No. 2.

Staff worked with Schweitzer to develop the detailed professional services scope of work to ensure that the required elements met the needs of the project. A review of the preliminary and final proposed level of effort was conducted based on the Sanitation District's experience programming



control systems and performing factory testing and field commissioning. Based on this review, staff determined the negotiated fee to be fair and reasonable for these services.

## **CEQA**

The project is exempt from CEQA under the Class 1, 2, and 3 categorical exemptions set forth in California Code of Regulations Sections 15301, 15302, and 15303. These three sections are exempt from CEQA projects involving repair, replacement, and or minor alteration of existing facilities that have no expansion of use or capacity, replacement of existing utilities, and installation of small new equipment. A Notice of Exemption will be filed with the OC Clerk-Recorder after the Sanitation District's Board of Directors approves the Professional Design Services Agreement.

## **FINANCIAL CONSIDERATIONS**

This request complies with authority levels of the Sanitation District's Purchasing Ordinance. This item has been budgeted, (Budget Update FY19-20, Appendix A, Page A-8). The project budget is sufficient for the recommended action.

## **ATTACHMENT**

*The following attachment(s) may be viewed on-line at the OCSD website ([www.ocsd.com](http://www.ocsd.com)) with the complete agenda package:*

- Professional Services Agreement

TW:dm:sa

## **PROFESSIONAL SERVICES AGREEMENT**

THIS PROFESSIONAL SERVICES AGREEMENT, hereinafter referred to as AGREEMENT, is made and entered into and is to be effective the 25<sup>th</sup> day of March, 2020, by and between the ORANGE COUNTY SANITATION DISTRICT, hereinafter referred to as "SANITATION DISTRICT", and SEL Engineering Services Inc., for purposes of this AGREEMENT hereinafter referred to as "CONSULTANT". The SANITATION DISTRICT and CONSULTANT are referred to herein collectively as the "Parties" or individually as a "Party."

### **WITNESSETH:**

WHEREAS, the SANITATION DISTRICT desires to engage a consultant for OCSD Project No. J-98, (Project) to provide support services for J-98 - Electrical Power Distribution System Improvements, to provide professional services and provide support services for both 480V and 12kV electrical power distribution systems including modifications to double-ended switchgear, transformers, MCCs, breakers, and conductors.; and,

WHEREAS, CONSULTANT satisfies all qualification requirements identified in this AGREEMENT and agrees to provide the professional services and equipment specified herein; and,

WHEREAS, the SANITATION DISTRICT has adopted procedures for the selection of professional services and equipment and has proceeded in accordance with said procedures to select CONSULTANT to perform this work; and,

WHEREAS, at its regular meeting on March 25, 2020, the Board of Directors, by Minute Order, accepted the recommendation of the Operations Committee to approve this AGREEMENT between the SANITATION DISTRICT and CONSULTANT.

NOW, THEREFORE, in consideration of the mutual obligations, representations, and promises contained in this AGREEMENT, the Parties hereby agree as follows:

### **1. SCOPE OF WORK**

CONSULTANT agrees to furnish all professional services and equipment necessary to accomplish those Project elements outlined in the Scope of Work attached hereto as "Attachment A", and by this reference made a part of this AGREEMENT.

- A. The CONSULTANT shall be responsible for the professional quality, technical accuracy, and completeness and coordination of the work and services furnished by the CONSULTANT under this AGREEMENT, including the work performed by its Subconsultants. Where approval by the SANITATION DISTRICT is required, it is understood that any such approval shall operate as conceptual approval only and shall not relieve the CONSULTANT of responsibility for complying with all applicable laws, regulations, codes, or industry standards, and shall not limit or reduce CONSULTANT's liability for any and all damages caused by errors, omissions, noncompliance with industry standards, and/or negligence on the part of the CONSULTANT or its Subconsultants to the extent indicated herein.
- B. CONSULTANT is solely responsible for the quality of work prepared under this AGREEMENT and shall ensure that all work is performed to the highest industry standards for clarity, uniformity, and completeness. CONSULTANT shall timely respond to all comments, suggestions, and recommendations from the SANITATION DISTRICT. All comments from the SANITATION DISTRICT, or its agent, shall be incorporated into the work prior to the next review deadline or addressed, in writing, as to why the comment(s)

has/have not been incorporated. CONSULTANT shall ensure that each submittal is 100% accurate for the level of work submitted (i.e. correct references, terms, capitalization or equal status, spelling, punctuation, etc.).

- C. In the event that CONSULTANT's services and/or work product(s) is not to the satisfaction of the SANITATION DISTRICT and/or does not conform to the requirements of this AGREEMENT or applicable laws, regulations, or industry standards, the CONSULTANT shall, without additional compensation, promptly correct or revise any errors or deficiencies in its work product(s) within the timeframe specified by the Project Manager in accordance with Section 1.E below and any other Warranty provided herein.
- D. Any CAD drawings, figures, and other work produced by CONSULTANT and Subconsultants shall be completed pursuant to the SANITATION DISTRICT CAD Manual. Conversion of CAD work from any other non-standard CAD format to the SANITATION DISTRICT format shall not be acceptable in lieu of this requirement.

Electronic files shall conform to all SANITATION DISTRICT specifications. Any changes to these specifications by the CONSULTANT are subject to review and require advance written approval of the SANITATION DISTRICT.

- E. Submittals, including electronic files, shall be subject to an acceptance review period established in the schedule for the noted milestone and associated submittal. If a submittal is required which is not addressed in the schedule, the SANITATION DISTRICT will provide a response to the submittal provided by CONSULTANT on the required date unless otherwise negotiated with the CONSULTANT. The SANITATION DISTRICT shall perform appropriate reviews to ensure compliance with SANITATION DISTRICT's internal standards and requirements, including CAD Manual compliance. CONSULTANT shall correct any discrepancies or errors detected and reported within the acceptance period at no additional cost to the SANITATION DISTRICT. CONSULTANT's revisions shall be submitted to SANITATION DISTRICT within five (5) calendar days of CONSULTANT's receipt of the SANITATION DISTRICT's revision request, for the second review period of no more than five (5) days. Should there be further requests for revisions by SANITATION DISTRICT or, should SANITATION DISTRICT take more than the five (5) days to respond to CONSULTANT, the Project schedule will be adjusted to account for any further delays in order to gain SANITATION DISTRICT's acceptance. The Parties understand and agree that SANITATION DISTRICT shall have no responsibility to review submittals for compliance with any applicable laws, regulations, or industry standards, and further agree that nothing in this AGREEMENT shall limit CONSULTANT's responsibility to ensure that all submittals or other work product conform with all applicable laws, regulations, and industry standards.
- F. The Parties understand that the provision of consulting services under this AGREEMENT may require CONSULTANT and SANITATION DISTRICT to provide certain Confidential Information to the other Party. Confidential Information includes, without limitation, any information, design, process, procedure, formula, data, concept, or know how, regardless of form or means of conveyance, that is: (i) valuable and secret in the sense that its confidentiality affords the disclosing party a competitive advantage over its competitors; (ii) confidential or proprietary, whether or not patentable or copyrightable; or (iii) related to a Party or its business operations, financials, performance results, product planning, marketing strategies, pricing, customers, prospects, suppliers, products, computers, software and any related information. Confidential Information shall not include any information, design, process, procedure, formula, data, concept, or know how that: (i) is known to the receiving Party prior to disclosure by the disclosing Party, (ii) is independently developed by a Party without use of any Confidential Information, (iii) is or becomes lawfully available to the receiving Party on a non-confidential basis from a

source other than the disclosing Party, or (iv) that the disclosing Party authorizes for release in writing. The receiving Party shall use Confidential Information solely in connection with discussions with the disclosing Party and any resulting business transactions between the Parties, provided such use does not violate the terms of this AGREEMENT. The receiving Party shall not use, share, or exploit Confidential Information for the Party's own benefit or that of any third party and shall only use Confidential Information as contemplated by this Agreement or as otherwise specifically authorized in writing by the disclosing Party. The receiving Party shall not make any more copies of Confidential Information than are necessary for its use pursuant to this Agreement. Except as may be required by law or otherwise permitted herein, the receiving Party shall not disclose to any third party any of the Confidential Information of the disclosing Party, or the fact that discussions between the parties are taking place or any of the terms, conditions or other facts with respect thereto, including the status thereof, without the prior written consent of the disclosing Party. The Parties may disclose Confidential Information to officers, directors, employees, service providers, consultants, subcontractors, agents and attorneys (collectively, "Representatives") with a need to know the Confidential Information in order to complete the services contemplated in this AGREEMENT, provided the receiving Party binds those Representatives to terms at least as restrictive as those in this Agreement. The Parties agree to take commercially reasonable efforts to prevent the improper disclosure or dissemination of Confidential Information and shall be responsible for any breach of this Agreement by any person to whom the receiving Party discloses any Confidential Information. In the event that either Party is required by law, governmental authority, or judicial order, according to advice of counsel, to disclose any Confidential Information covered by this Agreement, the Party being compelled to disclose shall provide the other Party with prompt notice of such pending disclosure so that the other party may seek a protective order, if appropriate. The receiving Party shall use at least the same degree of care (and, in any event, not less than a reasonable degree of care) in protecting the disclosing Party's Confidential Information as it exercises in protecting its own similar Confidential Information. The receiving Party shall notify the disclosing Party immediately upon discovery of any unauthorized use or disclosure of Confidential Information, or any other breach of this Agreement, and shall cooperate in every reasonable way with the disclosing Party to help regain possession of Confidential Information and prevent its further unauthorized use and/or disclosure. The Parties acknowledge that irreparable harm may result from use or disclosure of Confidential Information in violation of this AGREEMENT and agree that, in the event of breach or threatened breach of this AGREEMENT by either Party, the other party shall have remedy in law and/or equity, including without limitation appropriate injunctive relief or specific performance, as may be granted by a court of competent jurisdiction. The termination, expiration, or completion of the consulting relationship established under this AGREEMENT shall not relieve the Parties or their Representatives of their obligations under this provision, including the obligation to prevent improper disclosure, use, or dissemination of Confidential Information.

## **2. COMPENSATION**

Total fixed-price compensation shall be paid to CONSULTANT for services completed in accordance with the scope of work detailed in Attachment A- SCOPE OF WORK in the amount of One Million, Two Hundred Ninety-Six Thousand, Eight Hundred Seventy-Eight Dollars (\$1,296,878.00). Total compensation is inclusive of all taxes required to be paid by the CONSULTANT.

## **3. PROGRESS AND OTHER REPORTS**

- A. Progress Reports. CONSULTANT will submit a progress report with each invoice reflecting the amount of funds expended in labor and/or in other Project costs for the invoice submitted and in total for the Project by milestone. The progress reports shall summarize the stage of

completion the Project as a whole, address any concerns or delays which may be foreseen, and identify potential items which may require a change order which are not included in the Final Scope of Work attached herein.

#### **4. PAYMENT**

A. Upon completion of any Project milestone, CONSULTANT shall submit invoices, hereinafter referred to as "Milestone Invoices," to the SANITATION DISTRICT. All Milestone Invoices shall include a Progress Report as specified in Section 3. CONSULTANT shall warrant and certify the accuracy of the amounts invoiced for each fixed price milestone. CONSULTANT understands that submitted prices are subject to Section 11 Audit Provisions.

B. CONSULTANT will submit Milestone Invoices covering milestones tasks performed for payment no later than the second Wednesday of the following month after completion of the milestone and in the format required by the SANITATION DISTRICT. The format must include, at a minimum:

- (a) current milestone being invoiced and the dollar amount
- (b) current total Project percent invoiced to date and the dollar amount
- (c) remaining total Project percent to be invoiced and the dollar amount

Upon approval of such payment request by the SANITATION DISTRICT, payment shall be made to CONSULTANT net thirty (30) days of the date of CONSULTANT's invoice for one hundred percent (100%) of the invoiced amount.

C. Upon satisfactory completion of the Scope of Work performed hereunder and prior to final payment under this AGREEMENT for such Scope of Work, or upon prior settlement following termination of this AGREEMENT, and as a condition precedent thereto, CONSULTANT shall execute and deliver to the SANITATION DISTRICT a release of all claims against the SANITATION DISTRICT arising under or by virtue of this AGREEMENT other than such claims, if any, as may be specifically exempted by CONSULTANT from the operation of the release in stated amounts to be set forth therein.

D. Pursuant to the California False Claims Act (Government Code sections 12650-12655), any CONSULTANT that knowingly submits a false claim to the SANITATION DISTRICT for compensation under the terms of this AGREEMENT may be held liable for treble damages and up to a \$10,000 civil penalty for each false claim submitted. This section shall also be binding on all Subconsultants.

A CONSULTANT or Subconsultant shall be deemed to have submitted a false claim when the CONSULTANT or Subconsultant:

- (a) knowingly presents or causes to be presented to an officer or employee of the SANITATION DISTRICT a false claim or request for payment or approval;
- (b) knowingly makes, uses, or causes to be made or used a false record or statement to get a false claim paid or approved by the SANITATION DISTRICT;
- (c) conspires to defraud the SANITATION DISTRICT by getting a false claim allowed or paid by the SANITATION DISTRICT;
- (d) knowingly makes, uses, or causes to be made or used a false record or statement to conceal, avoid, or decrease an obligation to the SANITATION DISTRICT; or
- (e) is the beneficiary of an inadvertent submission of a false claim to the SANITATION DISTRICT and fails to disclose the false claim to the SANITATION DISTRICT within a reasonable time after discovery of the false claim.

5. SANITATION DISTRICT's working hours are 6:30 am to 4:30 am. A workday is ten (10) working hours. If CONSULTANT requires overtime wherein, overtime pay will be required, CONSULTANT will request and receive written approval from SANITATION DISTRICT's to work the requested amount of overtime hours at 1.5 times the rate of the CONSULTANT employee's daily per diem rate for the amount of overtime approved.

**6. PREVAILING WAGES**

- A. To the extent CONSULTANT intends to utilize employees or Subconsultants who will perform public works during the Agreement, as more specifically defined under Labor Code Section 1720, CONSULTANT shall be subject to, and shall comply with, all prevailing wage requirements with respect to such employees, and will ensure that all Subconsultants comply with all applicable prevailing wage requirements.

**7. CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION AND RECORD OF WAGES**

- A. To the extent CONSULTANT's employees and/or Subconsultants who will perform Work during the design and preconstruction phases of a construction contract for which Prevailing Wage Determinations have been issued by the DIR and as more specifically defined under Labor Code Section 1720 et seq., CONSULTANT and Subconsultants shall comply with the registration requirements of Labor Code Section 1725.5. Pursuant to Labor Code Section 1771.4, the Work is subject to compliance monitoring and enforcement by the DIR.
- B. The CONSULTANT and Subconsultants shall maintain accurate payroll records and shall at all times comply with all applicable provisions of the Labor Code, including Labor Code Section 1776, and shall submit payroll records to the Labor Commissioner pursuant to Labor Code Section 1771.4(a)(3). Penalties for non-compliance with the requirements of Section 1776 may be deducted from progress payments per Section 1776.
- C. Pursuant to Labor Code Section 1776, the CONSULTANT and Subconsultants shall furnish a copy of all certified payroll records to the SANITATION DISTRICT and/or members of the general public upon request, provided the public request is made through SANITATION DISTRICT, the Division of Apprenticeship Standards or the Division of Labor Enforcement of the Department of Industrial Relations.
- D. The CONSULTANT and Subconsultants shall comply with the job site notices posting requirements established by the Labor Commissioner, including those described in Title 8, California Code of Regulation Section 16461(3).

**8. INTELLECTUAL PROPERTY.**

- A. CONSULTANT retains all intellectual property rights to anything created, owned, conceived, reduced to practice, or fixed in a tangible medium by CONSULTANT before the Project or outside of the scope of the Project and any improvement based solely thereon ("CONSULTANT Background Technology").
- B. SANITATION DISTRICT will own all intellectual property rights to improvements which are made (fixed in a tangible medium of expression or conceived and reduced to practice) and delivered to SANITATION DISTRICT under the Project, subject to CONSULTANT ownership of CONSULTANT Background Technology.

- C. Subject to CONSULTANT's ownership of CONSULTANT BACKGROUND TECHNOLOGY, SANITATION DISTRICT will retain sole ownership of any and all Work Product provided by the CONSULTANT under this AGREEMENT. Work Product includes, but is not limited to, all drafts, data, correspondence, proposals, and reports (collectively, "Work Product") compiled, composed, or created by CONSULTANT under this AGREEMENT.
- D. CONSULTANT grants SANITATION DISTRICT a perpetual, worldwide, non-exclusive, non-transferrable, personal, revocable, limited license to use and modify CONSULTANT Background Technology that are integrated into the Project only for the purpose of operation, repair, modification, extension, and maintenance of the Project. SANITATION DISTRICT agrees to indemnify, defend and hold harmless CONSULTANT and all related parties from and against any changes made by SANITATION DISTRICT or others relating to design documents produced by CONSULTANT.

## **9. INSURANCE**

### **A. General**

- i. Insurance shall be issued and underwritten by insurance companies acceptable to the SANITATION DISTRICT.
- ii. Insurers must have an "A-" Policyholder's Rating, or better, and Financial Rating of at least Class VIII, or better, in accordance with the most current A.M. Best's Guide Rating. However, the SANITATION DISTRICT will accept State Compensation Insurance Fund, for the required policy of Worker's Compensation Insurance subject to the SANITATION DISTRICT's option to require a change in insurer in the event the State Fund financial rating is decreased below "B". Further, the SANITATION DISTRICT will require CONSULTANT to substitute any insurer whose rating drops below the levels herein specified. Said substitution shall occur within twenty (20) days of written notice to CONSULTANT, by the SANITATION DISTRICT or its agent.
- iii. Coverage shall be in effect prior to the commencement of any work under this AGREEMENT.

### **B. General Liability**

The CONSULTANT shall maintain during the life of this AGREEMENT, Commercial General Liability Insurance written on an occurrence basis providing the following minimum limits of liability coverage: Two Million Dollars (\$2,000,000) per occurrence with Four Million Dollars (\$4,000,000) annual aggregate. Said insurance shall include coverage for the following hazards: Premises-Ongoing Operations, contractual liability, products liability/completed operations (including any product manufactured or assembled), broad form property damage, independent contractor liability, personal and advertising injury. A statement on an insurance certificate will not be accepted in lieu of the actual additional insured endorsement(s). If requested by SANITATION DISTRICT and applicable, XCU coverage (Explosion, Collapse and Underground) and Riggers/On Hook Liability must be included in the General Liability policy and coverage must be reflected on the submitted Certificate of Insurance.

**C. Umbrella Excess Liability**

The minimum limits of general liability and Automotive Liability Insurance required, as set forth herein, shall be provided for through either a single policy of primary insurance or a combination of policies of primary and umbrella excess coverage. Umbrella excess liability coverage shall be issued with limits of liability which, when combined with the primary insurance, will equal the minimum limits for general liability and automotive liability.

**D. Automotive/Vehicle liability Insurance**

The CONSULTANT shall maintain a policy of Automotive Liability Insurance on a comprehensive form covering all owned, non-owned, and hired automobiles, trucks, and other vehicles providing the following minimum limits of liability coverage: Combined single limit of One Million Dollars (\$1,000,000) per person for bodily injury and One Million Dollars (\$1,000,000) per accident for property damage. A statement on an insurance certificate will not be accepted in lieu of the actual additional insured endorsement.

**E. Drone Liability Insurance**

If a drone will be used, drone liability insurance must be maintained by CONSULTANT in the amount of one million dollars (\$1,000,000) in form acceptable to the SANITATION DISTRICT.

**F. Worker's Compensation Insurance**

The CONSULTANT shall provide such Workers' Compensation Insurance as required by the Labor Code of the State of California in the amount of the statutory limit, including Employer's Liability Insurance with a minimum limit of One Million (\$1,000,000) per occurrence. Such Worker's Compensation Insurance shall be endorsed to provide for a waiver of subrogation in favor of the SANITATION DISTRICT. A statement on an insurance certificate will not be accepted in lieu of the actual endorsements unless the insurance carrier is State of California Insurance Fund and the identifier "SCIF" and endorsement numbers 2570 and 2065 are referenced on the certificate of insurance. If an exposure to Jones Act liability may exist, the insurance required herein shall include coverage for Jones Act claims.

**G. Errors and Omissions/Professional Liability**

CONSULTANT shall maintain in full force and effect, throughout the term of this AGREEMENT, standard industry form professional negligence errors and omissions insurance coverage in an amount of not less than Five Million Dollars (\$5,000,000) with limits in accordance with the provisions of this Paragraph.

If the policy of insurance is written on a "claims made" basis, said policy shall be continued in full force and effect at all times during the term of this AGREEMENT, and for a period of three (3) years from the date of the completion of the services hereunder.

In the event of termination of said policy during this period, CONSULTANT shall obtain continuing insurance coverage for the prior acts or omissions of CONSULTANT during the course of performing services under the term of this AGREEMENT. Said coverage shall be evidenced by either a new policy evidencing no gap in coverage or by separate extended "tail" coverage with the present or new carrier.



In the event the present policy of insurance is written on an "occurrence" basis, said policy shall be continued in full force and effect during the term of this AGREEMENT or until completion of the services provided for in this AGREEMENT, whichever is later. In the event of termination of said policy during this period, new coverage shall be obtained for the required period to insure for the prior acts of CONSULTANT during the course of performing services under the term of this AGREEMENT.

CONSULTANT shall provide to the SANITATION DISTRICT a certificate of insurance in a form acceptable to the SANITATION DISTRICT indicating the expiration date of said policy and shall provide renewal certificates not less than ten (10) days prior to the expiration of each policy term.

#### **H. Proof of Coverage**

The CONSULTANT shall furnish the SANITATION DISTRICT with original certificates and amendatory endorsements effecting coverage. Said policies and endorsements shall conform to the requirements herein stated. All certificates and endorsements are to be received and approved by the SANITATION DISTRICT before work commences. In such case of a claim, the SANITATION DISTRICT reserves the right to require complete, certified copies of the applicable insurance policies, including endorsements, effecting the coverage required. The following are approved forms that must be submitted as proof of coverage:

Certificate of Insurance	ACORD Form 25 (5/2010) or equivalent
Additional Insurance (General Liability)	(ISO Form) CG 2001 10 01 or CG 2010 04 13. All other Additional Insured endorsements must be submitted for approval by the SANITATION DISTRICT, and the SANITATION DISTRICT may reject alternatives that provide different or less coverage to the SANITATION DISTRICT.
Additional Insured (Auto Liability)	Submit endorsement provided by carrier for the SANITATION DISTRICT approval.
Waiver of Subrogation	State Compensation Insurance Fund Endorsement No. 2570 or equivalent
Cancellation Notice	State Compensation Insurance Fund Endorsement No. 2065 or equivalent

#### **I. Cancellation Notice**

Each insurance policy required herein shall be endorsed to state that coverage shall not be cancelled by either Party, except after thirty (30) days' prior written notice. The Cancellation Section of ACORD Form 25 (5/2010) shall state the required thirty (30) days' written notification. The policy shall not terminate, nor shall it be cancelled, nor the coverage reduced until thirty (30) days after written notice is given to the SANITATION DISTRICT except for nonpayment of premium, which shall require not less than ten (10) days written notice to the SANITATION DISTRICT. Should there be changes in coverage, the CONSULTANT and its insurance broker/agent shall send to the SANITATION DISTRICT a certified letter which includes a description of the changes in coverage. The certified letter must be sent to the attention of Risk Management, Div. 260, and shall be received by the SANITATION DISTRICT not less than thirty (30) days prior to the effective date of the change(s) if the change would reduce coverage or otherwise reduce or limit the scope of insurance coverage provided to the SANITATION DISTRICT.

**J. Primary Insurance**

All liability policies shall contain a Primary and Non-Contributory Clause. Any other insurance maintained by the SANITATION DISTRICT shall be excess and not contributing with the insurance provided by CONSULTANT.

**K. Non-Limiting (if applicable)**

Nothing in this document shall be construed to limit the indemnification provision contained in this AGREEMENT, or the extent to which CONSULTANT may be held responsible for payment of damages to persons or property pursuant to this Agreement.

**L. Deductibles and Self-Insured Retentions**

Any deductible and/or self-insured retention will be the responsibility of CONSULTANT. The SANITATION DISTRICT will not be required to pay any deductibles and/or self-insured retention with regard to any claims filed on CONSULTANT's policies.

**M. Subconsultants**

The CONSULTANT shall be responsible to establish insurance requirements for any Subconsultant hired by the CONSULTANT. The insurance shall be in amounts and types reasonably sufficient to deal with the risk of loss involving the Subconsultant's operations and work.

**10. SCOPE CHANGES**

In the event of a change in the Scope of Work or a change in the proposed Project, as requested by the SANITATION DISTRICT, the Parties hereto shall execute an Amendment to this AGREEMENT setting forth with particularity any additional terms of the Amendment, changes required to the terms of the AGREEMENT, but not limited to any additional CONSULTANT's fees. Additional on-site work required by SANITATION DISTRICT after completion of the project will be proposed at the rates noted below:

Table 1 Per Diem Rate Table (U.S.)

Item	Description	Price (USD)
1	Mobilization fee per U.S. personnel	Distant (requires air travel) = \$3,800 Local (within 200 miles) = \$1,800
2	Daily rate per U.S. personnel	Weekday rate = \$2,400/day Saturday rate = \$3,100/day Sunday and holiday rate = \$4,000/day

Table 1 Per Diem Rate Table (U.S.)

If SANITATION DISTRICT requests or requires additional days with the RTDS beyond five-day RTDS allocation provided in the initial scope of work, the RTDS rate for such additional days is \$4,000 per day. Additional RTDS days due to CONSULTANT'S delay in the attached Scope of Work will not be billed to SANITATION DISTRICT.

## **11. PROJECT TEAM AND SUBCONSULTANTS**

Prior to the execution of this Agreement, CONSULTANT shall provide to SANITATION DISTRICT, and the SANITATION DISTRICT shall approve, a list containing the names and full description of all Subcontractors/Subconsultants and CONSULTANT's Project team members anticipated to be used on this Project under this AGREEMENT by CONSULTANT. CONSULTANT shall include a description of the work and services to be done by each Subcontractor/Subconsultant and each of CONSULTANT's Project team member. CONSULTANT shall include the respective compensation amounts for CONSULTANT and each Subcontractor/Subconsultant, broken down as indicated in Section 2- COMPENSATION. SANITATION DISTRICT must approve CONSULTANT's list of Subcontractors, Subconsultants, and Project team members prior to the initiation of any work under this AGREEMENT. SANITATION DISTRICT retains the right to prevent CONSULTANT from using certain Subcontractors, Subconsultants, or Project team members if SANITATION DISTRICT reasonably believes such Subcontractors, Subconsultants, or Project team members are unqualified or unfit.

There shall be no substitution of the listed Subcontractors/Subconsultants without prior written approval by the SANITATION DISTRICT.

## **12. ENGINEERING REGISTRATION**

The CONSULTANT's personnel and Subconsultants are comprised of registered engineers and a staff of specialists and draftsmen in each department. The firm itself is not a registered engineer but represents and agrees that wherever, in the performance of this AGREEMENT, the services of a registered engineer are required, such services will be performed by, or under the direct supervision of, registered engineers who are registered in California.

## **13. AUDIT PROVISIONS.**

- A. SANITATION DISTRICT retains the reasonable right to access, review, examine, and audit applicable records, documents and any other evidence of procedures and practices that are reasonably related to the CONSULTANT's work under this AGREEMENT and which may be necessary to discover and verify that the CONSULTANT is in compliance with all requirements under this AGREEMENT. The CONSULTANT shall include the SANITATION DISTRICT's right as described above in any and all of their subcontracts and shall ensure that these rights are binding upon all Subcontractors/Subconsultants during the term of this AGREEMENT and for a period of three (3) years after its termination.
- B. CONSULTANT shall maintain complete and accurate records in accordance with generally accepted industry standard practices. The CONSULTANT shall make available to the SANITATION DISTRICT for review and audit, all Project related accounting records and documents for the type of work provided within 15 days after receipt of notice from the SANITATION DISTRICT. If an audit is performed, CONSULTANT shall ensure that a qualified employee of the CONSULTANT will be available to assist SANITATION DISTRICT's auditor in obtaining all Project related accounting records and documents.
- C. It is understood that CONSULTANT will not release the make-up of its labor rates nor product prices nor the formulas or processes used to determine such rates and prices.

#### **14. LEGAL RELATIONSHIP BETWEEN PARTIES**

The legal relationship between the parties hereto is that of an independent contractor and nothing herein shall be deemed to transform CONSULTANT, its staff, independent contractors, or Subconsultants into employees of the SANITATION DISTRICT. CONSULTANT's staff performing services under the AGREEMENT shall at all times be employees and/or independent contractors of CONSULTANT. CONSULTANT shall monitor and control its staff and pay wages, salaries, and other amounts due directly to its staff in connection with the AGREEMENT. CONSULTANT shall be responsible for hiring, review, and termination of its staff and shall be accountable for all reports and obligations respecting them, such as social security, income tax withholding, unemployment compensation, workers' compensation and similar matters.

#### **15. NOTICES**

All notices hereunder and communications regarding the interpretation of the terms of this AGREEMENT, or changes thereto, shall be affected by delivery of said notices in person or by depositing said notices in the U.S. mail, registered or certified mail, return receipt requested, postage prepaid and addressed as follows:

SANITATION DISTRICT:

Orange County Sanitation District  
10844 Ellis Avenue  
Fountain Valley, CA 92708-7018  
Attention: Clarice Marcin, Senior Contracts Administrator  
Copy: Todd Waltz, CIP Project Manager

CONSULTANT:

SEL ENGINEERING SERVICES, INC.  
Dita Wexler, Contracts and Risk Manager  
2350 NE Hopkins Court  
Pullman, WA 99163  
Phone: 509-332-1890  
FAX: 509-332-7990  
Email: selcontracts@selinc.com

All communication regarding the Scope of Work will be addressed to the Project Manager identified above. Direction from other SANITATION DISTRICT staff must be approved in writing by the SANITATION DISTRICT's Project Manager prior to action from the CONSULTANT.

#### **16. TERMINATION**

The SANITATION DISTRICT may terminate this AGREEMENT at any time, without cause, after giving thirty (30) days written notice to CONSULTANT. In the event of such termination, CONSULTANT shall be entitled to compensation for work performed on a prorated basis through and including the effective date of termination and any non-cancellable obligations incurred for the Project.

CONSULTANT shall be permitted to terminate this AGREEMENT upon thirty (30) days written notice only if CONSULTANT is not compensated for billed amounts in accordance with the provisions of this AGREEMENT, when the same are due.

Notice of termination shall be mailed to the SANITATION DISTRICT at the address listed in Paragraph 14 - NOTICES.

**17. DOCUMENTS AND STUDY MATERIALS**

The documents and study materials for this Project which have been paid for but not yet delivered by CONSULTANT shall become the property of the SANITATION DISTRICT upon the termination or completion of the work in accordance with Section 7 herein.

**18. COMPLIANCE**

CONSULTANT certifies by the execution of this AGREEMENT that it pays employees not less than the minimum wage as defined by law, and that it does not discriminate in its employment with regard to race, color, religion, sex or national origin; that it is in compliance with all federal, state and local directives and executive orders regarding non-discrimination in employment; and that it agrees to demonstrate positively and aggressively the principle of equal opportunity in employment.

**19. AGREEMENT EXECUTION AUTHORIZATION**

Both the SANITATION DISTRICT and CONSULTANT do covenant that each individual executing this document by and on behalf of each Party is a person duly authorized to execute this AGREEMENT for that Party.

**20. DISPUTE RESOLUTION**

In the event of a dispute arising between the parties regarding performance or interpretation of this AGREEMENT, the dispute shall be resolved by binding arbitration under the auspices of the Judicial Arbitration and Mediation Service ("JAMS"), or similar organization or entity conducting alternate dispute resolution services and approved by both Parties.

**21. ATTORNEY'S FEES, COSTS AND NECESSARY DISBURSEMENTS**

If any action at law or in equity or if any proceeding in the form of an Alternative Dispute Resolution (ADR) or arbitration is necessary to enforce or interpret the terms of this AGREEMENT, the prevailing party shall be entitled to reasonable attorney's fees, costs and necessary disbursements in addition to any other relief to which he may be entitled.

**22. WARRANTY**

CONSULTANT warrants to SANITATION DISTRICT that CONSULTANT-manufactured products or equipment ["Product(s)"] are free from defects in material and workmanship for ten (10) years after delivery to SANITATION DISTRICT for all CONSULTANT Products, including CONSULTANT-manufactured control enclosure structures and panels. The sole and exclusive warranties for any software are set forth in the CONSULTANT Software License Agreement. The warranty described herein is conditioned upon proper storage of Products and shall be void in its entirety if SANITATION DISTRICT modifies Products without prior written consent to, and subsequent approval of, any such modifications by CONSULTANT, or if SANITATION DISTRICT uses Products for any applications that require product listing or qualification not specifically included in the CONSULTANT written quotation or proposal. If any Product fails to conform to this warranty and SANITATION DISTRICT properly notifies CONSULTANT of such failure and returns the Product to CONSULTANT's factory for diagnosis (and pays all expenses for such return), CONSULTANT shall correct any such failure by, at its sole discretion, either repairing any defective or damaged Product part(s) or making available any necessary replacement part(s) or Product(s). CONSULTANT will pay the freight to return the Product to the SANITATION DISTRICT (Carriage Paid to (CPT) customer's place of business). If CONSULTANT is unable or unwilling to repair or replace, CONSULTANT and SANITATION DISTRICT shall negotiate an equitable resolution such as a prorated refund or credit to the SANITATION DISTRICT's account. Any Product repair or upgrade shall be covered by this warranty for the longer of one (1) year from date of repair or the remainder

of the original warranty period. TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS WARRANTY SHALL BE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER STATUTORY, EXPRESS OR IMPLIED (INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE AND WARRANTIES ARISING FROM COURSE OF PERFORMANCE OR DEALING OR USAGE OF TRADE), EXCEPT WARRANTY OF TITLE AND AGAINST PATENT INFRINGEMENT. CONSULTANT shall, whenever possible, pass the original manufacturer warranty to SANITATION DISTRICT for non-CONSULTANT products and/or services. CONSULTANT does not warrant non-CONSULTANT products and/or services, including non-CONSULTANT control enclosure structures, and non-CONSULTANT products within CONSULTANT panels, control enclosure structures and systems, and products or prototypes provided by CONSULTANT for testing, marketing, or loan purposes.

CONSULTANT shall perform its services in accordance with generally accepted industry and professional standards and in a manner consistent with the degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances. If, within the 12-month period following completion of CONSULTANT's services under this AGREEMENT, the SANITATION DISTRICT informs CONSULTANT that any part of the services fails to meet those standards, CONSULTANT shall reperform (or, at CONSULTANT's option and subject to SANITATION DISTRICT approval, pay a third party to reperform) any of its defective services (including services performed in conjunction with CONSULTANT systems) at no cost to SANITATION DISTRICT upon receipt of such notice detailing the defective service(s). CONSULTANT shall, within a reasonable time prescribed by the SANITATION DISTRICT, take all such actions as are necessary to correct or complete the noted deficiency(ies).

## **23. INDEMNIFICATION**

To the fullest extent permitted by law and subject to the provisions of California Civil Code Section 2782.8, CONSULTANT shall indemnify, defend (at CONSULTANT's sole cost and expense and with legal counsel approved by the SANITATION DISTRICT, which approval shall not be unreasonably withheld), protect and hold harmless the SANITATION DISTRICT and all of SANITATION DISTRICT's officers, directors, employees, and agents (collectively the "Indemnified Parties"), from and against any and all claims, damages, liabilities, causes of action, suits, losses, judgments, fines, penalties, costs and expenses (including reasonable attorneys' fees, disbursements and court costs; individually, a "Claim"; collectively, "Claims") which may arise from, or are in any manner related to, work, operations, activities, or services performed by, or under the supervision of, CONSULTANT pursuant to this AGREEMENT. Such Claims include, but are not limited to, any negligent acts or omissions, recklessness and/or willful or intentional misconduct of CONSULTANT or CONSULTANT's principals, officers, agents, employees, suppliers, Subconsultants, subcontractors, and/or any person or entity employed directly or indirectly by any such party

Notwithstanding the foregoing, nothing herein shall be construed to require CONSULTANT to indemnify the Indemnified Parties from any Claim or any portion thereof arising from:

- (a) the negligence or willful misconduct of the Indemnified Parties as determined in a final judgment, arbitration, award, order, settlement, or other final resolution of the matter; or
- (b) a natural disaster or other act of God, such as an earthquake; or
- (c) the action(s) of an independent third party who is wholly unrelated to the Indemnified Parties, the CONSULTANT, and CONSULTANT's principals, officers, agents, employees, suppliers, Subconsultants, and subcontractors, including any person or entity employed directly or indirectly by any of the aforementioned parties.

Exceptions (a) through (c) above shall not apply, and CONSULTANT shall, to the fullest extent permitted by law, indemnify, defend, protect, and hold harmless the Indemnified Parties, from Claims arising from more than one cause if any such cause due to Contractor's negligence taken alone would otherwise result in the obligation to indemnify hereunder.

To the extent permitted by law, CONSULTANT's liability for indemnification hereunder is in addition to any liability CONSULTANT may have to the SANITATION DISTRICT for a breach by CONSULTANT of any of the provisions of this AGREEMENT to the extent allowed herein. In no event, whether as a result of breach of contract, indemnity, warranty, tort (including negligence), strict liability or otherwise, shall either Party be liable to the other Party or their insurers for any loss or damage which is not covered by the negligent Party's insurance, for an amount exceeding five million dollars (\$5,000,000) and any liability shall terminate upon the expiration of the warranty period or the statute of limitations whichever is shorter. No claim, regardless of form, arising under this AGREEMENT may be brought by a Party outside of the applicable California statute of limitations. In no event, whether as a result of breach of contract, indemnity, warranty, tort (including negligence), strict liability or otherwise, shall either Party be liable for any special, consequential, incidental, liquidated or punitive damages, including without limitation any loss of profit or revenues, loss of use of products or associated equipment, damage to associated equipment, cost of capital, cost of substitute products, facilities, services or replacement power, downtime costs or claims of either Party's customers for such damages. The terms of this AGREEMENT are contractual and the result of negotiation between the parties hereto. Accordingly, rule of construction of contracts (including, without limitation, California Civil Code Section 1654) that ambiguities are to be construed against the drafting party, shall not be employed in the interpretation of this AGREEMENT.

#### **24. DUTY TO DEFEND**

CONSULTANT's duty to defend the Indemnified Parties from a Claim brought hereunder subject to California Civil Code section 2782.8. Such defense obligation shall arise immediately upon presentation of a Claim by any person if such Claim could potentially result in an obligation to indemnify one or more Indemnified Parties, and upon written notice of such Claim being provided to CONSULTANT. Payment to CONSULTANT by any Indemnified Party or the payment or advance of defense costs by any Indemnified Party shall not be a condition precedent to enforcing such Indemnified Party's rights to indemnification hereunder. In the event a final judgment, arbitration, award, order, settlement, or other final resolution expressly determines that the claim did not arise out of, pertain to, or relate, in whole or in part, to the negligence, recklessness, or willful misconduct of the CONSULTANT, then the SANITATION DISTRICT will reimburse CONSULTANT for the reasonable costs of defending the Indemnified Parties against such claims for the portion and extent of the SANITATION DISTRICT's adjudicated negligence, recklessness, or willful misconduct. In no event shall the costs to defend the Indemnified Party charged to the Consultant exceed the Consultant's proportionate percentage of fault.

CONSULTANT'S indemnification obligation hereunder shall survive the expiration or earlier termination of this AGREEMENT until such time as action against the Indemnified Parties for such matter is fully and finally barred by the applicable statute of limitations.

#### **25. COMPLIANCE WITH SANITATION DISTRICT POLICIES AND PROCEDURES**

CONSULTANT shall be required to comply with all SANITATION DISTRICT policies and procedures, including the OCSD Safety Standards, as applicable, as may be amended from time to time.

#### **26. CLOSEOUT**

When the SANITATION DISTRICT determines that all work authorized under the AGREEMENT is fully complete and that the SANITATION DISTRICT requires no further work from CONSULTANT, or the AGREEMENT is otherwise terminated or expires in accordance with the terms of the AGREEMENT, the SANITATION DISTRICT shall give the CONSULTANT written notice that the

AGREEMENT will be closed out. CONSULTANT shall submit all outstanding billings, work submittals, deliverables, reports or similarly related documents as required under the AGREEMENT within thirty (30) days of receipt of notice of AGREEMENT closeout.

Upon receipt of CONSULTANT'S submittals, the SANITATION DISTRICT shall commence a closeout audit of the AGREEMENT and will either:

- i. Give the CONSULTANT a final AGREEMENT Acceptance; or
- ii. Advise the CONSULTANT in writing of any outstanding item or items which must be furnished, completed, or corrected at the CONSULTANT's cost unless such costs were approved for expenditure by the SANITATION DISTRICT.

CONSULTANT shall be required to provide adequate resources to fully support any administrative closeout efforts identified in the AGREEMENT. Such support must be provided within the timeframe requested by the SANITATION DISTRICT.

Notwithstanding the final AGREEMENT acceptance, the CONSULTANT will not be relieved of its obligations hereunder, nor will the CONSULTANT be relieved of its obligations to complete any portions of the work, the non-completion of which were not disclosed to the SANITATION DISTRICT (regardless of whether such nondisclosures were fraudulent, negligent, or otherwise), and the CONSULTANT shall remain obligated under all applicable provisions of the AGREEMENT which expressly or by their nature extend beyond and survive final AGREEMENT Acceptance.

Any failure by the SANITATION DISTRICT to reject the work or to reject the CONSULTANT's request for final AGREEMENT Acceptance as set forth above shall not be deemed to be acceptance of the work by the SANITATION DISTRICT for any purpose nor imply acceptance of, or agreement with, the CONSULTANT's request for final AGREEMENT Acceptance.

- 27.** When the CONSULTANT will WORK on SANITATION DISTRICT sites, the OCSD's Safety Standard will be complied with by CONSULTANT employees. CONSULTANT engineers will bring hard hat, safety-toe protective footwear, safety glasses, ear plugs, and cotton or fire-rated shirt. SANITATION DISTRICT will provide any other special clothing or safety equipment required to enter site. Also, SANITATION DISTRICT will provide any special safety training to enter site (training time shall apply to onsite support time).

**28. ENTIRE AGREEMENT**

This AGREEMENT constitutes the entire understanding and AGREEMENT between the Parties and supersedes all previous negotiations between them pertaining to the subject matter thereof. This Agreement may be modified or amended only by a written document executed by the Parties and by persons with authority to execute the same.

**29. WORK SUSPENSION**

De-mobilization and re-mobilization which is written into the Project schedule is not considered Work Suspensions under this article. Work Suspensions herein are defined as those suspensions which are not planned and therefore are not expected and would require additional funding to cover such costs. Should the Sanitation District require Consultant to suspend progress on the Consultant's work which would require Consultant to shut down the Project until such time the Sanitation District provides notice to Consultant to re-start the Project, or the Sanitation District does not respond within



thirty (30) days to a request for information or other key decision points needed for the Project to remain active and progressing, the Sanitation District agrees to pay Consultant \$10,000 for such situations which would require Consultant to demobilize and re-mobilize the Project for each and every situation.

Upon written notice from the Sanitation District to re-mobilize the Project, Sanitation District will also Provide a revised Project schedule which extends the Project dates by, at least, the same amount of time as the time of the suspension of the Project.

Should Consultant's staff be unavailable to re-start the work due to workload incurred during the Work Suspension, the revised schedule shall also take this into account for extending the dates for reasonable completion periods.

In the event that a Project is shut down or suspended due the reasons noted in this Section, for a period of more than forty-five (45) days, Consultant, will charge the Sanitation District and the Sanitation District agrees to pay. Consultant additional a 20% restocking fee for any material that has been ordered but not delivered or installed which can be returned for credit. If such material is customized and cannot be re-stocked, but the Sanitation District agrees to pay for any for the actual cost for the portion of the customized material that cannot be re-stocked.

IN WITNESS WHEREOF, this AGREEMENT has been executed in the name of the SANITATION DISTRICT, by its officers thereunto duly authorized, and CONSULTANT as of the day and year first above written.

**CONSULTANT: SEL ENGINEERING SERVICES, INC.  
and its affiliates**

By \_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_  
Printed Name & Title

**ORANGE COUNTY SANITATION DISTRICT**

By \_\_\_\_\_ Date \_\_\_\_\_  
David John Shawver  
Board Chairman

By \_\_\_\_\_ Date \_\_\_\_\_  
Kelly A. Lore  
Clerk of the Board

By \_\_\_\_\_ Date \_\_\_\_\_  
Ruth Zintzun  
Purchasing & Contracts Manager

Attachments: Attachment "A" – Scope of Work  
Attachment "I" – Cost Matrix and Summary Form  
Attachment "K" – OCSD Safety Standards

CMM:ms

# **ATTACHMENT A**

## **SCOPE OF WORK**

**ELECTRICAL POWER DISTRIBUTION SYSTEM IMPROVEMENTS**

**PROJECT NO. J-98**

**PROFESSIONAL SERVICES AGREEMENT**

**ATTACHMENT A – SCOPE OF WORK**

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## I. SUMMARY

Orange County Sanitation District (OCSD) is seeking a proposal from Schweitzer Engineering Laboratories Engineering Services, Inc. (SEL ES) for Substation LAN and load-shedding design and programming services. These services shall be provided directly to OCSD under a professional services contract between OCSD and SEL ES. These SEL ES design and programming services will be supplemented by the design services performed by the OCSD designated CONSULTANT. The CONSULTANT's design services will be provided by a separate professional design services contract between OCSD and the CONSULTANT. Procurement of SEL hardware shall be provided under a separate construction contract between the Contractor and SEL during the construction phase of the project. The Contractor or the construction Contractor herein is defined by the Contractor whom will be successfully awarded the construction contract of the work that is designed under this professional services contract. The design services shall include network design, integration, programming, factory demonstration testing, commissioning, training, and closeout of the Load Shed and Substation LAN system.

As part of the separate construction contract between the Contractor and SEL, SEL will furnish to the construction Contractor the hardware (including the development of the associated submittals) for installation by the Contractor. Networking equipment will be procured (with required submittals) in the construction phase in accordance with the specifications issued as part of the professional services contract between OCSD and SEL ES. The construction contract will perform installation only. SEL ES' construction contract price to the Contractor, will include providing the following: equipment, control panel fabrication, construction submittals, equipment service manuals, operations and maintenance training, construction Contractor coordination, installation support, certification of proper installation and operation of the Load Shed and Substation LAN system (equipment directly furnished by SEL to the Contractor), facility site visits to assist in field problem resolution, and clarification/verification to help resolve construction issues as they arise. This approach is similar to the approach taken in the engineering services contract agreement between OCSD and SEL ES for Plant No. 2 on the J-117B project, with some noted differences as stated in this Scope of Work (SOW).

OCSD will furnish and deliver the following equipment and software to SEL ES for configuration after the Functional Design Specification (FDS) is approved:

1. Two servers for the load shedding HMI system
2. Four HMI client applications

SEL ES shall ship all equipment provided by OCSD and the Contractor to OCSD's Plant No. 1 site after all testing has been completed. All shipping fees shall be included in SEL ES's proposal.

Table 1 has been provided to identify the overview of work to be done by others for the Substation LAN to help facilitate integration into the SEL ES design. The OCSD designated CONSULTANT will provide certain engineering services which shall be integrated into the SEL design by SEL ES. SEL ES shall provide timely support for any information and documentation required for the CONSULTANT to complete the CONSULTANT's deliverables, as they relate to the SEL design and hardware.

**Table 1 – Overview of Work to be Done by Others for the Substation LAN**

<b>Phase</b>	<b>OCSD DESIGNATED CONSULTANT</b>	<b>CONSTRUCTION CONTRACTOR</b>
<b>Design</b>	<ul style="list-style-type: none"> <li>- Front-end Documents Bid Documents</li> <li>- Technical Specifications (except Functional Design Specification and Load Shed &amp; Substation LAN Specification)</li> <li>- Overall Site Plan</li> <li>- Power &amp; Control Plan Drawings</li> <li>- Single Line Drawings</li> <li>- Circuit Breaker Elementary Diagrams</li> <li>- Cable, Conduit, &amp; Tray Schedules</li> <li>- Electrical Ductbank Sections</li> <li>- LAN Relay Connection Details based on the SEL ES Produced Sample Riser Diagrams</li> <li>- Network Panel Wiring Diagrams Based on SEL ES Front-End Engineering Design (FEED)</li> <li>- Fiber Optic Cable Routing Between Buildings Based on SEL ES Produced Topological Network Diagrams</li> <li>- Fiber Cabinet Layout Drawings and BOM based on SEL ES FEED</li> <li>- Power Panel Schedules</li> <li>- P&amp;IDs</li> <li>- Civil and Mechanical Drawings</li> </ul>	<ul style="list-style-type: none"> <li>- None</li> </ul>
<b>Construction/ Commissioning /Close-out</b>	<ul style="list-style-type: none"> <li>- As-built Drawings Designed by OCSD Designated CONSULTANT in the Design Phase</li> </ul>	<ul style="list-style-type: none"> <li>- NETA Testing</li> <li>- As-built Switchgear Elevation Drawings</li> <li>- As-built Switchgear Wiring (Interconnect) drawings</li> <li>- As-built 3-line Drawings</li> <li>- Procurement and Installation of Hardware &amp; certain Services per Construction Contract Requirements</li> </ul>

## II. PROJECT SCHEDULE

The construction/commissioning/close-out services specified in this SOW shall be executed in accordance with the awarded Contractor's construction contract. SEL ES shall periodically review Contractor's schedule as needed to confirm that the SEL ES work plan is in alignment with the Contractor's schedule.

The following table describes major milestones and deadlines. Where Contractor schedule requires stricter deadlines, SEL shall abide by and adhere to those deadlines instead. This would apply to tasks impacting the Contractor, such as installation of the SEL hardware at the project site. Non-milestone tasks (included in this SOW) that are pre-requisite to the milestone tasks shall be scheduled and executed by SEL ES to meet these deadlines.



**Table 2 – Project Milestones and Deadlines**

<b>MILESTONE</b>	<b>DEADLINE</b>
Kickoff Meeting	15 workdays from NTP
Certificates of Training, Credentials, etc.	20 workdays from NTP
Submit draft Front End Engineering Design (FEED) and Network Drawings	30 workdays from Kickoff Meeting
OCSD Review of draft FEED and Network Drawings	15 workdays from receipt of draft FEED
Submit final FEED and Network Drawings	10 workdays from receipt of OCSD Comments on draft FEED
Submit draft FDS	60 workdays from Kickoff Meeting
OCSD Review of FDS	15 workdays from receipt of draft FDS
Submit final FDS	10 workdays from receipt of OCSD Comments on draft FDS
Submit draft Initial Program Development Submittal	120 workdays prior to Factory Demonstration Test (FDT)
OCSD Review of draft Initial Program Development Submittal	15 workdays from receipt of draft Initial Program Development
Submit final Initial Program Development Submittal	10 workdays from receipt of OCSD Comments on Initial Program Development Submittal
Submit draft Final Program Development Submittal	60 workdays prior to FDT
OCSD Review of draft Final Program Development Submittal	15 workdays from receipt of draft Final Program Development
Submit final Program Development Submittal	10 workdays from receipt of OCSD Comments on Final Program Development Submittal
Submit draft Bench Test, Real Time Digital Simulation (RTDS), and FDT Procedures	40 workdays prior to bench test
OCSD Review of Bench Test, RTDS, and FDT Procedures	15 workdays from receipt of draft Bench Test Procedure
Submit final Bench Test, RTDS, and FDT Procedures	10 workdays from receipt of OCSD comments on draft Bench Test Procedure
Bench Test Completion	10 workdays prior to FDT
FDT and RTDS Testing	90 workdays prior to Construction Bid Advertisement

**Table 2 – Project Milestones and Deadlines**

<b>MILESTONE</b>	<b>DEADLINE</b>
Submit draft Load Shed and Substation LAN Specification Submittal	120 workdays prior to Construction Bid Advertisement
OCSD Review of draft Load Shed and Substation LAN Specification Submittal	15 workdays from receipt of draft Load Shed and Substation LAN
Submit final Load Shed and Substation LAN Specification Submittal	10 workdays from receipt of OCSD Comments on draft Load Shed and Substation LAN
Submit draft Training Plans & Materials Submittal	30 workdays prior to each training course
OCSD Review of Training Plans & Materials Submittal	15 workdays from receipt of draft Training Plans & Materials
Submit final Training Plans & Materials Submittal	10 workdays from receipt of OCSD comments on Training Plans & Materials
Submit draft FAT Procedure	90 workdays prior to FAT
OCSD Review of draft FAT Procedure	15 workdays from receipt of draft FAT procedure
Submit final FAT Procedure	30 workdays prior to FAT
Submit draft Operations Manual and Procedures (OMaP)	50 workdays prior to RAT, or 50 days prior to training of operations staff, whichever is sooner
OCSD Review of OMaP	15 workdays from receipt of draft OMaP
Submit final OMaP	60 workdays prior to RAT, or 30 days prior to training of operations staff, whichever is sooner
Completion of Pre-Commissioning Inspection Check / Punchlist	20 workdays prior to FAT
OCSD Review of Pre-Commissioning Punchlist Completion	15 workdays from receipt of punch list completion
Submit draft As-built Documentation Submittals	60 workdays prior to RAT
OCSD Review of draft As-built Documentation Submittals	20 workdays from receipt of As-built Documentation Submittals
Submit final As-built Documentation Submittals	10 workdays from receipt of OCSD Comments on draft As-built Documentation Submittals

### III. PROJECT IMPLEMENTATION

All OCSD projects are divided into six phases. SEL ES shall provide engineering services for Phase 3 Design Services, Phase 4 Construction and Installation Services, Phase 5 Commissioning, and Phase 6 Closeout.

Phase 1 – Project Development – *Completed, Not in Scope of Work*

Phase 2 – Preliminary Design – *Not required, Not in Scope of Work*

**Phase 3 – Design Services**

**Phase 4 – Construction and Installation Services**

**Phase 5 – Commissioning Services**

**Phase 6 – Closeout**

#### PHASE 3 – DESIGN

SEL ES shall provide engineering services during Phase 3 for all detailed engineering design for the Load Shed and Substation LAN system, detailed network design drawings, detailed functional design specification, system integration, programming, and programming standards development. An overview of the responsibilities of OCSD's designated CONSULTANT and the construction Contractor are described in Table 1 – Responsibility Overview Matrix. Refer to Contract Documents for detailed requirements.

##### TASK 3.1 – PROJECT MANAGEMENT

SEL ES shall be responsible for project management, including project execution, scheduling to meet the construction contract milestones, budget, workshops, coordination with project bidding, and coordination with OCSD through Phase 3 – Design Services, Phase 4 – Construction and Installation Services, Phase 5 – Commissioning Services, and Phase 6 – Closeout.

SEL ES shall not reassign key personnel without prior acceptance by OCSD. OCSD may request reassignment of any of SEL ES's personnel, based on that individual's poor performance.

##### TASK 3.1.1 – DESIGN KICK-OFF MEETING

SEL ES shall convene a two-hour meeting at OCSD no more than two weeks after notice to proceed. This meeting shall cover the following:

- Team introductions
- Brief project overview
- Project execution (where and when work will be performed)
- Overall project schedule
- Sequencing constraints and procurement timelines
- Lines of communication
- Project management (scheduling, potential scope changes, invoicing, etc.)

### **TASK 3.1.2 – PROJECT MANAGEMENT PROGRESS MEETINGS**

SEL ES shall prepare an agenda and conduct monthly project status conference calls with OCSD's Project Manager and Project Engineer. Status conference calls shall review the status of the project scope, budget, and any issues which may affect completion of the project. SEL ES shall also hold additional meetings as required to keep OCSD apprised of the job, to review work in progress, and to receive and resolve comments.

SEL ES shall prepare the meeting minutes as described below and transmit them to the OCSD Project Manager within three business days of the meeting in MS Word format using OCSD's template, or an approved substitution. SEL ES shall also update and transmit the Action Item Log, Decision Log, and Issues Log with the minutes.

The OCSD Project Manager will distribute the minutes for internal review. If there are no OCSD comments on the minutes, they will be considered final. If there are comments, the OCSD Project Manager will incorporate all appropriate OCSD comments on the MS Word file with changes tracked. The updated MS Word file will be transmitted back to SEL ES. If SEL ES has no comments on the OCSD edits, the minutes will be considered final. If SEL has further comments on the OCSD edits, those comments should be discussed with the OCSD Project Manager as needed, until both parties agree in writing or email on final version.

#### **Informal Meetings**

Informal meetings may include office meetings, telephone meetings, teleconferencing meetings, and conference calls shall be carried out as follows:

- SEL ES shall notify the OCSD Project Manager/Project Engineer prior to the meeting.
- SEL ES shall prepare minutes for the meeting.
- The minutes shall be submitted to the OCSD Project Manager/Project Engineer.
- After review and modification, the minutes shall be filed as a formal record of the meeting.
- A copy of all comments on project issues obtained by SEL ES from OCSD staff without direct OCSD Project Manager's involvement shall be submitted by SEL ES for the Project Manager's approval within three business days of the conclusion of the meeting. SEL ES shall make every effort to obtain alignment/agreement from OCSD Project Engineer and/or OCSD staff before submitting these issues to OCSD Project Manager.

Informal meetings that do not follow this procedure will not be recognized as having occurred.

### **TASK 3.1.3 – PROGRESS REPORTS**

SEL ES shall submit monthly progress reports at the same time as monthly invoices that include the following contents:

- Work activities completed to date, in the current reporting period, and projected for the coming month.

- A brief description of outstanding issues and their potential for impact on scope, schedule (design, construction, and commissioning), budget (design, construction, and commissioning) and quality.
- Potential changes in the scope.
- Budget status including estimates of actual costs to date, earned value, costs to complete, and cost estimates at completion. The budget status over time shall be presented on a graph with associated tabular data indicating for each month the actual costs incurred, earned value, and planned value.
- A discussion of corrective actions to be taken to avoid or mitigate cases where estimated costs at completion exceed budgets.
- Schedule status, including an updated project schedule as a searchable color PDF and as native format electronic file.
- A discussion of corrective actions to be taken to avoid or mitigate cases where project schedule is expected to be delayed.
- Updated Project Decisions/Action items/Issues Log
- Overall project budget and schedule completion in graphical format on the same graph. Show actual budget used, original schedule completion, and actual estimated project completion on the graph.
- The approved WBS shall form the basis for reporting the status of each SOW task in the monthly project Progress Report and the project Invoices.

All calculations of earned value and estimates to complete shall be made at the same level of detail as included in the Cost Matrix and Summary submitted with SEL ES's proposal. Furthermore, for estimating earned value, tasks shall be further broken down to subtasks of no more than \$100,000. Progress Reports shall include the basis for estimating earned value for each task and subtask. See Exhibit 1 - Example of Monthly Progress Report.

#### **TASK 3.1.4 – PROJECT INVOICES**

SEL ES shall prepare and submit monthly invoices to OCSD no later than the first Wednesday of the following month. Invoices shall be submitted for every month that work is being performed, unless OCSD's Project Manager has provided prior approval for combining the work of two months into a single invoice. The invoices shall document the man-hours and billing rate for each person that works on the project for each task in the WBS. Overhead, profit, and any direct costs shall also be shown for each task. As part of the summary section of the invoice, SEL ES shall also include the following information at minimum:

- Budget
- Current billing period invoicing
- Previous billing period "total invoiced to date"
- Budget amount remaining
- Current billing period "total percent invoice to date"
- Current billing period "total percent completed to date"

The cost component breakdown for each element above shall match that of the Professional Services Agreement (PSA). The monthly progress report and project schedule shall be submitted with the project invoice as part of the monthly request and prerequisite for the payment. SEL ES shall provide the percent budget spent for each of OCSD's WBS cost codes (i.e. by work package and phase). OCSD shall provide a list of cost codes by phase to SEL ES. SEL shall provide a summary of progress and expenditures. OCSD will provide a sample invoice structure to SEL ES at the beginning of the project.

### **TASK 3.1.5 – PROJECT LOGS**

SEL shall produce and maintain on at least a monthly basis the following logs through the course of the project:

Project Decision Log. The Project Decision Log shall track decisions made during workshops, meetings, submittal reviews, and any other forms of communication related to this scope. The log shall include the date of the decision, the title of the meeting where it was made (if applicable), a description of the decision, and a brief summary of the impacts.

Action Item Log. The Action Item Log is used to track action items generated during meetings. Action items may only be assigned to OCSD or SEL ES team members. If action is required by a different party, the action item shall be assigned to the person on the team who will track the action item. The action item log is not intended to include normal SEL ES tasks, nor to include comments on deliverables. The Action Item Log shall include a tracking number (typically coded to the date), the date it was created, a description of the action required, the lead person, and the date it was resolved. If action is required by more than one person, the person who will be asked to coordinate that action shall be listed.

Issues Log. The Issues Log shall list general comments and concerns raised by OCSD or SEL ES staff during project meetings. An example of an issue would be a request raised during a workshop for a specific programming method, graphic, or method of control. Issues that pose a moderate to significant impact to the Load Shed system architecture and design, or require additional consideration before final system design, shall be tracked on the Issues Log to be verified prior to completion of the detailed design. This log is not intended to track OCSD comments on submittals. The log shall include a short description of how the issue will be addressed. The Issues Log will be used to periodically confirm that the issue has been appropriately addressed.

Risk Mitigation Log. SEL ES shall prepare a log of all the mitigation measures recommended to be implemented. The log is likely to include measures to be taken during the design phase, as well as during the bid, construction, and commissioning phases. The log is not intended to track mitigation measures that would be implemented only when a particular risk occurs.

The log shall include the following information for each recommended mitigation measure:

- A brief description of the mitigation measure and the risk it is intended to address.
- A description of who has the lead to implement the measure.

- What components of the project design, specification, plans and other documents would need to incorporate or address the measure?
- The time frame for completing the measure.
- A brief summary of the status of the measure, to be used in on-going updates.
- The Risk Mitigation Measure Log will be used for on-going risk management and as a basis of reviewing SEL ES submittals.

#### **TASK 3.1.6 – QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)**

SEL ES shall administer a program of QA/QC procedures for producing quality work and shall effectively manage and control the work for all tasks. Specific procedures shall include but not be limited to planning, coordination, tracking, checking, reviewing, and scheduling the work. SEL ES shall subject all work products prepared by SEL ES to in-house QA/QC procedures prior to submittal to OCSD. All non-conformances to this specification shall be documented by SEL and referred to OCSD for a written disposition. QA/QC hours and costs shall be incorporated into related tasks within this SOW.

#### **TASK 3.2 – DESIGN SERVICES**

SEL shall develop a detailed design for a fully functional Load Shed and Substation LAN system as described in this SOW. SEL ES shall provide all necessary engineering details required for the construction Contractor to install a complete Load Shed and Substation LAN system that is ready for programming, integration, testing, commissioning and operation by SEL ES. The system shall be similar to the system that will be installed on Project J-117B.

##### Load Shed System General Requirements

- Load Shed system shall utilize two (2) Load Shed controllers to achieve a redundant system.
- Perform electrical metering at all systems involved with the Load Shed system.
- Primary Load Shed scheme shall be contingency-based and backup scheme shall be underfrequency-based.
- The controller shall continually calculate, based on an operator configurable priority table, which loads are to be shed in a utility power loss event.
- Load Shed system shall support fast Load-Shedding and disconnection from utility before an under-frequency triggered event occurs.
- Operator initiated Load-Shed based on pre-defined priorities or known power availability and configuration.
- Load Shed controller shall detect loss of network connectivity to load shedding areas, and intelligently adjust the load calculation and Load Shedding decisions.
- Prevent nuisance Load Shedding due to communication failure between Substation LAN and protection relay or I/O device associated with the Load Shed scheme.

- Total time of Load Shed operation shall not exceed 100ms (from time of event detection to breaker(s) tripping).

### Substation LAN General Requirements

The Substation LAN shall be designed as a dual LAN Parallel Redundancy Protocol (PRP) network with link recovery times, latency, and bandwidth sufficient for all applications listed in the section below. The Substation LAN shall employ quality of service (QoS) methodologies sufficient to prioritize GOOSE trip messages over less critical traffic. Environmental requirements for network hardware shall conform to IEC 61850 Edition 2. Inter-building links shall be via OS2 (single mode) or OM1 (multi-mode) fiber optic cabling. The Substation LAN shall be designed to securely interface with OCSD's industrial control system (ICS) network without degrading performance. Consideration should be given to how to address future expansion to additional power buildings (substations) while minimizing increases to network latency and recovery time.

### Application Requirements

- IEC 61850 Edition 2 Type 1A performance class P1 GOOSE trip messaging.
- IEC 61850 MMS.
- Parallel Redundancy Protocol (PRP).
- PTP time synchronization - two GPS clocks installed at 12kV Service Center and the Thickening and Dewatering Building (as a backup). The clocks shall support time synchronization using IEEE 1588 PTP (Precision Time Protocol). All network devices between the GPS clocks and the IEDs shall support PTP time stamping.
- Sequence of event reporting including a centralized repository for events stored inside the Substation LAN, and the option to automatically and continually export SoE data to a server on the ICS network.
- Full Configuration of the SEL TEAM application on two OCSD provided servers and associated SEL devices to display alarms and record event data (SOE, Oscillography). This includes the SEL Event software application. Utilize TEAM Synch to replicate the event data to a read-only server in the ICS network.
- All SEL relays (installed or modified) on this project shall be capable of having their maintenance mode (alternate group settings) enabled and disabled via the existing OCSD electrical SCADA (residing on a separate ICS network). Secure interface will be needed between the Substation LAN and the ICS network to transmit the data.
- Secured administrative access to IEDs from the ICS network.
- Change management system capable of detecting changes to IED configuration and sending alerts to SMTP (e-mail) alerts hitting an SMTP relay server in the ICS-DMZ.
- Network monitoring with ability to send alerts to SMTP (e-mail) alerts hitting an SMTP relay server in the ICS-DMZ.



- Cisco switches are capable of sending SNMP traps to RTAC for switch status. SEL ES to configure the switches and RTACs to monitor health status.

#### Auto-Synchronization

SEL ES shall provide design and programming services to perform auto-synchronization for the two main breakers at the 12kV Service Center. Auto-synchronization for the 12kV Service Center main breakers shall be provided by two SEL-451 relays. SEL ES shall design and program the IEDs so that the SEL-451 relays will send raise/lower pulses to the SEL-700G relays, located in Cen-Gen, to adjust the voltage and speed of the generators through the existing generator controls described below. In addition, during islanding (loss of utility) conditions, the SEL-451 relays shall send information to one SEL-700G relay to enable that relay to communicate the information to the existing controls. The communication between the SEL-451 and SEL-700G relays shall occur over fast IEC 61850 communication protocols. The SEL ES solution shall seamlessly integrate with the existing controls with very limited modifications to the existing controls. Any configuration change to the existing controls, if accepted by OCSD, shall be clearly described by SEL ES. Fiber-optic links and miscellaneous communication equipment for the communication between the SEL-700G relays and the existing generator controls will be procured and installed by the construction Contractor. SEL ES shall support OCSD in coordinating the design and programming of the system by the Contractor in the construction phase. Presently auto-synchronization occurs at the Cen-Gen main breakers (connecting to 12kV Service Center busses) as described below. This functionality shall be retained. The SEL auto-synchronization at 12kV Service Center main breakers shall be designed to work in conjunction with this feature. Both synchronization actions shall be initiated from the existing OCSD SCADA system (which resides in a separate network from the substation LAN network). This task is to be performed by SEL ES at the discretion of OCSD and should be reflected as an optional item on the proposal. A viable solution shall be accepted by OCSD in the design workshops prior to proceeding forward with this effort.

#### **Brief Summary of Operation of Existing Generation Controls:**

The existing generator controls, which will remain, utilize Woodward MSLC (Master Synchronizer and Load Controller) and DSLC (Digital Synchronizers and Load Controllers). The MSLC performs the master control for the load control, controls the automatic synchronization for the main breakers on Cen-Gen Bus A and Bus B main breakers (depending on position of auto-synchronization hand switch), and is fully configured to operate with individual DSLC for each of the three engines. During automatic synchronization across the Cen-Gen main breaker, the MSLC communicates with the DSLCs for the engines to adjust the voltage and speed of the engine generators together. Voltage and frequency feedback signals are provided from PT circuits on either side of the Cen-Gen main breaker. When the voltage sources are in-synch, the MSLC closes an output contact to close the main breaker. The controller provides either phase matching or slip frequency automatic synchronizing. When the plant is operating in parallel with the utility, the master controller controls the overall real power output of the engine generators by communicating with the DSLC over the LonWorks network. Feedback signals for master load control are provided by analog 4-20 mA signals from power transducers located in the 12kV Service Center. The controller provides bump less loading and unloading against the power grid. It is capable of controlling plant load in either base load or constant utility import/export

control modes, and accurately share loads between the engine generators when operating isolated from the utility by setting all engine generators in isochronous load sharing to a chosen percentage of their individual rated loads. The controller accepts an analog 4-20 mA input from the Master PLC (separate existing PLC for Cen-Gen SCADA purposes) for remote adjustment of the master load set point. The controller accepts hard-wired inputs to enable automatic synchronization and to switch between base load and constant import/export control modes.

A summary of the functional requirements at the various buildings shall be as follows:

### **Plant 1**

- 12kV Service Center (12kV SWGR-ESC BUS A and BUS B)
  - Utilization of existing SEL relays where possible while meeting functional requirements
  - Replacement/Upgrade of certain existing IEDs (intelligent electronic devices) as required to achieve design requirements (such as 351, 351A, 311L)
  - Addition of hardware to interface with existing IEDs
  - Load Shed location (all main and feeder breakers)
  - Auto-Synchronization location
  - Power data collection location
  - Circuit breaker opened/closed status location
  - Circuit breaker racked-in/out status location
  - Contingency breaker location (connection point to SCE utility power)
  - Load Shed controller/HMI client location
  - Substation LAN location
- CenGen Distribution Switchgear (12kV SWGR-CGS BUS A and BUS B)
  - Utilization of existing SEL relays where possible while meeting functional requirements
  - Replacement/Upgrade of certain existing IEDs as required to achieve design requirements (such as SEL 351, 351A, 311L)
  - Addition of hardware to interface with existing IEDs
  - Load Shed location (all main and feeder breakers)
  - HMI client location
  - Power data collection location
  - Circuit breaker opened/closed status location
  - Circuit breaker racked-in/out status location
  - Contingency breaker location
  - Substation LAN location
- CenGen Generator Switchgear (12kV BUS G)
  - Replacement of existing SEL 300G relays with new SEL 400G or 700G as required to achieve design requirements
  - Addition of hardware to interface with existing IEDs
  - Power data collection location
  - Circuit breaker opened/closed status location
  - Circuit breaker racked-in/out status location
- Power Building 7 (480V SWGR-7-A and SWGR-7-B)
  - New SEL relays for transformer virtual main (location for relay-relay tripping via 61850 communication)

- Substation LAN location
- Power Building 8 (480V SWGR-TFA and SWGR-TFB)
  - New SEL relays for transformer virtual main (location for relay-relay tripping via 61850 communication)
  - Substation LAN location
- Power Building 9 (480V SWGR-LA-A and SWGR-LA-B)
  - New SEL relays for transformer virtual main (location for relay-relay tripping via 61850 communication)
  - Existing GE F60 Relays on 480V main breakers are utilized for protection and transfer scheme logic. SEL shall provide a separate (alternate bid item) cost item to provide either a relay-based or RTAC based solution to implement a closed-transition transfer scheme on the existing switchgear lineup (Main-Tie-Tie-Main configuration). The solution shall be acceptable to OCSD prior to proceeding forward with detailed design. Existing GE F60 relays shall be included in the Substation LAN for SoE and time-synchronization.
  - Substation LAN Location
- Blower Building 1 (4.16kV SWGR-BLOWER)
  - New SEL relays for the main breakers located at the 4.16kV SWGR-BLOWER
  - Load Shed location for the two main breakers
  - Power data collection location for the two main breakers
  - Circuit breaker opened/closed status location for the two main breakers
  - Circuit breaker racked-in/out status location for the two main breakers
  - Substation LAN Location
- Blower Building 2 (12kV SWGR-J-A and SWGR-J-B, 480V SWGR JB-A and SWGR JB-B)
  - SEL relays for transformer virtual main (location for relay-relay hard-wired tripping)
  - Existing GE F60 and Multilin relays shall be included in the Substation LAN for SoE and time-synchronization. SEL shall provide a separate (alternate bid item) cost item to provide either a relay-based or RTAC based solution to implement a closed-transition transfer scheme on the existing switchgear lineup (Main-Tie-Tie-Main configuration) – scheme is similar to Power Building 9. The solution shall be acceptable to OCSD prior to proceeding forward with detailed design.
  - Substation LAN location
- Thickening and Dewatering Building (12kV SWGR-Q-A and SWGR-Q-B, 480V SWGR-QA-A, SWGR-QA-B, SWGR-QC-A, SWGR-QC-B)
  - New SEL relays for transformer virtual main (location for relay-relay hard-wired tripping)
  - Existing GE Multilin relays shall be included in the Substation LAN for SoE and time-synchronization.
  - Load Shed controller location
  - Substation LAN location
- SALS - Steve Anderson Lift Station – (480V SWGR-HB-A and SWGR-HB-B)
  - New SEL relays for transformer virtual main (location for future relay-relay tripping via 61850 communication). The upstream medium voltage power source for this is from Power Building 3. A separate project will install new relays

- at Power Building 3. That project will provide programming for relay-relay tripping via 61850 communication. This project will install the relays at SALS.
  - Substation LAN location
- Power Building 5 (12kV SWGR-5-A and SWGR-5-B, 480V SWGR-RA-A, SWGR-RA-B, SWGR-RB-A, and SWGR-RB-B)
  - Substation LAN location
  - The new SEL relays at this location will be designed, programmed, and installed by a separate project. However, this Substation LAN future expansion shall be accounted for in the overall integrated testing under this SOW.
- New (Future) Power Building 3
  - Substation LAN location
  - The new SEL relays will be designed, programmed, and installed by a separate project (P1-105). However, this Substation LAN future expansion shall be accounted for in the overall integrated design and testing under this SOW.
- Control Center
  - HMI client location
- Electrical Maintenance Building
  - HMI client location
- Power Building 6
  - Replacement of Electro-mechanical Relays with SEL Relays (Including Door Replacements)
  - Existing SEL Relays (to be installed by a separate project)
  - Substation LAN Location

## **Plant 2**

- Distribution Center A (12kV SWGR-DCA-A and SWGR-DCA-B)
  - Replacement of existing relays with new SEL relays (location for relay-relay tripping via 61850 communication)
  - Substation LAN location. DC-A shall be added to the J-117B Substation LAN ring between Headworks Standby PB and Cen-Gen.
- Power Building B (480V SWGR-DCSL-A and SWGR-DCSL-B)
  - New SEL relays for transformer virtual main (location for relay-relay tripping via 61850 communication)
  - Substation LAN location
- Power Building C (480V SWGR-CPB)
  - New SEL relays for transformer virtual main (location for relay-relay tripping via 61850 communication)
  - Connects to Power Building B Substation LAN switches
- Power Building D (480V MCC-G)
  - New SEL relays for transformer virtual main (location for relay-relay tripping via 61850 communication)
  - Connects to Power Building B Substation LAN switches
- New (Future) Distribution Center F
  - Substation LAN location
  - The new SEL relays will be designed, programmed, and installed by a separate project (P2-98). However, this Substation LAN future expansion shall be accounted for in the overall integrated design and testing under this SOW.

### **TASK 3.2.1 – BID DOCUMENTS**

SEL ES shall provide engineering services to prepare biddable technical specification and other Bid Documents as required to meet design requirements. In this SOW, construction documents include the Load-shed and Substation LAN specification and any SEL ES related support documentation for OCSD's designated CONSULTANT to complete their design.

#### **TASK 3.2.1.1 – TECHNICAL SPECIFICATIONS**

OCSD's designated CONSULTANT shall be responsible for contents of all technical specifications (Divisions 01 through 17), including edited OCSD Master technical specifications, except for the Load Shed & Substation LAN specification. SEL ES shall prepare the Load Shed & Substation LAN specification.

#### **TASK 3.2.1.2 – CONSULTANT PREPARED BID DOCUMENTS REVIEW**

SEL ES shall review the network drawings and general network panel wiring diagrams prepared by OCSD's designated CONSULTANT for the Load Shed and Substation LAN elements and provide review comments.

#### **TASK 3.2.1.3 – BID PHASE ACTIVITIES**

SEL ES shall provide timely clarification and resolve errors and omissions identified during the bid phase activities and reissue updated documents.

### **TASK 3.2.2 – DESIGN SUBMITTALS**

SEL ES shall provide submittals listed in this section. All drawings submitted shall be in searchable PDF format for 11-inch by 17-inch printouts with details and text clearly legible. Final drawing submittals shall be provided in both searchable PDF format and native AutoCAD files. SEL ES shall provide OCSD four weeks to review and comment on each submittal, unless stated otherwise in Table 2 – Project Milestones and Deadlines. The front-end engineering and network drawing submittals shall occur in the first part of the design. The OCSD designated CONSULTANT will then proceed with detailed design on the network drawings in their SOW based on these SEL ES submittals. The other design phase submittals shall be completed per the remaining design phase schedule. For each design submittal, current copies of all relevant project logs and a written response log to OCSD comments from the previous submittal, as applicable, shall be provided with the associated submittal.

#### **TASK 3.2.2.1 – FRONT END ENGINEERING DESIGN (FEED) SUBMITTAL**

- Front End Engineering Design (FEED) Report – SEL ES shall submit a report containing the analysis, evaluation, and recommendations for the following topics at a minimum:
  - Existing Hardware – SEL ES shall evaluate existing hardware capability to meet design requirements and proposed new hardware and design solutions. Existing SEL relays at 12kV Service Center and Cen-Gen should be utilized as much as possible to minimize switchgear modifications.
  - Plant 2 Modifications - SEL ES shall integrate the Plant 2 SOW within this project to the Substation LAN design that is being installed by Project J-117B. Any necessary integration documents and efforts shall be completed as part of this SOW. This applies to DC-A, PB-B, PB-C, and PB-D.

#### **TASK 3.2.2.2 – NETWORK DRAWINGS SUBMITTAL**

- Network Block Diagrams
  - SEL ES shall be responsible for the design of the following network drawings for the modifications described in this SOW:
    - Topological Diagrams that illustrate the overall Substation LAN topology. These diagrams will be used by the OCSD designated CONSULTANT as the basis for detailed design of fiber cabling between buildings.
    - Sample Riser Diagrams that provide detailed examples of cabling between each model IED to be connected and its local Substation LAN switches. These shall include all redboxes, protocol converters, cables, taps, terminating resistors, and any other component required for connectivity between each model IED used and the Substation LAN. These diagrams will be incorporated into the J-98 bid documents by the OCSD designated CONSULTANT.

#### **TASK 3.2.2.3 – FDS AND RTDS SUBMITTAL**

SEL shall provide the following design submittals as described in this SOW:

- Functional Design Specification
  - SEL shall develop a functional design specification that shall serve as the written basis of design for the Load Shed and Substation LAN system. The Load Shed and Substation LAN system shall be designed, programmed, and configured to integrate seamlessly into the overall integrated substation control, monitoring, and protections system. As part of the development process, SEL ES shall participate in workshops to establish detailed requirements. SEL ES shall schedule and execute the work such that the functional design specification is produced and submitted early enough that OCSD comments can be addressed and changes incorporated without any significant impact to the overall project schedule. The design will be similar to the J-117B design.

- RTDS Reports: SEL ES shall submit detailed analysis reports describing the results of the RTDS testing. The reports shall describe in detail all assumptions, input data, system configurations, calculation methods, conclusions, and recommendations resulting from the RTDS testing. The following reports shall be provided:
  - RTDS Model Validation Report
  - RTDS Under-frequency and Under-voltage Analysis Report
  - RTDS FDT Report

### **TASK 3.3 – DEVELOPMENT SERVICES**

SEL ES shall perform all required configuration and programming services for all Load Shed and Substation LAN system hardware and software to provide a completely functional and operational Load Shed system. SEL ES shall define all interfacing requirements for the Load Shed and Substation LAN system, and coordinate with OCSD staff about network and security requirements. During the development process, OCSD will provide integration/programming support and feedback, and provide all necessary information to achieve a successful system integration. Development services shall include the following:

#### **TASK 3.3.1 – SCADA/HUMAN MACHINE INTERFACE (HMI) SCREEN DEVELOPMENT**

SEL ES shall develop the following HMI screens for the Load Shed and Substation LAN system. Screens shall be similar to and coordinated with the screens developed for Project J-117B:

- Overall simplified single-line diagram showing breaker status
- One detailed single line diagram per electrical switchgear being controlled by the Load Shed system. Detailed single line diagrams shall include at minimum power flow data (kW, amperes, voltage), switchgear in local/remote, and breaker status. Single line diagrams shall be provided for the following 12kV switchgear:
  - 12kV Electric Service Center
  - Cen Gen
  - Blower Building 1
- Contingency summary screen – this shall include two pre-set priority lists as provided by OCSD (i.e. dry weather priority and wet weather priority). This screen should display the present breaker status, bus connection, contingency status, present power, and load-shedding satisfaction for each contingency, as well as the details of each individual contingency. Information about the present power system operating scenario is also shown, allowing the user to tune the power management system (PMS) by setting the Incremental Reserve Margin (IRM) values. The operator is also able to enable or disable each contingency individually.

- Contingency cross point screen. This screen should display information about all the contingencies and their associated loads that are either a) selected, b) inhibited or c) unavailable for shedding. Across each contingency, the loads that are selected are highlighted in green, loads that are inhibited are highlighted in red and loads that are unavailable are greyed out. Using this screen, the operator is able to determine the response of the system to a particular contingency ahead of time.
- Underfrequency Load Shed summary and cross point screen. This screen should display the underfrequency thresholds, frequency, amount of load selected to shed, contingency satisfied status, and an input for the amount of load required to be shed. The UF Pickup (Hz) and the amount to shed values for the two levels will be provided by the customer. The UFLSP dynamically selects from the same load priority list as the contingency system to equalize the generation to load. The operator can input the minimum load to shed. Whether the contingency is enabled or disabled is automatically determined by the system. The underfrequency contingencies will be enabled as soon as the generator is isolated (islanded) from the utility. These load-shedding decisions are separate from the CLSP system algorithm and cover all causes for frequency drops that are not detectable by the contingency system.
- Load summary screen. This screen should display the present Breaker Status, Test Shed Select, Load Priority, Live Power (MW), Force Value of Power (MW), and Toggle Live Force values for each load. When a load-shedding event occurs, a yellow banner is displayed under the load number in the Load Number column. When the LSP is placed in Test mode, a red Test Mode Enabled banner is displayed in the upper left corner of the screen. This allows the operator to shed loads manually. This feature is typically used for testing the outputs responsible for tripping loads in the event of a load-shedding occurrence. The Toggle Live Force column is used in case of a measurement discrepancy. This allows the operator to input a known good value in the Force Value of Power column. By doing this, the operator overwrites the value of the load. The LSP will use the forced value for all load-shedding calculations.
- Pop-up load trend screen. The necessary parameters for Operators to evaluate system data shall be trended. This includes loading, generation, and utility data for each source/load being monitored by the PowerMax controller.
- Contingency Event Report. Event Reports are text files generated by the controller every time a contingency is triggered. They contain data about the contingency and resulting actions taken by the controller. The operator can analyze this report to gain information on a particular event that occurred. The controller (i.e., LSP1 or LSP2), the event that occurred, and the action that was taken are all identified, in addition to the MW selected to shed and the MW required to shed.
- PowerMAX diagnostic screen. The POWERMAX Diagnostics screen displays critical diagnostic information for the system. The indication fields on the POWERMAX Diagnostics screen will display a red background and flash for each of the areas affected by an alarm. This screen allows the operator to view all alarms, watchdog counters, and status indications for each of the POWERMAX controllers. Watchdog counters are used to check the integrity of the communications channel between the HMI, gateways, controllers, and



SCADA FEPs. When a watchdog counter stops responding, the HMI will wait for a brief period before issuing an alarm. The operator can reset alarms and trips for the controllers, as well as enable or disable each controller individually.

- PowerMAX alarm screen. This screen should display all alarms that were generated in the system and the time they were generated, acknowledged, and returned to normal. The alarms are selectable by group and can be filtered by substation, area etc. Acknowledgement buttons (Ack Visible, Ack All, and Ack Selected) are also provided.
- Network health monitoring screen for health of each switch
- Communication health for each connected IED / Controller (Load-Shedding and peer to peer communication)

Data from the Load Shed controller regarding Load Shed initiation and breaker trips initiated by the Load Shed controller will be read by the OCSD electrical SCADA system via the SEL security gateway device between the two separate networks.

SEL's HMI solution shall be developed on Aveva Wonderware System Platform for the HMI back end, and InTouch for System Platform for the HMI front end. Development and runtime licensing of the Wonderware software and hardware are to be provided by OCSD. SEL shall provide pricing for development and all programming services. This system shall be a shared Wonderware Galaxy Platform with the J-117B Load Shed system located on OCSD's ICS network. The Wonderware OI servers will communicate with the PMAX gateway RTAC via the SEL security gateway device. All HMI clients will be connected to OCSD's ICS network and communicate directly with the Wonderware System Platform servers over the ICS network.

### **TASK 3.3.2 – LOAD SHED CONTROLLER/RTAC PROGRAMMING**

SEL ES shall perform all programming for the Load Shed Controller/Real-Time Automation Controller (RTAC). All programming shall be well organized and documented such that the program is easy to understand, maintain, and troubleshoot. SEL ES shall configure two (2) redundant SEL controllers to provide the following features:

- Contingency-based load-shedding for up to 16 contingencies.
- Under-frequency load-shedding system

### **TASK 3.3.3 – INTELLIGENT ELECTRONIC DEVICE PROGRAMMING**

SEL ES shall perform all programming (Load Shedding and protective device settings) for all Intelligent Electronic Devices (IED) used for the Load Shed system, including but not limited to relay-to-relay communications, protective device settings, network configuration, event captures for SEL TEAM, arc flash detection settings, and "virtual-main" configuration. The programming shall be for up to 90 SEL relays. The programming shall be based on the coordination and arc-flash studies provided by OCSD. SEL ES shall be responsible for all other settings and overall integration of devices into the Load Shed and Substation LAN system. SEL shall be responsible for developing the frequency-based settings of the relays and the Load Shed system. SEL shall provide protective device settings for the three central generators. The three

central generators have similar ratings and design as one-another. IED tagging in the software and HMI shall be based on the device tags used in the design drawings. Programming of relay output trip and Load Shed contacts shall be coordinated with the contacts used on the design drawings.

#### **TASK 3.3.4 – NETWORK DEVICE PROGRAMMING**

SEL ES shall perform all network device programming for the Load Shed and Substation LAN system. All settings shall be coordinated and reviewed by OCSD. Network devices shall be configured with temporary passwords by SEL, and passwords shall be turned over to OCSD with delivery of equipment to site. OCSD will reset passwords on all networking equipment after commissioning.

#### **TASK 3.3.5 – OTHER CONFIGURATION, PROGRAMMING & APPLICATION DEVELOPMENT**

SEL ES shall configure, develop settings for, and otherwise integrate all other software and components utilized as part of the Load Shed and Substation LAN system. This includes, but is not limited to full configuration of MS Office, SEL TEAM, RTAC, and Architect software, as well as RTAC devices, GPS clocks, IRIG distribution hardware, and all other components and systems required for Load Shed system functionality.

### **TASK 3.4 – PRE-COMMISSIONING PROCEDURES**

#### **TASK 3.4.1 – BENCH TEST PROCEDURE**

SEL ES shall develop bench test procedures with accompanying test sheets for the bench test. The test sheets and test procedures shall be submitted and accepted by OCSD prior to bench testing.

#### **TASK 3.4.2 – FDT PROCEDURE**

SEL ES shall develop FDT procedures describing the complete step-by-step testing of the Load Shed and Substation LAN system and relay-to-relay communications at the factory.

### **TASK 3.5 – TESTING IN DESIGN PHASE**

#### **TASK 3.5.1 – BENCH TEST**

SEL ES shall execute an OCSD witnessed bench test according to the bench test procedure. The bench test consists of loading/importing the tag databases into an RTAC controller and SCADA server, and loading/importing the HMI graphics into an HMI workstation. The bench test is to assure coordination between the RTAC logic and SCADA graphics, not the logical operation of the program. Changes made to the RTAC program or SCADA program may require a repeat of the bench test for all software, at OCSD's discretion. Bench test shall be performed either at OCSD facility or SEL Irvine facility.

### **TASK 3.5.2 – REAL-TIME DIGITAL SIMULATOR TEST**

SEL ES shall develop a system model in the RTDS and run simulations and tests to validate and confirm total Load Shed system performance. The RTDS should achieve a complete closed-loop testing environment by utilizing a digital model in conjunction with actual relays and be accompanied with a detailed analysis report. OCSD utilizes ETAP for performing system studies and can make the system model available to SEL ES for the purpose of this task. OCSD will provide kW and kVA data at all 12kV feeder breakers at the 12kV Service Center and Cen Gen for dry weather and wet weather conditions for use in the RTDS model. OCSD will provide generator nameplate data for the central generators. The model shall have sufficient detail to study areas of interest identified by SEL ES and OCSD. The testing shall evaluate the dynamic and transient responses of the generators, large motors and associated Variable Frequency Drives (VFDs), and the associated electrical busses. SEL ES shall build an electrical model of the system within the RTDS system and will test the system in a Hardware-in-the-Loop (HIL) configuration. All required test equipment shall be provided by SEL ES. This task and the associated RTDS reports are to be performed by SEL at the discretion of OCSD and should be reflected as an optional item on the proposal.

### **TASK 3.5.3 – FACTORY DEMONSTRATION TEST (FDT)**

SEL ES shall perform FDT on the Load Shed and Substation LAN system according to the FDT procedure. SEL ES to provide FDT documentation indicating that system performance is satisfactory, prior to provision and delivery of systems to the Contractor. FDT procedures shall be developed by SEL ES and reviewed and accepted by OCSD prior to testing.

### **TASK 3.6 – WORKSHOPS**

SEL ES shall hold workshops throughout the project to keep OCSD appraised of the job, review work in progress, share information, discuss project submittals, present findings of technical analyses, receive and resolve comments, and obtain decisions and direction by OCSD staff. This task outlines the major workshops to be convened or attended by SEL as part of, or in addition to, other tasks in this SOW. It is anticipated that efficiencies will be realized from the J-117B workshop efforts and documented decisions. As this is similar work, the relevant decisions and efforts shall be utilized for this project. For each workshop convened by SEL ES, SEL ES shall submit an agenda to OCSD for review at least one week prior to the workshop. Agenda to include the following:

- Topics: A listing of each topic to be covered with sufficient detail so that OCSD attendees can reasonably determine if their participation is needed or not. A one-line description is not typically sufficient for this purpose. The topic description shall include what information will be presented, and what decisions will be needed.
- Attendees: The agenda shall include both OCSD and SEL team members. The OCSD Project Manager will add the OCSD staff attendees to the agenda prepared by SEL ES, based on SEL's agenda and SEL's recommendation of which OCSD staff members should attend.

- Workshop time and place: SEL ES shall work with the OCSD Project Manager to set the workshop date and time. When held at OCSD offices, the OCSD Project Manager will reserve the conference room this case.
- A preliminary list of material to be provided at the workshop.

For each workshop convened by SEL ES, SEL ES shall transmit to OCSD the following by the time of the meeting:

- Hard copies of the agenda (if applicable), one for each attendee
- One sign-in sheet with the names of attendees pre-listed
- Native electronic files used for the presentation. With the exceptions noted below, hard copies of presentation materials will generally not be required. The OCSD Project Manager will make the electronic files available to the OCSD project team internally.
- Hardcopies of all materials that cannot be easily viewed when projected on a screen. Examples might include design drawings and spreadsheets.

SEL ES shall transmit the workshop meeting minutes to the OCSD Project Manager within three business days of the meeting in MS Word format using OCSD's template, or an approved substitution. SEL ES shall also update and transmit the Action Item Log, Decision Log, and Issues Log with the minutes.

The OCSD Project Manager will distribute the minutes for internal review. If there are no OCSD comments on the minutes, they will be considered final. If there are comments, the OCSD Project Manager will incorporate all appropriate OCSD comments on the MS Word file with changes tracked. The updated MS Word file will be transmitted back to SEL ES. If SEL has no comments on the OCSD edits, the minutes will be considered final. If SEL ES has further comments on the OCSD edits, those comments should be discussed with the OCSD Project Manager as needed, until both parties agree in writing or email on final version.

#### **TASK 3.6.1 – NETWORK DESIGN WORKSHOP**

SEL ES shall convene one two-hour network design workshop prior to starting detailed network design, at the SEL Irvine facility. During this workshop SEL ES and OCSD shall review elements of the network design proposed by SEL ES.

#### **TASK 3.6.2 – FUNCTIONAL DESIGN SPECIFICATION WORKSHOPS**

SEL ES shall convene one four-hour (initial discussion to discuss system requirements) and one four-hour (review draft and final) functional design specification (FDS) workshops at the Irvine SEL facility. These workshops shall serve to support the development and approval of the functional design specification, which shall be produced by SEL ES. The workshops shall highlight any differences between this project and the J-117B project.

#### **TASK 3.6.3 – GRAPHICAL STANDARDS WORKSHOPS**

SEL ES shall convene one four-hour graphical standards workshop to discuss the proposed HMI screens. This workshop will provide examples from previous projects and will set requirements and expectations for all graphics development tasks performed by SEL ES. The workshop shall highlight any differences between this project and the J-117B project.

#### **TASK 3.6.4 – HMI/SCADA SCREEN DEVELOPMENT WORKSHOPS**

SEL ES shall convene one eight-hour HMI/SCADA Screen Development workshop. During this workshop, OCSD personnel will review and comment on SEL-produced HMI screens to allow for a familiar and easy to understand solution for OCSD operators. The workshop shall highlight any differences between this project and the J-117B project.

#### **TASK 3.6.5 – NETWORK WORKSHOPS**

SEL ES shall convene one two-hour workshop on GOOSE messaging occurring on this project.

SEL ES shall convene two four-hour network configuration workshops to review detailed network configurations and administrative access. During these workshops, OCSD personnel will review and comment on SEL-produced switch configurations, configurations for all other configurable network devices, and determine design requirements and network architecture requirements for secure remote engineering access of the Load Shed and Substation LAN system components by OCSD personnel via the ICS network. The workshops shall focus on any differences between this project and the J-117B project.

#### **TASK 3.6.6 – FDT PROCEDURE WORKSHOPS**

SEL ES shall convene one two-hour FDT workshop. The workshop shall cover testing requirements, scheduling, test personnel requirements from OCSD and SEL ES, simulation methods, and test system architecture. The workshop shall highlight any differences between this project and the J-117B project.

#### **TASK 3.6.7 – AUTO-SYNCHRONIZATION WORKSHOP**

SEL ES shall convene two four-hour Auto-synchronization workshops. Workshop #1 shall cover the proposed SEL solution based on design requirements. Workshop #2 shall serve as a review of the detailed auto-synchronization design and control strategy.

### **TASK 3.7 – DEVELOPMENT SUBMITTALS**

#### **TASK 3.7.1 – TRAINING PLANS & MATERIALS SUBMITTAL**

SEL ES shall propose training plans, agendas, and materials for all training provided by SEL ES. OCSD will review contents of training plans and material submittals and provide feedback as necessary. SEL ES shall then re-submit finalized training plans and materials.

#### **TASK 3.7.2 – INITIAL PROGRAM DEVELOPMENT SUBMITTAL**

Submittal shall include the following:

- Preliminary Program Flowchart: Programmer shall develop the preliminary program flowchart. See Exhibit 2 – Sample Program Flowchart.
- Preliminary HMI Graphics: Submit a draft of all unique graphics of the proposed HMI. This shall include system overviews, single-line graphics, configuration screens, alarm summary screens, network overview, diagnostics, and any other SEL ES standard/recommended graphics for a typical Load Shed system.

- Preliminary SCADA server tag database
- Preliminary RTAC tag database
- Preliminary Device Data Map Configuration Table
- Real IO list
- Preliminary Communications Traffic Flows Block Diagram
  - The intent of the communications traffic flows block diagram is to illustrate all traffic flows passing through the Substation LAN. SEL ES shall include the following detail at a minimum: All connected devices (including the HMI server, Load Shed controller, IEDs, clocks, security gateway, TEAM server, etc.) shall be represented as blocks. All traffic flows between devices shall be represented with a unique line identifying each protocol type and indicating the direction of the traffic flow. A brief description of the data being transmitted shall be included for each traffic flow, and in cases where the traffic flow is GOOSE, the publisher and subscribers shall be identified.

Completion of the programming standards workshop and the graphical standards workshop are required prior to this submittal.

### **TASK 3.7.3 – FINAL PROGRAM DEVELOPMENT SUBMITTAL**

SEL ES shall include all up-to-date information for the following in the Final Program Development Submittal:

- Program Flowchart
- RTAC/Load Shed Controller Program: The final version of the untested program shall be completed for this submittal. All parameters, routines, subroutines, variables, etc. shall be completed prior to this submittal.
- SCADA server tag database
- RTAC tag database
- Real IO list
- Final HMI graphics: Include a complete set of HMI graphics screens (color printout screen captures)
- Communications Traffic Flows Block Diagram
- Device Data Map Configuration Table
- Training Materials

Completion of the RTAC/Load Shed Controller Programming Workshop and the HMI/Screen Development Workshops are required prior to this submittal.

### **TASK 3.7.4 – CERTIFICATES OF TRAINING, CREDENTIALS, ETC.**

SEL ES shall submit certificates of training, credentials, resumes, and supporting documentation demonstrating competency for each technician, engineer, integrator, and SEL responsible for the design, development, programming, testing, and

commissioning of the Load Shed and Substation LAN system, or personnel providing training as part of this SOW.

## **PHASE 4 – CONSTRUCTION AND INSTALLATION SERVICES**

SEL ES shall provide engineering services during Phase 4 for all detailed engineering design for the Load Shed and Substation LAN system, detailed network design (including drawings for the construction Contractor), functional design specification, system integration, programming, programming standards development, bench testing, and factory demonstration testing.

### **TASK 4.1 – PROJECT MANAGEMENT**

The requirements specified in Task 3.1 Project Management for Phase 3 – Design Services shall also apply for Phase 4 – Construction, Phase 5 Commissioning Services, and Phase 6 Closeout.

#### **TASK 4.1.1 – CONSTRUCTION KICK-OFF MEETING**

SEL ES shall convene a two-hour meeting at OCSD no more than one (1) month after the notice to proceed has been issued to the construction Contractor. This meeting shall cover the following:

- Team introductions
- Brief project overview
- Project execution (where and when work will be performed)
- Overall project schedule
- Sequencing constraints and procurement timelines
- Lines of communication

#### **TASK 4.1.2 – PROJECT MANAGEMENT PROGRESS MEETINGS**

The requirements specified in Task 3.1 Project Management for Phase 3 – Design Services shall also apply for Phase 4 – Construction, Phase 5 Commissioning Services, and Phase 6 Closeout.

#### **TASK 4.1.3 – PROGRESS REPORTS**

The requirements specified in Task 3.1 Project Management for Phase 3 – Design Services shall also apply for Phase 4 – Construction, Phase 5 Commissioning Services, and Phase 6 Closeout.

#### **TASK 4.1.4 – PROJECT INVOICES**

The requirements specified in Task 3.1 Project Management for Phase 3 – Design Services shall also apply for Phase 4 – Construction, Phase 5 Commissioning Services, and Phase 6 Closeout.

#### **TASK 4.1.5 – PROJECT LOGS**

The requirements specified in Task 3.1 Project Management for Phase 3 – Design Services shall also apply for Phase 4 – Construction, Phase 5 Commissioning Services, and Phase 6 Closeout.

#### **TASK 4.1.6 – QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)**

The requirements specified in Task 3.1 Project Management for Phase 3 – Design Services shall also apply for Phase 4 – Construction, Phase 5 Commissioning Services, and Phase 6 Closeout.

#### **TASK 4.2 – DEVELOPMENT SERVICES**

Tasks not fully completed in Phase 3 – Design Services, as they relate to development services, shall be completed in Phase 4 - Development Services to meet the Contractor's schedule.

#### **TASK 4.3 – WORKSHOPS**

The requirements specified in Task 3.5 Workshops for Phase 3 – Design Services shall also apply for Phase 4 – Construction, Phase 5 Commissioning Services, and Phase 6 Closeout. Any workshops not completed in Task 3.5 Workshops in Phase 3 – Design Services shall be completed in Phase 4 – Construction and Installation and/or Phase 5 – Commissioning Services, as required.

#### **TASK 4.4 – SUBMITTALS**

The requirements specified in the various Submittals sections for Phase 3 – Design Services shall also apply for Phase 4 – Construction, Phase 5 Commissioning Services, and Phase 6 Closeout. Any submittals not accepted by OCSD in Phase 3 – Design Services shall be completed and accepted by OCSD in Phase 4 – Construction and Installation and/or Phase 5 – Commissioning Services, as required.

#### **PHASE 5 – COMMISSIONING SERVICES**

Any requirements which are not completed in Phase 3 – Design Services or Phase 4 – Construction and Installation shall be completed in Phase 5 Commissioning Services and Phase 6 Closeout, as required.

#### **TASK 5.1 – COMMISSIONING TEAM MEETINGS**

SEL ES shall attend Commissioning Team meetings at OCSD request, to ensure coordination between key responsible parties throughout the commissioning process.

#### **TASK 5.2 – PRE-COMMISSIONING**

##### **TASK 5.2.1 – PRE-COMMISSIONING INSPECTION**

SEL ES shall perform field inspections to verify that the Load Shed and Substation LAN system is properly installed, including all SEL IEDs installed as part of the design.



### **TASK 5.3 – COMMISSIONING**

SEL's commissioning staff members shall oversee and perform commissioning of the Load Shed and Substation LAN system. All components and equipment that require configuration and/or programming as part of the Load Shed and Substation LAN system shall be commissioned and put into service by SEL ES. The commissioning staff members shall be available to assist with troubleshooting during commissioning and to prepare operations manuals and procedures (OMAP). Commissioning efforts by SEL shall include on-site visits to participate in the development of stable process/systems.

The following are the anticipated steps of commissioning. The only test equipment provided by the Contractor for the Substation LAN, Load-Shed system, and associated hardware (including relays) is to perform the NETA acceptance testing of the protective relays. All other test equipment needed for the SEL systems shall be operated and provided by SEL ES, under the oversight of the SEL Engineer in charge. It is anticipated that the Contractor would be completing relay installations one building (substation) at a single time. As the plant will remain in operation, each switchgear must be fully operational after work is completed on that switchgear, before work can begin on another switchgear.

1. OCSD provides the coordination study with relay setpoints (not rdb files) to SEL ES for the protective relays.
2. Relay settings configuration (programming) files (native) are provided by SEL ES to OCSD.
3. OCSD provides relay programming files to the Contractor/NETA and provides oversight of testing. The NETA test company will test per the NETA Acceptance Testing Standards for relays (check functionality of relay for hard-wired trips and controls). This would not include relay-relay trips via the 61850 GOOSE communications.
4. At each building (substation), OCSD Engineer and Contractor perform loop testing. Loop testing involves verifying the I/O wiring between end devices and OCSD's PLC. Concurrently, OCSD Engineer and the Contractor will verify I/O wiring to each IED. OCSD Engineer will also verify ethernet connectivity to each IED. SEL ES will be required to assist on-site only at the first building to ensure configuration is adequate as it relates to this step.
5. For the entire system, Substation LAN network switches are to be configured and installed. Load Shedding system hardware is to be configured and installed. Fiber optic cabling is to be installed by the Contractor and accepted by OCSD.
6. Once items 1 through 4 are completed for each building and item 5 is completed for the system, then SEL ES shall proceed with performing the remaining items.
7. Substation LAN testing of complete system including relays, switches, and controller (to be included in the FAT procedure):
  - a. Test multiple failure scenarios, including but not limited to:
    - i. Link loss recovery including recovery time
    - ii. Controller fail-over, including all RTACs used for Load Shedding system
    - iii. Loss of PRP LAN A and loss of PRP LAN
    - iv. Time source failover between clocks
  - b. Communication to all connected devices

- c. Perform I/O testing of IEDs programmed in the TEAM application.
  - d. Perform I/O testing of IEDs programmed to the PowerMax HMI.
  - e. Time Synchronization
  - f. IEC prescribed GOOSE message time requirements
  - g. Security Gateway Functional Checks
  - h. Auto-synchronization functionality testing
  - i. All Applications & Software (including TEAM Software & associated SoE data, HMI functionality, administrative access, alarms, etc.)
8. Relay to Relay testing – to be performed by SEL ES (may occur in multiple short site visits based on relay installation sequence by the Contractor and to be included in the FAT procedure).
  9. Load Shedding System FAT (to be included in the FAT procedure)

#### **TASK 5.3.1 – FAT PROCEDURES**

SEL ES shall develop FAT procedures, to be performed upon completion, describing the automatic operation of the Load Shed and Substation LAN system and the relay-to-relay communications (Load Shedding and virtual mains). These procedures shall describe how each Load Shedding initiation event will be triggered (actual event or simulation) to demonstrate proper operation in a real-world event. All modes of operation and interlocks shall be fully demonstrated.

#### **TASK 5.3.2 – COMMISSIONING PROCEDURE WORKSHOPS**

SEL ES shall participate in two four-hour commissioning procedure workshops. Topics that may be covered in these workshops include, but are not limited to:

- Review of FAT procedures
- Review of responsibilities and expectations of support from OCSD, SEL ES, and Contractor during the commissioning process
- Commissioning schedule and risks

The last workshop shall take place three weeks before the commissioning of the Load Shed and Substation LAN system. This workshop shall be convened by SEL ES and attended by Contractor and OCSD personnel.

#### **TASK 5.3.3 – COMMISSIONING SUBMITTALS**

##### **TASK 5.3.3.1 – FAT PROCEDURE**

SEL shall submit FAT procedures developed in Task 5.3.1 and the signed off, completed procedures to OCSD and the construction Contractor.

#### **TASK 5.3.4– FUNCTIONAL ACCEPTANCE TEST (FAT)**

SEL ES shall perform Functional Acceptance Testing (FAT) for the Load Shed and Substation LAN system per requirements in Section 16850, Load Shed and Substation Local Area Network Hardware, and Specification Section 01810, Commissioning. Any deviations from the FAT procedures, equipment failures, anomalies or system issues

during FAT shall be documented by SEL ES and reported to OCSD. All testing affecting the equipment shall be subject to quality assurance surveillance by OCSD.

#### **TASK 5.3.5 – RELIABILITY ACCEPTANCE TEST (RAT)**

The Load Shed and Substation LAN system shall operate without significant issues or errors for a period of seven days and in accordance with Section 01810, Commissioning, before OCSD's acceptance of the system.

#### **TASK 5.3.6 – POST-DEVELOPMENT TRAINING**

The following training shall be classroom-based, instructor-led format, convened locally at OCSD.

##### **TASK 5.3.6.1 – LOAD SHEDDING AND SUBSTATION LAN TRAINING**

Prior to RAT, SEL ES shall train OCSD personnel on the Load Shed and Substation LAN system. SEL shall provide one (1) eight-hour training session to provide the required training on the Load Shed and Substation LAN system to allow OCSD to completely maintain the system without any restriction (except modifying the internal calculation logic of the Load Shed PowerMax controller). This includes all hardware, applications, programming, and operator interfaces. Length and duration of the training sessions shall be provided in the proposal. The training shall focus on the key differences between this project and the J-117B project. Training shall include the following:

- Configuration of any device on the system after it has been replaced due to a failure
- Troubleshooting of the system in the event there is a device or communications failure
- Network architecture and SEL's implementation of the Substation LAN, including Ethernet switch and port configurations, protocols used, network monitoring, and security gateway configuration to allow remote access and transfer of data to the plant historian.
- Adding or removing loads for the Load Shedding system
- GOOSE configuration and adding, modifying or removing relay-to-relay GOOSE communications
- Adding or modifying HMI graphics for the Load Shedding screens
- Testing of the system after modifications
- Modifying IEC 61850 SCL files due to logical node and other changes
- Security gateway configuration, administration, and management of profiles

#### **TASK 5.4 – OPERATIONS MANUAL AND PROCEDURES (OMAP)**

SEL ES shall develop an Operations Manuals and Procedures (OMaP) document to describe the functionality of the system. OMaP shall be finalized and accepted by OCSD no less than 30 days prior to RAT. The OMaP shall include the following:

- Introduction – Introductory overview of system
- Design Criteria – Design information Tables
- Theory of Operation – Describe complete operations and functionality of system

- Equipment Controls – Narrative plus summary tables for controls and SCADA screens, plus how control system works
- SEL ES Recommended Procedures – Include all relevant reference material
- Safety – Identify safety alarms, equipment, and hazards
- Troubleshooting – quick-reference tables
- Maintenance – links to equipment service manuals

## **PHASE 6 – CLOSEOUT**

Closeout tasks include completion of punch list items by SEL ES, final inspection, completion of record drawings, and electronic data submittals. SEL ES shall submit a final invoice at the completion of the project.

### **TASK 6.1 – AS-BUILT DOCUMENTATION**

After completion of RAT, and any commissioning punch list items, SEL ES shall submit all as-built details, documentation, and drawings representing all aspects of the completed Load Shed and Substation LAN system. All programs, configuration files, and related documentation for the entire Load Shed and Substation LAN system shall be turned over to OCSD for review and acceptance. SEL shall submit all documentation typically provided by SEL ES for Load Shed systems (SEL ES standard documentation). Documentation shall be provided in native and pdf files per OCSD documentation requirements.

As-built documentation shall include:

- Ethernet switch configurations
- Security gateway configuration
- IED configurations and programming
- SEL Architect Project and IED IEC 61850 configuration files
- Load Shed Controller programming
- HMI server configuration and programming and graphics files
- Automation controller's configuration and programming
- Clock and time distribution settings and configuration
- TEAM server and software configuration and programming
- Settings, configuration, and programming for any other configurable or programmable device related to or part of the Load Shed and Substation LAN system.
- Communications Traffic Flows Block Diagram
- Device Data Map Configuration Table
- Final Completion Report
- Certifies that SEL has completed the installation and commissioning of the Load Shed and Substation LAN system
- Includes system supplier instruction and operational manuals and recommendations

## **TASK 6.2 – FINAL INSPECTION AND PUNCHLISTS**

SEL ES's construction coordinator shall attend the final inspection job walk with the Contractor and OCSD staff. SEL ES shall make recommendations on the completion of the work including, but not limited to, completion of punch list items, overall system operability, and recommendations for follow-up work. SEL ES shall assist OCSD in developing punch lists of items required to be completed prior to final acceptance of the project by OCSD. Punch lists can include action items to be completed by OCSD, SEL ES, or the Contractor.

## **TASK 6.3 – SOFTWARE AND LICENSES**

SEL ES shall submit to OCSD software licenses, software maintenance agreements, and software support agreements for all licensed software products used for the Load Shed and Substation LAN system. The expiration of software maintenance and support agreements shall occur no sooner than one year after the successful completion of the Reliability Acceptance Test (RAT). All software licenses, software support agreements, and software maintenance agreements shall be transferred to OCSD and registered to OCSD prior to the successful completion of RAT. Licenses shall include SEL-5045 AcSELERator TEAM Software license to collect data from up to 150 SEL IEDs and MS-Office.

## **TASK 6.4 – TRANSFER OF OWNERSHIP**

All programming and associated documentation, excluding programming tools copyrighted by others, shall become the property of OCSD upon Final Completion. Any software licenses required for the ownership, maintenance, or operation of any application or service for the Load Shed and Substation LAN system shall be registered to OCSD, all software media, manuals, paper licenses and other associated materials shall be provided to OCSD upon system handoff.

## **TASK 6.5 – WARRANTY**

SEL ES shall warrant all labor and services provided by SEL ES as part of this scope for a period of two years, beginning the day of acceptance of the Load Shed and Substation LAN system by OCSD. Warranty shall guarantee performance of the Load Shed and Substation LAN system, based on engineering and configuration parameters provided by SEL ES. Warranty services shall be performed expeditiously after notification by OCSD.

- Following necessary replacement or modification, SEL ES shall re-test the system and perform any additional procedures needed to place the complete system in satisfactory operation. Record documentation shall be updated to reflect modifications performed.
- Cost for all labor, travel, subsistence, and other expenses incurred in providing all services and service visits during the two-year warranty period shall be borne by SEL ES.

## **IV. GENERAL REQUIREMENTS**

### **Working Hours**

Meetings with OCSD staff shall be scheduled from Monday through Thursday between the hours of 7:00 AM and 4:00 PM. SEL's on-site staff shall conform to OCSD work schedules and safety standards. SEL shall coordinate any site inspection or work with the OCSD Engineer at least two weeks prior to the scheduled activity.

## **V. STAFF ASSISTANCE**

OCSD staff member or designee assigned to work with SEL ES on the design and construction phase of this project is Sandip Patel at (714) 593-7383, e-mail to: [sspatel@ocsd.com](mailto:sspatel@ocsd.com).

## **EXHIBITS:**

<b>Exhibit 1</b>	<b>Example of Monthly Progress Report</b>
<b>Exhibit 2</b>	<b>Sample Program Flowchart</b>
<b>Exhibit 3</b>	<b>Not Used</b>
<b>Exhibit 4</b>	<b>Sample Bench Test Procedure</b>
<b>Exhibit 5</b>	<b>Plants 1 &amp; 2 Overall Single Line Diagrams</b>
<b>Exhibit 6</b>	<b>OCSD Safety Standards</b>

SP:TW:dm

# **ATTACHMENT “I”**

## **COST MATRIX & SUMMARY**



Electrical Power Distribution System Improvements, Project No. J-98 PSA Request for Proposal Attachment I - Cost Matrix and Summary Form															
Task Item	Labor hours										Total Hours	Labor Fee	Total Subs	Allowable Direct Costs	Total Fees
	Engineer II	Engineer III	Technician	Specialist	Designer	Security Engineer	PM	Technical Editor	(insert role)	(insert role)					
5.3.2 Commissioning Procedure Workshops	16	8									24	0.00			0.00
5.3.3 Commissioning Submittals											0	0.00			0.00
5.3.4 Functional Acceptance Test (FAT)	120	50	70								240	0.00			0.00
5.3.5 Reliability Acceptance Test (RAT)											0	0.00			0.00
5.3.6 Post-Development Training	48	24									72	0.00			0.00
5.4 Operations Manual and Procedures (OMAP)	240	40						40			320	0.00			0.00
Subtotal - Phase 5 - Commissioning Services	528	146	86	0	0	0	8	64	0	0	832	0.00	0.00	0.00	0.00
PHASE 6 - CLOSEOUT															
6.1 As-Built Documentation	40	16									56	0.00			0.00
6.2 Final Inspection and Punchlists	80	40									120	0.00			0.00
6.3 Software & Licenses											0	0.00			0.00
6.4 Transfer of Ownership											0	0.00			0.00
6.5 Warranty											0	0.00			0.00
Subtotal - Phase 6 - Closeout	120	56	0	0	0	0	0	0	0	0	176	0.00	0.00	0.00	0.00
Optional Service - Auto Synchronization															
SEL-451 Autosync Design, Program and Test	290	43									333	0.00			0.00
Subtotal - Optional Service - Auto Synchronization	290	43	0	0	0	0	0	0	0	0	333	0.00	0.00	0.00	0.00
Optional Service - Main-Tie-Main															
Documentation	104	32						16			152	0.00			0.00
Development	104	40													
Testing	128	24													
Subtotal - Optional Service - Auto Synchronization	336	96	0	0	0	0	0	16	0	0	448	0.00	0.00	0.00	0.00
TOTAL - PHASES 4, 5 and 6 Rounded - Use for Attach E - Fee Proposal Form	5,374	1,170	86	40	80	120	708	240	0	0	7,818	0.00	0.00	0.00	0.00
												0.00	0.00	0.00	0.00

Electrical Power Distribution System Improvements, Project No. J-98  
PSA Request for Proposal  
Attachment I - Cost Matrix and Summary Form

Task Item	Labor hours										Total Hours	Labor Fee	Total Subs	Allowable Direct Costs	Total Fees
	Engineer II	Engineer III	Technician	Specialist	Designer	Security Engineer	PM	Technical Editor	(insert role)	(insert role)					
Fully Burdened Hourly Rate (Includes Payroll costs, OH, and Profit)															
PHASE 3 - DESIGN															
3.1 Project Management							656				656	0.00			0.00
3.2 Design Services											0	0.00			0.00
3.2.1 Bid Documents	40	40									80	0.00			0.00
3.2.1.1 Technical Specifications											0	0.00			0.00
3.2.1.2 Consultant Prepared Bid Doc Review											0	0.00			0.00
3.2.1.3 Bid Phase Activities											0	0.00			0.00
3.2.2 Design Submittals											0	0.00			0.00
3.2.2.1 Front End Engineering Design (FEED) Submittal	310	126		40		40		16			532	0.00			0.00
3.2.2.2 Network Drawings Submittal	40	40			80	80					240	0.00			0.00
3.2.2.3 FDS and RTDS Submittal	380	56						64			500	0.00			0.00
3.3 Development Services											0	0.00			0.00
3.3.1 SCADA/Human Machine Interface (HMI) Screen Development	320	40									360	0.00			0.00
3.3.2 Load Shed Controller / RTAC Programming	700	88									788	0.00			0.00
3.3.3 Intelligent Electronic Device Programming	270	45									315	0.00			0.00
3.3.4 Network Device Programming	64	32									96	0.00			0.00
3.3.5 Other Configuration, Programming, and Application Development	120	24									144	0.00			0.00
3.4 Pre-Commissioning Procedures											0	0.00			0.00
3.4.1 Bench Test Procedure	80	24						16			120	0.00			0.00
3.4.2 FDT Procedure	80	24						16			120	0.00			0.00
3.5 Testing in Design Phase											0	0.00			0.00
3.5.1 Bench Test	164	64					24				252	0.00			0.00
3.5.2 Real-Time Digital Simulator Test	600	80									680	0.00			0.00
3.5.3 Factory Demonstration Test (FDT)	580	40					20				640	0.00			0.00
3.6 Workshops											0	0.00			0.00
3.6.1 Network Design Workshop	4	2									6	0.00			0.00
3.6.2 Functional Design Specification Workshops	16	8									24	0.00			0.00
3.6.3 Graphical Standards Workshop	12	6									18	0.00			0.00
3.6.4 HMI/SCADA Screen Development Workshop	16	8									24	0.00			0.00
3.6.5 Network Workshops	20	10									30	0.00			0.00
3.6.6 FDT Procedures Workshops	8	4									12	0.00			0.00
3.6.7 Auto-Synchronization Workshop	16	8									24	0.00			0.00
3.7 Development Submittals	260	60						48			368	0.00			0.00
3.7.1 Training Plans and Materials Submittal											0	0.00			0.00
3.7.2 Initial Programming Development Submittal											0	0.00			0.00
3.7.3 Final Program Developmetn Submittal											0	0.00			0.00
3.7.4 Certificates of Training, Credentials, Etc.											0	0.00			0.00
Subtotal - Phase 3 - DESIGN	4,100	829	0	40	80	120	700	160	0	0	6029	0.00			0.00
PHASE 4 - CONSTRUCTION & INSTALLATION SERVICES															
4.1 Project Management											0	0.00			0.00
4.2 Development Services											0	0.00			0.00
4.3 Workshops											0	0.00			0.00
4.4 Submittals											0	0.00			0.00
Subtotal - Phase 4 - Construction & Installation Services	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00
PHASE 5 - COMMISSIONING SERVICES															
5.1 Commissioning Team Meetings	8						8				16	0.00			0.00
5.2 Pre-Commissioning	16		16								32	0.00			0.00
5.2.1 Pre-Commissioning Inspection											0	0.00			0.00
5.3 Commissioning											0	0.00			0.00
5.3.1 Functional Acceptance Test Procedures	80	24						24			128	0.00			0.00



# Orange County Sanitation District

Administration Building  
10844 Ellis Avenue  
Fountain Valley, CA 92708  
(714) 593-7433

## OPERATIONS COMMITTEE

### Agenda Report

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**File #:** 2020-910

**Agenda Date:** 3/4/2020

**Agenda Item No:** 4.

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**FROM:** James D. Herberg, General Manager  
Originator: Kathy Millea, Director of Engineering

**SUBJECT:**

**REDHILL RELIEF SEWER RELOCATION AT STATE ROUTE 55, PROJECT NO. FE18-13**

**GENERAL MANAGER'S RECOMMENDATION**

RECOMMENDATION: Recommend to the Board of Directors to:

Approve Utility Agreement No. OCSD-1005 between the Orange County Sanitation District and the Orange County Transportation Authority agreeing to specific terms, conditions, and funding obligations regarding the relocation and protection of the Redhill Relief Sewer at State Route 55 in the City of Santa Ana.

**BACKGROUND**

The Orange County Transportation Authority (OCTA) is implementing the State Route 55 Improvement Project (SR-55 Improvement Project) to widen State Route 55 between Interstate 5 and Interstate 405.

**RELEVANT STANDARDS**

- Maintain collaborative and cooperative relationships with regulators, stakeholders, and neighboring communities
- Protect Orange County Sanitation District assets

**PROBLEM**

The SR-55 Improvement Project will widen the freeway right-of-way and add a travel lane. An existing Orange County Sanitation District (Sanitation District) manhole is located where the additional lane will be constructed and the sewer under the added freeway lane is unprotected.

**PROPOSED SOLUTION**

Conduct a project to relocate a portion of the sewer and construct a casing at the unprotected sewer segments underneath the proposed right-of-way addition. OCTA has agreed to fund the relocation and protection of the Sanitation District sewer. To receive the funding, the Sanitation District must enter into a Utility Agreement with OCTA.

**TIMING CONCERNS**

The relocation and protection of the sewer must begin by June 2021 to align with OCTA's SR-55 Improvement Project's schedule.

**RAMIFICATIONS OF NOT TAKING ACTION**

The Sanitation District sewer may be damaged by the OCTA project.

**PRIOR COMMITTEE/BOARD ACTIONS**

N/A

**ADDITIONAL INFORMATION**

A design task order under an existing Master Design Services Agreement has been procured and negotiated with a design consultant for this project. The task order will be awarded upon Board Approval of this Utility Agreement. Staff will advertise the project for construction pursuant to California Public Contract Code Section 20103.8 and estimates the construction to start in June 2021.

**CEQA**

The relocation and protection of the Redhill Relief Sewer is included in the Initial Study/Mitigated Negative Declaration/Environmental Assessment, prepared by Caltrans and OCTA, for the SR-55 Improvement Project.

**FINANCIAL CONSIDERATIONS**

This request complies with authority levels of the Sanitation District's Purchasing Ordinance. This item has been budgeted (Budget Update, FY 2019-20, Appendix A, Page A-8, Small Construction Projects Program, Project M-FE) and is sufficient for the recommended action. Costs for the project will be reimbursed by OCTA.

**ATTACHMENT**

*The following attachment(s) may be viewed on-line at the OCSD website ([www.ocsd.com](http://www.ocsd.com)) with the complete agenda package:*

- Utility Agreement No. OCSD-1005

RD:dm:sa

**ORANGE COUNTY TRANSPORTATION AUTHORITY  
UTILITY AGREEMENT**

Page 1 of 5

**RW 13-05 (REV 12/2016)**

DISTRICT 12	COUNTY Orange	ROUTE SR-55	POST MILE <u>6.4/10.2</u>	Project ID <u>1200020328</u> E.A. <u>0J340</u>
FEDERAL AID NUMBER  STPLN-6071 (129)		OWNER'S PLAN NUMBER  OCSD-1005		
FEDERAL PARTICIPATION On the project <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO On the Utilities <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				

**UTILITY AGREEMENT NO. OCSD-1005**

**DATE**

Pursuant to Cooperative Agreement Number C-7-1936 (Cooperative Agreement), the Orange County Transportation Authority (OCTA) is partnering with the California Department of Transportation (Caltrans) in a project that proposes to widen State Route 55 (SR-55) between Interstate 405 and Interstate 5 (SR-55 Improvement Project). Per the Cooperative Agreement, OCTA is the lead agency for Right of Way Acquisition and Utility. The SR-55 Improvement Project proposes to reduce traffic congestion, improve mobility as well as traffic operations to an existing four mile stretch of SR-55.

**Orange County Sanitation District (OCSD)**  
10844 Ellis Avenue  
Fountain Valley, CA 92708

Hereinafter referred to as "OWNER", owns and maintains sewer facilities in the City of Santa Ana within the limits of OCTA's project which requires project development, design, inspection, project management, relocation of a manhole and sewer segments and the extension of casing to accommodate OCTA's project, and provision of necessary easement interests as set forth in Section V below.

It is hereby mutually agreed that:

**I. WORK TO BE DONE**

In accordance with Notice to Owner No. OCSD-1005 dated February 13, 2020, OWNER shall relocate sewer manhole and extend casing. All work shall be performed substantially in accordance with OWNER's Plan No. OCSD-1005 dated February 13, 2020 consisting of 1 sheet, a copy of which is on file in the OCTA office at 550 S. Main Street, Orange, CA 92863-1584.

Deviations from the OWNER's plan described above initiated by either the OCTA or the OWNER, shall be agreed upon by both parties hereto under a Revised Notice to Owner. Such Revised Notices to Owner, approved by the OCTA and agreed to/acknowledged by the OWNER, will constitute an approved revision of the OWNER's plan described above and are hereby made a part hereof. No work under said deviation shall commence prior to written execution by the OWNER of the Revised Notice to Owner. Changes in the scope of the work will require an amendment to this Agreement in addition to the revised Notice to Owner.

**II. LIABILITY FOR WORK**

**ADA Notice** For individuals with sensory disabilities, this document is available in alternate formats. For alternate format information, contact the Forms Management Unit at (916) 445-1233, TTY 711, or write to Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

LEGAL02/39492711v1  
LEGAL02/39617270v1

The existing facilities are lawfully maintained in their present location and qualify for relocation at OCTA expense under the provisions of Section (703) of the Streets and Highways Code.

### **III. PERFORMANCE OF WORK**

OWNER agrees to cause the herein described work to be performed by a contract with the lowest qualified bidder, selected pursuant to a valid competitive bidding procedure, and to furnish or cause to be furnished all necessary labor, materials, tools, and equipment required therefore, and to prosecute said work diligently to completion.

Use of personnel requiring lodging and meal 'per diem' expenses shall not exceed the per diem expense amounts allowed under the California Department of Human Resources travel expense guidelines. Accounting Form FA-1301 is to be completed and submitted for all non-OCTA personnel travel per diem. Owner shall also include an explanation why local employee or contract labor is not considered adequate for the relocation work proposed.

Work performed by OWNER's contractor is a public work under the definition of Labor Code Section 1720(a) and is therefore subject to prevailing wage requirements.

Work performed directly by Owner's employees falls within the exception of Labor Code Section 1720(a)(1) and does not constitute a public work under Section 1720(a)(2) and is not subject to prevailing wages. OWNER shall verify compliance with this requirement in the administration of its contracts referenced above.

### **IV. PAYMENT FOR WORK**

The OCTA shall pay its share of the actual and necessary cost of the herein described work within 45 days after receipt of OWNER's itemized bill, signed by a responsible official of OWNER's organization and prepared on OWNER's letterhead, compiled on the basis of the actual and necessary cost and expense. The OWNER shall maintain records of the actual costs incurred and charged or allocated to the project in accordance with recognized accounting principles.

It is understood and agreed that OCTA will not pay for any betterment or increase in capacity of OWNER's facilities in the new location and that OWNER shall give credit to OCTA for the salvage value of any material or parts salvaged and retained or sold by OWNER.

Not more frequently than once a month, but at least quarterly, OWNER will prepare and submit detailed itemized progress bills for costs incurred, not to exceed OWNER's recorded costs as of the billing date less estimated credits applicable to completed work. Payment of progress bills not to exceed the amount of this Agreement may be made under the terms of this Agreement. Payment of progress bills which exceed the amount of this Agreement may be made after receipt and approval by OCTA of documentation supporting the cost increase and after an Amendment to this Agreement has been executed by the parties to this Agreement.

The OWNER shall submit a final bill to OCTA within 360 days after the completion of the work described in Section I above. If OCTA has not received a final bill within 360 days after notification of completion of OWNER's work described in Section I of this Agreement, and OCTA has delivered to OWNER fully executed Director's Deeds, Consents to Common Use or Joint Use Agreements for OWNER's facilities (if required), OCTA will provide written notification to OWNER of its intent to close its file within 30 days. OWNER hereby acknowledges, to the extent

## UTILITY AGREEMENT NO. OCSD-1005

allowed by law, that all remaining costs will be deemed to have been abandoned. If OCTA processes a final bill for payment more than 360 days after notification of completion of OWNER's work, payment of the late bill may be subject to allocation and/or approval by the OCTA Board of Directors.

The final billing shall be in the form of a detailed itemized statement of the total costs charged to the project, less the credits provided for in this Agreement, and less any amounts covered by progress billings. However, OCTA shall not pay final bills which exceed the estimated cost of this Agreement without documentation of the reason for the increase of said cost from the OWNER and approval of documentation by OCTA. Except, if the final bill exceeds the OWNER's estimated costs solely as the result of a revised Notice to Owner as provided for in Section I, a copy of said revised Notice to Owner shall suffice as documentation. In either case, payment of the amount over the estimated cost of this Agreement may be subject to allocation and/or approval by the OCTA Board of Directors.

In any event if the final bill exceeds 125% of the estimated cost of this Agreement, an Amended Agreement shall be executed by the parties to this Agreement prior to the payment of the OWNER's final bill. Any and all increases in costs that are the direct result of deviations from the work described in Section I of this Agreement, shall have the prior concurrence of OCTA.

Detailed records from which the billing is compiled shall be retained by the OWNER for a period of three years from the date of the final payment and will be available for audit by OCTA and or Federal auditors. In performing work under this Agreement, OWNER agrees to comply with the Uniform System of Accounts for Public Utilities found at 18 CFR, Parts 101, 201, et al., to the extent they are applicable to OWNER doing work on the project that is the subject of this agreement, the contract cost principles and procedures as set forth in 48 CFR, Chapter 1, Subpart E, Part 31, et seq., 23 CFR, Chapter 1, Part 645 and 2 CFR, Part 200, et al. If a subsequent OCTA and/or Federal audit determines payments to be unallowable, OWNER agrees to reimburse OCTA upon receipt of OCTA billing. If OWNER is subject to repayment due to failure by OCTA to comply with applicable laws, regulations, and ordinances, then OCTA will ensure that OWNER is compensated for actual cost in performing work under this agreement.

## **V. GENERAL CONDITIONS**

All costs accrued by OWNER as a result of OCTA's request of August 22, 2018 to review, study and/or prepare relocation plans and estimates for the project associated with this Agreement may be billed pursuant to the terms and conditions of this Agreement.

If OCTA's project which precipitated this Agreement is canceled or modified so as to eliminate the necessity of work by OWNER, OCTA will notify OWNER in writing and OCTA reserves the right to terminate this Agreement by Amendment. The Amendment shall provide mutually acceptable terms and conditions for terminating the Agreement.

All obligations of OCTA under the terms of this Agreement are subject to the acceptance of the Agreement by OCTA Board of Directors or the Delegated Authority (as applicable), the passage of the annual Budget Act by the State Legislature, and the allocation of those funds by the California Transportation Commission.

OWNER shall submit a Notice of Completion to the OCTA within 30 days of the completion of the work described herein.

## UTILITY AGREEMENT NO. OCSD-1005

Such Easement Deeds as deemed necessary by the OCTA will be delivered to OWNER, conveying new rights of way for portions of the facilities relocated under this Agreement, over available STATE owned property outside the limits of the highway right of way.

OCTA's liability for the new rights of way will be at the proration shown for the relocation work involved under this Agreement.

It is understood that said highway is a Federal aid highway and accordingly, 23 CFR, Chapter 1, Part 645 is hereby incorporated into this Agreement.

In addition, the provisions of 23 CFR 635.410, Buy America, are also incorporated into this agreement. The Buy America requirements are further specified in Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21), section 1518; 23 CFR 635.410 requires that all manufacturing processes have occurred in the United States for steel and iron products (including the application of coatings) installed on a project receiving funding from the FHWA.

OWNER understands and acknowledges that this project is subject to the requirements of the Buy America law (23 U.S.C., Section 313) and applicable regulations, including 23 CFR 635.410 and FHWA guidance, and will demonstrate Buy America compliance by collecting written certification(s) from the vendor(s) or by collecting written certification(s) from the manufacturer(s) mill test report (MTR).

All documents obtained to demonstrate Buy America compliance will be held by the OWNER for a period of three (3) years from the date of final payment to the OWNER and will be made available to OCTA or FHWA upon request.

One set of copies of all documents obtained to demonstrate Buy America compliance will be attached to, and submitted with, the final invoice.

This does not include products for which waivers have been granted under 23 CFR 635.410 or other applicable provisions or excluded material cited in the Department's guidelines for the implementation of Buy America requirements for utility relocations issued on December 3, 2013.

OCTA further acknowledges that OWNER, in complying with the Buy America Rule, is expressly relying upon the instructions and guidance (collectively, "Guidance") issued by Caltrans and its representatives concerning the Buy America Rule requirements for utility relocations within the State of California. Notwithstanding any provision herein to the contrary, OWNER shall not be deemed in breach of this Agreement for any violations of the Buy America Rule if OWNER's actions are in compliance with the Guidance.

AB 262 – Buy Clean California Act of 2017 requires as of January 1, 2019 that the Department of General Services (DGS) is to publish in the State Contracting Manual (SCM) a maximum acceptable level of global warming potential (GWP) for each category of required materials. The categories of eligible materials are, carbon steel rebar, flat glass, mineral wool board insulation and structural steel. A statement of Environmental Product Declaration (EDP) is required prior to beginning of relocation work, to the extent required by law.

THE ESTIMATED COST TO OCTA FOR THE ABOVE DESCRIBED WORK IS \$ 1,435,000.00.

**Signatures on Following Page**



UTILITY AGREEMENT NO. OCSD-1005

IN WITNESS WHEREOF, the above parties have executed this Agreement the day and year above written.

**OWNER:**  
**ORANGE COUNTY SANITATION DISTRICT**

**ORANGE COUNTY TRANSPORTATION  
AUTHORITY,  
a public entity**

APPROVED

APPROVED

By: \_\_\_\_\_  
David John Shawver  
Board Chairman

By: \_\_\_\_\_  
James G. Beil, P.E.  
Executive Director,  
Capital Programs

Date: \_\_\_\_\_

Date: \_\_\_\_\_

APPROVED AS TO FORM:  
Alston & Bird

APPROVED AS TO FORM:

By:  Partner  
Pamela J. Privett  
Special Counsel

By: \_\_\_\_\_  
Rick E. Rayl  
Special Counsel



Orange County Transportation Authority

## NOTICE TO OWNER

District	County	Route	Post Mile	Project ID	E.A.
12	ORANGE	SR-55	6.4/10.2	1200020328	0J340
FEDERAL AID NUMBER STPLN-6071 (129)					
OWNERS FILE OCSD-1005					
DATE 2/13/2020		FREEWAY <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			

Number OCSD-1005

Orange County Sanitation District (OCSD)  
10844 Ellis Avenue  
Fountain Valley, CA 92708

Attn: Mr. Rudy Davila

**Because of the State Highway project:** Pursuant to Cooperative Agreement Number C-7-1936 (Cooperative Agreement), the Orange County Transportation Authority (OCTA) is partnering with the California Department of Transportation (Caltrans) in a project that proposes to widen State Route 55 (SR-55) between Interstate 405 and Interstate 5 (SR-55 Improvement Project). Per the Cooperative Agreement OCTA is the lead agency for Right of Way Acquisition and Utility relocations. The SR-55 Improvement Project proposes to reduce traffic congestion, improve mobility as well as traffic operations to an existing four mile stretch of SR-55.

**Which affects your facilities:** OCSD manhole located within private property South of Warner Avenue overcrossing within the limits of the proposed construction project.

**You are hereby ordered to:** relocate your facility per approved plan #OCSD-1005.

**Your work schedule shall be as follows:** Schedule your forces to begin relocation work concurrent with project contractor work scheduled for January 2021.

**Notify** Should you have any questions, please contact Utility Coordinator Pete Castelan at (949) 268.5724.

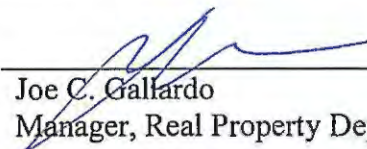
**Liability for the cost of the work is:** The-existing facilities are lawfully maintained in their present location and qualify for relocation at OCTA expense under the provisions of Section (703) of the Streets and Highways Code.

Orange County Transportation Authority

Darrell Johnson  
Chief Executive Officer

Jim Beil  
Executive Director of Capital Programs

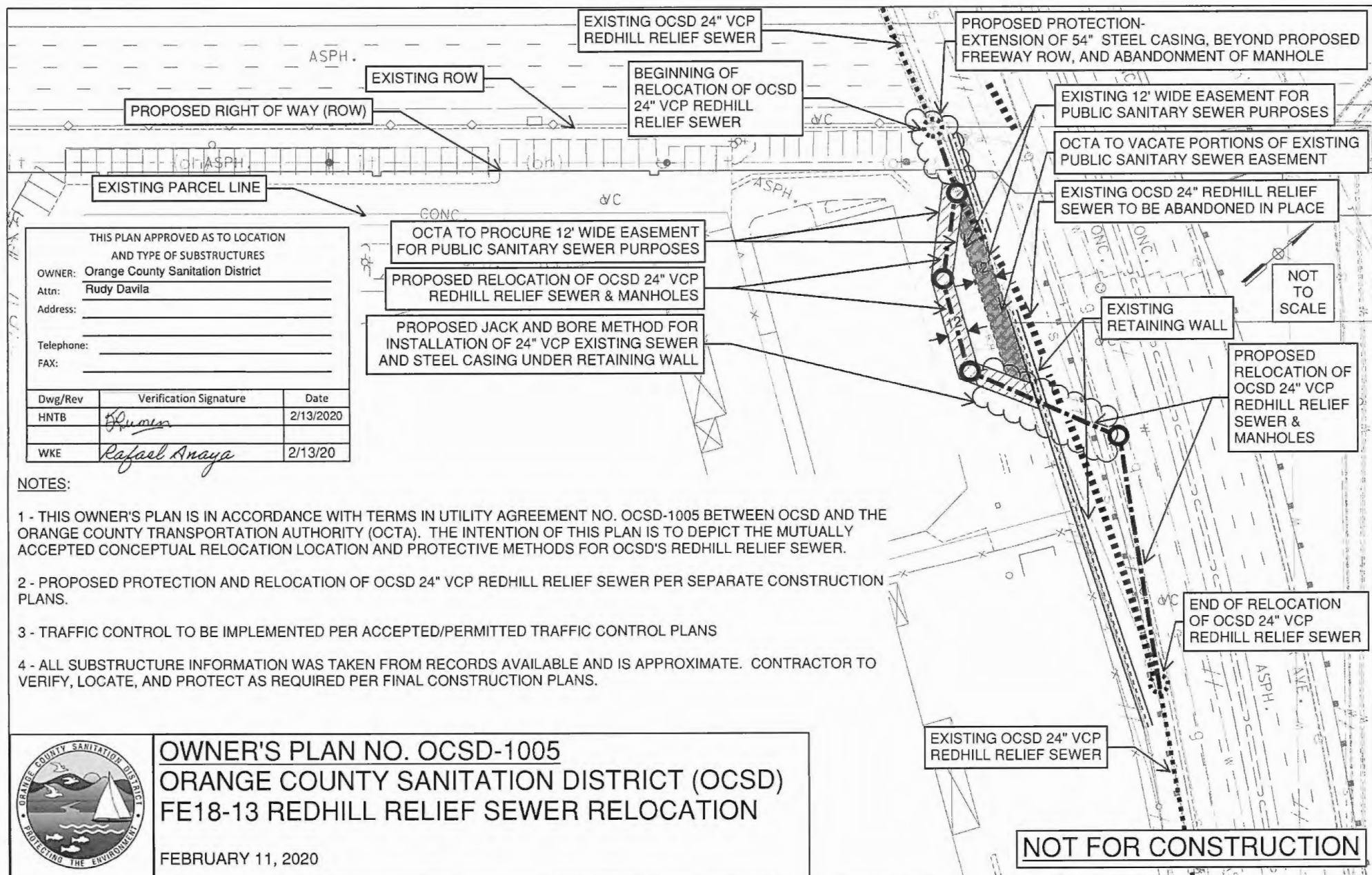
By:

  
Joe C. Galfardo  
Manager, Real Property Department

OPC Utility Consultant PC

OCTA Utility Coordinator AG

Distribution: 1) Owner, 2) OCTA - File





# Orange County Sanitation District

Administration Building  
10844 Ellis Avenue  
Fountain Valley, CA 92708  
(714) 593-7433

## OPERATIONS COMMITTEE

### Agenda Report

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**File #:** 2019-629

**Agenda Date:** 3/4/2020

**Agenda Item No:** 5.

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**FROM:** James D. Herberg, General Manager  
Originator: Kathy Millea, Director of Engineering

**SUBJECT:**

**OCEAN OUTFALL CONDITION ASSESSMENT AND SCOPING STUDY, PROJECT NO. PS18-09**

**GENERAL MANAGER'S RECOMMENDATION**

RECOMMENDATION: Recommend to the Board of Directors to:

- A. Approve a Professional Services Agreement with Carollo Engineers, Inc. to provide engineering services for the Ocean Outfall Condition Assessment and Scoping Study, Project No. PS18-09, for an amount not to exceed \$2,744,000; and
- B. Approve a contingency of \$274,400 (10%).

**BACKGROUND**

Secondary effluent from both Plant Nos. 1 and 2 is either reclaimed through the Groundwater Replenish System or pumped five miles out to the ocean through a 120-inch diameter undersea ocean outfall pipeline from Plant No. 2. This ocean outfall has been in operation for nearly fifty years since its commissioning in 1971, and is vital to the mission of the Orange County Sanitation District (Sanitation District.)

Recently, an Integrity Assessment Report for the ocean outfall was completed in order to meet requirements of the lease agreement with the California State Lands Commission. The report was based on historical construction and inspection records as well as other documentation collected during prior inspections. This report included recommendations for future repairs, monitoring, and studies. The report concluded that while the overall structural integrity of the outfall appears to be suitable for continued use, additional inspection of the metallic components and the ballast is needed to determine the remaining useful life of the outfall.

**RELEVANT STANDARDS**

- 24/7/365 treatment plant reliability
- Comply with environmental permit requirements
- Maintain a proactive asset management program

**PROBLEM**

A detailed assessment of the ocean outfall's condition is needed to ensure that the outfall remains a viable and reliable asset. However, performing an assessment of the outfall is extremely difficult and expensive due to its location on the bottom of the ocean floor. Assessments to date have been primarily limited to external visual inspections.

**PROPOSED SOLUTION**

Perform a detailed inspection of the outfall including interior scanning and concrete testing; exterior testing of metal and concrete components, port cleaning and clearing, 3-dimensional scanning of the outfall's exterior including ballast, and subsurface profiling in order to make a comprehensive determination of its current condition. Utilize the detailed condition information collected to develop potential rehabilitation projects and prepare an implementation plan to extend the utility of this asset.

**TIMING CONCERNS**

The outfall is nearing 50 years old, which was the initial design life of the outfall. Detailed inspection/analysis is needed to develop a plan to extend the outfall's useful life and prevent unplanned failure of the outfall.

**RAMIFICATIONS OF NOT TAKING ACTION**

Outfall condition assessment would continue utilizing exterior visual inspection, which will not completely quantify the deterioration and remaining useful life of the metal components, and to establish a baseline survey of the ballast.

**PRIOR COMMITTEE/BOARD ACTIONS**

N/A

**ADDITIONAL INFORMATION**Consultant Selection:

The Sanitation District requested and advertised for proposals for Ocean Outfall Condition Assessment and Scoping Study, Project No. PS18-09, on August 27, 2019. The following evaluation criterion were described in the Request for Proposals (RFP) and used to determine the most qualified Consultant.

CRITERION	WEIGHT
Project Understanding and Approach	40%
Related Project Experience	30%
Project Team and Staff Qualifications	30%

Two proposals were received on October 7, 2019 and evaluated in accordance with the evaluation process set forth in the Sanitation District's Purchasing Ordinance by a pre-selected Evaluation Team

consisting of the following Sanitation District staff: Senior Engineer (Project Manager), Senior Engineer (Project Engineer), Engineering Supervisor, Senior Scientist, and Engineer.

The Evaluation Team also included one non-voting representative from the Contracts Administration Division.

The Evaluation Team scored the proposals based on the established criteria as summarized in the table below.

	Firm	Approach (Max 40)	Related Experience (Max 30)	Team (Max 30)	Total Score (Max 100)
1	Carollo Engineers, Inc.	32	26	25	83
2	Black & Veatch	31	25	25	81

Based on this scoring, both Consultants were shortlisted for interviews that were held on October 29, 2019. Following the interviews, each member of the Evaluation Team scored the Consultants based on both the proposals and interviews using the evaluation criterion and weighting described above. Based on the scoring shown below, Carollo Engineers, Inc. was selected as the most qualified Consultant.

	Firm	Approach (Max 40)	Related Experience (Max 30)	Team (Max 30)	Total Score (Max 100)
1	Carollo Engineers, Inc.	37	26	25	88
2	Black & Veatch	34	24	25	83

The selected firm presented a clear understanding of the project's goals, identification of key risk and mitigation methods, and direct experience with the Sanitation District's ocean outfall. The proposed team's experience, qualifications, and staff utilization best match the Sanitation District's needs for this project

#### Review of Fee Proposal and Negotiations:

Proposals were accompanied by sealed fee proposals. In accordance with Sanitation District's Purchasing Ordinance, the fee proposal of only the highest-ranked firm was opened after approval by the Director of Engineering of the Evaluation Committee's recommendation.

Meetings were held with Carollo Engineers, Inc. to review the required project elements, clarify components of the Scope of Work, discuss any assumptions made for the estimated level of effort, and ensure a thorough understanding of the proposed approach to meet the goals and objectives for the project. These negotiations resulted in modifications to the level of effort for various project tasks and modified the original scope of work to include more detailed modelling, removal of interior sampling, and changes to some testing elements.

The negotiated hours and price are appropriate for the effort required to perform the work requested.

	Total Hours	Total Fee
Original Fee Proposal	8,302	\$3,139,295
Negotiated Fee Proposal	8,042	\$2,744,000

The Consultant's fringe and overhead costs, which factor into the billing rate, have been substantiated. The contract profit is 9.05%, which is based on an established formula included in the Sanitation District's standard design agreements.

Based on the above, staff has determined that the final negotiated fee is fair and reasonable for the level of effort required for this project and recommends award of the Professional Services Agreement to Carollo Engineers, Inc.

### **CEQA**

The project is exempt from CEQA under the statutory exemptions set forth in CEQA Guidelines Section 15262 because it is a feasibility or planning study for possible future action which the Board has not approved or funded, does not require preparation of an Environmental Impact Report or negative declaration, but does require consideration of environmental factors. A Notice of Exemption will be filed with the OC Clerk-Recorder after the Sanitation District's Board of Directors approval of the Professional Services Agreement.

### **FINANCIAL CONSIDERATIONS**

This request complies with authority levels of the Sanitation District's Purchasing Ordinance. This item has been budgeted. (FY2019-20 Update, Appendix A, Page A-9).

### **ATTACHMENT**

*The following attachment(s) may be viewed on-line at the OCSD website ([www.ocsd.com](http://www.ocsd.com)) with the complete agenda package:*

- Professional Service Agreement

JF:sa:dm:sa



## **PROFESSIONAL SERVICES AGREEMENT**

THIS AGREEMENT, is made and entered into to be effective the 25<sup>th</sup> day of March, 2020, by and between the ORANGE COUNTY SANITATION DISTRICT, hereinafter referred to as "SANITATION DISTRICT", and CAROLLO ENGINEERS, INC., for purposes of this AGREEMENT hereinafter referred to as "CONSULTANT". The SANITATION DISTRICT and CONSULTANT are referred to herein collectively as the "Parties" or individually as a "Party."

### **WITNESSETH:**

WHEREAS, the SANITATION DISTRICT desires to engage a consultant for **Ocean Outfall Condition Assessment and Scoping Study, Project No. PS18-09**, to provide professional engineering services to support the condition assessment and recommendations for rehabilitation of the marine (submerged) portion of the 120-inch diameter ocean outfall pipeline; and,

WHEREAS, CONSULTANT is qualified to provide the necessary services in connection with these requirements and has agreed to provide the necessary professional services; and,

WHEREAS, the SANITATION DISTRICT has adopted procedures for the selection of professional services and has proceeded in accordance with said procedures to select a CONSULTANT to perform this work; and,

WHEREAS, at its regular meeting on March 25, 2020 the Board of Directors, by Minute Order, accepted the recommendation of the Operations Committee to approve this AGREEMENT between the SANITATION DISTRICT and CONSULTANT.

NOW, THEREFORE, in consideration of the promises and mutual benefits, which will result to the parties in carrying out the terms of this AGREEMENT, it is mutually agreed as follows:

#### **1. SCOPE OF WORK**

CONSULTANT agrees to furnish necessary professional services to accomplish those project elements outlined in the Scope of Work attached hereto as "Attachment A", and by this reference made a part of this AGREEMENT.

- A. The CONSULTANT shall be responsible for the professional quality, technical accuracy, and completeness and coordination of the work and services furnished by the CONSULTANT under this AGREEMENT, including the work performed by its Subconsultants. Where approval by the SANITATION DISTRICT is indicated, it is understood to be conceptual approval only and does not relieve the CONSULTANT of responsibility for complying with all applicable laws, regulations, codes, industry standards and liability for damages caused by errors, omissions, noncompliance with industry standards, and/or negligence on the part of the CONSULTANT or its Subconsultants.
- B. CONSULTANT is responsible for the quality of work prepared under this AGREEMENT and shall perform all work to the industry standards for clarity, uniformity, and completeness. CONSULTANT shall timely respond to all comments, suggestions, and recommendations from the SANITATION



DISTRICT. All comments from the SANITATION DISTRICT, or its agent, shall be incorporated into the work prior to the next review deadline or addressed, in writing, as to why the comment(s) has/have not been incorporated. CONSULTANT shall ensure that each submittal is 100% accurate for the level of work submitted (i.e. correct references, terms, capitalization or equal status, spelling, punctuation, etc.)

- C. In the event that CONSULTANT's services and/or work product(s) is not to the satisfaction of the SANITATION DISTRICT and/or does not conform to the requirements of this AGREEMENT or the applicable industry standards, the CONSULTANT shall, without additional compensation, promptly correct or revise any errors or deficiencies in its work product(s) within the timeframe specified by the Project Manager. The SANITATION DISTRICT may charge to CONSULTANT all costs, expenses and damages associated with any such corrections or revisions.
- D. Any CADD drawings, figures, and other work produced by CONSULTANT and Subconsultants using the SANITATION DISTRICT CAD Manual. Conversion of CADD work from any other non-standard CADD format to the SANITATION DISTRICT format shall not be acceptable in lieu of this requirement.

Electronic files shall conform to the SANITATION DISTRICT specifications. Any changes to these specifications by the CONSULTANT are subject to review and require advance written approval of the SANITATION DISTRICT.

Electronic files shall be subject to an acceptance period of thirty (30) calendar days during which the SANITATION DISTRICT shall perform appropriate reviews and including CAD Manual compliance. CONSULTANT shall correct any discrepancies or errors detected and reported within the acceptance period at no additional cost to the SANITATION DISTRICT.

- E. All professional services performed by the CONSULTANT, including, but not limited to, all drafts, data, correspondence, proposals, and reports compiled or composed by the CONSULTANT, pursuant to this AGREEMENT, are for the sole use of the SANITATION DISTRICT, its agents and employees. Neither the documents nor their contents shall be released to any third party without the prior written consent of the SANITATION DISTRICT. This provision does not apply to information that (a) was publicly known, or otherwise known to the CONSULTANT, at the time that it was disclosed to the CONSULTANT by the SANITATION DISTRICT, or (b) subsequently becomes publicly known to the CONSULTANT other than through disclosure by the SANITATION DISTRICT.

## **2. COST ESTIMATES**

The CONSULTANT has no control over the cost of labor, materials, equipment or services furnished by others, or over the construction contractor's methods of determining prices, or other competitive bidding or market conditions, practices or bidding strategies. CONSULTANT shall use best engineering practices along with

experience and judgement utilizing current local costs of labor, materials, equipment or services to prepare cost estimates. CONSULTANT cannot and does not guarantee that proposals, bids, actual Project construction, operation and/or lifecycle costs will not vary from cost estimates prepared by CONSULTANT.

### **3. COMPENSATION**

Total compensation shall be paid to CONSULTANT for services in accordance with the following provisions:

#### **A. Total Compensation**

Total compensation shall be in an amount not to exceed Two Million Seven Hundred Forty-four Thousand Dollars (\$2,744,000.00). Total compensation to CONSULTANT including burdened labor (salaries plus benefits), overhead, profit, direct costs, and Subconsultant(s) fees and costs shall not exceed the sum set forth in Attachment "E" - Fee Proposal.

#### **B. Labor**

As a portion of the total compensation to be paid to CONSULTANT, the SANITATION DISTRICT shall pay to CONSULTANT a sum equal to the burdened salaries (salaries plus benefits) actually paid by CONSULTANT charged on an hourly-rate basis to this project and paid to the personnel of CONSULTANT. Upon request of the SANITATION DISTRICT, CONSULTANT shall provide the SANITATION DISTRICT with certified payroll records of all employees' work that is charged to this project.

#### **C. Overhead**

As a portion of the total compensation to be paid to CONSULTANT, the SANITATION DISTRICT shall compensate CONSULTANT and Subconsultants for overhead at the rate equal to the percentage of burdened labor as specified in Attachment "E" - Fee Proposal.

#### **D. Profit**

Profit for CONSULTANT and Subconsultants shall be a percentage of consulting services fees (Burdened Labor and Overhead). When the consulting or subconsulting services amount is \$250,000 or less, the maximum Profit shall be 10%. Between \$250,000 and \$2,500,000, the maximum Profit shall be limited by a straight declining percentage between 10% and 5%. For consulting or subconsulting services fees with a value greater than \$2,500,000, the maximum Profit shall be 5%. Addenda shall be governed by the same maximum Profit percentage after adding consulting services fees.

As a portion of the total compensation to be paid to CONSULTANT and Subconsultants, the SANITATION DISTRICT shall pay profit for all services rendered by CONSULTANT and Subconsultants for this project according to Attachment "E" - Fee Proposal.

E. Subconsultants

For any Subconsultant whose fees for services are greater than or equal to \$100,000 (excluding out-of-pocket costs), CONSULTANT shall pay to Subconsultant total compensation in accordance with the Subconsultant amount specified in Attachment "E" - Fee Proposal.

For any Subconsultant whose fees for services are less than \$100,000, CONSULTANT may pay to Subconsultant total compensation on an hourly-rate basis per Attachment "J" – Minor Subconsultant Hourly Rate Schedule and as specified in the Scope of Work. The SANITATION DISTRICT shall pay to CONSULTANT the actual costs of Subconsultant fees and charges in an amount not to exceed the sum set forth in Attachment "E" - Fee Proposal.

F. Direct Costs

The SANITATION DISTRICT shall pay to CONSULTANT and Subconsultants the actual costs of permits and associated fees, travel and licenses for an amount not to exceed the sum set forth in Attachment "E" - Fee Proposal. The SANITATION DISTRICT shall also pay to CONSULTANT actual costs for equipment rentals, leases or purchases with prior approval of the SANITATION DISTRICT. Upon request, CONSULTANT shall provide to the SANITATION DISTRICT receipts and other documentary records to support CONSULTANT's request for reimbursement of these amounts, see Attachment "D" - Allowable Direct Costs. All incidental expenses shall be included in overhead pursuant to Section 2 - COMPENSATION above.

G. Other Direct Costs

Other Direct Costs incurred by CONSULTANT and its Contractor due to modifications in scope of work resulting from field investigations and field work required by Contract. These items may include special equipment, test equipment and tooling and other materials and services not previously identified. Refer to attachment "D" Allowable Direct Costs for payment information.

H. Reimbursable Direct Costs

The SANITATION DISTRICT will reimburse the CONSULTANT for reasonable travel and business expenses as described in this section and further described in Attachment "D" - Allowable Direct Costs to this AGREEMENT. The reimbursement of the above mentioned expenses will be based on an "accountable plan" as considered by Internal Revenue Service (IRS). The plan includes a combination of reimbursements based upon receipts and a "per diem" component approved by IRS. The most recent schedule of the per diem rates utilized by the SANITATION DISTRICT can be found on the U.S. General Service Administration website at <http://www.gsa.gov/portal/category/104711#>.

The CONSULTANT shall be responsible for the most economical and practical means or management of reimbursable costs inclusive but not limited to travel, lodging and meals arrangements. The SANITATION DISTRICT shall apply the

most economic and practical method of reimbursement which may include reimbursements based upon receipts and/or “per diem” as deemed the most practical.

CONSULTANT shall be responsible for returning to the SANITATION DISTRICT any excess reimbursements after the reimbursement has been paid by the SANITATION DISTRICT.

Travel and travel arrangements – Any travel involving airfare, overnight stays or multiple day attendance must be approved by the SANITATION DISTRICT in advance.

Local Travel is considered travel by the CONSULTANT within the SANITATION DISTRICT geographical area which includes Orange, Los Angeles, Ventura, San Bernardino, Riverside, San Diego, Imperial and Kern Counties. Automobile mileage is reimbursable if CONSULTANT is required to utilize personal vehicle for local travel.

Lodging – Overnight stays will not be approved by the SANITATION DISTRICT for local travel. However, under certain circumstances overnight stay may be allowed at the discretion of the SANITATION DISTRICT based on reasonableness of meeting schedules and the amount of time required for travel by the CONSULTANT. Such determination will be made on a case-by-case basis and at the discretion of the SANITATION DISTRICT.

Travel Meals – Per-diem rates as approved by IRS shall be utilized for travel meals reimbursements. Per diem rates shall be applied to meals that are appropriate for travel times. Receipts are not required for the approved meals.

Additional details related to the reimbursement of the allowable direct costs are provided in the Attachment “D” - Allowable Direct Costs of this AGREEMENT.

#### I. Limitation of Costs

If, at any time, CONSULTANT estimates the cost of performing the services described in CONSULTANT’s Proposal will exceed seventy-five percent (75%) of the not-to-exceed amount of the AGREEMENT, including approved additional compensation, CONSULTANT shall notify the SANITATION DISTRICT immediately, and in writing. This written notice shall indicate the additional amount necessary to complete the services. Any cost incurred in excess of the approved not-to-exceed amount, without the express written consent of the SANITATION DISTRICT’s authorized representative shall be at CONSULTANT’s own risk. This written notice shall be provided separately from, and in addition to any notification requirements contained in the CONSULTANT’s invoice and monthly progress report. Failure to notify the SANITATION DISTRICT that the services cannot be completed within the authorized not-to-exceed amount is a material breach of this AGREEMENT.

#### 4. REALLOCATION OF TOTAL COMPENSATION

The SANITATION DISTRICT, by its Director of Engineering, shall have the right to approve a reallocation of the incremental amounts constituting the Total Compensation, provided that the Total Compensation is not increased.

#### 5. PAYMENT

- A. Monthly Invoice: CONSULTANT shall include in its monthly invoice, a detailed breakdown of costs associated with the performance of any corrections or revisions of the work for that invoicing period, in a format acceptable to the SANITATION DISTRICT. CONSULTANT shall warrant and certify the accuracy of these costs and provide all support documentation required by the SANITATION DISTRICT. CONSULTANT understands that submitted costs are subject to Section 12 Audit Provisions.
- B. CONSULTANT will submit monthly statements covering services and/or work performed for payment for those items included in Section 2 hereof no later than the second Wednesday of the following month and in the format required by the SANITATION DISTRICT. The format must include, as a minimum: 1) current billing period invoicing, 2) current billing period "total percent invoiced to date", 3) future activities, 4) previous billing period "total invoiced to date", 5) potential items that are not included in the Scope of Work, 6) concerns and possible delays, 7) percentage of completion to date, and 8) budget status and amount remaining. Such requests shall be accompanied by such supporting data as may be required by the SANITATION DISTRICT.

Upon approval of such payment request by the SANITATION DISTRICT, payment shall be made to CONSULTANT as soon as practicable of one hundred percent (100%) of the invoiced amount.

If the SANITATION DISTRICT determines that the work under this AGREEMENT or any specified project element hereunder, is incomplete and that the amount of payment is in excess of:

- i. The amount considered by the SANITATION DISTRICT's Director of Engineering to be adequate for the protection of the SANITATION DISTRICT; or
- ii. The percentage of the work accomplished for each project element,

The SANITATION DISTRICT may, at the discretion of the Director of Engineering, retain an amount equal to that which insures that the total amount paid to that date does not exceed the percentage of the completed work for the Project in its entirety.

- C. CONSULTANT may submit periodic payment requests for each 30-day period of this AGREEMENT for the profit as set forth in Section 2 - COMPENSATION above. Said profit payment request shall be proportionate to the work actually accomplished to date on a per-project-element basis. In the event the SANITATION DISTRICT's Director of Engineering determines that no satisfactory

progress has been made since the prior payment, or in the event of a delay in the work progress for any reason, the SANITATION DISTRICT shall have the right to withhold any scheduled proportionate profit payment.

- D. Upon satisfactory completion by CONSULTANT of the work called for under the terms of this AGREEMENT, and upon acceptance of such work by the SANITATION DISTRICT, CONSULTANT will be paid the unpaid balance of any money due for such work based on the monthly statements, including any retained percentages relating to this portion of the work.
- E. Upon satisfactory completion of the work performed hereunder and prior to final payment under this AGREEMENT for such work, or prior settlement upon termination of this AGREEMENT, and as a condition precedent thereto, CONSULTANT shall execute and deliver to the SANITATION DISTRICT a release of all claims against the SANITATION DISTRICT arising under or by virtue of this AGREEMENT other than such claims, if any, as may be specifically exempted by CONSULTANT from the operation of the release in stated amounts to be set forth therein.
- F. Pursuant to the California False Claims Act (Government Code sections 12650-12655), any CONSULTANT that knowingly submits a false claim to the SANITATION DISTRICT for compensation under the terms of this AGREEMENT may be held liable for treble damages and up to a \$10,000 civil penalty for each false claim submitted. This section shall also be binding on all Subconsultants.

A CONSULTANT or Subconsultant shall be deemed to have submitted a false claim when the CONSULTANT or Subconsultant: (a) knowingly presents or causes to be presented to an officer or employee of the SANITATION DISTRICT a false claim or request for payment or approval; (b) knowingly makes, uses, or causes to be made or used a false record or statement to get a false claim paid or approved by the SANITATION DISTRICT; (c) conspires to defraud the SANITATION DISTRICT by getting a false claim allowed or paid by the SANITATION DISTRICT; (d) knowingly makes, uses, or causes to be made or used a false record or statement to conceal, avoid, or decrease an obligation to the SANITATION DISTRICT; or (e) is a beneficiary of an inadvertent submission of a false claim to the SANITATION DISTRICT, and fails to disclose the false claim to the SANITATION DISTRICT within a reasonable time after discovery of the false claim.

## **6. PREVAILING WAGES**

To the extent CONSULTANT intends to utilize employees who will perform work during the contract, as more specifically defined under Labor Code Section 1720, CONSULTANT shall be subject to prevailing wage requirements with respect to such employees.

## **7. CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION AND RECORD OF WAGES**

- A. To the extent CONSULTANT's employees and/or Subconsultants who will perform Work during the design and preconstruction phases of a construction

contract for which Prevailing Wage Determinations have been issued by the DIR and as more specifically defined under Labor Code Section 1720 et seq, CONSULTANT and Subconsultants shall comply with the registration requirements of Labor Code Section 1725.5. Pursuant to Labor Code Section 1771.4, the Work is subject to compliance monitoring and enforcement by the DIR.

- B. The CONSULTANT and Subconsultants shall maintain accurate payroll records and shall comply with all the provisions of Labor Code Section 1776, and shall submit payroll records to the Labor Commissioner pursuant to Labor Code Section 1771.4(a)(3). Penalties for non-compliance with the requirements of Section 1776 may be deducted from progress payments per Section 1776.
- C. Pursuant to Labor Code Section 1776, the CONSULTANT and Subconsultants shall furnish a copy of all certified payroll records to SANITATION DISTRICT and/or general public upon request, provided the public request is made through SANITATION DISTRICT, the Division of Apprenticeship Standards or the Division of Labor Enforcement of the Department of Industrial Relations.
- D. The CONSULTANT and Subconsultants shall comply with the job site notices posting requirements established by the Labor Commissioner per Title 8, California Code of Regulations Section 16461(e).

## **8. DOCUMENT OWNERSHIP – CONSULTANT PERFORMANCE**

- A. Ownership of Documents for the Professional Services performed.

All documents in all forms (electronic, paper, etc.), including, but not limited to, studies, sketches, drawings, computer printouts, disk files, and electronic copies prepared in connection with or related to the Scope of Work or Professional Services, shall be the property of the SANITATION DISTRICT. The SANITATION DISTRICT's ownership of these documents includes use of, reproduction or reuse of and all incidental rights, whether or not the work for which they were prepared has been performed. The SANITATION DISTRICT ownership entitlement arises upon payment or any partial payment for work performed and includes ownership of any and all work product completed prior to that payment. This Section shall apply whether the CONSULTANT's Professional Services are terminated: a) by the completion of the AGREEMENT, or b) in accordance with other provisions of this AGREEMENT. Notwithstanding any other provision of this paragraph or AGREEMENT, the CONSULTANT shall have the right to make copies of all such plans, studies, sketches, drawings, computer printouts and disk files, and specifications.

- B. CONSULTANT shall not be responsible for damage caused by subsequent changes to or uses of the study or deliverable where the subsequent changes or uses are not authorized or approved by CONSULTANT, provided that the service rendered by CONSULTANT was not a proximate cause of the damage.

The SANITATION DISTRICT shall furnish the CONSULTANT available studies, reports and other data pertinent to the CONSULTANT's services; obtain or authorize the CONSULTANT to obtain or provide additional reports and data as the SANITATION DISTRICT determines to be reasonably required; and furnish to the CONSULTANT services of others the SANITATION DISTRICT determines to be reasonably required for the performance of the CONSULTANT's services hereunder. The CONSULTANT shall be entitled to use and rely upon all such information and services provided by the SANITATION DISTRICT or others in performing the CONSULTANT's services under this AGREEMENT.

## **9. INSURANCE**

### **A. General**

- i. Insurance shall be issued and underwritten by insurance companies acceptable to the SANITATION DISTRICT.
- ii. Insurers must have an "A-" Policyholder's Rating, or better, and Financial Rating of at least Class VIII, or better, in accordance with the most current A.M. Best's Guide Rating. However, the SANITATION DISTRICT will accept State Compensation Insurance Fund, for the required policy of Worker's Compensation Insurance subject to the SANITATION DISTRICT's option to require a change in insurer in the event the State Fund financial rating is decreased below "B". Further, the SANITATION DISTRICT will require CONSULTANT to substitute any insurer whose rating drops below the levels herein specified. Said substitution shall occur within twenty (20) days of written notice to CONSULTANT, by the SANITATION DISTRICT or its agent.
- iii. Coverage shall be in effect prior to the commencement of any work under this AGREEMENT and shall remain in effect for two years after the completion of the Project.

### **B. General Liability**

The CONSULTANT shall maintain during the life of this AGREEMENT, including the period of warranty, Commercial General Liability Insurance written on an occurrence basis providing the following minimum limits of liability coverage: Two Million Dollars (\$2,000,000) per occurrence with Four Million Dollars (\$4,000,000) aggregate with NO waterborne exclusions. Said insurance shall include coverage for the following hazards: Premises-Operations, blanket contractual liability (for this AGREEMENT), products liability/completed operations (including any product manufactured or assembled), broad form property damage, blanket contractual liability, independent contractors liability, personal and advertising injury, mobile equipment, owners and contractors protective liability, and cross liability and severability of interest clauses. A statement on an insurance certificate will not be accepted in lieu of the actual additional insured



endorsement(s). If requested by SANITATION DISTRICT and applicable, XCU coverage (Explosion, Collapse and Underground) and Riggers/On Hook Liability must be included in the General Liability policy and coverage must be reflected on the submitted Certificate of Insurance.

C. Umbrella Excess Liability

The minimum limits of general liability and Automotive Liability Insurance required, as set forth herein, shall be provided for through either a single policy of primary insurance or a combination of policies of primary and umbrella excess coverage. Umbrella excess liability coverage shall be issued with limits of liability which, when combined with the primary insurance, will equal the minimum limits for general liability and automotive liability.

D. Automotive/Vehicle liability Insurance

The CONSULTANT shall maintain a policy of Automotive Liability Insurance on a comprehensive form covering all owned, non-owned, and hired automobiles, trucks, and other vehicles providing the following minimum limits of liability coverage: Combined single limit of One Million Dollars (\$1,000,000) or alternatively, One Million Dollars (\$1,000,000) per person for bodily injury and One Million Dollars (\$1,000,000) per accident for property damage. A statement on an insurance certificate will not be accepted in lieu of the actual additional insured endorsement.

E. Maritime Employers Liability Insurance

If divers will be used, maritime employers liability (MEL) insurance must be maintained by CONSULTANT in the amount of One Million Dollars (\$1,000,000) in a form acceptable by the SANITATION DISTRICT and divers must be commercially certified. The CONSULTANT's diver Subconsultant will provide this coverage directly.

F. Drone Liability Insurance

If a drone will be used, drone liability insurance must be maintained by CONSULTANT in the amount of One Million Dollars (\$1,000,000) in a form acceptable by the SANITATION DISTRICT.

G. Worker's Compensation Insurance

The CONSULTANT shall provide such Workers' Compensation Insurance as required by the Labor Code of the State of California in the amount of the statutory limit, including Employer's Liability Insurance with a minimum limit of One Million Dollars (\$1,000,000) per occurrence. Such Worker's Compensation Insurance shall be endorsed to provide for a waiver of subrogation in favor of the SANITATION DISTRICT. Such Worker's Compensation Insurance shall also have United States Longshore and Harbor Workers (USL & H) coverage. A statement on an insurance certificate will not be accepted in lieu of the actual endorsements unless the insurance carrier is State of California Insurance Fund

and the identifier “SCIF” and endorsement numbers 2570 and 2065 are referenced on the certificate of insurance. If an exposure to Jones Act liability may exist, the insurance required herein shall include coverage for Jones Act claims.

H. Errors and Omissions/Professional Liability

CONSULTANT shall maintain in full force and effect, throughout the term of this AGREEMENT, standard industry form professional negligence errors and omissions insurance coverage in an amount of not less than Two Million Dollars (\$2,000,000) with limits in accordance with the provisions of this Paragraph. If the policy of insurance is written on a “claims made” basis, said policy shall be continued in full force and effect at all times during the term of this AGREEMENT, and for a period of five (5) years from the date of the completion of the services hereunder.

In the event of termination of said policy during this period, CONSULTANT shall obtain continuing insurance coverage for the prior acts or omissions of CONSULTANT during the course of performing services under the term of this AGREEMENT. Said coverage shall be evidenced by either a new policy evidencing no gap in coverage or by separate extended “tail” coverage with the present or new carrier.

In the event the present policy of insurance is written on an “occurrence” basis, said policy shall be continued in full force and effect during the term of this AGREEMENT or until completion of the services provided for in this AGREEMENT, whichever is later. In the event of termination of said policy during this period, new coverage shall be obtained for the required period to insure for the prior acts of CONSULTANT during the course of performing services under the term of this AGREEMENT.

CONSULTANT shall provide to the SANITATION DISTRICT a certificate of insurance in a form acceptable to the SANITATION DISTRICT indicating the deductible or self-retention amounts and the expiration date of said policy, and shall provide renewal certificates not less than ten (10) days prior to the expiration of each policy term.

I. Proof of Coverage

The CONSULTANT shall furnish the SANITATION DISTRICT with original certificates and amendatory endorsements effecting coverage. Said policies and endorsements shall conform to the requirements herein stated. All certificates and endorsements are to be received and approved by the SANITATION DISTRICT before work commences. The SANITATION DISTRICT reserves the right to require complete, certified copies of all required insurance policies, including endorsements, effecting the coverage required, at any time. The following are approved forms that must be submitted as proof of coverage:

- Certificate of Insurance ACORD Form 25 (5/2010) or equivalent.

- Additional Insurance (General Liability) (ISO Form) CG2010 11 85 or  
The combination of (ISO Forms)  
CG 2010 10 01 and CG 2037 10 01  
  
All other Additional Insured endorsements must be submitted for approval by the SANITATION DISTRICT, and the SANITATION DISTRICT may reject alternatives that provide different or less coverage to the SANITATION DISTRICT.
- Additional Insured (Auto Liability) Submit endorsement provided by carrier for the SANITATION DISTRICT approval.
- Waiver of Subrogation State Compensation Insurance Fund Endorsement No. 2570 or equivalent.
- Cancellation Notice State Compensation Insurance Fund Endorsement No. 2065 or equivalent.

J. Cancellation Notice

Each insurance policy required herein shall be endorsed to state that coverage shall not be cancelled by either party, except after thirty (30) days' prior written notice. The Cancellation Section of ACORD Form 25 (5/2010) shall state the required thirty (30) days' written notification. The policy shall not terminate, nor shall it be cancelled, nor the coverage reduced until thirty (30) days after written notice is given to the SANITATION DISTRICT except for nonpayment of premium, which shall require not less than ten (10) days written notice to the SANITATION DISTRICT. Should there be changes in coverage or an increase in deductible or SIR amounts, the CONSULTANT and its insurance broker/agent shall send to the SANITATION DISTRICT a certified letter which includes a description of the changes in coverage and/or any increase in deductible or SIR amounts. The certified letter must be sent to the attention of Risk Management, and shall be received by the SANITATION DISTRICT not less than thirty (30) days prior to the effective date of the change(s) if the change would reduce coverage or increase deductibles or SIR amounts or otherwise reduce or limit the scope of insurance coverage provided to the SANITATION DISTRICT.

K. Primary Insurance

All liability policies shall contain a Primary and Non Contributory Clause. Any other insurance maintained by the SANITATION DISTRICT shall be excess and not contributing with the insurance provided by CONSULTANT.

L. Separation of Insured

All liability policies shall contain a "Separation of Insureds" clause.

M. Non-Limiting (if applicable)

Nothing in this document shall be construed as limiting in any way, nor shall it limit the indemnification provision contained in this AGREEMENT, or the extent to which CONSULTANT may be held responsible for payment of damages to persons or property.

N. Deductibles and Self-Insured Retentions

Any deductible and/or self-insured retention must be declared to the SANITATION DISTRICT on the Certificate of Insurance. All deductibles and/or self-insured retentions require approval by the SANITATION DISTRICT. At the option of the SANITATION DISTRICT, either: the insurer shall reduce or eliminate such deductible or self-insured retention as respects the SANITATION DISTRICT; or the CONSULTANT shall provide a financial guarantee satisfactory to the SANITATION DISTRICT guaranteeing payment of losses and related investigations, claim administration and defense expenses.

O. Defense Costs

Except for Errors and Omissions/Professional Liability, all liability policies shall have a provision that defense costs for all insureds and additional insureds are paid in addition to and do not deplete any policy limits.

P. Subconsultants

The CONSULTANT shall be responsible to establish insurance requirements for any Subconsultant hired by the CONSULTANT. The insurance shall be in amounts and types reasonably sufficient to deal with the risk of loss involving the Subconsultant's operations and work.

Q. Limits Are Minimums

If the CONSULTANT maintains higher limits than any minimums shown above, then SANITATION DISTRICT requires and shall be entitled to coverage for the higher limits maintained by CONSULTANT.

## 10. SCOPE CHANGES

In the event of a change in the Scope of Work or a change in the proposed Project, as requested by the SANITATION DISTRICT, the Parties hereto shall execute an Amendment to this AGREEMENT setting forth with particularity all terms of the new AGREEMENT, including, but not limited to any additional CONSULTANT's fees.

## 11. PROJECT TEAM AND SUBCONSULTANTS

CONSULTANT shall provide to SANITATION DISTRICT, prior to execution of this AGREEMENT, the names and full description of all Subconsultants and CONSULTANT's project team members anticipated to be used on this Project under this AGREEMENT by CONSULTANT. CONSULTANT shall include a description of the work

and services to be done by each Subconsultant and each of CONSULTANT's Project team member. CONSULTANT shall include the respective compensation amounts for CONSULTANT and each Subconsultant, broken down as indicated in Section 2-COMPENSATION.

There shall be no substitution of the listed Subconsultants and CONSULTANT's project team members without prior written approval by the SANITATION DISTRICT.

## **12. ENGINEERING REGISTRATION**

The CONSULTANT's personnel and Subconsultants are comprised of registered engineers and a staff of specialists and draftsmen in each department. The firm itself is not a registered engineer but represents and agrees that wherever, in the performance of this AGREEMENT, the services of a registered engineer is required, such services hereunder will be performed under the direct supervision of registered engineers who are registered in California.

## **13. AUDIT PROVISIONS.**

- A. SANITATION DISTRICT retains the reasonable right to access, review, examine, and audit, any and all books, records, documents and any other evidence of procedures and practices that the SANITATION DISTRICT determines are necessary to discover and verify that the CONSULTANT is in compliance with all requirements under this AGREEMENT. The CONSULTANT shall include the SANITATION DISTRICT's right as described above, in any and all of their subcontracts, and shall ensure that these rights are binding upon all Subconsultants.
- B. SANITATION DISTRICT retains the right to examine CONSULTANT's books, records, documents and any other evidence of procedures and practices that the SANITATION DISTRICT determines are necessary to discover and verify all direct and indirect costs, of whatever nature, which are claimed to have been incurred, or anticipated to be incurred or to ensure CONSULTANT's compliance with all requirements under this AGREEMENT during the term of this AGREEMENT and for a period of three (3) years after its termination.
- C. CONSULTANT shall maintain complete and accurate records in accordance with generally accepted industry standard practices and the SANITATION DISTRICT's policy. The CONSULTANT shall make available to the SANITATION DISTRICT for review and audit, all project related accounting records and documents, and any other financial data within 15 days after receipt of notice from the SANITATION DISTRICT. Upon SANITATION DISTRICT's request, the CONSULTANT shall submit exact duplicates of originals of all requested records to the SANITATION DISTRICT. If an audit is performed, CONSULTANT shall ensure that a qualified employee of the CONSULTANT will be available to assist SANITATION DISTRICT's auditor in obtaining all Project related accounting records and documents, and any other financial data.

#### **14. LEGAL RELATIONSHIP BETWEEN PARTIES**

The legal relationship between the parties hereto is that of an independent contractor and nothing herein shall be deemed to transform CONSULTANT, its staff, independent contractors, or Subconsultants into employees of the SANITATION DISTRICT. CONSULTANT'S staff performing services under the AGREEMENT shall at all times be employees and/or independent contractors of CONSULTANT. CONSULTANT shall monitor and control its staff and pay wages, salaries, and other amounts due directly to its staff in connection with the AGREEMENT. CONSULTANT shall be responsible for hiring, review, and termination of its staff and shall be accountable for all reports and obligations respecting them, such as social security, income tax withholding, unemployment compensation, workers' compensation and similar matters.

#### **15. THIRD PARTIES**

This AGREEMENT is entered into by and for the SANITATION DISTRICT and the CONSULTANT, and nothing herein is intended to establish rights or interests in individuals or entities not a party hereto.

#### **16. NOTICES**

All notices hereunder and communications regarding the interpretation of the terms of this AGREEMENT, or changes thereto, shall be effected by delivery of said notices in person or by depositing said notices in the U.S. mail, registered or certified mail, return receipt requested, postage prepaid and addressed as follows:

ORANGE COUNTY SANITATION DISTRICT  
10844 Ellis Avenue  
Fountain Valley, CA 92708-7018  
Attention: Clarice Marcin, Senior Contracts Administrator  
Copy: Valerie Ratto, Project Manager

CONSULTANT:

Carollo Engineers, Inc.  
3150 Bristol Street  
Suite 500  
Costa Mesa, CA 92626  
Attention: Walid T. Karam, P.E.  
Stephen G. Hough, P.E.

All communication regarding the Scope of Work, will be addressed to the Project Manager. Direction from other SANITATION DISTRICT staff must be approved in writing by the SANITATION DISTRICT's Project Manager prior to action from the CONSULTANT.

#### **17. TERMINATION**

The SANITATION DISTRICT may terminate this AGREEMENT at any time, without cause, upon giving thirty (30) days written notice to CONSULTANT. In the event of such

termination, CONSULTANT shall be entitled to compensation for work performed on a prorated basis through and including the effective date of termination.

CONSULTANT shall be permitted to terminate this AGREEMENT upon thirty (30) days written notice only if CONSULTANT is not compensated for billed amounts in accordance with the provisions of this AGREEMENT, when the same are due.

Notice of termination shall be mailed to the SANITATION DISTRICT at the address listed in Section 14 - NOTICES.

## **18. DOCUMENTS AND STUDY MATERIALS**

The documents and study materials for this Project shall become the property of the SANITATION DISTRICT upon the termination or completion of the work.

CONSULTANT agrees to furnish to the SANITATION DISTRICT copies of all memoranda, correspondence, electronic materials, computation and study materials in its files pertaining to the work described in this AGREEMENT, which is requested in writing by the SANITATION DISTRICT.

## **19. COMPLIANCE**

### **A. Labor**

CONSULTANT certifies by the execution of this AGREEMENT that it pays employees not less than the minimum wage as defined by law, and that it does not discriminate in its employment with regard to race, color, religion, sex or national origin; that it is in compliance with all federal, state and local directives and executive orders regarding non-discrimination in employment; and that it agrees to demonstrate positively and aggressively the principle of equal opportunity in employment.

### **B. Air Pollution**

CONSULTANT and its subconsultants and subcontractors shall comply with all applicable federal, state and local air pollution control laws and regulations.

## **20. AGREEMENT EXECUTION AUTHORIZATION**

Both the SANITATION DISTRICT and CONSULTANT do covenant that each individual executing this document by and on behalf of each Party is a person duly authorized to execute this AGREEMENT for that Party.

## **21. DISPUTE RESOLUTION**

In the event of a dispute arising between the parties regarding performance or interpretation of this AGREEMENT, the dispute shall be resolved by binding arbitration under the auspices of the Judicial Arbitration and Mediation Service ("JAMS"), or similar organization or entity conducting alternate dispute resolution services.

## **22. ATTORNEY'S FEES, COSTS AND NECESSARY DISBURSEMENTS**

If any action at law or in equity or if any proceeding in the form of an Alternative Dispute Resolution (ADR) is necessary to enforce or interpret the terms of this AGREEMENT, the prevailing party shall be entitled to reasonable attorney's fees, costs and necessary disbursements in addition to any other relief to which he may be entitled.

## **23. WARRANTY**

CONSULTANT shall perform its services in accordance with generally accepted industry and professional standards. If, within the 12-month period following completion of its services, the SANITATION DISTRICT informs CONSULTANT that any part of the services fails to meet those standards, CONSULTANT shall, within the time prescribed by the SANITATION DISTRICT, take all such actions as are necessary to correct or complete the noted deficiency(ies).

## **24. INDEMNIFICATION**

To the fullest extent permitted by law, CONSULTANT shall indemnify, defend (at CONSULTANT's sole cost and expense and with legal counsel approved by the SANITATION DISTRICT, which approval shall not be unreasonably withheld), protect and hold harmless the SANITATION DISTRICT and all of SANITATION DISTRICT's officers, directors, employees, CONSULTANT's, and agents (collectively the "Indemnified Parties"), from and against any and all claims, damages, liabilities, causes of action, suits, arbitration awards, losses, judgments, fines, penalties, costs and expenses (including, without limitation, attorneys' fees, disbursements and court costs, and all other professional, expert or CONSULTANT's fees and costs and the SANITATION DISTRICT's general and administrative expenses; individually, a "Claim"; collectively, "Claims") which may arise from or are in any manner related, directly or indirectly, to any work performed, or any operations, activities, or services provided by CONSULTANT in carrying out its obligations under this AGREEMENT to the extent of the negligent, recklessness and/or willful misconduct of CONSULTANT, its principals, officers, agents, employees, CONSULTANT's suppliers, CONSULTANT, Subconsultants, subcontractors, and/or anyone employed directly or indirectly by any of them, regardless of any contributing negligence or strict liability of an Indemnified Party. Notwithstanding the foregoing, nothing herein shall be construed to require CONSULTANT to indemnify the Indemnified Parties from any Claim arising solely from:

- (A) the active negligence or willful misconduct of the Indemnified Parties; or
- (B) a natural disaster or other act of God, such as an earthquake; or
- (C) the independent action of a third party who is neither one of the Indemnified Parties nor the CONSULTANT, nor its principal, officer, agent, employee, nor CONSULTANT's supplier, CONSULTANT, Subconsultant, subcontractor, nor anyone employed directly or indirectly by any of them.

Exceptions (A) through (B) above shall not apply, and CONSULTANT shall, to the fullest extent permitted by law, indemnify the Indemnified Parties, from Claims arising from more than one cause if any such cause taken alone would otherwise result in the obligation to indemnify hereunder.



CONSULTANT's liability for indemnification hereunder is in addition to any liability CONSULTANT may have to the SANITATION DISTRICT for a breach by CONSULTANT of any of the provisions of this AGREEMENT. Under no circumstances shall the insurance requirements and limits set forth in this AGREEMENT be construed to limit CONSULTANT's indemnification obligation or other liability hereunder. The terms of this AGREEMENT are contractual and the result of negotiation between the parties hereto. Accordingly, any rule of construction of contracts (including, without limitation, California Civil Code Section 1654) that ambiguities are to be construed against the drafting party, shall not be employed in the interpretation of this AGREEMENT.

The CONSULTANT's liability for claims, damages and/or losses not otherwise covered by the insurance policies required in Section 9 INSURANCE hereunder, shall be limited to the extent of Two (2) times the CONSULTANT's compensation as delineated in Section 3.A. Total Compensation hereunder.

## **25. DUTY TO DEFEND**

The duty to defend hereunder is wholly independent of and separate from the duty to indemnify and such duty to defend shall exist regardless of any ultimate liability of CONSULTANT and shall be consistent with Civil Code section 2782.8. Such defense obligation shall arise immediately upon presentation of a Claim by any person if, without regard to the merit of the Claim, such Claim could potentially result in an obligation to indemnify one or more Indemnified Parties, and upon written notice of such Claim being provided to CONSULTANT. Payment to CONSULTANT by any Indemnified Party or the payment or advance of defense costs by any Indemnified Party shall not be a condition precedent to enforcing such Indemnified Party's rights to indemnification hereunder. In no event shall the cost to defend charged to the CONSULTANT exceed the CONSULTANT's proportionate percentage of fault. The duty to indemnify, including the duty and the cost to defend, is limited as provided in California Civil Code Section 1782.8.

CONSULTANT's indemnification obligation hereunder shall survive the expiration or earlier termination of this AGREEMENT until such time as action against the Indemnified Parties for such matter indemnified hereunder is fully and finally barred by the applicable statute of limitations.

## **26. COMPLIANCE WITH SANITATION DISTRICT POLICIES AND PROCEDURES**

CONSULTANT shall comply with all SANITATION DISTRICT policies and procedures including the OCSD Safety Standards, as applicable, all of which may be amended from time to time.

## **27. CLOSEOUT**

When the SANITATION DISTRICT determines that all Work authorized under the AGREEMENT is fully complete and that the SANITATION DISTRICT requires no further work from CONSULTANT, or the AGREEMENT is otherwise terminated or expires in accordance with the terms of the AGREEMENT, the SANITATION DISTRICT shall give the Consultant written notice that the AGREEMENT will be closed out. CONSULTANT

shall submit all outstanding billings, work submittals, deliverables, reports or similarly related documents as required under the AGREEMENT within thirty (30) days of receipt of notice of AGREEMENT closeout.

Upon receipt of CONSULTANT's submittals, the SANITATION DISTRICT shall commence a closeout audit of the AGREEMENT and will either:

- i. Give the CONSULTANT a final AGREEMENT Acceptance: or
- ii. Advise the CONSULTANT in writing of any outstanding item or items which must be furnished, completed, or corrected at the CONSULTANT's cost.

CONSULTANT shall be required to provide adequate resources to fully support any administrative closeout efforts identified in the AGREEMENT. Such support must be provided within the timeframe requested by the SANITATION DISTRICT.

Notwithstanding the final AGREEMENT acceptance, the CONSULTANT will not be relieved of its obligations hereunder, nor will the CONSULTANT be relieved of its obligations to complete any portions of the work, the non-completion of which were not disclosed to the SANITATION DISTRICT (regardless of whether such nondisclosures were fraudulent, negligent, or otherwise), and the CONSULTANT shall remain obligated under all those provisions of the AGREEMENT which expressly or by their nature extend beyond and survive final AGREEMENT Acceptance.

Any failure by the SANITATION DISTRICT to reject the work or to reject the CONSULTANT's request for final AGREEMENT Acceptance as set forth above shall not be deemed to be acceptance of the work by the SANITATION DISTRICT for any purpose nor imply acceptance of, or AGREEMENT with, the CONSULTANT's request for final AGREEMENT Acceptance.

## **28. ACCESS**

The SANITATION DISTRICT shall arrange for access to and make all provisions for the CONSULTANT to enter upon public and private property as required for the CONSULTANT to perform services hereunder.

## **29. LIABILITY LIMITATIONS**

The CONSULTANT shall not be responsible for acts and decisions of third parties, including governmental agencies, other than the CONSULTANT's Subconsultants, that impact project completion and/or success.

## **30. ENTIRE AGREEMENT**

This AGREEMENT constitutes the entire understanding and AGREEMENT between the Parties and supersedes all previous negotiations between them pertaining to the subject matter thereof.

IN WITNESS WHEREOF, this AGREEMENT has been executed in the name of the SANITATION DISTRICT, by its officers thereunto duly authorized, and CONSULTANT as of the day and year first above written.

**CAROLLO ENGINEERS, INC.**

By \_\_\_\_\_ Date \_\_\_\_\_

\_\_\_\_\_  
Printed Name & Title

**ORANGE COUNTY SANITATION DISTRICT**

By \_\_\_\_\_ Date \_\_\_\_\_  
David John Shawver  
Board Chairman

By \_\_\_\_\_ Date \_\_\_\_\_  
Kelly A. Lore  
Clerk of the Board

By \_\_\_\_\_ Date \_\_\_\_\_  
Ruth Zintzun  
Purchasing & Contracts Manager

Attachments:	Attachment "A"	Scope of Work
	Attachment "B"	Labor Hour Matrix
	Attachment "C"	Not Attached
	Attachment "D"	Allowable Direct Costs
	Attachment "E"	Fee Proposal
	Attachment "F"	Not Used
	Attachment "G"	Cost Matrix
	Attachment "H"	Not Used
	Attachment "I"	Not Used
	Attachment "J"	Minor Subconsultant Hourly Rate Schedule
	Attachment "K"	OCSD Safety Standards

CMM:yp



# Orange County Sanitation District

Administration Building  
10844 Ellis Avenue  
Fountain Valley, CA 92708  
(714) 593-7433

## OPERATIONS COMMITTEE

### Agenda Report

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**File #:** 2020-871

**Agenda Date:** 3/4/2020

**Agenda Item No:** 6.

---

**FROM:** James D. Herberg, General Manager  
Originator: Kathy Millea, Director of Engineering

**SUBJECT:**

**ORANGE COUNTY SANITATION DISTRICT ASSET MANAGEMENT PROGRAM**

**GENERAL MANAGER'S RECOMMENDATION**

RECOMMENDATION:

Receive and file the Orange County Sanitation District Asset Management Program report.

**BACKGROUND**

Staff will provide a presentation to both the Operations and Administration Committees on the Orange County Sanitation District Asset Management Program.

**RELEVANT STANDARDS**

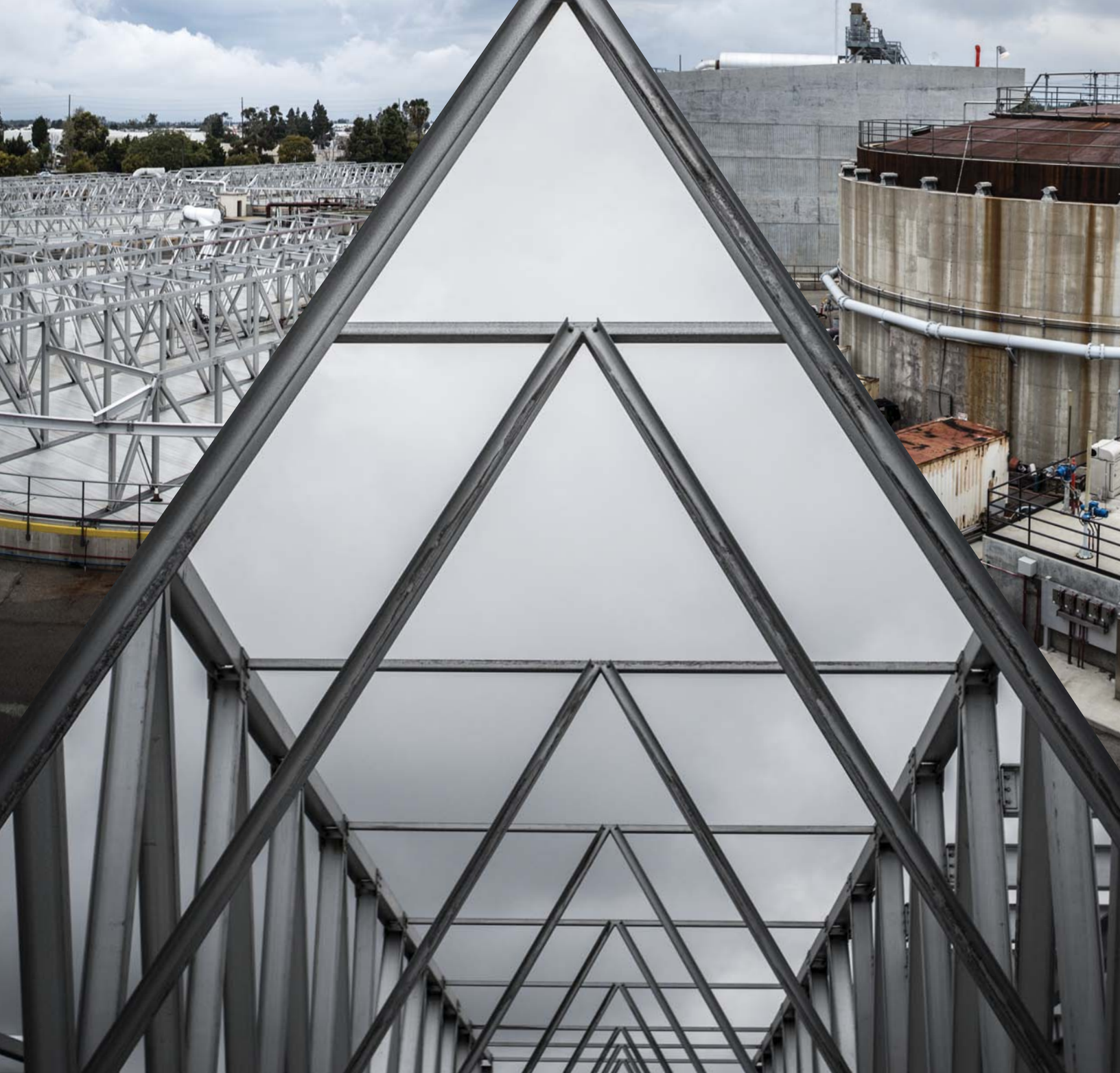
- Protect Orange County Sanitation District assets
- Sustain 1, 5, 20-year planning horizons
- Ensure the public's money is wisely spent
- Maintain a proactive asset management program
- 24/7/365 treatment plant reliability

**ATTACHMENT**

*The following attachment(s) may be viewed on-line at the OCSD website ([www.ocsd.com](http://www.ocsd.com)) with the complete agenda package:*

- Orange County Sanitation District Asset Management Program

EY:sa



# 2019 ASSET MANAGEMENT PLAN

*Orange County Sanitation District, California*



*February 2020*

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## ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Meaning
AM	Asset Management
AMP	Asset Management Plan
AS1	Activated Sludge 1
AS2	Activated Sludge 2
BB	Blower Building
CCTV	Closed-circuit Television
CenGen	Central Generation
CIP	Capital Improvement Program
CP-DIG-LEL	Control Panel - Digesters - Lower Explosive Limit
DAF	Dissolved Air Flotation
DAFT	Dissolved Air Flotation Thickener
DC	Distribution Center
DCJ	Distribution Center J
EBDB	East Basin Distribution Box
EJB	Effluent Junction Box
Elec.	Electrical
EPSA	Effluent Pump Station Annex
FE	Facilities Engineering
FeCl <sub>3</sub>	Ferric chloride
FY	Fiscal Year
GWRS	Groundwater Replenishment System
HCl	Hydrochloric Acid
HDPE	High-Density Polyethylene Resin
HP	Horsepower
HVAC	Heating, Ventilation, and Air Conditioning
HW	Headworks
I&C	Instrumentation and Controls
IA	Instrument Air
Inst.	Instrument
JB	Junction Box
kV	Kilovolt
kW	Kilowatt
LEL	Lower Explosive Limit
LOS	Level of Service
LOX	Liquid Oxygen
M&D	Metering & Diversion
MCC	Motor Control Center
MGD	Million Gallons Per Day



Acronym or Abbreviation	Meaning
MH	Manhole
ML	Mixed Liquor
MP	Maintenance Project
MSP	Main Sewage Pump
N/A	Not applicable
NaOH	Sodium Hydroxide
NASSCO	National Association of Sewer Service Companies
NFPA	National Fire Protection Association
No.	Number
NPDES	National Pollutant Discharge Elimination System
NSC	North Scrubber Complex
O&M	Operations and Maintenance
OCFCD	Orange County Flood Control District
OCSD	Orange County Sanitation District
OCWD	Orange County Water District
OEM	Original Equipment Manufacturer
OOBS	Ocean Outfall Booster Station
OXI	Oxidizer
P1	Plant No. 1
P2	Plant No. 2
PB	Power Building
PB	Primary Basin
PdM	Mature Predictive Maintenance
PDU	Power Distribution Unit
PE	Primary Effluent
PEDB	Primary Effluent Distribution Box
PEJB	Primary Effluent Junction Box
PEPS	Primary Effluent Pump Station
PISB	Primary Influent Splitter Box
PLC	Programmable Logic Controller
PM	Preventive Maintenance
PRN	Project Request Number
PS	Pump Station
PVC	Polyvinyl chloride
PWPS	Plant Water Pump Station
RAS	Return Activated Sludge
RCP	Reinforced Concrete Pipe
Recir.	Recirculation
RSS	Return Secondary Sludge

Acronym or Abbreviation	Meaning
RUL	Remaining Useful Life
RWQCB	Regional Water Quality Control Board
SALS	Steve Anderson Lift Station
SC	Secondary Clarifier
SCADA	Supervisory Control and Data Acquisition
SCR	Selective Catalytic Reduction
SE	Secondary Effluent
SEJB	Secondary Effluent Junction Box
SR	Secondary Return
SSC	South Scrubber Complex
T&D	Thickening & Dewatering
TF	Trickling Filter
TFPS	Trickling Filter Pump Station
TFSE	Trickling Filter Secondary Effluent
TL	Trunkline
TPAD	Temperature-phased Anaerobic Digester
UPS	Uninterruptible Power Supply
V	Voltage
VDC	Volts Direct Current
VFD	Variable Frequency Drive
WAS	Waste Activated Sludge
WSS	Waste Sidestream, Waste Secondary Sludge
WSSPS	Waste Sidestream Pump Station
Yr	Year

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## EXECUTIVE SUMMARY

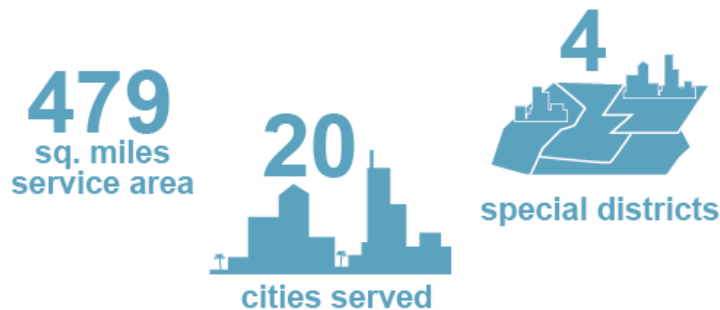
### Asset Management Plan Purpose

Over the past two years, Orange County Sanitation District (OCSD) has made a concerted effort to establish an updated and more robust understanding of the condition and performance of all critical and major assets and our ability to meet established levels of service. As OCSD embarks on another year of this renewed asset management program, we have updated our Asset Management Plan to be a tactical document summarizing our plans for addressing asset condition and performance issues.

This Asset Management Plan will be published annually, and we anticipate this document will continue to change in content and structure as our asset management program evolves.

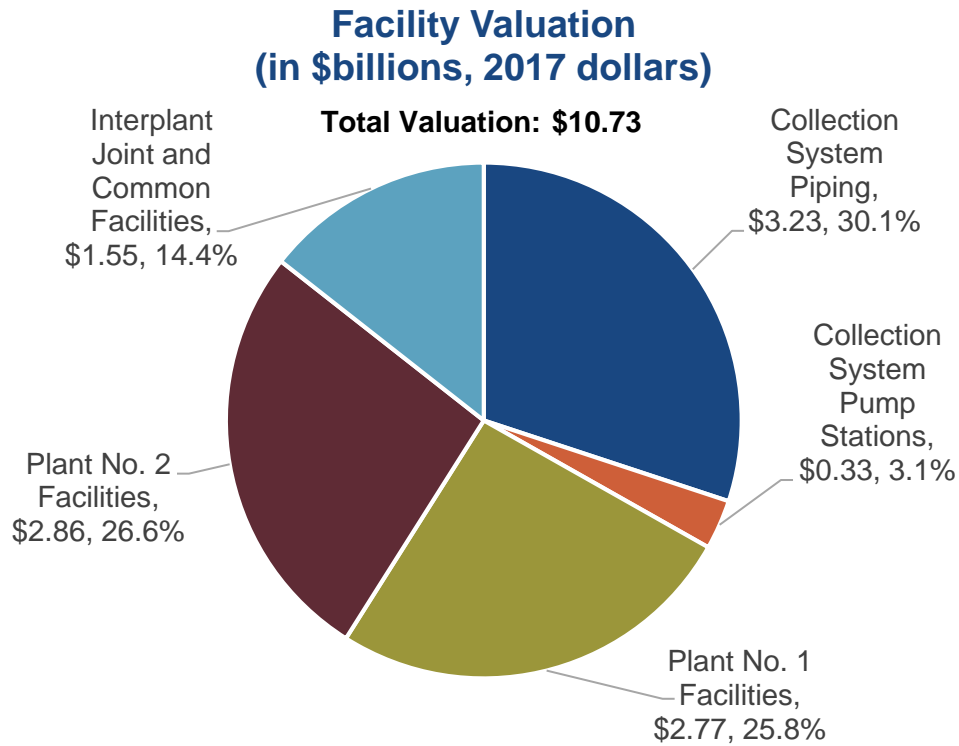
### Overview of OCSD's Infrastructure

OCSD is responsible for providing wastewater collection, treatment and recycling services to over 2.6 million people in central and northern Orange County, California. OCSD's two resource recovery and wastewater treatment facilities treat an average daily wastewater flow of 185 million gallons per day (MGD) from residential, commercial and industrial sources.



OCSD owns and operates wastewater collection system infrastructure as well as resource recovery and wastewater treatment facilities. Our collection system infrastructure includes 389 miles of regional trunk sewer pipelines and fifteen pump stations located throughout OCSD's service area. This wastewater is conveyed to Reclamation Plant No. 1 in Fountain Valley and Treatment Plant No. 2 in Huntington Beach, where resource recovery and wastewater treatment take place.

**Figure ES.1** shows the facility valuation by asset system for OCSD's wastewater infrastructure. The valuation was prepared as part of the 2017 Facilities Master Plan.



**Figure ES.1. Facility Valuation by Location**

## Asset Management Intent, Policy, and Initiatives

Reliable infrastructure is essential to achieving our mission and vision. We manage infrastructure reliability according to the following stated intent for our asset management program:

---

*“OCSD will know the condition of assets we own and will have a plan to operate and maintain these assets to deliver the required level of service at the lowest life cycle cost with an acceptable level of risk.”*

*~ James D. Herberg, OCSD General Manager*

---

In November 2019, OCSD’s strategic planning process resulted in the creation of an Asset Management Policy and Asset Management Initiatives.

### ASSET MANAGEMENT POLICY

*The Sanitation District will assess and manage the collection system and treatment plant systems and assets to improve resilience and reliability while lowering lifecycle costs. This will be accomplished through adaptive operation, coordinated maintenance and condition assessment, and planned capital investment. Staff will balance maintenance, refurbishment, and replacement strategies to maximize useful life, system availability and efficiency.*

### ASSET MANAGEMENT INITIATIVES

- Create an annual Asset Management Plan documenting the condition of the collection system and treatment plants, and upcoming maintenance or capital projects.
- Coordinate the efforts of operations, collections, mechanical maintenance, electrical maintenance, instrument maintenance and engineering through process teams to assure the Sanitation District’s resources are focused on the high priority work functions.
- Maintain a 20-year forecast of all CIP projects needed to maintain or upgrade the Sanitation District’s nearly \$11 billion in assets on a prioritized risk basis to establish rate structures.

## Asset Management Organization

Asset management is not new to OCSD. As shown in **Figure ES.2**, every part of our organization is involved in some aspect of ensuring assets are designed, constructed, operated, and maintained to reliably deliver service to our customers.



**Figure ES.2. Roles in Asset Management**

To fulfill our commitment to our ratepayers for providing safe and reliable services, OCSD has augmented and solidified our asset management program and restructured the organization to better align the Engineering and Operations and Maintenance (O&M) departments. Through this restructuring, OCSD has established an Asset Management Group within the Planning Division consisting of nine Asset Engineers responsible for understanding the key issues or concerns related to the condition of OCSD's assets and for developing and coordinating plans to ensure these assets operate reliably.

## State of OCSD's Infrastructure

The following system-level summary tables provide a high-level overview of the Area Asset Management Summaries contained in **CHAPTER 5**. The system-level summaries are organized by:

- Plant No. 1 (**Table ES.1**)
- Plant No. 2 (**Table ES.2**)
- Collection System – Pump Stations (**Table ES.3**)
- Collection – Pipelines (**Table ES.4**)

The system-level summaries generally include the following fields:

- **Area No.**
- **Area Name**
- **Average Remaining Useful Life (RUL) Score:** Estimated average RUL score for each discipline (civil, structural, mechanical, electrical, and instrumentation) or area based on an average of the RUL scores provided by Asset Engineers in the detailed Area AM Summaries.
- **Percentage of RUL Scores with 4s or 5s<sup>[1]</sup>:** Percentage based on total number of RUL scores assigned to each area by Asset Engineers in the detailed Area AM Summaries. The percentage is an alternate metric for the overall condition of the area. A RUL score of 5 indicates less than 5 years of useful life remains for an asset or set of assets. A RUL score of 4 indicates 5 to 10 years of useful life remains for an asset or a set of assets.
- **Replacement Value (\$million):** Process area replacement value from the facility valuation.

---

<sup>[1]</sup>RUL 5: <5 Years, RUL 4: 5 to 10 Years



**Table ES.1. Plant No. 1 Overview**

Area No.	Area Name	Average Remaining Useful Life Score						Percentage of RUL Scores with 4s or 5s	Number of Projects to Address 4s & 5s	Replacement Value (\$millions, in 2017 Dollars)
		Civil	Structural	Mechanical	Electrical	Instrumentation	All Assets			
10	Preliminary Treatment	1	2	4	4	4	4	56%	4	\$351.2
11	Primary Treatment	3	2	4	3	3	3	31%	8	\$451.6
12	Secondary Treatment - Activated Sludge	3	2	3	3	4	3	32%	11	\$887.3
12	Secondary Treatment - Trickling Filter	1	1	3	4	3	2	10%	6	\$61.6
14	Interplant	2	2	3	2	1	2	17%	4	\$683.1
15	Solids Handling - Digesters	2	1	2	2	2	2	3%	7	\$231.2
15	Solids Handling - Facilities	2	1	2	2	2	2	9%	6	\$206.5
16	Central Generation <sup>a</sup>		3	4	4	4	4	50%	12	\$154.8
17	Utilities	3	2	3	2	1	2	8%	11	\$176.2
18	Electrical Distribution <sup>a</sup>				3		3	48%	10	\$74.1
19	Miscellaneous Structures & Grounds	To Be Determined					TBD	TBD	TBD	\$220.0
	<b>Plant No. 1 Total</b>							<b>30%</b>	<b>79</b>	<b>\$3,497.7</b>

**RUL Legend:**

RUL <5 years
  RUL 5-10 years
  RUL 11-15 years
  RUL 16-20 years
  RUL >20 years

<sup>a</sup> Gray box with diagonal line indicates there are no assets assigned to this discipline within this process area.

Table ES.2. Plant No. 2 Overview

Area No.	Area Name	Average Remaining Useful Life Score						Percentage of RUL Scores with 4s or 5s	Number of Projects to Address 4s & 5s	Replacement Value (\$millions, in 2017 Dollars)
		Civil	Structural	Mechanical	Electrical	Instrumentation	All Assets			
20	Preliminary Treatment	3	1	2	2	2	2	2%	11	\$324.6
21	Primary Treatment	3	2	3	3	3	3	9%	7	\$454.3
22	Secondary Treatment - Activated Sludge	3	2	3	3	3	3	17%	8	\$608.5
22	Secondary Treatment - Trickling Filter	2	1	2	3	3	2	1%	7	\$310.8
24	Effluent Disposal	2	2	2	3	3	2	12%	10	\$817.1
25	Solids Handling - Digesters	3	3	3	4	4	3	45%	12	\$322.7
25	Solids Handling - Facilities	2	2	2	2	2	2	16%	7	\$201.5
26	Central Generation <sup>a</sup>		3	4	4	4	4	71%	13	\$330.2
27	Utilities	2	3	3	2	1	2	5%	9	\$98.3
28	Electrical Distribution <sup>a</sup>				3		3	57%	11	\$72.7
29	Miscellaneous Buildings & Grounds	To Be Determined					TBD	TBD	TBD	\$132.7
	<b>Plant No. 2 Total</b>							<b>29%</b>	<b>95</b>	<b>\$3,673.4</b>

**RUL Legend:**

RUL <5 years
  RUL 5-10 years
  RUL 11-15 years
  RUL 16-20 years
  RUL >20 years

<sup>a</sup> Gray box with diagonal line indicates there are no assets assigned to this discipline within this process area.

**Table ES.3. Collection System – Pump Station Overview**

Pump Station	Average Remaining Useful Life Score						Percentage of RUL Scores with 4s or 5s	Number of Projects to Address 4s & 5s	Replacement Value (\$millions, in 2017 Dollars)
	Civil	Structural	Mechanical	Electrical	Instrumentation	All Assets			
15th Street	3	4	3	2	3	3	17%	2	\$13.5
A Street	3	4	3	3	2	3	17%	1	\$11.7
Bay Bridge	4	4	4	4	4	4	85%	3	\$34.0
Bitter Point	2	3	2	1	2	2	15%	1	\$32.2
College Avenue	3	2	3	2	1	2	8%	2	\$24.0
Crystal Cove	3	3	4	3	2	3	17%	2	\$2.5
Edinger	4	3	3	3	3	3	27%	4	\$12.9
Lido	1	4	4	3	3	3	42%	5	\$20.1
MacArthur	4	3	4	3	1	3	36%	3	\$16.3
Main Street	4	3	4	2	2	3	38%	3	\$44.0
Rocky Point	1	3	3	2	2	2	15%	2	\$16.0
Seal Beach	3	4	5	5	3	4	75%	3	\$41.5
Slater	4	4	4	3	2	3	38%	4	\$35.2
Westside	3	3	3	2	3	3	0%	1	\$30.6
Yorba Linda	3	4	4	3	2	3	27%	1	Not Valued
<b>Total</b>							<b>31%</b>	<b>37+13<sup>a</sup></b>	<b>\$334.6</b>

**RUL Legend:**

■ RUL <5 years 
 ■ RUL 5-10 years 
 ■ RUL 11-15 years 
 ■ RUL 16-20 years 
 ■ RUL >20 years

<sup>a</sup> 37 projects affect only one pump station. An additional 13 projects affect multiple pump stations.

**Table ES.4. Collection System – Pipeline Overview**

Trunk	Miles of Pipe with Grade 4 Defects <sup>a</sup>	Miles of Pipe with Grade 5 Defects <sup>a</sup>	Total Miles with Grade 4 or Grade 5 Defects <sup>a</sup>	Total Miles	Percent of Length with Non-Isolated 4s or 5s	Replacement Value (\$millions, in 2017 Dollars)
Baker-Main	0.18	0.12	0.30	42.6	0.7%	\$275.5
Bushard	-	-	-	21.4	-	\$241.6
Coast Hwy	-	-	-	11.4	-	\$98.5
Euclid	-	-	-	34.4	-	\$269.9
Interplant	-	-	-	16.9	-	\$115.3
Knott	0.44	2.04	2.48	73.2	3.4%	\$625.0
Miller-Holder	0.23	-	0.23	31.5	0.7%	\$296.1
Newhope-Placentia	0.11	0.04	0.15	30.9	0.5%	\$209.0
Newport	0.10	-	0.10	31.5	0.3%	\$216.3
SARI	0.25	-	0.25	50.3	0.5%	\$516.1
Sunflower	0.39	0.23	0.62	34.8	1.8%	\$299.9
Talbert	-	-	-	8.4	-	\$57.6
<b>Total</b>	<b>1.70</b>	<b>2.43</b>	<b>4.13</b>	<b>387.4</b>	<b>1.1%</b>	<b>\$3,220.8</b>

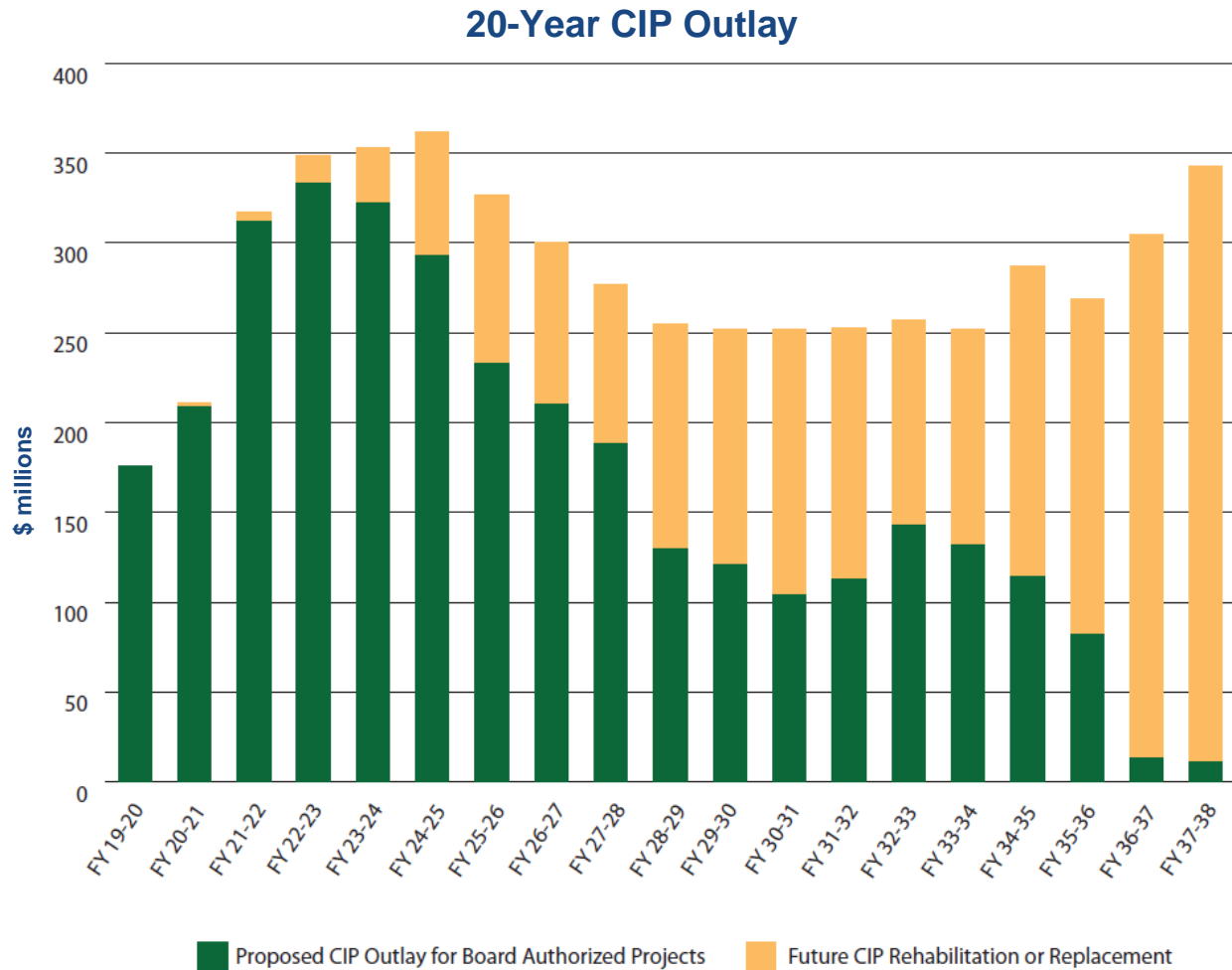
<sup>a</sup> Grade 4 and 5 defects include both isolated (i.e., pipes that can be fixed by point repair) and non-isolated (i.e., pipes that need rehabilitation or replacement) type pipe.

<sup>b</sup> The abandoned pipelines at the Airbase (\$6,366,516) and the Harvard Area Trunk Sewer (\$191,784) areas are not included in the replacement value total.

## Budgetary Considerations

The AMP focuses on documenting short- to long-term planning of maintenance and capital improvement projects to support effective budget development and sustainable operations. OCSD has been striving to more accurately identify medium- to long-term capital cash flow requirements.

Fiscal Year 2019-2020 Budget Update, adopted on June 26, 2019, includes updates to the 20-year CIP outlay. **Figure ES.3** includes current and projected Capital Improvement Program projects.



**Figure ES.3. 20-Year CIP Outlay**

## CHAPTER 1 PURPOSE

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Over the past two years, the Orange County Sanitation District (OCSD) has made a concerted effort to establish a baseline understanding of the condition and performance of all critical and major assets and our ability to meet established levels of service. As OCSD embarks on another year of this renewed asset management program, we have updated our Asset Management Plan to be a tactical document summarizing our plans for addressing asset condition and performance issues.

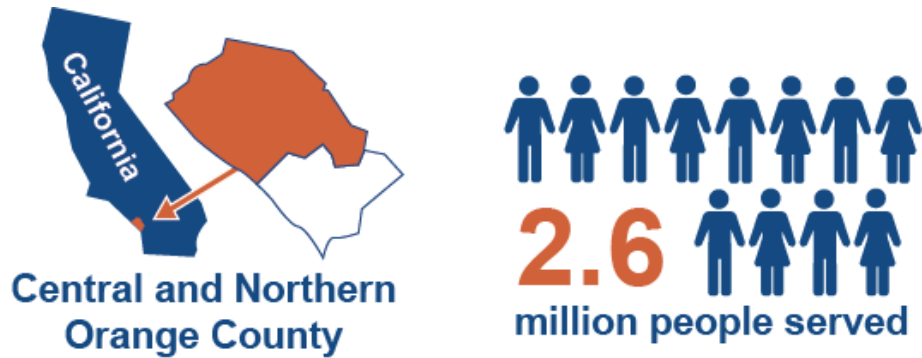
This Asset Management Plan will be published annually, and we anticipate this document will continue to change in content and structure as our asset management program evolves. The current structure is organized into the following chapters to meet the needs of stakeholders:

- **Executive Summary:** Summarizes purpose of the Asset Management Plan and main conclusions.
- **Chapter 1 Purpose:** Outlines purpose and organization of the Asset Management Plan.
- **Chapter 2 Overview of OCSD's Infrastructure:** Describes the major infrastructure that OCSD owns and operates.
- **Chapter 3 Asset Management Intent, Policy and Initiatives:** Defines organizational intents, policies, and initiatives driving the asset management program.
- **Chapter 4 Asset Management Organization:** Describes the asset management organizational structure and asset management strategies.
- **Chapter 5 State of OCSD's Infrastructure:** Summarizes the current state of OCSD's infrastructure and plans to address asset condition and performance issues.
- **Chapter 6 Program Monitoring and Improvements:** Documents activities to monitor the asset management program and improvement opportunities.
- **Chapter 7 Budgetary Considerations:** Summarizes CIP and maintenance expenditures, and planned maintenance projects.

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## CHAPTER 2 OVERVIEW OF OCSD'S INFRASTRUCTURE

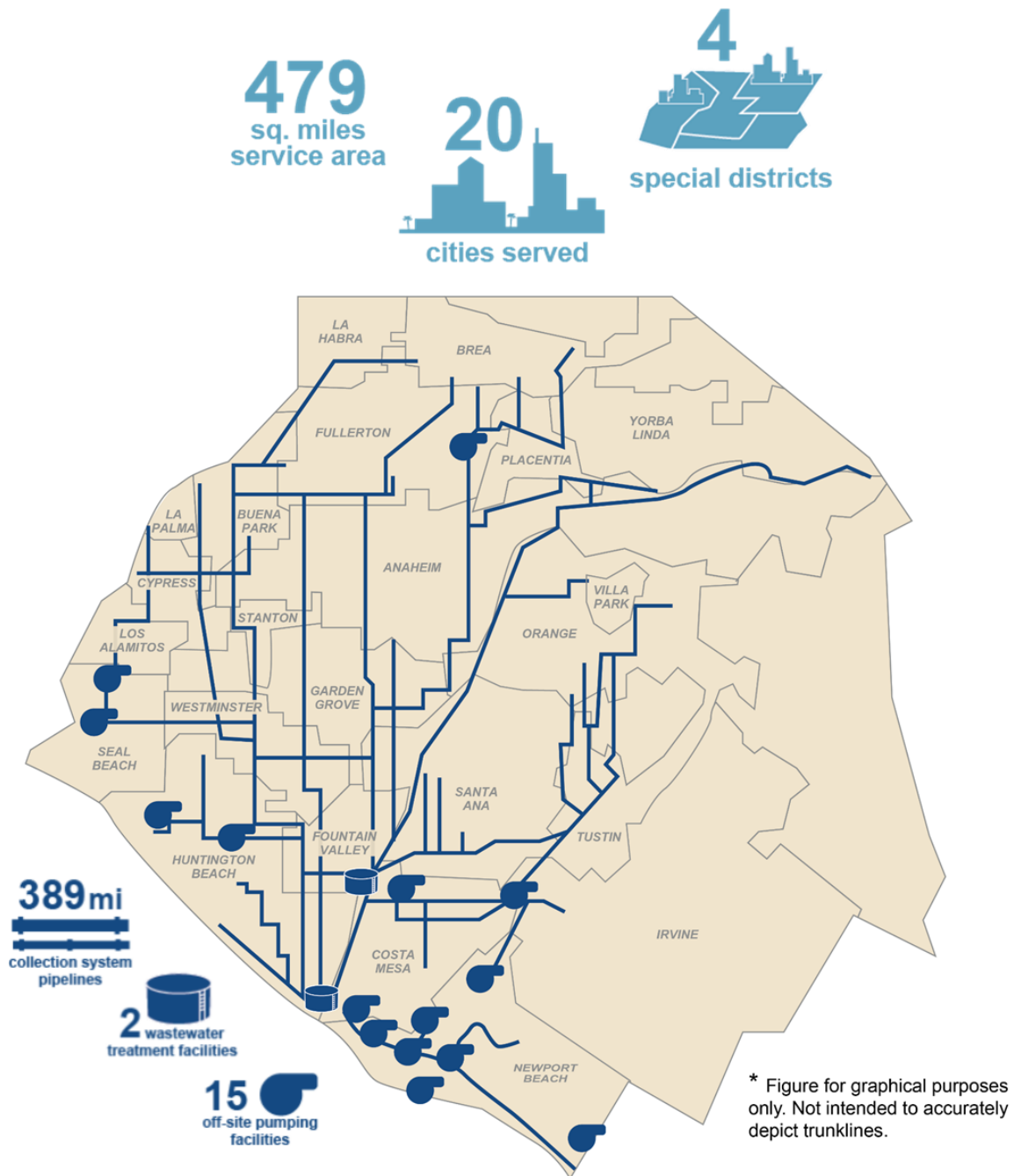
OCSD is responsible for providing wastewater collection, treatment and recycling services to over 2.6 million people in central and northern Orange County, California. OCSD's two resource recovery and wastewater treatment facilities treat an average daily wastewater flow of 185 million gallons per day (MGD) from residential, commercial and industrial sources.



OCSD owns and operates wastewater collection system infrastructure as well as resource recovery and wastewater treatment facilities. Our collection system infrastructure includes 389 miles of regional trunk sewer pipelines and fifteen pump stations located throughout OCSD's service area (shown in **Figure 2.1**). This wastewater is conveyed to Reclamation Plant No. 1 in Fountain Valley and Treatment Plant No. 2 in Huntington Beach, where resource recovery and wastewater treatment take place.

OCSD's treatment plants currently operate under a permit from the Regional Water Quality Control Board (RWQCB). This was established by the National Pollutant Discharge Elimination System (NPDES) that permits the discharge of treated wastewater through an ocean outfall system to the Pacific Ocean. While some of this treated water is released five miles offshore through a deep-water ocean outfall system, most is recovered and delivered to Orange County Water District (OCWD). OCWD further treats OCSD's effluent using the Groundwater Replenishment System, which improves the effluent water quality to drinking water standards for groundwater recharge and irrigation purposes. The following sections briefly describe the key systems under OCSD's management.

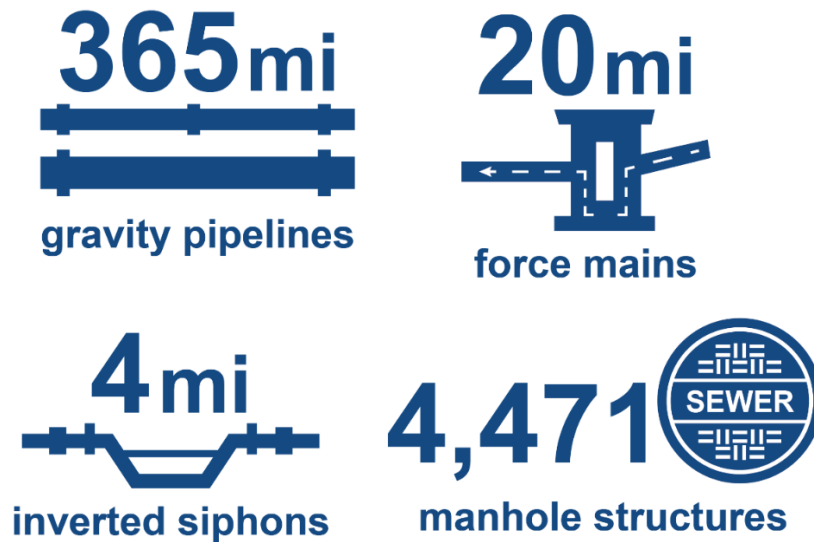




**Figure 2.1. OCSD Service Area**

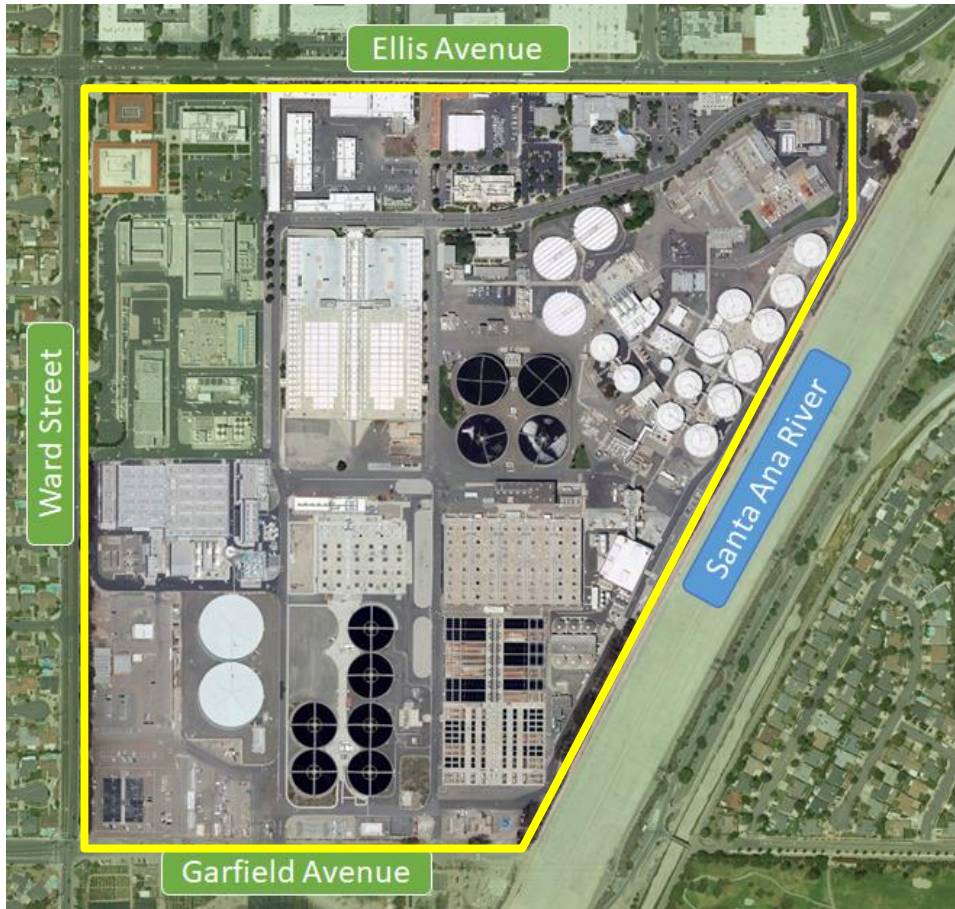
## 2.1 Collection System

OCSD's collection system serves as a regional conveyance system, collecting and conveying flows from 20 cities and four special districts. OCSD's 389 miles of collection system pipelines and 15 pump stations are spread throughout northern Orange County and include 365 miles of gravity pipelines, 20 miles of force mains, four miles of inverted siphons and 4,471 manholes structures.



## 2.2 Treatment Plant System

OCSD owns and operates two wastewater treatment plants. **Reclamation Plant No. 1** is located in the City of Fountain Valley, approximately four miles inland of the Pacific Ocean and adjacent to the Santa Ana River (shown in **Figure 2.2**). Influent wastewater entering Reclamation Plant No. 1 passes through a flow metering and diversion structure, mechanical bar screens, grit chambers, and primary basins, before going to one of two air activated sludge processes or trickling filters and secondary basins. Up to 135 MGD of secondary effluent can be diverted to OCWD's facilities for tertiary treatment prior to reuse.



**Figure 2.2. Aerial View of Reclamation Plant No. 1**

Solids treatment at Reclamation Plant No.1 includes co-thickening of primary and secondary sludge, followed by anaerobic digestion process and centrifuge dewatering of digested sludge to produce Class-B biosolids. Digester gas produced at Plant No. 1 is collected, compressed, cleaned, and transferred to the Central Power Generation Facility as a renewable fuel for energy generation. Plant No. 1 also has facilities for odor control and chemical addition.



**Treatment Plant No. 2** is located in the City of Huntington Beach, adjacent to the Santa Ana River and east of Pacific Coast Highway (shown in **Figure 2.3**). Raw sewage flow entering Treatment Plant No. 2 passes through a flow metering structure, mechanical bar screens and grit removal chambers. Flow then passes through primary basins before being split between the oxygen activated sludge secondary treatment facility or trickling filters/solids contact and is discharged directly to the ocean via the outfall pumping system.



**Figure 2.3. Aerial View of Treatment Plant No. 2**

Solids treatment at Treatment Plant No. 2 includes in-basin thickening of primary sludge, dissolved air flotation thickening of waste activated sludge and secondary sludge, anaerobic sludge digestion and centrifuge dewatering. Plant No. 2 also has facilities for odor control and chemical addition. Digester gas produced at Plant No. 2 is collected, compressed, cleaned, and distributed to a Central Power Generation System as a renewable fuel for energy generation.

## 2.3 Outfall System

The ocean outfall system includes three discharge structures: **Outfall No. 1**, **Outfall No. 2**, and the **Santa Ana River Emergency Overflow Weirs**.

**Outfall No. 2** serves as the primary ocean outfall, discharging treated wastewater approximately five miles offshore at a depth of approximately 200 feet. It began service in 1971.

### OUTFALL NO. 2 PRIMARY OCEAN OUTFALL



**Outfall No. 1** serves as an emergency outfall. It was originally constructed in 1954 and modified in 1965. It is located over a mile offshore at a depth of approximately 65 feet. OCSD's NPDES permit specifies that this outfall can only be used in the case of an emergency or maintenance.

### OUTFALL NO. 1 EMERGENCY OUTFALL



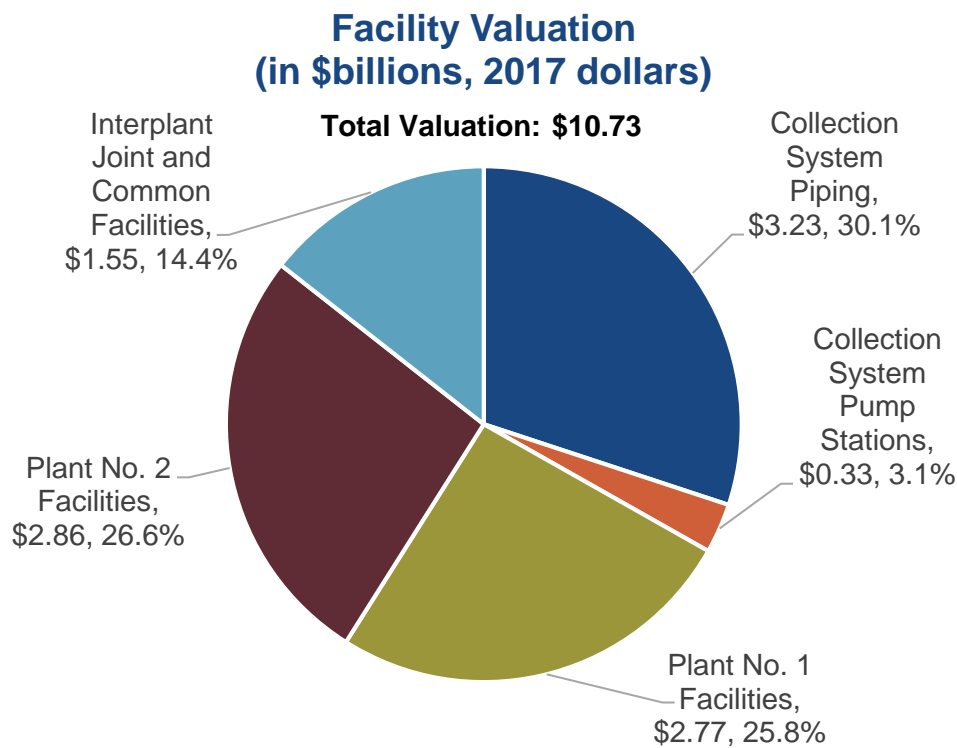
The Outfall System has two **Santa Ana River Emergency Overflow Weirs** at Plant No. 2 which discharge directly to the Santa Ana River. These weirs are for extreme emergency use only.

## 2.4 Facility Valuation

As part of the 2017 Facilities Master Plan, OCSD commissioned consulting engineering firms to conduct a study to determine the 2017 value of all OCSD capital facilities, including Reclamation Plant No. 1, Treatment Plant No. 2, interplant and joint treatment facilities, and the collection system, including sewer pipelines and lift stations.

**Figure 2.4** shows the valuation information presented in five general sub-process areas:

- Collections Systems Piping
- Collection Systems Pump Stations
- Plant No. 1 Facilities
- Plant No. 2 Facilities
- Interplant and Joint Treatment Facilities



**Figure 2.4. Facility Valuation by Area**

Figure 2.5 shows the valuation information presented by area designation.

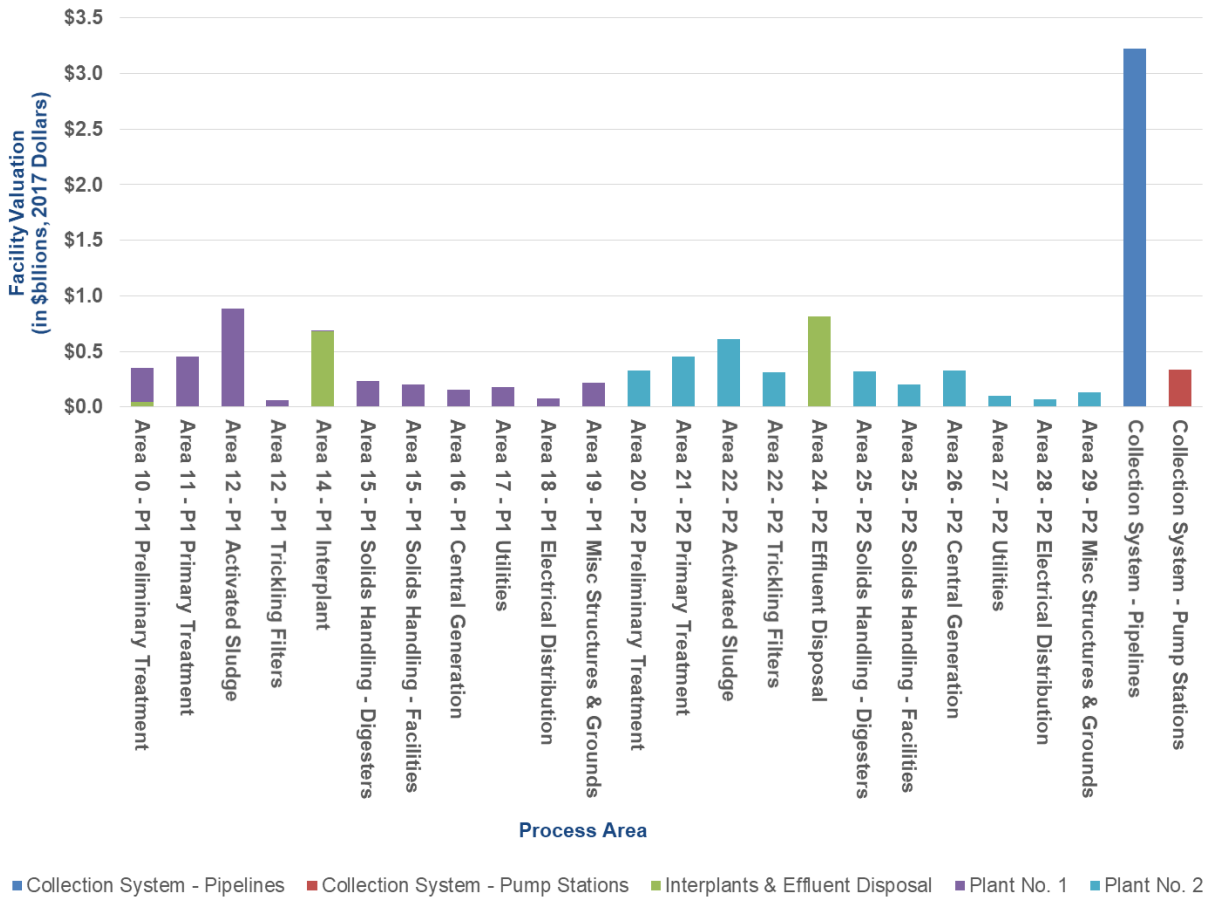
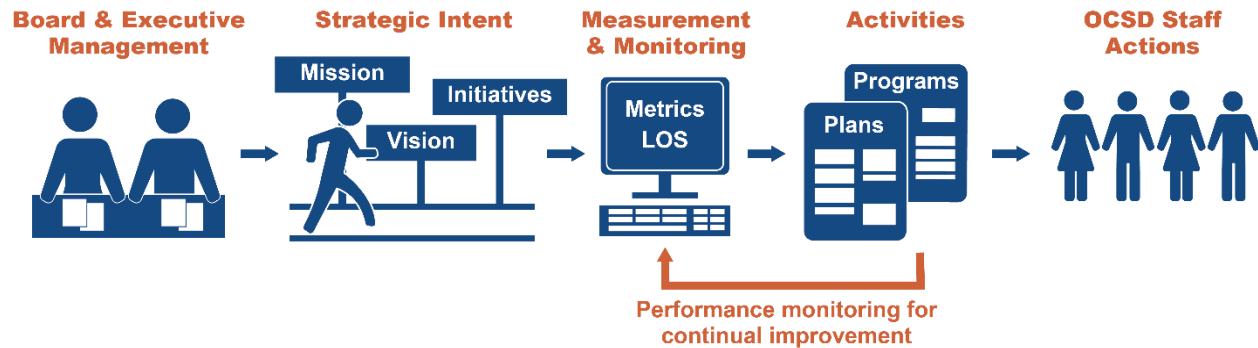


Figure 2.5. Facility Valuation by Area

## CHAPTER 3 ASSET MANAGEMENT INTENT, POLICY AND INITIATIVES

The Asset Management Plan is prepared in alignment with OCSD's Mission, Vision, Asset Management Policy and Asset Management Initiatives approved by our Board of Directors. OCSD's Asset Management Initiatives serve as a means for tracking progress towards meeting asset management objectives along with other performance measures.





This Asset Management Plan is a key component of OCSD's overall planning activities. It is aligned with the District's Strategic Plan, includes projects identified in the Facilities Master Plan, and identifies potential new activities requiring funding in the budget development process. **Table 3.1** describes the relationship of the Asset Management Plan to other planning activities.

**Table 3.1. Linkage between Asset Management Plan and Other Planning Activities**

Planning Activity	Description	Planning Horizon	Update Cycle
<b>Strategic Plan</b>	Defines the strategic initiatives to be pursued by OCSD and provides a basis for long-term financial, capital, and operating planning. The Asset Management Plan aligns with Strategic Plan goals and objectives.	5- to 10-year	Biennial
<b>Facilities Master Plan</b>	Identifies long-term capital improvement plans to address treatment and collection system infrastructure needs. Projects identified in the Facilities Master Plan are incorporated into the Asset Management Plan and refined as appropriate.	20-year	Varies
<b>Asset Management Plan</b>	Documents the overall condition of treatment and collection system assets and plans to address key condition and performance issues to ensure assets meet OCSD's levels of service.	1-year 5-year 10-year	Annual
<b>Budget Document</b>	Lays out the framework of OCSD's activities and serves as a source of information for our Board of Directors, ratepayers and employees. Includes operational, capital and debt service expenditures necessary to support our mission and execute the Strategic Plan adopted by our Board of Directors. The Asset Management Plan identifies new maintenance and capital improvement activities for consideration in the budget development process.	2-year	Annual

### 3.1 OCSD Mission and Vision Statements

OCSD's Board of Directors developed Mission and Vision statements to clearly communicate OCSD's purpose to our stakeholders and to articulate OCSD's organizational objectives. OCSD's Vision supports our Mission by expressing what we strive to achieve now and into the future.

#### OUR MISSION

*To protect public health and the environment by providing effective wastewater collection, treatment and recycling services.*

#### OUR VISION

*OCSD will be a leader in:*

- *Providing reliable, responsive, and affordable services in line with customer needs and expectations.*
- *Protecting public health and the environment utilizing all practical and effective means for wastewater, energy, and solids resource recovery.*
- *Continually seeking efficiencies to ensure that the public's money is well spent.*
- *Communicating our mission and strategies with those we serve and all other stakeholders.*
- *Partnering with others to benefit our customers, this region, and our industry.*
- *Creating the best possible workforce in terms of safety, productivity, customer service, and training.*

We are achieving this mission through improved asset management practices to better coordinate and plan actions to ensure our collection system, treatment and resource recovery infrastructure works when we need it.

One of the ways we are doing this in asset management is by defining clear roles and responsibilities for identifying the condition and performance needs of our assets. We work as a team to develop solutions and coordinate our efforts to solve these issues before they become problems that impact our ability to achieve our mission. This Asset Management Plan documents the key condition and performance issues identified by OCSD staff and our collective plans for addressing these issues.

### 3.2 Strategic Plan – Asset Management Policy and Initiatives

Reliable infrastructure is essential to achieving our mission and vision. The stated intent of OCSD's General Manager is:

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*“OCSD will know the condition of assets we own and will have a plan to operate and maintain these assets to deliver the required level of service at the lowest life cycle cost with an acceptable level of risk.”*

*– James D. Herberg, OCSD General Manager*

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Related to the intent, the key objectives we are building into the asset management program include:

- Proactive approach to repair, rehabilitation and replacement.
- Ensure assets are reliable and operating when needed.
- Minimize unplanned outages and equipment downtime.
- Manage risks associated with asset or service impairment through asset performance optimization.
- Develop cost-effective management strategies for the long term.
- Strive to implement world class asset management strategies through continual improvement in our asset management practices.

In addition, OCSD has a biennial strategic planning process designed to accomplish the following objectives:

- Affirm corporate mission and vision.
- Adjust strategic goals and policies.
- Set agency-wide prioritization of initiatives.
- Provide a disciplined budgeting process.
- Set operational goals at the operating level.
- Hold individual units accountable for performance.

The biennial strategic planning process is instrumental to aligning the activities OCSD's staff performs with the strategic intent of the Board of Directors. In November 2019, OCSD's strategic planning process resulted in the creation of an Asset Management Policy and Asset Management Initiatives.

### ASSET MANAGEMENT POLICY

*The Sanitation District will assess and manage the collection system and treatment plant systems and assets to improve resilience and reliability while lowering lifecycle costs. This will be accomplished through adaptive operation, coordinated maintenance and condition assessment, and planned capital investment. Staff will balance maintenance, refurbishment, and replacement strategies to maximize useful life, system availability and efficiency.*

### ASSET MANAGEMENT INITIATIVES

- *Create an annual Asset Management Plan documenting the condition of the collection system and treatment plants, and upcoming maintenance or capital projects.*
- *Coordinate the efforts of operations, collections, mechanical maintenance, electrical maintenance, instrument maintenance and engineering through process teams to assure the Sanitation District's resources are focused on the high priority work functions.*
- *Maintain a 20-year forecast of all CIP projects needed to maintain or upgrade the Sanitation District's nearly \$11 billion in assets on a prioritized risk basis to establish rate structures.*

Continual improvement in asset management practices is important. We are actively working to improve our implementation of the key objectives and our asset management capabilities, processes and systems through improved coordination in needs identification, solutions development, and project execution.

This Asset Management Plan provides a summary of the condition of the collection system and treatment plants in **CHAPTER 5** along with the upcoming maintenance and capital projects.

**CHAPTER 4** describes our approach to coordinating and focusing our efforts on high priority work functions.

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## CHAPTER 4 ASSET MANAGEMENT ORGANIZATION

Asset management is not new to OCSD. Every part of our organization is involved in some aspect of ensuring assets are designed, constructed, operated, and maintained to reliably deliver service to our customers.



**Figure 4.1. Roles in Asset Management**

- **Operations** operates assets to convey, treat and recover resources.
- **Maintenance** performs activities to maintain asset reliability.
- **Engineering Planning** provides engineering support for short- to long-term management of assets.
- **Project Management** manages design and construction of new facilities and the rehabilitation of older facilities.
- **Engineering Design** ensures projects and assets are designed to meet stakeholder needs.
- **Construction Management** ensures assets are constructed in accordance with contract requirements.

To fulfill our commitment to our ratepayers for providing safe and reliable services, OCSD has augmented and solidified our asset management program and restructured the organization to better align the Engineering and Operations and Maintenance (O&M) departments. Through this restructuring, OCSD has established an Asset Management Group within the Planning Division consisting of nine Asset Engineers responsible for understanding the key issues or concerns related to the condition of OCSD's assets and for developing and coordinating plans to ensure these assets operate reliably. The Asset Engineers work closely with O&M Area Team

members to maintain familiarity with operational, condition, and maintenance issues within their assigned areas.

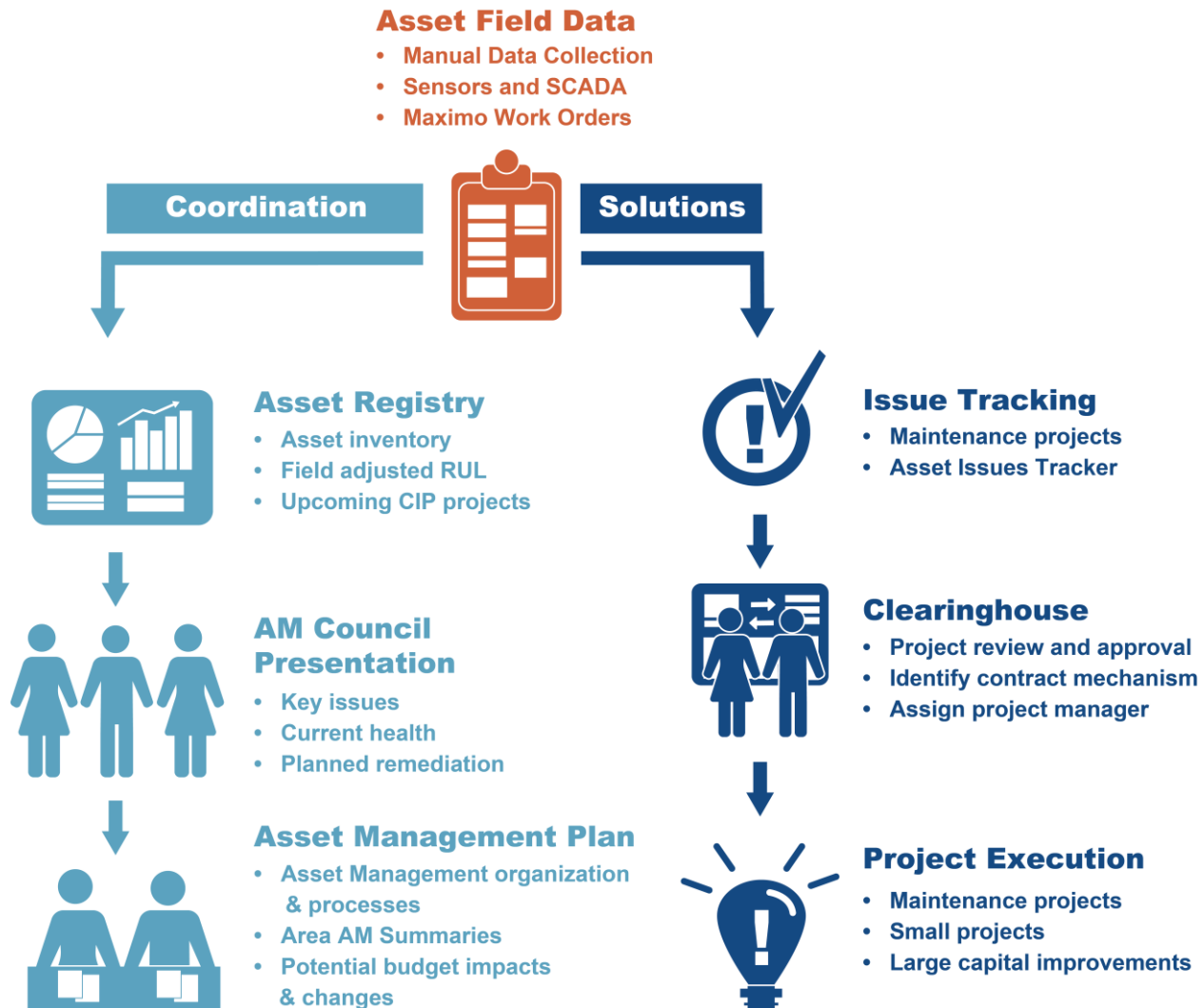
## 4.1 Asset Management Coordination and Solutions Development

The Area Teams are the starting point for leveraging field data to define issues requiring remediation. Area Teams are made up of plant operators, mechanics, electricians, instrument technicians and Asset Engineers. **Figure 4.2** shows how field data is used to support coordination and solutions development for reporting issues to management and gaining project approval.

- **Coordination:** Asset Engineers coordinate with O&M staff to understand asset conditions and needs based on staff knowledge, condition assessments (e.g., closed-circuit television [CCTV], corrosion assessments) and predictive maintenance data (e.g., vibration, infrared, oil quality). Asset Engineers update the area asset registries with estimated remaining useful life and relevant notes. Asset Engineers compile key issues and coordinate potential remediation activities, which are then presented to the Asset Management Council, consists of managers from all divisions within OCSD, during monthly presentations.
- **Solutions:** Asset Engineers support solutions development and tracking. OCSD has developed SharePoint sites to track asset issues (i.e., Asset Issues Tracker) and to track solutions to asset issues executed by other divisions. Asset Engineers also define and prepare the potential work packages for the Clearinghouse review and approval. The Clearinghouse consists of managers from all OCSD divisions who come to a common understanding of issues facing OCSD and prioritize resources necessary to address those issues. After the project is approved by the Clearinghouse, it is turned over to a project team for execution.

There are two sources of funding that may be used for projects approved by the Clearinghouse: Operating Budget and Capital Improvement Program.

- The two-year Operating Budget is adopted biennially with an annual update. This budget includes funding for all programmed maintenance work and repairs to the facilities and infrastructure.
- The Capital Improvement Program sets aside funds for projects that are planned to rehabilitate, replace, or extend the useful life of the facilities and infrastructure.



**Figure 4.2. Coordination and Solutions Development Processes**

The following subsections describe the groups involved in the coordination and solutions development process of asset management.

### 4.1.1 Operations and Maintenance

#### Area Teams

The O&M Department has created Area Teams assigned to various process areas within the two wastewater treatment plants with the vision of being a top-notch, high-performing team that increases process efficiency and asset availability.

The Area Teams consist of staff from operations and maintenance covering mechanical, instrumentation and electrical disciplines. Each Area Team is assigned an Area Champion (typically a supervisor) who assists the team through challenges, and aids in team collaboration and oversight. The Area Team is also assigned representatives from maintenance planning and an Asset Engineer from the Planning Asset Management Group (see **Subsection 4.1.2**).

The teams help streamline efforts and align resources within the current organizational structure to integrate the skills, knowledge and insights from all levels of operations, maintenance and engineering. O&M Area Team members provide the Asset Engineer with a direct line of



communication to field staff operating within the process areas and serve as a central resource for information sharing and collaboration for solution development.

#### 4.1.2 Engineering Planning

OCSD's Planning Division provides a comprehensive Capital Improvement Program (CIP) that considers projected capacity requirements, condition of current assets, projected regulatory, level of service changes and business opportunities.

##### Capital Improvement Program Planning

The Planning Division's CIP Planning Group develops and maintains the 20-year CIP plan consisting of capital improvement projects that maintain reliability, accommodate future growth, as well as meet future regulatory requirements, level of service goals, and strategic initiatives.

In 2017, the OCSD Board of Directors adopted the Facilities Master Plan which provides a 20-year roadmap setting forth OCSD's long term Capital Improvement Program. This roadmap provides a framework for infrastructure improvements needed at our treatment plant facilities, 15 pump stations, and 389 miles of regional sewers. In the 2017 Facilities Master Plan, most of the projects identified are the result of the need to rehabilitate and replace aging infrastructure in the collection system and treatment plants.

##### Asset Management

The Asset Management Group within the Planning Division consists of nine Asset Engineers who are responsible for OCSD's short- to long-term asset management goals. The primary responsibility of this group is to monitor the condition of assets, develop short to long-term planning for asset maintenance, rehabilitation and replacement, and identification, packaging and prioritization of maintenance and CIP projects.

Asset Engineers are assigned to one or more defined process or collection system areas. They work closely with O&M to maintain familiarity with operational, condition, and maintenance issues within their assigned areas. They also serve as "ambassadors" for each of their assigned areas to ensure that high priority issues are addressed in a timely fashion, and as the first point-of-contact for asset issues to drive root cause analysis and condition assessment. The Asset Management group plans and conducts condition assessments of critical assets utilizing corrosion consulting engineers, and CCTV contracts (**Figure 4.3**).



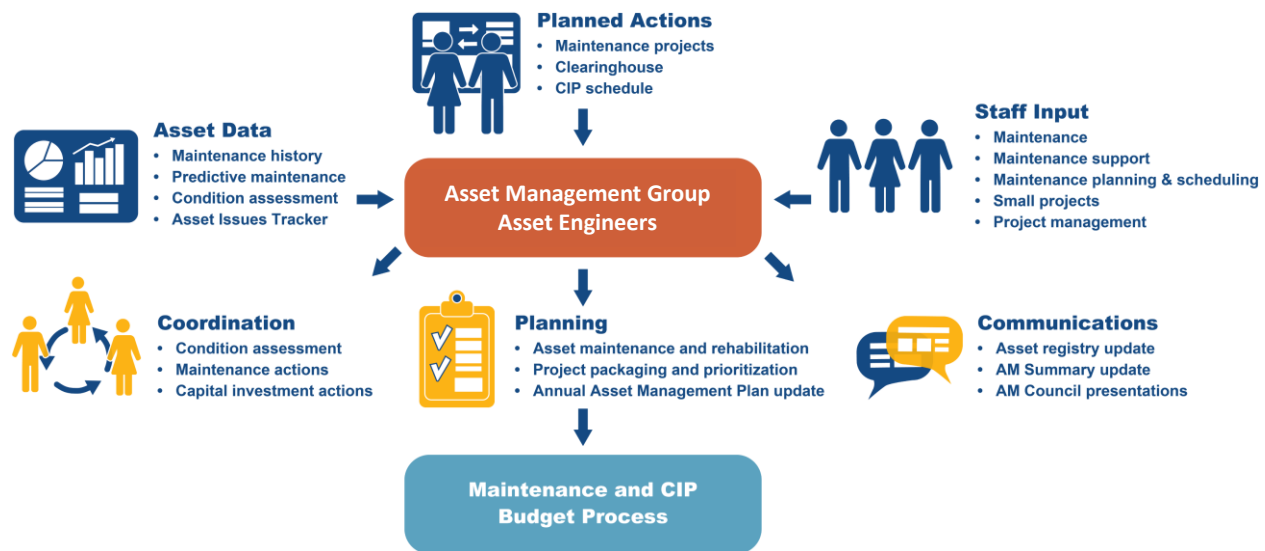
**Figure 4.3. CCTV Inspection**

Asset Engineers also engage with maintenance and capital improvement project delivery teams to monitor the scope of work and timing of planned projects, to verify that the projects will address the identified issues in a timely manner. One of their key responsibilities is to define the scope, appropriate timing and budget requirements of future maintenance and CIP projects, which are the basis for future project, operations, and maintenance budget development. Moving forward, the Asset Engineers will have the primary responsibility for submitting CIP projects for Clearinghouse approval.

Knowing the history, background information and the future plans for each specific area, the Asset Engineers are in a unique

position to coordinate asset maintenance and rehabilitation activities among various OCSD divisions. These coordination efforts support the goal of OCSD's Asset Management Program, which is to lower lifecycle costs of infrastructure, at an acceptable level of risk, while continuously delivering OCSD's established levels of service.

**Figure 4.4** illustrates the role Asset Engineers have in gathering information and understanding needs to support coordination, planning and communication of changes to the plans.



**Figure 4.4. Asset Engineer Role within Asset Management**

## 4.2 Maintenance and CIP Project Execution

### 4.2.1 Project Management Office

OCSD's Project Management Office Division manages the design and construction of new facilities plus the rehabilitation of existing facilities to ensure the safe, cost effective transport, and treatment of influent/effluent. This division is responsible for the delivery of projects from the preliminary design stages through closeout of construction. The division provides standards, processes, and methodologies to improve project quality, cost, and timeliness.

#### Small Project Delivery

The Small Projects Delivery team is a support arm of the Operations, Maintenance, and Engineering divisions and is responsible for the design and construction of facilities and maintenance projects. The purpose of this team is to deliver short term projects to effectively manage life of existing assets and in doing so deferring construction of capital projects in the longer term.

Project Engineers in the Small Projects Delivery team completes the scope of work, performs project design (in-house or by consultant), bids the project in collaboration with Contracts or Purchasing, and manages construction, implementation, commissioning, change management, and closeout.

## Project Management

The Project Management Group consists of engineers functioning as Project Managers for a range of CIP projects including design/construction projects, planning studies, CEQA studies, and research studies.

## Project Delivery Support

The Project Delivery Support group supports the CIP and small projects with reporting and monitoring tools for budgets, costs, schedules, cost estimates, amendments, change orders, and resource and cash forecasting for all projects.

### 4.2.2 Design

The Design division ensures that all projects are designed and constructed to be reliable, maintainable, and operable at optimum lifecycle costs in accordance with OCSD's Engineering Standards and codes. The division also ensures that the electrical and control systems on projects are properly and safely constructed, commissioned, and executed in accordance with the contract documents with minimal impact to operations, maintenance, local agencies, and the public. The division provides process control SCADA system hardware, software and data network support for collections and treatment plant processes that are highly reliable, safe, secure, online, and available to monitor, record, control, and operate our facilities. This division's role is also to provide commissioning support services during construction.

The division includes the following groups:

- Civil, Mechanical, and Process
- Electrical and I&C
- Process Controls Integration
- Commissioning

### 4.2.3 Construction Management

The Construction Management Division ensures timely and quality construction and commissioning execution. This division's role is to provide construction management and inspection services for OCSD projects to ensure they are safely constructed and inspected in accordance with contract requirements and regulatory and legal codes while minimizing impacts to operations, maintenance, local agencies and the public.

The division includes the following groups:

- Plant No. 1 and Pump Stations
- Plant No. 2 and Collections
- Civil Inspection – Plant No. 1 and Pump Stations
- Civil Inspection – Plant No. 2 and Collections
- Electrical and I&C Inspection

## 4.3 Asset Maintenance

The Maintenance division provides reliable maintenance to OCSD's assets. Maintenance-related asset management involves implementing strategies that ensure OCSD's assets will operate at a required level of service and the lowest lifecycle cost with an acceptable level of risk.

### 4.3.1 Maintenance

#### Maintenance Reliability Group

OCSD has developed a mature predictive maintenance (PdM) program, which is a core strategy for maximizing asset reliability for major rotating mechanical and electrical equipment. The premise of PdM is that regular monitoring of the actual mechanical condition of machine trains will lead to optimal intervals between repairs, minimize the number and cost of unscheduled repairs created by machine-train failures, and improve the overall equipment reliability.

The Reliability Technicians use various techniques such as:

- Vibration analysis to measure imbalance in rotating equipment.
- Thermography to measure excessive heat.
- Oil and wear debris analysis to predict failure of lubricants.
- Ultrasound inspection of electrical power distribution equipment for detecting potential for arc flash incidents and mechanical rotating and stationary equipment.

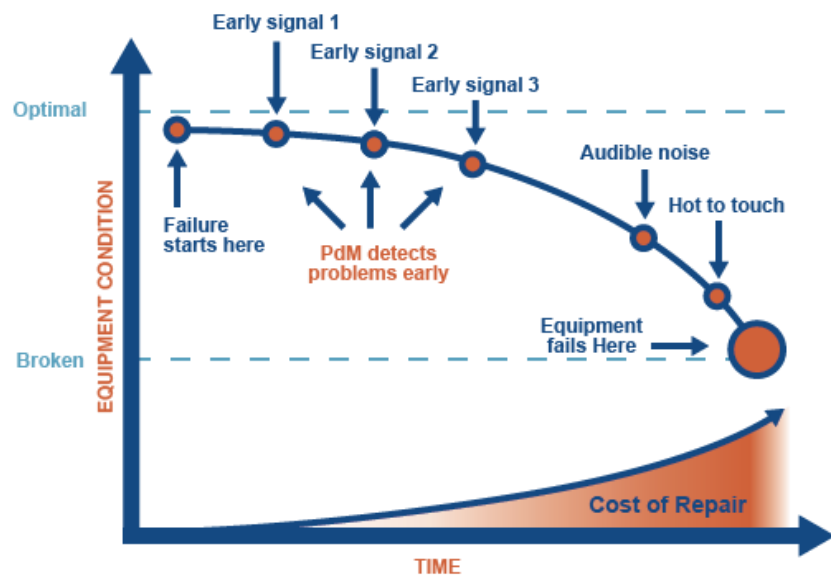


Figure 4.5. PdM Summary

OCSD has a two-decade history of predictive maintenance as summarized in **Table 4.1**.

**Table 4.1. High-level Summary of OCSD's PdM Program**

Year	Activity
2002	Baseline vibration monitoring with consultant assistance
2006	Comprehensive vibration analysis program implementation at both treatment plants and 15 pump stations
2012	Comprehensive predictive maintenance program implementation and establishment of Reliability Maintenance Team that includes engineers and four Reliability Maintenance Technicians
2014	Predictive maintenance program assessment conducted by Allied Reliability Inc.
2018	Machinery lubrication program assessment conducted by Noria Corporation Inc.; Added ultrasound and thermography to test electrical equipment

OCSD's predictive maintenance and monitoring program is organized around the mechanical, electrical and civil disciplines.

### Mechanical Discipline

The mechanical discipline has the most mature PdM Program and involves variance trending of the PdM test results, which include:

- Vibration analysis
- Oil analysis
- Ultrasonic
- Infrared thermography
- IRIS motion camera (measures deflection and displacement)



**Figure 4.6. Vibration Analysis Equipment**

In addition to PdM activities for mechanical equipment, OCSD also uses laser alignment techniques to enhance alignment rotating machinery accuracy to increase operating life span.

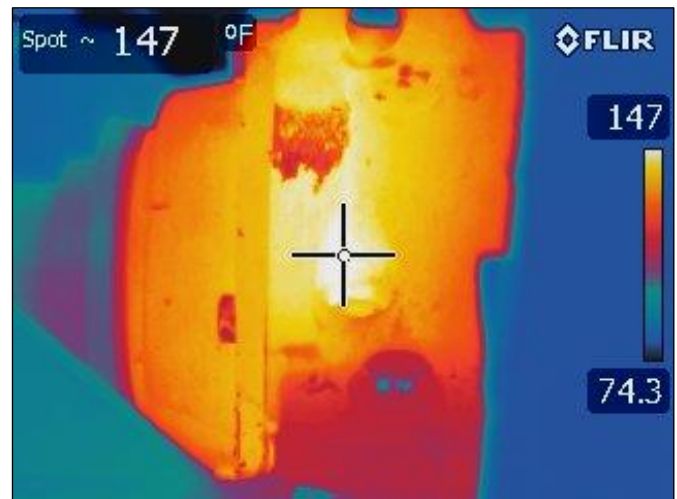
### Electrical Discipline

The electrical PdM Program continues to evolve and currently includes the following tests:

- Oil analysis for transformers
- Ultrasound to detect arcing
- Infrared thermography to detect hot spots
- Electrical power distribution equipment preventive maintenance
- Circuit breakers and protective relays preventive maintenance and testing

Future tests expected to be added include:

- Motor/generator circuit analysis
- Medium voltage feeder cable testing to determine the health of cables and insulation



**Figure 4.7. Infrared Thermography**

### Civil Discipline

Civil maintenance covers proactive and corrective maintenance tasks for all OCSD civil assets at all facilities located at Plants No. 1 and No. 2, as well as all OCSD pump stations and collection system. Civil maintenance activities complement the existing maintenance programs for mechanical, electrical and instrumentation. Civil maintenance includes the following activities:

- Valve and gate exercising program comprising more than 264 preventive maintenance tasks for over 1,650 valves and gates in both plants and collection system.
- Equipment rotation program to ensure equipment wear is predictable.
- Operating, maintaining and cleaning pump stations and associated facilities.
- Chemical conditioning of the sewage to reduce corrosion and control odors.



In addition to these activities, OCSD also implements life extension measures to increase the useful life of expensive equipment through minor repairs, and corrosion control methods such as coatings and cathodic protection.

### **Routine Maintenance**

Beyond the advanced predictive maintenance strategies used to cost-effectively extend equipment life, OCSD also performs routine time and cycle-based preventive maintenance (PM) activities including:

- Adjustments and mechanical alignments
- Electrical equipment cleaning and tightening
- Sensors and meters calibration
- Changing of lubricants and filters
- Exercising equipment
- Equipment rebuilding and regular testing

### **Preventative Optimization**

OCSD created a new Preventative Maintenance Optimization Group that will be tasked with conducting an in-depth assessment to optimize planned maintenance strategies for new and existing assets and to establish maintenance approaches and strategies for assets installed by capital improvement projects prior to beneficial occupancy. The PM Optimization Program will track, maintain, and manage assets throughout their lifecycles from design, construction, commissioning, beneficial occupancy, operations and maintenance, to the eventual decommissioning or replacement of assets.

This will ensure that asset lifecycle is maximized with the lowest risk to process failure by achieving the intended reliability, at the lowest possible cost, and maximizing equipment availability.

### **Maintenance Planners**

Maintenance Planners are responsible for managing blanket maintenance service contracts, planning and scheduling of craft-based maintenance activities, optimizing preventive maintenance activities within Maximo, and coordination of complex maintenance activities involving shutdowns and outages.

Maintenance Planners help drive reliability and effectiveness in the craft-based maintenance work groups they support by ensuring that work groups have sufficient ready-to-execute work with appropriate resources such as tools, materials, labor, and job plans.

Maintenance Planners are the owners of preventive maintenance and job plans. They are responsible for maintaining preventive maintenance and job plan database within Maximo. They continuously improved preventive maintenance by fine tuning job plans based upon input received from field staff, leads, maintenance Supervisors and Engineers.

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## CHAPTER 5 STATE OF OCSD'S INFRASTRUCTURE

The Area AM Summaries are intended to summarize the condition of major assets, identify key issues for further investigation, and summarize maintenance and CIP projects planned over the next ten years. The approach for developing the AM Summaries is to assemble a list of major assets, document key issues, define the average remaining useful lives of these assets, and identify OCSD's plan to address performance and reliability issues of these assets over the one-, five-, and ten-year planning horizons.

Every AM Summary is presented to the AM Council once annually. Each month, an Asset Engineer presents one or more of the AM Summaries to the AM Council. The Area AM Summaries are updated as needed and incorporated into the AMP which is published annually.

Asset Engineers maintain a detailed asset registry which is a primary data source for the Area AM Summaries. The asset registries generally include the fields shown in **Table 5.1**.

**Table 5.1. Asset Registry Fields**

Field	Description/Example
Asset Location	Plant No. 1, Plant No. 2, or Collections
Discipline	Examples: Civil, structural, mechanical, electrical and instrumentation
Category	Examples: Process, non-process
Asset Class Name	Examples: Pump, valve
Asset Description	Example: Primary Clarifier 3
Loop Tag	Location-based asset unique identifier
Asset ID	Asset unique identifier
Year Built	The year the asset was commissioned
Original Project	Code identifying under which project the asset was installed
Useful Life (SP-151)	Useful life estimates developed by project SP-151
Theoretical Remaining Useful Life	Calculated remaining life based on installation date and Useful Life (SP-151)
Field Adjusted RUL Score	Remaining useful life adjusted based on field condition
Upcoming CIP Project No.	Associated CIP project that will impact asset
Notes	Text field including notes from Facility Master Plan or other field observations



## 5.1 System Summaries

The following system-level summaries provide a high-level overview of the Area Asset Management Summaries contained in **Section 5.2**. The system-level summaries are organized by:

- Plant No. 1
- Plant No. 2
- Collection System – Pump Stations
- Collection System – Pipelines

The system-level summaries include an area map showing the general layout of the process areas or collection system, and a table with the following fields:

- **Area No.**
- **Area Name**
- **Average RUL Score:** Estimated average for each discipline (civil, structural, mechanical, electrical, and instrumentation) and area based on the detailed Area AM Summaries.
- **Average Remaining Useful Life (RUL) Score:** Estimated average RUL score for each discipline (civil, structural, mechanical, electrical, and instrumentation) or area based on an average of the RUL scores provided by Asset Engineers in the detailed Area AM Summaries.
- **Percentage of RUL Scores with 4s or 5s<sup>[1]</sup>:** Percentage based on total number of RUL scores assigned to each area by Asset Engineers in the detailed Area AM Summaries. The percentage is an alternate metric for the overall condition of the area. A RUL score of 5 indicates less than 5 years of useful life remains for an asset or set of assets. A RUL score of 4 indicates 5 to 10 years of useful life remains for an asset or a set of assets.
- **Replacement Value (\$million):** Process area replacement value from the facility valuation.

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<sup>[1]</sup>RUL 5: <5 Years, RUL 4: 5 to 10 Years

ASSET MANAGEMENT SYSTEM SUMMARY – PLANT NO. 1 OVERVIEW

Process Area Map



Remaining Useful Life and Replacement Value Summary

Area No.	Area Name	Average Remaining Useful Life Score						Percentage of RUL Scores with 4s or 5s	Number of Projects to Address 4s & 5s	Replacement Value (\$millions, in 2017 Dollars)
		Civil	Structural	Mechanical	Electrical	Instrumentation	All Assets			
10	Preliminary Treatment	1	2	4	4	4	4	56%	4	\$351.2
11	Primary Treatment	3	2	4	3	3	3	31%	8	\$451.6
12	Secondary Treatment - Activated Sludge	3	2	3	3	4	3	32%	11	\$887.3
12	Secondary Treatment - Trickling Filter	1	1	3	4	3	2	10%	6	\$61.6
14	Interplant	2	2	3	2	1	2	17%	4	\$683.1
15	Solids Handling - Digesters	2	1	2	2	2	2	3%	7	\$231.2
15	Solids Handling - Facilities	2	1	2	2	2	2	9%	6	\$206.5
16	Central Generation <sup>a</sup>		3	4	4	4	4	53%	12	\$154.8
17	Utilities	3	2	3	2	1	2	8%	11	\$176.2
18	Electrical Distribution <sup>a</sup>				3		3	48%	10	\$74.1
19	Miscellaneous Structures & Grounds	To Be Determined					TBD	TBD	TBD	\$220.0
Plant No. 1 Total								31%	79	\$3,497.7

**RUL Legend:**

RUL <5 years

RUL 5-10 years

RUL 11-15 years

RUL 16-20 years

RUL >20 years

**Acronym Key:**  
OCSD = Orange County Sanitation District; OCWD = Orange County Water District; RUL = Remaining Useful Life; TBD = To Be Determined

<sup>a</sup> Gray box with diagonal line indicates there are no assets assigned to this discipline within this process area.



ASSET MANAGEMENT SYSTEM SUMMARY – PLANT NO. 2 OVERVIEW

Process Area Map



Remaining Useful Life and Replacement Value Summary

Area No.	Area Name	Average Remaining Useful Life Score						Percentage of RUL Scores with 4s or 5s	Number of Projects to Address 4s & 5s	Replacement Value (\$millions, in 2017 Dollars)
		Civil	Structural	Mechanical	Electrical	Instrumentation	All Assets			
20	Preliminary Treatment	3	1	2	2	2	2	2%	11	\$324.6
21	Primary Treatment	3	2	3	3	3	3	9%	7	\$454.3
22	Secondary Treatment - Activated Sludge	3	2	3	3	3	3	17%	8	\$608.5
22	Secondary Treatment - Trickling Filter	3	2	3	3	3	2	1%	7	\$310.8
24	Effluent Disposal	2	1	2	3	3	2	12%	10	\$817.1
25	Solids Handling - Digesters	3	3	3	4	4	3	45%	12	\$322.7
25	Solids Handling - Facilities	2	2	2	2	2	2	16%	7	\$201.5
26	Central Generation <sup>a</sup>		3	4	4	4	4	71%	13	\$330.2
27	Utilities	2	3	3	2	1	2	5%	9	\$98.3
28	Electrical Distribution <sup>a</sup>				3		3	57%	11	\$72.7
29	Miscellaneous Buildings & Grounds	To Be Determined					TBD	TBD	TBD	\$132.7
Plant No. 2 Total								29%	95	\$3,673.4

**RUL Legend:**

RUL <5 years
  RUL 5-10 years
  RUL 11-15 years
  RUL 16-20 years
  RUL >20 years

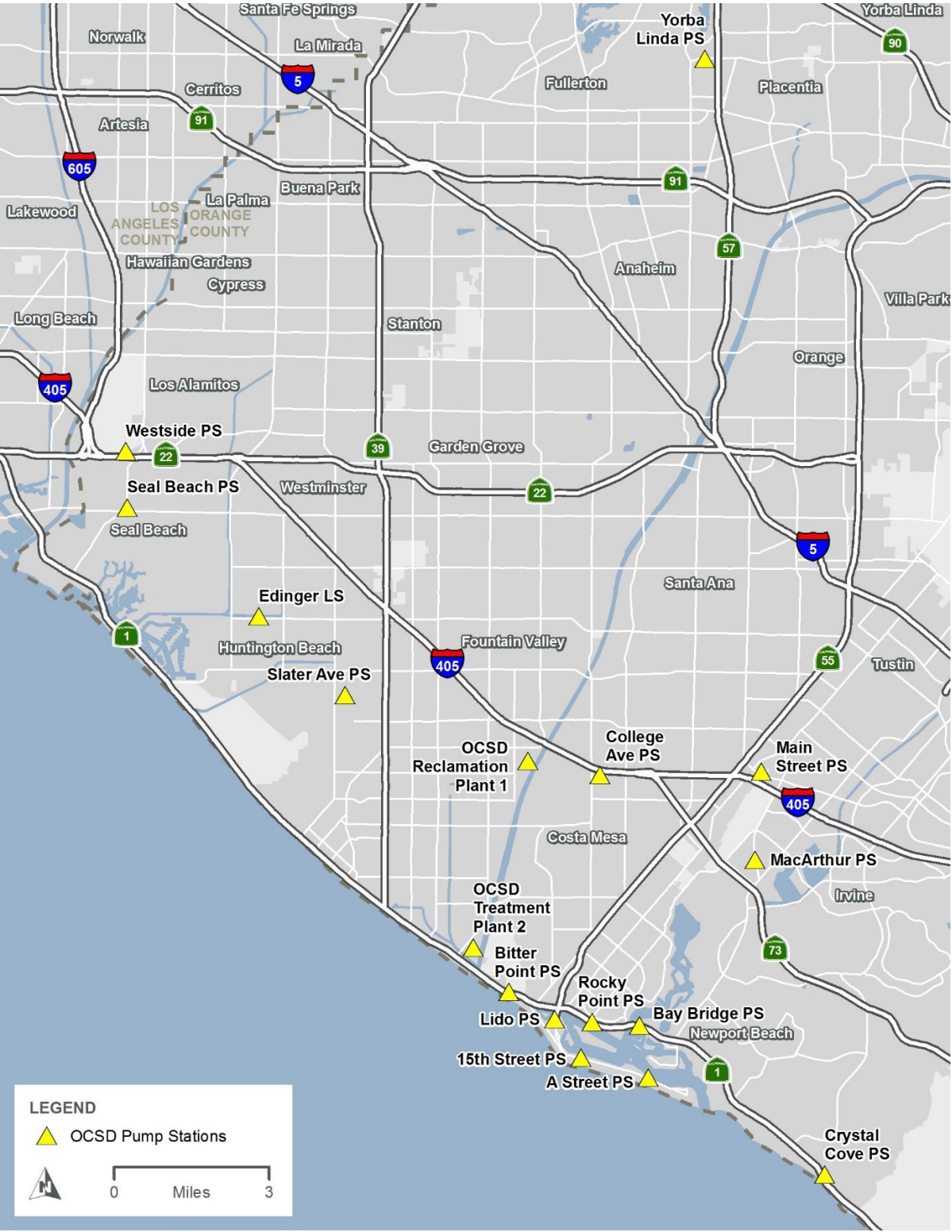
**Acronym Key:**  
 OCSD = Orange County Sanitation District; RUL = Remaining Useful Life; TBD = To Be Determined

<sup>a</sup> Gray box with diagonal line indicates there are no assets assigned to this discipline within this process area.



ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM PUMP STATION OVERVIEW

Collection System Pump Stations Location Map



Remaining Useful Life and Replacement Value Summary

Pump Station	Average Remaining Useful Life Score						Percentage of RUL Scores with 4s or 5s	Number of Projects to Address 4s & 5s	Replacement Value (\$millions, in 2017 Dollars)
	Civil	Structural	Mechanical	Electrical	Instrumentation	All Assets			
15th Street	3	4	3	2	3	3	17%	2	\$13.5
A Street	3	4	3	3	2	3	17%	1	\$11.7
Bay Bridge	4	4	4	4	4	4	85%	3	\$34.0
Bitter Point	2	3	2	1	2	2	15%	1	\$32.2
College Avenue	3	2	3	2	1	2	8%	2	\$24.0
Crystal Cove	3	3	4	3	2	3	17%	2	\$2.5
Edinger	4	3	3	3	3	3	27%	4	\$12.9
Lido	1	4	4	3	3	3	42%	5	\$20.1
MacArthur	4	3	4	3	1	3	36%	3	\$16.3
Main Street	4	3	4	2	2	3	38%	3	\$44.0
Rocky Point	1	3	3	2	2	2	15%	2	\$16.0
Seal Beach	3	4	5	5	3	4	75%	3	\$41.5
Slater	4	4	4	3	2	3	38%	4	\$35.2
Westside	3	3	3	2	3	3	0%	1	\$30.6
Yorba Linda	3	4	4	3	2	3	27%	1	Not Valued
Totals							31%	37+13 <sup>a</sup>	\$334.6

**RUL Legend:**

RUL <5 years

RUL 5-10 years

RUL 11-15 years

RUL 16-20 years

RUL >20 years

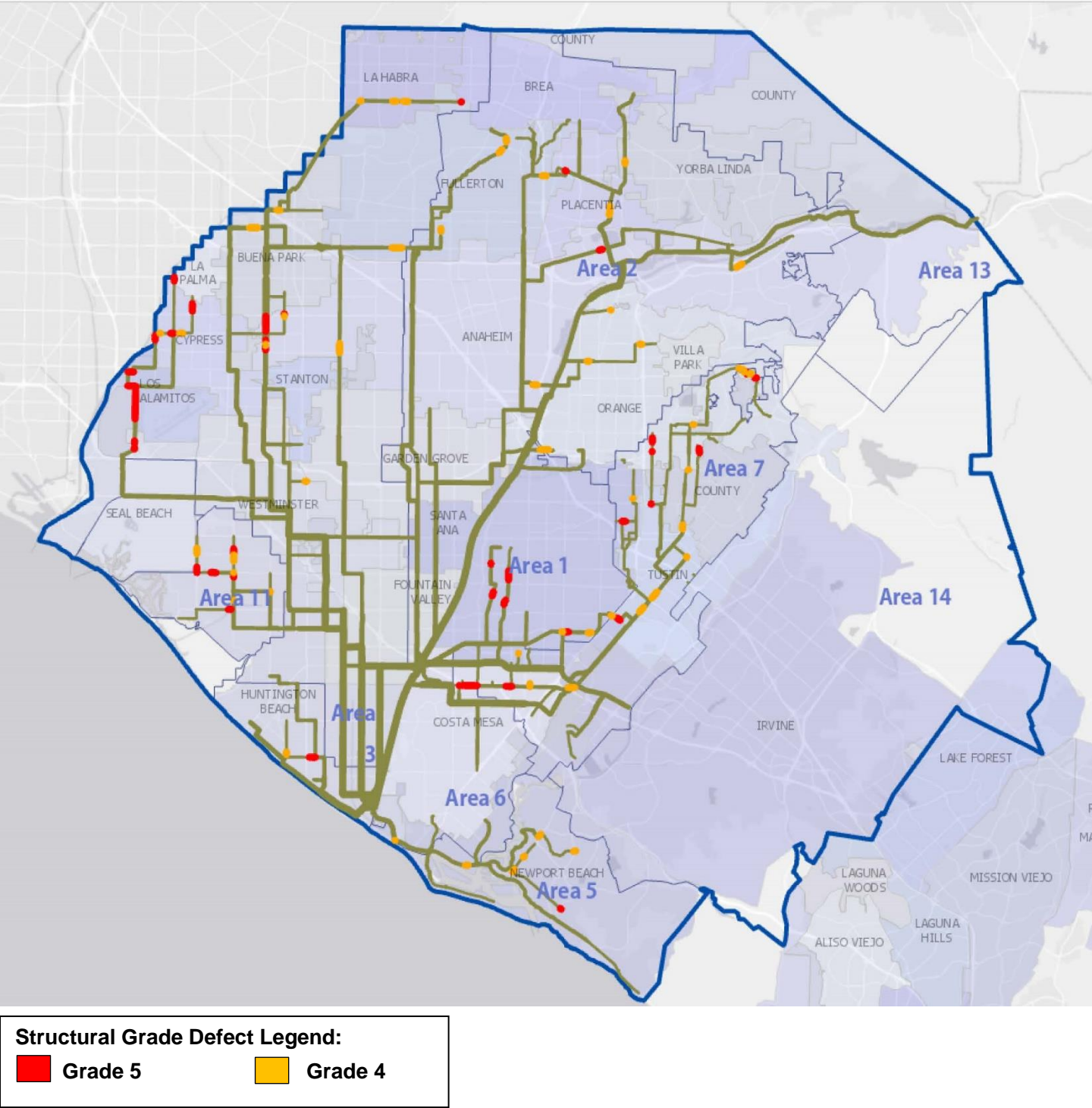
**Acronym Key:**

LS = Lift Station; OCSD = Orange County Sanitation District; PS = Pump Station; RUL = Remaining Useful Life

<sup>a</sup> 37 projects affect only one pump station. An additional 13 projects affect multiple pump stations.

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM PIPELINES OVERVIEW

Collection System Pipelines – Service Area Map



Pipeline Condition and Replacement Value Summary

Trunk	No. of Structural Grade 4 or 5 Defects <sup>a</sup>	No. of Pipes with Structural Grade 4 or 5 Defects <sup>a</sup>	Total Number of Pipes	Percent of Pipe Segments with Isolated Grade 4 or Grade 5 Defects	Replacement Value (\$millions, in 2017 Dollars) <sup>b</sup>
Baker-Main	10	9	637	1.4%	\$275.5
Bushard	3	3	194	1.5%	\$241.6
Coast Hwy	3	2	145	1.4%	\$98.5
Euclid	3	3	428	0.7%	\$269.9
Interplant	0	0	165	0.0%	\$115.3
Knott	33	24	821	2.9%	\$625.0
Miller-Holder	2	2	266	0.8%	\$296.1
Newhope-Placentia	5	3	345	0.9%	\$209.0
Newport	6	5	510	1.0%	\$216.3
SARI	9	6	580	1.0%	\$516.1
Sunflower	30	26	494	5.3%	\$299.9
Talbert	3	3	112	2.7%	\$57.6
Total	107	86	4,697	1.8%	\$3,220.8

<sup>a</sup> Grade 4 and 5 defects include both isolated (i.e., pipes that can be fixed by point repair) and non-isolated (i.e., pipes that needs rehabilitation or replacement) type pipe.  
<sup>b</sup> The abandoned pipelines at the Airbase (\$6,366,516) and the Harvard Area Trunk Sewer (\$191,784) areas are not included in the total.

Trunk	Miles of Pipe with Grade 4 Defects <sup>a</sup>	Miles of Pipe with Grade 5 Defects <sup>a</sup>	Total Miles with Grade 4 or Grade 5 Defects	Total Miles	Percent of Length with Non-Isolated 4s or 5s
Baker-Main	0.18	0.12	0.3	42.6	0.7%
Bushard	-	-	-	21.4	-
Coast Hwy	-	-	-	11.4	-
Euclid	-	-	-	34.4	-
Interplant	-	-	-	16.9	-
Knott	0.44	2.04	2.49	73.2	3.4%
Miller-Holder	0.23	-	0.23	31.5	0.7%
Newhope-Placentia	0.11	0.04	0.15	30.9	0.5%
Newport	0.1	-	0.1	31.5	0.3%
SARI	0.25	-	0.25	50.3	0.5%
Sunflower	0.39	0.23	0.62	34.8	1.8%
Talbert	-	-	-	8.4	-
Total	1.7	2.43	4.13	387.4	1.1%

<sup>a</sup> The miles of pipe with grade 4 or 5 defects are indicated only for non-isolated pipes.

## 5.2 Area Asset Management Summaries

The following AM Summaries document the current state of process areas in both plants and the collection system. The remainder of this section contains the AM Summaries organized as follows:

### Plant No. 1 Asset Management Summaries

- Preliminary Treatment
- Primary Treatment
- Secondary Treatment – Activated Sludge
- Secondary Treatment – Trickling Filters
- Interplant
- Solids Handling – Digesters
- Solids Handling – Facilities
- Central Power Generation
- Utilities
- Electrical Distribution

### Plant No. 2 Asset Management Summaries

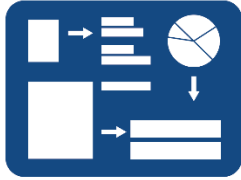
- Preliminary Treatment
- Primary Treatment
- Secondary Treatment – Activated Sludge
- Secondary Treatment – Trickling Filters
- Effluent Disposal
- Solids Handling – Digesters
- Solids Handling – Facilities
- Central Power Generation
- Utilities
- Electrical Distribution

### Collection System Asset Management Summaries

- Pump Stations
- Pipelines

The AM Summaries are built around a common structure. This structure provides a framework for continued use and development of the summaries. Key structure elements for AM Summaries are shown in **Figure 5.1** below.





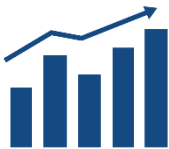
### Process Schematic

Provides high-level process schematic to communicate area function and interrelation of key assets



### Count of Major Assets

Provides a count of major assets within area



### Major Assets Remaining Useful Life

Provides high-level condition summary of area systems and asset types



### Key Issues, Actions & Recommendations

Identifies key issues and planned or recommended actions to remedy issues



### Current & Future Projects Over Next Ten Years

Identifies timing of current and planned projects impacting major assets within area

**Figure 5.1. Area Asset Management Summary Structure**

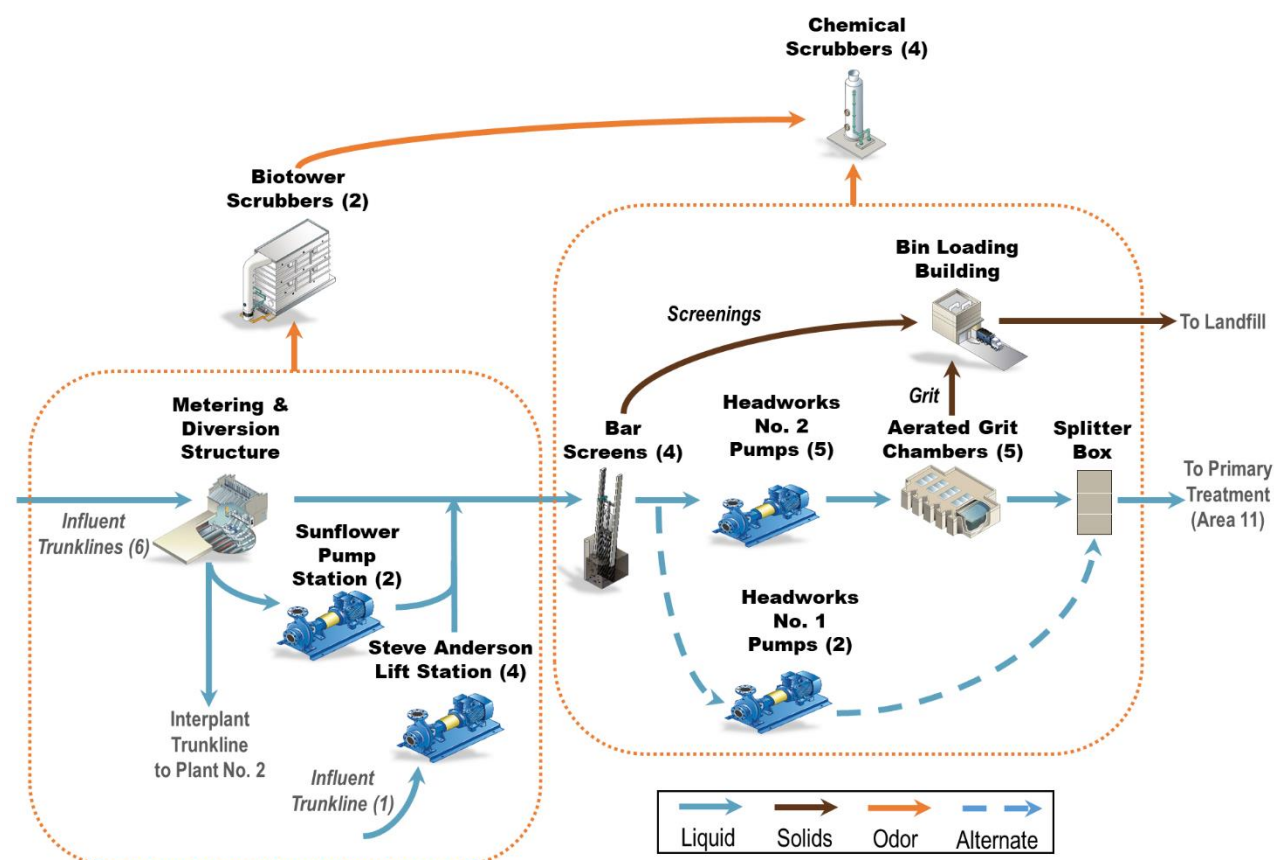
### **5.2.1 Plant No. 1 Asset Management Summaries**



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## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 10 – PLANT NO. 1 PRELIMINARY TREATMENT

## Process Schematic



## Major Assets Remaining Useful Life

Asset Type	Metering & Diversion	Sunflower Pump Station	Steve Anderson Lift Station	Barscreens	Main Sewage Pumps	Grit Chamber	Splitter Box	Bin Loading	Odor Control
<b>Civil</b>									
Effluent Piping	-	-	-	-	-	-	1	-	-
<b>Structural</b>									
General	2	2	1	2	2	2	2	3	3
<b>Mechanical</b>									
Piping	5	-	1	-	1	-	-	-	-
Gates/Valves	5	5	2	5	5	5	5	-	3
Gearboxes	-	2	-	1	-	-	-	4	-
Screens	-	-	-	4	-	-	-	-	-
Pumps	-	3	3	-	3	-	-	-	3
Conveyors	-	-	-	4	-	-	-	4	-
Fans/Blowers	4	3	1	4	4	4	-	4	5
<b>Electrical</b>									
Operators	5	-	-	-	-	-	5	-	-
Motors	-	3	3	1	5	-	-	5	-
Variable Frequency Drives	-	-	3	-	4	-	-	-	4
Motor Control Centers	5	5	2	5	5	5	-	5	5
<b>Instrumentation</b>									
General	4	4	3	4	4	-	4	-	5

## Asset RUL Legend:

<span style="background-color: red; width: 15px; height: 10px; display: inline-block;"></span>	RUL <5 years
<span style="background-color: orange; width: 15px; height: 10px; display: inline-block;"></span>	RUL 5-10 years
<span style="background-color: yellow; width: 15px; height: 10px; display: inline-block;"></span>	RUL 11-15 years
<span style="background-color: lightgreen; width: 15px; height: 10px; display: inline-block;"></span>	RUL 16-20 years
<span style="background-color: grey; width: 15px; height: 10px; display: inline-block;"></span>	RUL >20 years

## Major Assets

Major Assets	Quantities
<b>Metering &amp; Diversion</b>	
Flowmeters	7
Gates	26
<b>Sunflower Pump Station</b>	
Screw Pumps	2
Motors	2
Gearboxes	2
Lube Oil Systems	2
Gates	5

Major Assets	Quantities
<b>Steve Anderson Lift Station</b>	
Pump/Motor/VFD	4
Flowmeter	1
<b>Barscreens</b>	
5/8" Barscreens	2
1" Barscreens	2
Gates	22

Major Assets	Quantities
<b>Main Sewage Pumps</b>	
Pump/Motor/VFD	5
Headworks #1 Pumps	2
Gates	15
<b>Splitter Box</b>	
Gates	5
Weir Gates	15
Flowmeters	3

Major Assets	Quantities
<b>Grit Chambers</b>	
Grit Chambers	5
Gates	19
Stop Plates	10
Flap Gates	5
Blowers	3
<b>Bin Loading</b>	
Paddle Conveyors	2
Belt Conveyor	1

Major Assets	Quantities
<b>Odor Control</b>	
Bioscrubbers	2
Chemical Scrubbers	4

## Acronym Key:

RUL = Remaining Useful Life;  
VFD = Variable Frequency Drive

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 10 – PLANT NO. 1 PRELIMINARY TREATMENT

Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>P1-105 Construction</b> – This project will rehabilitate most assets throughout the preliminary treatment area, however the construction completion date is far in the future. Some assets have very little remaining life or have failed already and will need interim solutions before they are addressed by the project.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to actively monitor the condition of aging assets scheduled for repairs/replacement under P1-105 and develop temporary/minimal solutions as applicable until a permanent solution is provided by P1-105. In some instances, failed equipment may need to be replaced and removed from the P1-105 scope, but this approach should be minimized.</li> </ul>
<ul style="list-style-type: none"> <li><b>Steve Anderson Lift Station</b> – Steve Anderson Lift Station has experienced vibration issues and equipment failures over the past few years.</li> </ul>	<ul style="list-style-type: none"> <li>New pumps without vibration issues are being installed to replace the existing pumps. These replacements are planned to continue until all four pumps have been replaced. Vibration of the new pumps should continue to be monitored to confirm their performance.</li> </ul>
<ul style="list-style-type: none"> <li><b>Rags</b> – Rags have become an ongoing issue throughout the preliminary and primary process areas. The prevalence of rags is likely due to the rise in popularity of “flushable wipes”. Rags passing the barscreens have caused failures and increased wear on various mechanical equipment.</li> </ul>	<ul style="list-style-type: none"> <li>P1-105 will be replacing the existing 1-inch barscreens with 5/8-inch barscreens. This should reduce the number of rags passing the barscreens into the treatment process.</li> </ul>

Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
P1-105	Headworks Rehabilitation at Plant No. 1	Metering & Diversion, Sunflower Pump Station, Barscreens, Main Sewage Pumps, Grit Chambers, Splitter Box, Bin Loading, Odor Control	<ul style="list-style-type: none"> <li>Rehabilitate structures of impacted facilities.</li> <li>Replace mechanical/electrical/instrumentation as-needed throughout impacted facilities.</li> <li>Improve grit handling.</li> </ul>															
FE19-04	Sunflower Pump Station Repairs	Sunflower Pump Station	<ul style="list-style-type: none"> <li>Rehabilitate Sunflower Pump Station.</li> </ul>															
FE18-11	Headworks Explosive Gas Monitoring Systems at Plant No. 1 and No. 2	Metering & Diversion, Odor Control	<ul style="list-style-type: none"> <li>Install Lower Explosive Limit monitoring system to detect explosive gas.</li> </ul>															
X-044	Steve Anderson Lift Station Rehabilitation	Steve Anderson Lift Station	<ul style="list-style-type: none"> <li>Rehabilitate mechanical, electrical, and instrumentation.</li> </ul>															

**Types of Project Legend:**

CIP - Planning

CIP – Design

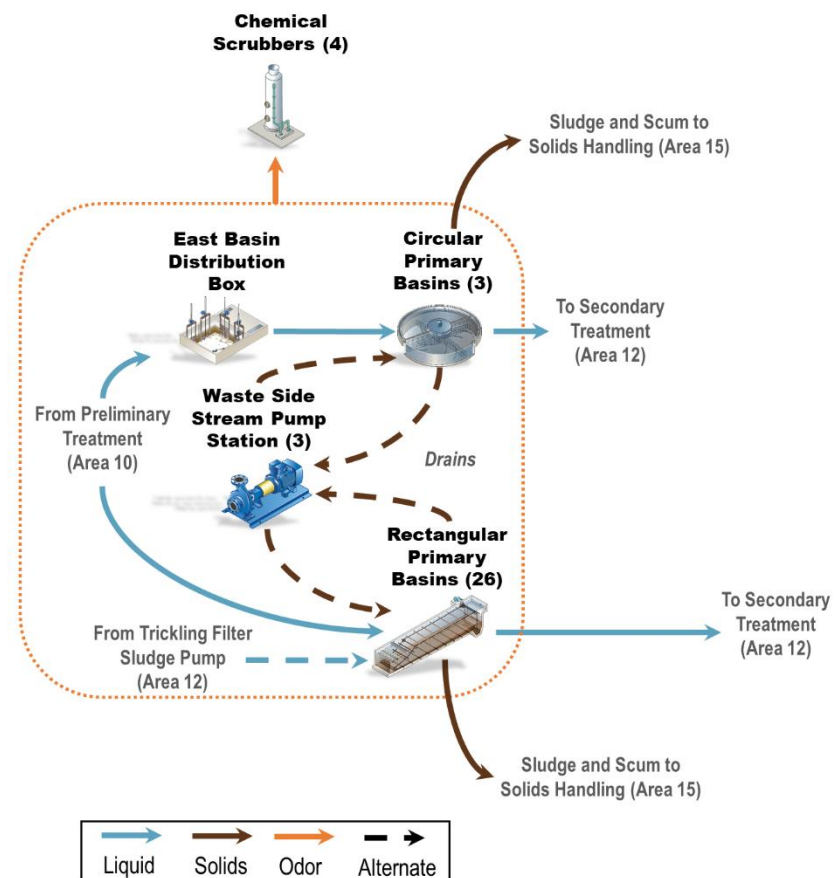
CIP - Construction

Maintenance Project

**Acronym Key:**  
CIP = Capital Improvements Program; FY = Fiscal Year

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 11 – PLANT NO. 1 PRIMARY TREATMENT

## Process Schematic



## Major Assets

Major Assets	Quantities
<b>Rectangular Primary Basins</b>	
Basins	26
Thickened Sludge Pumps	9
Dilute Sludge Pumps	4
Dilute Sludge Sumps	2
Scum Pumps	12
Scum Pits	6

Major Assets	Quantities
<b>Circular Primary Basins</b>	
Basins	3
Sludge Pumps	4
Scum Pumps	3
<b>Chemicals</b>	
Polymer Tanks	4
FeCl <sub>3</sub> Tanks	1
<b>Waste Sidestream Pump Station 1</b>	
Pumps	3

## Major Assets Remaining Useful Life

Asset Type	EBDB	PB 1	PB 2	PB 3	PB 4	PB 5	WSSPS	PISB	Centerfeed Channels	PB 6-15	PB 16-31	Odor Control
<b>Civil</b>												
Effluent Piping	4	2	2	5	5	5	3	-	-	1	1	-
<b>Structural</b>												
Structures	1	3	3	2	3	3	3	4	2	3	2	2
Cover	1	2	2	3	3	3	3	3	2	2	2	-
<b>Mechanical</b>												
Piping	-	-	-	-	-	-	3	-	-	-	-	-
Gates/Valves	3	5	5	5	5	5	3	3	3	3	3	2
Sludge/Scum Collection System	-	5	5	5	5	5	-	-	-	3	4	-
Sludge Pumping System	-	5	5	3	3	3	-	-	-	3	4	-
Scum Pumping System	-	5	5	3	3	3	-	-	-	4	4	-
<b>Electrical</b>												
General	3	5	5	3	3	3	3	2	-	2	2	3
<b>Instrumentation</b>												
General	3	5	5	3	3	3	3	3	-	3	3	3

## RUL Legend:

■ RUL <5 years  
 ■ RUL 5-10 years  
 ■ RUL 11-15 years  
 ■ RUL 16-20 years  
 ■ RUL >20 years

Major Assets	Quantities
<b>Primary Odor Scrubber Complex</b>	
Chemical Scrubbers	4
HCl Tanks	1
HCl Pumps	2
NaOH Tanks	1
NaOH Pumps	5
Bleach Tanks	1
Bleach Pumps	8

## Acronym Key:

EBDB: East Basin Distribution Box; FeCl<sub>3</sub>= Ferric chloride;  
 HCl= Hydrochloric acid; NaOH= Sodium hydroxide;  
 PB = Primary Basin; PISB: Primary Influent Splitter Box;  
 WSSPS: Waste Sidestream Pump Station

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 11 – PLANT NO. 1 PRIMARY TREATMENT

Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Rectangular Primary Basin</b> – The rectangular primary basins experience relatively frequent issues that require maintenance. These issues require ongoing attention from maintenance and can affect Plant No. 1 treatment capacity.</li> </ul>	<ul style="list-style-type: none"> <li>A number of projects are planned to address rectangular primary basin issues and reliability including MP-462, P1-133, and X-017. However, these projects cannot make the rectangular basins maintenance free. OCSD should expect to dedicate a significant amount of maintenance labor to these basins, especially during times when capacity is reduced by projects. Also, a planned Preventative Maintenance approach should be taken for continued maintenance on the mechanical parts within the basins after work is complete on MP-462.</li> </ul>
<ul style="list-style-type: none"> <li><b>Construction Sequencing</b> – There are many upcoming projects that will perform work on the Plant No. 1 primary treatment system. These projects are largely interdependent on one another and will temporarily impact the primary capacity at Plant No. 1.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to holistically assess the capacity/treatment consequences of the upcoming projects, especially if schedules change during design and construction. Perform a study to understand if phasing the replacement of the circular primary basins under P1-126 is feasible.</li> </ul>
<ul style="list-style-type: none"> <li><b>GWRS Final Expansion</b> – The final expansion of OCWD’s GWRS system is expected to be complete in 2023 and will produce 130 MGD of purified recycled water. This will require OCSD to provide more flow to OCWD.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD is executing a number of projects to prepare for the GWRS Final Expansion. The most directly applicable is P2-122 which will provide additional flow to OCWD from Plant No. 2 while also increasing OCSD’s flexibility to route flows between Plant No. 1 and Plant No. 2. The optimization of flow routing will be an ongoing consideration for OCSD operations and should be periodically re-evaluated as operating conditions change.</li> </ul>

Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
PRN-00563	P1-33/37 Scum Study	Primary Basins 6-31	<ul style="list-style-type: none"> <li>Perform a study to determine the best solution to the various scums system issues, such as issues for the scum pumping system.</li> </ul>															
MP-462	Primary Basin Sludge Collections System Rehabilitation at Plant No. 1 (Phase 3)	Primary Basins 6-15	<ul style="list-style-type: none"> <li>Replacement of mechanical parts in 9 rectangular basins. This is Phase 3 of a three phased approach for the scum/sludge collection system.</li> </ul>															
PRN-00567	Plant No. 1 Primary Basin Rebar Protection Blanket Contract	Primary Basins 6-15	<ul style="list-style-type: none"> <li>Repair protect exposed rebar.</li> </ul>															
P1-133	Primary Sedimentation Basins No. 6-31 Reliability Improvements at Plant No. 1	Primary Basins 6-31	<ul style="list-style-type: none"> <li>Upgrade of the sludge pumping system. Structural repair of launders in PISB. Repair of foul air system.</li> </ul>															
P1-126	Primary Clarifiers Replacements and Improvements at Plant No. 1	Primary Basins 3, 4, and 5	<ul style="list-style-type: none"> <li>Replace primary basins 3, 4, and 5. Rehabilitate associated conveyance pipes and structures. Demolish Primary Basins 1-2.</li> </ul>															
X-017	Plant No. 1 Primary Clarifiers 6-37 Rehabilitation	Primary Basins 6-31	<ul style="list-style-type: none"> <li>Major rehabilitation of primary basins 6-31.</li> </ul>															
X-079	Primary Scrubber Rehabilitation Project at Plant No. 1	Odor Control	<ul style="list-style-type: none"> <li>Replacement of the Plant No. 1 primary basin air scrubbing system.</li> </ul>															
X-006	Waste Sidestream Pump Station Upgrade	Waste Sidestream Pump Station	<ul style="list-style-type: none"> <li>Pump station rehabilitation and capacity increase.</li> </ul>															

Types of Project Legend:

CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

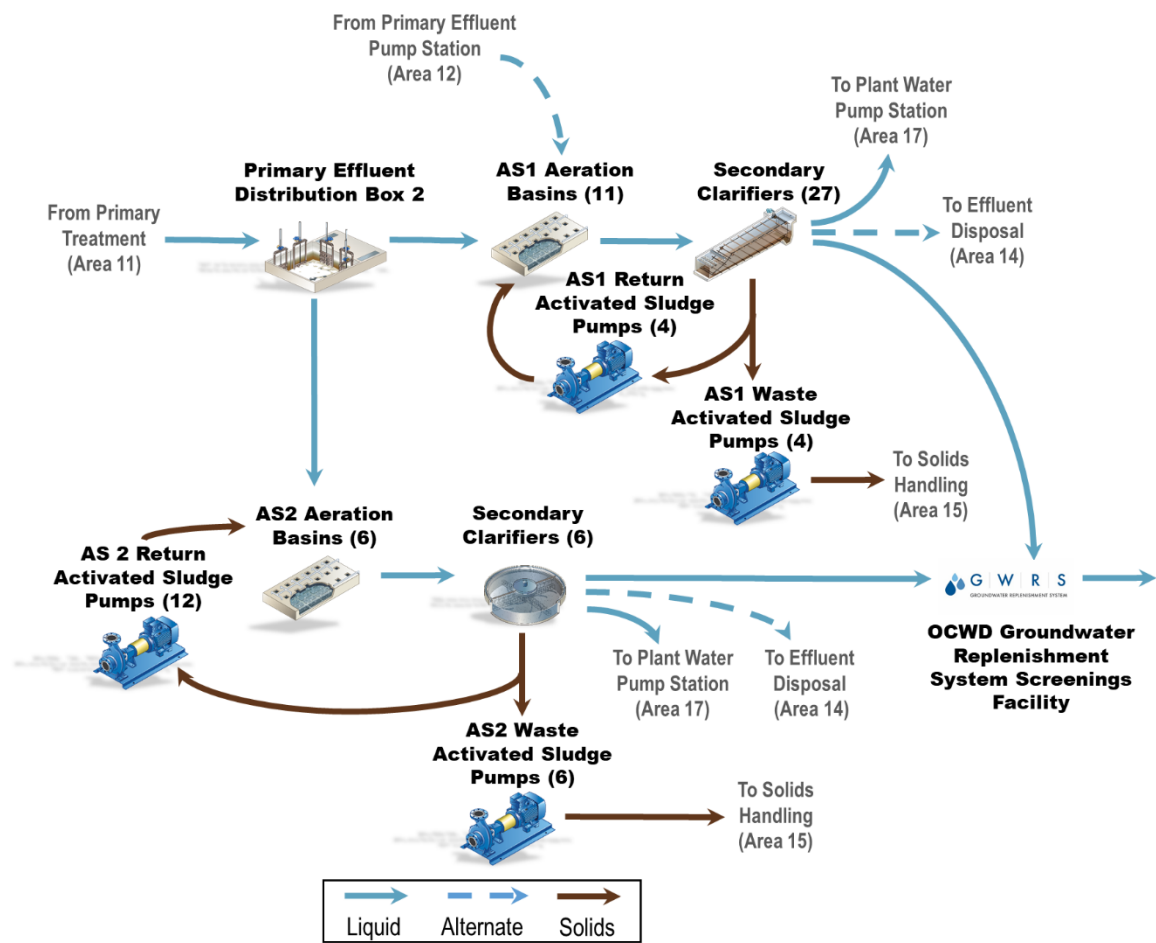
Acronym Key:

CIP = Capital Improvements Program; FY = Fiscal Year; GWRS = Groundwater Replenishment System; MGD = Million Gallons per Day; OCSD = Orange County Sanitation District; OCWD = Orange County Water District; PISB = Primary Influent Splitter Box



ASSET MANAGEMENT SYSTEM SUMMARY – AREA 12 – PLANT NO. 1 SECONDARY TREATMENT – ACTIVATED SLUDGE

Process Schematic



Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li>Activated Sludge Plant No. 1 – AS1 is an aging facility.</li> </ul>	<ul style="list-style-type: none"> <li>Corrosion assessment in 2016 showed several locations of corrosion on the wall between reactors and steel re-bar support chairs missing. Baffle wall supports and vertical airpipes were damaged on some of the basins and are monitored on remaining basins.</li> <li>Instrumentation is monitoring and replacing the equipment as needed.</li> </ul>
<ul style="list-style-type: none"> <li>Activated Sludge Basins Diffusers</li> </ul>	<ul style="list-style-type: none"> <li>Diffusers for activated sludge plants will be replaced in-house by Maintenance.</li> </ul>
<ul style="list-style-type: none"> <li>Primary Effluent Distribution Box 2</li> </ul>	<ul style="list-style-type: none"> <li>Demolished by P1-126.</li> </ul>
<ul style="list-style-type: none"> <li>Primary Effluent Pump Station</li> </ul>	<ul style="list-style-type: none"> <li>PEPS Pump 1 will be repaired in 2020 and the pump station will be demolished by a future project (P1-126).</li> </ul>

Major Assets Remaining Useful Life

Asset Type	PEDB1	PEPS	Blower Building 1	AS1 Aeration Basins	AS1 Clarifiers	AS1 RAS PS	AS1 WAS	AS2 PEPS 2	AS2 Blowers	AS2 Aeration Basins	AS2 Clarifiers	AS2 RAS /WAS PS	WSSPS 2	PEPS 2	PEDB2	AS1 & AS2 Junction Boxes	DAFTs	DAFTs Polymer System
<b>Civil</b>																		
Effluent Piping	4	-	3	3	3	5	-	-	-	-	-	-	-	1	1	1	4	-
<b>Structural</b>																		
Buildings	-	2	2	-	-	2	-	-	1	-	-	-	-	-	-	-	4	-
Structures	4	3	-	2	3	-	-	1	-	1	1	-	1	1	1	1	4	-
<b>Mechanical</b>																		
Piping	-	3	2	3	3	5	3	2	2	2	2	2	2	-	-	-	4	4
Pumps	-	5	-	-	-	3	3	-	-	-	-	3	3	-	-	-	5	5
Diffusers	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	-	-	-
Mixers	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Clarifier/DAFT Moving Mechanism	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	4	-
Blowers	-	-	3	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Drain Gates & Inlet Gates	4	-	-	3	3	-	-	-	-	2	2	-	-	1	2	-	-	-
HVAC & Ventilation	-	3	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Chemical/polymer Facility	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
<b>Electrical</b>																		
Variable Frequency Drives	-	2	-	2	2	2	2	-	-	4	4	4	4	-	-	-	2	2
Motor Control Centers	-	4	-	4	4	4	4	-	-	2	2	2	2	-	-	-	3	3
<b>Instrumentation-</b>																		
PLCs, Flow Meters	-	5	5	5	5	5	5	-	2	2	2	2	2	-	-	-	5	5
<b>RUL Legend:</b> <span style="color:red">■</span> RUL <5 years <span style="color:orange">■</span> RUL 5-10 years <span style="color:yellow">■</span> RUL 11-15 years <span style="color:green">■</span> RUL 16-20 years <span style="color:gray">■</span> RUL >20 years																		

**Acronym Key:**  
 AS1 = Activated Sludge Plant No. 1; AS2 = Activated Sludge Plant No. 2; DAFT = Dissolved Air Flotation Thickener;  
 HVAC=Heating, Ventilation, and Air Conditioning; OCWD=Orange County Water District;  
 PEDB1 = Primary Effluent Distribution Box 1; PEDB2 = Primary Effluent Distribution Box 2;  
 PEPS = Primary Effluent Pump Station; PEPS 2 =Primary Effluent Pump Station 2; PLC = Programmable Logic Controller;  
 PS= Pump Station; RAS = Return Activated Sludge; RUL=Remaining Useful Life; WAS = Waste Activated Sludge;  
 WSSPS2=Waste Sidestream Pump Station 2

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 12 – PLANT NO. 1 SECONDARY TREATMENT – ACTIVATED SLUDGE

Major Assets

Major Assets	Quantities
Primary Effluent Pump Station	
Building	1
Wetwell	1
Pumps	2
Discharge Valves	3
AS1 Aeration Basins	
Aeration Basins	10
Inlet gates	10
AS1 Blower Building 1	
Blower Building	1
Blowers	5

Major Assets	Quantities
AS1 Secondary Clarifiers	
Secondary Clarifiers	26
Inlet gates	78
Sludge collectors	52
AS1 RAS PS / WAS PS	
RAS PS Building	1
RAS Pumps	5
WAS Pumps	4
Primary Effluent Pump Station 2	
Structure	1
Gate	1

Major Assets	Quantities
AS2 Aeration Basins	
Aeration Basins	6
Inlet gates	6
AS2 Blower Building 2	
Blower Building	1
Blowers	4
AS2 Secondary Clarifiers	
Secondary Clarifiers	6
Sludge collectors	6
AS2 RAS PS / WAS PS	
RAS Pumps	12
WAS Pumps	6
Surface Wasting Pumps	6
Scum Pumps	6

Major Assets	Quantities
Waste Side Stream Pump Station 2	
Pumps	2
Structure	1
Primary Effluent Distribution Box 1	
Structure	1
Gates	1
Primary Effluent Distribution Box 2	
Structure	1
Gates	11
AS1 and AS2 Junction Boxes	
Junction Box Structures	8

Major Assets	Quantities
Dissolved Air Flotation Thickeners	
Concrete Tanks	6
Mechanical Sweep	6
Recycle Pumps	12
Retention Tank	6
TWAS Pumps	12
DAFTs Polymer System	
Storage Tank	2
Mix Tank	2
Polymer Transfer Pumps	2
Feed Pumps	6

**Acronym Key:**  
AS1 = Activated Sludge Plant No. 1; AS2 = Activated Sludge Plant No. 2; DAFT = Dissolved Air Flotation Thickeners;  
PS=Pump Station; RAS = Return Activated Sludge; WAS = Waste Activated Sludge; TWAS = Thickened Waste Activated Sludge

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 12 – PLANT NO. 1 SECONDARY TREATMENT – ACTIVATED SLUDGE

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
PRN-00516	PEPS Pump #1 Mechanical Repair	PEPS	• Repair of PEPS Pump #1.																
PRN-00520	AS1 Blower flowmeter modifications	AS1 Blowers	• Add flow conditioner to improve flow readings.																
PRN-00478	Plant No. 1 AS2 Clarifier #31 Catwalk - Coatings	AS2 Clarifier #31	• Coating repair.																
PRN-00375	Plant No. 1 AS2 blower silencer piping modification	AS2 blowers	• Provide access to service the blowers.																
PRN-00402	Plant No. 1 activated sludge clarifier lighting replacement	AS1 Clarifiers 1 to 14 lighting	• Replace 16 light poles and fixtures.																
MP-395	AS1 Influent gate assessment and repair	AS1 Basins 3, 4, 5, 6	• Modify the AS1 Basins 3 to 6 influent gates.																
P1-129	Return Activated Sludge Piping Replacement at AS1	AS1 RAS Pipes	• Replace the RAS pipes from the RAS pumps to the basins.																
FE 15-07	Secondary Treatment and Plant Water VFD Replacement	Replacing RAS pumps VFDs	• Replace RAS pumps.																
X-043	DAFT Demolition at Plant No. 1	DAFTS	• Demolish DAFTS since the new thickening centrifuges are in service and DAFT is no longer needed.																
X-048	AS1 Aeration Basin and Blower Rehabilitation	AS1 Aeration Basin and Blower	• Major rehabilitation of the basins and blowers.																
X-049	AS1 Clarifier and RAS PS Rehabilitation at Plant No. 1	AS1 Clarifier and RAS PS	• Major rehabilitation of the clarifiers and RAS pump station.																

## Types of Project Legend:

 CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

## Acronym Key:

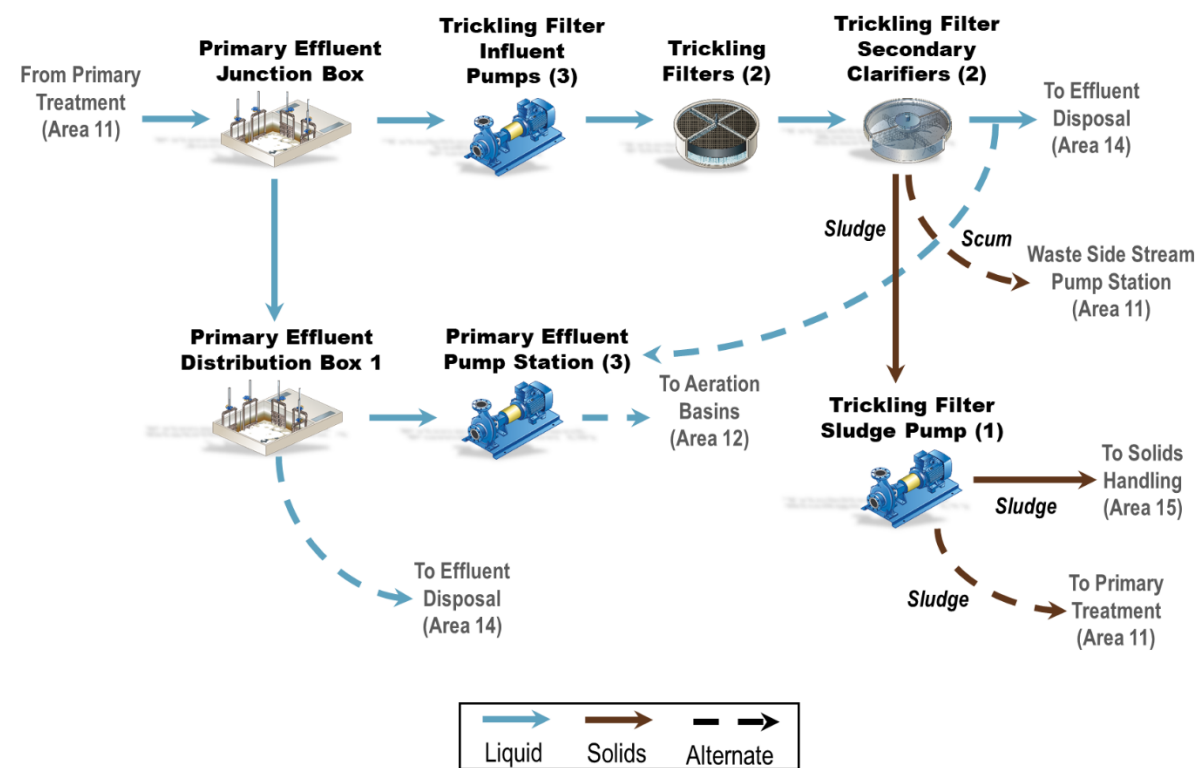
AS1 = Activated Sludge Plant No. 1; AS2 = Activated Sludge Plant No. 2; CIP=Capital Improvement Program; FY=Fiscal Year;  
 DAFT = Dissolved Air Flotation Thickeners; PS=Pump Station; RAS = Return Activated Sludge; WAS = Waste Activated Sludge;  
 TWAS = Thickened Waste Activated Sludge



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## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 12 – PLANT NO. 1 SECONDARY TREATMENT – TRICKLING FILTERS

## Process Schematic



## Major Assets

Major Assets	Quantities
<b>Trickling Filter Pump Station</b>	
Structure	1
Trickling Filter Pumps	3
<b>Trickling Filters</b>	
Trickling Filter Basins	2
Rotary Distributor	2
Recirculation Fans	8
<b>Secondary Clarifiers</b>	
Circular Clarifiers	2
Sludge Collector	2
<b>Junction Boxes</b>	
Structure	6

## Major Assets Remaining Useful Life

Asset Type	Trickling Filter Pump Station	Trickling Filters	Secondary Clarifiers	Junction Boxes
<b>Civil</b>				
Effluent Piping	1	1	1	1
<b>Structural</b>				
Buildings	-	1	1	-
Structures	1	1	1	1
<b>Mechanical</b>				
Piping	2	2	2	2
Pumps	3	-	3	-
Distributor Drive	-	3	-	-
Ventilation Fans	-	3	-	-
Trickling Filter Media	-	4	-	-
Clarifier Moving Mechanism	-	-	3	-
Valves, Gates	-	-	-	2
<b>Electrical</b>				
Motor Control Centers	3	3	3	-
Variable Frequency Drives	5	3	5	-
<b>Instrumentation</b>				
PLCs & Flow Meters	3	3	3	-

## Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

## Acronym Key:

PLC = Programmable Logic Controller;  
RUL = Remaining Useful Life

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 12 – PLANT NO. 1 SECONDARY TREATMENT – TRICKLING FILTERS

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Trickling Filter Sludge Pumps</b> – Currently, only one sludge pump is in service.</li> </ul>	<ul style="list-style-type: none"> <li>Project FE19-03 was created to replace the trickling filter's sludge and scum pumps.</li> </ul>
<ul style="list-style-type: none"> <li><b>Trickling Filter Influent Pumps</b> – VFDs are obsolete and need to be replaced. Replacement parts are not available.</li> </ul>	<ul style="list-style-type: none"> <li>Clearinghouse approved the replacement of the VFDs (PRN-00492) and adding a second source of power from SWGR-TFB bus to Drive #1.</li> </ul>
<ul style="list-style-type: none"> <li><b>Electrical</b> – Low voltage cable failure.</li> </ul>	<ul style="list-style-type: none"> <li>Several damaged cables were replaced by Maintenance in the past, and Clearinghouse approved a project to assess the remaining low voltage cables and replace the damaged cables. (PRN-00409).</li> </ul>
<ul style="list-style-type: none"> <li><b>Odor Control</b> – The Trickling Filters are open and are a source of foul air at Plant No.1.</li> </ul>	<ul style="list-style-type: none"> <li>Trickling Filter Bleach Test at Plant No. 1 (RE18-1) to study the performance of adding bleach to control the odors.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>FE19-03</b>	FE19-03 Trickling Filter Sludge and Scum Pumps Replacement at Plant No. 1	Sludge pumping	<ul style="list-style-type: none"> <li>Replace the sludge pump with two new pumps, and remove 3 scum pumps with straight piping.</li> </ul>																
<b>PRN-00414</b>	Snail Control at Plant No. 1 Trickling Filters	Trickling Filters	<ul style="list-style-type: none"> <li>Install permanent caustic dosing pumps and pipes to dose caustic to the Trickling Filters. Currently, Operations is using caustic totes.</li> </ul>																
<b>PRN-00492</b>	Plant No. 1 Trickling Filter Pumps VFD replacement (3 pumps)	Trickling Filters Pump Station	<ul style="list-style-type: none"> <li>Replace the obsolete VFDs on the Trickling Filter influent pumps.</li> </ul>																
<b>PRN-00409</b>	Low Voltage Cable Assessment	Low voltage cables from Power Building 8 to the Trickling Filters	<ul style="list-style-type: none"> <li>Assess and replace the damaged cables.</li> </ul>																
<b>RE18-01</b>	Trickling Filter Bleach Test at Plant No. 1	Trickling Filters	<ul style="list-style-type: none"> <li>A research project to study the impact of dosing bleach in controlling the odors.</li> </ul>																
<b>X-015</b>	Trickling Filters Facilities Rehabilitation at Plant No. 1	Major rehabilitation project	<ul style="list-style-type: none"> <li>Replace the Trickling Filter Feed Pumps, distribution arms and media, and secondary clarifier mechanisms.</li> </ul>																

## Types of Project Legend:

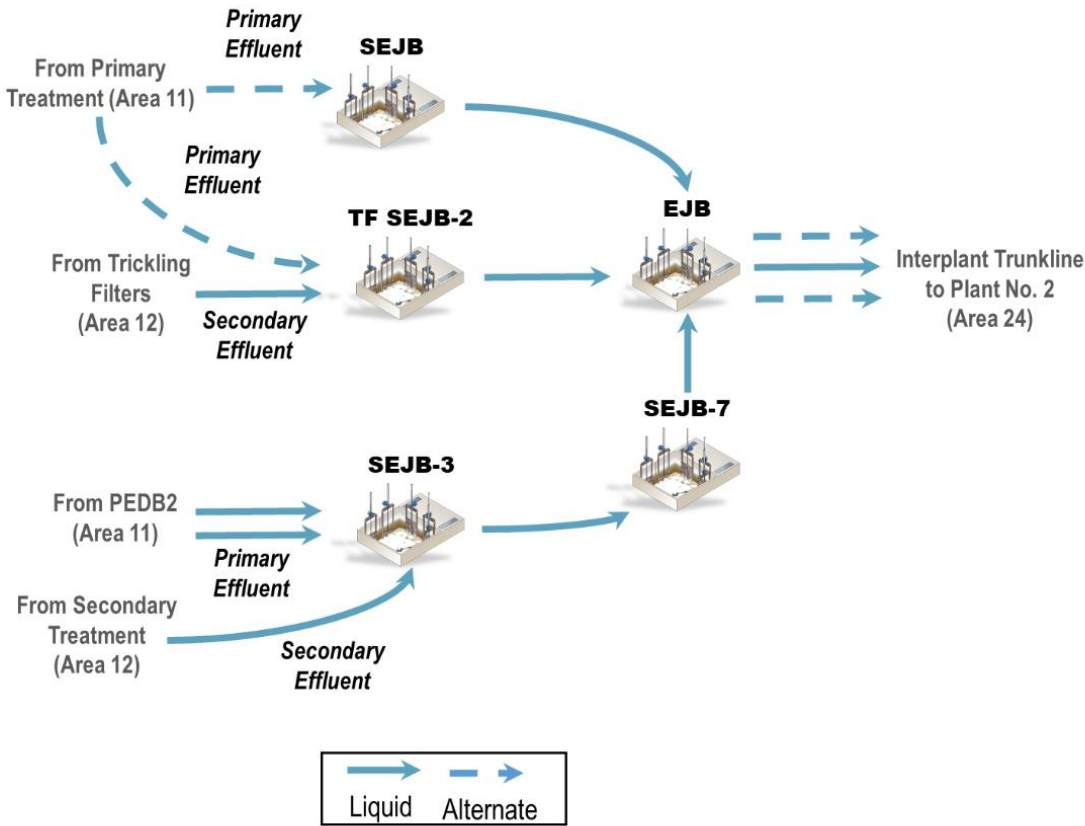
■ CIP - Planning
 ■ CIP – Design
 ■ CIP - Construction
 ■ Maintenance Project

## Acronym Key:

CIP = Capital Improvements Program; FY= Fiscal Year; VFD = Variable Frequency Drive

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 14 - PLANT NO. 1 INTERPLANT

Process Schematic



Major Assets Remaining Useful Life

Asset Type	Plant No. 1 Facility							Santa Ana Corridor				Brookhurst Corridor	Ellis/Bushard Corridor
	EJB	SEJB	SEJB3	SEJB7	PEJB1	SEJB2	108"PE/SE	66"PE	84"SE	120" SE	16"Gas		
<b>Civil</b>													
Effluent Pipe	-	-	-	-	-	-	3	2	4	1	-	2	-
Gas	-	-	-	-	-	-	-	-	-	-	1	-	-
<b>Structural</b>													
Structure	1	3	2	1	4	1	-	-	-	-	-	-	-
<b>Mechanical</b>													
Sluice Gates	3	-	3	1	-	-	-	-	-	-	-	-	-
Butterfly Valves	5	-	-	-	-	-	-	-	-	-	-	-	-
<b>Electrical</b>													
Fiber Optic	-	-	-	-	-	-	-	-	-	1	-	-	1

Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

Acronym Key:

EJB = Effluent Junction Box; PE = Primary Effluent; PEDB2 = Primary Effluent Distribution Box 2; PEJB1 = Primary Effluent Junction Box 1; RUL= Remaining Useful Life; SE = Secondary Effluent; SEJB = Secondary Effluent Junction Box; SEJB2 = Secondary Effluent Junction Box 2; SEJB3 = Secondary Effluent Junction Box 3; SEJB = Secondary Effluent Junction Box 7; TF = Trickling Filter

Major Assets

Major Assets	Quantities
<b>Plant No. 1 Facility</b>	
Junction Boxes	6
Gates	13
Butterfly Valves	5
Large Diameter Piping	6

Major Assets	Quantities
<b>Santa Ana Corridor</b>	
Large Diameter Piping	3
Fiber Optic Communication	1
Digester Gas Piping	1

Major Assets	Quantities
<b>Brookhurst Corridor</b>	
Large Diameter Piping	1
<b>Ellis/Bushard Corridor</b>	
Fiber Optic Communication	1

### ASSET MANAGEMENT SYSTEM SUMMARY – AREA 14 – PLANT NO. 1 INTERPLANT

#### Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Maintenance of Gates, Valves, &amp; Mechanical Equipment –</b> Mechanical components of the various junction structures are not typically operated during normal plant operation.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that mechanical equipment is routinely exercised to prolong its life and ensure its availability/function when needed.</li> </ul>
<ul style="list-style-type: none"> <li><b>Warranty of J-117A –</b> Determine the status of the recent interplant piping repairs that were performed as part of J-117A.</li> </ul>	<ul style="list-style-type: none"> <li>Make necessary repairs and corrections as identified.</li> </ul>

#### Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>GWRS</b>	GWRS Pump Station	66" PE	<ul style="list-style-type: none"> <li>Install new OCWD force main within existing 66" interplant pipe</li> </ul>															
<b>PRN-00522</b>	EJB Coating Repairs	EJB	<ul style="list-style-type: none"> <li>Replacement and recoating of various piping and supports</li> </ul>															
<b>MP-657</b>	Santa Ana River Erosion Control	Interplant Piping	<ul style="list-style-type: none"> <li>Correction of existing earthen slope above the interplant pipes</li> </ul>															
<b>X-XXX</b>	PEJB-1 & Piping Rehabilitation	PEJB-1	<ul style="list-style-type: none"> <li>Rehab the existing junction structure and associated piping</li> </ul>															

**Types of Project Legend:**

CIP - Planning

CIP – Design

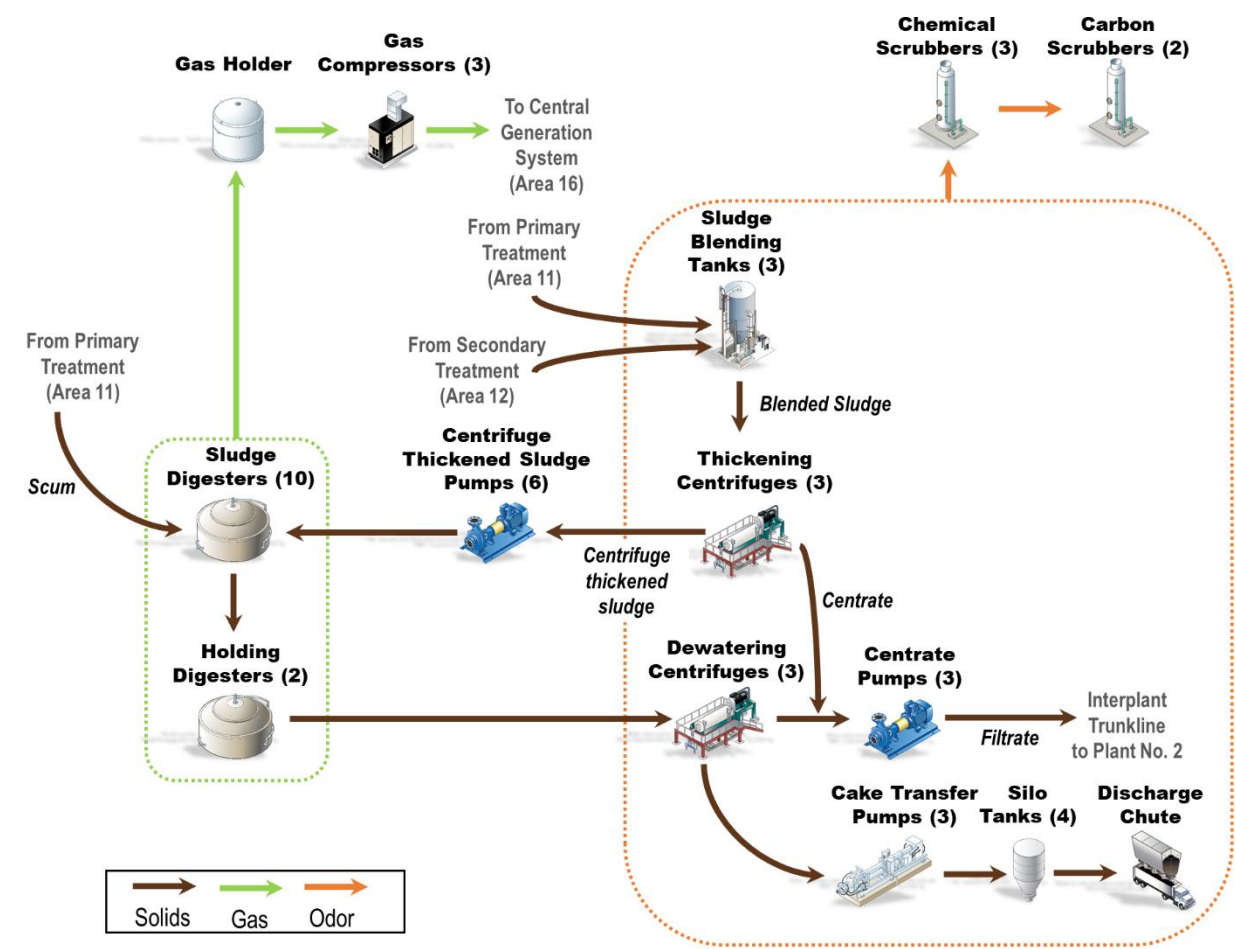
CIP - Construction

Maintenance Project

**Acronym Key:**  
CIP = Capital Improvement Program; EJB = Effluent Junction Box; FY = Fiscal Year; GWRS = Groundwater Replenishment Program; OCWD = Orange County Water District; PE = Primary Effluent; PEJB = Primary Effluent Junction Box; SE = Secondary Effluent

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 15 – PLANT NO. 1 SOLIDS HANDLING – DIGESTERS

Process Schematic



Major Assets Remaining Useful Life

Asset Type	Digester 5	Digester 6	Digester 7	Digester 8	Digester 9	Digester 10	Digester 11	Digester 12	Digester 13	Digester 14	Digester 15	Digester 16	Ferric System
<b>Civil</b>													
Effluent Piping	2	2	2	2	2	2	2	2	2	2	2	2	-
<b>Structural</b>													
Digester	1	1	1	1	1	1	1	1	1	1	1	1	-
<b>Mechanical</b>													
Piping	2	2	2	2	2	2	2	2	2	2	2	2	4
Chemical Pumps	-	-	-	-	-	-	-	-	-	-	-	-	4
Ferric Control System	-	-	-	-	-	-	-	-	-	-	-	-	4
Sludge Mixing Pumps	2	2	2	2	2	2	2	2	2	2	2	2	-
Sludge Recirculation & Heating System	-	-	2	2	2	2	2	2	2	2	2	2	-
Hot Water System	-	-	2	2	2	2	2	2	2	2	2	2	-
Sludge Transfer Pumps	2	2	2	2	2	2	2	2	2	2	2	2	-
<b>Electrical</b>													
Motor Control Centers	2	2	2	2	2	2	2	2	2	2	2	2	-
<b>Instrumentation</b>													
PLCs & Flow Meters	2	2	2	2	2	2	2	2	2	2	2	2	-

Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

Acronym Key:

PLC = Programmable Logic Controller;  
RUL = Remaining Useful Life

Major Assets

Major Assets	Quantities
<b>Anaerobic Digesters</b>	
Digesters (7-16)	10
Holding Digesters (5 & 6)	2
Sludge Mixing Pumps	22
Grinders	10+3
Sludge Recirculation Pumps	10

Major Assets	Quantities
<b>Anaerobic Digesters (Continued)</b>	
Hot Water Circulation Pumps	10
Heat Exchangers	10
Bottom Sludge Pumps	5
Digesters Transfer Pumps	3
<b>Ferric System</b>	
Storage Tanks	2
Feed Pumps	2

# ASSET MANAGEMENT SYSTEM SUMMARY – AREA 15 – PLANT NO. 1 SOLIDS HANDLING – DIGESTERS

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>High Rate Mixing Pumps mechanical seals failure</b> – The high rate mixing pumps are experiencing higher than expected failures of the mechanical seals.</li> </ul>	<ul style="list-style-type: none"> <li>There are several efforts by Maintenance and Engineering to reduce the failure rate including precision alignment of the pumps, studying sludge piping supports (PS19-01) and monitoring the vibrations.</li> </ul>
<ul style="list-style-type: none"> <li><b>Structures</b> – Seismic risk.</li> </ul>	<ul style="list-style-type: none"> <li>The PS15 - 06 Seismic Evaluation of Structures at Plant Nos. 1 and 2 has identified lateral Spreading as the main seismic risk for the digesters.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
P1-135	Digester Ferric Chloride Piping Replacement at Plant No. 1	Digesters, ferric dosing system	<ul style="list-style-type: none"> <li>This project will replace the digester ferric chloride piping, valves and appurtenances to its point of connection with the digesters.</li> </ul>																
MP- 563	Plant No. 1 digester 9 & 10 Pump Work Platform Replacement	Digesters 9 and 10 mixing pumps	<ul style="list-style-type: none"> <li>Adding access platforms for maintenance activities.</li> </ul>																
MP - 561	Plant No. 1 Digesters 8 and 11 Area Lighting Installation	Digesters 8 and 11	<ul style="list-style-type: none"> <li>Relocate existing warehouse.</li> </ul>																
MP- 588	Digester 7 & 8 Sludge Pipeline Improvements	Digester 7 and 8 sludge pipes	<ul style="list-style-type: none"> <li>Adding flexibility in transferring sludge.</li> </ul>																
MP- 610	CP-DIG LEL Area Safety Monitoring Obsolescence	The LEL monitoring system in Digester 11 to 16 pump room and tunnels	<ul style="list-style-type: none"> <li>Upgrading the LEL monitors.</li> </ul>																
PS19-01	Digester 6 Pipe Stress Analysis at Plant No. 1	Digester 6 high-rate mixing pumps	<ul style="list-style-type: none"> <li>Performing pipe stress analysis to improve pipe supports if needed.</li> </ul>																
N/A	Digester Cleaning	On-going maintenance activity	<ul style="list-style-type: none"> <li>Cleaning the digesters and performing preventive condition assessment every 5 to 7 years.</li> </ul>																

### Types of Project Legend:

■ CIP - Planning
 ■ CIP – Design
 ■ CIP - Construction
 ■ Maintenance Project

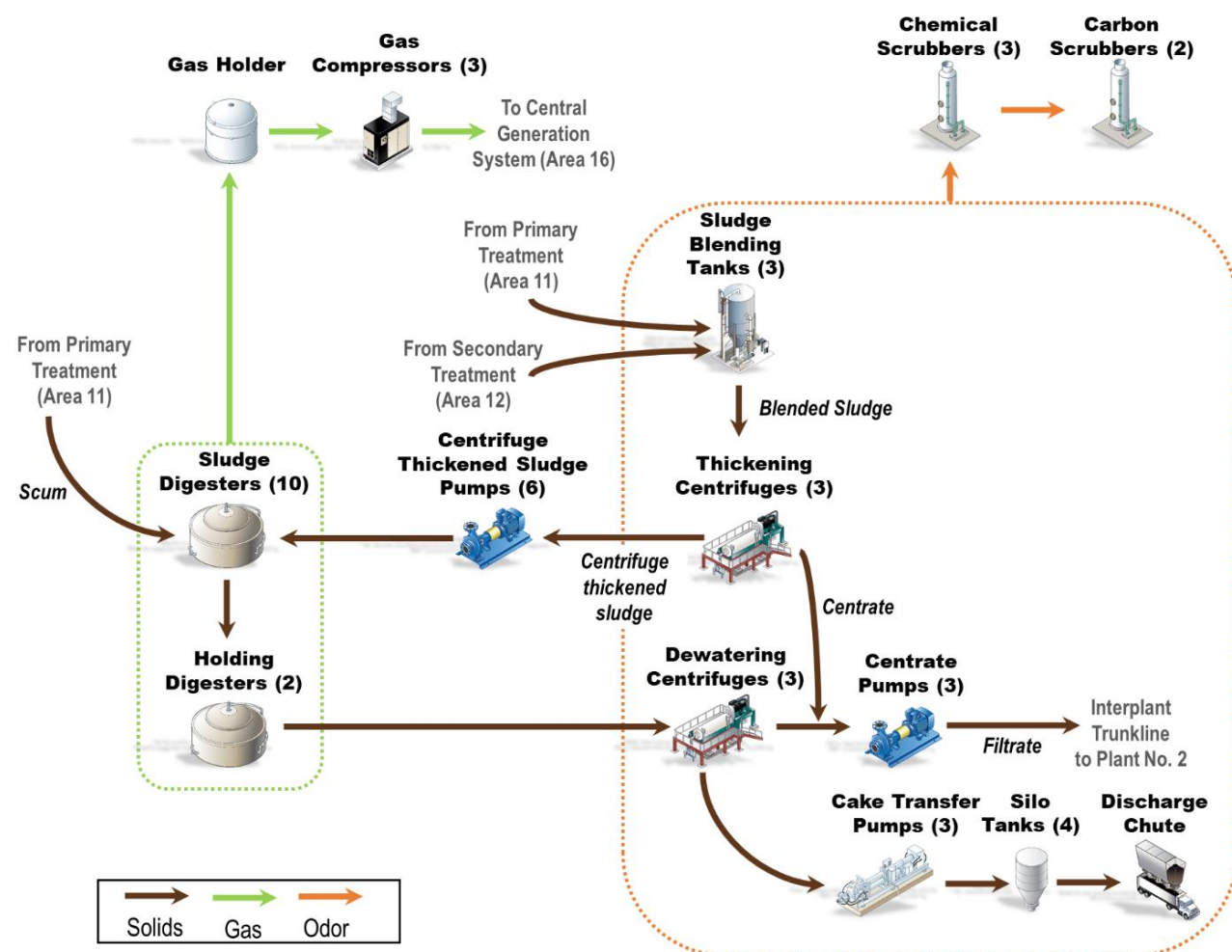
### Acronym Key:

CIP=Capital Improvement Program; CP=Control Panel; DIG=Digester; FY=Fiscal Year; LEL= Lower Explosive Level; N/A=Not Applicable



## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 15 – PLANT NO. 1 SOLIDS HANDLING – FACILITIES

## Process Schematic



## Major Assets Remaining Useful Life

Asset Type	Boiler System	Sludge Blending Facility	Thickening System	Dewatering System	Dewatering Odor Control	Truck Loading	Gas Handling	Gas Holder
<b>Civil</b>								
Effluent Piping	-	1	1	1	-	1	3	3
<b>Structural</b>								
Structures	-	1	-	-	-	1	-	3
Buildings	-	-	1	1	-	1	2	-
<b>Mechanical</b>								
Piping	1	-	1	1	1	1	3	-
Pumps-grinders	-	1	1	1	1	1	-	-
Boilers & Heat Exchangers	2	-	-	-	-	-	-	-
Centrifuges	-	-	1	1	-	-	-	-
Biofilters and carbon media	-	-	-	-	1	-	-	-
Chemical/polymer System	-	-	1	1	1	-	-	-
Gas Compressors	-	-	-	-	-	-	4	-
Gas Dryer	-	-	-	-	-	-	5	-
Gas Flares	-	-	-	-	-	-	4	-
Silo Cake Conveyors	-	-	-	-	-	1	-	-
Silo Sliding Frames	-	-	-	-	-	1	-	-
<b>Electrical</b>								
Variable Frequency Drives	-	2	2	2	-	2	-	-
Motor Control Centers	2	1	1	1	1	1	4	-
<b>Instrumentation</b>								
PLCs & Flow Meters	1	1	1	1	1	1	5	-

## Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

## Acronym Key:

RUL= Remaining Useful Life;  
PLC=Programmable Logic Controller



## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 15 – PLANT NO. 1 SOLIDS HANDLING – FACILITIES

## Major Assets

Major Assets	Quantities
<b>Thickening System</b>	
Sludge Blending Tanks	3
Thickening Grinders	3
Centrifuge Feed Pumps	3
Thickening Centrifuges	3
Thickened Sludge Wet Wells	3
Thickened Sludge Pumps	6

Major Assets	Quantities
<b>Thickening System (Continued)</b>	
Centrate Wetwell	1
Centrate Pumps	3
<b>Chemical Equipment</b>	
Thickening Polymer Feed Pumps	3
Dewatering Polymer Feed Pumps	3

Major Assets	Quantities
<b>Chemical Equipment (Continued)</b>	
Polymer Mixing/Aging Tank	6
Polymer Make-Down Unit	4
<b>Dewatering System</b>	
Dewatering Grinders	2
Centrifuge Feed Pumps	3
Dewatering Centrifuges	3
Cake Transfer Pumps	3

Major Assets	Quantities
<b>Dewatering Odor Control</b>	
3-Stage Packed Tower Scrubbers	3
Carbon Media	2
<b>Truck Loading</b>	
Cake Storage Silos	4
Cake Silo Transfer Pumps	4
Stand-by Truck Loading Bay	1

Major Assets	Quantities
<b>Gas Handling</b>	
Low Pressure Gas Holder	1
Gas Compressors	3
Gas Dryer	1
Gas Flares	3
Boiler	1

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Maintainability of the Equipment</b> – There are several improvements that are needed for Thickening and Dewatering Area including lighting improvement, equipment access for maintenance, instrument air and power access and improving drains.</li> </ul>	<ul style="list-style-type: none"> <li>Most of the improvements will be done by Maintenance.</li> <li>PRN-00505 was approved by the Clearinghouse for safety improvements.</li> <li>MP-669 was approved by the Clearinghouse regarding equipment access and platform installation.</li> </ul>
<ul style="list-style-type: none"> <li><b>Gas Handling System</b> – Gas compressor system is aging and needs replacement of major units.</li> </ul>	<ul style="list-style-type: none"> <li>J-124 – Digester Gas Facilities rehabilitation in</li> <li>Gas compressors repair and gas compressor overhaul by Maintenance.</li> </ul>
<ul style="list-style-type: none"> <li><b>Gas Dryer</b> – Out of service. Currently, gas goes through a heat exchanger and condensate drop out.</li> </ul>	<ul style="list-style-type: none"> <li>The gas dryer refrigerator system will be replaced by J-124 Project.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
J-124	Digester Gas Facilities Rehabilitation	Gas compressors, dryers, and flares	<ul style="list-style-type: none"> <li>Replace the entire gas handling system including the gas compressor building.</li> </ul>																
MP-659	New Floor and Equipment Drains for the Truckloading Basement	Truckloading Facility	<ul style="list-style-type: none"> <li>Improving the drainage in the basement.</li> </ul>																
P1-101	Sludge Dewatering and Odor Control at Plant No. 1	Thickening centrifuges, dewatering centrifuges and odor control	<ul style="list-style-type: none"> <li>Construction of new thickening and dewatering and odor control facility and major rehabilitation of truck loading facility.</li> </ul>																
FE 16-06	Fuel Cell Facilities Demolition	None	<ul style="list-style-type: none"> <li>Demolition of concrete pads, pavement and buried utilities.</li> </ul>																
PRN-00505	Safety Improvements at the Thickening and Dewatering Building	Thickening and Dewatering Building	<ul style="list-style-type: none"> <li>Improving safety outside of the thickening and dewatering building.</li> </ul>																
MP-669	Truckloading and silo's slide frame conveyor motor platform	Truckloading slide frame	<ul style="list-style-type: none"> <li>Improve access to the equipment for maintenance activities.</li> </ul>																

## Types of Project Legend:

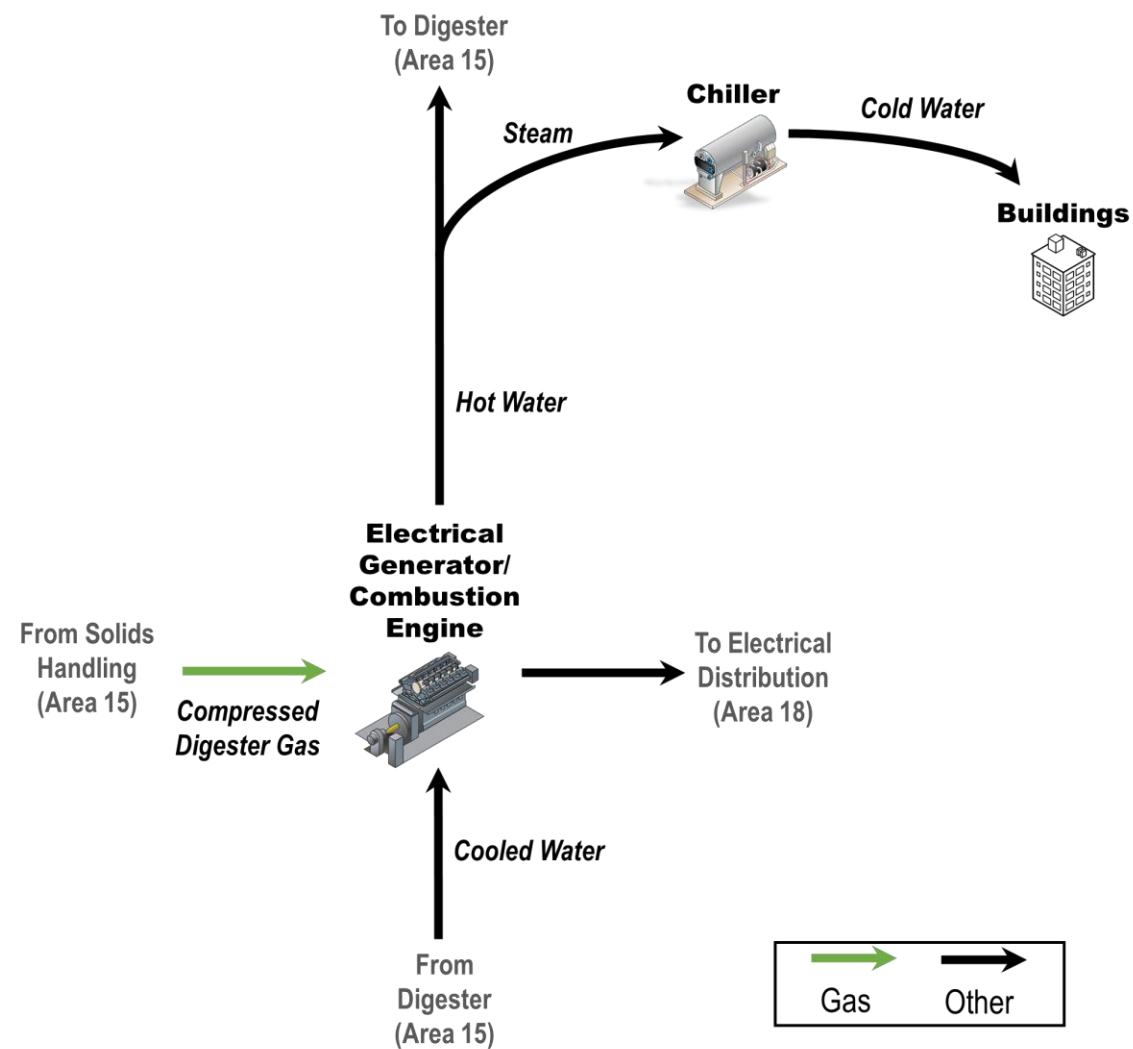
■ CIP - Planning
 ■ CIP – Design
 ■ CIP - Construction
 ■ Maintenance Project

## Acronym Key:

CIP=Capital Improvement Program; FY=Fiscal Year

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 16 – PLANT NO. 1 CENTRAL GENERATION

## Process Schematic



## Major Assets

Major Assets	Quantities
<b>Engine Generator</b>	
Gas Engine (12 Cylinder)	3
Electrical Generator	3
Engine Lube Oil System	3
<b>Cooling System</b>	
Absorption Chiller	2
Deaerator Vessel	1

Major Assets	Quantities
<b>Engine Emission Control</b>	
OXI Catalyst	3
SCR Catalyst	3
Urea Injection System	3
<b>Heat Recovery System</b>	
Heat Recovery Boiler	3

## Major Assets Remaining Useful Life

Asset Type	Engine Generator #1	Engine Generator #2	Engine Generator #3	Absorption Chiller #1	Absorption Chiller #2	Deaerator Vessel	Heat Recovery Boiler #1	Heat Recovery Boiler #2	Heat Recovery Boiler #3	OXI Catalyst	SCR Catalyst	Urea Injection System	Starting Air Compressor #1	Starting Air Compressor #2	Inst. Air Compressor #1	Inst. Air Compressor #2	Battery Backup	Building Elevator	Plant Water Piping	Miscellaneous
<b>Structural</b>																				
Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	1
<b>Mechanical</b>																				
General	4	4	4	3	3	2	3	3	3	3	3	3	5	5	5	5	-	5	-	-
HVAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Lube Oil System	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Electrical</b>																				
General	4	4	4	-	-	-	-	-	-	-	-	3	3	3	3	5	5	5	-	-
Switchgear	4	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Instrumentation</b>																				
General	5	5	5	3	3	3	3	3	3	3	3	3	4	4	5	5	5	5	-	-

## RUL Legend:

■ RUL <5 years  
 ■ RUL 5-10 years  
 ■ RUL 11-15 years  
 ■ RUL 16-20 years  
 ■ RUL >20 years

## Acronym Key:

HVAC=Heating, Ventilation, and Air Conditioning; Inst.=Instrument; OXI=Oxidizer; RUL=Remaining Useful Life;  
 SCR= Selective Catalytic Reduction

Major Assets	Quantities
<b>Building</b>	
Elevator	1
Piping	Various
<b>HVAC</b>	
Ventilation Exhaust Fans	5

Major Assets	Quantities
<b>Air Compressors</b>	
Engine Starting Air	2
Instrument Air	2

# ASSET MANAGEMENT SYSTEM SUMMARY – AREA 16 – PLANT NO. 1 CENTRAL GENERATION

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Gas Engine Generator Reliability</b> – Monies shall be spent to address aging components and systems required to operate the Central Generation Engines.</li> </ul>	<ul style="list-style-type: none"> <li>Engine Overhauls (ongoing).</li> <li>Replace obsolete systems (i.e. Battery Backup, Switch Gear, etc.).</li> </ul>
<ul style="list-style-type: none"> <li><b>Engine Lube Oil System</b> – The Lube Oil Centrifuges are no longer operational.</li> </ul>	<ul style="list-style-type: none"> <li>Install new instrumentation and controls onto the existing 2 units.</li> </ul>
<ul style="list-style-type: none"> <li><b>Plant Water Piping</b> – The plant water (i.e., Cooling Water) piping has degraded and is in need of replacement.</li> </ul>	<ul style="list-style-type: none"> <li>Replace all plant water piping in the basement of Central Generation.</li> </ul>
<ul style="list-style-type: none"> <li><b>Emission Control System</b> – The Housings on the Oxidizer Catalysts are failing prematurely.</li> </ul>	<ul style="list-style-type: none"> <li>Analyze existing deficiencies and design new Catalyst Housings.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
P1-127	Central Generation Rehabilitation	Central Generation Facility Wide	<ul style="list-style-type: none"> <li>Rehabilitation of Gas Engine Support Systems.</li> </ul>															
FE17-03	Battery Storage System	Plant Wide	<ul style="list-style-type: none"> <li>Install batteries for electricity storage purposes.</li> </ul>															
X-077	Switch Gear Replacement	Engine Generator	<ul style="list-style-type: none"> <li>Install new Switch Gear for the engines.</li> </ul>															
FE19-02	Plant Water Pipe Rehabilitation	Plant Water Piping	<ul style="list-style-type: none"> <li>Replace existing plant water piping with new.</li> </ul>															
PRN-00211	Engine Lube Oil System Controls Upgrade	Engine Generator	<ul style="list-style-type: none"> <li>Install new instrumentation and controls onto the existing oil centrifuge units.</li> </ul>															
MP-187	Public Address System Rehabilitation	Central Generation Facility	<ul style="list-style-type: none"> <li>Replace the Public Address System at the Central Generation Facility.</li> </ul>															
MP-227	Starting Air Compressor System Rehabilitation	Starting Air Compressor System	<ul style="list-style-type: none"> <li>Rehabilitation of the Air Compressors.</li> </ul>															
PRN-00248	Engine Overhauls	Engine Generator	<ul style="list-style-type: none"> <li>Overhaul the engines as needed (ongoing).</li> </ul>															
PRN-00283	Elevator Rehabilitation	Building Elevator	<ul style="list-style-type: none"> <li>Rehabilitate the existing elevator.</li> </ul>															
PRN-00322	Lube Oil Filter Catwalk	Engine Generator	<ul style="list-style-type: none"> <li>Install Lube Oil Filter catwalks for maintenance purposes.</li> </ul>															
MP-608	Engine Ignition and Controls Upgrade	Engine Generator	<ul style="list-style-type: none"> <li>Replace the existing engine ignition, controls, and fuel system.</li> </ul>															
PRN-00525	Battery Backup Rehabilitation	Battery Backup	<ul style="list-style-type: none"> <li>Replace the existing backup batteries for the switch gear.</li> </ul>															

### Types of Project Legend:

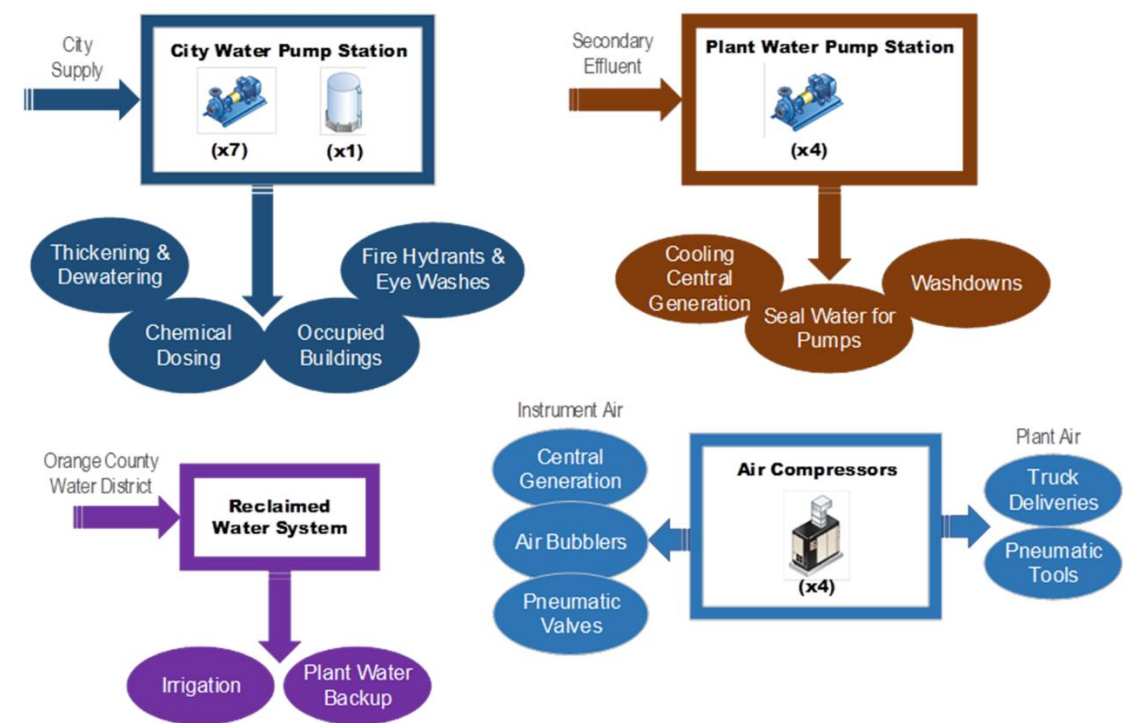
■ CIP - Planning
 ■ CIP – Design
 ■ CIP - Construction
 ■ Maintenance Project

### Acronym Key:

CIP=Capital Improvement Program; FY=Fiscal Year

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 17 – PLANT NO. 1 UTILITIES

Process Schematic



Major Assets

Major Assets	Quantities
City Water	
Pumps	7
Tanks	3
Piping	10.6 Miles
Plant Water	
Pumps	4
Strainers	3
Piping	12.5 Miles
Reclaimed Water	
Piping	5.4 Miles
Plant Air	
Compressors	4
Plant Air Piping	4 Miles
Instrument Air Piping	3.5 Miles

Major Assets Remaining Useful Life

Asset Type	City Water System	Plant Water System	Reclaimed Water Piping	Plant Air Systems
Civil				
Piping	3	3	2	-
Structural				
Pump Station	1	3	-	-
Tanks	3	-	-	-
Mechanical				
Pumps	3	3	-	-
Strainers	-	3	-	-
Compressors	-	-	-	5
Ventilation System	2	3	-	-
Electrical				
Motor Control Centers	1	2	-	-
Variable Frequency Drives	3	1	-	-
Instrumentation				
PLCs, Flowmeters	1	1	-	1

Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

Acronym Key:

RUL= Remaining Useful Life;  
PLC=Programmable Logic Controller

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 17 – PLANT NO. 1 UTILITIES

Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Plant/Instrument Air Lines</b> – Severe corrosion issues.</li> </ul>	<ul style="list-style-type: none"> <li>Current plan is to run to fail and repair the lines as they fail. In addition, if opportunity arises through future CIP or FE projects within areas where known air system deficiencies exist, we will address them at the time.</li> </ul>
<ul style="list-style-type: none"> <li><b>City Water Pump Station</b> – Pumps are possibly undersized.</li> </ul>	<ul style="list-style-type: none"> <li>The three medium pumps at the City Water Pump Station continuously run causing excessive wear. There are 1 smaller jockey pumps that run very infrequently. Study is needed to properly size the pumps at the station to meet the current needs of the plant.</li> </ul>
<ul style="list-style-type: none"> <li><b>Reclaimed Water System</b> – This system needs a pressure regulating valve installed.</li> </ul>	<ul style="list-style-type: none"> <li>Reclaimed water is meant to be a back up to plant water and to provide necessary support to Central Generation. When the pressure on the plant water side drops, the plant becomes in need of reclaimed water to compensate for the loss. Currently, the reclaimed water pressure varies between 100psi to 130psi, depending on the operational conditions at OCWD. OCSD plant water is at 80 psi, so with the current valves, reclaimed water with the higher psi tends to replace plant water, even when we are not in need. This causes unnecessary reclaimed water charges. Installing a pressure regulating valve at the OCWD/OCSD reclaimed water connection point will help reduce unnecessary charges and better manage our reclaimed water usage.</li> </ul>

Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY19/20	FY20/21	FY21/22	FY22/23	FY23/24	FY24/25	FY25/26	FY26/27	FY27/28	FY28/29	FY29/30	FY30/31	FY31/32	FY32/33	FY33/34
FE15-07	Secondary Treatment and Plant Water Variable Frequency Drive Replacement	Plant Water Pump Station	<ul style="list-style-type: none"> <li>Replace Variable Frequency Drives at the Plant Water Pump Station.</li> </ul>															
FE18-06	Instrument Air Compressors at Central Generation	Central Generation	<ul style="list-style-type: none"> <li>Replace Instrument Air compressors at Central Generation.</li> </ul>															
P1-105	Headworks Rehabilitation and Expansion	City Water Pump Station	<ul style="list-style-type: none"> <li>Refeed city water pumps from new power building and replace current compressor at headworks with 2 new compressors.</li> </ul>															
FE18-20	Blower Building Compressor Replacement	Blower Building	<ul style="list-style-type: none"> <li>Replace current compressor with 2 new compressors.</li> </ul>															
P1-126	Primary Clarifier Replacement and Improvement	Primary Clarifier	<ul style="list-style-type: none"> <li>Address plant water pipes near primary clarifiers.</li> </ul>															
X-038	City Water Pump Station Replacement	City Water Pump Station	<ul style="list-style-type: none"> <li>Rehabilitate City Water Pump Station.</li> </ul>															
X-039	Plant Water Pump Station Rehabilitation	Plant Water Pump Station	<ul style="list-style-type: none"> <li>Rehabilitate Plant Water Pump Station.</li> </ul>															
FE-XX1	Dissolved Air Flotation Thickeners Air Compressor Replacement	Dissolved Air Flotation Thickeners	<ul style="list-style-type: none"> <li>Relocate existing 100 HP Air Compressor.</li> </ul>															
FE-XX2	Plant Water Piping Replacement	Activated Sludge: Train 1	<ul style="list-style-type: none"> <li>Replace portions of the plant water piping near Activated Sludge Plant No. 1.</li> </ul>															
PRN-00518	Air Compressor replacement Headworks	Headworks	<ul style="list-style-type: none"> <li>Replace in kind compressor at headworks (100 HP).</li> </ul>															
PRN-00568	Air Compressor replacement Blower Building	Blower Building	<ul style="list-style-type: none"> <li>Replace in kind compressor at blower building (60 HP).</li> </ul>															

Types of Project Legend:

 CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

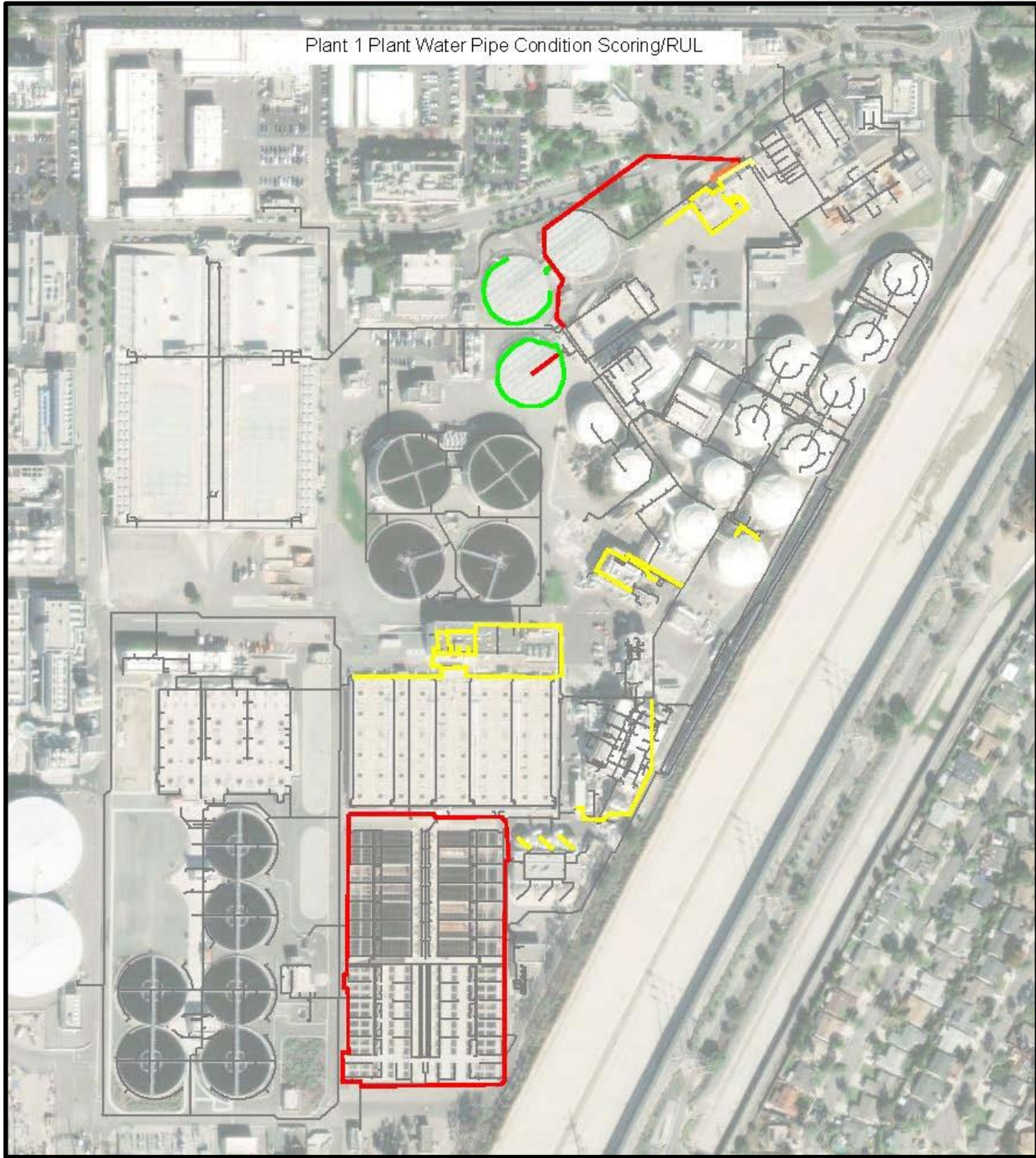
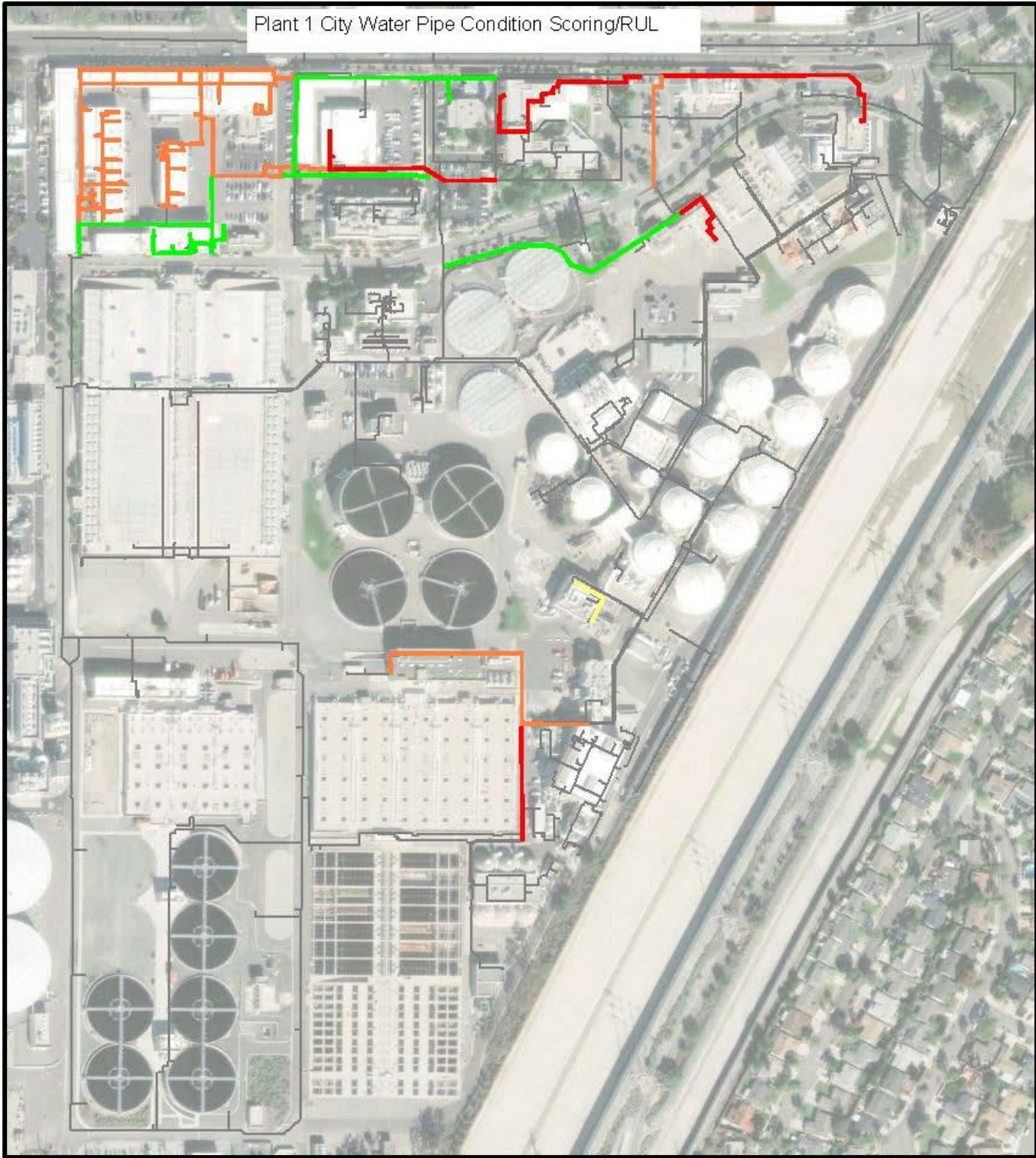
Acronym Key:

CIP=Capital Improvement Program; FE= Facilities Engineering; FY=Fiscal Year; HP=Horsepower;  
 OCSD=Orange County Sanitation District; OCWD=Orange County Water District



ASSET MANAGEMENT SYSTEM SUMMARY – AREA 17 – PLANT NO. 1 UTILITIES

Remaining Useful Life of Utility Infrastructure



**RUL Legend:**

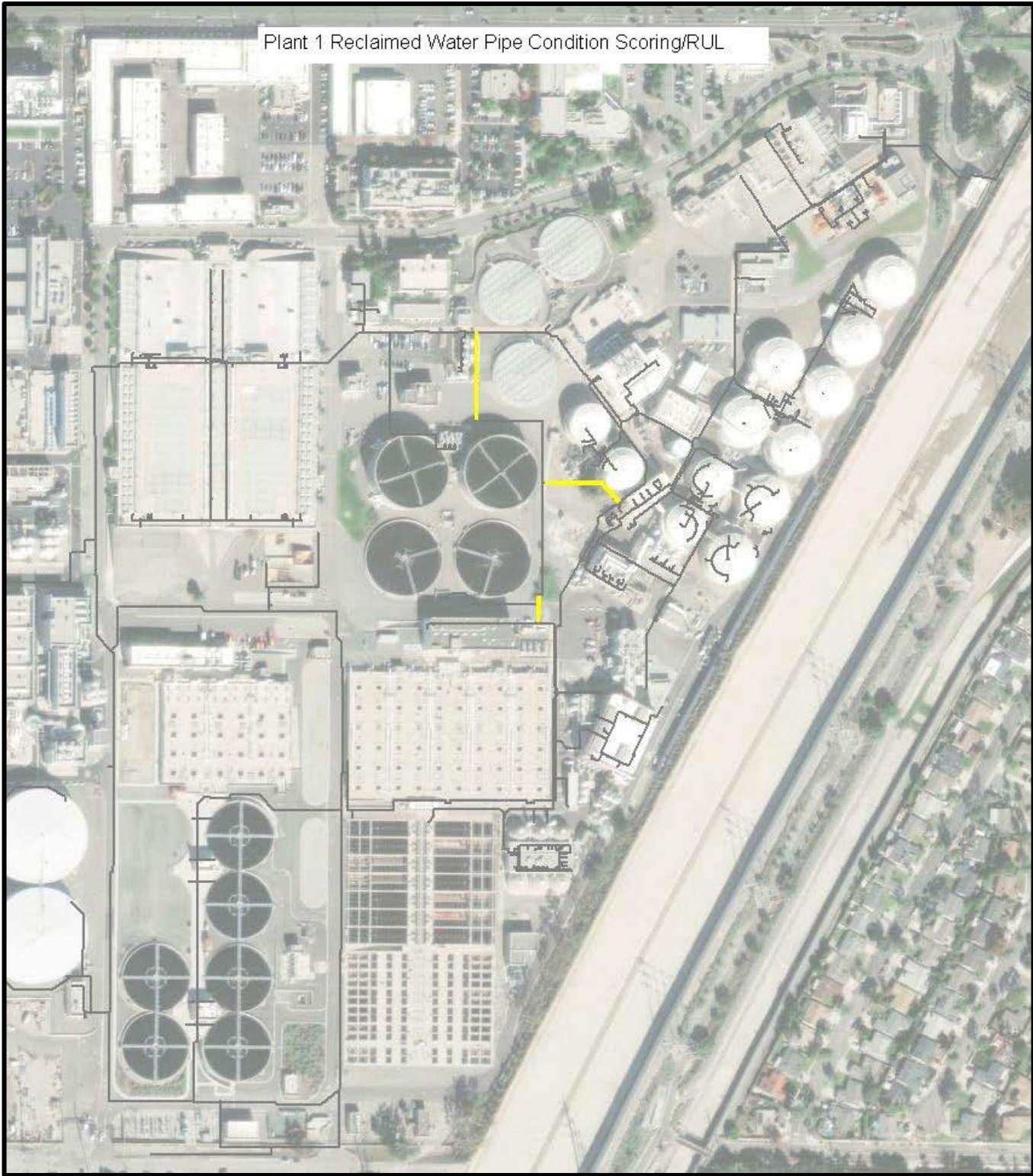
<span style="color: red;">■</span> RUL <5 years	<span style="color: orange;">■</span> RUL 5-10 years	<span style="color: yellow;">■</span> RUL 11-15 years	<span style="color: green;">■</span> RUL 16-20 years	<span style="color: grey;">■</span> RUL >20 years
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**Acronym Key:**  
RUL=Remaining Useful Life



ASSET MANAGEMENT SYSTEM SUMMARY – AREA 17 – PLANT NO. 1 UTILITIES

Remaining Useful Life of Utility Infrastructure



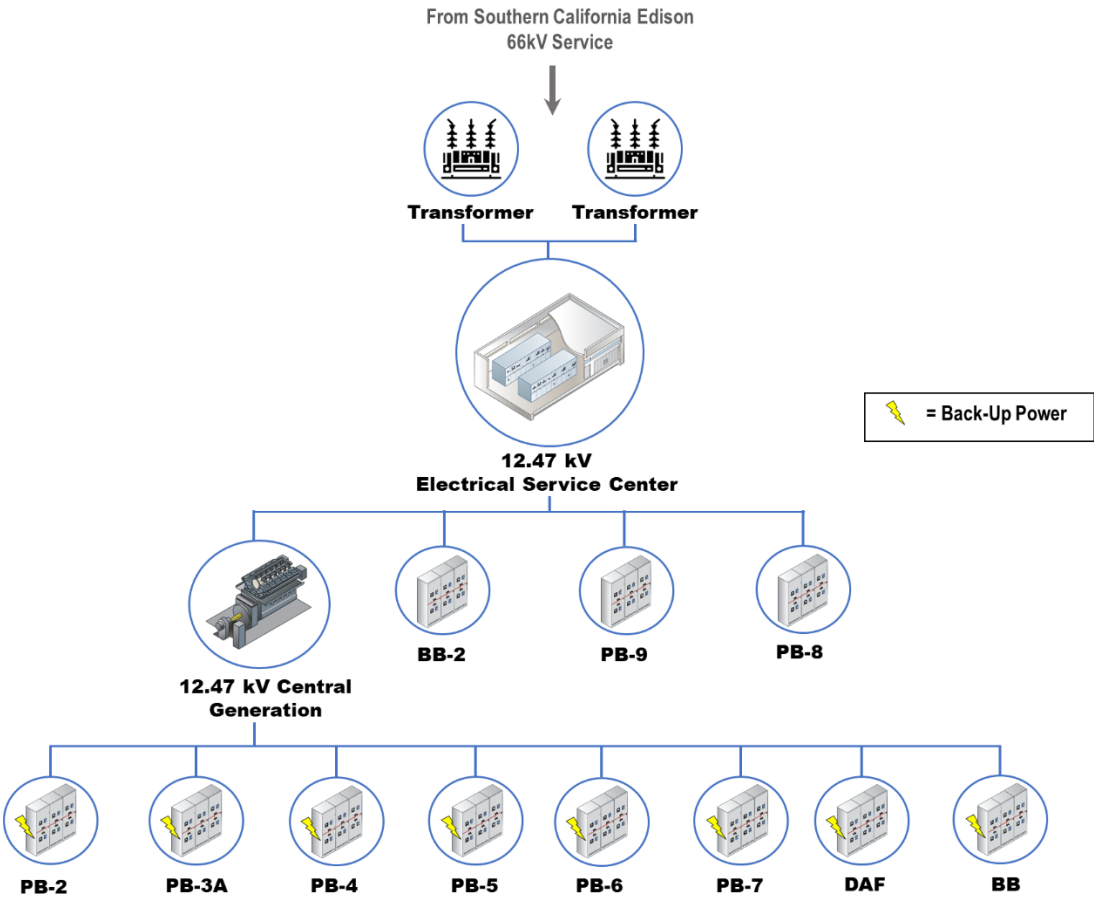
**RUL Legend:**

<span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span> RUL <5 years	<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span> RUL 5-10 years	<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> RUL 11-15 years	<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span> RUL 16-20 years	<span style="display:inline-block; width:15px; height:15px; background-color:gray; border:1px solid black;"></span> RUL >20 years
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**Acronym Key:**  
RUL=Remaining Useful Life

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 18 – PLANT NO. 1 ELECTRICAL DISTRIBUTION

Process Schematic



Major Assets

Major Assets	Quantities
Transformers	35
Standby Generators	8
12kV Switchgears	19
480V Switchgears	5
125VDC and 24VDC Battery Systems	22
UPS	25

Major Assets Remaining Useful Life

Asset Type	Service Center	CENGEN	PB-2	PB-3A	PB-4	PB-5	PB-6	PB-7	PB-8	PB-9	DAF	BB-1	BB-2
Tier I – 12.47kV Primary Distribution Level													
Transformers: 12.47/4.16kV	-	-	-	-	-	-	-	-	-	-	-	4	1
Transformers: 12.47/0.48kV	1	4	2	2	4	1	4	1	1	1	3	4	1
12.47kV Switchgears	3	4	4	4	4	4	4	-	-	-	-	-	1
12.47 kV Transfer Switches	4	-	-	-	-	-	-	-	-	-	-	-	-
12.47 kV Level Indicator Switches	-	-	4	4	4	-	-	1	1	1	3	4	-
12.47kV Feeders	1	4	4	4	4	4	4	1	1	1	4	4	1
Tier II – 4.16kV Distribution Level													
4.16kV Switchgears	-	-	-	-	-	-	-	-	-	-	-	4	1
4.16kV Feeders	-	-	-	-	-	-	-	-	-	-	-	4	1
Tier IV – 480V Distribution Level													
480V Switchgears	-	4	2	2	-	2	4	1	1	1	3	4	1
Transfer Switches	-	-	2	2	4	-	2	-	-	-	4	4	1
Generators	-	-	5	5	5	-	-	1	1	-	-	5	-
Tier V – Uninterruptible Power Supply													
UPSs Individual	-	5	-	5	-	-	3	-	3	2	3	3	3
Tier VI – 125 VDC and 24 VDC Battery Systems													
125VDC Chargers	5	5	5	5	-	3	3	3	3	2	3	-	3
125VDC Batteries	5	5	5	5	-	3	3	3	3	2	3	-	3
24VDC Chargers	-	5	5	5	5	-	-	3	3	-	-	3	-
24VDC Batteries	-	5	5	5	5	-	-	3	3	-	-	3	-
Generator Controls													
Generator Controls	-	5	5	5	5	-	-	1	1	-	-	5	-

Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

Acronym Key:

BB=Blower Building;  
CENGEN=Central Generation;  
kV=Kilovolt;  
PB=Power Building;  
RUL=Remaining Useful Life;  
VDC=Volts of Direct Current;  
UPS=Uninterruptible Power Supply



## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 18 – PLANT NO. 1 ELECTRICAL DISTRIBUTION

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Standby Generators</b> <ul style="list-style-type: none"> <li>- Power Building 2, &amp;3A: Overheating at 75%-80% loading.</li> <li>- Power Building 4: Engine unable to drive the generator at 100% loading.</li> <li>- Blower Building 1: Shut down on high temp. at 100%, cannot synchronize both generators.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>P1-105 will install centralized standby system with (4)-2500kW, 12kV diesel generators for Headworks Area, Power Building 2, 5 and Blower Building standby loads. P1-105 will demolish generators at Power Building 3A. P1-126 will demolish Power Building 4 Generator and re-feed standby loads from Power Building 8. Future Projects will design feeders from new generators to Power Building 2 and Blower Building 1 Standby Loads.</li> </ul>
<ul style="list-style-type: none"> <li><b>Battery Chargers and Batteries – Aging.</b></li> </ul>	<ul style="list-style-type: none"> <li>MP-233: Monitor existing battery life, develop path forward for replacing aged battery and charger systems.</li> </ul>
<ul style="list-style-type: none"> <li><b>Cabling – Aging medium voltage cabling infrastructure.</b></li> </ul>	<ul style="list-style-type: none"> <li>MP-320: Testing aging Medium Voltage Cabling to perform Condition Assessment and develop plan for preventive maintenance.</li> </ul>
<ul style="list-style-type: none"> <li><b>Variable Frequency Drive – Obsolescence.</b></li> </ul>	<ul style="list-style-type: none"> <li>Identified obsolete Variable Frequency Drive. Proceed with Variable Frequency Drive Replacement Strategy</li> </ul>
<ul style="list-style-type: none"> <li><b>Power Building 2 –Seismic issues.</b></li> </ul>	<ul style="list-style-type: none"> <li>Plan to transfer Power Building 2 Loads to T&amp;D Building and demo the building. Consider feeding Power Building 2 standby loads from future Blower Building standby power.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34
MP-233	P1 and P2 Battery System Upgrade	Plant No. 1 Power Distribution	<ul style="list-style-type: none"> <li>Battery Systems are old and in need of refurbishment. The Project will look into replacing old batteries and chargers.</li> </ul>															
MP-320	P1 Medium Voltage Cable PM Services	Plant No. 1 Power Distribution	<ul style="list-style-type: none"> <li>Medium Voltage Cables Condition Assessment and Testing.</li> </ul>															
MP-666,667,668	Obsolete Variable Frequency Drive Replacement Strategy	Plant No. 1 Power Distribution	<ul style="list-style-type: none"> <li>Replacement of obsolete Variable Frequency Drive at Plant No. 1.</li> </ul>															
FE17-03	Battery Storage System at P1	Plant No. 1 Power Distribution	<ul style="list-style-type: none"> <li>Project will arrange for installation, operation, maintenance, and management of behind- the-meter battery energy storage system at Plant No. 1 to reduce peak electrical demand chargers.</li> </ul>															
P1-126	Primary Clarifiers Replacement and Improvements at P1	Plant No. 1 Power Distribution	<ul style="list-style-type: none"> <li>Demolish Power Building 4 Diesel Generator, re-feed standby loads from Power Building 8.</li> </ul>															
X-077	P1 Central Generation Switchgear replacement	Plant No. 1 Central Generation Switchgear Replacement	<ul style="list-style-type: none"> <li>Project will replace existing 12.47kV Central Generation Switchgear, install new 12.47kV Feeder from Electrical Service Center to Central Generation. Install new 12.47kV feeders from Central Generation to Dissolved Air Flotation and Blower Building 1.</li> </ul>															
P1-105	P1 Headworks Rehabilitation	Plant No. 1 Power Distribution/Headworks	<ul style="list-style-type: none"> <li>Project will rehabilitate and upgrade facilities at the Plant No. 1 Headworks. Project will install (3) new Electrical Power Buildings: Power Building 3, Standby Power Electrical Building and Headworks Electrical Building. Project will install new centralized standby generator system; (4) 2500kW Generators.</li> </ul>															
X-038	City Water Pump Station Rehabilitation at P1	Plant No. 1 Power Distribution/Mechanical Equipment/Instrumentation	<ul style="list-style-type: none"> <li>Project will retrofit the building, replace HVAC, replace electrical distribution equipment and control equipment, such as transformers, switchgears, MCCs, VFDs, and surge arrestors.</li> </ul>															
P1-132	UPS Improvement at P1	Plant No. 1 Power Distribution/UPS Systems	<ul style="list-style-type: none"> <li>Project will install new regional UPS at Power Building 8 to provide critical power to facilities northwest region of the plant. New electrical distribution and branch circuits panelboards will replace existing old and obsolete equipment.</li> </ul>															
J-98	Electrical Power Distribution Improvements	Plant No. 1 & Plant No. 2 Power Distribution	<ul style="list-style-type: none"> <li>Project provides various electrical distribution system improvements at Plant No. 1 and Plant No. 2 as recommended by J-25-4 Study.</li> </ul>															

## Types of Project Legend:

■ CIP - Planning   
 ■ CIP – Design   
 ■ CIP - Construction   
 ■ Maintenance Project

## Acronym Key:

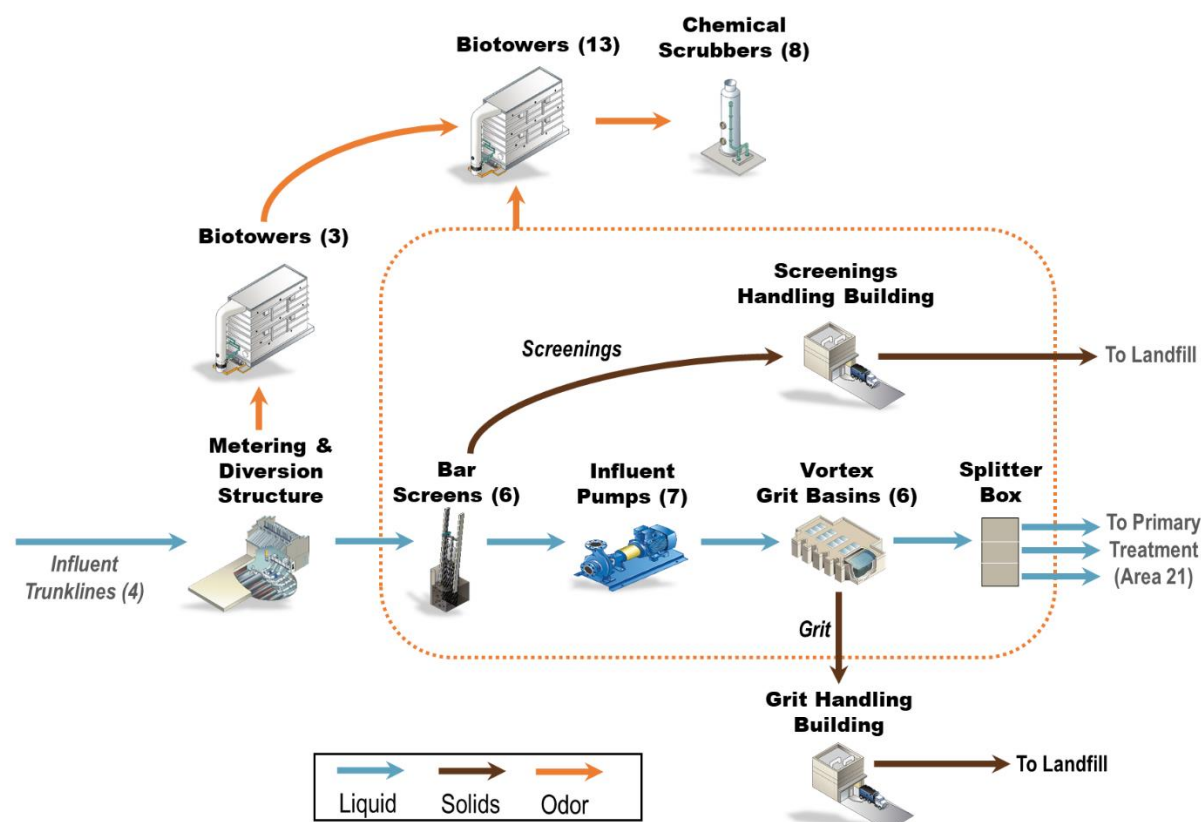
CIP=Capital Improvement Program; FE= Facilities Engineering; FY=Fiscal Year;  
 HVAC=Heating, Ventilation, and Air Conditioning; kV=Kilovolt; kW=Kilowatt; MCC=Motor Control Center; P1=Plant No. 1;  
 P2=Plant No. 2; T&D=Thickening and Dewatering; VFD=Variable Frequency Drive; UPS=Uninterruptible Power Supply

## **5.2.2 Plant No. 2 Asset Management Summaries**

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## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 20 – PLANT NO. 2 PRELIMINARY TREATMENT

## Process Schematic



## Major Assets Remaining Useful Life

Asset Type	Headworks					Trunkline Odor Control	Headworks Odor Control
	Metering & Diversion	Bar Screens	Main Sewage Pump	Grit Basins	Splitter & Metering		
Civil							
Effluent Piping	-	-	-	-	3	-	-
Structural							
Building	-	1	1	1	-	-	-
Concrete & Tanks	1	1	1	1	1	1	1
Mechanical							
Piping & Valve	1	1	1	1	1	-	-
Pump	-	-	1	2	-	2	2
Screening Washer Compactor	-	3	-	-	-	-	-
Grit Cyclone/ Classifier	-	-	-	2	-	-	-
Conveyor	-	2	-	2	-	-	-
Fans & Blower	-	-	-	-	-	2	2
Control Gate	2	2	2	2	2	-	-
Heating, Ventilation & Air Conditioning	-	2	2	2	-	-	-
Crane	-	1	1	-	-	-	-
Electrical							
Process – Motor, MCC, VFD	2	2	4	2	2	2	2
Instrumentation							
PLCs, Flow Meters	2	2	2	2	2	2	2

## Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

## Acronym Key:

MCC=Motor Control Center;  
 PLC= Programmable Logic Controller;  
 RUL=Remaining Useful Life;  
 VFD=Variable Frequency Drive

## Major Assets

Major Assets	Quantities
<b>Metering &amp; Diversion Structure</b>	
Influent Flow Meter	4
Control Gate	7
<b>Trunk Odor Control</b>	
Supply Fan	3
Biotower	3
Recirculation Pump	6

Major Assets	Quantities
<b>Bar Screens</b>	
Bar Screen	6
Screening Washer Compactor	3
Screenings Conveyor	4
Control Gate	14

Major Assets	Quantities
<b>Main Sewage Pump</b>	
Pump	7
Control Gate	16
<b>Splitter and Metering</b>	
Flow meter	3
Control Gate	26

Major Assets	Quantities
<b>Grit Basins</b>	
Grit Basins	6
Grit Slurry Pump	6
Grit Cyclone/ Classifier	4
Control Gate	12

Major Assets	Quantities
<b>Headworks Odor Control</b>	
Supply Fan	21
Biotower	13
Chemical Scrubber	8
Recirculation Pump	42
Bleach Tank	1
Bleach Pump	16

Major Assets	Quantities
<b>Headworks Odor Control (Continued)</b>	
Acid Tank	1
Acid Pump	2
Caustic Tank	1

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 20 – PLANT NO. 2 PRELIMINARY TREATMENT

Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Headworks Low Voltage Cable</b>– There are 480V cables and circuits that are currently grounded, causing ground faults on 480 volt equipment. Last incident happened in July 2019, when the Grit Classifier A was lost due to the ground fault. Due to the complexity of the repair job and its impact to operations, need to develop a replacement plan for known failed cables.</li> </ul>	<ul style="list-style-type: none"> <li>880E located a spare wire for the Grit Classifier A and put back in service.</li> <li>PRN-00409 P2 Headworks 480V Grounded Cable Repair was approved by the Clearinghouse to do the engineering design in-house and bid for service contract for repairs on damaged cables. The bid was awarded and will be presented to the December board for approval.</li> </ul>
<ul style="list-style-type: none"> <li><b>Main Sewage Pump System</b> – P2-122 Headworks Modifications at Plant No. 2 for GWRS Final Expansion will replace 3 of 7 MSP pumps, but use the existing VFDs and Motors. They are due for overhaul to ensure that they continue to be reliable during and beyond the P2-122 construction. Also, current vibration monitoring system, which is Emerson CSI 4500, for MSP is obsolete and no longer supported after this year.</li> </ul>	<ul style="list-style-type: none"> <li>Variable frequency drives are halfway through their anticipated life cycle, so PRN-00528 P2 MSP Variable Frequency Drive Year 10 Preventative Maintenance was approved by the Clearinghouse to perform Year 10 Preventative Maintenance on the drives by the original equipment manufacturer.</li> <li>PRN-00529 Plant No. 2 MSP Motor Overhaul was approved by the Clearinghouse to have the motors overhauled in the motor shop</li> <li>Recommend replacing the obsolete vibration system with GE Bently Nevada since the District plans to standardize the vibration monitoring system.</li> </ul>
<ul style="list-style-type: none"> <li><b>Headworks</b> – Asset life of P2-66 Headworks is relatively new, since it was completed in 2012. No condition assessment has been done in the past. There is a need to perform condition assessment at the Headworks to build a condition baseline.</li> </ul>	<ul style="list-style-type: none"> <li>With P2-122 construction starting next year, area engineer will coordinate with the project team and Operation and Maintenance to conduct condition assessments on areas that will be down for the construction.</li> </ul>

Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
P2-122	Headworks Modifications at Plant No. 2 for GWRS Final Expansion	Headworks	<ul style="list-style-type: none"> <li>Modify headworks and sidestream routing to create reclaimable and non-reclaimable trains to support GWRS Final Expansion.</li> <li>Replace 3 of 7 MSPs with more efficient lower capacity pumps.</li> </ul>															
PRN-00409	Plant No. 2 Headworks 480V Grounded Cable Repair	Headworks	<ul style="list-style-type: none"> <li>In-house engineering design, and bid for service contract for repairs.</li> </ul>															
PRN-00528	Plant No. 2 MSP VFD Year 10 PM	MSP	<ul style="list-style-type: none"> <li>Refurbish all 7 MSP VFDs by performing Year 10.</li> </ul>															
PRN-00529	Plant No. 2 MSP Motor Overhaul	MSP	<ul style="list-style-type: none"> <li>Overhaul all 7 MSP motors in the motor shop.</li> </ul>															
PRN-00561	Plant No. 2 MSP Vibration System Modernization	MSP	<ul style="list-style-type: none"> <li>Modernize obsolete MSP vibration system.</li> <li>Replace and install new vibration sensors on pumps.</li> </ul>															
FE18-11	Headworks Explosive Gas Monitoring Systems at Plant No. 2	TL & HW Odor Control	<ul style="list-style-type: none"> <li>Install an Early Warning System to provide early indication of combustible gas at the influent of the plant.</li> </ul>															
FE18-17	Trunkline Sampler Power Feed at Plant No. 2	Trunkline	<ul style="list-style-type: none"> <li>Provide 120V power for four automated samplers at 4 trunkline sample collection points.</li> </ul>															
MP-699	Plant No. 2 Trunkline Biotower #3 Repair	TL Odor Control	<ul style="list-style-type: none"> <li>Repair internal mechanism of the Biotower #3 vessel.</li> </ul>															
N/A	Plant No. 2 Biotower Media Replacement	TL & HW Odor Control	<ul style="list-style-type: none"> <li>Replace biotower media of 16 biotowers.</li> </ul>															
N/A	Plant No. 2 Chemical Scrubber Media Replacement	HW Odor Control	<ul style="list-style-type: none"> <li>Replace scrubber media of 8 chemical scrubbers.</li> </ul>															
X-030	Plant No. 2 Headworks Rehabilitation	Headworks	<ul style="list-style-type: none"> <li>Rehabilitate any equipment, electrical, structures, or materials that cannot provide 25 years of useful life.</li> </ul>															

Types of Project Legend:

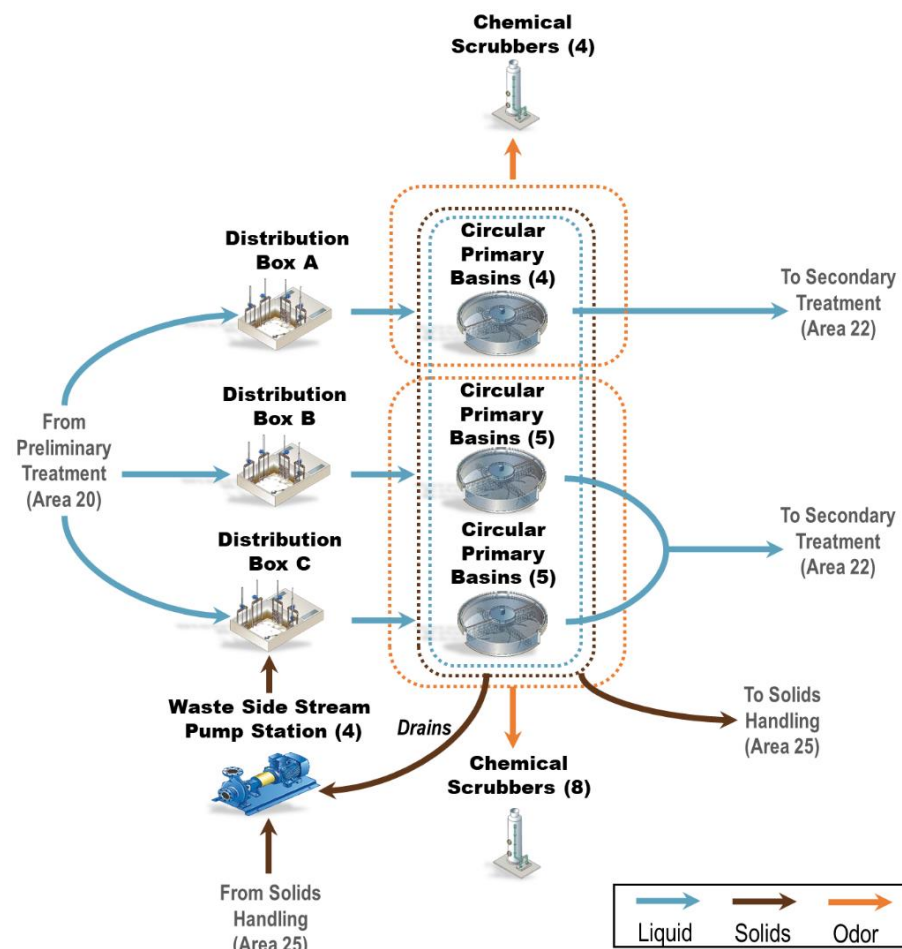
CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

Acronym Key:

CIP=Capital Improvement Program; FY=Fiscal Year; GWRS=Groundwater Replenishment System; HW=Headworks; MSP=Main Sewage Pump; N/A= Not Applicable; PM=Preventative Maintenance; TL=Trunkline; V=Volts; VFD=Variable Frequency Drive

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 21 – PLANT NO. 2 PRIMARY TREATMENT

## Process Schematic



## Acronym Key:

HVAC=Heating, Ventilation, and Air Conditioning; MCC=Motor Control Center; NSC=North Scrubber Complex; PB=Power Building; RUL=Remaining Useful Life; SSC=South Scrubber Complex; VFD=Variable Frequency Drive; WSSPS=Waste Sidestream Pump Station

## Major Assets Remaining Useful Life

Asset Type	A-Side				B-Side					C-Side					NSC	SSC	Polymer System	Ferric System	Distribution Box	WSSPS-C
	PB-D	PB-E	PB-F	PB-G	PB-H	PB-I	PB-J	PB-K	PB-L	PB-M	PB-N	PB-O	PB-P	PB-Q						
Civil																				
Effluent Piping	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	-	-	2
Structural																				
General	4	4	3	3	4	3	3	3	3	3	2	2	2	2	3	3	3	2	3	1
Dome	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-
Mechanical																				
Piping	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	2	3	2
Internal Mechanism	5	5	3	3	5	3	3	3	3	4	5	3	4	4	-	-	-	-	-	-
Fans & Pumps	3		3		3		3		3		3		3		3	3	3	2	-	4
HVAC & Ventilation	2		2		2		2		2		2		2		-	-	-	-	-	-
Gates	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
Electrical																				
Process – Motor, MCC, VFD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	-	3
Instrumentation																				
PLC, Flow Meters	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	2	-	3

## RUL Legend:

■ RUL <5 years  
 ■ RUL 5-10 years  
 ■ RUL 11-15 years  
 ■ RUL 16-20 years  
 ■ RUL >20 years

## Major Assets

Major Assets	Quantities
<b>Primary Basin</b>	
Primary Basin	4
Sludge/ Scum Collectors	4
Sludge/ Scum Pump	8
Supply Fan	6
<b>B-Side</b>	
Primary Basin	5
Sludge/ Scum Collectors	5
Sludge/ Scum Pump	10
Supply Fan	7

Major Assets	Quantities
<b>C Side</b>	
Primary Basin	5
Sludge/ Scum Collectors	5
Sludge/ Scum Pump	10
Supply Fan	8
<b>North Scrubber Complex</b>	
Chemical Scrubber	7
Biofilter	1
Recirculation Pump	16
Supply Fan	8
Caustic Tank	1

Major Assets	Quantities
<b>North Scrubber Complex (Continued)</b>	
Acid Feed Pump	2
Bleach Tank	1
Bleach Feed Pump	14
Caustic Feed Pump	16
Acid Tank	1
<b>South Scrubber Complex</b>	
Supply Fan	4
Scrubbers	4
Recirculation Pump	8
Caustic Tank	1

Major Assets	Quantities
<b>South Scrubber Complex (Continued)</b>	
Caustic Feed Pump	8
Acid Tank	1
Acid Feed Pump	2
Bleach Tank	1
Bleach Feed Pump	2
<b>Polymer System</b>	
Polymer Bulk Tank	3
Polymer Bulk Transfer Pump	4
Polymer Mix Tank	2

Major Assets	Quantities
<b>Polymer System (Continued)</b>	
Polymer Feed Pump	4
<b>Ferric System</b>	
Ferric Bulk Tank	2
Ferric Feed Pump	6
<b>Distribution Boxes</b>	
Structure	3
Sluice Gates	24
<b>Waste Sidestream Pump Station C</b>	
Waste Sidestream Pump	4



# ASSET MANAGEMENT SYSTEM SUMMARY – AREA 21 – PLANT NO. 2 PRIMARY TREATMENT

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Reliability of Primary Basins</b> – Due to its age, basins have corroded internal mechanism issues, and Basin D, E, H, I, and N are not currently operational. With wet weather officially begins in October 15<sup>th</sup>, at least two basins need to be back in service, bringing the total available to 11 basins. With existing A-Side basins being demolished and replaced with new basins, B/ C side of basins need to be stay reliable for 10 years to support P2-98A construction.</li> </ul>	<ul style="list-style-type: none"> <li>Basins D, E, H, and I are down for repair through P2-98B B &amp; C Side Interim Repair. Basin N is down due to the imbalance of the sweep arm. Basin N is scheduled to be assessed by OEM of internal mechanism to identify addition scope needed to put the basin back in service.</li> <li>MP-692 P2 Primary Basin N Repairs is in place to cover additional items beyond P2-98B scope.</li> <li>P2-98A and P2-133 are in place to provide long term solutions to all A, B, &amp; C side of primary clarifiers.</li> </ul>
<ul style="list-style-type: none"> <li>Reliability of Waste Sidestream Pump Station C – Waste sidestream pumps and their associate equipment show accelerated corrosion issue due to the drains from the South Scrubber Complex. The South Scrubber Complex uses bleach for their scrubbers and the bleach pumps are oversized and do not have good turndown ratio. Excessive bleach goes to the drains that go to the WSSPS-C. The materials are not compatible with bleach, resulting accelerated corrosion.</li> </ul>	<ul style="list-style-type: none"> <li>MP-420 Plant No. 2 South Scrubber Complex Bleach Pump is in place to replace oversized bleach pump with smaller sized pump with better turndown capacity. This will reduce excess bleach that flows to the WSSPS-C.</li> <li>Two failed pumps (5HP and 35HP) are sent out for root cause failure analysis and will be replaced with improved design.</li> <li>X-054 WSSPS-C Rehabilitation at Plant No. 2 is in place to address corroded equipment caused by replacing equipment with upgraded material.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
P2-98A	A-Side Primary Clarifiers Replacement at Plant No. 2	A Side Primary Basins	<ul style="list-style-type: none"> <li>Demolish and replace four existing A-Side Primary Basins.</li> <li>Demolish and replace the South Scrubber Complex.</li> </ul>															
P2-98B	B/C Side Primary Clarifiers Interim Repair at Plant No. 2	B & C Side Primary Basins	<ul style="list-style-type: none"> <li>Repair the structural steel mechanism members of 12 primary basins.</li> <li>Interim repairs to make basins reliable for 10 years during P2-98A construction.</li> </ul>															
P2-133	B/C Side Primary Clarifiers Rehabilitation at Plant No. 2	B & C Side Primary Basins	<ul style="list-style-type: none"> <li>Long term repairs to extend remaining useful life of B &amp; C side basins to 40 years or greater.</li> </ul>															
PRN-00306	Plant No. 2 Primary Clarifier D & E Repairs	Primary Basin D & E	<ul style="list-style-type: none"> <li>Interim repairs for Primary Basin D &amp; E to extend the lifecycle by 8-10 years. Added to P2-98B scope.</li> </ul>															
MP-692	Plant No. 2 Primary Clarifier N Repairs	Primary Basin N	<ul style="list-style-type: none"> <li>Identify and repair items not covered in P2-98B scope to make the basin operable for next 10 years.</li> </ul>															
MP-420	Plant No. 2 South Scrubber Complex Bleach Pump	South Scrubber Complex	<ul style="list-style-type: none"> <li>Replace existing bleach pumps with higher turndown capable pump to reduce excess bleach usage.</li> </ul>															
X-054	Waste Sidestream Pump Station C Rehabilitation at Plant No. 2	Waste Sidestream Pump Station C	<ul style="list-style-type: none"> <li>Replace pumps and associated equipment with chemical resistant material to provide reliable operation.</li> </ul>															

### Types of Project Legend:

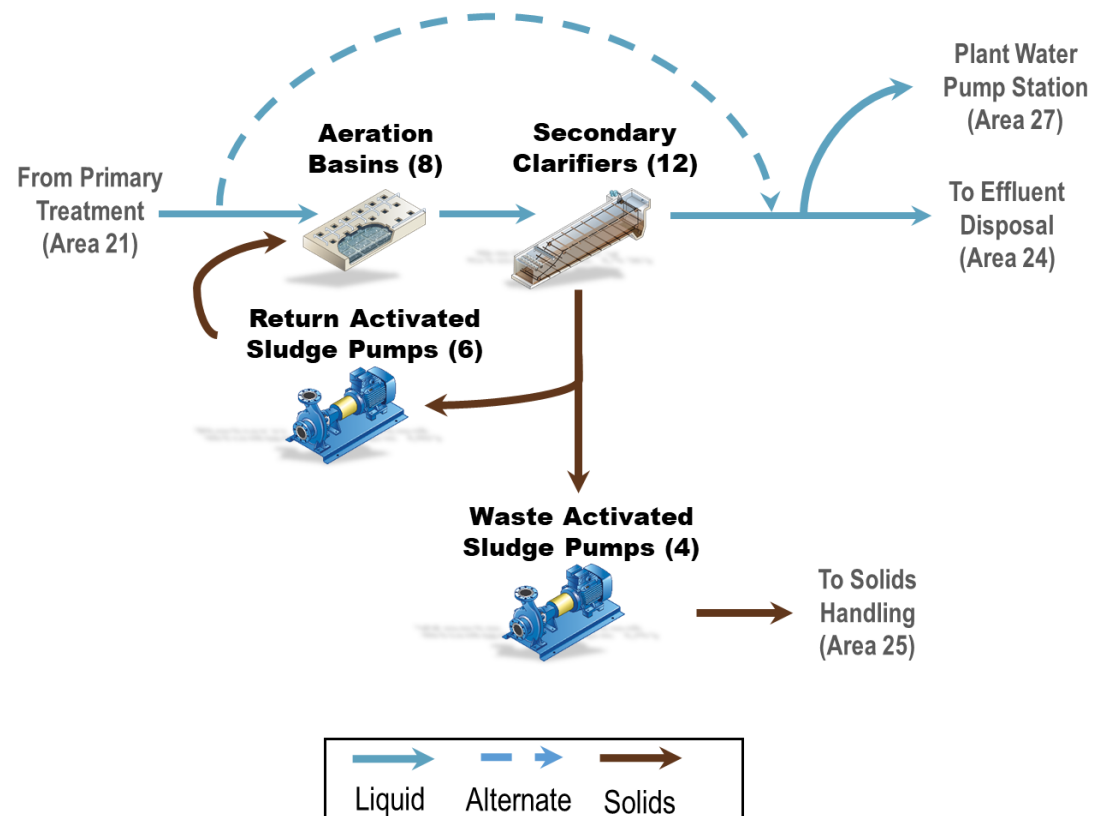
CIP - Planning
CIP – Design
CIP - Construction
Maintenance Project

### Acronym Key:

CIP=Capital Improvement Program; FY=Fiscal Year; HP=Horsepower;  
OEM=Original Equipment Manufacturer; WSSPS=Waste Sidestream Pump Station

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 22 – PLANT NO. 2 SECONDARY TREATMENT – ACTIVATED SLUDGE

## Process Schematic



## Acronym Key:

DAFT=Dissolved Air Flotation Thickener; LOX=Liquid oxygen; MCC=Motor Control Center;  
 PEPS=Primary Effluent Pump Station; PLC=Programmable Logic Controller; PS=Pump Station;  
 RAS=Return Activated Sludge; RUL=Remaining Useful Life; SEJB=Secondary Effluent Junction Box;  
 TWAS= Thickened Waste Activated Sludge; VFD=Variable Frequency Drive; WAS=Waste Activated Sludge;  
 WSSPS=Waste Sidestream Pump Station

## Major Assets Remaining Useful Life

Asset Type	PEPS	Aeration Basins	Secondary Clarifiers A-L	SEJB	East RAS /WAS PS	West RAS/WAS PS	Oxygen Facility	DAFTs A-D	DAFTs Polymer System	DAFTs Odor Control	WSSPS
<b>Civil</b>											
Effluent Piping	2	-	3	3	4	4	-	-	-	-	4
<b>Structural</b>											
Building	2	-	-	-	2	2	-	1	-	-	-
Structure	2	4	3	3	-	-	-	1	1	1	-
<b>Mechanical</b>											
Pump	2	-	-	-	3	3	-	2	2	-	3
Aerator	-	4	-	-	-	-	-	-	-	-	-
Piping and Valve	3	3	3	3	3	3	3	2	2	3	3
Clarifier/DAFT Moving Mechanism	-	-	5	-	-	-	-	2	-	-	-
Channel Air Blower	-	-	-	-	-	4	-	-	-	-	-
Control Gate	-	3	4	3	-	-	-	-	-	2	-
LOX Facility	-	-	-	-	-	-	3	-	-	-	-
HVAC & Ventilation	2	-	-	-	3	3	-	-	-	-	-
Crane	3	-	-	-	-	-	-	-	-	-	-
<b>Electrical</b>											
MCC & VFD	4	3	3	-	4	4	-	3	3	3	3
<b>Instrumentation</b>											
PLC & Flow Meter	3	3	3	-	3	3	3	3	3	-	3

## RUL Legend:

RUL <5 years
  RUL 5-10 years
  RUL 11-15 years
  RUL 16-20 years
  RUL >20 years

## Major Assets

Major Assets	Quantities
<b>Primary Effluent Pump Station</b>	
Building	1
Structure	1
Pumps	4
<b>Aeration Basins</b>	
Basins	8
Surface Aerators	32
Inlet gates	8

Major Assets	Quantities
<b>Secondary Clarifiers A-L</b>	
Basins	12
Inlet gates	36
Sludge collectors	24
<b>Secondary Effluent Junction Box</b>	
Structure	1
Control Gate	1
<b>East RAS/WAS PS</b>	
RAS/WAS Pumps	5

Major Assets	Quantities
<b>West RAS/WAS PS</b>	
RAS Pumps	3
WAS Pumps	2
Channel air blowers	2
Sliding Frames	2
<b>Oxygen Facility</b>	
LOX Storage Tanks	2
Vaporizer	6
Oxygen Purging Fan	2

Major Assets	Quantities
<b>DAFTs A-D</b>	
Concrete Tanks	4
Mechanical Sweep	4
Recycle Pumps	6
Saturation Tank	4
TWAS Pumps	8
<b>DAFTs Polymer System</b>	
Storage Tank	1
Aging Tank	2

Major Assets	Quantities
<b>DAFTs Polymer System (Continued)</b>	
Storage Tank Rec. Pumps	2
Blend Pumps	2
Feed Pumps	6
<b>DAFTs Odor Control</b>	
Biofilters	3
Foul Air Fans	3
<b>Waste Sidestream Pump Station</b>	
Pumps	3



# ASSET MANAGEMENT SYSTEM SUMMARY – AREA 22 – PLANT NO. 2 SECONDARY TREATMENT – ACTIVATED SLUDGE

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>PEPS</b> – Obsolete VFD parts</li> <li>Missing flapper gates on the area drains inlets to the basins</li> </ul>	<ul style="list-style-type: none"> <li>PRN-00573 (MP-513) project will replace the PEPS VFDS</li> <li>Condition assessment will be performed to determine the condition</li> </ul>
<ul style="list-style-type: none"> <li><b>Aeration Basins</b>– Cracks and concrete spalling on aeration basins deck</li> <li>Aerator motor corrosion and vibration</li> </ul>	<ul style="list-style-type: none"> <li>P2-118 filled the cracks on west side, and the remaining work will be included in P2-123 contract</li> <li>Maintenance have been rebuilding the gearbox, the motor base, and replacing the motor</li> <li>X-050 will overall rehab. the aeration basins</li> </ul>
<ul style="list-style-type: none"> <li><b>Clarifiers</b>– Broken clarifier mechanism need to be repaired or replaced</li> <li>Corroded Inlet gates need to be replaced</li> <li>Broken Area lights</li> </ul>	<ul style="list-style-type: none"> <li>MP-248 will replace D, L, G, J, C, F), and the remaining six will be replaced by another MP</li> <li>MP-638 Will replace all the 36 inlet gates</li> <li>P2-123 will replace all the lights</li> </ul>
<ul style="list-style-type: none"> <li><b>RAS/WAS Pump Stations</b> – Obsolete VFDs</li> <li>Corroded RAS piping</li> </ul>	<ul style="list-style-type: none"> <li>PRN-00573 (MP-513) will replace the RAS and WAS VFDs</li> <li>P2-123 will replace the RAS piping</li> </ul>
<ul style="list-style-type: none"> <li><b>Oxygen Facility</b> - LOX Tank A out of service due to leaking flange</li> </ul>	<ul style="list-style-type: none"> <li>Operation is working on a contract to repair the LOX tank</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>MP-248</b>	Plant No. 2 Secondary Clarifiers D, G, L, J, F, C Repairs	Secondary clarifiers	<ul style="list-style-type: none"> <li>Replace the six clarifiers moving mechanisms.</li> </ul>																
<b>PRN-00457</b>	Activated Sludge Plant Clarifier Inlet Gate Replacement at Plant No. 2	Secondary clarifiers	<ul style="list-style-type: none"> <li>Replace all the 36 inlet gates with stainless steel gates.</li> </ul>																
<b>P2-122</b>	P2-122 - Headworks Modifications at Plant No. 2 for GWRS Final Expansion	AS plant, WSSPS	<ul style="list-style-type: none"> <li>Separate the reclaimable and non-reclaimable streams. AS Plant will treat non-reclaimable flow. WSSPS discharge piping to primary basins will be demolished and be directed to PEPS.</li> </ul>																
<b>P2-123</b>	Return Activated Sludge Piping Replacement at Plant No. 2	RSS pump stations and secondary clarifiers	<ul style="list-style-type: none"> <li>Replace RAS piping, area lights and fix the concrete cracks and spalling on east aeration basin decks.</li> </ul>																
<b>PRN -00573 (MP-513)</b>	Plant No. 1, Plant No. 2, Collections VFD Drives Replacement	PEPS, RSS pump stations	<ul style="list-style-type: none"> <li>Replace PEPS, RAS and WAS VFDs</li> </ul>																
<b>X-50</b>	Activated Sludge Aeration Basin Rehab. at Plant No. 2	AS plant aeration basins	<ul style="list-style-type: none"> <li>Rehabilitate the AS process.</li> </ul>																
<b>X-52</b>	Activated Sludge RAS/WAS/PEPS/Vaporizers Rehabilitation at Plant No. 2	AS plant	<ul style="list-style-type: none"> <li>Rehabilitate the RAS/WAS/PEPS/LOX vaporizers.</li> </ul>																
<b>PRN-00572</b>	Plant No. 2 AS Plant Clarifiers Rehabilitation - Phase 2	Secondary clarifiers	<ul style="list-style-type: none"> <li>Replace Clarifiers A, B, E, G, H, L moving mechanism.</li> </ul>																

### Types of Project Legend:

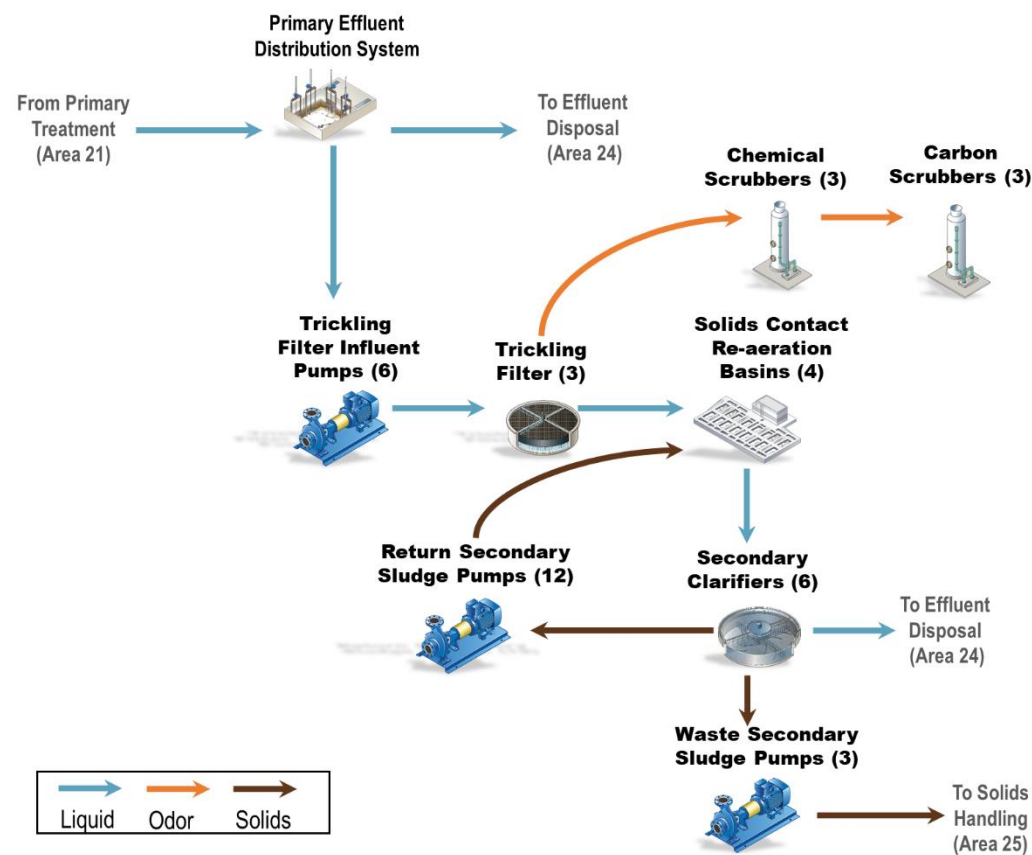
■ CIP - Planning
 ■ CIP – Design
 ■ CIP - Construction
 ■ Maintenance Project

### Acronym Key:

AS= Activated sludge; CIP=Capital Improvement Program; FY= Fiscal Year;  
 GWRS=Groundwater Replenishment System; LOX=Liquid Oxygen; PEPS=Primary Effluent Pump Station;  
 RAS=Return Activated Sludge; RSS= Return secondary sludge; VFD=Variable Frequency Drive;  
 WAS=Waste Activated Sludge; WSSPS=Waste Sidestream Pump Station

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 22 - PLANT NO. 2 SECONDARY TREATMENT – TRICKLING FILTERS

## Process Schematic



## Major Assets Remaining Useful Life

Asset Type	TFPS & Elec Room	Trickling Filters A-C	Solids Contact & ML Channel	Blower/ WSS PS Building	Secondary Clarifiers A-F	RSS PS A	RSS PS B	RSS PS C & Elec. Room	DCJ	Odor Control Facility	Chemical Facility
<b>Civil</b>											
Effluent Piping	2	2	2	2	2	2	2	2	-	2	2
<b>Structural</b>											
Building	1	-	-	1	-	1	1	1	-	-	-
Structure	1	1	1	-	1	-	-	-	-	2	2
<b>Mechanical</b>											
Pump	4	-	-	2	2	2	2	2	-	2	3
TF Rotary Distributor	-	2	-	-	-	-	-	-	-	-	-
TF Media	-	3	-	-	-	-	-	-	-	-	-
Clarifier Sludge Collector	-	-	-	-	3	-	-	-	-	-	-
Blower & Fan	-	2	-	2	-	-	-	-	-	2	-
Control Gate	-	3	3	3	3	-	-	-	-	-	-
Piping and Valve	2	2	2	2	2	2	2	2	-	2	2
Diffusor	-	-	2	-	-	-	-	-	-	-	-
HVAC & Ventilation	2	-	-	2	-	2	2	2	2	-	-
Crane	2	-	-	2	-	2	2	2	-	-	-
<b>Electrical</b>											
MCC & VFD	3	3	-	3	3	-	-	3	3	3	3
<b>Instrumentation</b>											
PLCs & Flow Meters	3	3	-	3	3	3	3	3	3	3	3

## Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

## Acronym Key:

HVAC=Heating, Ventilation, and Air Conditioning;  
 DCJ=Distribution Center J;  
 Elec.=Electrical;  
 RUL=Remaining Useful Life;  
 RSS=Return Secondary Sludge;  
 MCC=Motor Control Center;  
 ML=Mixed Liquor;  
 PLC= Programmable Logic Controller;  
 PS= Pump Station;  
 TF= Trickling Filter;  
 TFPS= Trickling Filter Pump Station;  
 VFD=Variable Frequency Drive;  
 WSS=Waste Secondary Sludge

## Major Assets

Major Assets	Quantities
<b>Trickling Filter Pump Station</b>	
Building	1
Pumps	6
<b>Trickling Filters A-C</b>	
Basins	3
Rotary Distributor	3
Recirculation Fans	6

Major Assets	Quantities
<b>Solids Contact &amp; ML Channel</b>	
Structures	2
Control gates	multiple
Diffusors	multiple
<b>Blower/WSS PS Building</b>	
Building	1
SR Blowers	3
SC Blowers	3
WSS Pumps	3

Major Assets	Quantities
<b>Secondary Clarifiers A-F</b>	
SC Basins	6
Sludge Collector	6
Scum pumps	6
<b>RSS PS A</b>	
Buildings	1
RSS Pumps	4
<b>RSS PS B</b>	
Buildings	1
RSS Pumps	4

Major Assets	Quantities
<b>RSS PS C &amp; Electrical Room</b>	
Buildings	1
RSS Pumps	4
<b>Distribution Center J</b>	
Building	1
<b>Odor Control Facility</b>	
Foul Air Fans	3
Chemical scrubbers	3
Carbon Units	3

Major Assets	Quantities
<b>Chemical System</b>	
Bleach Storage Tanks	2
Caustic Storage Tank	1
Bleach Pumps	7
Caustic Pumps	6

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 22 – PLANT NO. 2 SECONDARY TREATMENT – TRICKLING FILTERS

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>TFPS</b> – Pumps seal water failure due to the seal tube corrosion</li> </ul>	<ul style="list-style-type: none"> <li>PRN-00493 (MP-551) removed the C2 pump to the manufacture authorized pump shop to do inspection and evaluation. All six pumps will be repaired with parts replaced with better corrosion resistant materials. There pumps will be refurbished by the end of 2019.</li> </ul>
<ul style="list-style-type: none"> <li><b>Snail control</b> – Signs of snail shell accumulation at process area and excessive wearing on RSS and WSS pipes.</li> </ul>	<ul style="list-style-type: none"> <li>Changed from 25% percent caustic injection to 50%.</li> <li>PS18-10 did the evaluation and recommended to change the injection the original design of flooding. Operation is doing the testing of flooding.</li> <li>Performed condition assessment of various pipes and replaced the bad pipes.</li> </ul>
<ul style="list-style-type: none"> <li><b>Clarifiers</b>– Clarifier E out of service since December 2018 due to the damage of the moving mechanism.</li> </ul>	<ul style="list-style-type: none"> <li>PRN-00503 (MP-622) performed the condition assessment by the equipment manufacture Ovivo and will repair the mechanism. Clarifier E will return to service by in December 2019.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>MP-339</b>	Plant No. 2 Trickling Filter Fan Support Modifications	Trickling filter fans	<ul style="list-style-type: none"> <li>Raise the fan motor base, allowing for the use of shorter belts.</li> </ul>																
<b>PRN-00493 (MP-551)</b>	Plant No. 2 Trickling Filter Seal Tube Evaluation and Repair	TFPS pumps	<ul style="list-style-type: none"> <li>Identify the cause, replace parts and repair all the six pumps.</li> </ul>																
<b>PRN-00503 (MP-622)</b>	Plant No. 2 TFSC Clarifier E Damage Evaluation and Repair	Clarifier E	<ul style="list-style-type: none"> <li>Identify the cause of the damage, replace the damaged parts, make modification to bring Clarifier E back to service.</li> </ul>																
<b>J-117B</b>	Outfall Low Flow Pump Station	DCJ, TFSC effluent	<ul style="list-style-type: none"> <li>New PWPS to draw flow from TFSC secondary effluent</li> <li>Provide 2nd feed to DCJ from Central Generation and load shed for non-critical loads.</li> </ul>																
<b>P2-122</b>	Headworks Modifications at Plant No. 2 for GWRS Final Expansion	TFSC influent and effluent	<ul style="list-style-type: none"> <li>TFSC to treat the reclaimable stream.</li> </ul>																
<b>J-36-2</b>	GWRS Final Expansion Coordination	TFSC effluent	<ul style="list-style-type: none"> <li>New diversion structure and weir box to divert the TFSC effluent to OCWD equalization tanks and pump station at Plant No. 2.</li> </ul>																
<b>X-031</b>	Plant No. 2 TF/SC Rehabilitation	TFSC facility	<ul style="list-style-type: none"> <li>Overall rehab. TF/SC.</li> <li>Replace the TF media.</li> </ul>																

## Types of Project Legend:

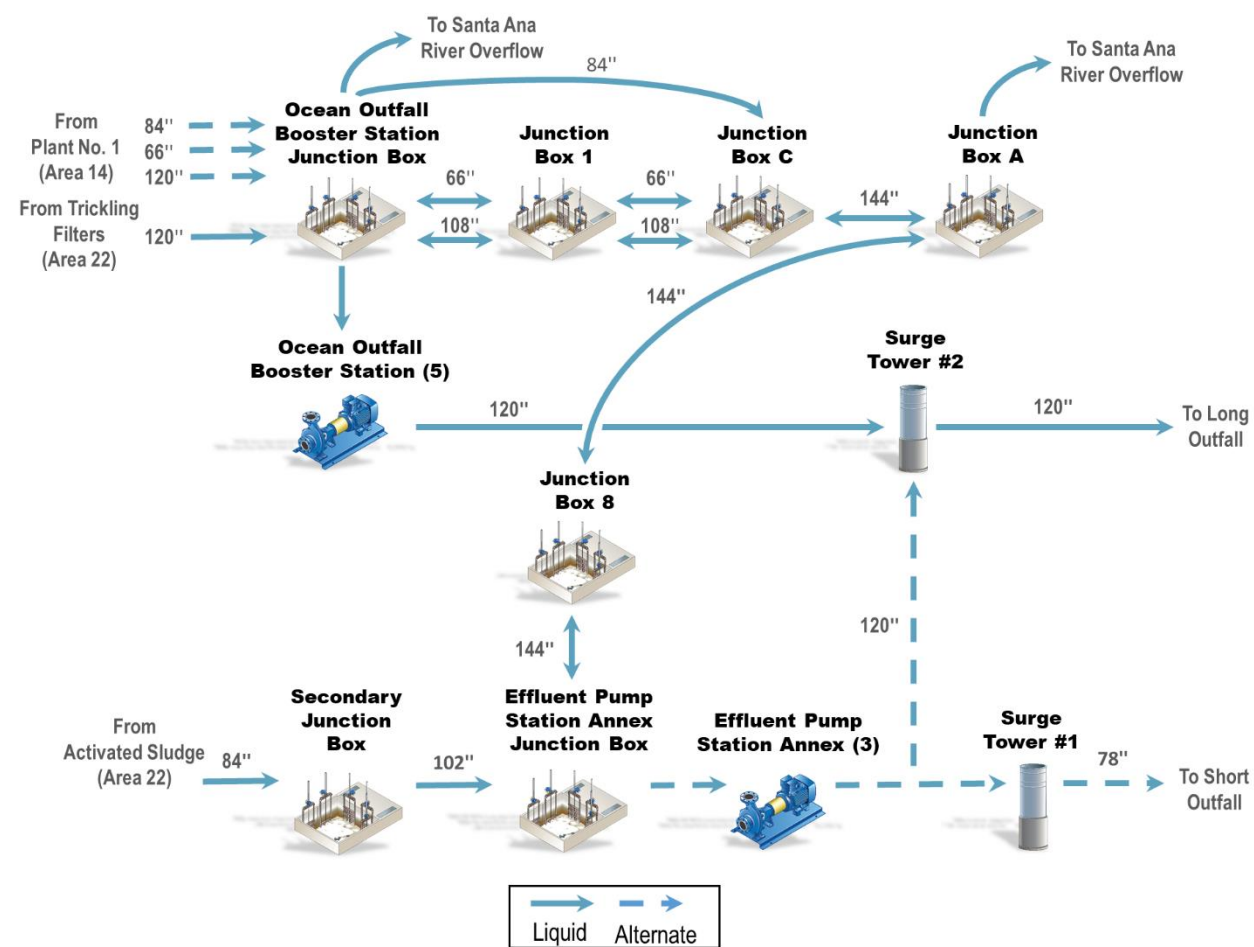
 CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

## Acronym Key:

CIP=Capital Improvement Program; DCJ=Distribution Center J; FY=Fiscal Year;  
 GWRS =Groundwater Replenishment System; MCC=Motor Control Center; ML=Mixed Liquor;  
 OCWD= Orange County Water District; PLC= Programmable Logic Controller;  
 PWPS = Plant Water Pump Station; RSS=Return Secondary Sludge; SC=Secondary Clarifier; TF= Trickling Filter;  
 TFPS= Trickling Filter Pump Station; TFSC= Trickling Filter Secondary Clarifier; VFD=Variable Frequency Drive;  
 WSS=Waste Secondary Sludge

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 24 – PLANT NO. 2 EFFLUENT DISPOSAL

## Process Schematic



## Major Assets Remaining Useful Life

Asset Type	OOBS	Junction Boxes				EPSC	Disinfection System	Land Outfalls				120" Ocean Outfall	78" Ocean Outfall
		JB-1	JB-C	JB-A	JB-8			Surge Tower #1	Surge Tower #2	Sample Building	Beach Box		
Civil													
Effluent Piping	4	1	2	2	2	4	2	1	2	1	2	-	-
Structural													
Structures, Buildings	4	1	2	2	2	2	2	1	2	1	2	1	1
Mechanical													
Pumps, Fans	3	-	-	-	-	2	2	-	-	-	-	-	-
Gates	2	1	2	2	2	3	-	-	-	-	-	-	-
Valves	2	-	-	-	-	2	-	-	2	-	-	-	-
Pipes	3	1	2	2	2	4	-	1	2	1	1	-	-
Manhole Covers	-	-	-	-	-	-	-	-	-	-	-	?	?
Monel Parts	-	-	-	-	-	-	-	-	-	-	-	?	?
Ballast	-	-	-	-	-	-	-	-	-	-	-	?	?
Electrical													
Process – Motor, MCC, VFD	5	-	-	-	-	4	2	2	2	2	-	-	-
Instrumentation													
PLC, Flow Meters	5	-	-	-	-	3	2	2	2	2	-	-	-

## Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

## Acronym Key:

EPSC=Effluent Pump Station Annex;  
 JB=Junction Box;  
 MCC=Motor Control Center;  
 OOBS=Ocean Outfall Booster Station;  
 PLC= Programmable Logic Controller;  
 RUL=Remaining Useful Life;  
 ? = Unknown RUL;  
 VFD=Variable Frequency Drive

## Major Assets

Major Assets	Quantities
<b>Ocean Outfall Booster Station</b>	
Pump	5
Wingwall Structure	1
Gate	3
<b>Junction Boxes</b>	
Junction Boxes	4
Wingwall Structure	1
Gate	13

Major Assets	Quantities
<b>Effluent Pump Station Annex</b>	
Pump	3
Gate	14
<b>Disinfection Facility</b>	
Sodium Bisulfite Tank	3
Sodium Bisulfite Feed Pump	6
Bleach Tank	6
Bleach Feed Pump	8

Major Assets	Quantities
<b>Land Outfalls</b>	
Surge Tower	2
Sample Building	1
Flowmeters	3
Beach Box	1
<b>120" Ocean Outfall</b>	
Port hole	500
Manhole cover	47

Major Assets	Quantities
<b>78" Ocean Outfall</b>	
Port hole	125
Manhole cover	14



## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 24 – PLANT NO. 2 EFFLUENT DISPOSAL

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Reliability of EPSA Pumps</b> – With J-117B rehabilitating OOBs pumps, up to 2 OOBs pumps may be down during the construction, which is scheduled to begin in April of 2021. By then, EPSA system needs to stay reliable to compensate outfall capacity loss from OOBs being down. There are currently 3 ongoing projects to improve EPSA reliability, which are VFD cells refurbishment, motor cooling improvement, and EPSA discharge line assessment and repair</li> </ul>	<ul style="list-style-type: none"> <li>EPSA motors cooling issue has been approved by Clearinghouse (PRN-00519) by modifying the motor cooling with additional internal fans. This effort will be executed by the Small Capital Delivery group.</li> <li>VFD cells refurbishment and control modernization approved by the Board. Plan is to complete the refurbishment and perform control upgrades by summer of 2020.</li> <li>Issued a Purchase Order to perform a confined space entry assessment for EPSA discharge pipelines. Once the internal condition is known, repair plan will be developed.</li> </ul>
<ul style="list-style-type: none"> <li><b>OOBS &amp; EPSA Overflow pipe and wing wall assessment</b> – J-117A Interplant Effluent Pipeline Rehabilitation assessed OOBs overflow structure pipe segments and its concrete wing wall. The assessment identified separation of the pipe joints and deterioration of the wing wall</li> </ul>	<ul style="list-style-type: none"> <li>PS17-10 Emergency Overflow Weirs, Wing Wall Structural and Geotechnical Investigations is in place to investigate the root causes of the issues and provide recommendations to protect these structures. This study will feed into a FE project for execution.</li> </ul>
<ul style="list-style-type: none"> <li><b>Long Ocean Outfall Assessment</b> – With long outfall pipe approaching 50 years in service, need an extensive assessment to understand maintenance required to extend the useful life. The permit with the California State Lands Commission was renewed for 25 years effective August 28, 2017, and the permit requires to maintain the outfall to use its land.</li> </ul>	<ul style="list-style-type: none"> <li>PS18-09 Ocean Outfall Condition Assessment and Scoping Study is in place to determine the condition of ocean outfall and provide recommendations to extend its useful life.</li> <li>X-053 is created to execute rehabilitation efforts per recommendations from PS18-09. May need to assume similar condition to that of the 78" Outfall to address its condition.</li> </ul>
<ul style="list-style-type: none"> <li><b>Corrosion issues</b> – Due to its corrosive environment, there are various areas that began to show signs of coating failure. There are areas, such as EPSA discharge line, that need to be assessed and Surge Tower welding joint between lower concrete and upper steel shell</li> </ul>	<ul style="list-style-type: none"> <li>Continue to work with coating team to address visible coating failures. PRN-00480 will repair the OOBs pipeline thermal expansion supports, and PRN-00566 will repair the external coating for OOBs &amp; EPSA pipes</li> <li>Coordinate with condition assessment team to develop work plans for welding joint and EPSA underground discharge assessment.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
PS17-10	Emergency Overflow Weirs, Wing Wall Structural and Geotechnical Investigations	OOBS & JB-A	<ul style="list-style-type: none"> <li>Perform a geotechnical and structural assessment of piping and respective wing wall structures.</li> </ul>															
PS18-09	Ocean Outfall Condition Assessment	120" Ocean Outfall	<ul style="list-style-type: none"> <li>Determine condition of Ocean Outfall and provide recommendations.</li> </ul>															
J-117B	Outfall Low Flow Pump Station	OOBS & New Low Flow Pump Station	<ul style="list-style-type: none"> <li>Rehabilitate the OOBs and construct a new Low Flow Pump Station.</li> <li>Replace the Plant Water Pump Station.</li> </ul>															
X-053	Long Ocean Outfall Rehabilitation	120" Ocean Outfall	<ul style="list-style-type: none"> <li>Rehabilitate long ocean outfall per PS18-09 recommendations.</li> </ul>															
PRN-00480	OOBS 120-in Pipe Plinths Repair	OOBS	<ul style="list-style-type: none"> <li>Conduct repairs on the pipe support by encapsulating with pitch.</li> </ul>															
PRN-00566	EPSA Pipe Coating	EPSA	<ul style="list-style-type: none"> <li>Conduct a repair painting job on areas identified with corrosion to prevent further deterioration.</li> </ul>															
PRN-00499	EPSA VFD Modernization	EPSA	<ul style="list-style-type: none"> <li>VFD power cell refurbishment and control modernization.</li> </ul>															
PRN-00519	EPSA Motor Cooling	EPSA	<ul style="list-style-type: none"> <li>Modify motor cooling system to provide adequate cooling to the motor at a lower speed.</li> </ul>															
N/A	Outfall External Inspection	120" Ocean Outfall	<ul style="list-style-type: none"> <li>Ocean outfall external inspection every 2.5 years per lease agreement with the California State Lands Commission.</li> </ul>															
N/A	Outfall Structural Integrity Report	120" Ocean Outfall	<ul style="list-style-type: none"> <li>Ocean outfall structural integrity report every 5 years per the NPDES Permit.</li> </ul>															

## Types of Project Legend:

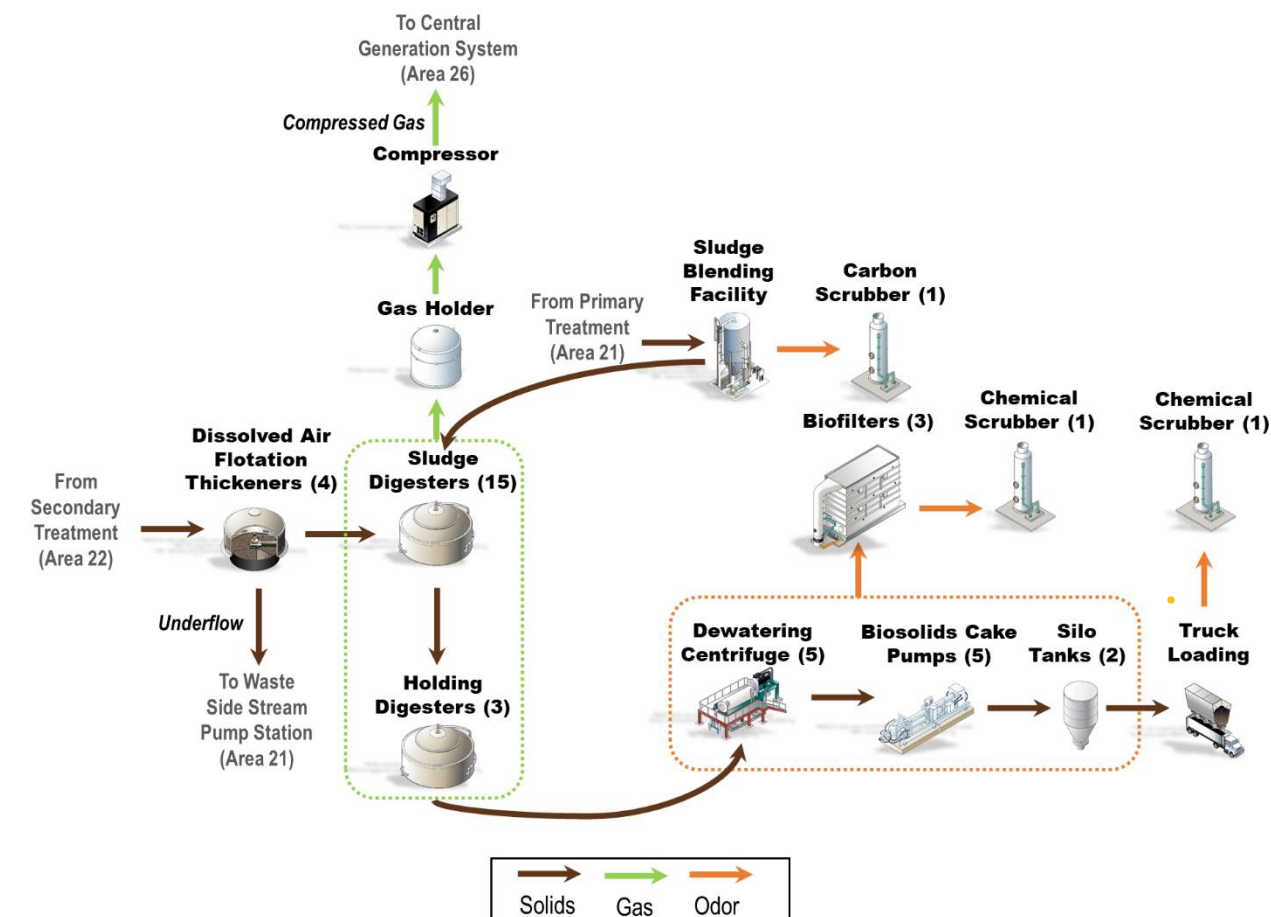
■ CIP - Planning
 ■ CIP – Design
 ■ CIP - Construction
 ■ Maintenance Project

## Acronym Key:

CIP=Capital Improvement Program; EPSA=Effluent Pump Station Annex; FY=Fiscal Year;  
 JB=Junction Box; N/A=Not Applicable; NPDES=National Pollutant Discharge Elimination System;  
 OOBs=Ocean Outfall Booster Station; VFD=Variable Frequency Drive

# ASSET MANAGEMENT SYSTEM SUMMARY – AREA 25 – PLANT NO. 2 SOLIDS HANDLING – DIGESTERS

## Process Schematic



## Major Assets

Major Assets	Quantities
<b>Anaerobic Digesters (C-T)</b>	
Active Digesters	15
Active/Holding Digesters (I&J)	2
Holding Digesters (K)	1
Sludge Mixing Pumps	15+1+4 (1 each Digester + 1 in Digester K+ 1 backup in each Digester L, M, N, & O)

Major Assets	Quantities
<b>Anaerobic Digesters (C-T) (Continued)</b>	
Jet Mixing Pumps	4 (2 each in Digester I&J)
Sludge Recirculation Pumps	17
Hot Water Circulation Pumps	17
Heat Exchangers	17
Bottom Sludge Pumps	10

Major Assets	Quantities
<b>Digester Ferric Facility</b>	
Digester Ferric Storage Tanks	2
Ferric Feed Pumps	6

### Acronym Key:

MCC=Motor Control Center;  
RUL=Remaining Useful Life;  
PLC= Programmable Logic Controller;  
VFD=Variable Frequency Drive

## Major Assets Remaining Useful Life

Asset Type	Digester C	Digester D	Digester E	Digester F	Digester G	Digester H	Digester I	Digester J	Digester K	Digester L	Digester M	Digester N	Digester O	Digester P	Digester Q	Digester R	Digester S	Digester T	Digester Ferric
<b>Civil</b>																			
Effluent Piping	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
<b>Structural</b>																			
Structure	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3	2
Digester Dome	3	3	3	3	3	3	2	2	3	3	3	3	3	2	2	2	2	2	-
<b>Mechanical</b>																			
Sludge Mixing Pumps/Jet Mixing	4	4	2	4	4	2	2	2	4	4	4	4	4	2	2	2	2	2	-
Sludge Recirculation and Heating System	3	3	3	3	3	3	2	2	-	3	3	3	3	3	3	3	3	3	-
Hot Water System	4	4	4	4	4	4	2	2	-	4	4	4	4	4	4	4	4	4	-
Sludge Transfer Pump	4	4	4	4	4	4	2	2	4	4	4	4	4	4	4	4	4	4	-
Piping & Valve	4	4	4	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	2
Chemical Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
<b>Electrical</b>																			
MCC & VFD	4	4	4	4	4	4	2	2	4	4	4	4	4	4	4	4	4	4	2
<b>Instrumentation</b>																			
PLC & Flow Meter	4	4	4	4	4	4	2	2	4	4	4	4	4	4	4	4	4	4	2

### RUL Legend:

■ RUL <5 years
 ■ RUL 5-10 years
 ■ RUL 11-15 years
 ■ RUL 16-20 years
 ■ RUL >20 years

# ASSET MANAGEMENT SYSTEM SUMMARY – AREA 25 – PLANT NO. 2 SOLIDS HANDLING – DIGESTERS

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Reliability of Digesters</b> – Keep the existing digesters in operable condition before the digesters being replaced by new TPAD process as planned by the Biosolids Master Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Digester replacement food waste related projects.</li> <li>Digester cleaning and repairs by Maintenance projects that need to be done while digester out of service after cleaning.</li> <li>P2-91-1 to rehabilitate existing digesters</li> </ul>
<ul style="list-style-type: none"> <li><b>Digester Replacement</b> – Building new digester complex as recommended by Biosolids Master Plan to replace the existing digesters</li> </ul>	<ul style="list-style-type: none"> <li>Series of projects identified by Biosolids Master Plan and 2017 Facility Master Plan to replace the digesters with TPAD facility and improve the site.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
P2-124	Interim Food Waste Receiving Facility	Plant No. 2 Digesters, gas treatment facilities and Central Generation	<ul style="list-style-type: none"> <li>Receive 150 wet ton per day of source separated and processed organic food waste to digesters for Co-digestion.</li> </ul>																
P2-125	Perimeter Screening at Plant No. 2 (on hold)	Plant No. 2 perimeter walls and plants	<ul style="list-style-type: none"> <li>Add additional plants to perimeter wall areas.</li> </ul>																
P2-126	Plant No. 2 Warehouse Relocation	Plant No. 2 Warehouse	<ul style="list-style-type: none"> <li>Relocate existing warehouse.</li> </ul>																
P2-127	Plant No. 2 Collections Yard Relocation	Plant No. 2 Collections Yard	<ul style="list-style-type: none"> <li>Relocate existing Collections Yard.</li> </ul>																
P2-128	TPAD Digester Facility	New TPAD Digester Facility	<ul style="list-style-type: none"> <li>Build six new thermophilic digesters, batching and cooling facilities and use the existing digesters as the mesophilic phase to treat the sludge by TPAD process.</li> </ul>																
P2-129	Digester P, Q, R, and S Replacement	Digester P, Q, R, S	<ul style="list-style-type: none"> <li>Replace digester P, R, R, S as the new mesophilic digesters.</li> </ul>																
N/A	Digester Cleaning	Plant No. 2 Digesters	<ul style="list-style-type: none"> <li>Continue the digester cleaning. Digester O and I to be cleaned in 2020.</li> </ul>																
N/A	Digester repairs after cleaning	Plant No. 2 digesters	<ul style="list-style-type: none"> <li>Repairs that need to be done while digester out of service.</li> </ul>																
P2-91-1	Plant No. 2 Digesters Rehabilitations	Plant No. 2 Digesters	<ul style="list-style-type: none"> <li>Rehabilitate the digesters to keep them operable until the TPAD process in operation.</li> </ul>																
MP-690	Digester G and S Valve replacement	Digester G and S	<ul style="list-style-type: none"> <li>Replace penetration valves and other miscellaneous repairs identified by condition assessment after digester cleaning.</li> </ul>																
MP-688	Digester F and G Walkway Bridge repair	Digester F and G	<ul style="list-style-type: none"> <li>Repair walkway bridge between Digester F and G as recommended by condition assessment after Digester F cleaning.</li> </ul>																
PRN-00571	Digester O Repairs	Digester O	<ul style="list-style-type: none"> <li>Replace valves and minor repairs from condition assessment after cleaning</li> </ul>																

### Types of Project Legend:

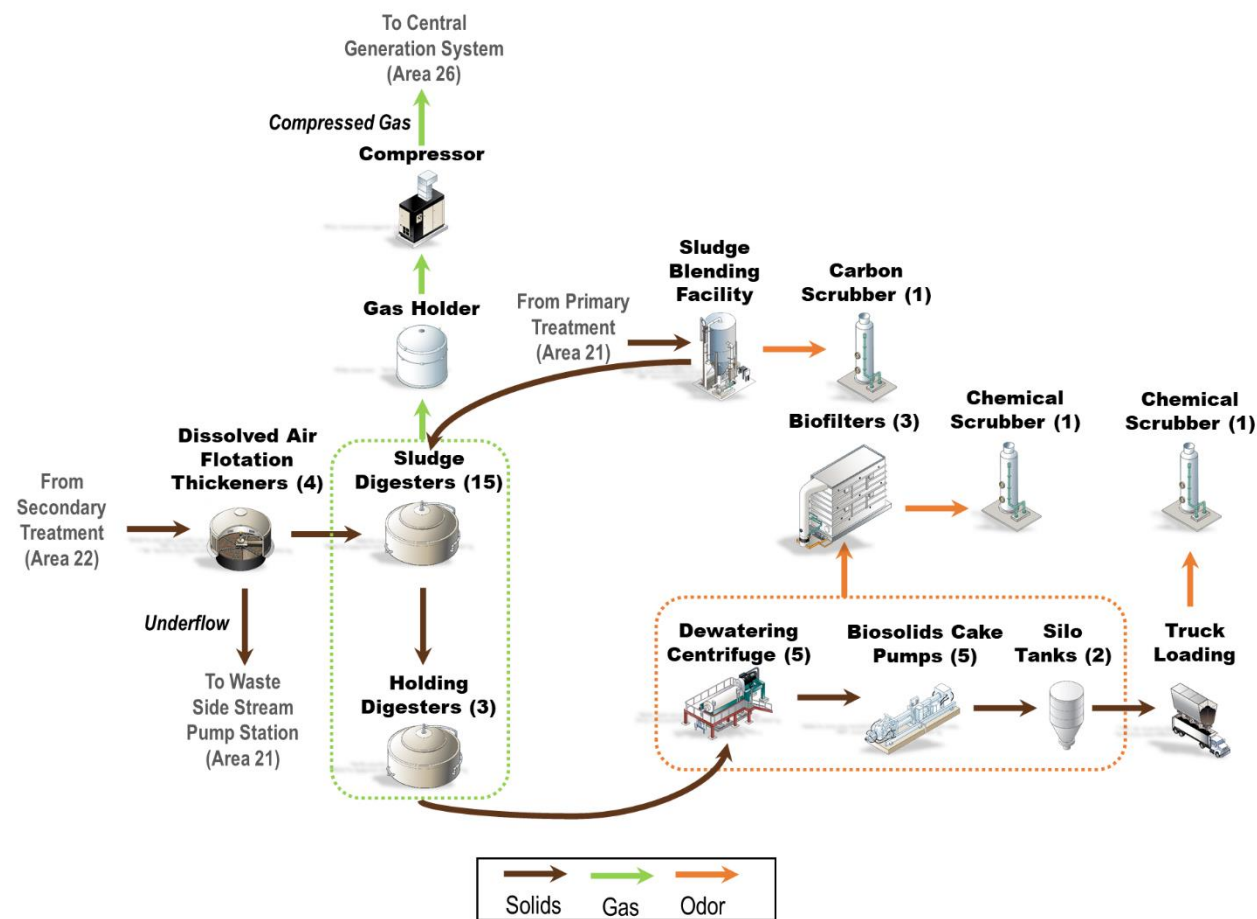
■ CIP - Planning
 ■ CIP – Design
 ■ CIP - Construction
 ■ Maintenance Project

### Acronym Key:

CIP=Capital Improvement Program; FY=Fiscal Year; N/A=Not Applicable; TPAD=Temperature Phased Anaerobic Digestion

# ASSET MANAGEMENT SYSTEM SUMMARY – AREA 25 – PLANT NO. 2 SOLIDS HANDLING – FACILITIES

## Process Schematic



## Major Assets Remaining Useful Life

Asset Type	Sludge Blending Facility	Plant Boiler	Centrifuge Dewatering	Centrifuge Bldg. & Silos Odor Control	Truck Loading Bay Odor Control	Gas Handling	Gas Holder	Truck Loading
<b>Civil</b>								
Effluent Piping	2	4	1	1	1	-	3	1
<b>Structural</b>								
Structure	2	-	1	1	1	-	3	1
Building	1	3	1	-	-	4	-	-
<b>Mechanical</b>								
Pump	2	-	1	1	1	-	-	-
Fan	-	-	-	1	2	-	-	-
Boiler & Heat Exchanger	-	5	-	-	-	-	-	-
Centrifuge	-	-	1	-	-	-	-	-
Polymer System	-	-	1	-	-	-	-	-
Biofilter	-	-	-	1	-	-	-	-
Chemical System	-	-	-	1	1	-	-	-
Gas Compressor	-	-	-	-	-	4	-	-
Gas Dryer	-	-	-	-	-	2	-	-
Gas Flare	-	-	-	-	-	4	-	-
Screw Conveyor	-	-	-	-	-	-	-	4
Sliding Frame	-	-	-	-	-	-	-	4
Piping & Valve	3	3	1	1	1	3	3	2
<b>Electrical</b>								
MCC & VFD	2	2	1	1	1	4	-	3
<b>Instrumentation</b>								
PLC & Flow Meter	2	2	1	1	1	4	-	3

### Asset RUL Legend:

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

### Acronym Key:

MCC=Motor Control Center;  
 PLC= Programmable Logic Controller;  
 RUL=Remaining Useful Life;  
 VFD=Variable Frequency Drive



ASSET MANAGEMENT SYSTEM SUMMARY – AREA 25 – PLANT NO. 2 SOLIDS HANDLING – SOLIDS HANDLING SYSTEMS

Major Assets	Quantities
<b>Sludge Blending Facility</b>	
Sludge Blending Tanks	2
Digester Feed Pumps	6
Electrical Building	1
<b>Plant Boiler Facility</b>	
Building	1
Boilers and heat exchangers	2

Major Assets	Quantities
<b>Dewatering</b>	
Centrifuges	5
Sludge Feed Pumps	5
Cake Transfer Pumps	5
Polymer System	1

Major Assets	Quantities
<b>Centrifuge Building &amp; Silos Odor Control</b>	
Biofilters	3
Ammonia Scrubber	1

Major Assets	Quantities
<b>Truck Loading Bay Odor Control</b>	
2-stage Chemical Scrubbers	2
<b>Gas Handling</b>	
Gas Compressors	3
Gas Dryer	1
Gas Flares	3

Major Assets	Quantities
<b>Gas Holder</b>	
Gas Holder Tank	1
<b>Truck Loading</b>	
Cake Storage Silos	2
Sliding Frames	2
Screw Conveyors	12

Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Boilers and Heat Exchangers</b> – Boiler tube leaking; boiler heat exchangers wearing out; no steam bypass outlet during boilers PM and AQMD required testing; boiler corrosion issues</li> </ul>	<ul style="list-style-type: none"> <li>MP-271 – P2 Boiler Heat Exchangers Replacement</li> <li>PRN-00455 (MP-624) – P2 Boiler Re-tubing</li> <li>PRN-00456 (MP-547) – P2 Boiler Steam By-pass</li> <li>Maintenance Activities – Chemical system improvements</li> </ul>
<ul style="list-style-type: none"> <li><b>Gas Handling System</b> – Gas compressor system lived its life and need replacement</li> </ul>	<ul style="list-style-type: none"> <li>J-124 – Digester Gas Facilities rehabilitation</li> <li>Gas compressors repair and overhaul by Maintenance</li> </ul>
<ul style="list-style-type: none"> <li><b>Truck Loading</b> – Auger No. 6 and No.3 out of service due to age and wearing from higher solids content from centrifuge dewatered cake; difficult to lubricate the screw conveyors because of access issues.</li> </ul>	<ul style="list-style-type: none"> <li>PRN-00513 (MP-585) – P2 Truck Loading Screw Conveyors Replacement (lubrication extension will be included in the new screw conveyor system)</li> </ul>

Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
J-124	Digester Gas Facilities Rehabilitation	Gas compressors, dryers, flare and holder system	<ul style="list-style-type: none"> <li>Replace the entire gas handling system including the gas compressor building.</li> </ul>																
MP-271	Plant No. 2 Boiler Heat Exchanger Replacement	Plant No. 2 Boiler system	<ul style="list-style-type: none"> <li>Replace two heat exchangers.</li> </ul>																
PRN-00456 (MP-547)	Plant No. 2 Boiler Steam By-pass	Plant No. 2 Boiler system	<ul style="list-style-type: none"> <li>Add steam by-pass to release the steam to the atmosphere at boiler bldg. room level.</li> </ul>																
PRN-00455 (MP-624)	Plant No. 2 Boiler Re-tubing	Plant No. 2 Boiler system	<ul style="list-style-type: none"> <li>Re-tube both boilers.</li> </ul>																
N/A	Plant No. 2 Boiler Chemical system Improvements	Plant No. 2 Boiler system	<ul style="list-style-type: none"> <li>Modifying the existing chemical injection system for better corrosion control.</li> </ul>																
PRN-00513 (MP-585)	Plant No. 2 Truck Loading Screw Conveyor Replacement	Plant No. 2 Truck Loading Station	<ul style="list-style-type: none"> <li>Replace all twelve screw conveyors, and lubrication extension will be included in the new screw conveyor system.</li> </ul>																
N/A	Gas Compressor Overhaul	Plant No. 2 Gas compressor facility	<ul style="list-style-type: none"> <li>Overhaul all gas compressors.</li> </ul>																

Types of Project Legend:

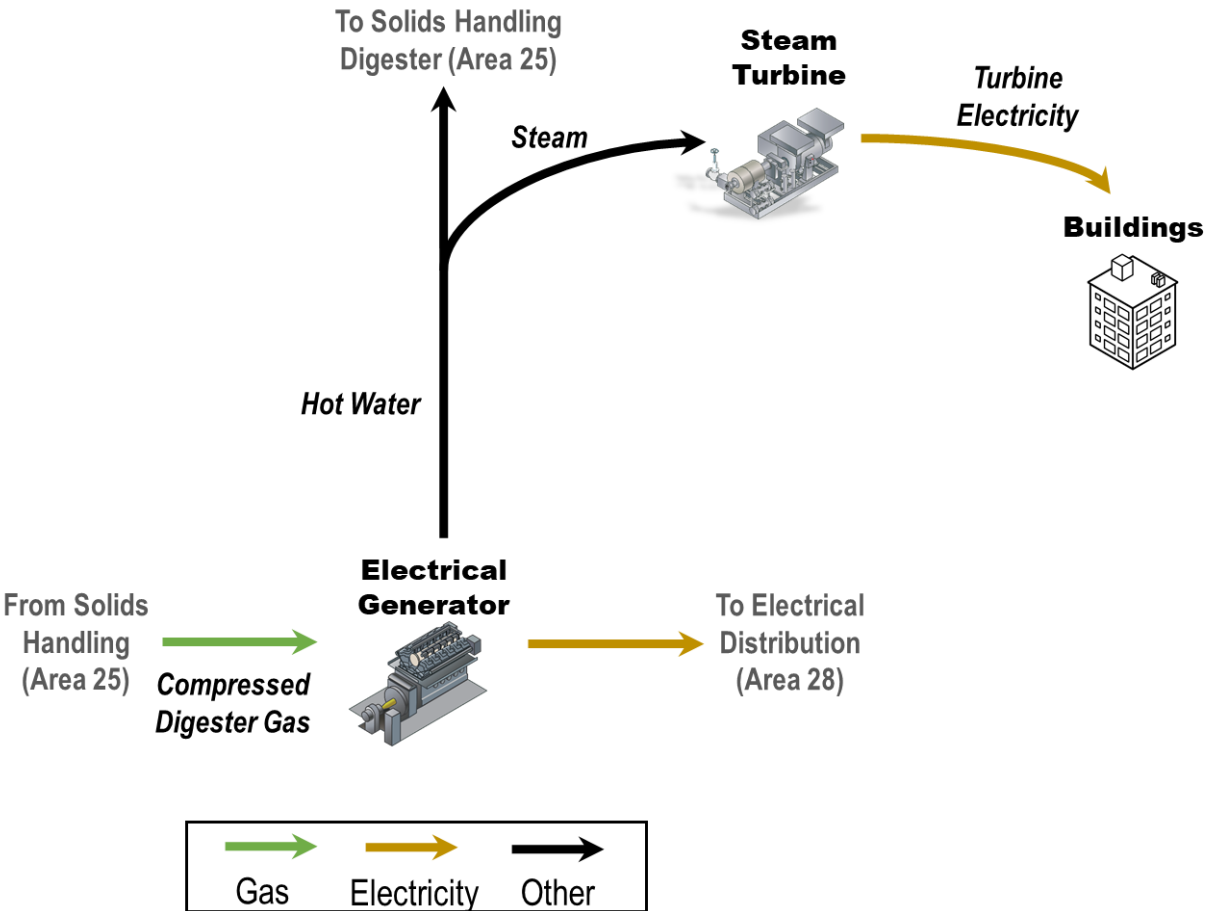
CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

Acronym Key:

AQMD= Air Quality Management District; CIP=Capital Improvement Program; FY=Fiscal Year; N/A=Not Applicable; PM=Preventative Maintenance

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 26 – PLANT NO. 2 CENTRAL GENERATION

Process Schematic



Major Assets Remaining Useful Life

Asset Type	Engine Generator #1	Engine Generator #2	Engine Generator #3	Engine Generator #4	Engine Generator #5	Steam Turbine Generator	Steam Condenser	Deaerator Vessel	Heat Recovery Boiler #1	Heat Recovery Boiler #2	Heat Recovery Boiler #3	Heat Recovery Boiler #4	Heat Recovery Boiler #5	OXI Catalyst	SCR Catalyst	Urea Injection System	Starting Air Compressor #1	Starting Air Compressor #2	Starting Air Compressor #3	Inst. Air Compressor #1	Inst. Air Compressor #2	Battery Backup	Plant Water Piping	Miscellaneous
Structural																								
Building	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	1
Mechanical																								
General	4	4	4	4	4	5	5	2	3	3	3	3	3	4	4	4	5	5	5	5	5	-	-	-
HVAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Lube Oil System	3	3	3	3	3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electrical																								
General	4	4	4	4	4	5	-	-	-	-	-	-	-	-	-	3	3	3	3	3	5	5	-	-
Switchgear	4	4	4	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Instrumentation																								
General	5	5	5	5	5	4	4	3	4	4	4	4	4	3	3	4	4	4	4	5	5	5	-	-
RUL Legend:																								
<div><div></div> RUL &lt;5 years</div> <div><div></div> RUL 5-10 years</div> <div><div></div> RUL 11-15 years</div> <div><div></div> RUL 16-20 years</div> <div><div></div> RUL &gt;20 years</div>																								
Acronym Key: HVAC=Heating, Ventilation, and Air Conditioning; Inst.=Instrument; OXI=Oxidizer; RUL=Remaining Useful Life; SCR= Selective Catalytic Reduction																								

Major Assets

Major Assets	Quantities
<b>Engine Generator</b>	
Gas Engine (16 Cylinder)	5
Electrical Generator	5
Engine Lube Oil System	5
<b>Steam Turbine Generator</b>	
Steam Turbine	1
Electrical Generator	1
Steam Condenser	1
Deaerator Vessel	1

Major Assets	Quantities
<b>Heat Recovery System</b>	
Heat Recovery Boiler	5
<b>Building</b>	
Building	1
Piping	Various
<b>Engine Emission Control</b>	
OXI Catalyst	5
SCR Catalyst	5
UREA Injection System	5

Major Assets	Quantities
<b>HVAC</b>	
Ventilation Supply Fans	5
Ventilation Exhaust Fans	6
<b>Air Compressors</b>	
Engine Starting Air	3
Instrument Air	2

# ASSET MANAGEMENT SYSTEM SUMMARY – AREA 26 – PLANT NO. 2 CENTRAL GENERATION

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li><b>Gas Engine Generator Reliability</b> – Monies shall be spent to address aging components and systems required to operate the 5 Central Generation Engines.</li> </ul>	<ul style="list-style-type: none"> <li>Overhaul engines (ongoing)</li> <li>Replace obsolete systems (i.e., Battery Backup, Switch Gear, etc.)</li> </ul>
<ul style="list-style-type: none"> <li><b>Engine Lube Oil System</b> – The Lube Oil Centrifuges are no longer operational</li> </ul>	<ul style="list-style-type: none"> <li>Install new instrumentation and controls onto the existing 2 units.</li> </ul>
<ul style="list-style-type: none"> <li><b>Steam Turbine System Rehabilitation</b> – The Steam Turbine has degraded and is in need of rehabilitation.</li> </ul>	<ul style="list-style-type: none"> <li>Overhaul the Steam Turbine and Steam Condenser.</li> </ul>
<ul style="list-style-type: none"> <li><b>Plant Water Piping</b> – The plant water (i.e., Cooling Water) piping has degraded and is in need of replacement.</li> </ul>	<ul style="list-style-type: none"> <li>Replace all plant water piping in the basement of Central Generation.</li> </ul>
<ul style="list-style-type: none"> <li><b>Emission Control System</b> – The Housings on the Oxidizer Catalysts are failing prematurely.</li> </ul>	<ul style="list-style-type: none"> <li>Analyze and design new Catalyst Housings.</li> </ul>
<ul style="list-style-type: none"> <li><b>Instrument Air Compressors</b> – The instrument air compressors are no longer working.</li> </ul>	<ul style="list-style-type: none"> <li>Replace the entire Instrument Air System, installing new compressors and appurtenances.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
P2-119	Central Generation Rehabilitation	Central Generation Facility Wide	<ul style="list-style-type: none"> <li>Rehabilitation of Gas Engine Support Systems.</li> </ul>															
FE18-06	Instrument Air Compressor Replacement	Instrument Air Compressor System, Urea Injection System	<ul style="list-style-type: none"> <li>Install 2 new Instrument Air Compressors.</li> </ul>															
MP-105 PRN-00262	Steam Turbine Rehabilitation	Steam Turbine Generator	<ul style="list-style-type: none"> <li>Rehabilitation of the Steam Turbine.</li> </ul>															
MP-118 PRN-00211	Engine Lube Oil System Controls Upgrade	Engine Generator	<ul style="list-style-type: none"> <li>Install new instrumentation and controls onto the existing units.</li> </ul>															
MP-227	Starting Air Compressor System Rehabilitation	Starting Air Compressor System	<ul style="list-style-type: none"> <li>Rehabilitation of the Air Compressors.</li> </ul>															
MP-231 PRN-00427	Engine Emission Control Redesign	OXI/SCR Catalyst	<ul style="list-style-type: none"> <li>Analyze and design new Catalyst Housings.</li> </ul>															
MP-257 PRN-00394	Steam Condenser Rehabilitation	Steam Condenser	<ul style="list-style-type: none"> <li>Replace the Steam Condenser Tube Bundle.</li> </ul>															
MP-275 PRN-00297	Engine Overhauls	Engine Generator	<ul style="list-style-type: none"> <li>Overhaul the engines as needed (ongoing).</li> </ul>															
MP-305 PRN-00314	Ventilation Supply Fan Rehabilitation	HVAC	<ul style="list-style-type: none"> <li>Replace one fan and rehabilitation the fan support structures.</li> </ul>															
MP-358 PRN-00322	Lube Oil Filter Catwalk	Engine Generator	<ul style="list-style-type: none"> <li>Install Lube Oil Filter catwalks for maintenance purposes.</li> </ul>															
MP-484	Steam Boiler Level Control Upgrade	Heat Recovery Boiler	<ul style="list-style-type: none"> <li>Install new technology for improved Boiler level control.</li> </ul>															
MP-546	Plant Water Pipe Rehabilitation	Plant Water Piping	<ul style="list-style-type: none"> <li>Replace existing plant water piping with new.</li> </ul>															
MP-608	Engine Ignition and Controls Upgrade	Engine Generator	<ul style="list-style-type: none"> <li>Replace the existing engine ignition, controls, and fuel system.</li> </ul>															

### Types of Project Legend:

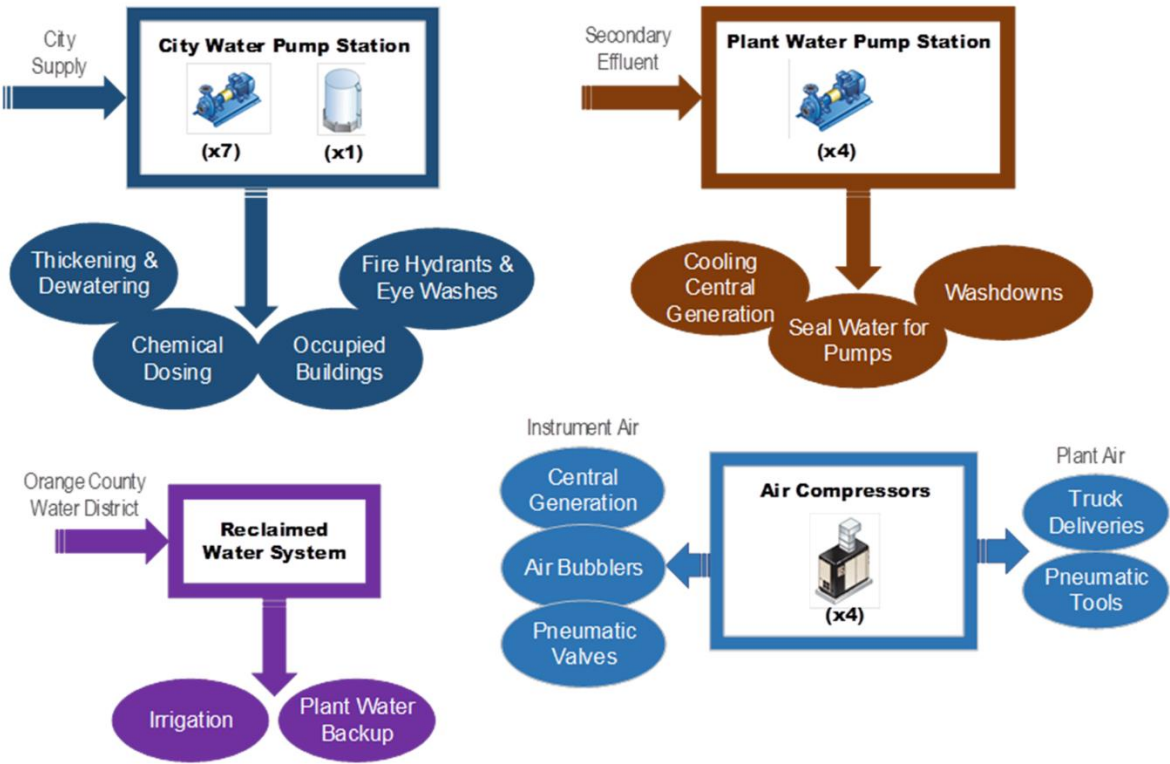
 CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

### Acronym Key:

CIP=Capital Improvement Program; FY=Fiscal Year; HVAC=Heating, Ventilation, and Air Conditioning; OXI=Oxidizer; RUL=Remaining Useful Life; SCR= Selective Catalytic Reduction

ASSET MANAGEMENT SYSTEM SUMMARY – AREA 27 – PLANT NO. 2 UTILITIES

Process Schematic



Major Assets Remaining Useful Life

Asset Type	City Water System	Plant Water System	Reclaimed Water Piping	Plant Air Systems
<b>Civil</b>				
Pipes	2	3	2	-
<b>Structural</b>				
Pump Station	3	3	-	-
Tanks	3	-	-	-
<b>Mechanical</b>				
Pumps	3	3	-	-
Strainers	-	3	-	-
Compressors	-	-	-	4
Ventilation System	2	2	-	-
<b>Electrical</b>				
MCC	1	1	-	-
VFD	3	3	-	-
<b>Instrumentation</b>				
PLC, Flowmeter	1	1	-	1

**Asset RUL Legend:**

- RUL <5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL >20 years

**Acronym Key:**

MCC=Motor Control Center;

RUL=Remaining Useful Life;

PLC= Programmable Logic Controller;

VFD=Variable Frequency Drive

Major Assets

Major Assets	Quantities
<b>City Water</b>	
Pumps	7
Tanks	4
Piping	8.9 Miles

Major Assets	Quantities
<b>Plant Water</b>	
Pumps	4
Strainers	4
Piping	10.6 Miles

Major Assets	Quantities
<b>Reclaimed Water</b>	
Piping	6 Miles

Major Assets	Quantities
<b>Plant Air</b>	
Compressors	3
Plant Air Piping	6.7 Miles
Instrument Air Piping	1.6 Miles

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 27 – PLANT NO. 2 UTILITIES

## Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"> <li>Plant/Instrument Air Lines have severe corrosion issues.</li> </ul>	<ul style="list-style-type: none"> <li>Current plan is to run to fail and repair the lines as they fail. In addition, if opportunity arises through future CIP or FE projects within areas where known air system deficiencies exist, we will address them at that time.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY19/20	FY20/21	FY21/22	FY22/23	FY23/24	FY24/25	FY25/26	FY26/27	FY27/28	FY28/29	FY29/30	FY30/31	FY31/32	FY32/33	FY33/34
FE18-14	Plant Water Pipeline Rehabilitation	Piping in tunnels	<ul style="list-style-type: none"> <li>1600 feet of piping in the tunnels.</li> </ul>															
FE18-06	Instrument Air Compressors at Central Generation	Central Generation	<ul style="list-style-type: none"> <li>Replace Instrument Air compressors at Central Generation.</li> </ul>															
J-117B	Outfall Low Flow Pump Station	Plant Water Pump Station	<ul style="list-style-type: none"> <li>Replace Plant Water Pump Station and plant water piping near project.</li> </ul>															
P2-133	B/C Side Primary Clarifiers Rehab	Primary Clarifiers	<ul style="list-style-type: none"> <li>Replace City water piping near project.</li> </ul>															
P2-98A	Primary Treatment Rehab	City Water Pump Station	<ul style="list-style-type: none"> <li>Refeed City Water Pump Station directly from DC-F 480 switchgear.</li> </ul>															
X-036	Plant No. 2 City Water Pump Station	City Water Pump Station	<ul style="list-style-type: none"> <li>Rehab of City Water Pump Station.</li> </ul>															
X-037	Plant No. 2 Plant Water Pump Station Demolition	Plant Water Pump Station	<ul style="list-style-type: none"> <li>Demo Plant Water Pump Station.</li> </ul>															
FE-XX1	Relocation of Air Compressor Central Generation to Ocean Outfall Booster Station	Central Generation and OOBS	<ul style="list-style-type: none"> <li>Relocate existing 100HP Air Compressor.</li> </ul>															
FE-XX2	Repair Reclaimed Pipe Leaks	Piping in tunnels	<ul style="list-style-type: none"> <li>Repair and re-route portions of reclaimed water line near Primary Clarifiers and Bar Screen.</li> </ul>															

## Types of Project Legend:

■ CIP - Planning   
 ■ CIP – Design   
 ■ CIP - Construction   
 ■ Maintenance Project

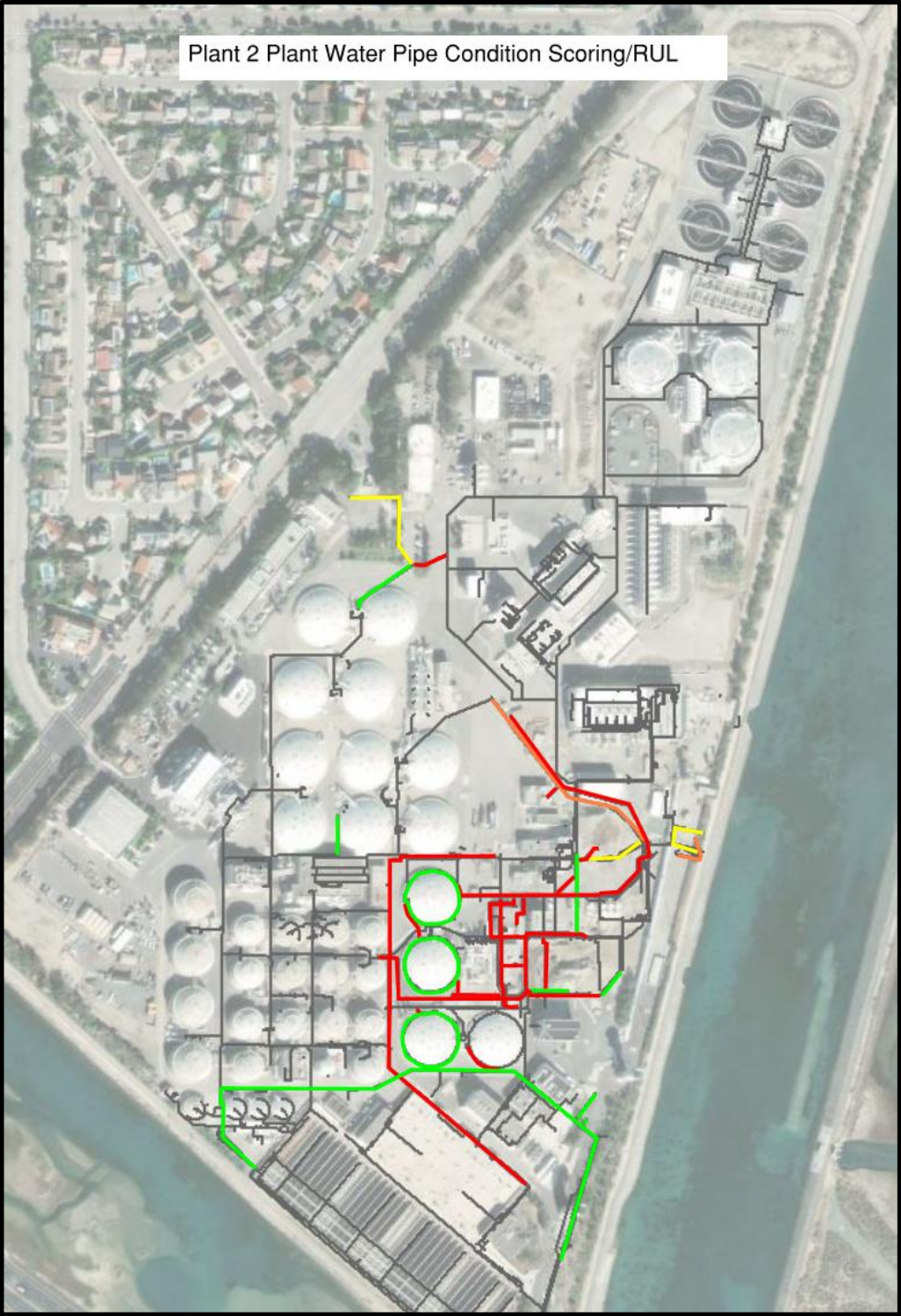
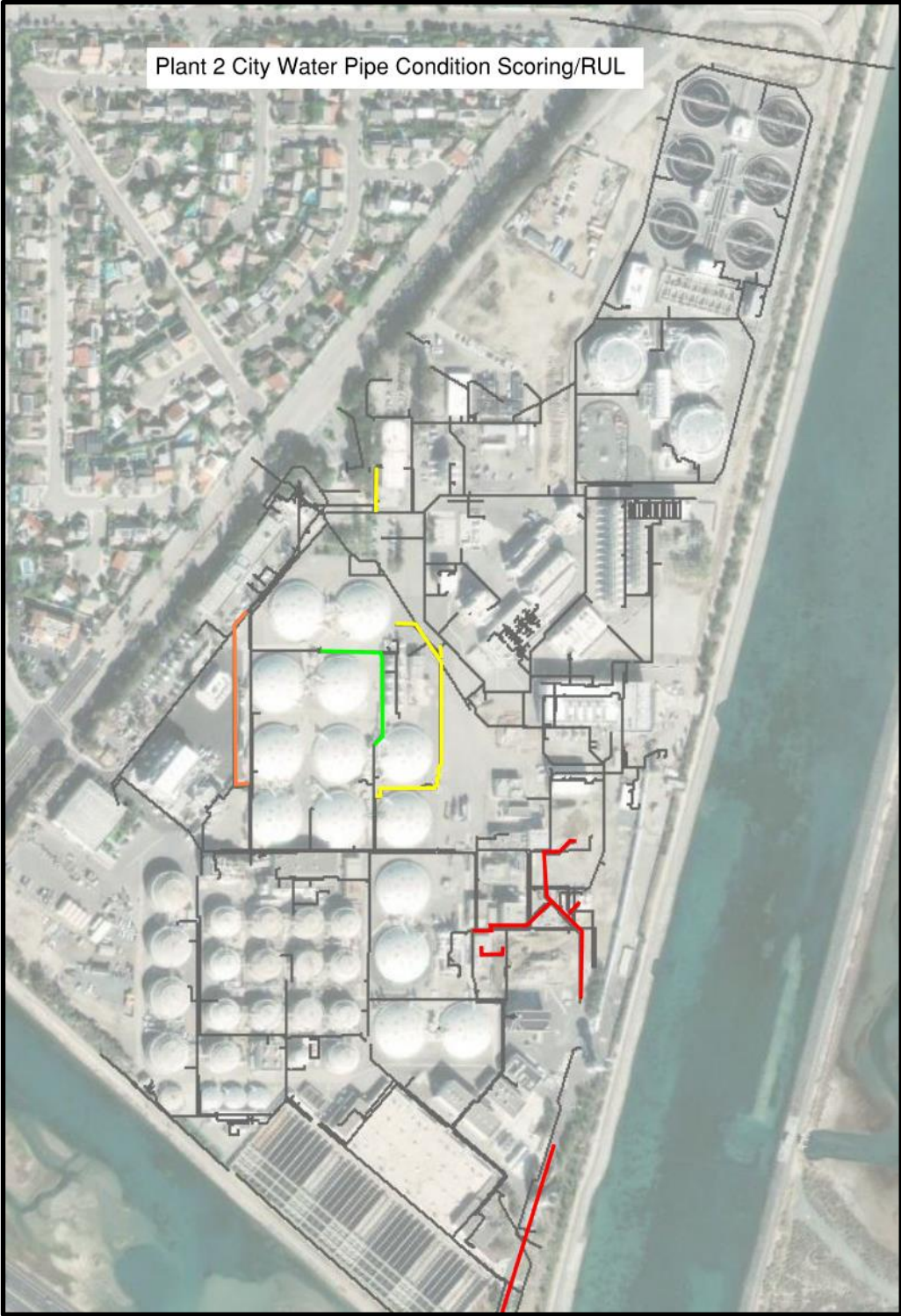
## Acronym Key:

CIP=Capital Improvement Program; FY=Fiscal Year; HP=Horsepower;  
 OOBS= Ocean Outfall Booster Station



ASSET MANAGEMENT SYSTEM SUMMARY – AREA 27 – PLANT NO. 2 UTILITIES

Remaining Useful Life of Utility Infrastructure



RUL Legend:

<span style="color: red;">■</span> RUL <5 years	<span style="color: orange;">■</span> RUL 5-10 years	<span style="color: yellow;">■</span> RUL 11-15 years	<span style="color: green;">■</span> RUL 16-20 years	<span style="color: grey;">■</span> RUL >20 years
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Acronym Key:  
RUL=Remaining Useful Life



ASSET MANAGEMENT SYSTEM SUMMARY – AREA 27 – PLANT NO. 2 UTILITIES

Remaining Useful Life of Utility Infrastructure

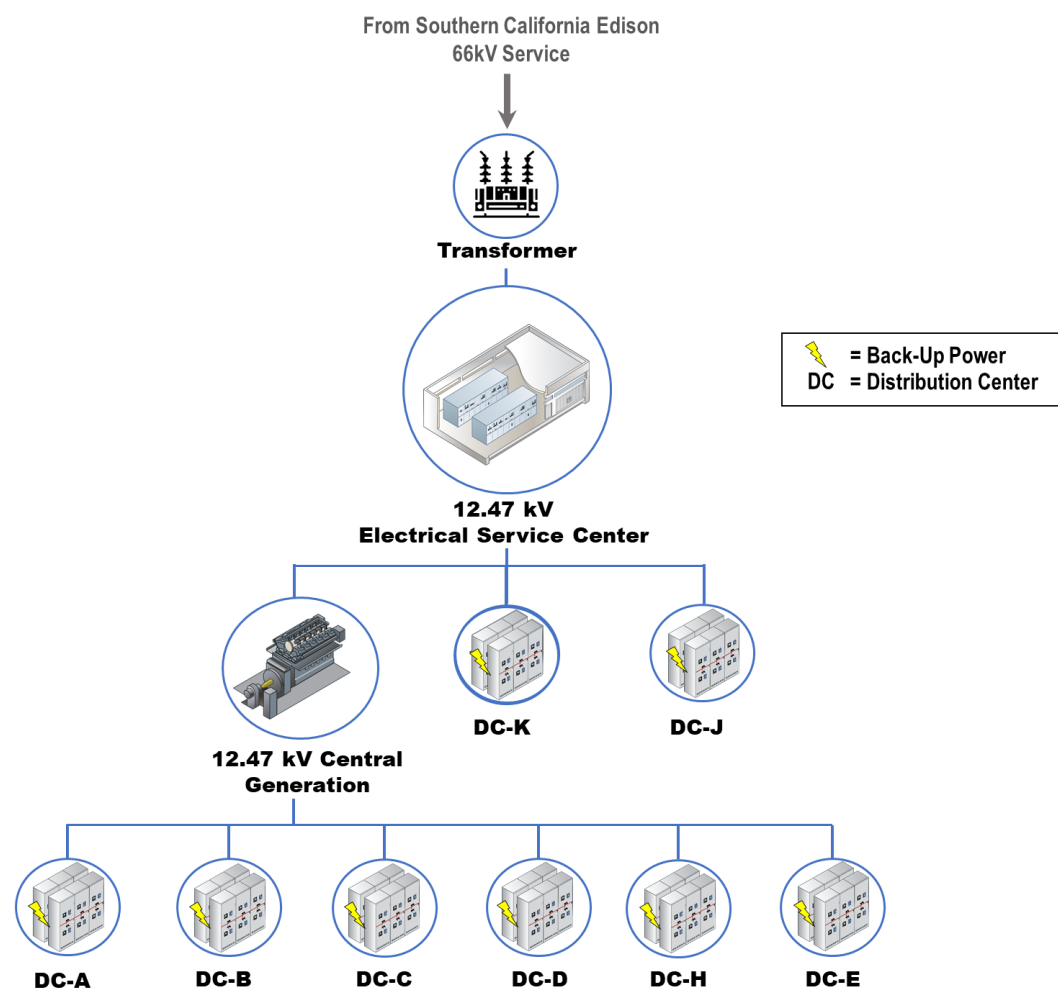


**RUL Legend:**  
■ RUL <5 years   ■ RUL 5-10 years   ■ RUL 11-15 years   ■ RUL 16-20 years   ■ RUL >20 years

**Acronym Key:**  
RUL=Remaining Useful Life

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 28 – PLANT NO. 2 ELECTRICAL DISTRIBUTION

## Process Schematic



## Major Assets

Major Assets	Quantities
Transformers	58
Standby Generators	9
12kV Switchgears	27
480V Switchgears	32
125VDC and 24VDC Battery Systems	38
Uninterruptible Power Supply (UPS)	27

## Acronym Key:

CENGEN=Central Generation;  
DC=Distribution Center;  
kV=Kilovolt;  
PB=Power Building;  
RUL=Remaining Useful Life;  
VDC=Volts of Direct Current;  
UPS=Uninterruptible Power Supply

## Major Assets Remaining Useful Life

Asset Type	Service Center	CENG	DC-A	DC-B	DC-C	DC-D	DC-E (EPSA)	EPSP	DC-H (Headworks)	Headworks Standby Building	DC-J	DC-K	PB-A	PB-B	PB-C	PB-D
<b>Tier I – 12.47KV Primary Distribution Level</b>																
Transformers: 12.47/2.4kV	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
Transformers: 12.47/0.48kV	4	2	3	3	4	4	3	-	2	-	2	1	4	4	4	4
12.47kV Switchgears	3	5	3	3	4	4	4	3	2	2	2	1	-	-	-	-
12.47 kV Level Indicator Switches	-	-	-	-	-	-	-	-	2	-	2	1	1	3	3	4
12.47kV Feeders	4	4	1	1	4	4	3	3	2	2	2	1	1	1	1	4
12.47kV Generators	-	-	-	-	-	-	-	3	-	3	-	-	-	-	-	-
<b>Tier II – 4.16kV Distribution Level</b>																
4.16kV Feeders	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
<b>Tier III – 2.4kV Distribution Level</b>																
2.4kV Feeders	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
<b>Tier IV – 480V Distribution Level</b>																
480V Switchgears	-	-	3	-	-	-	-	-	2	-	2	1	3	3	3	4
Transfer Switches	-	-	-	-	-	-	-	-	-	-	-	-	4	3	3	4
Generators	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4
<b>Tier V – UPS</b>																
UPSs Individual	-	5	-	5	5	-	4	-	4	-	4	-	-	4	-	-
UPSs Regional	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-
<b>Tier VI – 125 VDC and 24 VDC Battery Systems</b>																
125VDC Chargers	5	5	5	5	-	-	-	4	-	4	4	1	4	4	-	-
125VDC Batteries	5	5	5	5	-	-	-	4	-	4	4	1	4	4	-	-
24VDC Chargers	-	5	-	-	-	-	-	4	-	4	-	-	-	-	4	4
24VDC Batteries	-	5	-	-	-	-	-	4	-	4	-	-	-	-	4	4
<b>Generator Controls</b>																
Generator Controls	-	5	-	-	-	-	-	3	-	3	-	-	-	-	4	4

## RUL Legend:

■ RUL <5 years  
 ■ RUL 5-10 years  
 ■ RUL 11-15 years  
 ■ RUL 16-20 years  
 ■ RUL >20 years



ASSET MANAGEMENT SYSTEM SUMMARY – AREA 28 – PLANT NO. 2 ELECTRICAL DISTRIBUTION

Key Issues

Key Issues	Actions and Recommendations
<ul style="list-style-type: none"><li>Southern California Edison is Currently a single 66kV Feeder Service</li></ul>	<ul style="list-style-type: none"><li>PS16-02 &amp; Plant No. 2-124 (Plant No. 2-124 will start ~January 2002):<ul style="list-style-type: none"><li>New 66kV Switchyard; Additional 66kV Line; Additional Transformer with automatic Load tap changes</li></ul></li></ul>
<ul style="list-style-type: none"><li>Aging Battery Chargers and Batteries</li></ul>	<ul style="list-style-type: none"><li>MP-233: Monitor existing battery life, develop path forward for replacing aged battery and charger systems.</li></ul>
<ul style="list-style-type: none"><li>Plant No. 2 Cabling: Aging Medium Voltage Cabling Infrastructure</li></ul>	<ul style="list-style-type: none"><li>MP-320: Testing aging Medium Voltage Cabling to perform Condition Assessment and develop plan for preventive maintenance.</li></ul>
<ul style="list-style-type: none"><li>Plant No. 2 Cabling: 480V (Headworks) failing cables<ul style="list-style-type: none"><li>Areas where there are no direct Back Up Standby Generation:</li><li>Gas Compressor (4.16kV Motors), PEPs &amp; Trickling Filter Pumps</li></ul></li></ul>	<ul style="list-style-type: none"><li>PRN-00401/MP-509 address repairs.<ul style="list-style-type: none"><li>J-124 will address Gas Compressors</li><li>Revisit policy to address Back Up Generation for PEPs and Trickling Filter Pumps</li></ul></li></ul>

**Acronym Key:**  
kV=Kilovolt; PEPS=Primary Effluent Pump Station; V=Volt

## ASSET MANAGEMENT SYSTEM SUMMARY – AREA 28 – PLANT NO. 2 ELECTRICAL DISTRIBUTION

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34
MP-233	Plant No. 2 and P1 Battery System Upgrade	Plant No. 2 Power Distribution	<ul style="list-style-type: none"> <li>Replace old batteries and chargers.</li> </ul>															
MP-320	Plant No. 2 Medium Voltage Cable PM Services	Plant No. 2 Power Distribution	<ul style="list-style-type: none"> <li>Medium Voltage Cables Condition Assessment and Testing.</li> </ul>															
P2-107	SCADA System and Network Upgraders	Plant No. 2 Power Distribution	<ul style="list-style-type: none"> <li>Process Data Network, SCADA System Expansion, Load Management and Load Shedding.</li> </ul>															
J-117B	Outfall Low Flow Pump Station	Plant No. 2 Outfall Booster Station	<ul style="list-style-type: none"> <li>Rehabilitation of Mechanical, electrical and Civil Systems at the Ocean Outfall Booster Station at Plant No. 2 that includes 12.47 kV switchgear replacement, VFD motors, and feeder cable replacement.</li> </ul>															
P2-98A	A-Side Primary Clarifiers Replacement at Plant No. 2	Plant No. 2 A-Side Primary Clarifiers	<ul style="list-style-type: none"> <li>Demolish and replace four (4) existing A-side Primary Clarifiers, Replace Scrubber Complex, demolish Power Building A and associated electrical equipment, install new Distribution Center F, including 12.47 kV switchgear, transformers, and 480V switchgear.</li> </ul>															
J-124	Digester Gas facilities Rehabilitation	Plant No. 2 – Gas compressors and flares	<ul style="list-style-type: none"> <li>Project will rehabilitate the low and high pressure gas facilities at Plant No. 1 and Plant No. 2 to meet current and future OCSD needs such as Air Quality Management District and NFPA regulations, and future projected gas production.</li> </ul>															
J-98	Electrical Power Distribution System Improvements	Plant No. 2 Power Distribution System	<ul style="list-style-type: none"> <li>Provide electrical distribution system improvements at Plant No. 1 and No. 2, as recommended by the J-25-4 project study, which are needed based on equipment condition and age, insufficient equipment ratings, grounding safety, non-compliance with the National Electrical Code requirements, and electrical configuration reliability.</li> </ul>															
P2-128	Temperature-Phased Anaerobic Digester at Plant No. 2	Plant No. 2 – Solids Handling	<ul style="list-style-type: none"> <li>Project will replace the mesophilic anaerobic digesters at Plant No. 2 with new digesters in a TPAD configuration. This project will add new electrical power building with 12 kV switchgear, 480V switchgears, oil-filled transformers located outside of the building, VFDs, transfer switches, and cables/conduits.</li> </ul>															
P2-134	Substation Replacement at Plant No. 2	Plant No. 2 Power Distribution	<ul style="list-style-type: none"> <li>This project will add a second 66-kV incoming distribution line to OCSD Plant No. 2 and construct a new 66-kV to 12.47-kV substation. The new substation will include two incoming 66-kV lines and two 66-kV to 12.47-kV transformer.</li> </ul>															
J-121	UPS System Upgrade	Plant No. 2 UPS System	<ul style="list-style-type: none"> <li>Provide a regional UPS in the northern portion of Plant No. 2 and provide UPS power distribution and power distribution units to feed UPS loads from the regional UPSs installed by this project and existing regional UPSs.</li> </ul>															
P2-133	Plant No. 2-133 B/C-Side Clarifiers Rehabilitation at Plant No. 1	Plant No. 2 Primary Clarifiers, Mechanical and Electrical Systems	<ul style="list-style-type: none"> <li>Extensively rehabilitate the C-Side primary clarifiers at Plant No. 2. The work is expected to include demolition of Power Building 80, including backup generator and installation of new electrical systems.</li> </ul>															

## Types of Project Legend:

■ CIP - Planning    
 ■ CIP – Design    
 ■ CIP - Construction    
 ■ Maintenance Project

## Acronym Key:

CIP=Capital Improvements Program; FY=Fiscal Year; kV=Kilovolt; NFPA= National Fire Protection Association; OCSD=Orange County Sanitation District; SCADA=Supervisory Control and Data Acquisition; TPAD=Temperature-Phased Anaerobic Digester; UPS=Uninterruptible Power Supply; V=Volt; VFD=Variable Frequency Drive

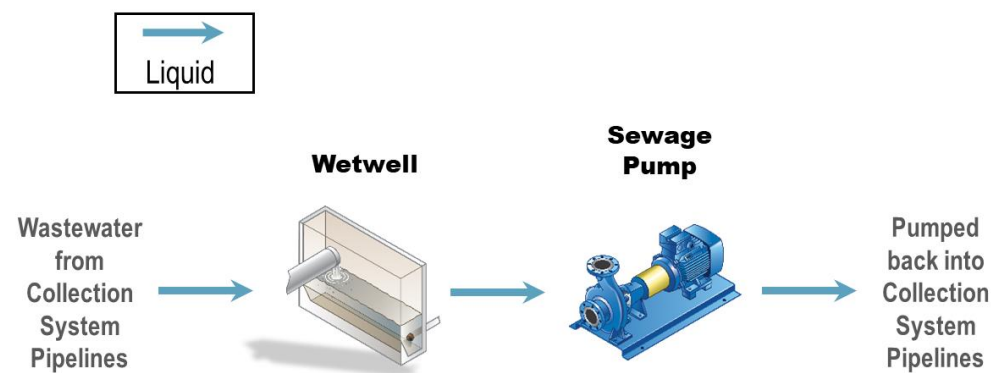
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### **5.2.3 Collection System Pump Station Asset Management Summaries**

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# ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – PUMP STATIONS

## Process Schematic



## Major Assets Remaining Useful Life

Asset Type	15 <sup>th</sup> Street	A Street	Bay Bridge	Bitter Point	College	Crystal Cove	Edinger	Lido	MacArthur	Main Street	Rocky Point	Slater	Seal Beach	Westside	Yorba Linda
<b>Civil - Piping</b>															
Force Mains	3	3	4	2	3	3	4	1	4	4	1	4	3	3	3
<b>Structural</b>															
Pump Station	3	4	3	4	1	3	3	3	3	1	2	3	3	2	4
Wet Well	4	4	4	1	2	3	3	4	3	4	4	4	4	3	3
<b>Mechanical</b>															
Pumps	3	3	4	1	2	3	3	3	3	4	2	4	5	3	5
Valves	4	3	4	1	3	5	3	4	5	5	5	5	5	3	4
Ventilation System	3	3	4	5	5	4	3	4	3	3	3	3	4	3	2
Emergency Generator	--	--	3	1	--	3	--	--	--	2	2	3	--	2	--
<b>Electrical</b>															
Motor Control Center	1	2	4	1	1	3	4	3	4	2	2	2	5	2	3
Variable Frequency Drive	2	3	5	1	3	--	--	2	3	4	3	4	5	2	--
Motors	3	3	4	1	2	3	2	4	2	2	2	3	4	3	3
Transformer	2	2	4	1	1	3	2	3	4	1	2	2	4	2	3
<b>Instrumentation</b>															
Programmable Logic Controller	3	1	4	2	1	1	1	4	1	1	1	1	2	2	1
Flowmeter	3	3	4	2	1	3	4	2	--	3	2	3	4	3	3

### Asset RUL Legend:

- RUL < 5 years
- RUL 5-10 years
- RUL 11-15 years
- RUL 16-20 years
- RUL > 20 years

### Acronym Key:

RUL=Remaining Useful Life

Pump Station	Major Assets – Quantities					Emergency Generators (Y/N)
	Wet Wells	Pumps	Force Mains	Valves		
15 <sup>th</sup> Street	1	3	2	22		N
A Street	1	3	2	19		N
Bay Bridge	1	5	2	17		Y
Bitter Point	1	5	2	23		Y
College	1	3	2	18		N
Crystal Cove	1	2	2	13		Y
Edinger	1	2	1	8		N
Lido	1	3	2	17		N
MacArthur	1	2	1	8		N
Main Street	2	10	3	38		Y
Rocky Point	1	4	2	18		Y
Slater	1	5	2	17		Y
Seal Beach	2	8	2	24		N
Westside	1	4	1	16		Y
Yorba Linda	1	3	1	11		N
<b>Total</b>	<b>17</b>	<b>62</b>	<b>27</b>	<b>269</b>		<b>--</b>

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – PUMP STATIONS

Key Issues	Actions and Recommendations	Acronym Key: OCSD=Orange County Sanitation District
<ul style="list-style-type: none"><li><b>Safety</b> – Currently four of OCSD’s older pump stations do not have atmospheric monitoring (for hydrogen sulfide gases) or standard safety indication lighting. Also, pump station infrastructure is often located in the public right of way making safe access to these facilities an on-going issue.</li></ul>	<ul style="list-style-type: none"><li>A planning study has been established to review and interpret electrical code and establish OCSD design standards to address this issue. Practicing on-going safety measures and traffic control when working in the public right of way will continue to be of the utmost importance.</li></ul>	
<ul style="list-style-type: none"><li><b>Natural Phenomenon</b> – Edinger pump station is located immediately adjacent to an undersized flood control channel. Crystal Cove pump station is experiencing gradual site settlement. Both natural hazards present a risk to normal operation of the pump stations.</li></ul>	<ul style="list-style-type: none"><li>Siting analysis has identified an area farther away from the active flood control channel to which Edinger pump station may be moved. Also, the County of Orange is planning to increase the capacity of the channel to accommodate future planned flows. A planning study has been established to determine the necessary mitigation measures to remediate site settlement at Crystal Cove pump station.</li></ul>	
<ul style="list-style-type: none"><li><b>Increased Methane Gas Levels</b> – methane gas accumulation has become a safety concern at some pump stations. The amount of gas seems to increase during summer months and presents a unique challenge because of the short response time necessary to address the safety concerns of increased ignition risk.</li></ul>	<ul style="list-style-type: none"><li>OCSD crews respond to alarms that indicate increased levels of methane gas. An internal effort has been defined to place flow monitors in the system to collect necessary data prior to establishing a planning study to determine the cause of the gas accumulation and possible mitigation measures.</li></ul>	
<ul style="list-style-type: none"><li><b>Corrosion</b> – Corrosion is an on-going problem in this very harsh environment. In places where the system has been kept from venting and mixing of wastewater is prevalent, such as wet wells, the degree of corrosion has (or will soon) require the replacement/rehabilitation of the assets.</li></ul>	<ul style="list-style-type: none"><li>Visual assessments of known corrosion issues are performed on an on-going basis. When necessary, cameras are used to evaluate the spreading of corrosion impacts and confined space entry may be performed to gather additional information to determine when the facility needs to be rehabilitated.</li></ul>	
<ul style="list-style-type: none"><li><b>Groundwater Intrusion</b> – Groundwater has penetrated four of the newly constructed pump stations in the coastal region of the service area. Groundwater is notoriously corrosive and may compromise the strength of the rebar within the concrete structure walls.</li></ul>	<ul style="list-style-type: none"><li>Execute a planning study to identify possible mitigation measures.</li></ul>	
<ul style="list-style-type: none"><li><b>Maintenance Access</b> – In some cases, such as venting of the Newport Beach force main system, access to critical facilities is limited by safety and public impact concerns. In other cases, such as MacArthur Pump Station force main, access to critical facilities is not possible because redundancy was not considered when the pump station was designed.</li></ul>	<ul style="list-style-type: none"><li>OCSD continues to improve planned maintenance processes and inter-agency coordination that allow crews to minimize impacts to the community during necessary maintenance operations. A future capital project has been established to construct a redundant force main to serve MacArthur pump station.</li></ul>	



Rocky Point Pump Station



Main Street Pump Station



College Pump Station



## ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – PUMP STATIONS

## Current and Future Projects

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
General – Projects that affect more than one pump station																			
5-68	Newport Beach Pump Station Odor Control Improvements	Multiple Pump Stations in Newport Beach Area	<ul style="list-style-type: none"> <li>Installation of venting equipment; phased implementation of chemical use</li> </ul>																
FE19-01	Portable Generator Connectors at Pump Stations	Multiple Pump Stations	<ul style="list-style-type: none"> <li>Installation of standard portable generator connectors</li> </ul>																
MP-304	Pump Station Deragger Unit Install	Multiple Pump Stations	<ul style="list-style-type: none"> <li>Installation of Deragger units at multiple pump stations</li> </ul>																
MP-393	Pump Station On-Call Electrical PM Services	All Pump Stations	<ul style="list-style-type: none"> <li>Various electrical PM services including testing of equipment</li> </ul>																
MP-429	Portable Emergency Generator Set Purchase	Multiple Facilities	<ul style="list-style-type: none"> <li>Purchase of portable generators and associated equipment</li> </ul>																
MP-474	Pacific Coast Highway Force Main Manual Air Release Valve PM	Newport Force Main System	<ul style="list-style-type: none"> <li>Venting of force mains on Pacific Coast Highway</li> </ul>																
MP-503	Critical Breaker Replacement Procurement	Multiple Pump Stations	<ul style="list-style-type: none"> <li>Procurement of critical breakers</li> </ul>																
MP-529	Dry Well Concrete Crack Repair	Multiple Pump Stations	<ul style="list-style-type: none"> <li>Groundwater intrusion remediation</li> </ul>																
MP-542	Pump Station Bypass Parts Procurement	Multiple Pump Stations	<ul style="list-style-type: none"> <li>Purchase pump station bypass parts</li> </ul>																
PS00005	Newport Beach Methane Gas Reduction Study	Newport Beach Force Main System	<ul style="list-style-type: none"> <li>Comprehensive study of methane gas reduction alternatives</li> </ul>	On Hold - Internal Effort															
PS15-08	Collections Capacity Evaluation Study	All Pump Stations	<ul style="list-style-type: none"> <li>Collection system master plan and model update</li> </ul>																
PS18-06	Go/No-Go Lights and Signage Study	All Pump Stations	<ul style="list-style-type: none"> <li>Standardize hazardous gas warning systems</li> </ul>																
XPS0009	A Street and 15 <sup>th</sup> Street Pump Station and Force Main Study	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive study of pump station condition and capacity</li> </ul>																



Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>15th Street Pump Station</b>																			
<b>MP-658</b>	15 <sup>th</sup> Street Pump Station Force Main Valve Replacement	Pump Station Force Main Isolation Valves	<ul style="list-style-type: none"> <li>Replace isolation valves</li> </ul>																
<b>X-022</b>	15 <sup>th</sup> Street Pump Station and Force Main Project	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station and force mains</li> </ul>																
<b>A Street Pump Station</b>																			
<b>X-041</b>	A Street Pump Station and Force Main Project	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station and force mains</li> </ul>																
<b>Bay Bridge Pump Station</b>																			
<b>5-67A</b>	Bay Bridge Pump Station Force Main Replacement	Pump Station Force Main	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station and force mains</li> </ul>																
<b>5-67B</b>	Bay Bridge Pump Station Replacement	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station and force mains</li> </ul>																
<b>MP-681</b>	Bay Bridge Pump Station Valve Replacement Project	Pump Station Isolation Valves	<ul style="list-style-type: none"> <li>Replacement of pump suction and discharge valves</li> </ul>																
<b>Bitter Point Pump Station</b>																			
<b>XPS0004</b>	Bitter Point Pump Station Rehabilitation Study	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive study of pump station condition and capacity</li> </ul>																
<b>College Pump Station</b>																			
<b>MP-482</b>	College Pump Station Vapex Improvements	Pump Station Vapex Unit and Wet Well	<ul style="list-style-type: none"> <li>Modifications to Vapex Unit</li> </ul>																
<b>X-026</b>	College Avenue Force Main Rehabilitation Project	Pump Station Force Main	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of force mains</li> </ul>																

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>Crystal Cove Pump Station</b>																			
<b>PS00004</b>	Crystal Cove Pump Station Settlement Evaluation	Crystal Cove Pump Station site	<ul style="list-style-type: none"> <li>Study to determine how to mitigate site settlement</li> </ul>																
<b>5-66</b>	Crystal Cove Pump Station Upgrade and Rehabilitation Project	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station</li> </ul>																
<b>Edinger Pump Station</b>																			
<b>11-33</b>	Edinger Pump Station Rehabilitation Project	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive relocation of pump station</li> </ul>																
<b>MP-444</b>	Edinger Pump Station UPS Repairs	Pump Station UPS	<ul style="list-style-type: none"> <li>Replacement of pump station UPS</li> </ul>																
<b>MP-495</b>	Edinger Pump Station Stair Repairs	Pump Station Stairs	<ul style="list-style-type: none"> <li>Paint metal stairs in the pump room</li> </ul>																
<b>PS15-02</b>	Edinger Pump Station Rehabilitation Study	Entire Pump Station	<ul style="list-style-type: none"> <li>Determine extent of pump station replacement or rehabilitation</li> </ul>																
<b>Lido Pump Station</b>																			
<b>FE15-10</b>	East Lido Force Main Rehabilitation Project	Pump Station East Force Main	<ul style="list-style-type: none"> <li>Rehabilitation of east force main</li> </ul>																
<b>MP-442</b>	Lido Pump Station Bathroom Drainpipe Replacement	Pump Station Bathroom and Wet Well	<ul style="list-style-type: none"> <li>Replacement of drain line from the bathroom to the wet well</li> </ul>																
<b>MP-618</b>	Lido Pump Station Camlock Receptacle Panel Installation	Pump Station Electrical Equipment	<ul style="list-style-type: none"> <li>Installation of standard portable generator connector</li> </ul>																
<b>X-023</b>	Lido Pump Station Rehabilitation Project	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station</li> </ul>																
<b>XPS0017</b>	Lido Pump Station Rehabilitation Study	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive study of pump station condition and capacity</li> </ul>																

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>MacArthur Pump Station</b>																			
<b>7-63</b>	MacArthur Pump Station Rehabilitation Project	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station</li> </ul>																
<b>7-68</b>	MacArthur Force Main Improvements	Pump Station Force Main	<ul style="list-style-type: none"> <li>Installation of second force main and rehabilitation of existing force main</li> </ul>																
<b>MP-427</b>	MacArthur Pump Station Force Main Valve Replacement	Pump Station Force Main	<ul style="list-style-type: none"> <li>Replacement of force main isolation valve</li> </ul>																
<b>Main Street Pump Station</b>																			
<b>7-64</b>	Main Street Pump Station Rehabilitation Project	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station</li> </ul>																
<b>MP-559</b>	Main Street Pump Station Valve Replacement	Pump Station Isolation Valves	<ul style="list-style-type: none"> <li>Pump And force main isolation valve replacement</li> </ul>																
<b>XPS0048</b>	Main Street Pump Station Rehabilitation Study	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive study of pump station condition and capacity</li> </ul>																
<b>Rocky Point Pump Station</b>																			
<b>MP-508</b>	Rocky Point Pump Station Wet Well Liner Repair	Pump Station Wet Well	<ul style="list-style-type: none"> <li>Repair wet well liner</li> </ul>																
<b>XPS0005</b>	Rocky Point Pump Station Rehabilitation Study	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive study of pump station condition and capacity</li> </ul>																

Project No.	Project Title	Impacted Facilities	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>Slater Pump Station</b>																			
11-34	Slater Pump Station Rehabilitation Project	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive rehabilitation of pump station</li> </ul>																
FE16-14	Slater Pump Station Valve Replacement	Pump Station Pump Isolation Valves	<ul style="list-style-type: none"> <li>Replacement of pump isolation valves</li> </ul>																
MP-207	Slater Pump Station Link Seal Repair	Pump Station Dry Well Wall	<ul style="list-style-type: none"> <li>Replace leaking link seal</li> </ul>																
XPS0044	Slater Pump Station Rehabilitation Study	Entire Pump Station	<ul style="list-style-type: none"> <li>Comprehensive study of pump station condition and capacity</li> </ul>																
<b>Seal Beach Pump Station</b>																			
3-67	Seal Beach Pump Station Replacement	Entire Pump Station	<ul style="list-style-type: none"> <li>Reconstruction of pump station</li> </ul>																
PRN-00550	Seal Beach Pump Station – Fan No. 3 Relocation	Fan No. 3	<ul style="list-style-type: none"> <li>Relocate the fan to the outside of the building for better maintenance access</li> </ul>																
N/A	Seal Beach Valve Replacement Project	Pump and force main isolation valves	<ul style="list-style-type: none"> <li>Replace 17 gate valves of various sizes</li> </ul>																
<b>Westside Pump Station</b>																			
3-62	Westminster Boulevard Force Main Replacement	Seal Beach PS Force Main	<ul style="list-style-type: none"> <li>Replacement of the force mains</li> </ul>																
<b>Yorba Linda Pump Station</b>																			
2-73	Yorba Linda Pump Station Abandonment Project	Entire Pump Station and Force Main	<ul style="list-style-type: none"> <li>Abandonment of pump station and force main</li> </ul>																

**Types of Project Legend:**

CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

**Acronym Key:**

CIP=Capital Improvement Project; FY=Fiscal Year; N/A=Not Applicable  
 UPS=Uninterruptible Power Supply

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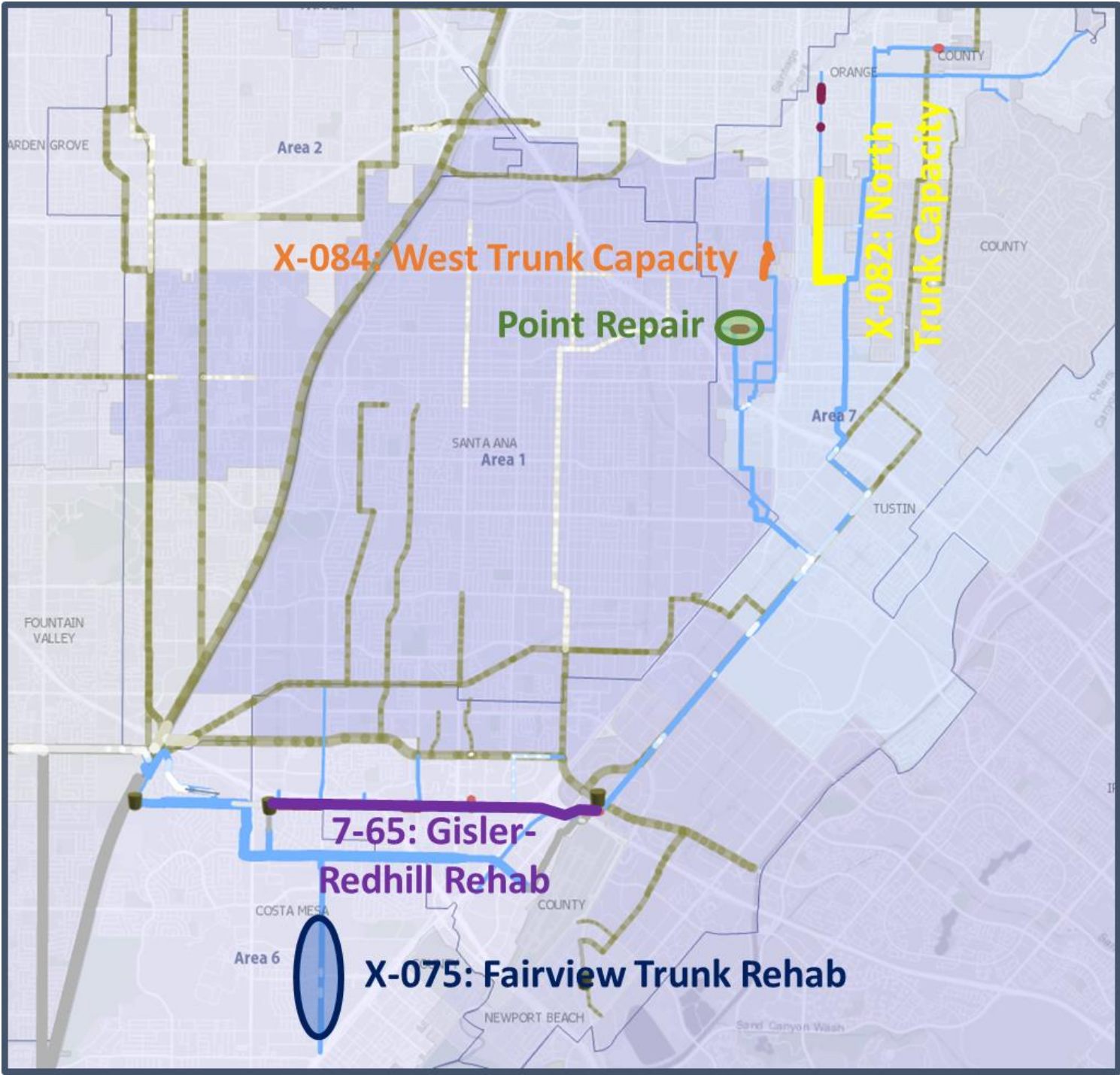
## **5.2.4 Collection System Pipeline Asset Management Summaries**

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ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – BAKER-MAIN TRUNK

System Overview



**Structural Grade Defect Legend:**

- Grade 5
- Grade 4

Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	18.8	339	52	4	3
21" - 27" Ø	9.7	162	33	-	-
≥ 30" Ø	6.1	79	44	5	1
Reinforced Concrete					
≤ 48" Ø	0.3	4	26	-	-
51" - 66" Ø	0.9	12	28	-	-
≥ 72" Ø	3.7	35	25	-	-
Ductile Iron					
42" Ø	0.5	2	28	-	-

**Acronym Key:**  
 NASSCO=National Association of Sewer Service Companies



ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – BAKER-MAIN TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"><li>• <b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li></ul>	<ul style="list-style-type: none"><li>• OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li></ul>
<ul style="list-style-type: none"><li>• <b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li></ul>	<ul style="list-style-type: none"><li>• Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li></ul>
<ul style="list-style-type: none"><li>• <b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li></ul>	<ul style="list-style-type: none"><li>• Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li></ul>
<ul style="list-style-type: none"><li>• <b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li></ul>	<ul style="list-style-type: none"><li>• OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li></ul>

Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
7-65	Gisler-Redhill Interceptor Rehabilitation Project	<ul style="list-style-type: none"><li>• Rehabilitation of sewer facilities in the city of Costa Mesa.</li></ul>																
X-082	North Trunk Improvement Project	<ul style="list-style-type: none"><li>• Upsizing of pipe segments to increase capacity in the city of Tustin.</li></ul>																
X-075	Fairview Trunk Sewer Rehabilitation Project	<ul style="list-style-type: none"><li>• Rehabilitation of sewer facilities in the city of Costa Mesa.</li></ul>																
X-084	Tustin Ave Sewer Relief Project	<ul style="list-style-type: none"><li>• Upsizing of pipe segments to increase capacity in the city of Santa Ana.</li></ul>																

Types of Project Legend:

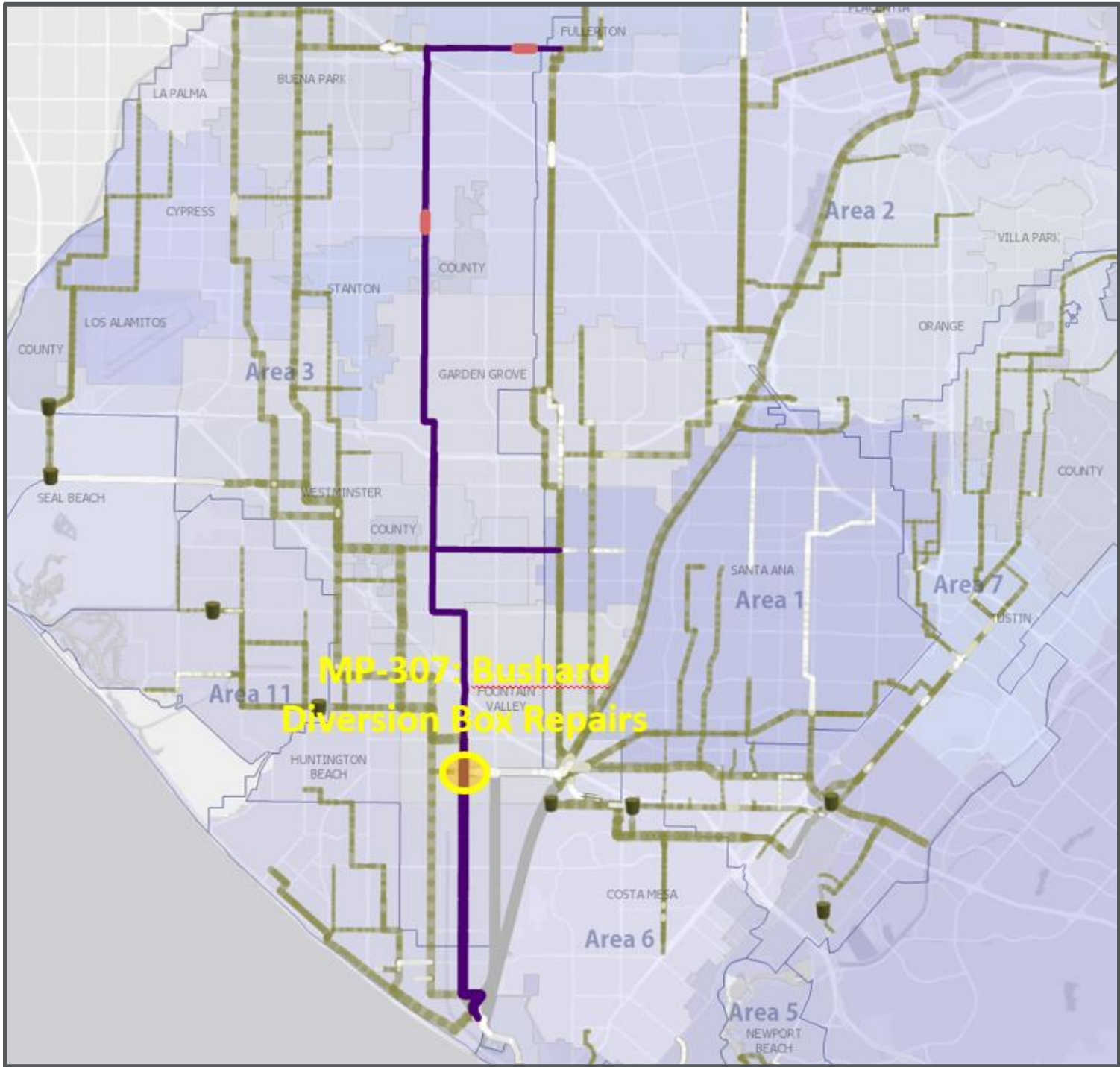
CIP - Planning     CIP – Design     CIP - Construction     Maintenance Project

Acronym Key:

CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – BUSHARD TRUNK

System Overview



Structural Grade Defect Legend:

Grade 5

Grade 4

Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	0.03	3	54	-	-
21" - 27" Ø	5.1	73	54	-	2
≥ 30" Ø	3.6	26	44	-	1
Reinforced Concrete					
≤ 48" Ø	2.4	14	55	-	-
51" - 66" Ø	0.3	8	55	-	-
≥ 72" Ø	4.5	32	19	-	-
Fiberglass					
36" - 48" Ø	4.7	27	8	-	-
Unreinforced Concrete					
42" - 48" Ø	1.0	10	22	-	-
HDPE					
22" Ø	0.06	2	21	-	-

Acronym Key:  
HDPE=High-Density Polyethylene Resin;  
NASSCO=National Association of Sewer Service Companies

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – BUSHARD TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"> <li><b>Bushard Diversion Box</b> - the Bushard Diversion Box is not able to operate as originally intended (flow modulation between Plant No. 1 and Plant No. 2 based on flows).</li> </ul>	<ul style="list-style-type: none"> <li>A planning study is underway to determine a course of action regarding potential modifications to the Bushard Diversion Box. This study will also incorporate box rehabilitation beyond the scope of the more immediate repairs being performed as part of MP-307.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li> </ul>
<ul style="list-style-type: none"> <li><b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li> </ul>

Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
MP-307	Bushard Diversion Box Repairs	<ul style="list-style-type: none"> <li>Repair of structural assets and replacement of electrical and instrumentation and control components.</li> </ul>																
PS18-02	Bushard Diversion Structure Rehabilitation Study	<ul style="list-style-type: none"> <li>Study to determine the scope of necessary modifications that will reinstate and improve operation of the structure.</li> </ul>																

Types of Project Legend:

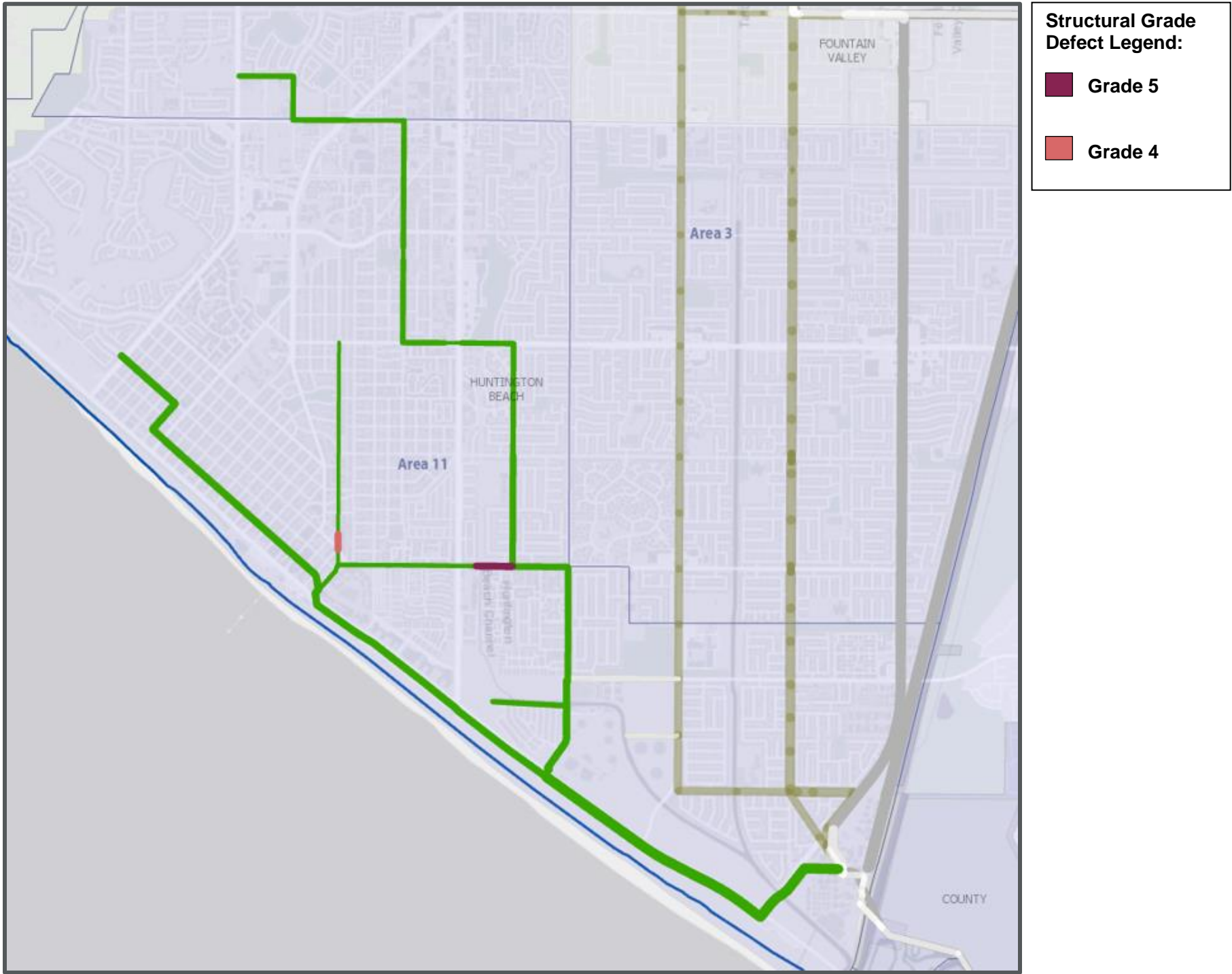
CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

Acronym Key:

CCTV=Closed-Circuit Television; CIP=Capital Improvement Project; FY=Fiscal Year; OCSD=Orange County Sanitation District

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – COAST TRUNK

System Overview



Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	2.1	32	60	1	1
21" - 27" Ø	2.6	34	57	-	-
≥ 30" Ø	1.8	24	60	-	-
Reinforced Concrete					
≤ 48" Ø	0.5	5	60	-	-
51" - 66" Ø	2.8	38	34	-	-
≥ 72" Ø	1.6	11	38	-	-
Polyvinyl Chloride					
54" Ø	0.05	2	38	-	-

**Acronym Key:**  
NASSCO=National Association of Sewer Service Companies



ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – COAST TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"><li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li></ul>	<ul style="list-style-type: none"><li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li></ul>
<ul style="list-style-type: none"><li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li></ul>	<ul style="list-style-type: none"><li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li></ul>
<ul style="list-style-type: none"><li><b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li></ul>	<ul style="list-style-type: none"><li>OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li></ul>

Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Types of Project Legend:**

CIP - Planning

CIP – Design

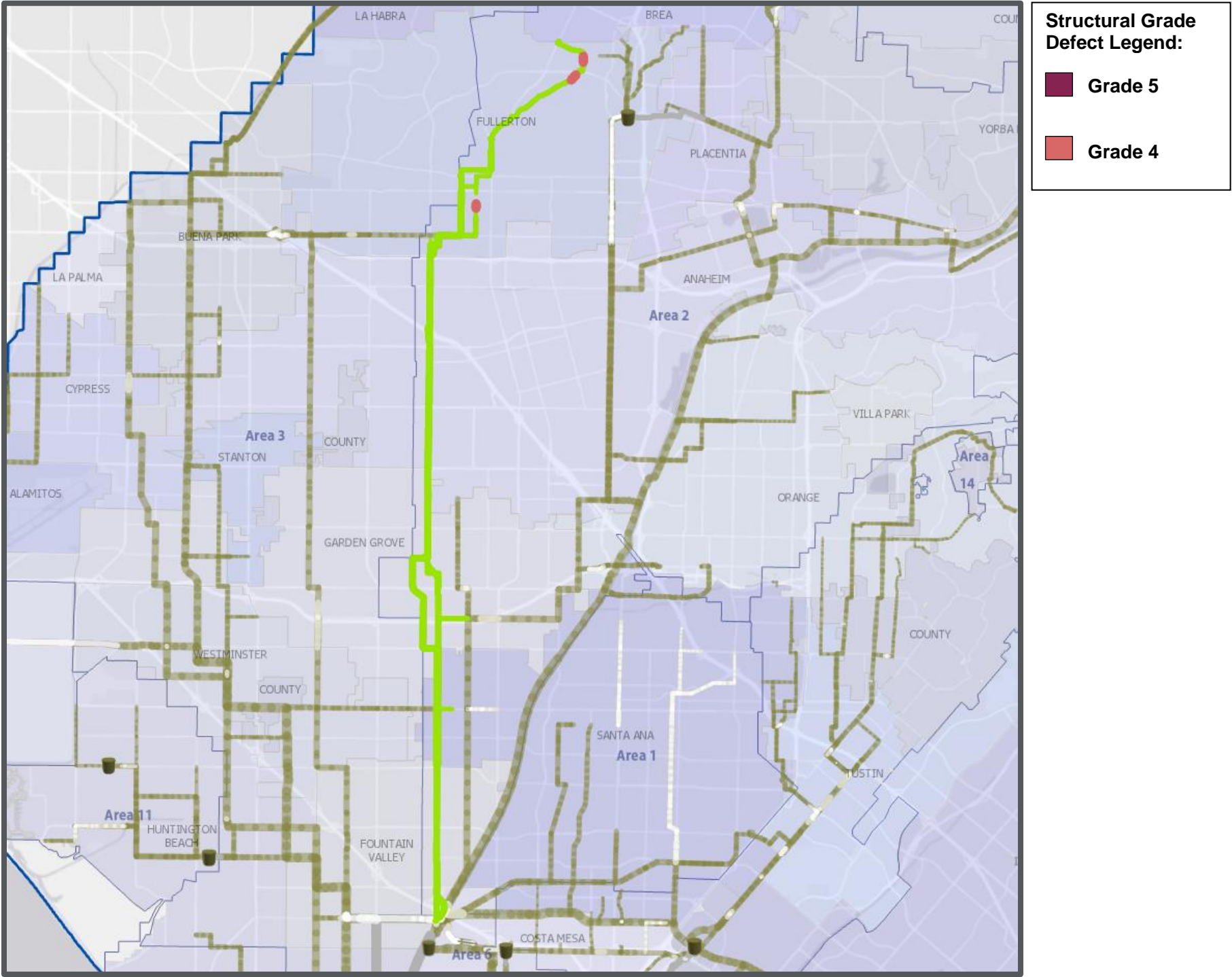
CIP - Construction

Maintenance Project

**Acronym Key:**  
CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – EUCLID TRUNK

System Overview



Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	4.4	76	56	-	3
21" - 27" Ø	3.9	52	37	-	-
≥ 30" Ø	12.1	154	47	-	-
Reinforced Concrete					
≤ 48" Ø	7.0	69	33	-	-
51" - 66" Ø	7.0	75	31	-	-
≥ 72" Ø	-	-	-	-	-

**Acronym Key:**  
NASSCO=National Association of Sewer Service Companies

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – EUCLID TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"><li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li></ul>	<ul style="list-style-type: none"><li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li></ul>
<ul style="list-style-type: none"><li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li></ul>	<ul style="list-style-type: none"><li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li></ul>
<ul style="list-style-type: none"><li><b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li></ul>	<ul style="list-style-type: none"><li>Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li></ul>
<ul style="list-style-type: none"><li><b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li></ul>	<ul style="list-style-type: none"><li>OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li></ul>

Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Types of Project Legend:**

CIP - Planning

CIP – Design

CIP - Construction

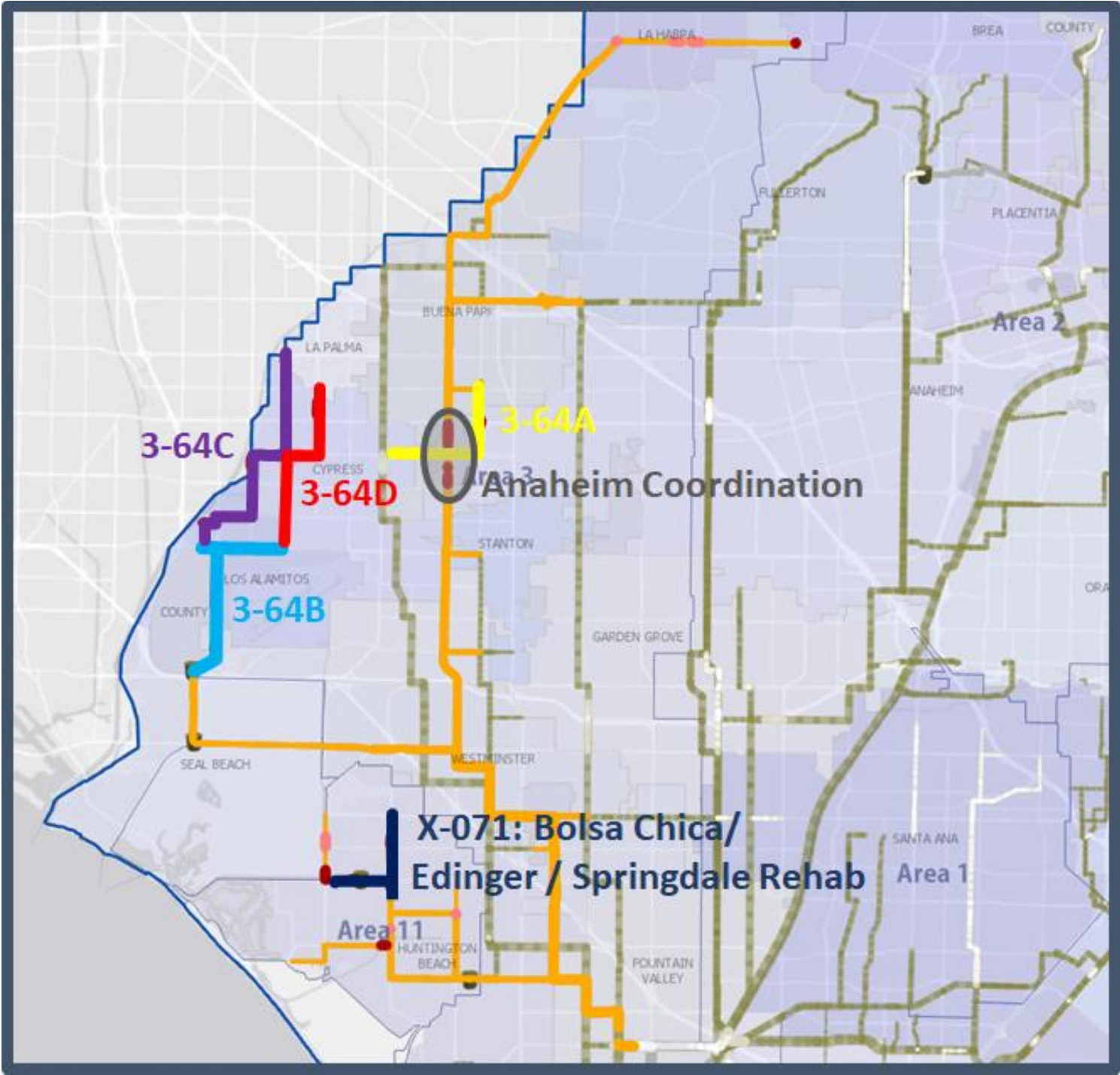
Maintenance Project

**Acronym Key:**  
CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride



ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – KNOTT TRUNK

System Overview



Structural Grade Defect Legend:

Grade 5

Grade 4

Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	9.0	127	51	21	7
21" - 27" Ø	20.5	299	45	9	4
≥ 30" Ø	17.0	215	38	14	1
Reinforced Concrete					
≤ 48" Ø	3.0	37	32	-	-
51" - 66" Ø	6.8	57	45	-	-
≥ 72" Ø	9.4	66	44	-	-
Polyvinyl Chloride					
18" Ø	1.2	12	15	-	-
Fiberglass					
30" Ø	0.04	1	23	-	-
Ductile Iron					
20" Ø	0.02	1	60	-	-

Acronym Key:  
NASSCO=National Association of Sewer Service Companies



ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – KNOTT TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"> <li><b>Anaheim Coordination</b> – The city of Anaheim owns and operates various small diameter pipelines and diversions throughout the northern central area of the trunk.</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate with the City of Anaheim pertaining to operation and maintenance of these pipelines and diversions.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li> </ul>
<ul style="list-style-type: none"> <li><b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li> </ul>
<ul style="list-style-type: none"> <li><b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li> </ul>

Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
3-64A	Orange Western Sub-Trunk Rehabilitation	<ul style="list-style-type: none"> <li>Rehabilitate sewer facilities in the cities of Cypress, Anaheim, and Buena Park.</li> </ul>																
3-64B	Los Alamitos Trunk Sewer Rehabilitation	<ul style="list-style-type: none"> <li>Rehabilitate sewer facilities in the cities of Seal Beach, Los Alamitos, and the community of Rossmoor.</li> </ul>																
3-64C	Cypress Trunk Sewer Rehabilitation - West	<ul style="list-style-type: none"> <li>Upsize and rehabilitate sewer facilities in the cities of Cypress and La Palma.</li> </ul>																
3-64D	Cypress Trunk Sewer Rehabilitation - East	<ul style="list-style-type: none"> <li>Rehabilitate sewer facilities in the cities of Cypress and La Palma.</li> </ul>																
X-071	Bolsa Chica / Edinger / Springdale Rehabilitation	<ul style="list-style-type: none"> <li>Rehabilitation of sewer facilities in the City of Huntington Beach.</li> </ul>																

Types of Project Legend:

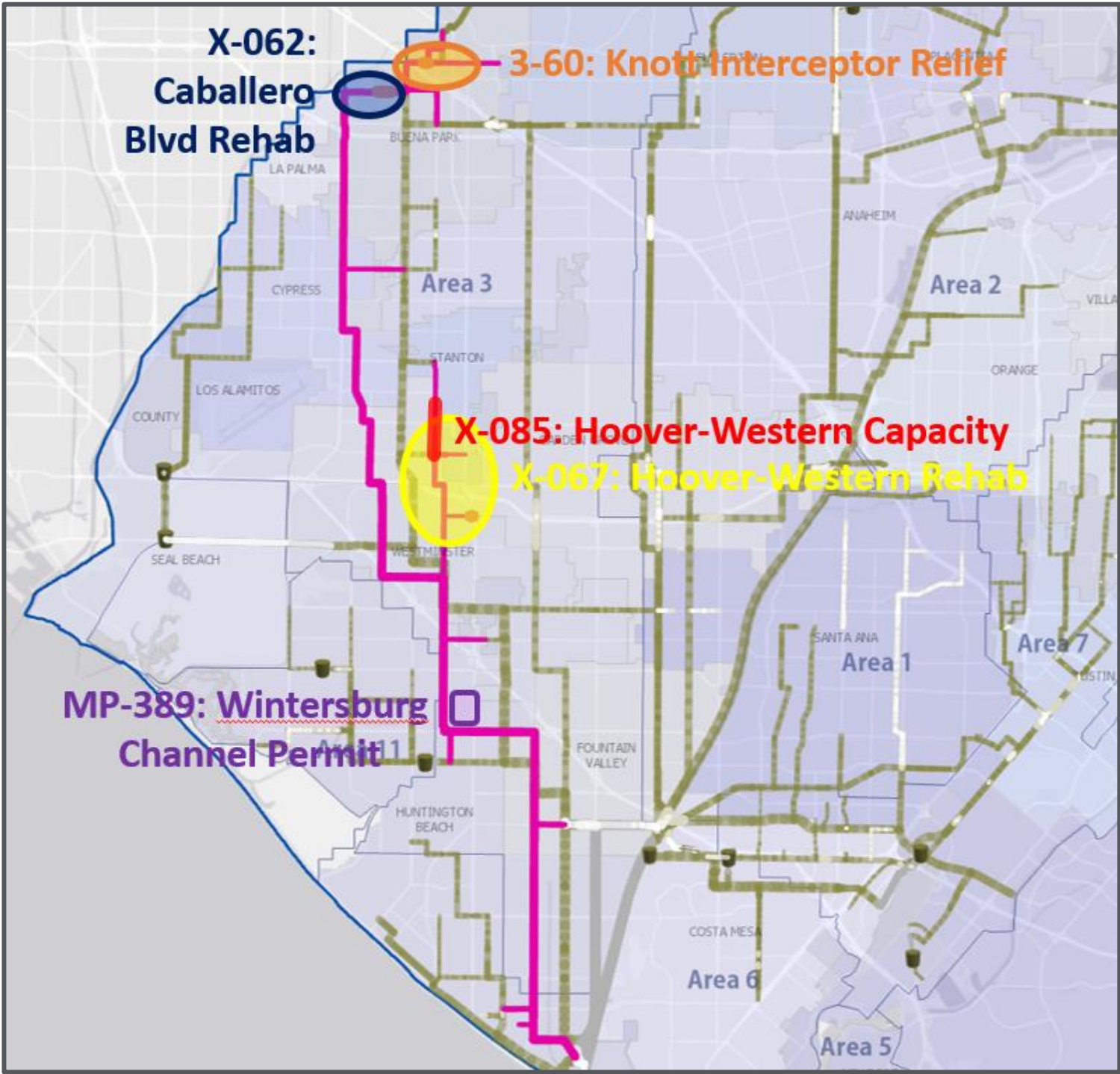
CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

Acronym Key:

CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – MILLER-HOLDER TRUNK

System Overview



Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	2.9	50	60	-	1
21" - 27" Ø	6.9	87	58	-	-
≥ 30" Ø	2.4	5	57	-	2
Reinforced Concrete					
≤ 48" Ø	2.9	20	61	-	-
51" - 66" Ø	6.6	35	61	-	-
≥ 72" Ø	9.8	46	65	-	-
Ductile Iron					
12" Ø	0.03	2	60	-	-
<b>Acronym Key:</b> NASSCO=National Association of Sewer Service Companies					

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – MILLER-HOLDER TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"> <li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li> </ul>
<ul style="list-style-type: none"> <li><b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li> </ul>

Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
MP-389	Wintersburg Channel Permit	<ul style="list-style-type: none"> <li>Easement coordination to improve existing manhole access.</li> </ul>																
3-60	Knott Interceptor Relief	<ul style="list-style-type: none"> <li>Rehabilitation of sewer facilities in the city of Buena Park.</li> </ul>																
X-062	Caballero Blvd. Trunk Sewer Rehabilitation	<ul style="list-style-type: none"> <li>Rehabilitation of sewer facilities in the city of Buena Park.</li> </ul>																
X-067	Western Ave. / Hoover St. Trunk Sewer Rehabilitation	<ul style="list-style-type: none"> <li>Rehabilitation of sewer facilities in the city of Westminster.</li> </ul>																
X-085	Hoover-Western Sub-Trunk Improvement Project	<ul style="list-style-type: none"> <li>Upsizing of sewer segments to increase capacity.</li> </ul>																

**Types of Project Legend:**

CIP - Planning

CIP – Design

CIP - Construction

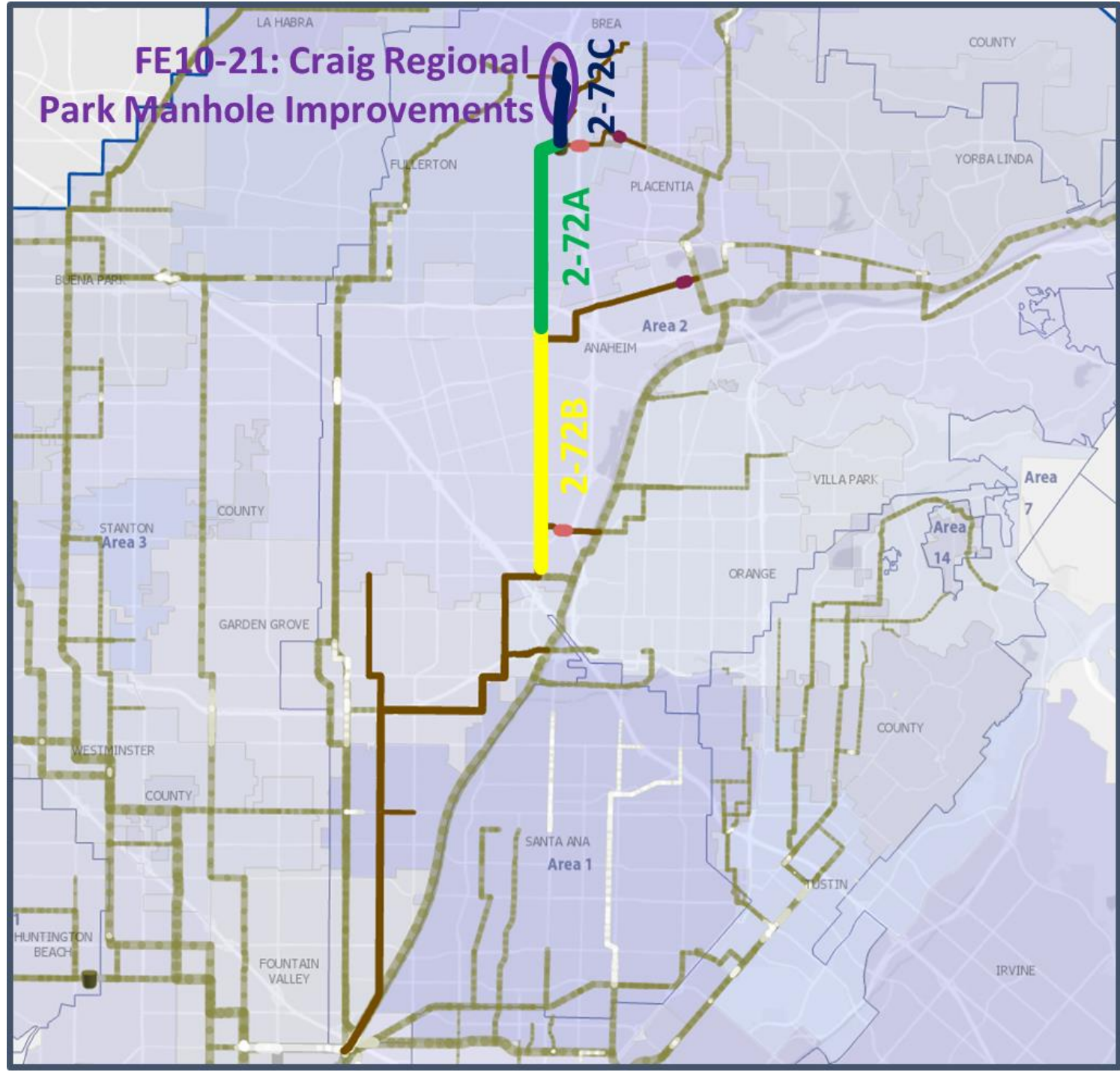
Maintenance Project

**Acronym Key:**  
CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride



ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – NEWHOPE TRUNK

System Overview



**Structural Grade Defect Legend:**

- Grade 5
- Grade 4

Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	2.7	57	56	1	1
21" - 27" Ø	2.7	39	59	1	-
≥ 30" Ø	10.5	140	49	-	1
Reinforced Concrete					
≤ 48" Ø	4.6	30	61	-	-
51" - 66" Ø	3.8	19	57	-	-
≥ 72" Ø	-	-	-	-	-
Polyvinyl Chloride					
24" Ø	0.01	1	25	-	-
Fiberglass					
30" Ø	0.03	1	2	-	-
Ductile Iron					
20" Ø	1.3	24	30	-	-

**Acronym Key:**  
 NASSCO=National Association of Sewer Service Companies

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – NEWHOPE TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"> <li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li> </ul>
<ul style="list-style-type: none"> <li><b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li> </ul>
<ul style="list-style-type: none"> <li><b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li> </ul>

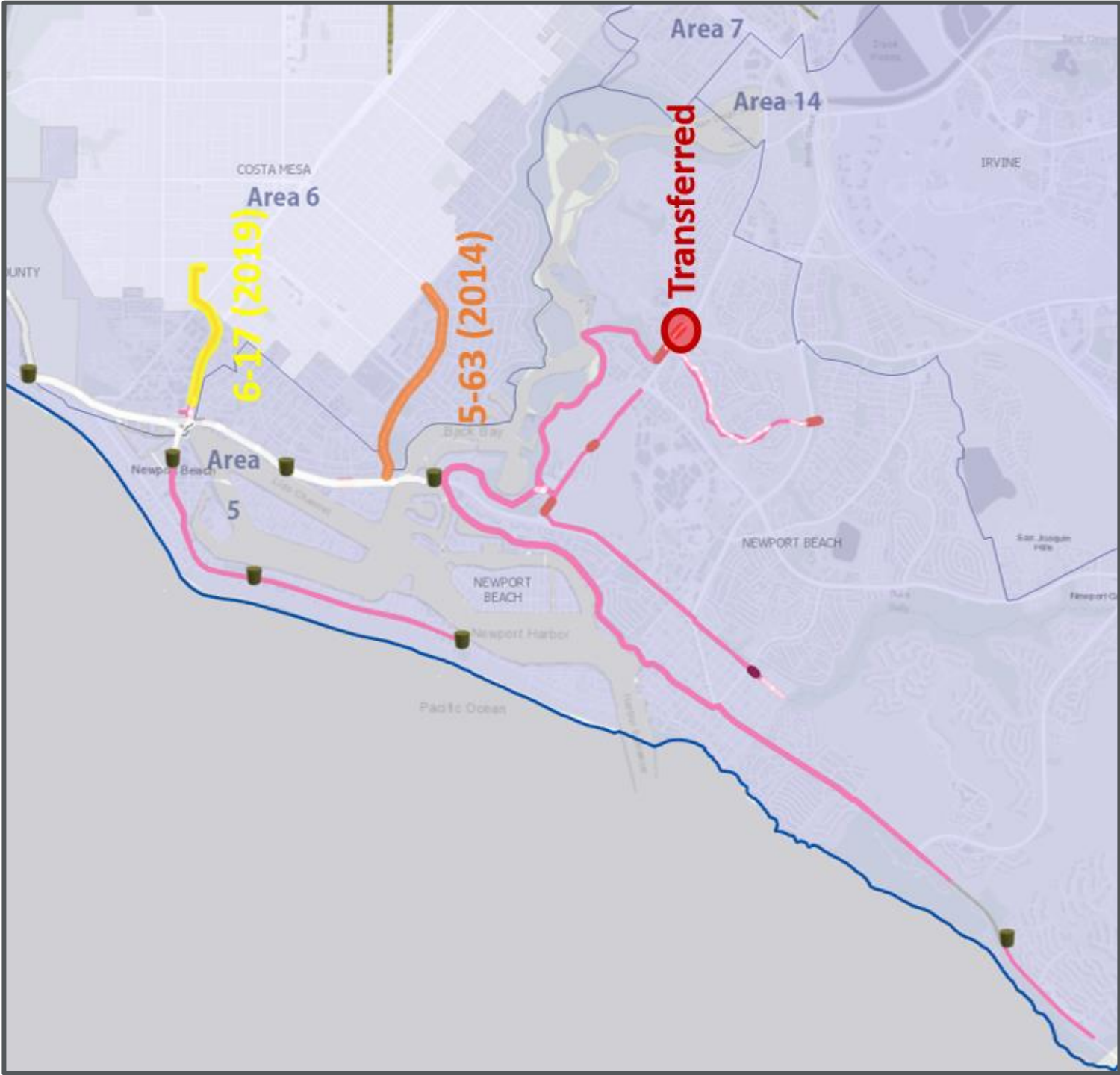
Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
2-72B & 2-72C	Newhope Placentia Trunk Sewer Replacement	<ul style="list-style-type: none"> <li>Upsizing of segments of sewer to increase capacity.</li> </ul>																
FE10-21	Craig Regional Park Manhole Improvements	<ul style="list-style-type: none"> <li>Manhole access improvements throughout Craig Regional.</li> </ul>																

<b>Types of Project Legend:</b> <div> <div></div> CIP - Planning <div></div> CIP – Design <div></div> CIP - Construction <div></div> Maintenance Project </div>	<b>Acronym Key:</b> CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride
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ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – NEWPORT TRUNK

System Overview



Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	6.1	122	44	1	3
21" - 27" Ø	4.5	99	35	-	-
≥ 30" Ø	3.8	75	32	-	1
Ductile & Cast Iron					
8" - 30" Ø	3.0	44	27	-	1
Polyvinyl Chloride					
12" - 36" Ø	2.6	37	19	-	-
Cured-in-Place					
24" Ø	1.1	13	21	-	-
HDPE					
20" Ø	0.6	12	27	-	1

**Acronym Key:**  
HDPE=High-Density Polyethylene Resin;  
NASSCO=National Association of Sewer Service Companies



ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – NEWPORT TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"><li><b>Tuberculation</b> – Some portions of the existing metal pipes have tuberculation which poses a risk. Several of these segments have been lined; however, some work remains to complete these repairs.</li></ul>	<ul style="list-style-type: none"><li>Review condition of unlined metal pipes and rehabilitate pipes subject to tuberculation as needed.</li></ul>
<ul style="list-style-type: none"><li><b>Local Sewers</b> – A portion of gravity collection system that was local service was transferred to Newport Beach.</li></ul>	<ul style="list-style-type: none"><li>None.</li></ul>
<ul style="list-style-type: none"><li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li></ul>	<ul style="list-style-type: none"><li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li></ul>
<ul style="list-style-type: none"><li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li></ul>	<ul style="list-style-type: none"><li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li></ul>
<ul style="list-style-type: none"><li><b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li></ul>	<ul style="list-style-type: none"><li>Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li></ul>
<ul style="list-style-type: none"><li><b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li></ul>	<ul style="list-style-type: none"><li>OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li></ul>

Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Types of Project Legend:**

CIP - Planning

CIP – Design

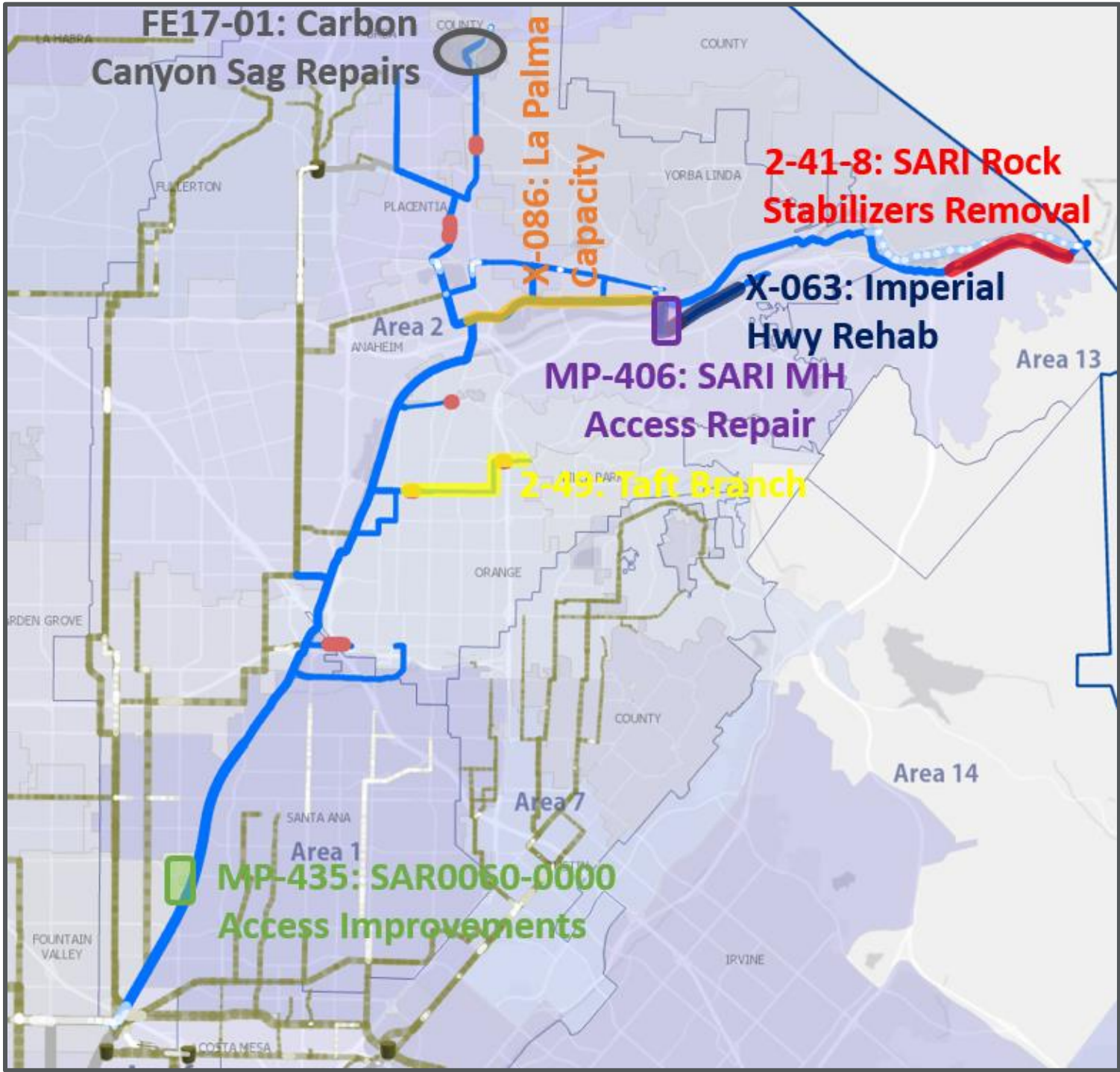
CIP - Construction

Maintenance Project

**Acronym Key:**  
CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – SARI TRUNK

System Overview



**Structural Grade Defect Legend:**

Grade 5

Grade 4

Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	5.0	114	55	-	2
21" - 27" Ø	11.6	187	44	-	4
≥ 30" Ø	6.0	85	34	-	3
Reinforced Concrete					
42" Ø	1.5	19	34	-	-
Fiberglass					
54" Ø	0.3	2	10	-	-
HDPE					
12" - 30" Ø	0.7	3	9	-	-
Ductile Iron					
24" - 48" Ø	0.4	5	27	-	-
Steel					
24" - 48" Ø	0.03	2	9	-	-

**Acronym Key:**  
HDPE=High-Density Polyethylene Resin; MH=Manhole;  
NASSCO=National Association of Sewer Service Companies



# ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – SARI TRUNK

## Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"> <li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li> </ul>
<ul style="list-style-type: none"> <li><b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li> </ul>
<ul style="list-style-type: none"> <li><b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Description of Work	FY19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
MP-406	SARI Manhole Access Repair	<ul style="list-style-type: none"> <li>Improvements for manholes with limited vehicle access.</li> </ul>																
MP-435	SAR0060-0000 Access Improvements	<ul style="list-style-type: none"> <li>Coordination with OCFCD to improve vehicle access to manholes.</li> </ul>																
2-41-8	SARI Rock Stabilizers Removal	<ul style="list-style-type: none"> <li>Removal of rip rap and restoration of access roads.</li> </ul>																
2-49	Taft Branch Improvements	<ul style="list-style-type: none"> <li>Upsizing of sewer segments to increase capacity.</li> </ul>																
X-063	Imperial Hwy / 91 Freeway Trunk Sewer Rehabilitation	<ul style="list-style-type: none"> <li>Rehabilitation of sewer facilities in the city of Anaheim.</li> </ul>																
X-086	Santa Ana River Sewer Relief Project	<ul style="list-style-type: none"> <li>Upsizing of sewer segments to increase capacity.</li> </ul>																

### Types of Project Legend:

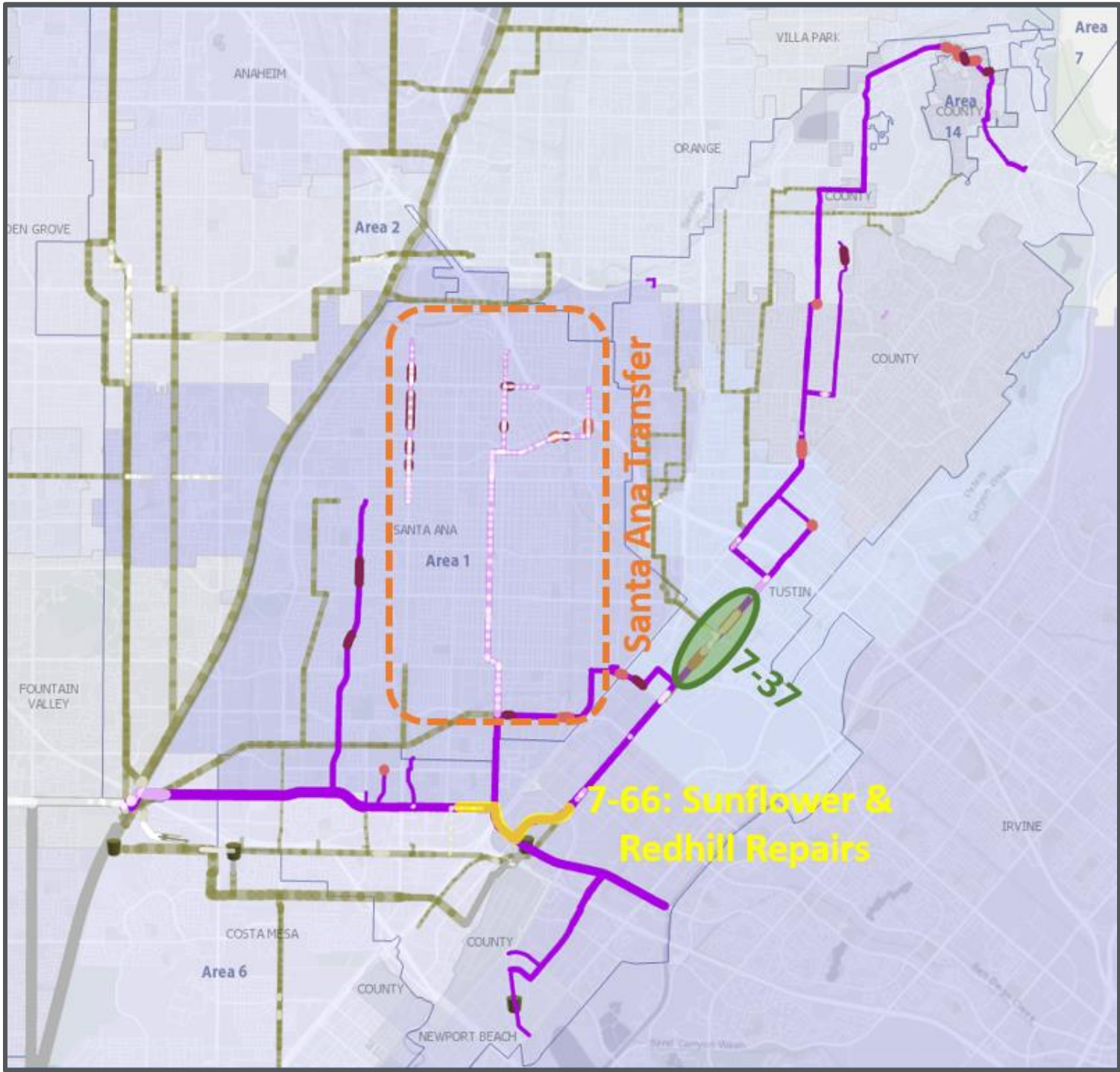
■ CIP - Planning
 ■ CIP – Design
 ■ CIP - Construction
 ■ Maintenance Project

### Acronym Key:

CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; PVC=Polyvinyl chloride; OCFCD=Orange County Flood Control District; OCSD=Orange County Sanitation District

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – SUNFLOWER TRUNK

System Overview



Structural Grade Defect Legend:

Grade 5

Grade 4

Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	7.06	142	43	1	4
21" - 27" Ø	13.6	207	48	7	4
≥ 30" Ø	4.4	55	44	-	1
Reinforced Concrete					
≤ 48" Ø	1.6	15	40	-	-
51" - 66" Ø	3.1	32	40	-	-
≥ 72" Ø	4.1	27	33	-	-
Ductile Iron					
20" Ø	0.5	11	20	1	1
Polyvinyl Chloride					
30" Ø	0.02	2	13	-	-

Acronym Key:  
NASSCO=National Association of Sewer Service Companies

ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – SUNFLOWER TRUNK

Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"><li>• <b>Point Repairs</b> – There are two isolated pipe segments with significant defects.</li></ul>	<ul style="list-style-type: none"><li>• Evaluate the extent of the necessary repairs in these locations.</li></ul>
<ul style="list-style-type: none"><li>• <b>Sewer Transfer</b> – Approximately 7.8 miles of gravity sewer were transferred to the City of Santa Ana.</li></ul>	<ul style="list-style-type: none"><li>• None.</li></ul>
<ul style="list-style-type: none"><li>• <b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li></ul>	<ul style="list-style-type: none"><li>• OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li></ul>
<ul style="list-style-type: none"><li>• <b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li></ul>	<ul style="list-style-type: none"><li>• Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li></ul>
<ul style="list-style-type: none"><li>• <b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li></ul>	<ul style="list-style-type: none"><li>• Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li></ul>
<ul style="list-style-type: none"><li>• <b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li></ul>	<ul style="list-style-type: none"><li>• OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li></ul>

Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
7-66	Sunflower and Red Hill Interceptor Repairs	<ul style="list-style-type: none"><li>• Rehabilitation of sewer facilities in the cities of Santa Ana and Costa Mesa.</li></ul>																

**Types of Project Legend:**

CIP - Planning

CIP – Design

CIP - Construction

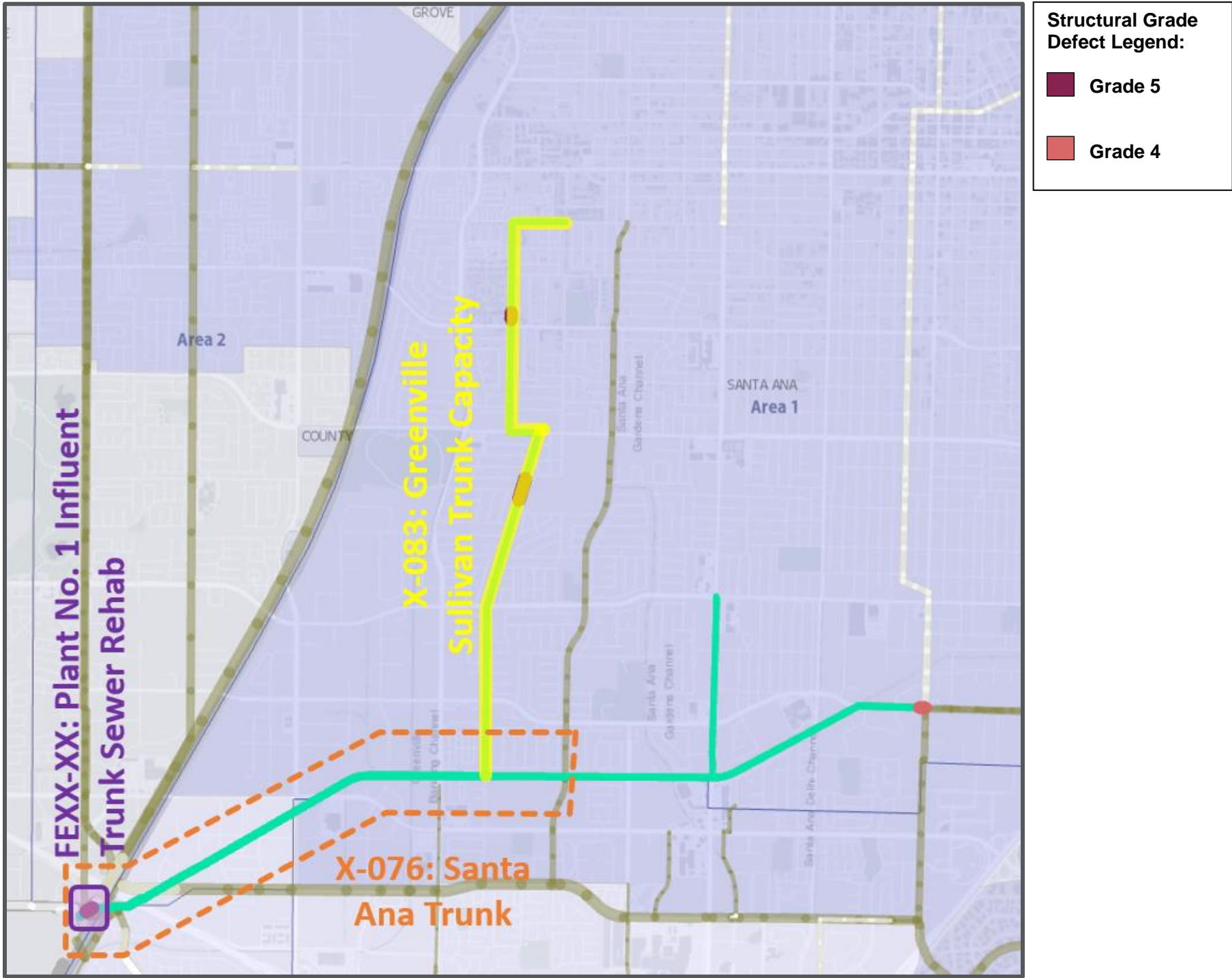
Maintenance Project

**Acronym Key:**  
CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride



ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – TALBERT TRUNK

System Overview



Major Assets and Condition Information

Asset Type	Total Length (miles)	# of Pipes	Average Age (years)	# of NASSCO Structural 5	# of NASSCO Structural 4
Vitrified Clay					
≤ 18" Ø	0.03	3	62	-	-
21" - 27" Ø	3.4	46	66	3	-
≥ 30" Ø	1.7	23	64	-	1
Reinforced Concrete					
≤ 48" Ø	3.3	39	49	-	-
51" - 66" Ø	0.08	2	55	-	-
≥ 72" Ø	-	-	-	-	-

**Acronym Key:**  
NASSCO=National Association of Sewer Service Companies



Santa Ana Trunk Sewer

# ASSET MANAGEMENT SYSTEM SUMMARY – COLLECTION SYSTEM – TALBERT TRUNK

## Key Issues

Key Issues	Actions & Recommendations
<ul style="list-style-type: none"> <li><b>Unlined Reinforced Concrete Pipelines</b> – The lower portions of the Santa Ana trunk are unlined reinforced concrete pipe that has been routinely evaluated and is currently in acceptable condition. These segments are more prone to corrosion related issues than typical pipe materials utilized within the collection system.</li> </ul>	<ul style="list-style-type: none"> <li>Continue frequent monitoring of the pipeline condition to provide routine updates from which the scheduling of a future rehabilitation project (X-076) can be determined.</li> </ul>
<ul style="list-style-type: none"> <li><b>Sewer Transfer</b> – Approximately 7.8 miles of gravity sewer were transferred to the City of Santa Ana.</li> </ul>	<ul style="list-style-type: none"> <li>None.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Gravity Pipelines</b> - Many factors impact the accuracy of the coding system used to identify the type and severity of condition issues within the collection system. Video quality, operator experience, and field conditions often make correct and consistent coding of defects difficult. For this reason, defects that have been identified may not illicit an immediate response.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff reviews condition reports on a regular basis and if necessary, marks the defect for monitoring or repair.</li> </ul>
<ul style="list-style-type: none"> <li><b>Condition Assessment of Siphons and Large Diameter Pipelines</b> – Siphons are regularly cleaned but are not inspected because they are inaccessible using CCTV equipment. Large diameter pipe (&gt; 42”) are not cleaned and CCTV footage does not identify sediment or debris below the waterline.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and execute a Planning Study to identify alternative methods for inspection of siphons and large diameter pipelines.</li> </ul>
<ul style="list-style-type: none"> <li><b>Capacity</b> – The Collections Capacity Evaluation Study completed in 2019 conducted a detailed capacity analysis to identify the location of capacity deficiencies during dry and peak wet weather flows.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and complete CIPs identified by the Collections Capacity Evaluation Study to address capacity issues. Monitor potential spill locations associated with capacity deficiencies not identified as near-term CIPs.</li> </ul>
<ul style="list-style-type: none"> <li><b>T-lock</b> – The T-Lock PVC sheet lining system use to line manholes and concrete structures throughout the collection system will be discontinued.</li> </ul>	<ul style="list-style-type: none"> <li>OCSD staff will investigate alternative liner technologies and methods to repair existing lined structures.</li> </ul>

## Current and Future Projects

Project No.	Project Title	Description of Work	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	FY 31/32	FY 32/33	FY 33/34	FY 34/35
<b>FEXX-XX (PRN-00223)</b>	Plant No.1 Influent Trunk Sewer Rehabilitation	<ul style="list-style-type: none"> <li>Rehabilitation of influent trunk line.</li> </ul>																
<b>X-076</b>	Santa Ana Trunk Sewer Rehab	<ul style="list-style-type: none"> <li>Rehabilitation of sewer facilities in the cities of Santa Ana and Costa Mesa.</li> </ul>																
<b>X-083</b>	Greenville Sullivan Trunk Capacity	<ul style="list-style-type: none"> <li>Upsizing of sewer segments to increase capacity.</li> </ul>																

### Types of Project Legend:

CIP - Planning
  CIP – Design
  CIP - Construction
  Maintenance Project

### Acronym Key:

CCTV=Closed-Circuit Television; CIP=Capital Improvement Program; FY=Fiscal Year; OCSD=Orange County Sanitation District; PVC=Polyvinyl chloride

## CHAPTER 6 PROGRAM MONITORING AND IMPROVEMENTS

### 6.1 Program Monitoring

OCSD is continually evaluating AM Program progress and realized benefits. To support the evaluation, OCSD is in the early stages (first year) of developing metrics for monitoring. The metrics will be included in subsequent AMP versions.

### 6.2 AM Program Improvement Opportunities

Several improvement opportunities are defined in **Table 6.1** as part of the AM Program continuous improvement process. Reasonable timeframes are defined for implementing these improvements. Future AMP updates will summarize the implementation progress.

**Table 6.1. AM Program Improvement Opportunities**

Improvement Opportunity	Description	Timeframe (Years)	Success Measures
<b>Performance Management Framework and Metrics</b>	Establish metrics, processes, and organizational roles for tracking and trending the AM program performance and progress towards meeting the GM's intent.	1-2	<ul style="list-style-type: none"> <li>• Defined metrics</li> <li>• Documented reporting processes</li> </ul>
<b>Remaining Useful Life</b>	Continue to monitor and update the condition of assets and remaining useful life estimates for major assets.	Ongoing	<ul style="list-style-type: none"> <li>• RUL estimate defined for each major asset</li> </ul>
<b>Risk Assessment</b>	Expand existing risk assessment process and update likelihood and consequence of failure criteria. Score each major asset using the criteria.	2-5	<ul style="list-style-type: none"> <li>• Risk score for each major asset</li> </ul>
<b>Integrated Use of Maximo</b>	Transition asset hierarchy and inventory, replacement costs, risk scores, and RUL estimates to Maximo to make it the system of record.	2-5	<ul style="list-style-type: none"> <li>• Maximo used as system of record</li> <li>• Elimination of Asset Engineer asset registry spreadsheets</li> </ul>
<b>Life Cycle Costing</b>	Continue refining processes to track asset-level life cycle cost data.	2-5	<ul style="list-style-type: none"> <li>• Documented processes for conducting life cycle cost analyses</li> <li>• Formalized templates</li> <li>• Staff trained on processes and templates</li> </ul>

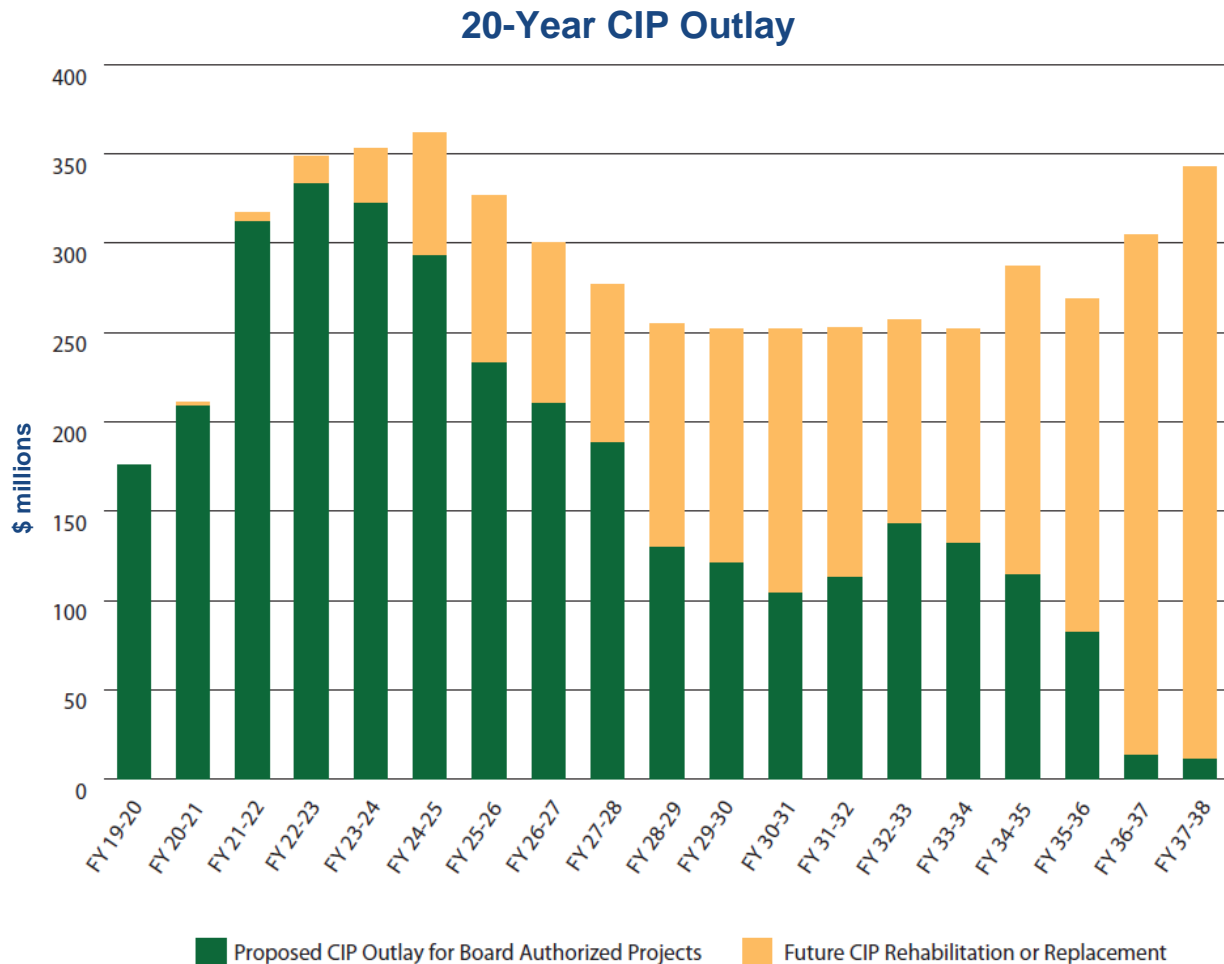
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## CHAPTER 7 BUDGETARY CONSIDERATIONS

The AMP focuses on documenting short- to long-term planning of maintenance and capital improvement projects to support effective budget development and sustainable operations. OCSD has been striving to more accurately identify medium- to long-term capital cash flow requirements. Specifically, the Planning Division has been working on developing a 20-year CIP by creating project plans for forecasted rehabilitation, replacement, improvements and expansion for the collection system and treatment plants. The CIP budget is being evaluated and updated on an on-going basis as new information becomes available.

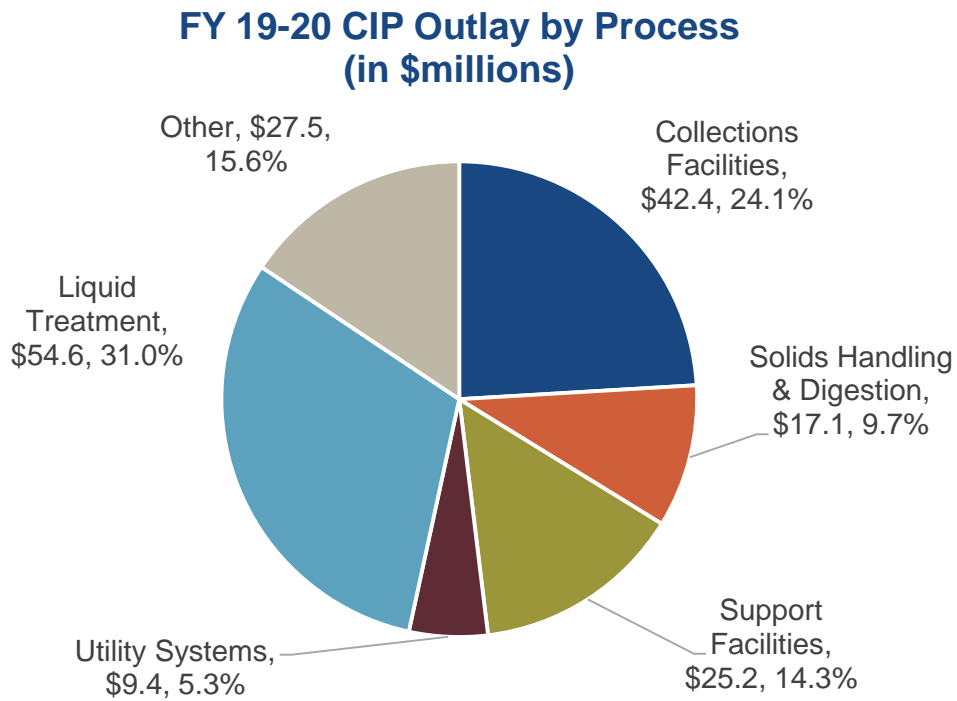
### 7.1 Capital Improvement Expenditures

Fiscal Year 2019-2020 Budget Update, adopted on June 26, 2019, includes updates to the 20-year CIP outlay. **Figure 7.1** shows the 20-year CIP outlay which includes current and projected future Capital Improvement Program projects. Fiscal Year 2019-2020 CIP outlay is further divided into process categories shown in **Figure 7.2**.



**Figure 7.1. 20-Year CIP Outlay**





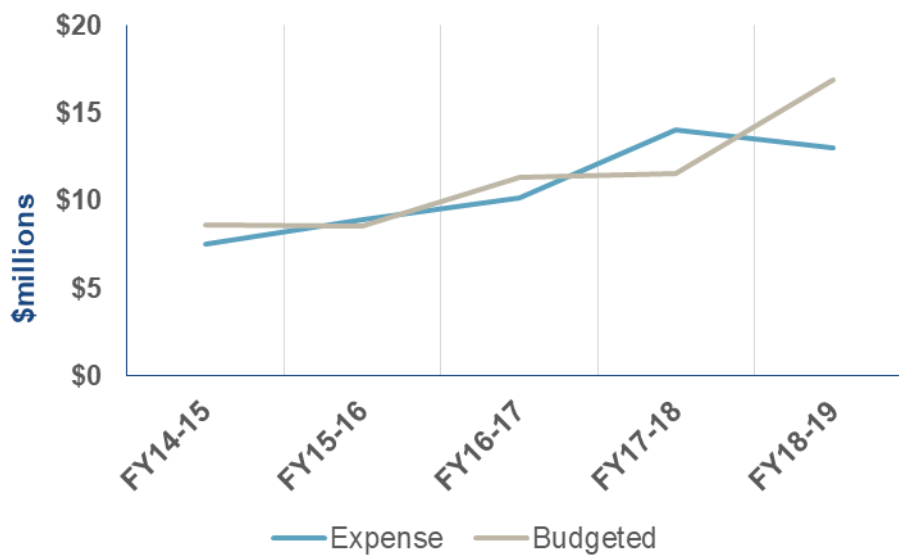
**Figure 7.2 CIP Outlay by Process**

## 7.2 Maintenance Expenditures

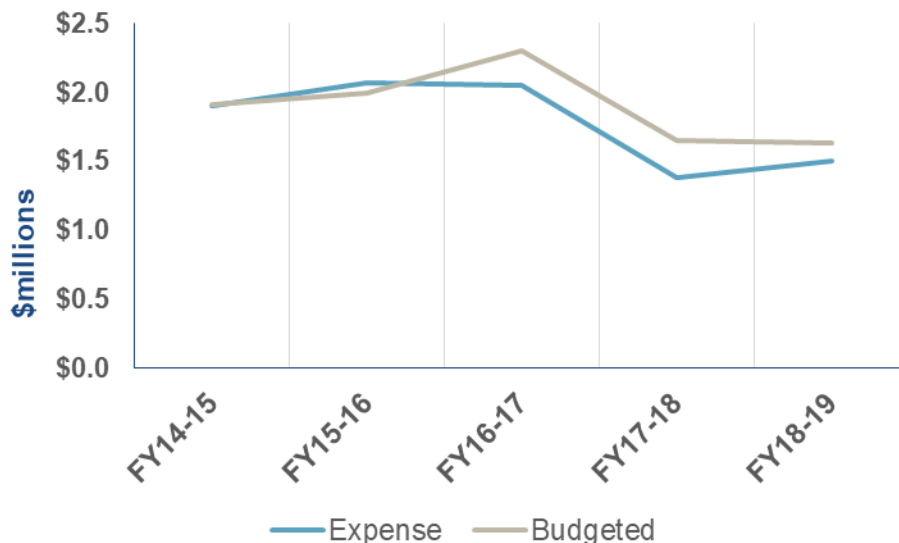
### 7.2.1 Five-Year Historical Maintenance Expenditures

**Figure 7.3** and **Figure 7.4** show the historical actual spent versus budgeted operational and maintenance expenditures for the treatment plants and collection system, respectively.

- The treatment plant expenditures include maintenance services and materials (budget objects 54010, 54020).
- The collection system expenditures include maintenance services and materials (budget objects 54010, 54020).
- These costs represent the operations and maintenance costs of fixed assets, including operationally funded repair/replacement projects.



**Figure 7.3. Five-Year Historical Maintenance Costs for Treatment Plants**



**Figure 7.4. Five-Year Historical Maintenance Costs for Collection System**

## 7.2.2 Three-Year Look-Ahead Maintenance Expenditures

**Table 7.1** shows operational-funded projects identified to-date and includes the projected annual expenditures. The projects are grouped by location (Plant No. 1, Plant No. 2, and Collection System), and then sorted by the project start fiscal year and estimated cost (highest to lowest). The list encompasses projects identified thus far. It is likely FY20-21 and beyond will fluctuate based on the condition of assets as they age. Additionally, projects in the following list represent expenditures that are operationally funded and capital in nature.

**Table 7.1. Planned Operational-Funded Maintenance Projects in Fiscal Years 2019/20 through 2021/22**

#	Project Title	Location	Cost Type	FY19-20	FY20-21	FY21-22	Three-Year Total Cost
PRN-00159	Bushard Diversion Structure Repair	CS	Project	\$365,000	\$365,000	\$0	\$730,000
PRN-00250	Yorba Linda Pump Station - Leaking WYE Needs Replacement	CS	Project	\$60,000	\$0	\$0	\$60,000
PRN-00302	Slater, Lido, And Seal Beach Pump Station Deragger Unit Install	CS	Project	\$47,000	\$0	\$0	\$47,000
PRN-00376	Warner Avenue Vault - Structural Design	CS	Project	\$10,000	\$0	\$0	\$10,000
PRN-00377	Warner Avenue Vault - Structural Repair	CS	Project	\$20,000	\$0	\$0	\$20,000
PRN-00393	Pump Station Dry Well Concrete Crack Evaluation At A Street, 15th Street, and Bitter Point Pump Stations	CS	Project	\$0	\$0	\$0	\$0
PRN-00448	Main Street Pump Station Manual Check Valve And Plug Valve Replacement- MP 559	CS	Project	\$80,000	\$0	\$0	\$80,000
PRN-00463	College Pump Station Vapex Modifications	CS	Project	\$30,000	\$0	\$0	\$30,000
PRN-00550	Seal Beach PS - Fan No. 3 Relocation	CS	Project	\$30,500	\$0	\$0	\$30,500
	Seal Beach Valve Replacement	CS	Project	\$0	\$100,000	\$0	\$100,000
PRN-00435	Pipe Coatings And Sump Pump In Effluent-Junction-Box Valve Vault	P1 & P2	Project	\$0	\$0	\$0	\$0
PRN-00537	P2 And P1 Office Space For Heavy Mechanics Group	P1 & P2	Project	\$0	\$0	\$0	\$0
PRN-00252	Garfield Traffic Spike Barrier	P1	Project	\$11,000	\$0	\$0	\$11,000

#	Project Title	Location	Cost Type	FY19-20	FY20-21	FY21-22	Three-Year Total Cost
PRN-00263	AS1 Blower Building Generator Tank Repair (MP-122)	P1	Project	\$15,000	\$0	\$0	\$15,000
PRN-00332	Lab Second Floor Repair/Replace Flooring	P1	Project	\$0	\$0	\$0	\$0
PRN-00333	Plant 1 Primary Clarifiers 16-31 Restroom	P1	Project	\$5,000	\$0	\$0	\$5,000
PRN-00375	P1 AS-2 Blower Silencer Piping Repairs (MP-405)	P1	Project	\$31,798	\$0	\$0	\$31,798
PRN-00385	P1-37 Primary Rectangular Basin Rehab (MP-462)	P1	Project	\$400,000	\$400,000	\$400,000	\$1,200,000
PRN-00398	P1 Power Building 3A Protective Relay Replacement	P1	Project	\$60,000	\$0	\$0	\$60,000
PRN-00402	P1 AS Clarifier Lighting Replacement	P1	Project	\$71,060	\$0	\$0	\$71,060
PRN-00460	P1 Primary #3 Repairs	P1	Project	\$65,375	\$0	\$0	\$65,375
PRN-00478	P1 AS2 Clarifier #31 Catwalk - Coatings	P1	Project	\$66,570	\$0	\$0	\$66,570
PRN-00489	P1 Barscreen #6 Driveshaft Replacement	P1	Project	\$68,487	\$0	\$0	\$68,487
PRN-00491	Repair Storm Drains Throughout Plant 1 (MP 584)	P1	Project	\$0	\$0	\$40,000	\$40,000
PRN-00500	P1 CenGen Elevator Hydraulic Jack Replacement	P1	Project	\$265,230	\$0	\$0	\$265,230
PRN-00507	Work Platforms Over The Pipes - Plant 1 Truck Loading Roof	P1	Project	\$6,000	\$0	\$0	\$6,000
PRN-00509	P1 Primary Basin #4 Temp Repairs	P1	Project	\$139,664	\$0	\$0	\$139,664
PRN-00516	PEPS Pump #1 Mechanical Repair	P1	Project	\$80,000	\$0	\$0	\$80,000
PRN-00517	PB-7 Generator Radiator Repair	P1	Project	\$100,000	\$0	\$0	\$100,000
PRN-00522	Coating - P1 Effluent Junction Box (EJB) Piping Coating Repairs (CTO-0018)	P1	Project	\$0	\$120,000	\$0	\$120,000

#	Project Title	Location	Cost Type	FY19-20	FY20-21	FY21-22	Three-Year Total Cost
PRN-00526	P1 Emergency Generator Breaker Spares	P1	Project	\$170,000	\$0	\$0	\$170,000
PRN-00569	Emergency Generator Protection Relays Upgrade	P1	Project	\$150,000	\$150,000	\$0	\$300,000
PRN-00569	P1 Emergency Generator Relay Upgrade	P1	Project	\$0	\$190,000	\$0	\$190,000
	P1 Gas Compressor Overhaul (1 / Yr)	P1	Annual	\$100,000	\$100,000	\$100,000	\$300,000
	P1 Centrifuge Overhaul (4K Hr) (3/Yr)	P1	Annual	\$1,000,000	\$1,000,000	\$1,000,000	\$3,000,000
	P1 CenGen Overhaul (1 / Yr)	P1	Annual	\$0	\$1,800,000	\$1,800,000	\$3,600,000
	P1 Primary Basin Torque Limiter	P1	Annual	\$0	\$500,000	\$0	\$500,000
	P1 Secondary Clarifier (AS1) Collectors And Torque Limiters	P1	Annual	\$0	\$2,000,000	\$2,000,000	\$4,000,000
	P1 Holding Digester Annual Cleaning	P1	Annual	\$0	\$300,000	\$300,000	\$600,000
	P1 Digester Cleaning - 5 Year	P1	Annual	\$820,000	\$0	\$0	\$820,000
PRN-00258	Dual Heat Exchanger Replacement		Project	\$192,815	\$0	\$0	\$192,815
PRN-00207	Plant 2 Clarifier N Steel Support Cage Repairs	P2	Project	\$8,200	\$0	\$0	\$8,200
PRN-00215	P2 AS2 Secondary Clarifier Gate Replacement (MP#252)	P2	Project	\$75,000	\$75,000	\$0	\$150,000
PRN-00241	P2 Cen-Gen Exhaust Recovery Boiler #2 Repair (MP-266)	P2	Project	\$200,000	\$0	\$0	\$200,000
PRN-00262	P2 CenGen Steam Turbine Rehabilitation	P2	Project	\$189,528	\$0	\$0	\$189,528
PRN-00306	P2 Primary Clarifier E & D Repairs	P2	Project	\$275,000	\$0	\$0	\$275,000
PRN-00331	P2 Dewatering Building Plant Water Pipe Repair (MP-385)	P2	Project	\$54,000	\$0	\$0	\$54,000

#	Project Title	Location	Cost Type	FY19-20	FY20-21	FY21-22	Three-Year Total Cost
PRN-00340	P2 TF 'A' Refurbishment	P2	Project	\$98,478	\$0	\$0	\$98,478
PRN-00374	Plant 2 South Scrubber Complex Bleach Pump Turndown	P2	Project	\$86,000	\$0	\$0	\$86,000
PRN-00394	P2 CenGen Steam Turbine Condenser Repair	P2	Project	\$232,100	\$0	\$0	\$232,100
PRN-00398	P2 Power Building 'C' Protective Relay Replacement	P2	Project	\$60,000	\$0	\$0	\$60,000
PRN-00409	P2 Headworks Low Voltage Cable Assessment	P2	Project	\$397,500	\$397,500	\$0	\$795,000
PRN-00428	P2 Tricking Filter Fan Support Fan Modifications Pilot	P2	Project	\$10,000	\$0	\$0	\$10,000
PRN-00441	MP-592 P2 CenGen Engine #3 Exhaust System Repair	P2	Project	\$50,000	\$0	\$0	\$50,000
PRN-00451	P2 Secondary Clarifier Repairs (MP-248)	P2	Project	\$1,524,000	\$1,524,000	\$0	\$3,048,000
PRN-00457	P2 AS Plant Inlet Gate Replacement	P2	Project	\$662,000	\$0	\$0	\$662,000
PRN-00493	P2 TF Pump Overhaul / Seal Tube Evaluation	P2	Project	\$631,000	\$0	\$0	\$631,000
PRN-00499	P2 EPSA VFD Upgrades	P2	Project	\$218,842	\$218,842	\$0	\$437,684
PRN-00503	P2 TF Clarifier 'E' Damage Evaluation & Repair	P2	Project	\$190,280	\$0	\$0	\$190,280
PRN-00512	Plant No. 2 Steam Pipe Repairs	P2	Project	\$0	\$25,000	\$0	\$25,000
PRN-00513	P2 Truck Loading Auger Replacement	P2	Project	\$913,400	\$0	\$0	\$913,400
PRN-00521	P2 Aeration Basins Mixers Coating Repairs (CTO-0028)	P2	Project	\$0	\$0	\$0	\$0
PRN-00529	P2 MSP Motor Overhaul	P2	Project	\$0	\$462,000	\$0	\$462,000
PRN-00530	Plant No. 2 Digester Facilities Rehabilitation	P2	Project	\$50,000	\$0	\$0	\$50,000

#	Project Title	Location	Cost Type	FY19-20	FY20-21	FY21-22	Three-Year Total Cost
PRN-00530	P2 Digester F Repair	P2	Project	\$150,000	\$0	\$0	\$150,000
PRN-00557	P2 Digester S Concrete Crack Repair	P2	Project	\$10,000	\$0	\$0	\$10,000
PRN-00561	AI-041 P2 MSP Vibration Monitoring System Modernization	P2	Project	\$0	\$277,000	\$0	\$277,000
PRN-00565	Plant 2 EPSA Building City Water Line Repair	P2	Project	\$15,000	\$0	\$0	\$15,000
PRN-00566	EPSA Piping Coating	P2	Project	\$50,000	\$0	\$0	\$50,000
PRN-00570	Primary Treatment Rehabilitation at P2 B/C Side Primary Clarifiers	P2	Project	\$462,000	\$0	\$0	\$462,000
	P2 Cake Transfer Pumps Overhaul	P2	Project	\$0	\$275,000	\$0	\$275,000
	P2 Secondary Clarifier Repairs (Phase II)	P2	Project	\$50,000	\$50,000	\$0	\$100,000
	P2 Centrifuge Damage Repair And Spare Part Purchase	P2	Project	\$0	\$0	\$3,000,000	\$3,000,000
	P2 Gas Compressor Overhaul (1 / Yr)	P2	Annual	\$100,000	\$100,000	\$100,000	\$300,000
	P2 Centrifuge Overhaul (4K Hr) (3/Yr)	P2	Annual	\$1,000,000	\$1,000,000	\$1,000,000	\$3,000,000
	P2 CenGen Overhaul (1 / Yr)	P2	Annual	\$0	\$2,200,000	\$2,200,000	\$4,400,000
	P2 AS Plant High Rate Mix Pumps Corrosion Repairs	P2	Annual	\$0	\$500,000	\$0	\$500,000
	P2 Cathodic Protection/Ground Rod Replacement	P2	Annual	\$0	\$0	\$0	\$0
	P2 Holding Digester Annual Cleaning	P2	Annual	\$0	\$500,000	\$500,000	\$1,000,000
	P2 Digester Cleaning - 5 Year	P2	Annual	\$1,664,640	\$0	\$0	\$1,664,640

**Acronym Key:**

AS=Activated Sludge, AS1=Activated Sludge Plant No. 1; AS2=Activated Sludge Plant No. 2; CenGen=Central Generation; CS = Collection System; EPSA=Effluent Pump Station Annex; MP=Maintenance Project; MSP=Main Sewage Pump; P1=Plant No. 1, P2=Plant No. 2; PEPS=Primary Effluent Pump Station; PS=Pump Station; TF=Trickling Filter; VFD=Variable Frequency Drive; Yr=Year



**Reclamation Plant No.1 (Administration Offices)**

10844 Ellis Avenue, Fountain Valley, California 92708

**Treatment Plant No. 2**

22212 Brookhurst Street, Huntington Beach, California 92646

Phone: 714.962.2411

[www.ocsd.com](http://www.ocsd.com)

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# Orange County Sanitation District

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Fountain Valley, CA 92708  
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## OPERATIONS COMMITTEE

### Agenda Report

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**File #:** 2020-927

**Agenda Date:** 3/4/2020

**Agenda Item No:** 7.

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**FROM:** James D. Herberg, General Manager  
Originator: Lan C. Wiborg, Director of Environmental Services

**SUBJECT:**

**ORANGE COUNTY SANITATION DISTRICT - ENVIRONMENTAL SERVICES**

**GENERAL MANAGER'S RECOMMENDATION**

RECOMMENDATION:

Information Item.

**BACKGROUND**

Each month, staff provides an informational presentation on topics of interest to the Board of Directors. This month's topic: Orange County Sanitation District's Environmental Services Department - Constituents of Emerging Concern: PFAS.

**RELEVANT STANDARDS**

- Comply with environmental permit requirements
- Use all practical and effective means for resource recovery
- Listen to and seriously consider community input on environmental concerns
- Build brand, trust, and support with policy makers and community leaders

**ATTACHMENT**

*The following attachment(s) may be viewed on-line at the OCSD website ([www.ocsd.com](http://www.ocsd.com)) with the complete agenda package:*

N/A

## ORANGE COUNTY SANITATION DISTRICT COMMON ACRONYMS

<b>ACWA</b>	Association of California Water Agencies	<b>LAFCO</b>	Local Agency Formation Commission	<b>RWQCB</b>	Regional Water Quality Control Board
<b>APWA</b>	American Public Works Association	<b>LOS</b>	Level Of Service	<b>SARFPA</b>	Santa Ana River Flood Protection Agency
<b>AQMD</b>	Air Quality Management District	<b>MGD</b>	Million Gallons Per Day	<b>SARI</b>	Santa Ana River Interceptor
<b>ASCE</b>	American Society of Civil Engineers	<b>MOU</b>	Memorandum of Understanding	<b>SARWQCB</b>	Santa Ana Regional Water Quality Control Board
<b>BOD</b>	Biochemical Oxygen Demand	<b>NACWA</b>	National Association of Clean Water Agencies	<b>SAWPA</b>	Santa Ana Watershed Project Authority
<b>CARB</b>	California Air Resources Board	<b>NEPA</b>	National Environmental Policy Act	<b>SCADA</b>	Supervisory Control And Data Acquisition
<b>CASA</b>	California Association of Sanitation Agencies	<b>NGOs</b>	Non-Governmental Organizations	<b>SCAP</b>	Southern California Alliance of Publicly Owned Treatment Works
<b>CCTV</b>	Closed Circuit Television	<b>NPDES</b>	National Pollutant Discharge Elimination System	<b>SCAQMD</b>	South Coast Air Quality Management District
<b>CEQA</b>	California Environmental Quality Act	<b>NWRI</b>	National Water Research Institute	<b>SOCWA</b>	South Orange County Wastewater Authority
<b>CIP</b>	Capital Improvement Program	<b>O &amp; M</b>	Operations & Maintenance	<b>SRF</b>	Clean Water State Revolving Fund
<b>CRWQCB</b>	California Regional Water Quality Control Board	<b>OCCOG</b>	Orange County Council of Governments	<b>SSMP</b>	Sewer System Management Plan
<b>CWA</b>	Clean Water Act	<b>OCHCA</b>	Orange County Health Care Agency	<b>SSO</b>	Sanitary Sewer Overflow
<b>CWEA</b>	California Water Environment Association	<b>OCSD</b>	Orange County Sanitation District	<b>SWRCB</b>	State Water Resources Control Board
<b>EIR</b>	Environmental Impact Report	<b>OCWD</b>	Orange County Water District	<b>TDS</b>	Total Dissolved Solids
<b>EMT</b>	Executive Management Team	<b>OOBS</b>	Ocean Outfall Booster Station	<b>TMDL</b>	Total Maximum Daily Load
<b>EPA</b>	US Environmental Protection Agency	<b>OSHA</b>	Occupational Safety and Health Administration	<b>TSS</b>	Total Suspended Solids
<b>FOG</b>	Fats, Oils, and Grease	<b>PCSA</b>	Professional Consultant/Construction Services Agreement	<b>WDR</b>	Waste Discharge Requirements
<b>gpd</b>	gallons per day	<b>PDSA</b>	Professional Design Services Agreement	<b>WEF</b>	Water Environment Federation
<b>GWRS</b>	Groundwater Replenishment System	<b>POTW</b>	Publicly Owned Treatment Works	<b>WERF</b>	Water Environment & Reuse Foundation
<b>ICS</b>	Incident Command System	<b>ppm</b>	parts per million	<b>WIFIA</b>	Water Infrastructure Finance and Innovation Act
<b>IERP</b>	Integrated Emergency Response Plan	<b>PSA</b>	Professional Services Agreement	<b>WIIN</b>	Water Infrastructure Improvements for the Nation Act
<b>JPA</b>	Joint Powers Authority	<b>RFP</b>	Request For Proposal	<b>WRDA</b>	Water Resources Development Act

## ORANGE COUNTY SANITATION DISTRICT GLOSSARY OF TERMS

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**ACTIVATED SLUDGE PROCESS** – A secondary biological wastewater treatment process where bacteria reproduce at a high rate with the introduction of excess air or oxygen and consume dissolved nutrients in the wastewater.

**BENTHOS** – The community of organisms, such as sea stars, worms, and shrimp, which live on, in, or near the seabed, also known as the benthic zone.

**BIOCHEMICAL OXYGEN DEMAND (BOD)** – The amount of oxygen used when organic matter undergoes decomposition by microorganisms. Testing for BOD is done to assess the amount of organic matter in water.

**BIOGAS** – A gas that is produced by the action of anaerobic bacteria on organic waste matter in a digester tank that can be used as a fuel.

**BIOSOLIDS** – Biosolids are nutrient rich organic and highly treated solid materials produced by the wastewater treatment process. This high-quality product can be recycled as a soil amendment on farmland or further processed as an earth-like product for commercial and home gardens to improve and maintain fertile soil and stimulate plant growth.

**CAPITAL IMPROVEMENT PROGRAM (CIP)** – Projects for repair, rehabilitation, and replacement of assets. Also includes treatment improvements, additional capacity, and projects for the support facilities.

**COLIFORM BACTERIA** – A group of bacteria found in the intestines of humans and other animals, but also occasionally found elsewhere, used as indicators of sewage pollution. E. coli are the most common bacteria in wastewater.

**COLLECTIONS SYSTEM** – In wastewater, it is the system of typically underground pipes that receive and convey sanitary wastewater or storm water.

**CERTIFICATE OF PARTICIPATION (COP)** – A type of financing where an investor purchases a share of the lease revenues of a program rather than the bond being secured by those revenues.

**CONTAMINANTS OF POTENTIAL CONCERN (CPC)** – Pharmaceuticals, hormones, and other organic wastewater contaminants.

**DILUTION TO THRESHOLD (D/T)** – The dilution at which the majority of people detect the odor becomes the D/T for that air sample.

**GREENHOUSE GASES (GHG)** – In the order of relative abundance water vapor, carbon dioxide, methane, nitrous oxide, and ozone gases that are considered the cause of global warming ("greenhouse effect").

**GROUNDWATER REPLENISHMENT SYSTEM (GWRS)** – A joint water reclamation project that proactively responds to Southern California's current and future water needs. This joint project between the Orange County Water District and the Orange County Sanitation District provides 70 million gallons per day of drinking quality water to replenish the local groundwater supply.

**LEVEL OF SERVICE (LOS)** – Goals to support environmental and public expectations for performance.

**N-NITROSODIMETHYLAMINE (NDMA)** – A N-nitrosamine suspected cancer-causing agent. It has been found in the Groundwater Replenishment System process and is eliminated using hydrogen peroxide with extra ultra-violet treatment.

**NATIONAL BIOSOLIDS PARTNERSHIP (NBP)** – An alliance of the National Association of Clean Water Agencies and Water Environment Federation, with advisory support from the US Environmental Protection Agency. NBP is committed to developing and advancing environmentally sound and sustainable biosolids management practices that go beyond regulatory compliance and promote public participation to enhance the credibility of local agency biosolids programs and improved communications that lead to public acceptance.

**PLUME** – A visible or measurable concentration of discharge from a stationary source or fixed facility.

**PUBLICLY OWNED TREATMENT WORKS (POTW)** – A municipal wastewater treatment plant.

**SANTA ANA RIVER INTERCEPTOR (SARI) LINE** – A regional brine line designed to convey 30 million gallons per day of non-reclaimable wastewater from the upper Santa Ana River basin to the ocean for disposal, after treatment.

**SANITARY SEWER** – Separate sewer systems specifically for the carrying of domestic and industrial wastewater. Combined sewers carry both wastewater and urban runoff.

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)** – Regional regulatory agency that develops plans and regulations designed to achieve public health standards by reducing emissions from business and industry.

**SECONDARY TREATMENT** – Biological wastewater treatment, particularly the activated sludge process, where bacteria and other microorganisms consume dissolved nutrients in wastewater.

**SLUDGE** – Untreated solid material created by the treatment of wastewater.

**TOTAL SUSPENDED SOLIDS (TSS)** – The amount of solids floating and in suspension in wastewater.

**TRICKLING FILTER** – A biological secondary treatment process in which bacteria and other microorganisms, growing as slime on the surface of rocks or plastic media, consume nutrients in wastewater as it trickles over them.

**URBAN RUNOFF** – Water from city streets and domestic properties that carry pollutants into the storm drains, rivers, lakes, and oceans.

**WASTEWATER** – Any water that enters the sanitary sewer.

**WATERSHED** – A land area from which water drains to a particular water body. The Orange County Sanitation District's service area is in the Santa Ana River Watershed.