AGENDA

A G E N D A
REGULAR MEETING OF THE GOVERNING BOARD
OF THE GOLETA SANITARY DISTRICT
A PUBLIC AGENCY

One William Moffett Place
Goleta, California 93117

January 6, 2020

CALL TO ORDER: 6:30 p.m.

ROLL CALL OF MEMBERS

BOARD MEMBERS: George W. Emerson
Sharon Rose
Robert O. Wageneck
Jerry D. Smith
Steven T. Majoewsky

CONSIDERATION OF THE MINUTES OF THE BOARD MEETING

The Board will consider approval of the Minutes of the Regular Meeting of December 16, 2019.

PUBLIC COMMENTS - Members of the public may address the Board on items within the jurisdiction of the Board.

POSTING OF AGENDA – The agenda notice for this meeting was posted at the main gate of the Goleta Sanitary District and on the District's web site 72 hours in advance of the meeting.

BUSINESS:

1. CONSIDERATION OF APPOINTMENT OF BOARD PRESIDENT AND PRESIDENT PRO TEM FOR CALENDAR YEAR 2020
   (Board may take action on this item.)

2. APPROVAL OF PLANS AND SPECIFICATIONS AND AUTHORIZATION FOR SOLICITATION OF PUBLIC BIDS FOR THE 2020 PIPELINE REHABILITATION PROJECT
   (Board may take action on this item.)

3. UPDATE ON THE EL SUENO FORCE MAIN REPLACEMENT PROJECT
   (Board may take action on this item.)

4. REVIEW AND CONSIDERATION OF PROPOSAL FOR PRELIMINARY ENGINEERING DESIGN SERVICES FOR BIOSOLIDS AND ENERGY STRATEGIC PLAN PHASE 1 IMPROVEMENTS
   (Board may take action on this item.)

5. GENERAL MANAGER'S REPORT

6. LEGAL COUNSEL'S REPORT

7. COMMITTEE/DIRECTOR'S REPORTS AND APPROVAL/RATIFICATION OF DIRECTOR'S ACTIVITIES

8. PRESIDENT'S REPORT

9. ITEMS FOR FUTURE MEETINGS

10. CORRESPONDENCE
    (The Board will consider correspondence received by and sent by the District since the last Board Meeting.)

11. APPROVAL OF BOARD COMPENSATION AND EXPENSES AND RATIFICATION OF CLAIMS PAID BY THE DISTRICT
    (The Board will be asked to ratify claims.)

ADJOURNMENT

Any public records which are distributed less than 72 hours prior to this meeting to all, or a majority of all, of the District's Board members in connection with any agenda item (other than closed sessions) will be available for public inspection at the time of such distribution at the District's office located at One William Moffett Place, Goleta, California 93117.

Persons with a disability who require any disability-related modification or accommodation, including auxiliary aids or services, in order to participate in the meeting are asked to contact the District's Finance & H.R. Manager at least (3) days prior to the meeting by telephone at (805) 967-4519 or by email at info@goletasanitary.org.

MINUTES

MINUTES
REGULAR MEETING OF THE GOVERNING BOARD
GOLETA SANITARY DISTRICT
A PUBLIC AGENCY
DISTRICT OFFICE CONFERENCE ROOM
ONE WILLIAM MOFFETT PLACE
GOLETA, CALIFORNIA 93117

December 16, 2019

CALL TO ORDER: President Emerson called the meeting to order at 6:30p.m.

BOARD MEMBERS PRESENT: George W. Emerson, Sharon Rose, Robert O. Wageneck, Jerry D. Smith, Steven T. Majoewsky

BOARD MEMBERS ABSENT: None

STAFF MEMBERS PRESENT: Steve Wagner, General Manager/District Engineer, John Crisman, Plant Operations Manager, Richard Rosenbaum, Safety and Regulatory Compliance Manager and Richard Battles, Legal Counsel from Howell Moore & Gough LLP.

OTHERS PRESENT: Larry Meyer, Director, Goleta West Sanitary District and Tom Evans, Director, Goleta Water District

APPROVAL OF MINUTES: Director Majoewsky made a motion, seconded by Director Wageneck, to approve the minutes of the Regular Board meeting of 12/02/19. The motion carried by the following vote:

(19/12/2050)

AYES:	5	Emerson, Rose, Wageneck, Smith, Majoewsky
NOES:		None
ABSENT:		None
ABSTAIN:		None

POSTING OF AGENDA: The agenda notice for this meeting was posted at the main gate of the Goleta Sanitary District and on the District's website 72 hours in advance of the meeting.

PUBLIC COMMENTS: General Manager Steve Wagner introduced Richard Rosenbaum, the District's new Safety and Regulatory Compliance Manager.

BUSINESS:

1. OVERVIEW PRESENTATION ON WASTEWATER TREATMENT DISINFECTION PROCESSES

   Mr. Wagner introduced John Crisman, Plant Operations Manager who gave a presentation on wastewater disinfection. Since this was an informational item only, no Board action was taken.

2. REVIEW OF 2019 ACTION PLAN AND CURRENT PROJECTS LIST

   Mr. Wagner gave the staff report. Since this was an informational item only, no Board action was taken.

3. REVIEW OF 2020 CONFERENCE MEETING CALENDAR

   Mr. Wagner gave the staff report. Since this was an informational item only, no Board action was taken.

4. GENERAL MANAGER'S REPORT

   Mr. Wagner gave the report.

5. LEGAL COUNSEL'S REPORT

   Mr. Battles reported on the County's new recording and processing fees.

6. COMMITTEE/DIRECTORS' REPORTS AND APPROVAL/RATIFICATION OF DIRECTORS' ACTIVITIES

   Director Rose – Reported on the Goleta Water District Board meeting of December 12, 2019 and submitted a written report.

   Director Smith – No report.

   Director Wageneck – No report.

   Director Majoewsky – Reported on the Goleta West Sanitary District Board meeting of December 3, 2019.

7. PRESIDENT'S REPORT

   President Emerson – No report.

8. ITEMS FOR FUTURE MEETINGS

   No Board action was taken to return with an item.

9. CORRESPONDENCE

The Board reviewed and discussed the list of correspondence to and from the District in the agenda.

10. APPROVAL OF BOARD COMPENSATION AND EXPENSES AND RATIFICATION OF CLAIMS PAID BY THE DISTRICT

Director Majoewsky made a motion, seconded by Director Wageneck, to ratify and approve the claims, for the period 12/03/19 to 12/16/19 as follows:

Running Expense Fund #4640	$	292,700.13
Capital Reserve Fund #4650	$	664.08
Depreciation Replacement Reserve Fund #4655	$	195,747.12

The motion carried by the following vote:

(19/12/2051)

AYES:	5	Emerson, Rose, Wageneck, Smith, Majoewsky,
NOES:		None
ABSENT:		None
ABSTAIN:		None

ADJOURNMENT

There being no further business, the meeting was adjourned at 8:08 p.m.

George W. Emerson
Governing Board President

Robert O. Mangus, Jr.
Governing Board Secretary

Sharon Rose

Robert O. Wageneck

Jerry D. Smith

Steven T. Majoewsky

AGENDA ITEM #1

AGENDA ITEM: 1

MEETING DATE: January 6, 2020

I. NATURE OF ITEM

Consideration of Appointment of Board President and President Pro Tem for Calendar Year 2020

II. BACKGROUND INFORMATION

In accordance with Resolution 15-593, adopted by the Board on August 17, 2015, the office of President shall rotate on an annual basis among the five members of the Board. Such rotation was initially established in the order of seniority based on the number of years continuously served on the Board by the then current Board members. When a new member is appointed to the Board, the Board determines when the new member is placed at the end of the rotation. On November 6, 2017 the Board took action to place Director Wageneck into the rotation just prior to the end of Director Smith's term as Board President. As a result, the President rotation for 2020 pursuant to Resolution 15-593 is shown below:

1. Director Rose - President
2. Director Wageneck - President Pro Tem
3. Director Smith
4. Director Majoewsky
5. Director Emerson

III. COMMENTS AND RECOMMENDATIONS

In accordance with Resolution 15-593 described above, the next in line for the office of President is Director Rose, and the next in line for President Pro Tem is Director Wageneck. Staff recommends the Board consider and vote on the position of Board President and President Pro Tem in accordance with Resolution 15-593.

IV. REFERENCE MATERIAL

Resolution 15-593

RESOLUTION NO. 15-593

RESOLUTION OF THE GOVERNING BOARD OF THE GOLETA SANITARY DISTRICT REPEALING RESOLUTION NO. 08-480 AND ESTABLISHING REVISED PROCEDURES FOR APPOINTMENT OF BOARD PRESIDENT AND PRESIDENT PRO TEM

WHEREAS, Health and Safety Code Section 6486 requires the Governing Board of the Goleta Sanitary District (the "District") to choose a President from among its members. Health and Safety Code Section 6488 provides that, in case of the absence or inability of the President to act, the Board shall choose a President Pro Tem.

WHEREAS, the District's Governing Board adopted Resolution No. 08-480 on November 17, 2008 setting forth procedures for the appointment of the Governing Board President and President Pro Tem.

WHEREAS, the Governing Board deems it to be in the District's best interests to revise its procedures relating to the appointment of the President to clarify the manner in which a newly elected or appointed Board member will be placed in the annual rotation to serve as Board President.

NOW, THEREFORE, be it resolved by the Governing Board of the Goleta Sanitary District as follows:

1. **Repeal of Resolution No. 08-480**. Resolution No. 08-480 adopted on November 17, 2008 is hereby repealed in its entirety and is replaced by the procedures set forth herein.

2. **Rotation of Presidency**. The office of President shall rotate on an annual basis among the five members of the Board. Such rotation was initially established in the order of seniority based on the number of years continuously served on the Board by the then current Board members. When a new member is elected to the Board, such new member shall be placed at the end of the rotation as of the second meeting in January following such election, immediately after the new President assumes office. When a new member is appointed to the Board, the Board shall determine by a majority vote of a quorum as soon as reasonably feasible, but prior to January of the upcoming year, the timing for the placement of such new member at the end of the rotation. In making said determination, the Board shall take into consideration (i) the date of the new member's appointment, (ii) the time that is expected to elapse before the new member is eligible to serve as President, and (iii)

such other factors as the Board deems appropriate. A former Board member shall be considered a new member if he or she is elected or appointed to the Board after a break in service due to the fact that such member previously resigned or was not reelected. In the event two or more new members of the Board are elected or appointed at the same time, their placement relative to each other at the end of the rotation as provided above shall be determined by random selection.

The intent of the Board in adopting the forgoing procedures is that a new member will not serve as President until all existing members who desire to serve as President shall have served an annual term as President following the election or appointment of the new member. Exceptions to the procedures set forth above may be made on a case by case basis in the sole discretion of the Board to address unique circumstances and to achieve said intent.

3. **Date for Assuming Office**. Each year the new President shall be confirmed by a majority vote of a quorum of the Board at its first meeting in January and said new President shall assume office as of the second meeting in January. No Board member shall be required to serve as President against his or her wishes.

4. **President Pro Tem**. In case of the absence or inability of the President to act, the President Pro Tem shall be the Board member who is scheduled to serve as the President during the next annual rotation.

5. **Vacancy in Presidency**. In the event the position of Board President becomes vacant due to resignation, death, removal or other circumstances, the President Pro Tem, as determined under Section 4 above, shall become the new President (the "Successor President") as of the effective date of the vacancy. In such event, the Board shall determine by a majority vote of a quorum as soon as reasonably feasible, but prior to January of the upcoming year, whether (i) the Successor President shall continue as the President for the next annual term commencing on the second meeting in January of the upcoming year, or (ii) the Board member who is scheduled to serve next in the annual rotation after the Successor President shall become the President for the upcoming year. In making said determination, the Board shall take into consideration (a) the number of Board meetings at which the Successor President presided as President Pro Tem prior to the vacancy in the Presidency, (b) the number of Board meetings at which the Successor President will preside after filling the vacancy, and (c) such other factors as the Board deems appropriate.

PASSED AND ADOPTED this 17th day of August, 2015, by the following vote of the Governing Board of the Goleta Sanitary District:

AYES: Emerson, Rose, Smith, Fox
NOES: None
ABSTENTIONS: None
ABSENT: Majoewsky

COPY

George W. Emerson,
President of the Governing Board

COUNTERSIGNED
COPY

Robert O. Mangus, Jr.,
Secretary of the Governing Board

AGENDA ITEM #2

AGENDA ITEM: 2

MEETING DATE: January 6, 2020

I. NATURE OF ITEM

Approval of Plans and Specifications and Authorization for Solicitation of Public Bids for the 2020 Pipeline Rehabilitation Project

II. BACKGROUND INFORMATION

As part of the District's long-range Capital Improvement Program, the District seeks to rehabilitate sections of its sewer collection system that are cracked, subject to root intrusion or otherwise pose a risk of blockage. Based on the District's asset management program and a review of available video, staff recommends that the following actions be included in the District's 2020 Pipeline Rehabilitation Program (PRP):

1. 386 linear feet (LF) of 6-inch diameter sewer line, 6,571 LF of 8-inch diameter sewer line, and 777 LF of 12-inch diameter sewer line be rehabilitated with cured-in-place pipe (CIPP) lining throughout the unincorporated Santa Barbara area of the District along Camino Rio Verde, Camino Andaluz, Camino Palomera, Calle Anzuelo, Walnut Lane, Via Los Padres, Los Verdes Drive, N. Turnpike Road, N. La Cumbre Road, Sterrett Drive and State Street.
2. 73 connection service laterals and along the above-listed pipe sections be retrofitted with new CIPP seals.
3. 34 manholes along these pipe sections to be lined, various point repairs and ancillary work in above-listed areas be completed.

A vicinity map showing the above-listed areas is attached to this report. This project is the first to utilize the District's Asset Management Program to identify sewer lines most in need of repair. These lines have structural deficiencies which can best be remedied by Cured in Place Pipe (CIPP) rehabilitation. The Board previously approved engineering design services with Stantec Consulting Services, Inc.(Stantec) Project plans and specifications have been developed and the project is ready to go to bid pending approval by the Board.

III. COMMENTS AND RECOMMENDATIONS

The approved FY 2019-20 budget includes $1,000,000 for this project. The FY 2018-19 budget included $50,000 for design services. A summary of the revised total estimated project cost and funding sources is shown in the following table.

Projected Cost Estimate & Budget	
Design	$ 49,570
Construction	$ 904,088
Construction Management (CM)	$ 132,000
Total	$ 1,085,658

FY 2018-19 Budget	$ 50,000
FY 2019-20 Budget	$ 1,000,000
Total	$ 1,050,000

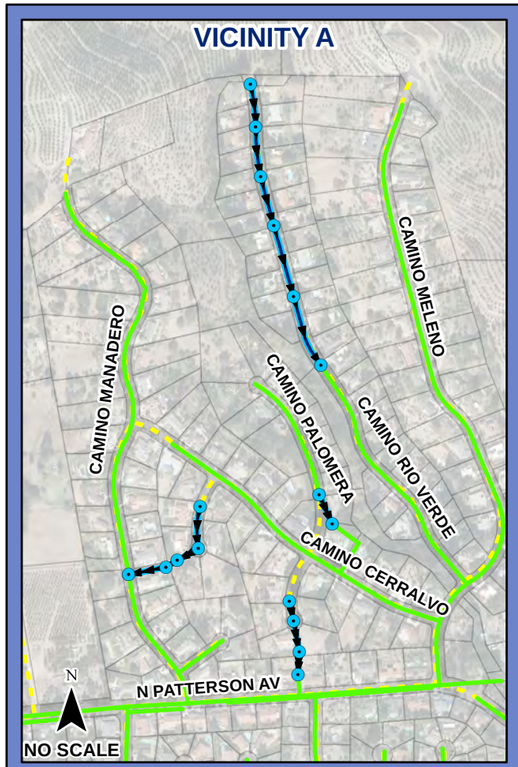
A copy of the estimated construction cost is attached to this report. While the total estimated project costs slightly exceed the funding included in the approved FY 2019-20, the actual costs will be based on the approved contract amount.

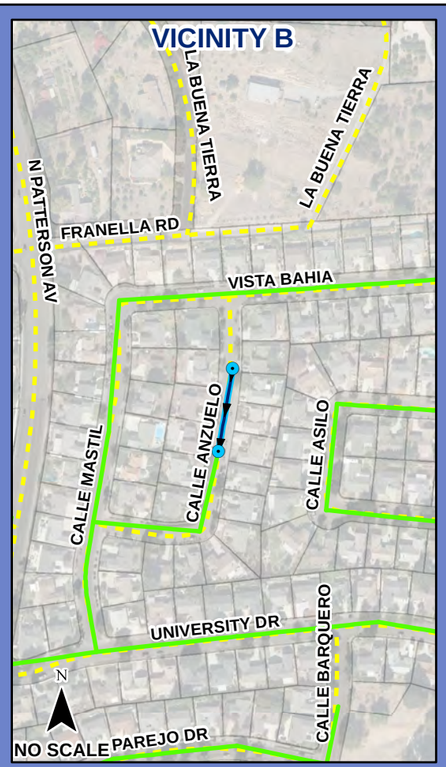
District staff has reviewed the Project Plans and Specifications with Stantec staff. On December 18, 2019 the Governing Board Engineering Committee reviewed this project and has recommended that the Board approve the plans and specifications and authorize staff to put the project out to bid. A copy of the project plans and specification is available for review in the District office and will be brought to the Board meeting. Once bids are received and reviewed, staff will bring the project back to the Board for consideration of award of construction and construction management services contracts.

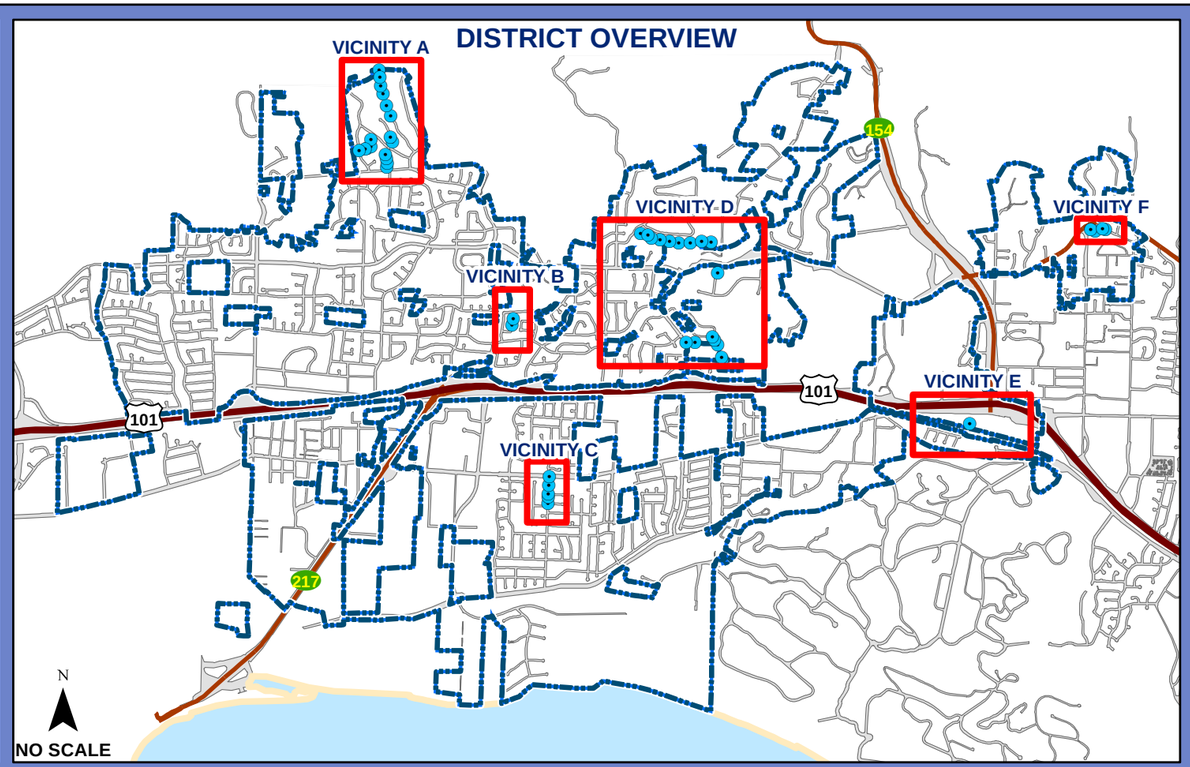
IV. REFERENCE MATERIAL

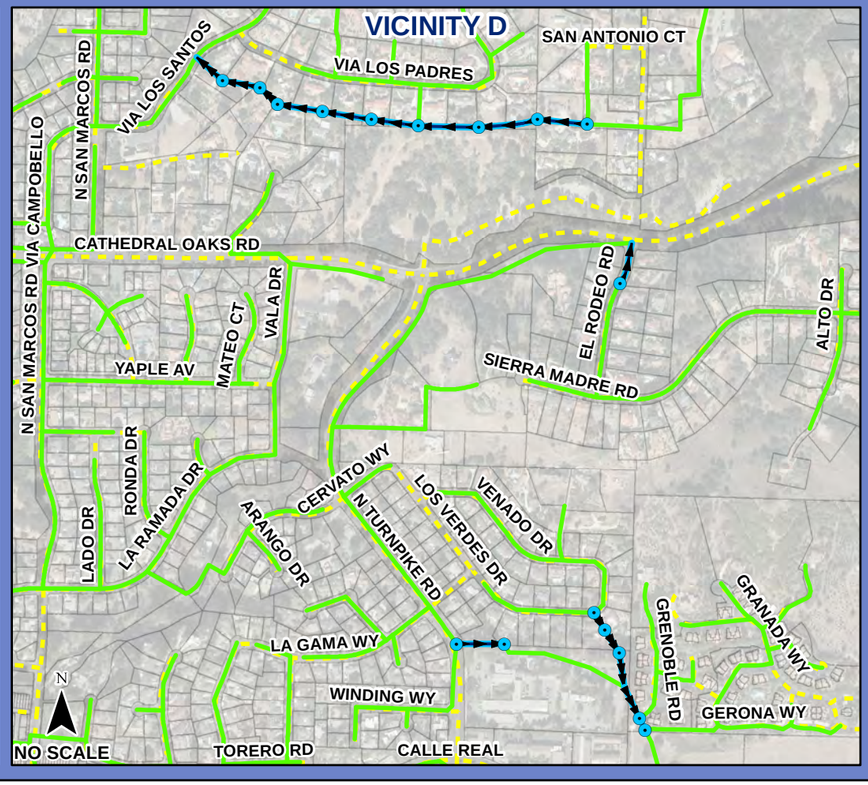
Vicinity Map of 2020 PRP

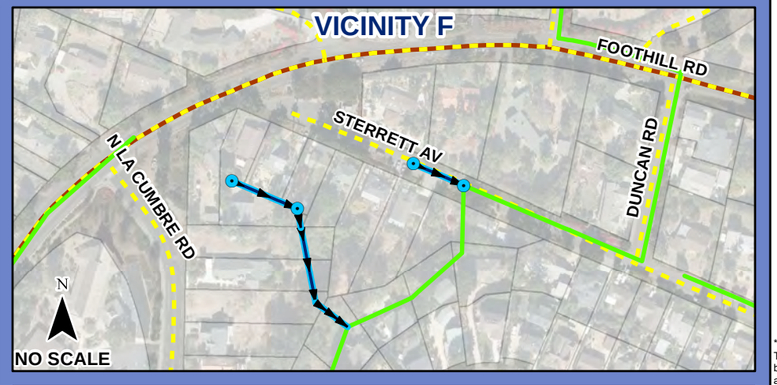
Engineer's Estimate of Probable Construction Cost

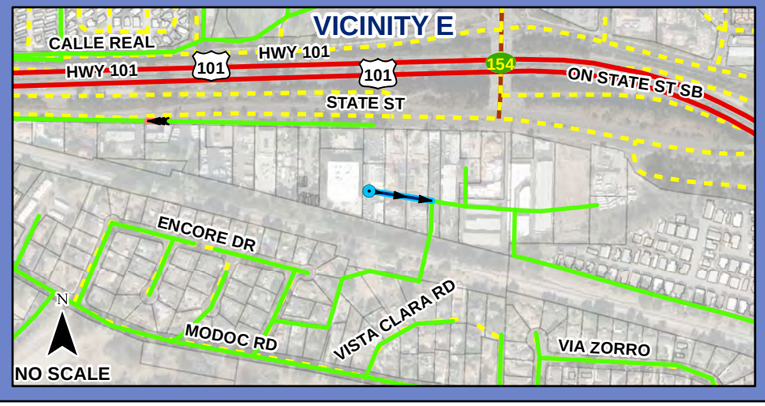












GOLETA SANITARY
Water Resource Recovery District

KEY TO FEATURES

2020 Rehab Project Locations

- Structures
- Rehab Sewer Pipe
- Existing Sewer Pipe
- Goleta Sanitary District Boundary

**********DISCLAIMER**********

This map is for reference only . Although every effort has been made to ensure the accuracy of information, errors and conditions originating from physical sources used to develop the database may be reflected on this map . ZWORLD GIS shall not be liable for any errors, omissions, or damages that result from inappropriate use of this document . No level of accuracy is claimed for the boundary lines shown here on and lines should not be used to obtain coordinate values, bearings or distances.

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State Plane California Zone V NAD 1983
Goleta Sanitary District

2020
Capital Improvement Projects
Rehab Locations with District

ZWORLD
GEOSPATIAL INFORMATION SYSTEMS
Prepared by ZWORLD GIS.
www.zworldgis.com

OPINION OF PROBABLE COST

Stantec
111 East Victoria Street
Santa Barbara, CA 93101
(805) 963-9532

Project: 2019 Pipeline Rehabilitation Project
Location: Goleta, California
Client: Goleta Sanitary District
W.O. No.: 2064184800
Calc'd By: HLL
Date: 22-Nov-19
Path Name: V:\2064\active\2064184800\engineering\cost_estimate\
File Name: 2064184800_construction_cost_estimate_pipeline_rehab_20191122.xlsx

ITEM		DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
	Base Bid					
1		Mobilization, Demobilization, Bonds & Insurance	LS	1	$35,000.00	$35,000
2		Traffic Control, Postings & Notifications	LS	1	$20,000.00	$20,000
3		Santa Barbara County APCD Permit	LS	1	$2,000.00	$2,000
4		OSHA Excavation Shoring Requirements and other Safety Measures	LS	1	$7,500.00	$7,500
5		6-in Diameter Pipe Cleaning, CCTV Inspection & Video	LF	386	$3.00	$1,158
6		8-in Diameter Pipe Cleaning, CCTV Inspection & Video	LF	6,571	$3.00	$19,713
7		12-in Diameter Pipe Cleaning, CCTV Inspection & Video	LF	777	$3.00	$2,331
8		6-Inch Diameter Pipe Rehabilitation by CIPP Method	LF	386	$41.00	$15,826
9		8-Inch Diameter Pipe Rehabilitation by CIPP Method	LF	6,571	$36.00	$236,556
10		12-Inch Diameter Pipe Rehabilitation by CIPP Method	LF	777	$42.00	$32,634
11		Re-establish and "Top Hat" Rehabilitation of Service Lateral Connections	EA	73	$1,200.00	$87,600
12		Point Repairs (Offset Joints; cracked pipe)	EA	4	$12,000.00	$48,000
13		Pipe Replacement	LF	300	$275.00	$82,500
14		Manhole Rehabilitation	EA	34	$3,500.00	$119,000
15		Remove Existing Manhole Frame and Cover and Provide New Manhole Frame and Cover with South Bay Foundry SBF 1254	EA	7	$1,800.00	$12,600
16		Remove Existing Manhole Frame and Cover and Install District Furnished Manhole Frame and Cover	EA	14	$800	$11,200
17		Remove existing sewer clean out or sewer manhole and provide and install new sewer manhole per District Std. Drwg. No. 10.	EA	6	$16,000.00	$96,000
18		Remove metal riser and raise to grade with precast concrete grade rings	EA	8	$1,500	$12,000
19		Provide new concrete collar (reuse existing frame & cover)	EA	10	$800.00	$8,000
20		Minor Repair in Manhole	EA	9	$750.00	$6,750
21		Dye Testing of Lateral Service Connections	EA	87	$60.00	$5,220
22		Handling Sewage Flows / Bypass Pumping	LS	1	$5,000.00	$5,000
23		Provide Portable Restroom with Hand Sink and Sanitizing Facilities	EA DAY	75	$100.00	$7,500
Contingency Bid Item						
24		Trench Subgrade Stabilization	CY	50	$100.00	$5,000
Contingency Allowance						
25		Allowance for Owner specified changes in work or additional work such as night work, force account work at Owner's discretion.	Allowance	1	$25,000.00	$25,000
Total Estimated Construction Cost						**$904,088**

AGENDA ITEM #3

AGENDA ITEM: 3

MEETING DATE: January 6, 2020

I. NATURE OF ITEM

Update on the El Sueno Force Main Replacement Project

II. BACKGROUND INFORMATION

The Governing Board previously authorized design services for the replacement of the existing 4-inch diameter force main at the El Sueno Lift Station located in an easement near El Sueno Road and Sherwood Drive in the area of Calle Real east of Turnpike Road. On July 15, 2019 the Board approved a California Environmental Quality Act (CEQA) exemption for the project. Stantec Consulting Services, Inc. has recently completed the plans and specifications for the project.

Staff is working with legal counsel to review and finalize the new easement agreement for the relocated force main. Upon finalization, staff will present the easement to the property owner for signature. The property owner has previously expressed strong interest in the completion of the project as it will facilitate the possibility of a future lot split.

III. COMMENTS AND DISCUSSION

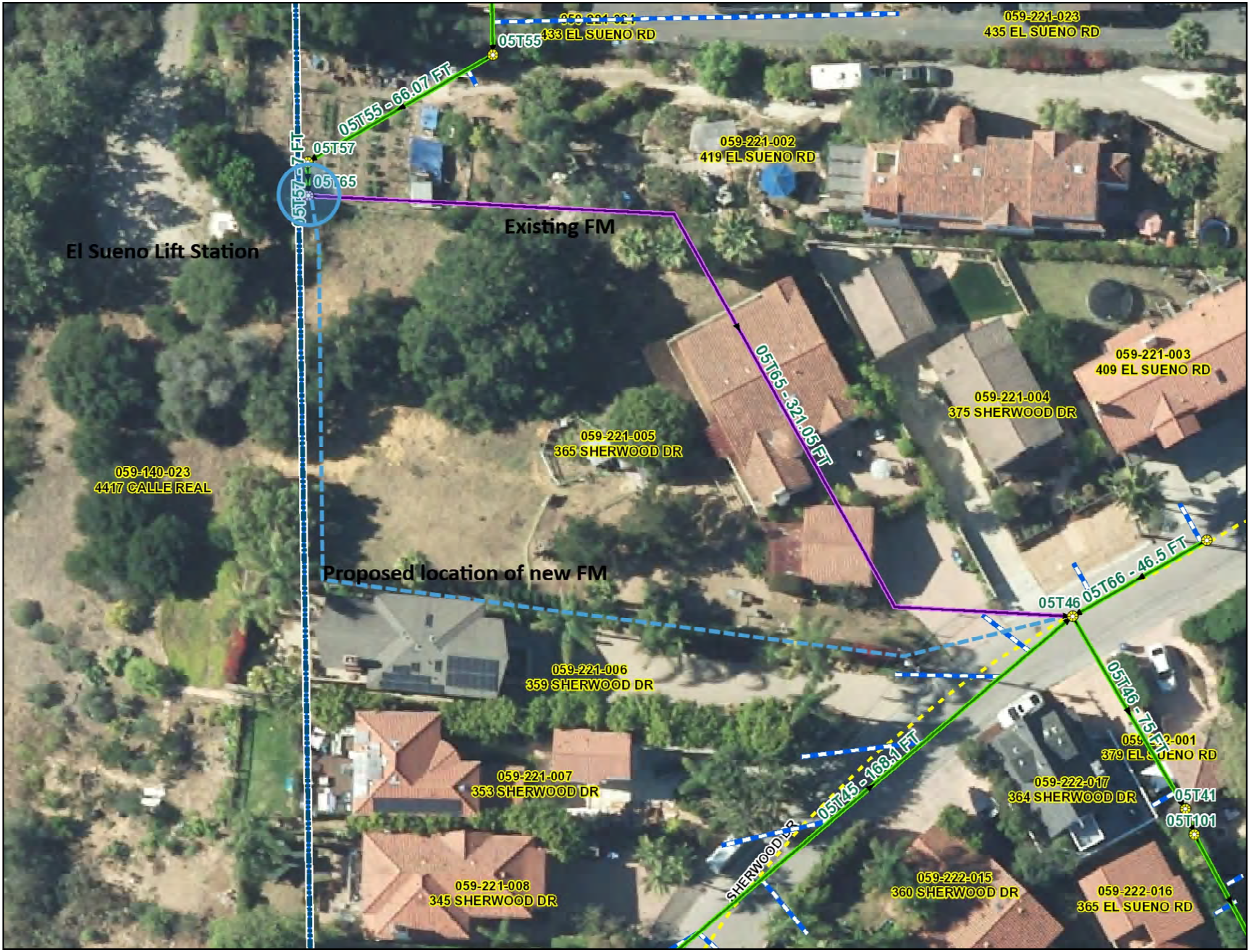
The attached Engineer's Cost Estimate has project construction costs at approximately $108,000 which includes $25,000 for contingency items. This cost allows the project to be advertised under the District's informal bid process pursuant to the California Uniform Construction Costs Accounting Act, which will reduce the overall time and effort associated with awarding a construction contract.

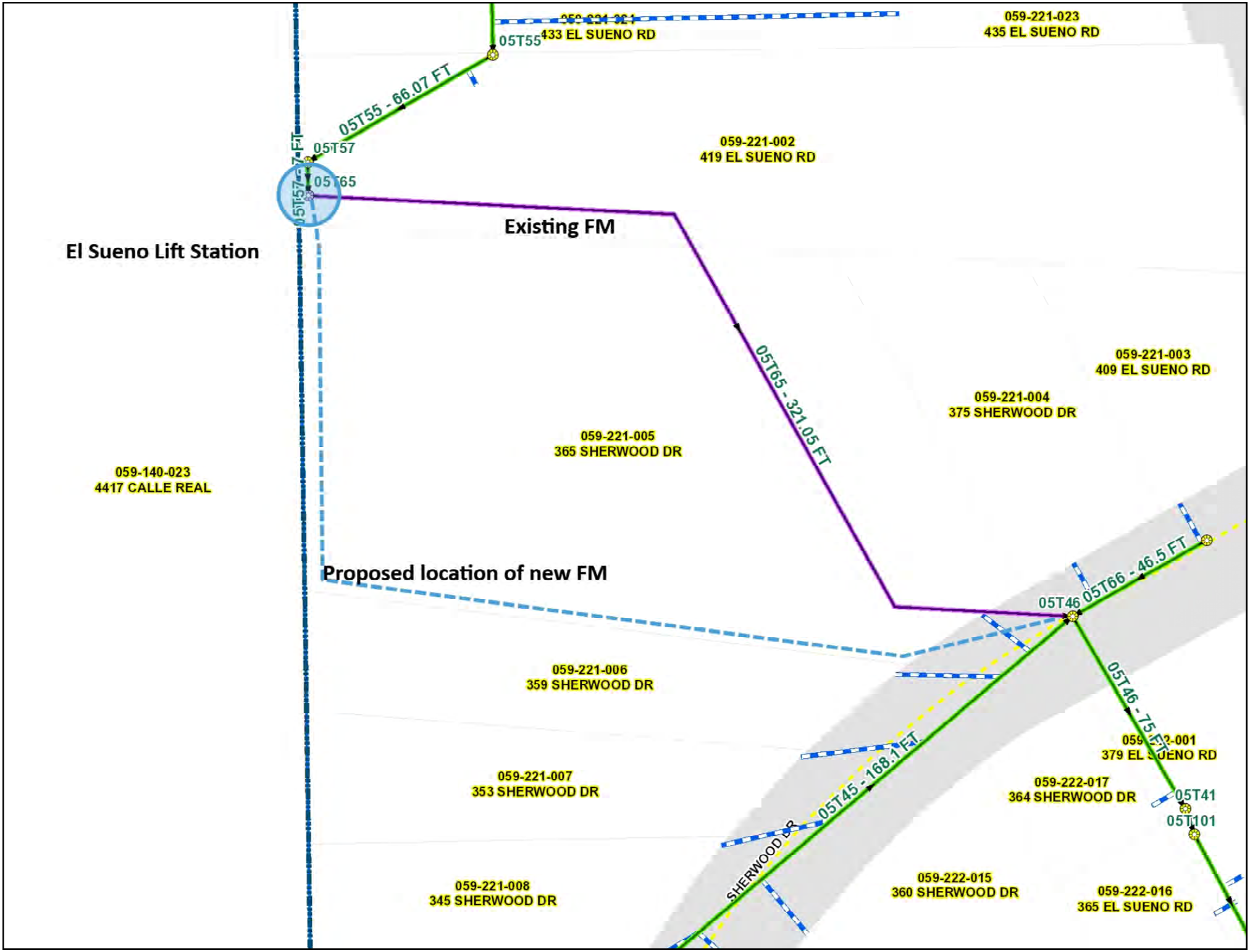
Upon completion of the easement documents, this project will be scheduled for review by the Board's Engineering Committee and will be brought to the Board for approval of plans and specifications and authorization to solicit bids.

IV. REFERENCES

Map of existing and proposed easements

Stantec Opinion of Engineering Costs


El Sueno Lift Station
Existing FM
Proposed location of new FM
05T55
05T55 - 66.07 FT
05T57
05T57 - 7 FT
05T65
05T65 - 321.05 FT
05T46
05T66 - 46.5 FT
05T46 - 75 FT
05T45 - 168.1 FT
05T41
05T101
059-221-023
435 EL SUENO RD
433 EL SUENO RD
059-221-002
419 EL SUENO RD
059-221-003
409 EL SUENO RD
059-221-004
375 SHERWOOD DR
059-221-005
365 SHERWOOD DR
059-140-023
4417 CALLE REAL
059-221-006
359 SHERWOOD DR
059-221-007
353 SHERWOOD DR
059-221-008
345 SHERWOOD DR
059-222-001
379 EL SUENO RD
059-222-017
364 SHERWOOD DR
059-222-015
360 SHERWOOD DR
059-222-016
365 EL SUENO RD


059-221-024
433 EL SUENO RD
059-221-023
435 EL SUENO RD
05T55
05T55 - 66.07 FT
05T57
05T57 - 7 FT
059-221-002
419 EL SUENO RD
05T65
El Sueno Lift Station
Existing FM
05T65 - 321.05 FT
059-221-003
409 EL SUENO RD
059-221-004
375 SHERWOOD DR
059-221-005
365 SHERWOOD DR
059-140-023
4417 CALLE REAL
Proposed location of new FM
05T46
05T66 - 46.5 FT
059-221-006
359 SHERWOOD DR
05T46 - 75.1 FT
059-221-001
379 EL SUENO RD
059-221-007
353 SHERWOOD DR
05T45 - 168.1 FT
059-222-017
364 SHERWOOD DR
05T41
05T101
SHERWOOD DR
059-221-008
345 SHERWOOD DR
059-222-015
360 SHERWOOD DR
059-222-016
365 EL SUENO RD

OPINION OF PROBABLE COST

Stantec
111 East Victoria Street
Santa Barbara, CA 93101
(805) 963-9532

Project: El Sueno Force Main Replacement
Location: Goleta, California
Client: Goleta Sanitary District
W.O. No.: 2064184800
Date: 22-Nov-19
Calc'd By: HLL
Path Name: V:\2064\active\2064184800\engineering\cost_estimate\
File Name: 2064184800_construction_cost_estimate_force_main_20191122.xlsx

ITEM		DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
	Base Bid					
1		Mobilization, Demobilization, Bonds & Insurance	LS	1	$15,000.00	$15,000
2		Traffic Control, Postings & Notifications	LS	1	$5,000.00	$5,000
3		Environmental Controls (Water, Noise, Dust)	LS	1	$750.00	$750
4		OSHA Excavation Shoring Requirements and other Safety Measures	LS	1	$5,000.00	$5,000
5		Connection at wet well; including interior piping and exterior bypass piping	LS	1	$7,500.00	$7,500
6		Connection to manhole and new sewer clean out at grade	LS	1	$7,500.00	$7,500
7		Abandon existing force main with 12" minimum concrete plugs both ends	LS	1	$2,500.00	$2,500
8		4-in Solid Wall Butt Fused HDPE Pipe by directional drilling	LF	235	$85.00	$19,937
9		4-in Solid Wall Butt Fused HDPE Pipe by open cut	LF	120	$110.00	$13,200
10		Fence replacment	LS	1	$1,100.00	$1,100
11		Handling Sewage Flows / Bypass Pumping	LS	1	$2,500.00	$2,500
	Contingency Bid Item					
12		Trench Subgrade Stabilization	CY	50	$75.00	$3,750
	Contingency Allowance					
13		Allowance for Owner specified changes in work or additional work such as night work, force account work at Owner's discretion.	Allowance	1	$25,000.00	$25,000
Total Estimated Construction Cost						**$108,737**

AGENDA ITEM #4

AGENDA ITEM: 4

MEETING DATE: January 6, 2020

I. NATURE OF ITEM

Review and Consideration of Proposal for Preliminary Engineering Design Services for Biosolids and Energy Strategic Plan Phase 1 Improvements

II. BACKGROUND INFORMATION

Over the last 2 years the District has worked with Hazen and Sawyer (Hazen) to develop a Biosolids and Energy Strategic Plan (BESP). The goal of the BESP was to determine the most appropriate combination of biosolids treatment, disposal and energy recovery improvements that once implemented would move the District towards long term energy sustainability.

The BESP was developed in five separate phases. The information gathered and decisions made at each phase of the process informed and guided the following phases. Along the way dozens of technologies, processes and improvements were considered, analyzed and compared using various analytical tools. At the end of this process, a final list of recommended biosolids treatment and energy recovery improvements was developed and incorporated into the final BESP along with a preliminary implementation plan. The Board adopted the final BESP on September 3, 2019. An excerpt from BESP executive summary that includes the recommended improvements and implementation plan is attached to this report.

III. COMMENTS AND RECOMMENDATIONS

The final list of recommended BESP improvements were grouped into the following 3 phases:

1. Install a new digester to resolve firm capacity issues and install 1st phase of a Combined Heat and Power (CHP) system to convert the existing biogas to energy
2. Install a high strength waste receiving station to increase biogas production and install 2nd phase of CHP system to convert additional biogas to energy
3. Install a thermal dryer to produce class A biosolids and reduce hauling costs

The next step in this process is to complete a preliminary engineering analysis to determine the estimated costs, scope of work and potential environmental impacts of the recommended Phase 1 improvements along with a conceptual level layout analysis of the remaining improvements. Once this is complete, a preliminary financial plan and project delivery schedule can be prepared, and the BESP project information will be incorporated into the District's Capital Improvement Plan (CIP) Masterplan.

Given their prior work with the District in developing the BESP and extensive knowledge of the District's facilities, capabilities and goals, Hazen was determined to be uniquely qualified to assist the District with the preliminary engineering design services that are required. As such, staff requested that Hazen submit a proposal for this effort. After several discussions with the Hazen team, a final proposal (attached) was submitted for consideration.

The proposal includes the following tasks:

1. Preliminary design of new anaerobic digestor to replace digestor #1
   - Review of existing information
   - Determination of digester volume
   - Assessment of digester systems and features
   - Digester equipment selection of sizing

2. Preliminary design of combined heat and power (CHP) facility
   - CHP system selection and sizing evaluations
   - Biogas pretreatment and conveyance preliminary design
   - Gas storage evaluations
   - System enclosure alternative
   - Heat recovery evaluations
   - Electrical connections evaluation
   - System and equipment siting
   - Summary report preparation

3. Regulatory/Permitting
   - Data collection
   - Emissions calculations
   - Air quality and CEQA regulatory analysis
   - Summary report preparation

4. Implementation/construction sequencing plan

5. Cost estimates

6. Phases 1,2 and 3 conceptual layouts

Funding for this effort in the amount of $300,000 is included in the approved FY 2019-20 budget. Staff recommends the Board authorize the General Manager to execute a design services agreement with Hazen for the preliminary engineering design services as stated above in an amount not to exceed $299,500 in the form of an addendum to proposal.

IV. REFERENCE MATERIAL

Excerpt from Final BESP Executive Summary

Proposal for Biosolids & Energy Strategic Plan Phase 1 Improvements

Hazen

GOLETA SANITARY
Water Resource Recovery District

OBJECTIVES

The main objective of the BESP was to provide a biosolids and energy roadmap and strategy for GSD to reach energy-sufficiency by reassessing their biosolids management practices in combination with numerous energy production approaches (energy generation, utilization, storage, and renewable energy sources). The planning horizon is established for year 2043.

Biosolids and energy management strategies cannot be studied separately as they are closely related. Biosolids contain most of the energy that can be recovered from wastewater treatment through anaerobic digestion. Furthermore, the anaerobic digestion process offers the ability to process imported high strength waste material (HSW) for recovering more energy with biosolids processing. Any changes in solids handling processes, especially in digestion have an impact on produced biogas quality and quantity and eventually change the potential energy production.

OVERVIEW OF THE STUDY

Hazen proposed the study be structured in five distinctive phases as shown in Figure 2, for arriving at the BESP that balances future risks and priorities identified. Each phase can be considered as a building block for the subsequent phase.

CONCLUSION: ROAD MAP TO BIOSOLIDS AND ENERGY PLANNING

The key findings of the Biosolids and Energy Strategic Plan are summarized below:

- Beneficial use of Class B biosolids cake for agriculture and/or reclamation is not a viable outlet for GSD moving forward.
- HSW codigestion increases the biogas generation and with codigestion GSD will benefit from increased energy production and anticipated tipping fee revenue.
- UCSB can provide source separated food waste for codigestion.
- There is an interest in the local market to supply FOG/HSW to GSD.

- Recuperative Thickening (RT) can provide a cost effective, short term solution to achieve firm capacity. However, Digester #1 might need to be replaced due to the results from condition assessment. GSD has indicated that the new mesophilic digester is the preferred alternative to achieve increased flexibility and firm capacity.
- Although the end use market assessment indicated composting as a viable option, due to the large footprint, bulking agent requirement, truck traffic involved and market risk, composting is not found to be a viable option for GSD.
- Thermal Drying reduces the amount of biosolids generated significantly and generates Class A cake. Considering other non-monetary criteria, in combination with cost and energy balance, thermal drying alternatives scored the highest of the alternatives.
- If GSD pursues thermal drying in the near term (within 5 years of implementing FOG/HSW program) then using biogas to fuel the dryer provides the highest level of economic benefit. If the thermal dryer implementation exceeds 5 years after the FOG/HSW program, GSD should consider implementing CHP at the same time as the FOG/HSW program. GSD has indicated that a thermal dryer will likely not be installed within the 5 year window and the timing will be driven by future biosolids regulations and increased hauling costs.
- CHP is the most desirable biogas utilization technology. It is recommended that a single engine CHP system with provisions for a second engine be installed with the new mesophilic digester so GSD can begin beneficially using digester gas as soon as possible (Phase 1). The second CHP engine should be installed after the FOG/HSW acceptance program is operational.
- A ~500kW (rated) on-site solar photo voltaic system will supply ~20% of GSD's annual energy usage. Solar does not provide a 20-year payback without funding and/or incentives.
- Using energy storage (battery system) to shift loads to off peak periods provided a marginal level of financial benefit. The level of benefit will not cover the cost of the battery system at the current estimated costs. Recommend GSD continue to re-evaluate energy storage as prices continue to fall.

Two biosolids and energy roadmaps were developed for GSD as shown in Figures 10 and 11. Figure 10 presents a roadmap with triggers for changing direction, adapt a new strategy, and implement technologies. Figure 11 presents a roadmap with a proposed phased timeline for implementing the biosolids and energy plan.

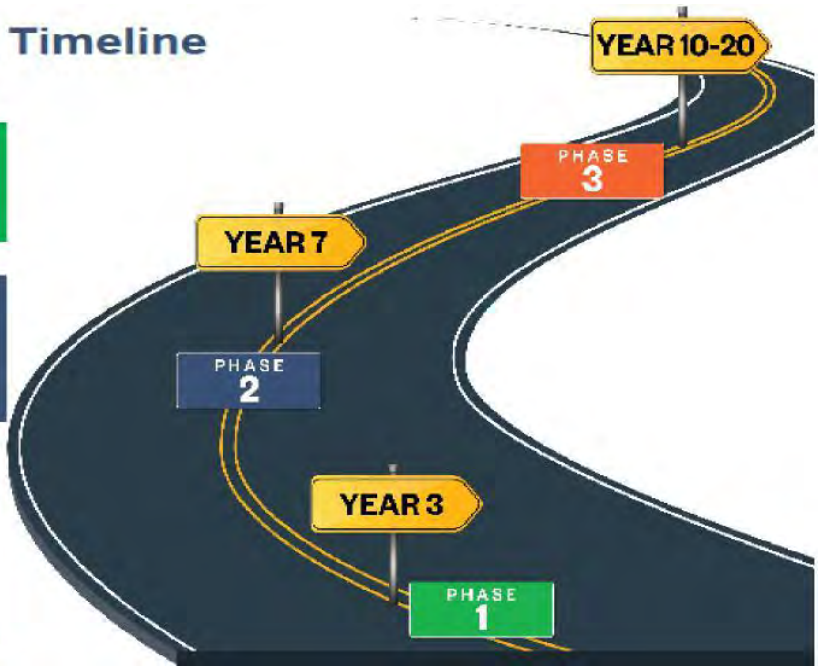
Proposed Phased Timeline

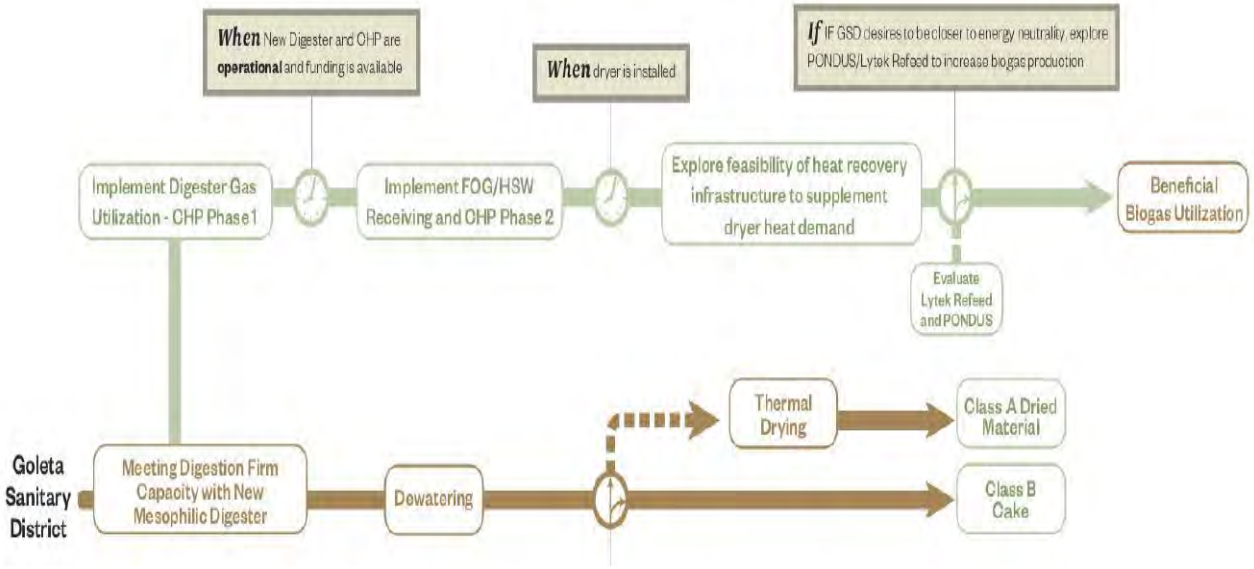
Biosolids Energy Roadmap

Phase 1
Provide Flexibility
- Implement New MAD and CoGen Phase 1

Phase 2
Accommodate Cash Flow and Produce New Revenue
- Pursue HSW and FOG
- Implement CoGen Phase 2

Phase 3
Triggered by Regulatory Timeline and Increased Hauling Costs
- Implement Thermal Dryer to Achieve Class A Biosolids





Hazen

GOLETA SANITARY
Water Resource Recovery District

Proposal for

Biosolids & Energy – Phase 1 Preliminary Design

December 3, 2019

Hazen and Sawyer
11260 El Camino Real, Suite 102
San Diego, CA 92130 • 858.764.5520

December 3, 2019

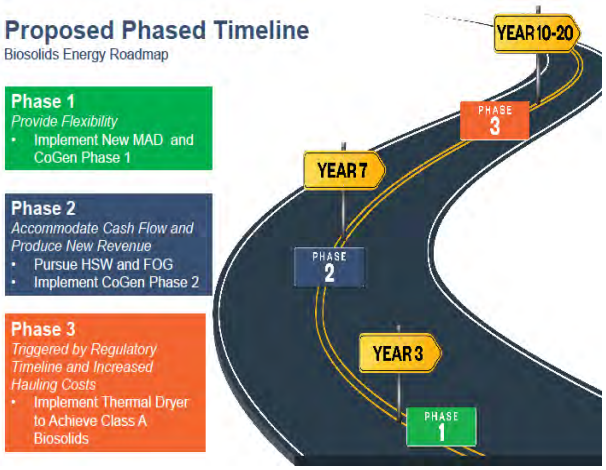
Mr. Steve Wagner
General Manager
Goleta Sanitary District
One William Moffett Place
Goleta, CA 93117

Ref: Biosolids and Energy Phase 1 Preliminary Design

Dear Steve,

The Biosolids and Energy Strategic Plan provides a roadmap for Goleta Sanitary District (District) to set a dynamic vision of biosolids beneficial reuse and energy self-sufficiency for the future. This vision should inject fresh thinking, solidly based in business reality that demonstrates the District is good stewards of precious resources. **The Hazen Team embraces the opportunity to provide the District with a team that will assist you to move forward towards implementation of Phase 1 of the Biosolids and Energy Strategic Plan.**

Multi-Disciplined, Experienced and Qualified. We have assembled a full-service, integrated multidisciplinary team of technical experts, some of whom worked on the Biosolids and Energy Strategic Plan, who are committed and prepared to respond expeditiously to the District's needs under this contract.



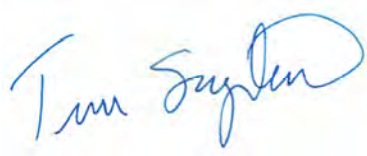
Design with Operations in Mind. We recognize that the ultimate success of any engineered solution rests with the individuals who are responsible for the day-to-day operation. Therefore, we will work closely with the District's operations team to develop implementable solutions.

Best Value Path Forward. Hazen consistently works with our clients to find solutions which balance capital investment and ongoing costs of operations to come up with the most overall cost effective solution. Our **Project Director**, **Dawn Guendert** and **Project Manager**, **Tim Suydam**, along with our Task Leaders together provide a superior combination of technical expertise and experience to provide you with the best balance of practical and innovative solutions.

As industry leaders in wastewater treatment, the Hazen Team is well suited to work collaboratively with the District to truly **realize more** from the Biosolids and Energy Strategic Plan. The Hazen's team technical expertise, knowledge of digester and cogeneration system design and understanding of your vision, are encapsulated throughout our proposal.

Hazen is committed to providing the leadership and resources necessary to ensure a successful outcome for your project. Should you have any questions about this proposal, please do not hesitate to contact Dawn Guendert at (858) 764-5523, or at dguendert@hazenandsawyer.com.

Sincerely



Dawn Guendert
Project Director

Tim Suydam, PE
Project Manager

Project Approach

Introduction

Goleta Sanitary District (GSD) owns and operates Goleta Water Resource Recovery Facility (WRRF) with an annual current average daily flow of approximately 5 MGD, and about 6 dry tons per day combined primary and WAS solids currently produced. A small portion of the biosolids are sent to sludge drying beds to meet Class A requirements and are distributed to local users for land application. The remaining dewatered, Class B biosolids are hauled to King County for beneficial use. Digester gas is currently utilized in boilers and the remaining is flared. Figure 1 shows the solids processing flow schematic.

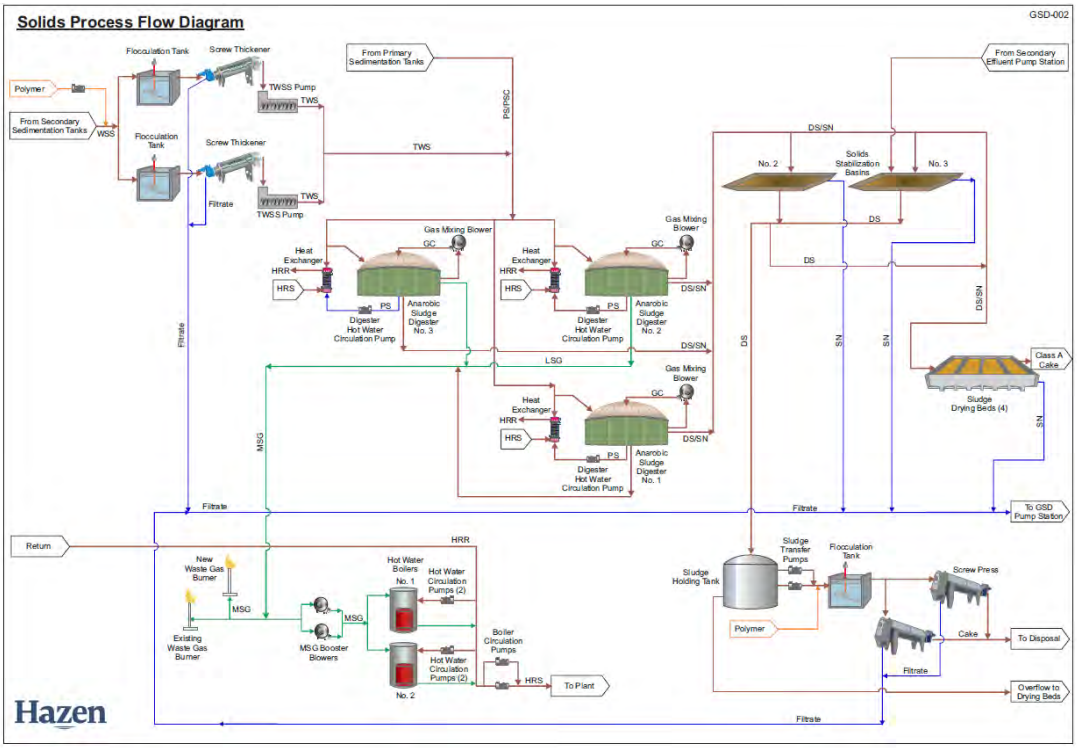


Figure 1. Solids Process Flow Diagram

Future risks facing GSD include significant increases in energy costs, loss of the one existing biosolids beneficial use outlet, increased pressure from the regulatory and environmental stakeholders on beneficial use of biosolids and imposed sustainable practices mandates. To mitigate these future risks, GSD hired Hazen and Sawyer (Hazen) to develop a Biosolids and Energy Strategic Plan (BESP) that focused on the following strategic goals.

- Minimize practice exposure to regulatory uncertainty and future changes.
- Diversify biosolids beneficial use outlets and market options.
- Achieve plant wide energy neutrality through effective use of on-site energy production strategies (i.e., biogas utilization, solar).
- Evaluate the benefits of High Strength Waste (HSW) codigestion.

Hazen's approach to developing a BESP that balanced future risk and GSD's priorities was structured in five distinctive phases as shown in Figure 2. Each phase was a building block for the subsequent phase

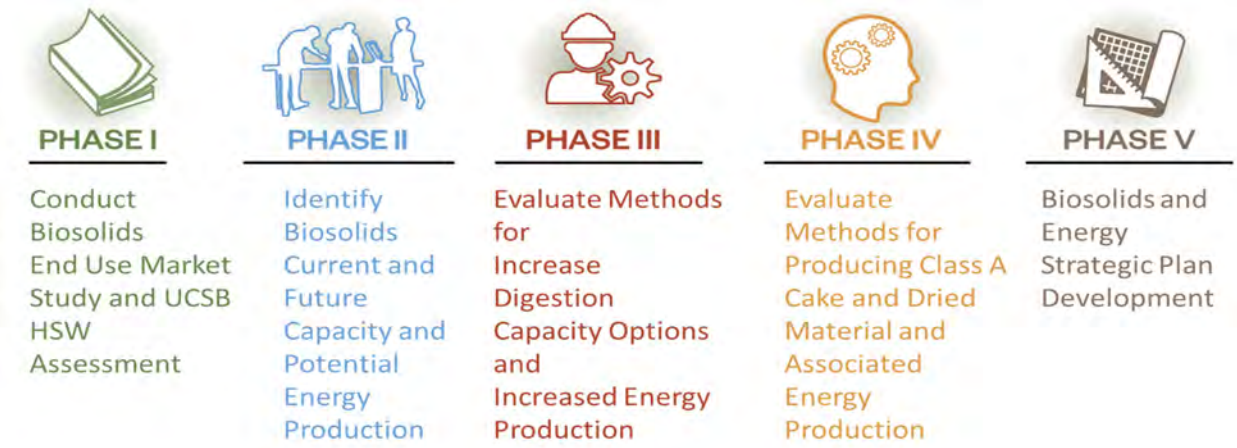


Figure 2. Strategic biosolids and energy plan phases

As part of the BESP, two biosolids and energy roadmaps were developed for GSD as shown in Figures 3 and 4. Figure 3 presents a roadmap with triggers for changing direction, adopting a new strategy, and implementing technologies. Figure 4 presents a roadmap with a proposed phased timeline for implementing the biosolids and energy plan.

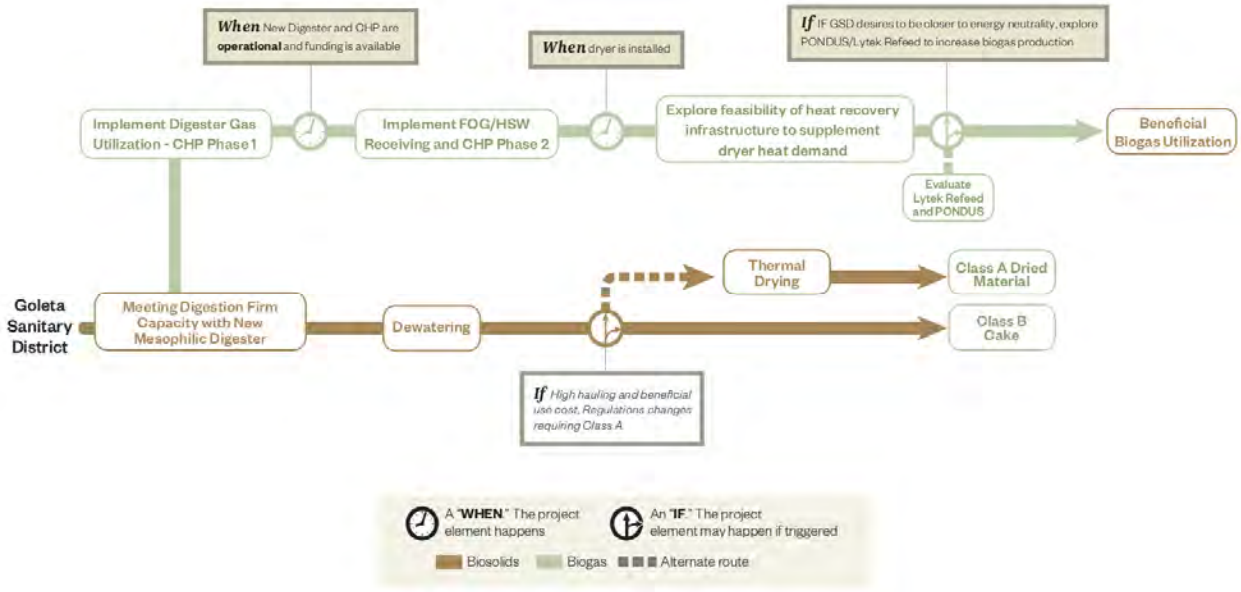


Figure 3. Trigger Roadmap for Biosolids and Energy Strategic Planning

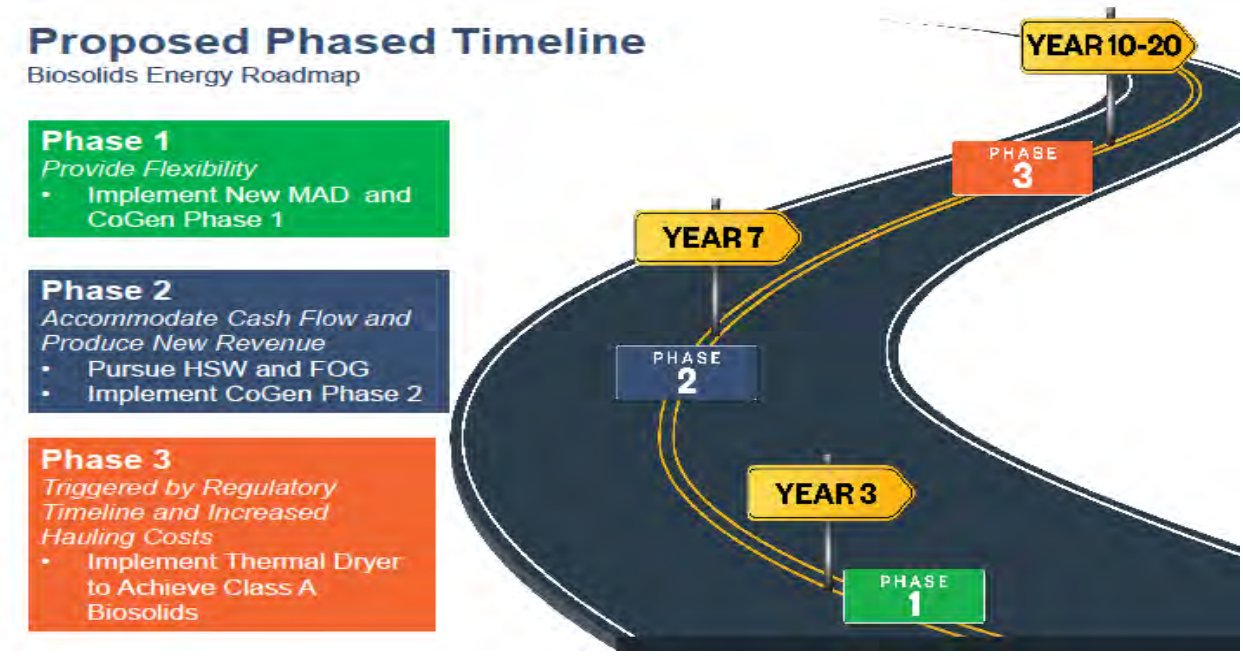


Figure 4. Timeline Roadmap for Biosolids and Energy Strategic Planning

GSD now proposes to move forward with Phase 1 which includes:

- Replacement of Digester 1, which is nearing the end of its useful life, with a larger unit to provide more digester volume and firm capacity to meet future conditions.
- Installation of the first engine of a two-engine combined heat and power (CHP) system.

As the first step in moving forward with Phase 1, Hazen will develop a Preliminary Design Report that will be comprised of the following elements:

- Preliminary design of a new digester and the first phase of a CHP system.
- Cost estimates for Phase 1.
- Regulatory and environmental assessment.
- Conceptual layout of all three phases proposed in the BESP.

Technical Approach

The proposed project must meet the GSD's current and future digester capacity needs and provide bioenergy recovery strategies that strike the right balance between cost, risk and benefit.

Our overall approach to preliminary design of a new digester, phase 1 of a CHP system, review of regulatory and permitting requirements and costs is summarized in Tasks 1 through 7.

Task 1 New Anaerobic Digester to Replace Digester #1

Hazen has designed more than 30 anaerobic digesters in the past decade, ranging from 0.6 MG to 2 MG. **Our approach includes a holistic assessment of the anaerobic digestion facility to replace existing Digester 1 in order to provide the necessary digestion capacity to meet future demands and maintain firm capacity per the BESP recommendations.**

Task 1.1 Review of Available Information

Hazen will review and assess all available information and data pertaining to the existing digestion infrastructure, current and future anticipated regulations, and the operation mode of the existing digestion facilities. Hazen will utilize available institutional knowledge from previous projects to verify and assess the validity of the information being provided by GSD.

The data review will include, but not limited to the following:

- Plant record drawings of all digester upgrades/expansions.
- Shop drawings and O&M manuals for all sludge processing equipment.

Hazen recently completed a detailed assessment of plant influent data (Flow, BOD, TSS, NH_3), primary and secondary sludge production, and sludge disposal volumes. This information will be used to optimize the effort required for this task.

Task 1.2 Determine New Digester Volume

The BESP provided an estimate of the required digestion capacity to meet future solids flows and loads and firm digestion capacity. Hazen is currently developing a process model of the existing liquid stream and solids handling facilities at the WRRF. Once calibrated, the model results will be used to arrive at the new digester capacity to process future solids flows and loads and meet firm capacity.

The new digestion capacity will also consider the amount of High Strength Waste (HSW) evaluated in the BESP. Hazen will evaluate and define various future scenarios (minimum 3 possible scenarios) that may represent an increase in influent flows and loads, differing operational modes (with and without HSW addition), and/or differing treatment levels. The calibrated process model will be used to:

- Estimate future biosolids generation rates and digester gas production.
- Determine capacity of existing digestion facility.
- Arrive at the recommended size of the new digester.
- Forecast performance of the proposed facilities.

Task 1.3 Assessment of Digester Systems and Features

GSD's existing WRRF has three (3) anaerobic digesters. Digester 1 was installed in 1950. Based on age and condition, Digester 1 is approaching the end of its useful life. Digester 2 and Digester 3 were installed in 1970 and 1988 respectively. Digester 2 and 3 have different volumes. Digester 2 has 45 ft

diameter and Digester 3 has 55 ft diameter. Both Digester 2 and Digester 3 are currently using gas mixing systems (Siemens Pearth) which were originally installed in 1988. Digester 2 mixing system was refurbished in 2010 and Digester 3 has been recently refurbished in 2016.

Overall, the technologies used in both Digester 2 and 3 are dated from 30 years ago. Although the new digester will have the same/similar type of equipment, Hazen proposes to evaluate newer technologies as part of new digester design that may improve operations or reduce costs.

Selection of a proper equipment plays a critical role in successful design of anaerobic digesters. Hazen will evaluate and identify the most appropriate technologies for digester cover, digester mixing and heating systems. The technologies used in existing digesters will be included in the evaluations.

Hazen will develop a weighting and scoring system to evaluate both economic and non-economic factors such as:

- Capital cost
- Life cycle cost (O&M, power, chemicals, etc.)
- Footprint/layout
- Process & equipment reliability
- Ease of operation/automation
- Maintenance requirements
- Additional staff requirements
- Redundancy
- Constructability/sequencing

If GSD desire, as part of the technology evaluation, Hazen will arrange site visits to facilities utilizing equipment being proposed in the evaluation. As an optional task, Hazen will budget two trips to local facilities reachable by automobile within a single day.

Task 1.4 Digester Equipment Selection and Sizing

Using design conditions determined in Task 1.2, Hazen will size the new anaerobic digester to meet anticipated flows and loads for the next 20-year period for all scenarios evaluated (with and without HSW addition) which will include:

- Identifying digester dimensions, diameter, height, bottom type, shape of the tanks.
- Sizing the mixing system and digester cover and take into consideration gas holding requirements.
- Evaluation of the existing heat exchanger (HEX) and boiler capacity and identify the need for a new HEX and boiler.

Hazen will utilize the knowledge gained from previous digester design projects to elevate the design.

Based on the outcome of Task 1.3, selected digester equipment will be sized. Hazen will contact technology providers/manufacturers and obtain quotes for selected technologies. In collaboration with GSD staff, this information will be used to select technology manufacturers.

Task 1.5 Siting Requirements and Site Selection

Hazen will evaluate the optimal digester location through discussions with GSD staff that minimizes the connection infrastructure costs and impacts to future plant expansions. Based on the evaluations conducted during development of the BESP, the proposed new digester could be located adjacent to Digester 3 as shown in Figure 5.

The evaluation will also consider whether to demolish Digester 1 or repurpose it for future use.

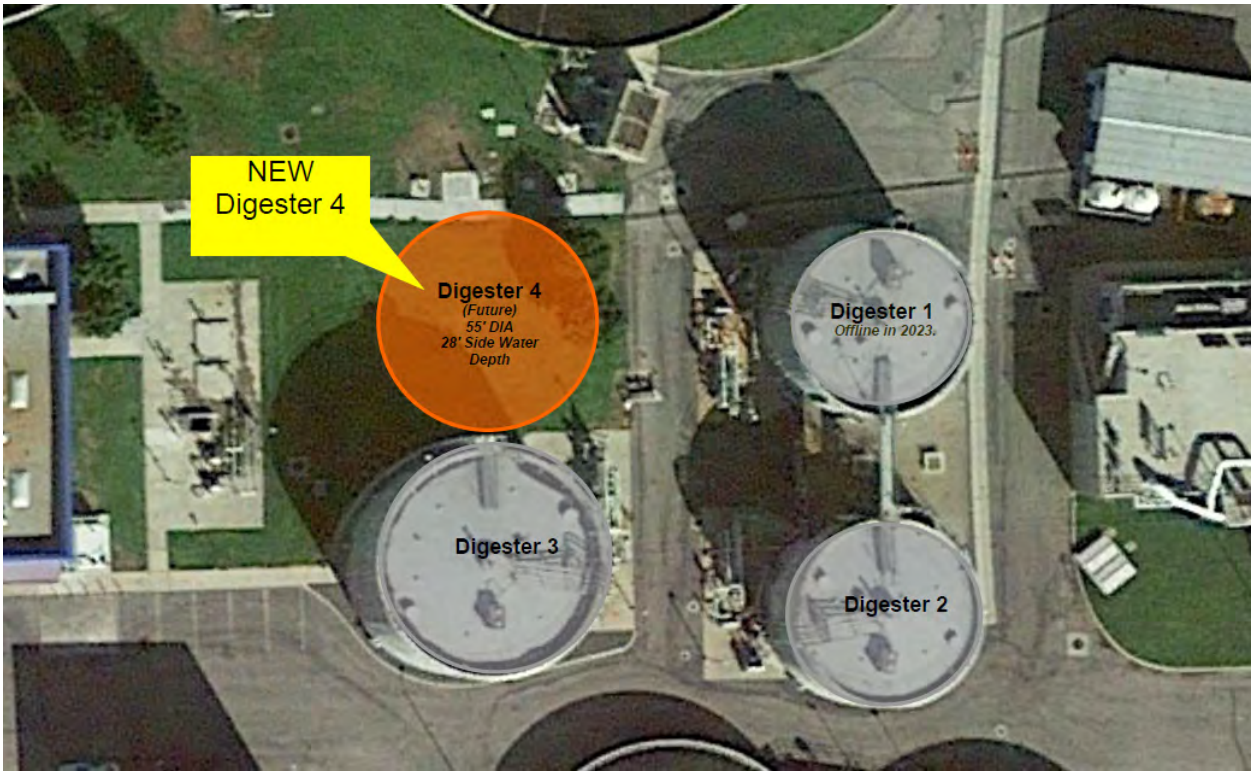


Figure 5. Potential Location for New Anaerobic Digester

Task 2 COGEN Phase 1

Hazen's approach to the Combined Heat and Power (CHP) system preliminary design will consider the optimal engine/heat recovery configuration, integration with existing and new heating infrastructure, gas pretreatment and emission post treatment requirements, electrical interconnection requirements and siting recommendations.

Task 2.1 CHP System Selection and Sizing Evaluations

Proper sizing of the biogas utilization system is a critical element of successful implementation of a combined heat and power system. Given that digester feeding is a continuous operation (24-hours/day) there is also a continuous need for liquid heating and the thermal energy associated with the liquid heating system. Therefore, it is advantageous if the CHP system can operate continuously to better match

recovered thermal energy with the thermal energy demand for digester heating. An oversized CHP system will either need to operate intermittently (not matching heating demands) or will require supplemental fuel (purchased natural gas) to sustain continuous operations. Intermittent operation or operation at partial capacity (generally less than 75% rated capacity) can also result in reduced efficiency and premature engine failure.

Hazen will build on the work done during the development of the BESP to identify the recommended CHP system prime mover technology (i.e. reciprocating engines, microturbines), system size, heat recovery configurations and gas blending considerations. Hazen will evaluate the engine size offerings from multiple engine manufacturers to identify the engine size offerings that would best fit the plant's biogas production and digester heating demands. The heat recovery evaluations will account for the seasonal variations in digester heating demands to identify the heat recovery method (i.e. exhaust system vs engine water jacket heat recovery) that meets the heating demand with the minimal amount of system complexity. This evaluation will also include an analysis of the potential operational and monetary benefits from fueling the CHP system with a blend of digester and natural gas.

The CHP system will be designed with provisions to add a second engine and heat recovery infrastructure to account for the additional biogas production and digester heating demands if the District implements a FOG/HSW codigestion program.

Task 2.2 Biogas Pretreatment and Conveyance Preliminary Design

Biogas pretreatment is critical for engine reliability and emissions compliance. Providing a clean fuel supply to the CHP engine(s) will significantly reduce the loss of revenue from engine down time and reduce O&M costs by expanding the time between engine rebuilds. In addition, a clean fuel supply will enable the engine(s) to operate at the most efficient point and reduce exhaust emissions.

Hazen will explore multiple biogas conditioning technologies to identify the technology that strikes the right balance of treatment performance, capital costs and long-term O&M costs. Treatment technologies include but are not limited to:

- Activated carbon beds, regenerative absorption, liquid scrubbing and membrane technologies for siloxane treatment
- Gas refrigeration systems for moisture removal and additional siloxane removal
- Iron sponge, chemical scrubbing and biological sulfur removal systems for H_2S removal

Typical Carbon Bed Siloxane Treatment System

The biogas conveyance system will include a gas blower sized to move biogas through the pretreatment system and supply the required fuel supply pressure to the CHP engine(s).

Task 2.3 Gas Storage Evaluations

Biogas storage plays an important role in providing the CHP engine(s) with a uniform and consistent fuel supply. The amount of gas storage will depend on the CHP system fuel consumption rate and the amount of natural gas that is blended with the biogas fuel supply. Multiple gas storage alternatives will be explored including, floating gas storage covers, membrane gas storage systems, compressed storage tanks and the use of annular space within the digesters as storage. The gas storage strategies will account for additional gas production from codigesting HSW/FOG and will include:

- Pretreatment capacity and needs (moisture, siloxane, H2S)
- Technology alternatives and recommendations
- Gas storage evaluations and recommendations
- Gas delivery pressure

The CHP system engine(s) will be required to meet the Santa Barbara County Air Pollution Control District's emission limitations for internal combustion engines. The current ruling limits NOX emissions to 50ppmv or 125ppmv for rich and lean burn engines respectively which may require after-treatment catalysts. The need and cost for emissions after treatment will be included in the overall CHP evaluation and additional provisions for future after-treatment will be considered.

Task 2.4 System Enclosure Alternatives

The CHP engine and heat recovery equipment can be furnished by the system supplier inside a prefabricated sound attenuated enclosure or installed inside a built on-site building. While prefabricated enclosures typically have a cost advantage, they significantly limit access to the CHP engine for maintenance/repairs and they will not match the existing architecture at the plant site. A dedicated building will facilitate easier access to the CHP system components but will increase the overall capital costs. The PDR will include a cost benefit analysis and recommendations for each alternative.

Prefabricated CHP System Enclosure Example

Task 2.5 Heat Recovery Evaluations

The seasonal digester heating demands from the existing and new digesters will be evaluated to understand how much of the total heat demand can be supplied by the CHP engine and if any supplemental heat is needed from purchased natural gas. Our team has a head start on this task with the development of the EBAT model during the BESP development process.

The CHP system can be supplied with exhaust and engine cooling system heat recovery capabilities that can provide a heat recovery efficiency of up to 40%. The potential to recover heat only from the exhaust or engine cooling will be evaluated to manage system cost and complexity. To help GSD troubleshoot any heat recovery problems, the CHP system will be designed with flow and temperature instrumentation for all heat recovery loops so that heat balance and heat exchanger performance can be observed.

Task 2.6 Electrical Interconnections

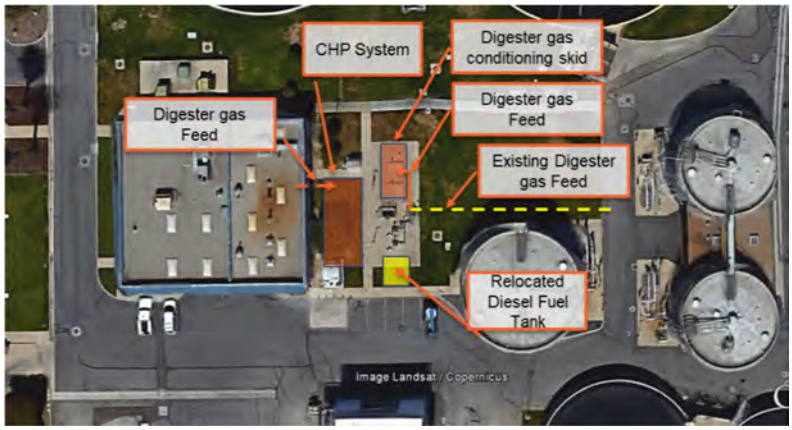
The CHP system will supply electric power to offset the plant's purchased power from Southern California Edison (SCE). To accomplish this, the CHP generator must operate in parallel with the plant utility service. Hazen will evaluate the electrical distribution system and identify the optimal CHP electrical connection point that has the capacity to accept the full build-out energy generation potential.

SCE's rules for parallel operation (Rule 21) requires that electrical protective relaying and a disconnecting means be installed to protect their facilities and linemen. This includes reverse power, under/over voltage, under/over frequency and negative sequence protection. It is anticipated a new protective relaying scheme will be needed to meet the Rule 21 requirements.

SCE also requires a preliminary interconnection study be performed by SCE to confirm parallel operations do not have a dangerous impact to their facilities and identify interconnection protection requirements. This preliminary study will be accelerated early in the PDR development to confirm the interconnection needs.

Task 2.7 System and Equipment Sitting

The CHP system should be sited to minimize the infrastructure needed to make the electrical connections, heat recovery loop connections and connection to the biogas offtake point. Hazen will evaluate the optimal CHP system location that minimizes the connection infrastructure costs and impacts to future plant expansions.



Potential CHP System Location

Task 3 Regulatory/Permitting

Hazen's team partner, Yorke Engineering, will calculate emissions and perform an environmental regulatory assessment of the proposed Phase 1 implementation and a projection for later phases.

Task 3.1 Data Collection

The following information will be requested from GSD to initiate the regulatory/permitting evaluation.

- Existing and proposed equipment lists, including as much information as possible on sizes and expected operations
- Copies of SBCAPCD permits for the existing GDS facility
- Copies of recent emissions reports for the existing equipment

Other items may be requested at the start of the project.

Task 3.2 Emissions Calculations

Using the data collected, we will quantify the emissions on an hourly, daily, and annual basis for regulatory analysis purposes. Emission calculations will include criteria pollutants, toxic air contaminants (TACs), and greenhouse gas emissions (GHGs). The fugitive emissions, as well as stationary sources will be calculated and any control systems planned will be taken into account. We will estimate emissions for the Phase 1 equipment and will also make a projection of the emissions from all three phases to take into account what will eventually needed to be permitted.

Task 3.3 Air Quality and CEQA Regulatory Analysis

We will review the processes, equipment, and chemicals to determine the air permitting and California Environmental Quality Act (CEQA) requirements for the BESP. For air quality, our analysis will include a rule review to determine what rule compliance requirements may impact the project (controls, work practice standards, monitoring requirements, etc.).

A preliminary new source review (NSR) evaluation will be conducted to determine the Best Available Control Technology (BACT) requirements for the new and any modified equipment proposed for this project and to determine if emission offsets would be required for the project. If offsets are required, we will provide input on the availability of emissions reduction credits (ERCs) and a range of potential costs. We will compare the estimated emissions to rule thresholds to determine whether or not ambient air quality modeling will be required to demonstrate compliance with ambient air quality standards, but no actual modeling is proposed at this stage.

A risk prioritization of the TAC emissions will be prepared to determine if the Santa Barbara County Air Pollution Control District (SBCAPCD) is likely to require a health risk assessment (HRA), **but an HRA will not be part of this preliminary scope of work.** The associated SBCAPCD permitting fees for budget planning will be determined and an estimated timeline for application processing and permit approval will be provided.

In addition to the air quality analysis, the team will review the existing Conditional or Special Use Permit for the facility and other prior CEQA documentation to determine if additional CEQA analyses will likely be required for the project. For this analysis, we assume that there will be no new substantial ground disturbance, i.e., that the new equipment will be within the existing facility footprint. We will discuss the potential for impacts from noise, traffic, etc., in addition to the air quality and GHG emissions in comparison to CEQA checklist significance thresholds.

Task 3.4 Summary Report Preparation

A technical memorandum summarizing the results of our investigation, including the required BACT for emissions control, air permitting timeframe and permitting costs, and other regulatory requirements will be provided to GSD. We will also provide input on potential CEQA requirements based on our findings.

Task 4 Implementation / Construction Sequencing Plan

Hazen will prepare a site layout identifying the locations of the new digester and CHP systems and provide a detailed construction sequence and constraints for the recommended activities related to the Phase 1 Implementation project. Also, a detailed construction sequencing plan will be prepared for the electrical and instrumentation systems while the plant is in service. Any facilities shutdown requirements, including frequency and duration, shall be discussed in detail if required during the construction phase.

Task 5 Cost Estimates

Hazen will provide a conceptual level cost estimates (10% design level) for the alternatives evaluated for the Phase 1 digester and CHP systems. These will be presented at the workshops for review and to aid GSD with alternatives analysis and selection of a preferred alternative. These estimated costs will be based on a combination of cost information from vendors, costs from similar projects and cost curves.

Hazen will provide a more detailed cost estimate for the preliminary design for the recommended project that will be included in the Preliminary Design Report.

Task 6 Phases 1,2 and 3 Conceptual Layout

Hazen will develop a conceptual level layout for Phases 1, 2 and 3 in the Biosolids and Energy Strategic Plan that will include preliminary sizing of equipment and location and orientation on the wastewater treatment plant. The layout will also consider vehicle movements and access control requirements for the FOG/HSW and biosolids hauling facilities.

Task 7 Preliminary Design Report

Hazen will provide a Draft and Final PDR Study Report. The report will include a summary of the investigative work and alternative analysis described above including the cost comparison for the alternatives, a recommended project with phasing, if required, and preliminary drawings for the recommended improvements.

GSD will review and provide comments to Hazen. Hazen will address all comments and finalize the PDR.

Project Deliverables

The following provides a summary of deliverables proposed for this project.

- Draft Phase 1, 2 and 3 Conceptual Layout
    - Review meeting (WEBEX)
- Final Phase 1, 2 and 3 Conceptual Layout
- Technical Memorandum (TM) documenting the results of capacity assessments and technology, alternatives evaluated for future and summarizing the basis of design for proposed new digester and CHP systems.
    - Workshop to review the findings and recommendations.
- Digester and CHP Selection, Sizing and Site Selection TM documenting the findings of design calculations, equipment vendor evaluations, sizing, and site layout.
    - Workshop to review findings and recommendations
- Preliminary Emissions Inventory
- Regulatory/ Permitting TM
- Draft Preliminary Design Report
    - Workshop
- Final Preliminary Design Report

Project Management and Quality Assurance

Hazen utilizes a team approach for project delivery with Tim Suydam assigned as project manager to administer the day-to-day execution of the assignment. Dawn Guendert will be the Project Director, as a secondary point of contact to Goleta Sanitary District and to verify that your needs are met. Mohammad Abu-orf and Michael Bullard will provide technical leadership and manage the QA/QC program. We will continue to maintain close communication with the District throughout our project, not only discussing technical issues, but making sure we are on track with deliverables and budget.

Communication is key to meeting your expectations. The key to a managing costs and schedule is coordination, transparency, and communication among the project team – Goleta Sanitary District and Hazen. Our communication approach starts by listening to and understanding your expectations. Tim Suydam will be in frequent communication with the District's Project Manager for the duration of the project. Workshops will be used to collectively hear the discussion and obtain consensus.

Progress Reporting is essential to maintaining the project schedule and efficient delivery as well as early identification of any issues which may lead to scope, cost or schedule variances. Tim Suydam, in conjunction with the assigned task leads, will track the schedule and budgets of the work.

Bi-Weekly Progress conference calls are effective to make decisions, provide input, and follow up on actions to keep the project. Hazen will develop an agenda for each meeting and attend at a project management level, with other key team members as required.

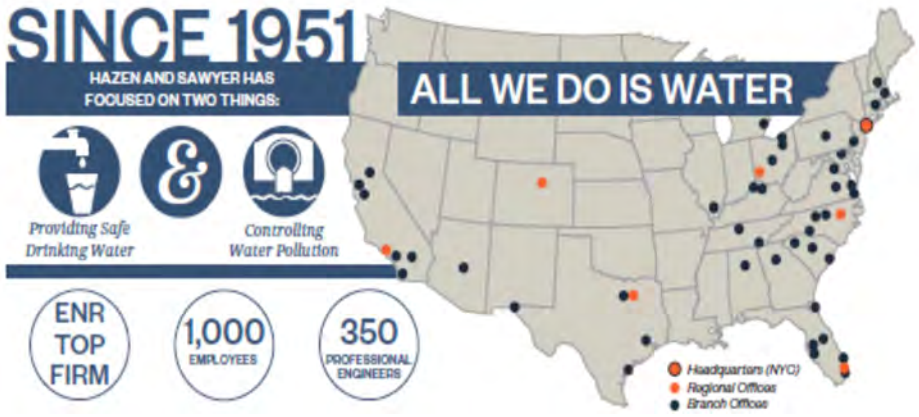
Quality Assurance is taken seriously. Michael Bullard will lead the QA/QC program implementation for this project. Hazen adheres to corporate Project Quality Assurance guidelines that outline policies and procedures required for execution of all projects. However, quality doesn't enter our projects simply as a result of any company procedures; it is an attitude within each of our staff about providing the highest quality work to our clients while remaining within our budgetary constraints.

Firm and Project Team Qualifications

Hazen's collaborative approach with a focus on the business/financial implications and delivery of superior technical expertise in a well-organized, holistic process will provide the best solutions for moving forward with implementation of Goleta Sanitary District's Biosolids and Energy Management Strategic Plan.

Since 1951, Hazen has had a singular focus on "All Things Water". According to ENR, Hazen has ranked as one of the top firms devoted entirely to water and wastewater. Our strength is in our deep project experience gained through years of designing, constructing, and helping agencies operate their systems. In the last five years alone, we have completed over 1,300 water and wastewater projects around the globe, providing planning, modeling, assessment, design, program and construction management, process diagnostics and operations assistance services. We inherently consider O&M concerns from the outset of a project. We are able to do this because our key team members bring a working background in operations, having worked at wastewater and water treatment plants. Thus, our team has the unique advantage of ***designing with operations in mind.***

Hazen will be the lead firm for this project. We will supply all management and technical and local leadership, leveraging our industry-leading expertise for the District's benefit. Our project partner has been selected to embody a focus on collaboration and leveraging of technical excellence.



The Hazen Team, including our Subconsultant, Yorke Engineering, have the capabilities and capacity to meet the design requirements, regulatory requirements, cost control, schedule milestones and quality parameters necessary to realize your vision for sustainable future.

Subconsultant

Hazen will be joined by Yorke Engineering. Yorke Engineering has specific expertise and experience with environmental review and has teamed with Hazen on similar projects.

Yorke ENGINEERING, LLC

Yorke Engineering, LLC (Yorke) was founded in 1996 to provide professional air quality and environmental services to clients in government and industry. With offices in Los Angeles, Alameda, Kern, Fresno, Orange, Ventura, San Diego, and Riverside Counties. Yorke specializes in air quality and environmental permitting and compliance under the Santa Barbara County Air Pollution Control jurisdiction of and other California air districts. Since Yorke's founding, they have served over 550 client organizations, including water and sanitation districts, waste-to-energy plants, biogas facilities, regional and municipal power plants, numerous cogeneration facilities, cities, counties and special districts.

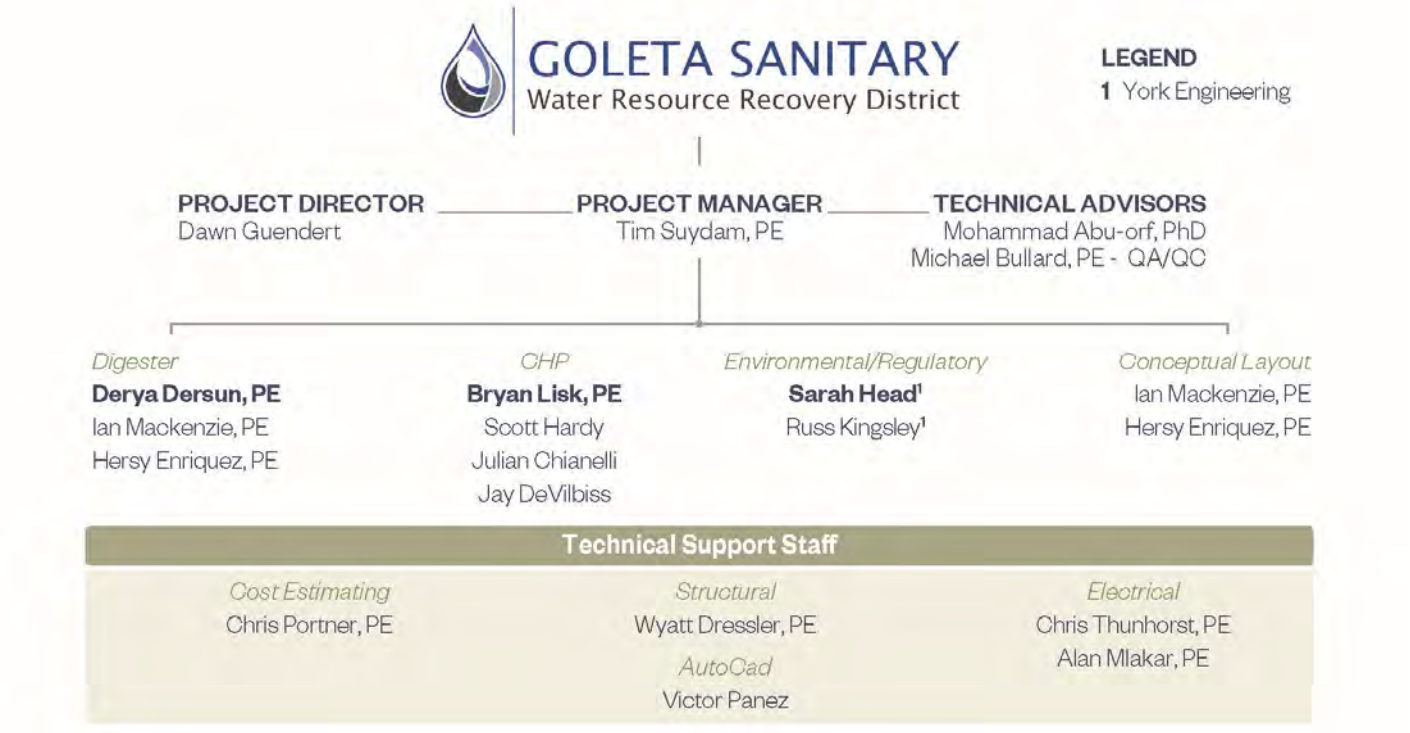
"We Have Teamed with Hazen Before"

Eastern Municipal Water District – Digester Gas Utilization Study

Coachella Valley Water District - Chromium-6 Removal Project

Organizational Chart

The Hazen team is comprised of both local and national expertise who welcome the opportunity to work on this project and further apply the knowledge we have gained of the District's treatment facility. Our project team's key personnel, led by Tim Suydam, Mohammad Abu-orf, Derya Dursun, Bryan Lisk and Ian Mackenzie have extensive experience in the evaluation and design of digesters and combined heat and power system for wastewater utilities. Our proposed organizational structure and staffing plan is shown below followed by capsule resumes of key project leaders. Detailed resumes can be found in the Appendix A.



Management Team

To ensure this project has the leadership needed to meet the project objectives on schedule and within budget, we are proposing a strong and experienced management team.

Tim Suydam, PE
Project Manager

Mr. Suydam has served as project manager for numerous major wastewater and water treatment projects. His experience ranges from planning, pre-design, design and construction management services. A number of projects have included the coordination of multi-discipline, multi-location and multi-firm teams delivering complex projects on time and within budget.

Dawn Guendert
Project Director

Ms. Guendert has extensive experience with water and wastewater projects and leads teams in operational performance efficiency improvement projects and asset management programs to help clients better manage their assets and improve productivity. Dawn serves as the Project Manager for the District's Asset Management Program and Project Director for the Biosolids and Energy Strategic Plan, Process Model and GHG Emission Baseline Inventory.

Technical Advisors

A Quality Culture is an attitude that touches the entire project team, establishes the technical and quality standards the team works to and builds on the technical experience and quality processes that guides the day-to-day work.

Technical Advisor
Mohammad Abu-Orf PhD

Dr. Abu-Orf is Hazen's National Residuals and Biosolids Practice Leader. His diverse experience ranges from research and development, project planning, preliminary design, operations and technical services. He applies his expertise to find opportunities for process optimization, evaluation of innovative technologies and conceptual design in the areas of sludge dewatering, stabilization, and energy recovery.

Michael Bullard, PE
Technical Advisor/QA-QC

Mr. Bullard is Hazen's National Residuals and Biosolids Practice Leader and has extensive experience in the full range of residuals and biosolids thickening, stabilization, dewatering, biogas utilization and treatment systems and ultimate residuals management processes from a planning, design and operational perspective.

Process and Design Leads

Our Process and Design Leads have all successfully collaborated together on projects for Goleta Sanitary District and similar wastewater treatment improvement projects, including recent projects for South Orange County Wastewater Authority (SOCWA) and San Bernardino Municipal Water Department.

Derya Dursun, PhD, PE
Process/Preliminary Design

Dr. Dursun specializes in biosolids treatment and handling and digester gas treatment and management with a focus on maximizing energy recovery. She has broad knowledge of anaerobic digestion, co-digestion, gas production and waste-to-energy facilities. Derya is currently working on several projects related to digester gas beneficial use. She is coauthor of Water Environment Federation's (WEF) Manual of Practice – Conditioning Section and Environmental Protection Agency's (EPA) Process Design Manual for Sludge Treatment and Disposal – Sludge Transport and Conveyance Section.

Ian Mackenzie, PE
Process/Preliminary Design

Mr. Mackenzie has extensive experience in the design and construction of wastewater treatment facilities. Ian was the lead design engineer for SOCWA's J.B. Latham and Coastal Treatment Plant Facilities Improvement project and is currently the design lead for the Plant 3A Biosolids Handling Improvements project for Moulton Niguel Water District.

Bryan Lisk, PE
Cogeneration

Mr. Lisk has worked on a number of alternative energy and biogas utilization projects for wastewater and water reclamation treatment facilities included the District's Biogas Utilization Preliminary Study. Bryan currently serves as Hazen's National Energy Services Lead, is a Certified Energy Manager with the Association of Energy Engineers (AEE) and has extensive experience in projects involving generating electricity from alternative renewable energy sources. These projects include Combined Heat and Power (CHP) studies and design, biogas utilization master planning, energy optimization studies and master planning, energy modeling, energy procurement optimizations, and electric utility interconnection coordination.

Sara Head
Regulatory / Permitting

Ms. Head is an experienced air quality professional with years of experience working with a number of air quality control boards, Annual Emissions Report (AER) preparation, Continuous Emission Monitoring Systems (CEMS), New Source Review (NSR) permitting and Best Available Control Technology (BACT).

Relevant Reference Projects

There are many challenges to realizing success in designing a new digester and combined heat and power (CHP) system in an existing treatment plant. Many of these challenges can be anticipated simply based on the engineering process during design. However, many challenges must be addressed based on past experience with similar projects. Hazen has designed a number of digester and CHP projects that have been successfully implemented. Relevant projects in which some of our team members participated are described on the following pages.

Broadrun Water Reclamation Facility Interim Biosolids Project

Loudoun Water, VA

Reference
Sarah Lothman
Engineering
Loudoun Water
571.291.7990
slothman@loudounwater.org

Team Members
Derya Dursun
Michael Bullard
Bryan Lisk

The Broad Run Water Reclamation Facility (BRWRF) Interim Biosolids Project expands the capacity of solids treatment process at BRWRF through the addition of two (2) anaerobic digesters. The work included addition of new tanks, supporting appurtenances, separate biogas storage, and improvements to the existing polymer feed facility within BRWRF's thickening and dewatering building.

This project consists of design and construction of an additional two new mesophilic digesters with 0.6 MG volume each to an existing facility with two existing digester tanks. The digestion new system included heating, mixing, gas collection and handling systems. Cast in Place, vertical tanks were constructed with fixed covers. Pump mixing was selected. The project also included design and construction of a new 8500 cubic foot dual membrane digester gas storage facility; and the associated electrical and computer controls upgrades that provided integration of digester gas storage into existing units.

Moores Creek Wastewater Treatment Plant Energy Efficiency Improvement

Rivanna Water and Wastewater Authority, Charlottesville, VA

As a part of the treatment plant upgrades design project for the 15-mgd Moores Creek Wastewater Treatment Plant, Hazen evaluated the energy efficiency benefits from replacing the plant's engine driven blowers with new electric high-speed turbo blowers and using excess digester gas to generate electricity. Significant gains in energy efficiency were achieved by decoupling process air production from digester heating to allow each system to be optimized independently.

Reference
Jennifer Whittaker, PE
Chief Engineer
Rivanna Water and
Wastewater Authority
(434) 977-2970
jwhitaker@rivaanna.org

Team Members
Bryan Lisk

Relevant elements of this project include:

- Replacement of dual-fuel engine driven blowers with high efficiency electric blowers
- Design and startup of a GE/Jenbacher 355 kW biogas fueled combined heat and power (CHP) system for on-site power production.
- Process modeling (BioWin) to address the process impacts from these modifications
- Installation of a hot water boiler system to increase digester system heating reliability and provide heat generation capacity to meet peak seasonal heating demands.

Hazen replaced Rivanna's engine blowers with high speed turbo blowers and installed a 355KW CHP system to lower energy demands

Process benefits included reduced supplemental carbon usage by minimizing DO carryover to unaerated zones and better digester heating control. A CHP system and boiler facility were constructed near the digesters which made more effective use of the digester gas and provided more reliable digester heating.

Roanoke Water Pollution Control Plant. Biogas Energy Recovery Facilities

Western Virginia Water Authority, Roanoke, VA

Hazen replaced WVWA's engine blowers with two 560KW biogas fueled CHP engines

Reference
S. Scott Shirley
Director of Wastewater Operations
Western Virginia Water Authority
(540) 853-1283
scott.shirley@westervawater.org

Team Members
Bryan Lisk

Hazen performed a plant-wide study for Western Virginia Water Authority to evaluate opportunities to increase plant sustainability, reduce the facilities carbon footprint, and beneficially utilize digester biogas. This project evaluated a wide range of opportunities that include changes to the electric utility service configuration opportunities and replacement of two engine driven blowers with a digester gas fueled CHP system. The study resulted in the installation of two (2) 560kW biogas fueled engine generators with heat recovery.

Relevant elements of this project include:

- Design, installation and startup of two (2) 560kW biogas fueled engine generators with heat engine and exhaust heat recovery for digester heating and activated carbon digester gas pretreatment system.

- Alternatives were assessed based on a 20-year lifecycle period considering seasonal variability in heating demands and long-term growth in gas production.
- Economic analyses were conducted accounting for the value of electrical energy produced, renewable energy credits generated, estimated O&M costs and capital investment requirements.
- Net metering negotiations and interconnection coordination with American Electric Power.
- Engineering support applying for DOE energy efficiency funding.

A goal for the project was to utilize as much existing heat recovery infrastructure as possible to control costs. This posed a significant challenge with integrating the CHP system hot water heat recovery system with the existing steam based heating system. We addressed this challenge by performing multiple on-site investigations and measurements of the existing heating loop flows and temperatures to ensure the engine heat balance was compatible with the existing digester heating system.

Southern California Edison Emergency Generator Compliance

Santa Barbara County, CA

Santa Barbara County Electrical Substation

Reference
Michelle Nuttall
Sr. Project Manager
Environmental Affairs & Sustainability
(626) 302-1677
Michelle.nuttall@sce.com

Team Members
Sara Head

In December 2015, Southern California Edison (SCE) installed a total of 41 emergency generators capable of producing a total of 79.5 megawatts (MW) of electrical generation at the Goleta, Isla Vista, and Gaviota Substation locations in Santa Barbara County. These emergency generators were installed in response to SC E's El Niño planning efforts following the prediction of severe storms during the winter and spring months (December through April) of 2015-2016. As part of a subconsultant agreement, Yorke staff was selected to assist SCE's inside and outside counsel with the identification of potential regulatory and permitting requirements prior to installation of these generators. SBCAPCD permitting requirements were reviewed, as well as CARB portable equipment registration and CEQA requirements. California's Proposition (Prop) 65 was identified as an applicable requirement and our staff worked with SCE to prepare an HRA to identify if operation of these generators for up to 3 weeks would expose the public to health risks above Prop 65 notification levels. Once the HRA was completed, Yorke staff assisted SCE with sending notification letters to the potentially affected businesses and residences.

City of Los Angeles Sanitation District, Hyperion Treatment Plant Cogeneration System Permitting

Los Angeles Department of Water and Power, Los Angeles, CA

City of Los Angeles Hyperion Wastewater Treatment Plant

Reference
James Marchese
Asst. Division Manager, Legislative and Regulatory Affairs
City of Los Angeles, Bureau of Sanitation
(213) 847-5174
Jim.Marchese@LACity.org

Team members
Sara Head
Russ Kingsley

The City of Los Angeles Bureau of Sanitation is proposing to build and operate a digester gas/natural gas-fired combined-cycle cogeneration facility within the current Hyperion Treatment Plant (HTP) boundary. The cogeneration system will combust digester gas generated at the facility in combustion turbine generators (CTGs) to generate electricity, the recovery of heat will generate steam using heat recovery steam generators (HRSGs), that steam will generate power in steam turbine generators (STGs), and the extraction of a portion of the steam will be used to meet the steam demand of the digesters.

The proposed project will provide HTP with approximately 39 MW of electrical generation and up to 50,000 lbs/hr of 30 pounds per square inch gauge (psig) saturated process steam, required by current throughput, utilizing up to three Solar Mars 100 turbines (approximately 10 MW each) and two STGs (approximately 9 MW from the two STGs). A black start diesel generator will provide startup power to the CTG if utility power is not available.

Yorke prepared emission calculations for criteria pollutants, toxic air contaminants, and greenhouse gases. Yorke used the toxic emission estimates to conduct an HRA using HARP. Yorke conducted air dispersion modeling of the criteria pollutants using AERMOD to demonstrate compliance with ambient air quality standards. All of this information was incorporated into a permit application to the SCAQMD.

Lower Reedy Water Resource Reclamation Facility

Renewable Water Resources (ReWa), Greenville, SC

Reference
Reference
Greg Wright
Engineering Director
(317) 445-6747
Gregoryw@re-wa.org

Team members
Michael Bullard

The Lower Reedy WRRF is a 11.5 mgd water resource reclamation facility (WRRF) operated by Renewable Water Resources (ReWa) outside of Simpsonville, SC. The plant includes a traditional activated sludge process with anaerobic digestion of primary and secondary solids. The original digestion facility included one 1.5 MG digester that has remained in continuous operation since it's construction in 1998. ReWa contracted Hazen to evaluate the existing digestion facilities and to make recommendations for improvements to operation, maintenance and redundancy to meet the long-term needs of the facility.

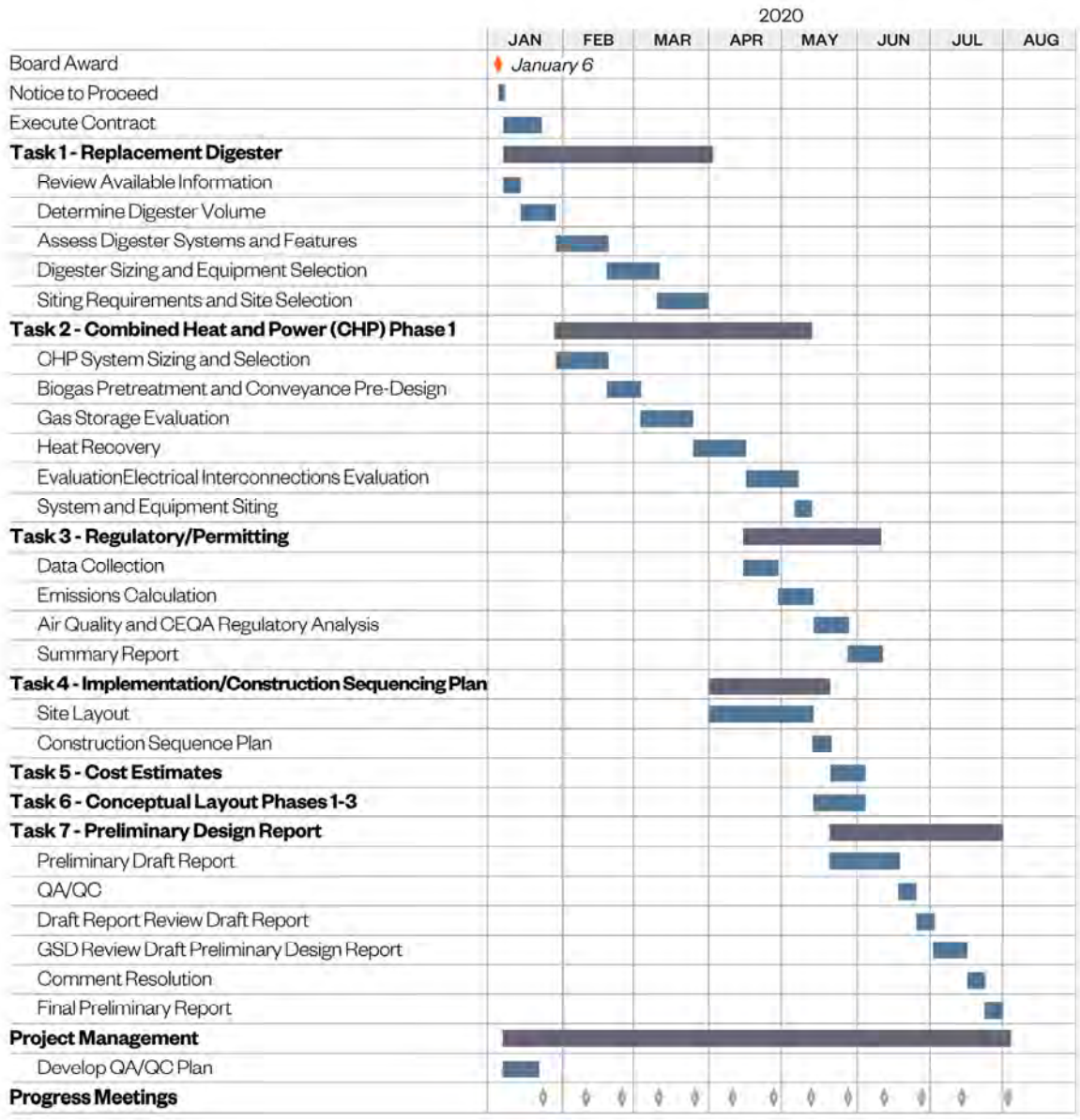
Relevant aspects of the project include:

- Added one new fixed cover anaerobic digester
- Heating and mixing improvements
- Phased project to rehab the existing digester
- New membrane gas storage
- Low emission waste gas flare

Schedule

Our schedule is designed to support our methodical and collaborative approach to the Biosolids and Energy Phase 1 Implementation. Findings and recommendations will be presented and time is allowed for District review provide feedback and decisions.

As shown in the schedule below, we estimate the duration of this project to be approximately 8 months from Notice to Proceed.



Fee

The fee schedule below will provide you with a breakdown of all phases of the project by task, team member, including our subconsultant Yorke Engineering, and hours. Our fee also includes an estimated $7,000 in Other Direct Costs (ODCs) to cover travel costs for attending workshops.

		Project Director	Project Manager	Technical Advisor/QA/QC	Associate Process Designer	Senior Associate Process Designer	Technical Lead Cogneration	Engineer	Senior Electrical Engineer	Senior CHP Engineerr	Senior CHP Engineerr	Cogeneration Scientist	Senior Principal Engineer	Structural Engineer	Cost Esitmator	Auto CAD	Total				Yorke Engineering LLC	Grand Total
		Dawn Guendert	Tim Suydam	Mohammad Abu-Orf Michael Bullard	Derya Dursun	Ian Mackenzie	Bryan Lisk	Hersy Enriquez	Chris Thornhurst	Scott Hardy	Julian Chianelli	Jay Devilbiss	Alan Mlakar	Wyatt Dressler	Chris Portner							
No.	Task	$245	$245	$245	$195	$245	$245	$150	$245	$245	$245	$160	$195	$185	$185	$125	Hours	Labor	ODCs	Total		
1	Replacement Digester																307	$ 56,125	$ 3,000	$ 59,125	$ -	$ 59,125
1.1	Review Available Information	1	1	1	3	3		4									13	$ 2,655		$ 2,655		
1.2	Determine Digester Volume			2	16	0		36		8							62	$ 10,970		$ 10,970		
1.3	Assess Digester Systems and Features			2	16	8		36		8							70	$ 12,930		$ 12,930		
1.4	Digester Sizing and Equipment Selection			8	16	8		36		8							76	$ 13,910	$ 3,000	$ 16,910		
1.5	Siting Requirements and Site Selection		2	2	16	8		36		8				4		12	88	$ 15,650		$ 15,650		
	Task 1 Totals	1	3	13	67	27	0	148	0	32	0	0	0	4	0	12	307					
2	Combine Heat and Power (CHP) Phase 1																360	$ 72,420	$ 3,000	$ 75,420	$ -	$ 75,420
2.1	CHP System Sizing and Selection			2			10			10	10	20					52	$ 11,040		$ 11,040		
2.2	Biogas Pretreatment and Conveyance Pre Design			2			10			10	10	20					52	$ 11,040		$ 11,040		
2.3	Gas Storage Evaluation			2			10			10	10	20					52	$ 11,040		$ 11,040		
2.4	Heat Recovery Evaluation			2			10			10	10	20					52	$ 11,040	$ 3,000	$ 14,040		
2.5	Electrical Interconnections Evaluation								0				36			30	66	$ 10,770		$ 10,770		
2.6	System and Equipment Siting		2				12		8	12	12	12	8	4		16	86	$ 17,490		$ 17,490		
	Task 2 Totals	0	2	8	0	0	52	0	8	52	52	92	44	4	0	46	360					
3	Regulatory/Permitting																16	$ 3,920	$ -	$ 3,920	$ 15,486	$ 19,406
	Data Collection	2	2														4	$ 980		$ 980	$ 2,212	
	Emissions Calculations	2	2														4	$ 980		$ 980	$ 2,655	
	Air Quality and CEQA Regulatory Analysis	1	1														2	$ 490		$ 490	$ 5,531	
	Summary Report	1	1	4													6	$ 1,470		$ 1,470	$ 6,088	
	Task 3 Totals	6	6	4	0	0	0	0	0	0	0	0	0	0	0	0	16					
4	Implementation/Construction Sequencing Plan																100	$ 19,620	$ 500	$ 20,120	$ -	$ 20,120
	Site Layout	2	2	2	4		4	4	2	4	4	4	4	4		20	60	$ 10,940	$ 500	$ 11,440		
	Construction Sequence Plan	2	2	6	4		4	4	2	4	4	4	4				40	$ 8,680		$ 8,680		
	Task 4 Totals	4	4	6	8	0	8	8	4	8	8	8	8	4	0	20	100	$ 8,640		$ 17,660		
5	Cost Estimates																76	$ 14,920	$ -	$ 14,920	$ -	$ 14,920
	Cost Estimates	2	2	4	2	2	2	0	2						60		76	$ 14,920		$ 14,920		
	Task 5 Totals	2	2	4	2	2	2	0	2	0	0	0	0	0	60	0	76					
6	Conceptual Layout Phases 1-3																120	$ 21,460	$ -	$ 21,460	$ -	$ 21,460
	Phase Layouts	2	2	4	8	8	8	16	4	4	4	4	8	8		40	120	$ 21,460		$ 21,460		
	Task 6 Totals	2	2	4	8	8	8	16	4	4	4	4	8	8	0	40	120					
7	Preliminary Design Report																342	$ 68,690	$ 500	$ 69,190	$ -	$ 69,190
7.1	Preliminary Draft Report	4	4		24	12	24	40	24	12	12		24	4	12	36	232	$ 45,360	$ 500	$ 45,860		
7.2	QA/QC Pre-Draft Report	4	4	16													24	$ 5,880		$ 5,880		
7.3	Draft Report				8	6	8	12	2	2	2		2		2	12	56	$ 10,520		$ 10,520		
7.4	GSD Comment Resolution	4	4	8	8	4	4		2				0				30	$ 6,560		$ 6,560		
7.5	Final Preliminary Design Report													2			2	$ 370		$ 370		
	Task 7 Totals	12	12	20	36	22	36	52	28	14	14	0	28	6	14	48	342					
PM	Project Management Services																64	$ 15,680	$ -	$ 15,680	$ -	$ 15,680
	Develop QA/QC and Comment Resolution Plan		4	4													8	$ 1,960		$ 1,960		
	Develop Project Plan		8														8	$ 1,960		$ 1,960		
	Subconsultant Management	4	4														8	$ 1,960		$ 1,960		
	Progress Reports	12	12														24	$ 5,880		$ 5,880		
	Progress Meetings	8	8														16	$ 3,920		$ 3,920		
	Task Project Management	24	36	4	0	0	0	0	0	0	0	0	0	0	0	0	64		$ -			
	Subtotal Labor	51	67	65	121	59	106	224	46	110	78	104	88	26	74	166	1,385	$ 272,835	$ 7,000	$ 279,835	$ 15,486	$ 295,321

Appendix: Resumes

Dawn Guendert

Project Director

Ms. Guendert uses her extensive experience with water and wastewater systems to lead teams in all elements of asset management including asset inventory, condition assessment, risk assessment, operational performance efficiency improvement, and implementation of asset management programs to help clients better manage their assets, understand future funding needs, and improve productivity.

Education

BA, Political Science, University of California, San Diego

Areas of Expertise

- Advanced Water and Wastewater Treatment
- Desalination
- Operational Efficiency
- Asset Management Strategic Plan

Professional Activities

American Water Works Association

Asset Management Plan, Goleta Sanitary District, Goleta, CA
Leading a phased approach to the development of an asset management program for Goleta Sanitary District's wastewater treatment plant, water reclamation plant, collection system and ocean outfall. Project includes staff training, a pilot project expandable District-wide, development of an asset management implementation plan and assistance with integration of the asset management plan with a new Computer Management Maintenance System (CMMS).

10-Year Capital Improvement Plan, Goleta Sanitary District, Goleta, CA
Project Director. Assisting the Project Manager is the development of a 10-year CIP utilizing the outcome of the projected rehabilitation and replacement projects identified in the Asset Management Plan AMP and incorporating new projects. Dashboards will be developed to integrate both the AMP and CIP.

Water Reclamation Facility 1110.2 Resultant Projects, City of San Bernardino Municipal Water Department, CA
The City of San Bernardino Municipal Water Department (SBMWD) produces digester gas (DG) from the anaerobic digestion process and beneficially utilizes that gas as a fuel source for engines and boilers. The air quality regulatory agency has amended regulations, Rule 1110.2, in efforts to reduce oxides of nitrogen, volatile organic compounds and carbon monoxide from stationary emission sources (like engines and flares). Hazen assisted SBMWD with design of beneficial reuse of DG and alternatives for improvements necessary to meet the Rule 1110.2 amendments. The design included a DG storage facility that will serve to accumulate DG and maintain a more constant gas supply for the proposed fuel cell and reduce wasting DG to the flare system. The evaluation included review of DG storage alternatives, future DG production, and impacts of DG

Publications

Greg Finlayson, David de Haas, Dawn Guendert, "Comparing Desalination and Recycling for Water Supply Augmentation", International Desalination and Water Reuse Quarterly, 2014

Al Bazzi, Slavica Hammond, Kenneth Redd, Michael Sarullo, Roshanak Aflaki , Dawn Guendert; "Microfiltration and Reverse Osmosis Membrane Replacement Understanding Operating Process Data and Autopsy Data Projection of Useful Remaining Life"; presented at WEFTEC 2011

Robert Huehmer, Lisa Henthorne, Dawn Guendert, "Increasing MF/UF Reliability in Seawater Desalination Pretreatment Applications using Enhanced Pre-filtration", presented at IDA World Congress, Singapore 2005

Dawn Guendert; "Orange County's Innovative Water Reuse Project to Purify 70 mgd in 2007", AWWA Journal, July 2004

Dawn Guendert, Ed Jordan; "Urban Reuse: Bringing Water Treatment Where It's Needed Most"; AWWA Journal, June 2004

Kevin Alexander, Dawn Guendert, Tom Pankratz, "Comparing MF/RO Performance on Secondary and Tertiary Effluents in Reclamation Applications", presented at IDA Conference, Bahamas 2003

Dawn Guendert, "Carmichael Bajamont Way WTP Treats Backwash to Maximize Recovery and Minimize Waste Disposal", AMTA Journal, Fall 2004

Marek Mierzejewski, Dawn Guendert, "Membranes for Reuse: Industrial Applications using Microfiltration as RO Pretreatment", Ultrapure Magazine, October 2004

Dawn Guendert, "Case Study" Bendigo – 33 MWD WTP Successfully Meets the Challenge"; AMTA Journal, Spring 2004

Dawn Guendert, "Membrane Filtration Conquers Water Quality at Australian Plant, Water & Wastewater Asia Journal, 2004

Dawn Guendert, "Utility Turns to Integrated Membrane System for Wastewater Reclamation, "Water World Magazine, March 2003

production due to fats, oils and greases. The DG storage was effectively designed in coordination with fuel cell manufacturers and flare system improvements including a new ultra-low emission flare.

Coastal Treatment Plant Facility Plan Improvements Engineering Services, South Orange County Wastewater Authority, Dana Point, CA
Project Director. This project included the design of substantial upgrades, repairs and replacement to the aeration, electrical and other systems that are critical to maintaining operation of the facility.

Piedmont Creek Asset Management Plan, Santa Clara Valley Water District, Santa Clara, CA
Leading a team that is utilizing Santa Clara Valley Water District's (SCVWD) watershed assessment management plan as a foundation for developing an asset management plan (AMP) for Piedmont Creek by utilizing the USEPA 10-step asset management planning model (AMPM). The project includes updating the asset register, documenting the status of the assets, identifying the critical assets, developing strategies to manage the assets and projecting future investments required for Piedmont Creek to provide flood risk management within the watershed. GIS mapping (including photo links where possible) was used for ease of exhibit creation for decision-makers use and public review.

Asset Management As-Needed Services Contract, Otay Water District, Spring Valley, CA
Principal-in-Charge. As part of Otay Water District's (OWD) Asset Management On-Call Contract, Hazen conducted an asset management data gap analysis and developed a data gap closure strategy. Benefits derived from the consolidation of the assets owned and managed by OWD in a centralized asset register included improved quality of asset information for operational and strategic asset management decisions, enhanced business process efficiency, improved customer service in providing accurate asset information, reduced capital and maintenance costs by effectively managing infrastructure assets.

Vertical Facilities Asset Inventory and AM Framework Pilot Project, Moulton Niguel Water District, Laguna Hills, CA
Led a team that developed an asset register framework and populated it with asset data, conducted a condition assessment and determined remaining useful life of facilities selected for the pilot project.

Sewer Pipelines Rehabilitation Prioritization Plan and Guidance Document, Moulton Niguel Water District, Laguna Hills, CA
Led the development of a risk methodology and risk model for the prioritization of repair and rehabilitation (R&R) of the District's sewer pipelines and a decision tree and guidance document for selection of the most appropriate rehabilitation method.

Tim Suydam

Project Manager

Mr. Suydam serves as Hazen and Sawyer's West Coast Design-Build Lead. He has over 30 years of experience in recycled water, wastewater and drinking water projects. He has spent the last 20 years specializing in alternative procurement of drinking water projects in the San Diego Region. He also specializes in treated water quality, has significant experience in groundwater and soil remediation, and industrial wastewater permitting and treatment.

Education

B.S., Chemical Engineering, University of California, San Diego, CA

Certification/License

Professional Engineer

Areas of Expertise

- Water Treatment
- Design-Build
- Construction Management
- Remediation

Technical Publications & Presentations

Weinberg, Ken, Yamada, Robert, Callahan, Neil V., Bianes, Vic, Chamberlain, Dave, Suydam, Tim, Eaton, Gary, San Diego County Water Authority. "Integrating Desalinated Seawater with existing Supplies and Delivery Systems." American Water Works Association,- Journal, February 2014, Volume 106, Issue 2.

Jesus Garcia-Aleman, CH2M Hill, 2012, Tim Suydam, San Diego County Water Authority, James Lozier, CH2M Hill, 2012, Brian MacDonald, CH2M Hill 2012, Jim Imrie, GE Water Technologies, Eric Savage, GE Water Technologies, 2012. "Treatment Optimization to Address Water Quality Challenges in a ZLD Scheme—5 Years of Operation of the Twin Oaks Valley WTP" to be presented at the AMTA/ AWWA 2013 Membrane Technology Conference, February 2013.

Ufuk Erdal, CH2M Hill, 2012, Tim Suydam, San Diego County Water Authority, James Lozier, CH2M Hill, 2012. "A Comprehensive Bench-Scale Study to Evaluate Chloramine Stability and DBP Formation for the Desalinated Seawater and Blends of Desalinated Seawater and Treated Surface Water"

Carlsbad Desalination Plant, San Diego County Water Authority; San Diego, CA

As Water Quality Operations Manager, Commissioning and Design-Build Lead for the Design-Build-Operate-Own-Transfer (DBOOT) 54 mgd Carlsbad Desalination Plant negotiated design, construction and water quality requirements with Poseidon Resource Corporation for the Water Purchase Agreement. Oversaw design and construction for the desalination plant and ensured successful commissioning and integration into the Water Authority's Aqueduct System.

TOVWTP Desalination Upgrades, San Diego County Water Authority, San Diego, CA

Based on knowledge and experience of Tampa Bay Water's DBOOT desalination project a chloramine decay and mixing study was implemented. The results of this study led to chloramine boosting and treated surface water mixing facilities to minimize/eliminate the effects of chloramine decay resulting from high bromide levels in desalinated seawater. Responsible for planning, drafting, executing a change order to the TOVWTP DBO Service Contract to implement a capital modification to accept, blend and process desalinated seawater from the Carlsbad Seawater Desalination Facility. This change order included piping to connect to the Water Authority's Pipeline 3 to the TOVWTP clearwells, chlorine and ammonia dosing systems to boost chloramine, monitoring systems, associated operations and maintenance, and revisions to the monthly invoicing. To date no issues with chloramine decay have been encountered and the Carlsbad desalinated seawater has been successfully integrated into San Diego regional supplies.

Hazen

to be presented at the AMTA/AWWA 2013 Membrane Technology Conference, February 2013.

T. Suydam, San Diego County Water Authority, San Diego, CA. (AWWA). Standards Committee on Membranes: American Water Works Association/ American National Standards Institute, Membrane Systems Standard, B110-09, March 1, 2010.

Tim Suydam, Senior Engineer, San Diego County Water Authority, John Economides, Director of Engineering, San Diego County Water Authority, Jerome B. Gilbert, Consulting Engineer, 2007. "Managing a Large Alternative Procurement: Optimizing Treatment Plant Delivery in the 21st Century" presented at the AWWA Annual Conference and Exposition, June 2007.

Ashley Currey, P.E., CH2M HILL, Tim Suydam, P.E., San Diego County Water Authority, Dan Wetstein, P.E., CH2M HILL, 2007. "World's Largest UF Facility a Model of Efficiency and Sustainability" presented at the AWWA Annual Conference and Exposition, June 2007.

Jesus Garcia-Aleman, P.E., CH2M HILL; Tim Suydam, P.E., San Diego County Water Authority; Jeremy Crutchfield, San Diego County Water Authority; Dan Wetstein, P.E., CH2M HILL; James Lozier P.E., CH2M HILL, 2007. "From 0 to 100-MGD in 30 Months - How the San Diego County Water Authority is Implementing the Largest Ultrafiltration Membrane Water Treatment Plant at Twin Oaks Valley with the Design-Build-Operate Process" presented at the AWWA Membrane Technology Conference, March 2007.

Zaid Chowdhury, Tim Suydam, Sunil Kommineni and Rich Pyle, 2005. "Process and Planning Considerations for a Zero Liquid Discharge Low-Pressure Membrane Treatment Plant" presented at the AWWA Annual Conference and Exposition, June 2005.

Suydam, T.A., R. Pyle, Z. Chowdhury, and S. Kommineni, 2004. "Comparison of Conventional and Membrane Technologies for Surface Water Treatment" presented at the American Water Works Association 2004 Water Quality Technology Conference. November 14 – 18, 2004. San Antonio, Texas.

Design Build Operate Twin Oaks Valley Water Treatment Plant, San Diego County Water Authority, San Diego, CA

Project Manager for the Design-Build-Operate Twin Oaks Valley Water Treatment Plant Project: Managed all aspects of schedule, budget, and scope for this capital improvement at the Water Authority, including a project team of more than 10 people. This project was delivered on-time and under budget by approximately $8 million. Management included retaining an Owner's Advisor consultant, Hawkins, Delafield, Wood as outside legal counsel and a Board of Senior Consultants, conducting conventional and membrane WTP conceptual designs, submerged membrane and DAF pilot testing, surveying, CEQA documentation, significant public outreach, due diligence evaluation for membrane treatment plants, due diligence evaluations for alternative procurement, DBO solicitation (RFQ/RFP), property acquisition, legal coordination, coordination with eight other departments within the Water Authority, coordination with California Department of Public Health to permit the Water Authority's entire system and the WTP, coordination with SDG&E, Deer Springs Fire Protection District and Vallecitos Water District. In order to manage this project a very strong understanding of principles of alternative procurement including design-build and design-build-operate and water treatment processes was required. Project management also included significant interaction with and presentations to the Water Authority's Board of Directors. An Ad Hoc Committee of the Board provided guidance to project staff during contract negotiations. Numerous presentations were provided to the Board of Directors and ultimately led to DBO contract approval on schedule. Subsequent to contract approval management included design reviews, submittal reviews, construction administration, claims administration, change orders, permitting, and coordination with all internal and external stakeholders for successful project implementation and resolution of all claims.

Mohammad M. Abu-Orf, PhD

Technical Advisor

Dr. Abu-Orf "Mo" is Hazen's Residuals Group Practice Leader and has over 25 years of experience in the areas of solids dewatering, drying, stabilization, and energy recovery.

Education

PhD, Environmental Engineering, University of Delaware

MS, Environmental Engineering, University of Delaware

BS, Civil Engineering, Birzeit University, West Bank, Palestine

Areas of Expertise

- Residuals
- Biosolids master planning
- Process optimization
- Sludge dewatering
- Energy recovery

Technical Publications

Five patents as the main inventor
More than 125 peer-reviewed and conference publications, and book chapters

Co-author of the fifth edition of the textbook "Wastewater Engineering: Treatment and Resource Recovery," published by McGraw Hill, October 2014

Projects experience involve directing biosolids master planning, biosolids management plans, preliminary and conceptual design of recommended processes, and applying innovative biosolids processing technologies that provide cost effective solids processing, and high quality product. Mo's experience also includes academia, research and development and providing high technical services for a major wastewater private operating corporation. Dr. Abu-Orf has more than 120 publications and 5 patents to his credit. Dr. Abu-Orf co-authored the Fifth Edition of the Textbook "Wastewater Engineering: Treatment and Resource Recovery," published by McGraw Hill in 2014.

Biosolids and Energy Strategic Plan, Goleta Sanitary District (GSD), Goleta, CA
Technical Director responsible for evaluating high strength waste available for co-digestion at GSD (Phase I) and assessing plant capacity for additional solids loading to anaerobic digesters (Phase II). In addition, the subsequent work from Phase I and II evaluates various technology to enhance digestion and biogas production. The project ultimately leads to developing a strategic plan for GSD in handling biosolids to meet future state regulatory requirement. Additional roles include conducting field interview for market assessment for biosolids residuals from GSD.

Broward County North Regional WWTP Facility Improvements, Broward Water and Wastewater Services, FL
Quality Control Reviewer. Provided quality control review services for the current design of the Phase III (3) Solids project, with an estimated construction cost of $64 million. Improvements include replacement of aging solids thickening, digestion and dewatering equipment, and facilities. The design consists of rehabilitation of the existing, dissolved air flotation system equipment, replacement of five anaerobic digester covers, digester gas mixing systems and piping, and replacement of three belt filter dewatering presses with new belt presses and/or centrifuges

Beneficial Use of Digester Gas at Regional Water Reclamation Facilities, Eastern Municipal Water District, CA
QA/QC for the biogas utilization study.

Hazen

East Central Regional WWTP, East Central Regional Operations Board, West Palm Beach, FL

Startup Senior Technical Advisor. Provided technical assistance of the startup of the of two-phase, temperature-phased anaerobic digestion (TPAD). TPAD digestion operates as a thermophilic-mesophilic digestion system, or alternatively can operate in conventional all mesophilic mode. Facilities included two fixed-cover thermophilic digesters and four floating cover mesophilic digesters. Digester heating accomplished with hot water boilers and external tube-in-tube heat exchangers and sludge-to-sludge heat recovery HEX units. The project also included rehabilitation of existing GBT thickening building and installation of a new dewatering facility including high solids centrifuges and FOG and Septage receiving and handling facilities.

San Francisco Public Utilities Commission, Program Management and Owner's Representative, San Francisco, CA

Three main responsibilities.

- **Biosolids Facility Design Project, Southeast Plant.** Since the selection of the design team for the biosolids project at the Southeast plan in November 2013, responsibilities include: 1) reviewing documents produced by the design team and provide comments for the SFPUC engineering staff, and 2) participating in meetings and decision making workshop for reviewing and selecting biosolids process alternatives.
- **South East Plant Biosolids Project, Preplanning Task Orders, San Francisco, CA.** Overall technical Director for the four biosolids project planning tasks, 1) Biosolids Project Needs Assessment, 2) Biosolids End Use Market Study, 3) Biogas Beneficial Use Study and 4) Project Description. Lead the technical and economic feasibility assessment of co-digesting high strength waste (Fats oils, and grease, green bin and black bin) with the new biosolids diges-tion facility.
- **San Francisco Public Utilities Commission, Evaluation and Validation of Sewer System Improvement Program, San Francisco, CA.** Technical Director and Task Leader for the biosolids process evaluation and program validation for the San Francisco Public Utility Commission Sewer System Improvement Program. The process evaluation includes reviewing capacity of solids processes at the Bayside and Oceanside Plants including thickening, digestion, and dewatering, and recommending short term process improvement until the biosolids new facility is implemented. Program validation includes evaluating the existing biosolids program management plan and validating long term recommendations.

PAR 1304 2018 Facility Plan, Metro Wastewater Reclamation District, Denver, CO

Technical Director for Solids Stream Processes. Served as a technical director on the 2018 Facility Plan focused on the identification and evaluation of solid stream process alternatives at the 220 mgd Robert W. Hite Treatment Facility (RWHTF) and the 24 mgd Northern Treatment Plant (NTP). Identified with MWRD stakeholders' innovative solutions to capacity constraints and developed a vision toward the future that will provide the greatest benefit to MWRD and their customers. The Facility Plan is a District-wide planning document that encompasses the collection system, treatment plants, and biosolids land application facilities. It was created to identify improvements necessary to meet the planning and regulatory drivers for a 20-year planning period and beyond.

Charleston Water Systems Biosolids Master Plan, Charleston SC

Technical Director. Providing technical direction to the various aspects of the biosolids master plan at the Plum Island WWTP. The plan includes end-use market study for the various biosolids products and addressing immediate needs for the solids processing system, focusing on new dewatering building and technologies. Near-term planning includes evaluating anaerobic digestion, Class A production with Schwing Bioset and Lystek thermochemical hydrolysis. Long-term planning includes evaluating thermal hydrolysis pretreatment to anaerobic digestion, Schwing Bioset lime stabilization, thermal drying, and Lystek thermochemical hydrolysis.

Michael Bullard, PE

Technical Advisor

Mr. Bullard is a national expert in digester gas generation, biogas storage and utilization, as well as, residuals management processes from a planning, design, and operational perspective.

Education

MCE, North Carolina State University

BSCE, North Carolina State University

Certification/License

Professional Engineer

Areas of Expertise

- Residuals and biosolids management
- Digester gas utilization and energy production
- Wastewater treatment facility design
- Wastewater operations process optimization

Professional Activities

Water Environment Federation

- Residuals and Biosolids Committee (Active)
- Specialty Conference Planning Group (2012-2013)

Technical Practice Committee

- MOP-11 – 4th Edition (Reviewer)
- MOP-11 – 5th Edition (Chapter Author)
- WEFTEC Program Committee
- Facility Operations Symposia: 2002-08 (Past Chair)
- Residuals and Biosolids Symposia – 2008 - Current

East Central Regional WWTP Solids Handling Improvements, City of West Palm Beach, FL

Senior Technical Advisor and QA/QC Review. Work included facilities for recapitalization and expansion of gravity belt thickening; installation of new temperature phased (thermophilic – mesophilic) anaerobic digestion stabilization infrastructure to replace aerobic stabilization process infrastructure; new high solids centrifuge dewatering to replace belt filter press dewatering along with FOG and septage receiving and handling facilities.

Hominy Creek WWTP Solids Handling Facility Upgrades, City of Wilson, NC

Project Engineer. Project at the 17-mgd WWTP included gravity belt thickener mechanical thickening for waste activated sludge stream; rehabilitation of existing anaerobic digestion facilities including new digester gas utilization facilities, digester heating and pumping, and mixing systems; and installation of belt filter press sludge dewatering facilities with a Class A alkaline stabilization unit treatment process.

East Central Regional WWTP Biosolids Master Plan Update, City of West Palm Beach, FL

Senior Technical Leader and Engineer. Preparation of an updated biosolids management master plan. Work included the development of raw sludge generation rates for liquid treatment train process configurations both with and without primary clarification for a range from process flow rates from 45 to 70 mgd process flow rates. Solids handling alternatives for thickening, digestion, dewatering and ultimate disposal were evaluated for the full range of process configurations and flow conditions, stabilization alternatives, energy recovery alternatives, and ultimate disposal resulting in the assessment of over 25 different combinations of solids handling and management configurations. The resultant recommended facilities included retaining activated sludge treatment without primary clarification; a recapitalization and expansion of gravity belt thickening; installation of new anaerobic digestion stabilization infrastructure to replace aerobic stabilization process infrastructure; new high solids centrifuge dewatering to replace belt filter press dewatering; and on-site thermal drying.

Hazen

Technical Papers

Bullard. C. M., Lisk, B. R, and Hardy, S. A., *On-site Energy Production: using Digester Gas in Combined Heat and Power Systems*, Indiana Water Environment Association 76th Annual Meeting, Indianapolis, IN, November, 2012

Bruton, T., Bullard, C. M., Rogers, P., Hardy, S. A., Latimer, R. L., and Porter, R., *Debottlenecking Anaerobic Digester Capacity – Sometimes WAS Thickening Isn't Enough*, Proceedings of the 2012 Water Environment Federation Technical Exposition and Conference (WEFTEC-2012), New Orleans, LA, October 2012

Bullard, C. M. and Van Horne, M. A., *Coming Full Circle: Moving Wastewater Treatment Plants Toward Energy Neutrality*, 2012 Kentucky-Tennessee Water Professionals Conference, Memphis, TN, July 2012

Rohrbacher, J. A., Lisk, B. R., Bullard, C. M., Whitaker, J., Wichser, R. C. , and Frederick, T., *Digester Gas Energy Recovery – Deciding Between Driving Blowers or Making Electricity*, Proceedings of the 2012 WEF Residuals and Biosolids Specialty Conference, Raleigh, NC, March 2012

Lisk, B. R., Dodson, J. J., and Bullard, C. M., *Coordinating Utility Billing Structures to Maximize the Benefit from Biogas Fueled Combined Heat and Power Systems*, Proceedings of the 2012 WEF Residuals and Biosolids Specialty Conference, Raleigh, NC, March 2012

Van Horne, M, Grandstaff, J., Chapman, M., Stone, A. L., Bullard, C. M., Peplinski, D, Long, H., *From Grease to Green: FOG Receiving, Co-Digestion and Combined Heat and Power Generation at the Henrico County, VA Water Reclamation Facility*, 2011 Chesapeake Water Environment Association "TRICON 2011" Meeting, Ocean City, MD, August 2011.

Van Horne, M., Bruton, T., Hardy, S., Bullard, C. M., and Long, H., From Grease to Green: Two Case Studies of FOG Receiving, Co-Digestion, and Combined Heat and Power Generation, Proceedings of the 2011 Water Environment Federation (WEF) Energy and Water Conference, Chicago, IL, August 2011.

M'Kean Maffitt WWTP Improvements and Expansion, Cape Fear Public Utility Authority, Wilmington, NC

Senior Technical Advisor and QA/QC. Detailed design of solids handling facilities for expansion to 24 mgd. Project included rehabilitation of existing digesters and construction of new anaerobic digestion facilities; digester gas utilization facilities; and a combined thickening and dewatering facility for centralized solids processing operations.

Henrico County WWTP Digester Gas Utilization Evaluation, Henrico County, VA

Senior Technical Advisor and QA/QC Reviewer. Evaluation of digester gas utilization and FOG receiving and handling facilities for the 75-mgd WWTP. Evaluated digester gas utilization alternatives with and without additional digester gas derived from FOG receiving and handling. Estimated that electrical power production of up to 1,600 kW could be reasonably developed on the treatment facility site with existing anaerobic digestion infrastructure.

F. Wayne Hill WRC Digester Gas Utilization Project, Gwinnett County, GA

Senior Technical Advisor and QA/QC. Development of a 2.145 MW combined heat and power at the 60-mgd that was delivered as a D/B project. Project included digester gas sampling and analysis, digester gas treatment for hydrogen sulfide and siloxane removal in addition to the engine-generator system and integration with existing digester heating infrastructure. A separate project included the design and construction by the same D/B team of a FOG and high strength waste receiving facility.

Village Creek WWTP Solids Handling and Treatment Upgrades, Jefferson County, AL

Senior Technical Advisor and QA/QC. Work included the design of a new FOG receiving system, new digester hot water boiler system building, new digester heating and mixing system improvements retrofitted into an existing digester control building facility, digester gas handling system improvements, and anaerobically digested sludge dewatering system improvements.

James A. Loughlin (Northside) WWTP Digester Gas Utilization Study, CFPUA, Wilmington, NC

Project Engineer. Evaluated multiple process configurations for digester gas utilization and determined that development of a combined-heat and power process configuration provided the best return on invested capital. Recommended development of up to 350kW on-site generation capacity.

Derya Dursun Balci, PhD, PE

Digester Lead

Dr. Dursun has over 15 years of experience as an environmental engineer. She has broad knowledge of solid/ liquid separation techniques for water and wastewater treatment. Her environmental expertise spans from advanced treatment technologies to process modeling.

Dr. Dursun has provided detailed process design for water and wastewater treatment plants, onsite testing and optimization studies by using process models, particularly the BioWin® process modeling, including anaerobic digester modeling and mass balances. She has several publications on conditioning and dewatering of biosolids, which include peer, reviewed papers, and presentations at scientific conferences, a thesis, and a PhD dissertation. She is also coauthor of Water Environment Federation's (WEF) Manual of Practice Conditioning Section and Environmental Protection Agency's (EPA) Process Design Manual for Sludge Treatment and Disposal – Sludge Transport and Conveyance Section.

Goleta Biosolids & Energy Strategic Plan, Goleta Sanitary District, Goleta, CA

Dr. Dursun was task lead for Biosolids Plan working in collaboration with energy group. She has evaluated High Strength Waste availability and conducted capacity assessments for 10 mgd facility for current and future demands including high strength waste additions. As the assessment engineer, she has conducted the analysis of organic waste sources and evaluating various alternatives for energy production.

Water Reclamation Facility 1110.2 Resultant Projects, City of San Bernardino Municipal Water Department, CA

Dr. Dursun is leading the Flare Replacement task working to enhance Digester Gas Management in the facility and meet ultra low emission (ULE) limits proposed in Rule 1118.1. She has evaluated current and future digester gas generation for 30 mgd facility and also impact of including high strength waste addition. Her tasks included identifying the design criteria for the ULE flares, evaluating the location for a new flare and also determining the upgrades in the existing digester gas system.

Education

Ph.D, Civil/Environmental Engineering, University of Delaware, Newark, DE

M.S., Environmental Engineering, Dokuz Eylul University, Izmir, Turkey

B.S., Environmental Engineering, Dokuz Eylul University, Izmir, Turkey

Certification/License

Professional Engineer

Areas of Expertise

- Solid/liquid separation
- Wastewater treatment
- Biosolids management

Professional Activities

Water Environment Federation (WEF)

International Water Association (IWA)

Book Chapters

Coauthor of Water Environment Federation's (WEF) Manual of Practice – Conditioning Section (2010)

Coauthor of Environmental Protection Agency's (EPA) Process Design Manual for Sludge Treatment and Disposal – Sludge Transport and Conveyance Section (2012)

Hazen

Refereed Journals

Dursun D., Ozkul S., Yuksel R., Unalan E. (2016) Enhancing capacitive deionization technology as an effective method for water treatment using commercially available graphene. Water Science and Technology 76(8),

Ebil M.T., Dursun D., Dentel S. K. (2014). Enhancement of Odor Removal and Dewaterability of Anaerobically Digested Sludge by Protease Addition. Journal of Residuals Science and Technology 11 (2), 55-64.

Dentel, S.K., Dursun, D. (2009). Shear Sensitivity of Digested Sludge: Comparison of Methods and Application in Conditioning and Dewatering. Water Research 43, 4617-4625.

Dursun D., Dentel S.K. (2009). Toward the Conceptual and Quantitative Understanding of Biosolids Conditioning: The Gel Approach. Water Science and Technology 59(9), 1679-1685.

Dursun D., Dentel S.K. (2007). The importance of structural and gel fractions in determining shear sensitivity of sludge. Water Science and Technology 56(9), 75-86.

Dursun, D., Turkmen, M., Abu-Orf M., Dentel S.K. (2006). Enhanced Sludge Conditioning by Enzyme Pretreatment: Comparison of Laboratory and Pilot Scale Dewatering Results. Water Science and Technology, 54(5), 33-41.

Dursun, D., Sengul, F. (2006). Waste Minimization Study in a Solvent Based Paint Manufacturing Study. Resources, Conservation and Recycling, 47(4), 316-331.

Dursun, D., Ayol, A., Dentel, S.K. (2004). Physical Characteristics of a Waste Activated Sludge. Water Science and Technology, 50 (9), 129-136.

Dr. Derya Dursun also has over 30 conference proceedings presented at international conferences.

East Central Regional Water Reclamation Facility Biosolids Improvement Project, West Palm Beach, FL

Dr. Dursun provided technical support in the development of a start-up plan for mesophilic digesters. The 70 mgd facility includes TPAD process including co-digestion facility with FOG addition. The facility was designed and built by Hazen and currently in the development of methods to initiate the start up in new biosolids.

Biosolids and Yard Waste to Energy Project – Feasibility Study, City of St. Petersburg, Florida, FL

Process Engineer responsible for developing the basis of design for different waste streams, evaluated alternatives including various anaerobic digestion options for the energy recovery. This feasibility study resulted in a design project.

Lynchburg Biosolids Masterplan, City of Lynchburg, VA

Dr. Dursun conducted process modeling for liquid & solid stream to evaluate the impact of digestate into liquid train. She also assessed various side stream treatment/management options to reduce nutrient loads into WWTP.

San Jose/Santa Clara Water Pollution Control Plant, City of San Jose, CA

As a process engineer, she worked on process modeling of anaerobic digesters to simulate and evaluate the performance of the existing digesters under various operating scenarios for current and future design loads.

Marlay Taylor Water Reclamation Facility, Hollywood, MD

Dr Dursun did complete process analyses and evaluations of existing facility to meet future effluent requirements. Several alternatives including IFAS technology were assessed. Detailed process simulation modeling -BioWin® - was used to evaluate 7.5 mgd plant's process configurations.

Greeley Water Pollution Control Facility, City of Greeley, CO

As a process engineer, she was responsible for the design and optimization of the WWTP to meet future nitrogen requirements. Performed on-site special sampling, BioWin® process modeling, evaluated alternatives and assessed capacity of the existing plant.

Ian Mackenzie, PE

Digester | Conceptual Layout

Mr. Mackenzie is a civil engineer with 30 years experience in water and wastewater projects. He has managed projects for water supply and wastewater treatment including the design and construction of wastewater systems, water treatment works and reservoirs.

Education

B.Sc., Civil Engineering, Queen's University (Canada)

Certification/License

Professional Engineer

Area of Expertise

- Design and construction of wastewater/water treatment plants
- Design and construction of wastewater collection systems
- Preparation of construction contracts

Professional Activities

California Water Environment Association – WEF Delegate Director

Goleta Wastewater Treatment Plant Asset Management Program, Goleta Sanitary District, Goleta, CA
Wastewater Engineer. This project conducted an asset valuation and condition survey of all assets at the Goleta Sanitary District's wastewater Treatment Plant. Mr. Mackenzie provided expertise for condition surveys and asset criticality ranking carried out under this project.

Coastal Treatment Plant Facility Improvements, South Orange County Wastewater Authority, Dana Point, CA
Design Manager. The project will provide equipment replacement and structural and architectural repairs to improve the performance and reliability of the Coastal Treatment Plant. The scope includes structural repairs, safety improvements and replacement of mechanical and electrical equipment. Mr. Mackenzie is leading the Hazen team designing these improvements.

JB Latham Treatment Plant Miscellaneous Improvements, South Orange County Wastewater Authority, Dana Point, CA
Process Mechanical Lead. Mr. Mackenzie was responsible for process mechanical design condition of improvements to this 13 mgd wastewater treatment facility. The project included structural and mechanical rehabilitation of the existing grit basins, replacement of the plant standby generator, effluent valves and effluent flow meters. The project was carefully coordinated with plant maintenance and operating staff to ensure that all improvements could be carried out with minimal impact on operations.

Landfill Gas Disposal Improvements, City of Riverside, Riverside, CA
Project Engineer. This study reviewed the existing arrangements for disposal of landfill gas at a closed landfill. The study evaluated the existing ground flare and gas handling equipment including compressors and gas cleaning equipment. Mr. Mackenzie conducted the investigation.

Hazen

Digester Crack Remediation, City of Simi Valley, CA
Project Engineer. This project developed a solution to digester gas leakage problems on the existing anaerobic digesters at this wastewater facility. The project team conducted water testing to identify gas leaks on the roof of the digesters and recommended remediation measrues to seal the leaks. Remedial works were performed by a term contractor. Mr. Mackenzie participated in the testing and developed the remediation scope and cost estimate.

Water Quality Control Plant Expansion (WQCP), City of Riverside, Riverside, CA
Technical Review. The WQCP Expansion project will provide 26-mgd of MBR capacity to feed the City of Riverside's recycled water system. The addition replaced the previous 20-mgd Plant 1 and serves in parallel with the 20-mgd Plant 2 at the site. Mr. Mackenzie provided a technical review of the design including reviewing the construction sequence of the replacement of existing anaerobic digesters.

Hyperion Treatment Plant, Digester Gas Flares Control System Improvements, City of Los Angeles, CA
Project Engineer. Mr. Mackenzie prepared the predesign report and oversaw the preparation of design drawings and specifications by structural, mechanical, electrical and I&C engineers. This project examined options for improving the control systems of the digester gas flare system at Hyperion Treatment Plant. In addition to control system hardware the improvements included replacement of the burners and pilot systems. As a critical safety system, the flares needed to start and operate reliability during a complete power failure. The design development process included identifying a construction sequence that would allow the system to remain in service throughout the upgrade.

Simi Valley Water Quality Control Plant Nitrification-Denitrification Upgrades, City of Simi Valley, CA
Project Engineer. This project upgraded the plant to convert the existing aeration basins to the MLE process. The scope of work included new mixed liquor recycle pumps, anoxic zone mixers and fiberglass partitions as well as related modifications to the process blowers, diffusers and related control systems. As project engineer Mr. Mackenzie was responsible for coordinating the design process including the production of plans and specifications.

Influent WetWell and Headworks Screening Project, Town of Windsor, CA
Process Engineer. Mr. Mackenzie served as process lead for this project which upgraded the 2mgd Windsor Wastewater Reclamation Plant. The project evaluated replacement of the facility's existing fine screen and grit removal facilities as well additional upstream protection to resolve clogging issues at the influent pumping station.

Oxygen Plant Demolition at Plant No. 2, Orange County Sanitation District, CA.
Project Manager. Mr. Mackenzie served as Project Manager for this project which will remove disused Air Separation Facilities. Mr. Mackenzie's role includes both technical and financial management of the project. This project removed existing redundant oxygen generation equipment, provided improvements to oxygen piping, upgraded the part of plant electrical system and converted an existing blower building for use as a maintenance and parts storage facility. Key issues include identifying means of safely removing existing equipment without affecting the treatment process or endangering adjacent high purity oxygen facilities and dealing with hazardous materials such as asbestos and lead.

Hersy Enriquez, EIT

Digester

Ms. Enriquez has extensive experience in water treatment operation and design, and stormwater best management practices (BMP) operation and optimization. She also worked on digester gas utilization projects as a client representative.

Education

MS, Civil Engineering, Kansas State University

BS, Civil Engineering, California State Polytechnic University, Pomona

Certification/License

Engineer in Training

Areas of Expertise

- Groundwater contamination
- Stormwater BMP System Operation and Optimization
- Water Treatment Plant Process
- Waste water Process

Professional Activities

California Water Environment Association

American Water Works Association

Biosolids and Energy Strategic Plan, Goleta Sanitary District (GSD), Goleta, CA

Engineer responsible for evaluating high strength waste available for co-digestion at GSD (Phase I) and assessing plant capacity for additional solids loading to anaerobic digesters (Phase II). In addition, the subsequent work from Phase I and II evaluates various technology to enhance digestion and biogas production. The project ultimately leads to developing a strategic plan for GSD in handling biosolids to meet future state regulatory requirement. Additional roles include conducting field interview for market assessment for biosolids residuals from GSD.

Coastal Treatment Plant Facility Plan Improvements, South Orange County Wastewater Authority, Dana Point, CA

Process engineer responsible for assisting in developing basis of design report, drawings and specifications on diffused aeration and secondary sedimentation equipment replacement. Additional roles include assisting in miscellaneous tasks including civil design work and budget tracking as part of the project management task.

Water Reclamation Facility 1110.2 Resultant Projects, City of San Bernardino Municipal Water Department, CA

Process engineer responsible for assisting in developing preliminary design report for digester gas flare system and blower decentralization and electrification to meet regulatory objectives mandated by the South Coast Air Quality Management District (SCAQMD) Rule 1110.2 and 1118.2.

Blower Electrification Project at EMWD RWRFs, Eastern Municipal Water District, Perris, CA

Process engineer responsible developing design drawings and reviewing technical specifications to convert of existing engine blowers at three wastewater treatment facility; MVRWRF, TVRWRF and SJVRWRF. Additional roles include assisting in evaluating and identifying automated control sequence and construction sequence while maintaining plant operation.

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Conversion of Engine Driven Blowers to Electric Blowers at the EMWD RWRFs, Eastern Municipal Water District, Perris, CA
Process engineer assisting in developing basis of design report, preliminary drawings on modification of existing blowers at three wastewater treatment facility; MVRWRF, TVRWRF and SJVRWRF. Additional roles include assisting in evaluating and identifying automated control sequence and construction sequence while maintaining plant operation.

City of Los Angeles, Bureau of Engineering (LABOE), Digester Gas Utilization Project (DGUP) Staff Augmentation Program
Resident Engineer. Assisted LABOE in reviewing contract drawings and documents for the DGUP project at Hyperion Water Reclamation Plant. The LABOE DGUP project is a design-build project to construct co-generation plant using digester gas at Hyperion Water Reclamation Plant.

Centralized Groundwater Treatment Facility for the City of Monterey Park, JR Filanc (Design-Build), Monterey Park
Process Engineer responsible in developing Title 22 Engineering Report and Start-up and Commissioning Plan for the UV/AOP and Catalytic GAC Groundwater Treatment Facility. This design-build project include installation of new UV/AOP treatment process and conversion of existing ion exchange vessels to catalytic GAC vessels.

Indio Water Authority/Coachella Water Authority, Recycled Water Program Development Feasibility Study
Assisted in running the pilot study to evaluate the filterability of secondary effluent of three different WWTP through UF membrane. The study includes investigating water quality and fluorescence excitation emission matrix to determine fouling propensity of the secondary effluent.

Olivenhain Municipal Water District, Optimization and Reliability Study for the David C McCollom Water Treatment Plant
Assisted engineers in evaluating different grit removal technologies and process flor to optimize the plant flow capacity. The project's objective is to improve the capacity reliability of the treatment plant by identifying opportunities to optimize existing processes.

West Basin Municipal Water District, Operations Support Contract
Staff Professional. Lead the effort in evaluating optimization opportunities for existing instrumentation and controls each process at the Edward C Little Water Recycling Facility including Biofor®, Densadeg®, Title 22 filters, solids handling, ozone and UV disinfection. A technical memorandum was submitted to the West Basin with the recommended instrumentation to optimize operation.

City of Los Angeles (LABOE), Terminal Island Advanced Water Purification Facility
Staff Professional. Assisted engineers in updating the Standard Operating Procedure (SOP) for the new equipment at the Advanced Water Purification Facility including RO membranes.

West Basin Municipal Water District, Title 22 Alkalinity Improvement
Staff Professional. Managed the RFI and submittals for the construction of the project. The project is to improve alkalinity of the Chevron and Exxon Mobil Biofor® units with CO_2 gas addition.

Bryan R. Lisk, PE, CEM

CHP Lead

Mr. Lisk is the firm's Energy Management lead with 20 years of water and wastewater energy management and design experience. Mr. Lisk has been involved in nearly all of Hazen's water and wastewater energy management projects.

Education

B.S. Electrical Engineer, North Carolina State University

Certification/License

Professional Engineer

Certified Energy Manager (CEM) – Association of Energy Engineers

Areas of Expertise

- Water and Wastewater Energy Management
- Water and Wastewater Electrical Engineering and Design

Professional Activities

Water Environment Federation

Association of Energy Engineers

Mr. Lisk's energy management experience includes biogas fueled combined heat and power (CHP) system evaluation and design, biogas to pipeline and vehicle fueling, biogas utilization modeling, interconnection and billing negotiations with natural gas and electric utilities, energy monitoring system, and energy management master planning. Mr. Lisk also has extensive experience with low- and medium-voltage power distribution systems, motor control systems, combined heat and power systems, standby power generation and peak shaving systems, lighting design, and variable frequency drive systems. Bryan is a Certified Energy Manager with the Association of Energy Engineers.

Biogas Utilization Studies for the Goleta Sanitation District, Santa Barbara, CA

Lead Engineer. Provided preliminary biogas utilization studies for the Goleta Sanitation District (GSD) to identify feasible biogas utilization strategies that warranted further evaluations. This study included energy balance modeling to evaluate multiple long term biogas utilization strategies including CHP and RNG pipeline injection. Mr. Lisk is currently serving as the energy management technical lead on a detailed Energy and Biosolids Strategic Master Plan for the GSD.

Biogas Utilization Master Planning for the Eastern Municipal Water District (EMWD), CA

Mr. Lisk served as the project manager for a biogas utilization master plan for EMWD's four (4) water reclamation facilities. This project includes plant energy balance modeling to evaluate multiple long term biogas utilization strategies including CHP, RNG pipeline injection, fuel cells, and biogas fueled blowers. This projected included a detailed assessment of current and future air emission regulations and renewable energy market assessments.

Hazen

Technical Publications

Lisk, B. R., Dodson, J. J.,and Bullard, C. M., "Coordinating Utility Billing Rate to Maximize the Benefit from On-Site Energy Generation and Combined Heat and Power Systems", Proceedings of the 2011 Water Environment Federation (WEF) Energy and Water Conference, Chicago, IL, August 2011.

Rohrabacher, J. W., Lisk, B. R., Szoch, C., Bullard, C. M., Whitaker, J., Wichser, R., and Frederick, T. "Bigger Savings From Biogas", WE&T Magazine, April 2012.

Bullard, C. M., Lisk, B. R., and Hardy, S. A., "Micro-constituents in Digester Gas – Sweating the Small Stuff", Proceedings of the 2011 Water Environment Federation (WEF) Energy and Water Conference, Chicago, IL, August 2011.

Bullard, C. M., Lisk, B. R., and Hardy, S. A., "Achieving Economic and Environmental Sustainability Objectives through On-Site Energy Production from Digester Gas", Ohio Water Environment Association Annual Conference, Sandusky, OH, June 2011.

Bullard, C. M., Fishman, M. A., Lisk, B. R., and Hardy, S. A., "Putting Digester Gas to Work: Economic and Environmental Sustainability Via on-Site Energy Production", 2010 NC AWWA-WEA 90th Annual Conference, Winston-Salem, NC, November 2010.

Moreno Valley RWRF TEPS MCC Replacement, Eastern Municipal Water District, Riverside County, CA

Sequencing and Operations Engineer for the TEPS MCC replacement project which includes the replacement of existing switchboards, motor control centers, variable frequency drives, and reduced voltage solid state starters that have deteriorated from exposure to chlorine gas. The new distribution and control equipment will be installed in a remote electrical building where it will not be exposed to the corrosive environment.

Energy Management Master Plan for the Town of Cary, Cary NC

Mr. Lisk was the project manager for the Town of Cary energy management master plan. This plan included long term and near term energy optimization recommendations for the Town's three (3) WWTP and one (1) WTP. This plan included energy modeling, process optimization, energy billing/procurement, and energy data management evaluations. Specific opportunities include energy monitoring expansions, aeration improvements, demand management, and DO control improvements.

Energy Management Master Plans for the North and South Durham Water Reclamation Facilities, City of Durham, NC

Mr. Lisk served as the Project Engineer for the North and South Durham energy management master plans. The master plans consisted of a series of projects to develop a long-term plan in coordination with the facilities' master plans to reduce energy usage and cost, and maximize the usage of renewable energy resources for each facility. Specific projects include biogas utilization, zone dissolved oxygen control, and influent pumping optimization.

Energy Management Master Plan for the Broad Run WRF, Loudoun Water, VA

Mr. Lisk served as the Energy Management master planning lead for the Broad Run WRF Master Plan. This visionary plan included long term strategies for biogas utilization, energy procurement, power monitoring program development, and programs to optimize energy performance through monitoring key performance indicators. The energy management master plan included the development of a graphical road map that identified future plant and market conditions that would trigger a change in energy management strategies.

Biogas Utilization Master Plan for the HFCAWTP, Tampa FL

Mr. Lisk is currently serving as the lead engineer developing a biogas utilization master plan for the Howard F Curren AWTP. This "forward looking" long term master plan included plant energy balance modeling to evaluate multiple biogas utilization strategies including internal combustion engines, bio-methane pipeline injection and sludge drying. This plan also evaluates impacts from air emission requirements and electric utility interconnection requirements.

Scott Hardy, PE, PMP

CHP

With over 25 wastewater solids process field and design projects, Mr. Hardy is the local, responsive lead for solids process support and training. He has performed anaerobic process training, including digester gas handling and hot water systems with heat recovery.

Education

MS, Georgia Institute of Technology

BS, Rensselaer Polytechnic Institute

Certification/License

Professional Engineer

Areas of Expertise

- Thickening/dewatering
- Anerobic digestion
- Codigestion
- Combined heat and power systems

Professional Activities

- Texas American Water Works Association
- Water Environment Association of Texas
- American Water Works Association
- Water Environment Federation

Publications

Hardy, Scott, et al, *"Holistic Approach To Residuals Handling At F. Wayne Hill Water Resources Center: Did The Upgrades Work?"* WEF Residuals and Biosolids Conference, Milwaukee, WI, 2016

F. Wayne Hill WRC Solids Process Evaluation & Training, Gwinnett County, GA

Project Engineer who performed evaluation of the solids treatment processes including co-thickening of primary sludge and WAS, anaerobic digestion, digester gas utilization, combined heat and power system, and centrifuge dewatering. Project also included field optimization of the rotary drum thickeners. Trained both management and operations staff for the nutrient recovery, digester gas handling and treatment, and FOG & HSW co-digestion processes at the 60 mgd advanced WWTP.

T.P. Smith Anaerobic Digester and Thermal Dryer Facilities, City of Tallahassee, FL

Lead Design Engineer who designed and led operations training for a new anaerobic digestion facility consisting of two 1.5 MG anaerobic digesters including hot water heating and digester gas handling systems. Mr. Hardy designed the upgrade of two existing anaerobic digesters and new 11,0000 evaporative lbs/day thermal dryer facility.

Phase II Improvement Study, Rowlett Creek Regional WWTP, North Texas Municipal Water District, Plano, TX

Solids Treatment Technical Lead for evaluating operation and performance of the existing solids treatment train that showed good WAS gravity belt thickening performance and higher than typical solids loading on the existing belt filter presses. Evaluated thickening and dewatering alternatives for optimized landfill hauling operations, reduced odors, cost effectiveness and reliability.

Village Creek WWTP Solids Process Evaluation, Jefferson County, AL

Lead Project Engineer for the evaluation of thickening, anaerobic digesters, centrifuge dewatering and FOG co-digestion. Centrifuge dewatering optimization included evaluation and optimization of feed pumps, polymer system, cake conveyors, cake pumping, and lime stabilization system. The digester upgrades included new hot water and digester heating systems, new pumped jet mixing system, digester gas piping replacement, and electrical/HVAC upgrades to meet current building codes.

Hazen

East Central Regional Water Reclamation Facility (WRF) Biosolids Improvement Project, Palm Beach County, FL
Senior Technical Reviewer for the design of a new FOG and septage receiving facility. FOG receiving facility includes terminal access software, pumped truck unloading with rock trap and grinder, storage, mixing, heating and feeding FOG to digested sludge recirculation system. Septage receiving consists of terminal access software, two complete plants consisting of screening and grit removal. Both facilities are odor controlled.

PTAR Cañaveralejo Wastewater Treatment Plant (WWTP) Upgrade, City of Cali, Columbia
Lead Solids Process Engineer for the evaluation and expansion of the existing solids treatment train with the addition of secondary process train at this 120 mgd primary treatment only WWTP. Mr. Hardy evaluated the current primary sludge treatment process of gravity thickening, anaerobic digestion with two 1,000 kW combined heat and power systems, belt filter press dewatering and solar greenhouse drying. With the addition of secondary treatment process, Mr. Hardy also evaluated expansion of solids train with waste activated sludge pre-treatment alternative analysis to increase digester gas production for greater power production.

Valley Creek Wastewater Treatment Plant (WWTP) Energy and Process Optimization Study, Jefferson County, AL
Principal Investigator for the anaerobic digester optimization study. The seven existing digesters showed limited volatile solids destruction and foaming issues. Mr. Hardy recommended cleaning the digesters and installing a pumped mixing system to help restore and maintain active digester volume, installing automatic feed system with automatic valve and magnetic flow meters to evenly load the digesters and improvements to the hot water system control to provide uniform digester heating.

Willow Lake Water Pollution Control Facility – FOG Codigestion Feasibility Study, Salem, OR
Lead technical engineer for the preliminary design of hauled waste (FOG and septage) receiving facility, including card access system, screening, analyzers for pH. Evaluated multiple locations at the Willow Lake WPCF taking into account traffic patterns, truck staging areas, operator access, security, and distance to discharge. Project also include digester capacity evaluation,

Heat Tracing and Insulation Project, Denton Creek Regional Wastewater System, Trinity River Authority of Texas, Roanoke, TX
Project Manager for the assessment, preliminary and detail design, and bidding of heat tracing and insulation systems at the wastewater treatment facility. Includes updating controls, thermostat locations, and positive feedback tied to SCADA to confirm heat tracing operation.

Vindobona Wastewater Treatment Plant (WWTP), Quito, Ecuador
Lead Design Engineer for the design of a new anaerobic digestion facility for the 270 mgd peak flow wastewater treatment plant that includes eight 6,500 m3 anaerobic silo digesters, pumped mixing system, heating system, gas storage, and waste gas burners.

Crooked Creek WRF Upgrades Phase 4 - Septage Receiving, Gwinnett County, GA
Project Engineer for the design of a sepatge receiving system with ID code access, pH monitoring, rock trap, drum screen with debris bagging system, and billing software system. Part of $132M plant upgrade.

Julian Chianelli, PE

CHP

Mr. Chianelli has a broad range of water and wastewater engineering experience with a technical focus on energy recovery/biogas utilization projects. From collection and distribution to treatment and processing, he is experienced in the coordination of the planning, design, and construction of wastewater projects with emphasis on resource recovery and the beneficial use of biogas.

Education

MS, Environmental Engineering, University of Texas at El Paso

BA, English, University of Alabama

Certification/License

Professional Engineer

Areas of Expertise

- Water and wastewater planning and design
- Resource recovery
- Energy management
- Biogas processing/utilization

Professional Activities

American Society of Civil Engineers

American Water Works Association

Water Environment Federation

Technical Publications

Finding the Sweet Spot: Maximizing Regional Biosolids Energy Potential for the Washington Suburban Sanitary Commission through the use of Combined Heat and Power,

5.6 MW Combined Heat and Power Facility Design, Philadelphia Water Department (PWD), PA

Project Engineer responsible for the design of a cogeneration system for the Philadelphia Water Department's Northeast water pollution control plant, for the beneficial use of digester gas (biogas) produced at the plant. A feasibility study was performed to evaluate several technologies for the beneficial use of biogas, including purification to pipeline quality methane and the cogeneration of combined heat and power through micro-turbines, internal combustion engines, and gas turbines. Combined heat and power design uses biogas produced from the anaerobic digesters that is pretreated for the removal of contaminants and sent to an I/C-based cogeneration facility where electricity is produced and heat is recovered from the engines for heating /cooling use on site. A selective catalytic reduction emission control system is integrated into the design to reduce anticipated engine emissions. Client, multiple subcontractors, and design team coordination are critical for successful achievement of an ambitious project schedule. Also responsible for the on-call engineering services during construction of a cogeneration system for PWD's Northeast water pollution control plant, for the beneficial use of digester gas (biogas) produced at the plant.

Decant Rehabilitation Project, Passaic Valley Sewerage Commission, Newark, NJ

Project Manager and Mechanical Design Lead for the detailed 3D design and construction of PVSC's Decant Facility. The decant facility is located immediately downstream of the Zimpro wet-air oxidation process and separates processed solids from liquid supernatant. The project will rehabilitate six one-million gallon covered concrete tanks as well as the sup-

Hazen

Presented at WEFTEC, New Orleans, LA, 2012.

Breaking Foreign Oil Dependency: One Wastewater Treatment Plant at a Time - Beneficial Use of Digester Gas for the Co-generation of Electricity and Heat at Philadelphia Water Department's Northeast Water Pollution Control Plant, Presented at the Water and Environment Federation Annual Residual and Biosolids Conference, Sacramento, CA., 2011.

porting ancillary systems and infrastructure for the facility. The year-long design phase of the project will culminate with bid-ready documents and permitting approvals. The construction phase of the project is anticipated to last four years and will involve careful planning for the maintenance of plant operations (MOPO) and include a Resident Project Representative.

Long Term Biosolids Plan, Cape May County Municipal Utilities Authority (CMCMUA), NJ

Project Manager. Hazen was selected in 2016 to provide engineering services for the Authority to help develop a long term comprehensive biosolids management plan. CMCMUA has four regional wastewater treatment facilities with a centralized composting facility to treat dewatered biosolids that is nearing the end of its life expectancy. The plan will help identify potential biosolids handling technologies available, determine the level of biosolids stabilization necessary, and how much biosolids capacity should be built taking into consideration with the large seasonal influence of summer vacationers. The planning process will also determine the economic and non-economic impacts of CMCMUA biosolids treatment capacity versus use of an external partner(s) for biosolids management. Hazen will use the data analysis tool Envision, so that the stakeholders are not only part of the process but support it, as well.

Biosolids Master Plan: Combined Heat and Power Evaluation, Washington Suburban Sanitary Commission (WSSC), Laurel, MD

Technical Specialist in the evaluation of the installation of solids processing and CHP facilities at two wastewater treatment plants for the WSSC. A review of existing CHP technologies was made as well as digester gas pre-treatment methodologies. A workshop was held with WSSC to discuss the technology review and establish a short-listed set of pretreatment and CHP equipment for economic evaluation. Capital costs and life cycle cost analyses were prepared for the short-listed CHP options including internal combustion engines and microturbine-based systems. Based upon the outcome of the economic evaluation and follow-up workshop with WSSC, recommendations were made regarding the conceptual design phase of the project which was developed to allow for a construction cost estimate to be prepared.

Jay DeVilbiss, LEED AP BD+C

CHP

Mr. DeVilbiss is a Principal Scientist within the Energy Management group at Hazen and Sawyer. He specializes in data analysis, energy modeling and energy performance optimization. His expertise includes biogas utilization evaluations, demand management opportunity evaluations, alternative energy evaluations and project life cycle-cost analysis (LCCA) evaluations. Other energy experience includes sustainable building consulting, whole-building energy modeling and building performance optimization evaluations.

Education

Bachelor of Science – Digital Arts and Science Engineering, University of Florida

Bachelor of Science – Mechanical Engineering, North Carolina State University

Certification/License

LEED AP BD+C – U.S. Green Building Council (USGBC)r

Areas of Expertise

- Data analysis and data visualizations in Microsoft Power BI
- Energy Monitoring Data Analyst
- Energy Management, energy auditing, and energy efficiency improvements for commercial buildings, water and wastewater facilities
- Alternative energy evaluations including biogas-fueled combined heat and power generation systems, solar PV, wind, geothermal and hydro power

Mr. DeVilbiss has extensive experience working with large datasets in several software environments, and extensive experience developing custom analytics tools. His current focus is the development of custom data models and data visualizations in Microsoft Power BI to support various projects' needs.

Biogas Utilization Studies for the Goleta Sanitation District, Santa Barbara, CA

Energy & Data Modeling Lead. Created an interactive Energy Balance Analysis Tool (EBAT) data model and custom visualizations in Power BI for biogas utilization studies for the Goleta Sanitation District (GSD) to identify optimal biogas utilization and solids processing strategies for implementation. This study included energy balance modeling to evaluate multiple solids processing strategies in conjunction with multiple long-term biogas utilization strategies, including FOG and HSW, CHP, RNG pipeline injection, Thermal Drying and Solar Drying.

Digester Gas Utilization Evaluation for ReWa, Greenville, SC

Energy & Data Modeling Lead. Created Energy Balance Analysis Tool (EBAT) data model in Power BI for preliminary biogas utilization studies for ReWa to identify feasible biogas utilization strategies that warranted further evaluation. This study included energy balance modeling to evaluate multiple long-term biogas utilization strategies including Biogas-Fueled Boilers, CHP, RNG pipeline injection, and Thermal Drying.

Hazen

GLRSTA Pump Station Power Source Study, Okeechobee and Indian River County, FL

Energy & Data Modeling Lead. Created a 50-year financial model for the pump station prime power source study for the Grove Land Reservoir and Storm Water Treatment Area (GLRSTA). This project involved the installation of two new pump stations requiring a significant power supply to primarily operate several large axial flow turbine pumps. Multiple strategies were analyzed, including electric prime power, natural gas prime power, diesel prime power, natural gas engine driven pump, and diesel engine driven pumps. On-site Solar PV was also analyzed and included in the model where applicable, as this technology was of high priority to the client.

Billing Rate Analysis for the Goleta Sanitation District, Santa Barbara, CA

Energy & Data Modeling Support. Supported the development of an interactive Billing Rate data model and custom visualizations in Power BI for the Goleta Sanitation District (GSD) to identify optimal demand management strategies and utility billing rate structures to minimize energy costs, as well as to understand the costs and benefits of various green energy strategies of interest, including battery storage, solar PV and CHP.

City of Mesa Energy Cost Study, Mesa, AZ

Energy Cost Evaluation Lead. Performed analysis of current energy costs at the Southeast Water Reclamation Plant (SEWRP) in order to identify any potential capital investments that City of Mesa might consider in order to reduce their energy costs. This study included an analysis of several alternate strategies, including alternate utility billing rates, load shift strategies, and combining separate services into a single service.

El Paso Power Monitoring Data Model, El Paso, TX

Energy & Data Modeling Lead. Created an interactive Power Monitoring data model and custom dashboards in Power BI for EL Paso to visualize various KPIs and better understand plant and equipment performance in real-time.

SARA J. HEAD, QEP

Principal Scientist

Yorke ENGINEERING, LLC
www.YorkeEngr.com

AREAS OF EXPERTISE

- Major Capital Projects and Renewable Energy Permitting and Impact Assessment
- Impact Mitigation Planning
- Air Quality Compliance Design, Implementation, and Management
- Environmental Impact Assessments, Reports, and Statements
- Federal, State, Province, and Local Regulatory Interface and Negotiation
- New Source Review Regulatory Consulting
- PSD Permitting
- Program Management for Project Permitting
- Project Feasibility, Siting, and Planning

EXPERIENCE

- Yorke Engineering, LLC Principal Scientist, 2016
- AECOM, Vice President/Project Director, 2005-2016
- ENSR, Air Quality Department Manager, 1992-2005
- AeroVironment, Air Quality Specialist, 1976-1992

PROFESSIONAL CERTIFICATIONS/ ASSOCIATIONS

- Qualified Environmental Professional
- Air and Waste Management Association, Fellow Member and Past President
- Ventura County Air Pollution Control District Advisory Committee, Chair

EDUCATION

- B.S., Atmospheric Sciences, University of California at Davis

OVERVIEW

Ms. Head has over 40 years of experience in environmental permitting and compliance. Air quality permitting is her expertise and she has obtained Authority to Construct (ATC) permits, Prevention of Significant Deterioration (PSD) permits, and/or Title V permits for many sources, including water treatment facilities, power plants, refineries, and others. She oversees projects that require environmental review documents under the California Environmental Quality Act (CEQA) and/or National Environmental Policy Act (NEPA), in addition to preparing air quality impact analyses for these documents. She has significant experience with California Energy Commission (CEC) permitting, a "CEQA-equivalent" process, having permitted over a dozen facilities through the Application for Certification (AFC) process, along with many other energy projects throughout the Southwestern U.S. She has worked on permitting and CEQA projects within many air districts, including the Santa Barbara County Air Pollution Control District (SBCAPCD). She is currently the Chair of the Ventura County Air Pollution Control District (VCAPCD) Advisory Committee, where she has served for 24 years, giving her a deep understanding of the air district rule making and ambient air quality standards attainment planning process. She also provided seconded consulting services to the SBCAPCD for 5 years by assisting SBCAPCD staff with writing permits, tracking compliance, ensuring quality assurance for the air and meteorological monitoring program, and developing policies and procedures.

REPRESENTATIVE PROJECT EXPERIENCE

County of Santa Barbara/Mustang Energy, CEQA Technical Report and Permitting, CA

For the Santa Barbara County Public Works Department, Resource Recovery and Waste Management Division (RRWMD), Ms. Head managed the team that prepared an Air Quality, Health Risk, Climate Change, and Odor Technical Report to support the Supplemental Environmental Impact Report (EIR) for the installation of a Material Recovery Facility (MRF) and landfill gas-fired power plant at the Tajiguas Landfill. The project included performing air quality and odor modeling, as well as doing an extensive health risk assessment (HRA) for both the existing landfill sources (stationary and mobile) and proposed MRF, power plant, composting area, and other sources. The greenhouse gas

(GHG) impact assessment involved life-cycle analyses to demonstrate the benefits of the project and the evaluation of the use of the U.S. Environmental Protection Agency's (EPA's) Waste Reduction Model (WARM). Upon completion of the EIR, she assisted the applicant, Mustang Energy, with the air permitting of these sources and updates to the hazards/risk assessment.

Southern California Edison (SCE), Emergency Generator Project Regulatory Analysis and HRA, Santa Barbara County, CA

In December 2015, SCE installed emergency generators capable of producing 79.5 megawatts (MW) of electrical generation at three substation locations in Santa Barbara County. These emergency generators were installed in response to SCE's El Niño planning efforts following the prediction of severe storms during December through April of 2015-2016. Ms. Head led the effort of the consulting team to identify environmental permitting and compliance requirements related to the use of these generators, working with both SCE's in-house and external legal team. Her team identified Proposition 65 as a substantial compliance requirement for this project, developed a Proposition 65 compliant HRA, and assisted with public notifications in case the generators were used (no outages requiring their use occurred).

Delta Diablo Sanitation District (DDSD)/Carollo Engineers, Permitting Feasibility Study and Permitting for a Wastewater Treatment Facility, Antioch, CA

Due to state regulations that require reductions in the amount of waste going to landfills, DDSD investigated options to generate and utilize biogas for energy production at its facility. Ms. Head led a study to investigate the feasibility of obtaining air permits from the BAAQMD for several alternatives under consideration. The feasibility study included the calculation of emissions (including GHGs), the review of control technologies, an HRA, and the determination of offset requirements and other BAAQMD and federal rule applicability. The HRA was provided for use in the Mitigated Negative Declaration (MND), as well as support to maintain consistency with the permitting. Upon completion of the study, support is being provided to obtain BAAQMD permits for Combined Heat and Power (CHP) engines and other sources.

Eastern Municipal Water District (EMWD)/Hazen and Sawyer, Regulatory Assistance, Southern CA

Ms. Head is coordinating the Yorke team's assistance to Hazen and Sawyer to provide regulatory insight, emissions calculations, and other input on a biogas utilization study involving four EMWD facilities. The study includes the assessment of various options for meeting EMWD's energy needs while maintaining compliance with South Coast Air Quality Management District (SCAQMD) current rule requirements and a projection of potential future requirements.

Coachella Valley Water District (CVWD)/Hazen and Sawyer, HRA and Permitting of Water Treatment Facilities, Riverside County, CA

Under a recent state law, CVWD proposed to implement additional water treatment for the removal of chromium from the groundwater. Ms. Head assisted with the preparation of an HRA using the new 2015 Office of Environmental Health Hazard Assessment (OEHHA) guidelines and a Technical Report to support the EIR that was developed by Hazen and Sawyer. Ms. Head also assisted with the preparation of Permit to Construct (PTC) applications for the proposed new equipment, including process tanks, scrubbers, emergency generator engines, crystallizer, and other control technology/filters.

Ventura Regional Sanitation District (VRSD), Air Permitting Support, Ventura County, CA

Ms. Head provided air permitting support to VRSD for the Toland Road Landfill. The landfill includes microturbines fueled with landfill gas, a flare, and a biosolids processing facility. For this project, Ms. Head directed an update of the HRA to include the new OEHHA risk factors, as well as updating the sulfur dioxide (SO_2) and hydrogen sulfide (H_2S) modeling to demonstrate compliance with VCAPCD Rule 54. These analyses were used in the permit application to increase the capacity of the flare.

RUSSELL J. KINGSLEY, C.P.P.

Principal Engineer

Yorke ENGINEERING, LLC
www.YorkeEngr.com

AREAS OF EXPERTISE

- Air Quality Permitting & Compliance
- CEQA Studies & Compliance
- Emission Inventories/Annual Emissions Reports
- Air Quality Auditing
- Project Management

EXPERIENCE

- Yorke Engineering, LLC
  Principal Engineer
  2011-Present
- AECOM/ENSR Corporation
  Project Manager, 2000-2011
- PGP Industries, Process Engineer, 1996-2000
- Kwikset Corporation
  Environmental Manager
  1985-1996

PROFESSIONAL CERTIFICATIONS

- Certified Permitting Professional, South Coast Air Quality Management District, 1996
- Certification of Air Permitting Professionals, San Joaquin Valley Air Pollution Control District, 2012

EDUCATION

- B.S., Chemical Engineering, University of California, San Diego, 1983

OVERVIEW

Mr. Kingsley is an experienced Project Manager specializing in air quality permitting, California Environmental Quality Act (CEQA) compliance, regulatory compliance support, and air quality and multi-media compliance audits.

Mr. Kingsley's air permitting experience includes Title V permit applications and compliance, Regional Clean Air Incentives Market (RECLAIM) compliance, air emission calculations and Best Available Control Technology (BACT) determinations for a wide variety of industrial processes, and preparation of health risk assessments for air permit applications. He has prepared hundreds of air permit applications for processes and equipment ranging from simple sand blast cabinets and spray booths to hydrogen plants and delayed cokers. He routinely works in the South Coast Air Quality Management District (SCAQMD), the Bay Area Air Quality Management District (BAAQMD), several other California jurisdictions, Arizona, and Nevada.

Mr. Kingsley has extensive experience with the preparation of CEQA Initial Studies (ISs) and Environmental Impact Reports (EIRs), as well as the CEQA equivalent process for power plant permitting with the California Energy Commission. He has conducted more than 50 air quality and multi-media compliance audits, including air quality audits for refinery operations, Benzene Waste Operations National Emission Standards for Hazardous Air Pollutants (NESHAP), power plants, waste-to-energy plants, terminal operations, and chemical plants. In addition to air quality work, he has experience with Risk Management Plans (RMPs), Storm Water Pollution Prevention Plans, Hazardous Materials Business Plans, and Toxics Release Inventory reporting.

Mr. Kingsley has experience in many industry sectors, including refineries, breweries, cement manufacturing, chemical plants, light and heavy industrial manufacturing, power plants, and utilities.

FIELDS OF EXPERIENCE

Air Permitting and Compliance

Mr. Kingsley provided technical guidance for air permitting and a Prevention of Significant Deterioration (PSD) non-applicability determination for the Chevron Product Reliability and Optimization (PRO) Project at the El Segundo Refinery. The work involved preparing permit applications for modifications to approximately 20 process units at the refinery. Process units included the Isomerization Unit, Sour Water Stripper, Crude Unit, Sulfur Recovery Unit, Tail Gas Unit, storage tanks, and many others.

In addition, Mr. Kingsley was included as an outside member of a team that evaluated the PSD applicability of the project and prepared the technical document for submittal to the Environmental Protection Agency (EPA) that demonstrated that the project was not subject to PSD requirements. The PSD determination required the development of a netting analysis and involved frequent interaction with Chevron staff and attorneys to develop the emissions analysis for the project, including evaluating upstream and downstream impacts, de-bottlenecking, aggregation of projects, historic actual emissions, future actual emission calculations, and potential to emit calculations.

Mr. Kingsley was the Team Leader for the preparation of an air quality permit application for the installation of a new delayed coker at the Tesoro Golden Eagle Refinery in the BAAQMD. There was a significant reduction in emissions of many criteria pollutants, which simplified the regulatory compliance analysis; however, the application required the evaluation of upstream and downstream impacts from the modifications for determination of compliance with federal PSD requirements and a health risk assessment to address toxic air contaminant emissions from fugitive components. The permit application included solids handling facilities and coker heaters with associated air pollution control equipment, fugitive components, and miscellaneous support equipment. Although exempt from evaluation under CEQA, he prepared or supervised the preparation of various studies and evaluations for submittal to the BAAQMD to support this determination. Mr. Kingsley assisted Tesoro and the BAAQMD in the development of permit conditions and the BAAQMD's engineering evaluation.

Mr. Kingsley prepared BAAQMD air permit applications for several refinery modifications at the Shell Oil Products, US, Martinez Refinery, including a new ethanol storage tank, a new asphalt storage tank, efficiency improvements in the Naphtha Hydrotreater, and a project involving fuel gas recovery from the flare header.

Mr. Kingsley prepared air permit applications for submittal to the SCAQMD for a variety of refinery operations for the ExxonMobil Refinery in Torrance, California, including vacuum trucks, wastewater sumps, waste storage tanks, and a biotreatment system. Work included conducting or supervising the development of innovative emission estimation methodologies and performing screening health risk assessments.

CEQA Studies and Compliance

Mr. Kingsley served as Project Manager for the preparation of five CEQA ISs/Mitigated Negative Declarations (MNDs) for 45-megawatt peaker power plants for Southern California Edison. Four of the five plants are in the SCAQMD, and one is in the City of Oxnard and subject to regulation under the Ventura County Air Pollution Control District. From project kick-off to the beginning of the public comment period for the SCAQMD projects was just over 3 months. The projects were certified shortly after the conclusion of the public comment period and were under construction in less than 6 months following project kick-off. Mr. Kingsley was directly responsible for writing the project description, air quality, energy, hazardous materials, and water sections of the ISs, and he managed the overall project, including technical editing and document preparation.

Christopher Portner, PE, CEP, ENV SP

Cost Estimating

Mr. Portner is a Civil Engineer with experience in process engineering, wastewater treatment plant design, cost estimating and construction management. He has performed cost estimating from planning level through construction for both water and wastewater projects, including conveyance and treatment facilities. Mr. Portner is an AACEi Certified Estimating Professional.

Education

MS, Environmental Engineering, University of California at Berkeley

BS, Civil and Environmental Engineering, University of California at Berkeley

Certification/License

Professional Engineer

CEP (00368)

EVP SP

Areas of Expertise

- Cost Estimating
- Wastewater Treatment Plant Design
- Wastewater Process Engineering
- Construction Management
- Scheduling
- Change Order Preparation and Negotiation
- Design Services During Construction

Asset Management Data Inventory and Validation Pilot Project, Goleta Sanitation District, CA

Cost Engineer for development of long-term replacement costs for District assets located at its wastewater Treatment plant as part of a plant assessment.

Blower Electrification Project, Eastern Municipal Water District, Riverside County, CA

Cost Estimator for the Blower Electrification Project which includes the replacement of five gas driven blowers with high speed turbo blowers at three different water reclamation facilities: Moreno Valley RWRF, San Jacinto Valley RWRF, and Temecula Valley RWRF. The electrical improvements at the Temecula Valley RWRF include modifications to the existing 12kV distribution system, installation of a new 480V distribution system and a new standby generator integrated into the facilities existing closed transition generator control system. The electrical improvements at the San Jacinto Valley RWRF include the integration of a new 12kV generator into an existing paralleling switchgear assembly.

Disinfection Improvements at the Laguna Treatment Plant, City of Santa Rosa, Santa Rosa, CA

Cost Engineer for the design of disinfection improvements at the 67-mgd Laguna Treatment Plant. The scope of work includes upgrade of the existing ultraviolet disinfection system to treat the entire 67-mgd plant flow, addition of a sodium hypochlorite system for disinfection of a side effluent stream and construction of a 35-mgd diversion pipeline to return off-spec water to the head of the plant.

Hazen

JB Latham Miscellaneous Improvements, South Orange County Wastewater Authority, Dana Point, CA
Cost Engineer for design of the miscellaneous improvements at the JB Latham WWTP. Improvements included rehabilitation of existing grit basins, including replacement of existing piping, covers and valves as well as structural modifications. Additionally replacement of the existing emergency generator and effluent flow meters and isolation valves were designed.

AB Diffusers, Instrumentation and Controls Project, Napa Sanitation District, CA
Cost Engineer for replacement of existing diffuser technology in two aeration basins at the 15-mgd Napa Sanitation wastewater treatment plant. Scope of work included alternative assessment and detailed design of the new aeration system, including control system modifications.

EBMUD Secondary Clarifier Technology Evaluation Assessment, Oakland, CA
Cost Engineer for the assessment and alternative evaluation for the secondary clarifiers. The scope of work includes an industry-wide survey of peripheral flow peripheral overflow clarifiers, stress testing, CFD modeling and alternative analysis.

EBMUD Struvite Control Project, Oakland, CA
Cost Engineer for a plant-wide assessment of struvite formation and assessment of control options at EBMUD's 168-mgd Main Wastewater Treatment Plant. The scope of work included field sampling, technological survey, process modeling, alternative evaluation and life cycle cost analysis of the centrate and dewatering systems.

Town of Windsor Influent Wet Well and Headworks Screening, Windsor, CA
Cost Engineer for the Influent Wet Well and Headworks Screening Project to provide upstream screening of the influent pump station and replacement of existing grit and fine screening equipment. The scope of work included alternative analysis of various vendors and technologies for both screening and grit washing equipment and detailed design of the selected alternatives. Cost estimating scope included new screening and grit equipment along with buried structures and process piping.

West Napa Pump Station Project, Napa, CA
Cost Estimator in charge of increasing the firm capacity of the pump station to 15.4 mgd, and address the aging infrastructure such as the seismic condition of the 40-year old existing facility. The existing pump station was congested with little to no room for expansion of pumping capacity. Project elements include a new submersible pump station, new electrical building and infrastructure, chemical injection for corrosion control, odor control, solar panels, demo of the existing pump station and site civil improvements.

Advanced Oxidation Groundwater Treatment Facility, City of Monterey Park, CA
Mr. Portner provided Cost Estimating to this Design-Build project involving the design, construction, and permitting of a 10 MGD groundwater treatment facility including UV peroxide AOP and catalytic GAC. She has interfaced with the Waterboards Division of Drinking Water (DDW) to answer technical questions and develop a pilot test of the catalytic GAC system for VOC removal.

Cr6 Treatment Facilities for Wells 13A, AA and 1E, Indio Water Authority, Indio, CA
Cost Engineer for design of groundwater treatment systems to remove chromium 6 from affected wells. Ion exchange units were used for the treatment system, other work included additional conveyance and the required supporting mechanical, structural, electrical and instrumentation equipment. The project was fast-tracked, requiring the cost estimate to be prepared in parallel with design, requiring close coordination with the Design Team to incorporate and track changes.

Wyatt Dressler, PE

Structural

Mr. Dressler specializes in structural and seismic design for water and wastewater treatment facilities, water storage facilities and support systems for conveyance pipelines and mechanical equipment.

Education

B.S., Civil Engineering, California State University Northridge

Certification/License

Professional Engineer

Cal OES Safety Assessment Program Evaluator Training

Areas of Expertise

- Design of Concrete Liquid-Containing Structures
- Design of Masonry Building Structures
- Bridge Pipeline Crossings

Professional Activities

American Society of Civil Engineers

American Institute of Steel Construction

Mr. Dressler is educated in reinforced concrete, reinforced masonry and steel design for both building and non-building applications, and has a comprehensive understanding of structural engineering principles and practices. Mr. Dressler has experience with structural modeling as well as seismic and structural evaluation and assessment of existing structures. Additionally, Mr. Dressler has field experience with structural observations of concrete, masonry, and steel construction.

Coastal Treatment Plant Facility Improvements Design, South Orange County Wastewater Authority, Laguna Niguel, CA

Senior Principal Engineer and Lead Structural for a facility improvements project that includes detailed design and engineering services during construction for the six mgd water reclamation plant. Structural tasks included condition assessment of primary & secondary sedimentation tanks, aeration basins and an existing storage building to be repurposed for the Electrical Main Switchgear. Tasks also included concrete rehabilitation and replacement of protective coating to channel structures and basins throughout the plant, replacement of Ferric Chloride bulk storage concrete containment structure, new Drainage Pump Station and Valve Vault, and fall protection improvements throughout the plant.

Influent Wet Well and Headworks Fine Screening Project, Town of Windsor, Windsor, CA

Mr. Dressler served as Senior Principal Engineer and Lead Structural for the Influent Wet Well and Headworks Screening Project. The project included the evaluation of screening location and technology alternatives to provide a recommendation for reducing ragging of the unscreened In-fluent Pump Station and replacement of the existing fine screen and grit classifier at the head-works. Structural scope includes PS&E for the design of a reinforced concrete channel adjacent to the existing influent pump station wet well to support new screening equipment. Structural tasks also include the design of upstream sewer junction structure and trunk line connections. De-tailed design for the recommended upgrades is currently ongoing.

Hazen

Carson Regional Water Recycling Facility, West Basin Municipal Water District, Carson, CA
Mr. Dressler served as Principal Engineer and Lead Structural for the design of a 2.0 MGD tertiary membrane bioreactor (tMBR) and a 2.64 MGD microfiltration (MF) treatment system, which is an upgrade to an existing 5.0 MGD MF-Reverse Osmosis (RO) system and 0.9 MGD biological aerated filtration (BAF) system originally installed for nitrification. Structural tasks consisted of design, plans, specifications, and estimate for the tMBR treatment, MF treatment, and chemical storage. The tMBR facility includes conventionally reinforced concrete aeration basins, membrane basins, neutralization tank, single-story concrete block blower building, 5-ton overhead bridge crane for membranes and 2-ton monorail crane over aeration pumps. The MF facility includes a concrete support microfiltration skids, pipe racks, tanks, pumps and a pre-engineered pre-fabricated metal canopy structure covering the treatment area. The chemical storage area was designed with a concrete mat foundation and concrete containment walls separating storage areas for two 20,000-gal sodium hydroxide tanks, a bulk storage citric acid tank, and a bulk storage phosphoric acid tank. FRP stairs and landing were designed for access into the sodium hydroxide containment area.

West Napa Pump Station Project, Napa, CA
Structural Engineer in charge of increasing the firm capacity of the pump station to 15.4 mgd, and address the aging infrastructure such as the seismic condition of the 40-year old existing facility. The existing pump station was congested with little to no room for expansion of pumping capacity. Project elements include a new submersible pump station, new electrical building and infrastructure, chemical injection for corrosion control, odor control, solar panels, demo of the existing pump station and site civil improvements.

J.B. Latham Treatment Plant Misc. Improvements, South Orange County Wastewater Authority, Dana Point, CA
Principal Engineer and Lead Structural for an improvements project that includeda preliminary design for the replacement of the Plant 1 Standby Generator, replacement of the Effluent Flow Meters, and replacement of the Plant Effluent Valves. The project also included detailed design of the rehabilitation of the Plant 1 Grit Basin. Responsibilities included condition assessment of the Grit Basin structure, followed by design and detailing of rehabilitation. The rehab work involved coating interior surface of walls and bottom slabs with epoxy mortar coating, slide gate replacements, concrete crack and spall repair, removable cover panel replacement over the basin, and replacement of checkered plate covers with solid plank aluminum grated covers with wall mounted ledger supports for the influent, effluent and bypass channels.

AB Diffusers - I&C Project, Napa Sanitation District, Napa, CA
Mr. Dressler served as Structural Design Engineer for the AB Diffusers, I&C project. The project included evaluation of diffuser technologies to provide a recommendation for aeration basin diffuser replacement and the detailed design for the replacement of the aeration basin diffusers and upgrade the aeration basin control system to include ammonia based DO control. The project required pre-purchase of the diffusers to meet the project schedule. Mr. Dressler was responsible for detailing the structural supports and anchorage for the new aeration piping.

South WWTP Headworks Improvements, Town of Florence, AZ
Mr. Dressler served as Senior Principal Engineer and Lead Structural for the South WWTP headworks improvements project to address screen performance, reduce odors and improve pump station reliability. The 2.5 MGD facility serves as the main screening for Florence's southern area. Design improvements include additional mechanical screening, new washer compactor, new influent pump station, and new odor control system. The structural scope consisted of condition assessment of existing influent pump station with rehabilitation and concrete repairs for support of a second screen and modifications to the wet well area to re-route flow downstream to a new influent pump station. The structural scope also included the design of structural foundations at grade for the odor control system, waste collection area, and slab around new prefabricated fiberglass pump station unit.

Victor Panez

AutoCAD

Mr. Panez is a Lead CAD/BIM Coordinator and Designer for Hazen's West Region with over 18 years of experience in the consulting field providing 3D CAD Design and CAD Coordination services for projects throughout Arizona and California. Experienced working in AutoCAD 2017, Revit 2017, Autodesk BIM 360, Bentley MicroStation V8i and Bentley OpenPlant Piping system. Also using Bentley Project Wise Explorer.

Education

Associate of Occupational Studies Degree Drafting/CAD Technology

Areas of Expertise

- All Autodesk Software Products and Bentley MicroStation V8i with Project Wise
- Process Mechanical Design and CAD/BIM Coordinator for Projects

Peer Review-Disinfection Improvements, Santa Rosa Laguna Treatment Plant, Santa Rosa, CA

Lead CAD Designer. The City of Santa Rosa owns and operates the Laguna Treatment Plant (LTP), which uses UV as its primary disinfection process. The facility produces disinfected tertiary recycled water, as defined by Title 22. The existing LTP UV system was recently re-rated from a capacity of 67-mgd, with redundancy, to a capacity of 48.5-mgd with redundancy. This creates a potential disinfection system capacity deficiency under some wet weather conditions. Additionally the existing Trojan 4000 system was installed in 1997 and is nearing the end of its useful life. These events triggered the need to upgrade the disinfection system in order to ensure that the LTP has adequate disinfection capacity under all flow rates.

Carson Plant, West Basin Municipal Water District, CA

Lead Designer for complete design of a 2.0 mgd tertiary membrane bioreactor (tMBR) and a 2.64 mgd microfiltration (MF) system and ancillary processes at the Carson Regional Water Recycling Facility. These will upgrade the existing 5.0 mgd MF - Reverse Osmosis (RO) train and the 0.9 mgd biological aerated filtration (BAF) treatment train originally installed for nitrification.

Centralized Groundwater Treatment System, City of Monterey Park, CA

This project contained a designed with Ultraviolet Light (UV) and Liquid Phase Granular Activated Carbon (LGAC) Vessel Systems. As the CAD/BIM Lead for this project. I led the design of a Revit 3D model for Hazen and J.R. Filanc. Coordinating with other disciplines and subs to meet project standards and meeting the project deadlines.

Hazen

Scottsdale CAP Water Treatment Plant Expansion, Microfiltration, City of Scottsdale, AZ
Developed a Draft Site Plan and prepared a Memorandum to document the CAP WTP expansion criteria. Aided with the coordination of the City of Scottsdale CAD Standards for the project. Responsible for ensuring that all project drawings were loaded into the system for reproduction and ready for delivery to the client.

Scottsdale Water Campus AWT – Microfiltration and Reverse Osmosis, City of Scottsdale, AZ
The 11.9mgd Water Campus Advanced Water Treatment (AWT) system treats tertiary effluent for recharge and irrigation using microfiltration (MF) and reverse osmosis (RO) systems. The existing RO system uses 14 existing RO trains. The MF and RO systems include auxiliary systems (feed pump stations, chemical feed, clean in place, and flushing systems). The treated effluent is recharged using 27 vadose zone wells for a total capacity of 18.7mgd. CAD Designer provided the coordination of the City of Scottsdale CAD Standards for the project between Prime and Subcontractor. Responsible for ensuring that all project drawings were loaded into the system for reproduction and ready for delivery to the client and for completion of record drawings.

Peer Review-Disinfection Improvements, City of Santa Rosa, CA
Lead CAD Designer. The City of Santa Rosa owns and operates the Laguna Treatment Plant (LTP), which uses UV as its primary disinfection process. The facility produces disinfected tertiary recycled water, as defined by Title 22. The existing LTP UV system was recently re-rated from a capacity of 67-mgd, with redundancy, to a capacity of 48.5-mgd with redundancy. This creates a potential disinfection system capacity deficiency under some wet weather conditions. Additionally the existing Trojan 4000 system was installed in 1997 and is nearing the end of its useful life. These events triggered the need to upgrade the disinfection system in order to ensure that the LTP has adequate disinfection capacity under all flow rates.

JOC Booster Pump Stations, City of Phoenix, AZ
Lead Designer for 4 Booster Pump Stations for the City of Phoenix and ensuring the CAD Standards for the City are being met.

Price River Water Treatment Facility Upgrade and Expansion Project, Price River Water Improvement District, Price, UT
Lead CAD Designer for the project including all 3D Models and CAD Drawings. The Price River WTP Upgrades involved addition of an Ozone process, improvements to the pre-sedimentation process, upgrades to the existing vertical shaft, large diameter paddle wheel flocculators, evaluation of parallel Actiflo™ or DAF processes to enhance the flocculation/sedimentation basin capacities to establish full capacity of the plant and upgrades to the chemical feed systems.

Enaville Well Membrane Filtration, City of Enaville, ID
Lead Designer, aided with the coordination of CAD Standards for the project. Worked to ensure that the CAD Standards were maintained throughout the project. Responsible for ensuring that all project 3D drawings from other sub consultants were loaded into the system for reproduction and ready for delivery to the client.

Yucaipa Valley Water District, Oak Valley, CA
CAD designer for the project provided assistance to subconsultants to ensure that their CAD standards were retained throughout. CAD standards were utilized to ensure the filenames and name layering of each drawing were standardized. Was responsible for loading and unloading drawings to project site for reproduction.

Christopher Thunhorst, PE

Electrical

Mr. Thunhorst has 17 years of experience in electrical engineering for building systems, water and wastewater treatment facilities, and pumping stations associated with water distribution and wastewater collection systems.

Education

BSEE, North Carolina State University

AAS, Asheville-Buncombe Technical Community College

Certification/License

Professional Engineer

Areas of Expertise

- Medium and Low Voltage Power Distribution
- Standby Power Systems
- Control Systems
- Process Instrumentation
- SCADA Systems

Professional Activities

Instrumentation, Systems, and Automation Society

Institute of Electrical and Electronics Engineers

Coastal Treatment Plant Facility Improvements, South Orange County Wastewater Authority, Dana Point, CA

Lead Electrical Engineer for the facility improvements project which includes replacement of the ferric chloride chemical storage and feed system, replacement of the secondary clarifier equipment (sludge and scum collection), new Drainage Pump Station, repair of damage to concrete structures throughout the plant and installation of fall protection (safety) features. The project also includes major upgrades to the electrical system: installation of a new electric utility service, new main distribution switchgear, new distribution system feeders and replacement of existing motor control centers.

Water Reclamation Facility 1110.2 Resultant Projects, City of San Bernardino Municipal Water Department, CA

The City of San Bernardino Municipal Water Department (SBMWD) produces digester gas (DG) from the anaerobic digestion process and beneficially utilizes that gas as a fuel source for engines and boilers. The air quality regulatory agency has amended regulations, Rule 1110.2, in efforts to reduce oxides of nitrogen, volatile organic compounds and carbon monoxide from stationary emission sources (like engines and flares). Hazen assisted SBMWD with design of beneficial reuse of DG and alternatives for improvements necessary to meet the Rule 1110.2 amendments. The design included a DG storage facility that will serve to accumulate DG and maintain a more constant gas supply for the proposed fuel cell and reduce wasting DG to the flare system. The evaluation included review of DG storage alternatives, future DG production, and impacts of DG production due to fats, oils and greases. The DG storage was effectively designed in coordination with fuel cell manufacturers and flare system improvements including a new ultra-low emission flare.

Hazen

Moreno Valley RWRF TEPS MCC Replacement, Eastern Municipal Water District, Riverside County, CA
Project Manager for the TEPS MCC replacement project which includes the replacement of existing switchboards, motor control centers, variable frequency drives, and reduced voltage solid state starters that have deteriorated from exposure to chlorine gas. The new distribution and control equipment will be installed in a remote electrical building where it will not be exposed to the corrosive environment.

City of Santa Rosa Wastewater Treatment Plant Upgrades, Santa Rosa, CA:
Electrical Engineer for improvements to the City's Title 22 tertiary disinfected wastewater treatment plant including new 69-kV electrical substation, 4.4 mW combined heat and power facility, 67-mgd UV disinfection facility, microgrid battery facility, and a flood protection levee to protect the plant. The $80MM of improvements support the City's regulatory compliance plan and energy independence.

J.B. Latham Treatment Plant Miscellaneous Improvements, South Orange County Wastewater Authority, Dana Point, CA
Project Manager and Lead Electrical Engineer for an improvements project that included preliminary design for the replacement of the Plant 1 Standby Generator, replacement of the Effluent Flow Meters, and replacement of the Plant Effluent Valves. The project also included detailed design of the rehabilitation of the Plant 1 Grit Basins.

Regional Treatment Plant Site Lighting Study, South Orange County Wastewater Authority, Dana Point, CA
Project Manager and Electrical Engineer for a site lighting study which included a lighting survey, illumination survey with plant operations staff, and a technical memorandum to document findings, recommendations for improvements, and an opinion of probable cost broken down by area.

Regional Treatment Plant Power Distribution Documentation, South Orange County Wastewater Authority, Dana Point, CA
Project Manager and Electrical Engineer responsible for compiling single line diagrams for all major power distribution equipment, field verifying equipment loads identified on the single line diagrams and developing a plant wide power distribution system single line diagram.

Aeration Basin Diffusers, Instrumentation and Controls Project, Napa Sanitation District, Napa, CA
Technical Advisor for the Aeration Basin Diffusers, Instrumentation and Controls Project. This project included replacement of the aeration basin diffusers and upgrade of the aeration basin control system to include ammonia-based DO control.

Clarksville WWTP, Plant Improvements Project, Clarksville, TN
Lead Electrical Engineer for the Clarksville WWTP Improvements project design which included a new 1500 kW, 12,470V standby generator, modifications to the plants existing medium voltage distribution system, a new Headworks Facility, modifications to the plants Aeration Basins, new Final Clarifiers, RAS/WAS Pump Station, Chlorine Contact Basin, Chemical Building, Blended Sludge Storage and Pump Station, modifications to the Maintenance and Dewatering Building including the installation of four (4) new centrifuges and a dewatered sludge conveyance system, new Odor Control Facilities, and a new Administration Building.

Lower Howards Creek WWTP Master Plan, Winchester, KY
Electrical Engineer for the master plan of the new Lower Howards Creek WWTP, a new 2.0 MGD facility south of Winchester.

Alan Mlakar, PE

Electrical

Mr. Mlakar has over 8 years in the Water/ Wastewater industry. He specializes in electrical and instrumentation design, electrical system studies, and engineering services during construction. This encompasses knowledge of electrical distribution systems, motor control centers, programmable logic control (PLC), process control related to water, wastewater and power projects.

Education

B.S., Electrical Engineering, California Polytechnic State University, California, CA

Certification/License

Professional Engineer

Areas of Expertise

- Electrical System Studies
- Electrical/Instrumentation and Control Systems
- Water and Waste Water Facility design
- Engineering services during construction

Professional Activities

IEEE

Edward C Little Water Recycling Facility Reverse Osmosis CIP Waste Discharge Project, West Basin Municipal Water District, El Segundo, CA
Lead Electrical and Instrumentation design engineer responsible for developing electrical and instrumentation drawings and specifications throughout design as well as providing E&IC engineering services during construction.

Initial Disinfection Sodium Hypochlorite Storage and Feed System, Irvine Ranch Water District, Irvine, CA
Lead Electrical design engineer responsible for developing electrical drawings and specifications throughout design as well as providing electrical engineering services during construction.

Phase I Plant Upgrade Project, Laguna County Sanitation District, Santa Maria, CA
Lead Instrumentation design engineer responsible for developing instrumentation drawings and specifications throughout design.

Site 2 Improvements Project, Henderson, Henderson, NV
Lead electrical design engineer responsible for developing electrical drawings and specifications throughout design.

Electrical System Studies of DOU Facilities, City of Sacramento, Sacramento, CA
Electrical system studies engineer responsible for performing short circuit calculations, arc flash analysis, and protective device coordination at over 40 remote sites.

Hazen

Roseville Remote Arc Flash Hazard Analysis, City of Roseville, Roseville, CA
Electrical system studies engineer responsible for performing short circuit calculations, arc flash analysis, arc flash hazard mitigation, and protective device coordination at over 35 remote sites.

Booster Stations Electrical System Studies, City of Riverside, Riverside, CA
Electrical system studies engineer responsible for performing short circuit calculations, arc flash analysis, arc flash hazard mitigation, and protective device coordination at 3 booster stations.

Water Resource Recovery Facility Improvements, Carson City, Carson City, NV
Responsible for providing electrical engineering services during construction.

GENERAL MANAGER'S REPORT

GOLETA SANITARY DISTRICT
GENERAL MANAGER'S REPORT

The following summary report describes the District's activities from December 17, 2019 through January 6, 2020. It provides updated information on significant activities under three major categories: Collection System, Treatment/Reclamation and Disposal Facilities, and General and Administration Items.

1. COLLECTION SYSTEM REPORT

LINES CLEANING
Staff has been conducting routine lines cleaning in the area of Turnpike Road and Calle Real.

CCTV INSPECTION
Staff has replaced the Audio-Visual board on the Cues Cable Control Unit, the interface between the cable and the on-board computer. Staff also repaired a damaged section of the Closed-Circuit Television Inspection (CCTVI) cable. CCTVI operations have resumed in the area of Hollister Avenue and Turnpike Road.

LA CUMBRE MUTUAL WATER COMPANY (LCMWC) SEWER MAIN EXTENSION
Staff is finalizing the reimbursement agreement. The sewer main extension is operational and the LCMWC parcel is connected to the District sewer.

CITY VENTURES DEVELOPMENT
Inspections continue as required for this project.

ROBIN HILL SEWER IMPROVEMENT PROJECT
Tierra has resumed the work of replacing the existing 10-inch Vitrified Clay Pipe (VCP) sewer line on Robin Hill Road after the holiday break. The work on the Hollister Avenue portion of the project has been completed. Anticipated project completion is late January/early February 2020.

EL SUENO LIFT STATION FORCE MAIN REPLACEMENT PROJECT
Update of this project will be presented to the Board.

2019 PIPELINE REHABILITATION PROJECT
Authorization to bid will be presented under a separate cover.

GREASE AND OIL INSPECTIONS
Staff has completed the annual restaurant grease and oil inspection program for 2019.

COMPETENCY BASED TRAINING
Staff conducted a teleconference preview of the District Competency Based Training (CBT) program put together by DKF Solutions Group.

2. TREATMENT, RECLAMATION AND DISPOSAL FACILITIES REPORT
Operations staff continues to work on the installation of the new ferrous chloride dosing facility as time permits.

The demand for reclaimed water has remained 0.03 million gallons a day (MGD) with the recent rain. The Reclamation plant has remained offline since November 25, 2019 and is expected to remain offline.

Beginning in January 2020, we will be sampling daily for a two-week period to determine the days with the highest concentrations of surfactants. This will aid in finding industrial users who may be contributing to the excess surfactant levels.

INDUSTRIAL WASTE SOURCE CONTROL PROGRAM

Wastewater Discharge Permit Renewal Stickers have been sent to industrial users who have submitted renewal applications and their 2020 renewal fees. Microdyn-Nadir US, Inc., formerly classified as a Class III industrial user, has been reclassified to a significant industrial user Class IV Permit # IV-437 based on their hydraulic loading of >25,000 gallons per day of industrial process wastewater discharge.

PUBLIC EDUCATION AND OUTREACH

A group of 6 people from the University of California Santa Barbara working in Student Services departments came to the District to see the Lystek demonstration project on Thursday December 19, 2019.

Staff welcomed a record number of members of the public in 2019 with visitors to the site totaling 1,488. The number of offsite engagements with the community totaled 2,780, for a combined total of public outreach and engagements of 4268 for 2019!

3. GENERAL AND ADMINISTRATIVE ITEMS

Financial Report

The District account balances as of January 6, 2020 shown below are approximations to the nearest dollar and indicate the overall funds available to the District at this time.

Operating Checking Accounts:	$ 654,566
Investment Accounts:	$ 27,391,942
Total District Funds:	$ 28,046,508

The following transactions are reported herein for the period 12/17/19 – 01/06/20.

Regular, Overtime, Cash-outs and Net Payroll:	$ 241,361
Claims:	$ 799,283
Total Expenditures:	$ 1,040,643
Total Deposits:	$ 5,233,363

Transfers of funds:

LAIF to Community West Bank (CWB):	$ - 0 -
CWB Operational to CWB Money Market:	$ 3,800,000
CWB Money Market to CWB Operational:	$ - 0 -

The District's investments comply with the District's Investment Policy adopted per Resolution No. 16-606. The District has adequate funds to meet the next six months of normal operating expenses.

Local Agency Investment Fund (LAIF)
LAIF Monthly Statement – December, 2019.
LAIF Quarterly Report – Previously submitted.
PMIA/LAIF Performance – Previously submitted.
PMIA Effective Yield – Previously submitted.

Community West Bank (CWB)
CWB Money Market Account – December, 2019.

Deferred Compensation Accounts
CalPERS 457 Deferred Compensation Plan – November, 2019.
Lincoln 457 Deferred Compensation Plan – December, 2019.

Personnel Update

A verbal update will be provided at the meeting.

California State Treasurer
Fiona Ma, CPA

Local Agency Investment Fund
P.O. Box 942809
Sacramento, CA 94209-0001
(916) 653-3001

January 02, 2020

LAIF Home
PMIA Average Monthly Yields

GOLETA SANITARY DISTRICT

GENERAL MANAGER
ONE WILLIAM MOFFETT PLACE
GOLETA, CA 93117

Tran Type Definitions

Account Number: 70-42-002

December 2019 Statement

Account Summary

Total Deposit:	0.00	Beginning Balance:	108,278.73
Total Withdrawal:	0.00	Ending Balance:	108,278.73

Community West Bank
445 Pine Avenue
Goleta, CA 93117

Statement Ending 12/31/2019

Customer Number: XXXXXXXX

RETURN SERVICE REQUESTED

GOLETA SANITARY DISTRICT
MONEY MARKET
1 WILLIAM MOFFETT PL
GOLETA CA 93117-3901

Managing Your Accounts

805-962-7420

Protecting your money is our top priority. To help reduce the risk of fraud on your account, a text alert will be sent to your mobile phone if we identify an uncharacteristic purchase which may be fraudulent.

If you authorize the purchase with a confirmation reply to the text, ask the merchant to reprocess the transaction and payment will be made.

Summary of Accounts

Account Type	Account Number	Ending Balance
PUBLIC AGENCY-MMDA	XXXXXXXX	$27,283,663.55

PUBLIC AGENCY-MMDA - XXXXXXXX5554

Account Summary

Date	Description	Amount		
11/30/2019	**Beginning Balance**	**$23,437,313.23**	Average Ledger Balance	$24,031,063.23
	2 Credit(s) This Period	$3,846,350.32		
	0 Debit(s) This Period	$0.00		
12/31/2019	**Ending Balance**	**$27,283,663.55**		

Account Activity

Post Date	Description	Debits	Credits	Balance
11/30/2019	**Beginning Balance**			**$23,437,313.23**
12/27/2019	SBCo SSC Funding to MMkt		$3,800,000.00	$27,237,313.23
12/31/2019	INTEREST AT 2.2000 %		$46,350.32	$27,283,663.55
12/31/2019	**Ending Balance**			**$27,283,663.55**

Daily Balances

Date	Amount	Date	Amount
12/27/2019	$27,237,313.23	12/31/2019	$27,283,663.55

CalPERS 457 Plan

November 30, 2019

This document includes important information to help you compare the investment options under your retirement plan. If you want additional information about your investment options, you can go to **https://calpers.voya.com**.

A free paper copy of the information available on the website can be obtained by contacting:

Voya Financial
Attn: CalPERS 457 Plan
P.O. Box 55772
Boston, MA 02205-5772
(800) 260-0659

Document Summary

This document has two parts. Part I consists of performance information for the plan investment options. This part shows you how well the investments have performed in the past. Part I also shows the total annual operating expenses of each investment option. Part II provides additional information concerning Plan administrative fees that may be charged to your individual account.

CalPERS 457 PLAN

Part I. Performance Information For Periods Ended November 30, 2019

https://calpers.voya.com

Table1 focuses on the performance of investment options that do not have a fixed or stated rate of return. Table 1 shows how these options have performed over time and allows you to compare them with an appropriate benchmark for the same time periods[1]. Past performance does not guarantee how the investment option will perform in the future. Your investment in these options could lose money. Information about an investment option's principal risks is available on the website listed above.

Table1 also shows the Total Annual Operating Expenses of each investment option. Total Annual Operating Expenses are expenses that reduce the rate of return of the investment option[2]. The cumulative effect of fees and expenses can substantially reduce the growth of your retirement savings. Visit the U.S. Department of Labor's website for an example showing the long-term fees and expenses at http://www.dol.gov/ebsa. Fees and expenses are only one of many factors to consider when you decide to invest in an option. You may also want to think about whether an investment in a particular option, along with your other investments, will help you achieve your financial goals.

Table 1 - Variable Net Return Investments

Name of Fund / *Name of Benchmark*	Performance 3 Month	Performance 1 Year	Annualized Performance 5 Years	Annualized Performance 10 Years	Annualized Performance Since Inception	Inception Date	Total Annual Operating Expenses[3] As a %	Total Annual Operating Expenses[3] Per $1000
Equity Funds								
State Street Russell All Cap Index Fund - Class 1	7.76	15.09	10.22	-	11.90	10/07/13	0.41%	$4.10
Russell 3000 Index	7.90	15.49	10.61	-	12.28			
State Street Global All Cap Equity ex-US Index Fund - Class 1	7.18	10.98	3.95	-	3.72	10/07/13	0.46%	$4.60
MSCI ACWI ex-USA IMI Index (net)	7.26	11.07	4.10	-	3.94			
Fixed Income								
State Street US ShortTerm Gov't/Credit Bond Index Fund - Class 1	0.17	4.12	1.08	-	0.97	10/07/13	0.45%	$4.50
Bloomberg Barclays Cap US 1-3 yr Gov't/Credit Bond Index	0.29	4.58	1.57	-	1.47			
State Street US Bond Fund Index - Class 1	-0.40	10.39	2.73	-	3.12	10/07/13	0.40%	$4.00
Bloomberg Barclays Capital US Aggregate Bond Index	-0.28	10.79	3.08	-	3.44			
Real Assets								
State Street Real Asset Fund - Class A	1.23	5.43	0.77	-	0.89	10/08/13	0.55%	$5.50
State Street Custom Benchmark[4]	1.33	5.88	1.21	-	1.34			
Cash (Cash Equivalents)								
State Street STIF	0.42	2.08	0.87	-	0.82	09/02/14	0.45%	$4.50
BofA ML 3-month US T-Bill	0.49	2.32	1.05	-	1.00			
Target Retirement Date Funds[5]								
CalPERS Target Income Fund	2.03	10.86	3.33	4.40	5.40	12/01/08	0.42%	$4.20
SIP Income Policy Benchmark[6]	2.14	11.21	3.63	4.87	6.00			
CalPERS Target Retirement 2015	2.43	11.03	3.27	5.09	6.59	12/01/08	0.42%	$4.20
SIP 2015 Policy Benchmark [6]	2.54	11.36	3.56	5.65	7.20			
CalPERS Target Retirement 2020	3.42	11.54	3.40	5.51	7.14	12/01/08	0.43%	$4.30
SIP 2020 Policy Benchmark[6]	3.54	11.87	3.70	6.04	7.73			
CalPERS Target Retirement 2025	4.36	11.92	4.09	6.23	7.92	12/01/08	0.43%	$4.30
SIP 2025 Policy Benchmark[6]	4.48	12.24	4.38	6.75	8.49			
CalPERS Target Retirement 2030	5.35	12.24	4.47	6.82	8.70	12/01/08	0.44%	$4.40
SIP 2030 Policy Benchmark[6]	5.46	12.55	4.76	7.35	9.24			
CalPERS Target Retirement 2035	6.35	12.64	4.95	7.36	9.33	12/01/08	0.44%	$4.40
SIP 2035 Policy Benchmark[6]	6.46	12.95	5.24	7.92	9.94			
CalPERS Target Retirement 2040	6.90	12.90	5.48	7.82	9.78	12/01/08	0.44%	$4.40
SIP 2040 Policy Benchmark[6]	7.01	13.19	5.77	8.37	10.35			
CalPERS Target Retirement 2045	6.90	12.90	6.00	8.11	10.00	12/01/08	0.44%	$4.40
SIP 2045 Policy Benchmark[6]	7.01	13.19	6.28	8.65	10.62			
CalPERS Target Retirement 2050	6.90	12.90	6.00	8.10	10.09	12/01/08	0.44%	$4.40
SIP 2050 Policy Benchmark[6]	7.01	13.19	6.28	8.65	10.62			
CalPERS Target Retirement 2055	6.90	12.89	6.00	-	6.46	11/01/13	0.44%	$4.40
SIP 2055 Policy Benchmark[6]	7.01	13.19	6.28	-	6.84			
CalPERS Target Retirement 2060	6.90	12.87	-	-	13.24	11/01/18	0.44%	$4.40
SIP 2060 Policy Benchmark[6]	7.01	13.19	-	-	13.56			
Broad-Based Benchmarks[7]								
Russell 3000 Index	7.90	15.49	10.61	13.41	-	-	-	-
MSCI ACWI ex-USA IMI Index (net)	7.26	11.07	4.10	4.98	-	-	-	-
Bloomberg Barclays Capital US Aggregate Bond Index	-0.28	10.79	3.08	3.59	-	-	-	-

Part II. Explanation of CalPERS 457 Plan Expenses
November 30, 2019

https://calpers.voya.com

Table 2 provides information concerning Plan administrative fees and expenses that may be charged to your individual account if you take advantage of certain features of the Plan. In addition to the fees and expenses described in Table 2 below, some of the Plan's administrative expenses are paid from the Total Annual Operating Expenses of the Plan's investment options.

Table 2 - Fees and Expenses

Individual Expenses[8]

Service	Fee Amount	Frequency	Who do you pay this fee to?	Description
Loan Origination Fee	$50	Per loan application	Voya	The charge covers the processing of your loan and applies each time you request a loan from your retirement account. This fee is deducted from your Plan account.
Self-Managed Account (SMA) Maintenance Fee	$50	Annual fee deducted monthly on a pro-rata basis	Voya	Schwab Personal Choice Retirement Account is available to you if your Employer has elected it as an option. This fee is deducted pro rata on a monthly basis from your core fund investments[9] in your CalPERS 457 account. For more information about SMAs, including a complete list of fees charged by Schwab for different types of investment transactions, please contact Schwab at (888) 393-PCRA (7272). Fees may also be incurred as a result of actual brokerage account trades. Before purchasing or selling any investment through the SMA, you should contact Schwab at (888) 393-PCRA (7272) to inquire about any fees, including any undisclosed fees, associated with the purchase or sale of such investment.
Self-Managed Account (SMA) Plan Administrative Fee	0.38% ($3.80 per $1,000)	Annual fee deducted monthly on a pro-rata basis	Voya	The SMA Plan Administrative fee pays for recordkeeping costs for assets in your SMA account. This fee is deducted pro rata on a monthly basis from your core fund investments in your CalPERS 457 account. The SMA Plan Administrative Fee is subject to change based on total Plan assets.

Footnotes for Table 1 and Table 2:

1 Fund returns shown are net of investment management and administrative expenses and fees unless otherwise noted. Benchmark performance returns do not reflect any management fees, transaction costs or expenses. Benchmarks are unmanaged. You cannot invest directly in a benchmark.

2 Historical annual operating expenses are not available. Reported annual operating expenses are estimated based on SSGA investment management, Voya recordkeeping, and SSGA capped operating expenses.

3 Total annual operating expenses are comprised of investment management and administrative expenses and fees incurred by the funds.

4 State Street Real Asset Fund has a custom benchmark comprised of 25% Bloomberg Roll Select Commodity Index, 25% S&P® Global LargeMidCap Commodity and Resources Index, 15% Dow Jones U.S. Select REIT Index, 25% Bloomberg Barclays U.S. TIPS Index, and 10% S&P Global Infrastructure Index NL SF Class A.

5 If the ending market value (EMV) falls to zero in any one month, the inception date resets to the next month with an EMV. Performance is then calculated from the new inception date.

6 The benchmark for each Target Retirement Date Fund is a composite of asset class benchmarks that are weighted according to each Fund's policy target weights. The asset class benchmarks are Russell 3000 Index, MSCI ACWI ex-USA IMI Index (net), Bloomberg Barclays Cap US 1-3 yr Gov't/Credit Bond Index, Bloomberg Barclays Capital US Aggregate Bond Index, the SSGA customized benchmark for Real Assets (see footnote 5), and BofA ML 3-month US T-Bill.

7 Broad-based benchmarks grouped here provide comparative performance standards for domestic equity, international equity and fixed income.

8 The CalPERS Board of Administration periodically reviews the plan administrative fees and adjusts fees to reflect expenses incurred by the Plan. Participant fees are charged to reimburse CalPERS for actual administrative fees of the Plan.

9 Core fund investments are listed in Table 1 above the Target Retirement Date funds. Core funds include: State Street Russell All Cap Index Fund (Class 1), State Street Global All Cap Equity ex-US Index Fund (Class 1), State Street US Short Term Government/Credit Bond Index Fund (Class 1), State Street US Bond Fund Index (Class 1), State Street Real Asset Fund (Class A), and State Street Short Term Investment Fund ("STIF").

Lincoln Financial Group℠

Multi-Fund®

Performance Update

MultiFund

Quoted performance data represents past performance. Past performance does not guarantee nor predict future performance. Current performance may be lower or higher than the performance data quoted. Please keep in mind that double-digit returns are highly unusual and cannot be sustained.

Variable products are sold by prospectus. Consider the investment objectives, risks, charges, and expenses of the variable product and its underlying investment options carefully before investing. The prospectus contains this and other information about the variable product and its underlying investment options. Please review the prospectus available online for additional information. Read it carefully before investing.

Investment return and principal value of an investment will fluctuate so that an investor's unit values, when redeemed, may be worth more or less than their original cost.

Monthly hypothetical performance adjusted for contract fees *

						Average Annual Total Return (%) as of 12/31/2019						
Investment Option		Inception Date	Change from Previous Day	YTD as of 12/31/2019	YTD as of 12/31/2019	1 Mo	3 Mo	1 Yr	3 Yr	5 Yr	10 Yr	Since Incep.
Maximum Capital Appreciation												
AB VPS Global Thematic Growth Portfolio - Class B[1, 2]	MCA	01/11/1996	0.25	28.49	28.49	2.75	8.84	28.49	15.61	9.03	6.86	4.90
Delaware VIP® Smid Cap Core Series - Standard Class[4, 8]	MCA	07/12/1991	0.13	28.34	28.34	1.14	7.47	28.34	9.46	8.41	13.01	9.10
DWS Alternative Asset Allocation VIP Portfolio - Class A[1, 2, 3, 9, 10]	MCA	02/02/2009	0.15	13.54	13.54	2.21	2.67	13.54	2.79	0.99	2.27	4.21
LVIP Baron Growth Opportunities Fund - Service Class[8]	MCA	10/01/1998	0.17	35.02	35.02	0.89	7.61	35.02	17.39	9.77	13.22	10.81
LVIP SSGA Emerging Markets 100 Fund - Standard Class[1, 19]	MCA	06/18/2008	0.02	6.54	6.54	5.64	8.73	6.54	4.28	1.25	1.53	2.23
LVIP SSGA Small-Cap Index Fund - Standard Class[8, 18]	MCA	04/18/1986	0.26	23.79	23.79	2.76	9.57	23.79	7.09	6.72	10.25	6.86
LVIP T. Rowe Price Structured Mid-Cap Growth Fund - Standard Class[8]	MCA	02/03/1994	0.22	36.03	36.03	1.65	8.26	36.03	17.25	11.65	13.55	6.72
Long Term Growth												
American Funds Global Growth Fund - Class 2[1]	LTG	04/30/1997	0.28	33.93	33.93	3.72	12.40	33.93	16.22	10.61	10.01	8.84
American Funds Growth Fund - Class 2	LTG	02/08/1984	0.26	29.47	29.47	3.13	13.02	29.47	17.54	13.24	12.85	11.49
American Funds International Fund - Class 2[1]	LTG	05/01/1990	0.24	21.66	21.66	3.85	9.18	21.66	11.03	5.81	4.97	6.85
Delaware VIP Small Cap Value[4, 8]	LTG	12/27/1993	0.02	26.45	26.45	3.39	8.47	26.45	4.78	6.69	10.56	9.26
Fidelity® VIP Contrafund® Portfolio - Service Class	LTG	01/03/1995	0.21	30.14	30.14	2.34	9.79	30.14	13.25	9.09	11.07	10.01

Performance Update

MultiFund

Monthly hypothetical performance adjusted for contract fees *

Investment Option		Inception Date	Change from Previous Day	YTD as of 12/31/2019	YTD as of 12/31/2019	Average Annual Total Return (%) as of 12/31/2019 1 Mo	3 Mo	1 Yr	3 Yr	5 Yr	10 Yr	Since Incep.
Fidelity® VIP Growth Portfolio - Service Class	LTG	10/09/1986	0.23	32.85	32.85	3.62	11.10	32.85	20.58	13.12	14.27	9.36
LVIP BlackRock Global Real Estate Fund - Standard Class[1, 2, 7]	LTG	04/30/2007	0.68	23.67	23.67	0.73	2.23	23.67	7.20	3.83	6.14	1.05
LVIP Delaware Social Awareness Fund - Standard Class[4]	LTG	05/02/1988	0.31	30.66	30.66	2.68	9.61	30.66	13.68	8.81	11.37	9.72
LVIP Delaware Special Opportunities Fund - Standard Class[4, 8]	LTG	12/28/1981	0.24	29.13	29.13	2.41	6.80	29.13	8.31	8.49	11.35	10.42
LVIP Dimensional U.S. Core Equity 1 Fund - Standard Class	LTG	12/28/1981	0.26	28.81	28.81	2.91	8.76	28.81	12.26	9.23	11.39	9.59
LVIP Mondrian International Value Fund - Standard Class[1]	LTG	05/01/1991	0.33	17.07	17.07	3.92	9.60	17.07	7.22	3.87	3.92	5.56
LVIP SSGA International Index Fund - Standard Class[1, 18, 20]	LTG	04/30/2008	0.23	20.37	20.37	2.93	7.55	20.37	8.28	4.42	4.07	1.04
LVIP SSGA S&P 500 Index Fund - Standard Class[18, 21]	LTG	05/01/2000	0.30	29.89	29.89	2.90	8.73	29.89	13.86	10.34	12.15	4.87
LVIP Vanguard Domestic Equity ETF Fund - Service Class[9, 22]	LTG	04/29/2011	0.24	28.67	28.67	2.56	8.06	28.67	12.76	9.34	N/A	10.18
LVIP Vanguard International Equity ETF Fund - Service Class[1, 9, 22]	LTG	04/29/2011	0.43	20.69	20.69	4.23	9.07	20.69	8.81	4.81	N/A	2.71
MFS® VIT Utilities Series - Initial Class[2]	LTG	01/03/1995	0.37	23.82	23.82	3.29	1.42	23.82	12.09	5.64	8.89	10.36
Growth and Income												
American Funds Growth-Income Fund - Class 2	GI	02/08/1984	0.26	24.88	24.88	2.79	8.65	24.88	13.73	10.29	11.41	10.04
BlackRock Global Allocation V.I. Fund - Class I[1, 3]	GI	02/28/1992	0.23	16.81	16.81	2.36	5.79	16.81	6.50	4.12	4.80	6.10
Delaware VIP REIT[2, 4, 7]	GI	05/04/1998	0.82	25.55	25.55	-1.36	-0.52	25.55	5.05	4.53	9.97	7.95
Delaware VIP Value[4]	GI	07/28/1988	0.42	18.83	18.83	3.13	5.60	18.83	8.87	7.65	11.81	8.01
Fidelity® VIP Freedom 2020 Portfolio℠ - Service Class[9, 11]	GI	04/26/2005	0.07	18.81	18.81	2.08	4.91	18.81	8.44	5.72	6.93	5.57
Fidelity® VIP Freedom 2025 Portfolio℠ - Service Class[9, 11]	GI	04/26/2005	0.13	20.48	20.48	2.33	5.55	20.48	9.13	6.13	7.68	6.07
Fidelity® VIP Freedom 2030 Portfolio℠ - Service Class[9, 11]	GI	04/26/2005	0.19	23.13	23.13	2.69	6.54	23.13	10.33	6.93	8.25	6.28
Fidelity® VIP Freedom 2035 Portfolio℠ - Service Class[9, 11]	GI	04/08/2009	0.24	26.06	26.06	3.20	7.85	26.06	11.34	7.53	8.88	11.61

Performance Update

MultiFund

Monthly hypothetical performance adjusted for contract fees *

Investment Option		Inception Date	Change from Previous Day	YTD as of 12/31/2019	YTD as of 12/31/2019	Average Annual Total Return (%) as of 12/31/2019 1 Mo	3 Mo	1 Yr	3 Yr	5 Yr	10 Yr	Since Incep.
Fidelity® VIP Freedom 2040 Portfolio℠ - Service Class[9, 11]	GI	04/08/2009	0.30	27.11	27.11	3.47	8.52	27.11	11.46	7.62	8.98	11.78
Fidelity® VIP Freedom 2045 Portfolio℠ - Service Class[9, 11]	GI	04/08/2009	0.26	27.12	27.12	3.43	8.49	27.12	11.46	7.61	9.05	11.87
Fidelity® VIP Freedom 2050 Portfolio℠ - Service Class[9, 11]	GI	04/08/2009	0.24	27.11	27.11	3.43	8.49	27.11	11.44	7.60	9.08	12.00
LVIP BlackRock Advantage Allocation Fund - Standard Class[3, 4, 12]	GI	07/28/1988	0.01	15.50	15.50	1.36	3.69	15.50	6.99	4.43	5.75	5.66
LVIP Delaware Wealth Builder Fund - Standard Class[3, 4, 12]	GI	08/03/1987	0.13	14.75	14.75	1.49	2.70	14.75	6.18	4.10	6.18	6.03
LVIP JPMorgan Retirement Income Fund - Standard Class[3, 4, 12]	GI	04/27/1983	0.01	12.80	12.80	1.15	2.75	12.80	5.41	3.55	4.96	6.59
Income												
Delaware VIP Diversified Income[4, 5]	I	05/16/2003	-0.19	9.33	9.33	0.01	0.03	9.33	3.34	2.07	3.05	4.31
Delaware VIP High Yield[4, 5, 6]	I	07/28/1988	0.00	15.27	15.27	1.92	2.37	15.27	5.07	3.75	5.65	5.69
LVIP BlackRock Inflation Protected Bond Fund - Standard Class[5]	I	04/30/2010	0.01	4.84	4.84	0.40	0.17	4.84	1.74	0.78	N/A	1.42
LVIP Delaware Bond Fund - Standard Class[4, 5]	I	12/28/1981	-0.18	8.12	8.12	-0.14	-0.14	8.12	3.13	2.08	3.12	6.67
LVIP Delaware Diversified Floating Rate Fund[4, 15]	I	04/30/2010	0.01	3.30	3.30	0.29	0.55	3.30	1.18	0.51	N/A	0.36
LVIP Global Income Fund - Standard Class[1, 5, 12, 14]	I	05/04/2009	-0.03	5.67	5.67	0.02	-0.50	5.67	3.50	1.37	1.87	2.65
LVIP SSGA Bond Index Fund - Standard Class[5, 18]	I	04/30/2008	-0.21	7.16	7.16	-0.29	-0.32	7.16	2.61	1.66	2.32	2.51
PIMCO VIT Total Return Portfolio - Administrative Class[5]	I	12/31/1997	-0.17	7.28	7.28	-0.29	-0.46	7.28	3.14	2.10	2.85	4.29
Preservation of Capital												
LVIP Government Money Market Fund - Standard Class[12, 17]	PC	01/07/1982	0.00	0.78	0.78	0.02	0.09	0.78	0.19	-0.28	-0.62	2.86
Risk Managed - Asset Allocation												
LVIP Global Conservative Allocation Managed Risk Fund - Standard Class[1, 3, 9, 12, 16]	RM	05/03/2005	0.03	13.86	13.86	1.18	3.30	13.86	5.62	3.52	5.13	4.84
LVIP Global Growth Allocation Managed Risk Fund - Standard Class[1, 3, 9, 12, 16]	RM	05/03/2005	0.15	14.70	14.70	2.10	5.77	14.70	6.79	3.78	5.17	4.43

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Performance Update

MultiFund

Monthly hypothetical performance adjusted for contract fees *

Investment Option		Inception Date	Change from Previous Day	YTD as of 12/31/2019	YTD as of 12/31/2019	Average Annual Total Return (%) as of 12/31/2019 1 Mo	3 Mo	1 Yr	3 Yr	5 Yr	10 Yr	Since Incep.
LVIP Global Moderate Allocation Managed Risk Fund - Standard Class[1, 3, 9, 12, 16]	RM	05/03/2005	0.11	13.87	13.87	1.81	4.99	13.87	6.46	3.58	5.07	4.68
LVIP SSGA Global Tactical Allocation Managed Volatility Fund - Standard Class[1, 3, 9, 12, 13, 14]	RM	05/03/2005	0.17	14.60	14.60	2.01	5.00	14.60	5.80	2.76	4.19	3.48
Risk Managed - US Large Cap												
LVIP BlackRock Dividend Value Managed Volatility Fund - Standard Class[12, 13]	RM	02/03/1994	0.31	17.41	17.41	2.69	6.98	17.41	7.26	5.20	7.26	6.56
LVIP Blended Large Cap Growth Managed Volatility Fund - Standard Class[12, 13, 14]	RM	02/03/1994	0.23	18.74	18.74	2.49	8.65	18.74	11.99	6.61	7.78	6.40
Asset Allocation												
Fidelity® VIP Freedom 2055 Portfolio℠ - Service Class[7, 9]	AsA	04/11/2019	0.27	N/A	N/A	3.51	8.46	N/A	N/A	N/A	N/A	10.97
Fidelity® VIP Freedom 2060 Portfolio℠ - Service Class[7, 9]	AsA	04/11/2019	0.27	N/A	N/A	3.52	8.48	N/A	N/A	N/A	N/A	10.99
LVIP T. Rowe Price 2010 Fund (Standard Class)[9, 11, 12]	AsA	05/01/2007	0.04	14.58	14.58	1.48	3.39	14.58	5.65	3.50	4.68	3.52
LVIP T. Rowe Price 2020 Fund (Standard Class)[9, 11, 12]	AsA	05/01/2007	0.08	17.74	17.74	1.86	4.56	17.74	6.87	4.09	5.08	3.49
LVIP T. Rowe Price 2030 Fund (Standard Class)[9, 11, 12]	AsA	05/01/2007	0.14	20.93	20.93	2.30	5.91	20.93	7.52	4.23	5.28	3.48
LVIP T. Rowe Price 2040 Fund (Standard Class)[9, 11, 12]	AsA	05/01/2007	0.18	23.20	23.20	2.65	6.89	23.20	8.11	4.47	5.53	3.18
LVIP T. Rowe Price 2050 Fund (Standard Class)[9, 11, 12]	AsA	04/29/2011	0.20	23.91	23.91	2.79	7.29	23.91	9.19	5.10	N/A	4.27
Risk Managed - US Mid Cap												
LVIP Blended Mid Cap Managed Volatility Fund - Standard Class[8, 12, 13, 14]	RM	05/01/2001	0.24	23.67	23.67	1.42	7.22	23.67	15.17	7.96	7.29	3.90
LVIP JPMorgan Select Mid Cap Value Managed Volatility Fund - Standard Class[8, 12, 13, 14]	RM	05/01/2001	0.40	15.00	15.00	2.41	6.00	15.00	4.47	2.55	7.28	5.76
Risk Managed - Global/International												
LVIP Franklin Templeton Global Equity Managed Volatility Fund - Standard Class[1, 12, 13]	RM	08/01/1985	0.23	11.67	11.67	2.83	6.65	11.67	6.48	2.20	4.55	6.88

Performance Update

Monthly hypothetical performance adjusted for contract fees *

Investment Option		Inception Date	Change from Previous Day	YTD as of 12/31/2019	YTD as of 12/31/2019	Average Annual Total Return (%) as of 12/31/2019 1 Mo	3 Mo	1 Yr	3 Yr	5 Yr	10 Yr	Since Incep.
LVIP SSGA International Managed Volatility Fund - Standard Class[1, 9, 12, 13]	RM	12/31/2013	0.24	17.60	17.60	2.92	7.51	17.60	7.94	2.77	N/A	0.99

* These returns are measured from the inception date of the fund and predate its availability as an investment option in the variable annuity (separate account). This hypothetical representation depicts how the investment option would have performed had the fund been available in the variable annuity during the time period. It includes deductions for the M&E charge, the contract administrative fee and a pro rata deduction for the annual contract charge. If selected above, the cost for a feature or death benefit will be reflected. No surrender charge is reflected.

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[1] International
Investing internationally involves risks not associated with investing solely in the United States, such as currency fluctuation, political or regulatory risk, currency exchange rate changes, differences in accounting and the limited availability of information.

[2] Sector Funds
Funds that target exposure to one region or industry may carry greater risk and higher volatility than more broadly diversified funds.

[3] Asset Allocation Portfolios
Asset allocation does not ensure a profit, nor protect against loss in a declining market.

[4] Macquarie Investment Management
Investments in Delaware VIP Series, Delaware Funds, LVIP Delaware Funds or Lincoln Life accounts managed by Macquarie Investment Management Advisers, a series of Macquarie Investments Management Business Trust, are not and will not be deposits with or liabilities of Macquarie Bank Limited ABN 46 008 583 542 and its holding companies, including their subsidiaries or related companies, and are subject to investment risk, including possible delays in repayment and loss of income and capital invested. No Macquarie Group company guarantees or will guarantee the performance of the fund, the repayment of capital from the fund, or any particular rate of return.

[5] Bonds
The return of principal in bond funds is not guaranteed. Bond funds have the same interest rate, inflation, credit, duration, prepayment and market risks that are associated with the underlying bonds owned by the fund or account.

[6] High-yield or mortgage-backed funds
High-yield funds may invest in high-yield or lower rated fixed income securities (junk bonds) or mortgage-backed securities with exposure to subprime mortgages, which may experience higher volatility and increased risk of nonpayment or default.

[7] REIT
A real estate investment trust (REIT) involves risks such as refinancing, economic conditions in the real estate industry, declines in property values, dependency on real estate management, changes in property taxes, changes in interest rates and other risks associated with a portfolio that concentrates its investments in one sector or geographic region.

[8] Small & Mid Cap
Funds that invest in small and/or midsize company stocks may be more volatile and involve greater risk, particularly in the short term, than those investing in larger, more established companies.

[9] Fund of funds
Each fund is operated as a fund of funds that invests primarily in one or more other funds, rather than in individual securities. A fund of this nature may be more expensive than other investment options because it has additional levels of expenses. From time to time, the Fund's advisor may modify the asset allocation to the underlying funds and may add new funds. A Fund's actual allocation may vary from the target strategic allocation at any point in time. Additionally, the Fund's advisor may directly manage assets of the underlying funds for a variety of purposes.

[10] Alternative Funds
Certain funds (sometimes called "alternative funds") expect to invest in (or may invest in some) positions that emphasize alternative investment strategies and/or nontraditional asset classes and, as a result, are subject to the risk factors of those asset classes and/or investment strategies. Some of those risks may include general economic risk, geopolitical risk, commodity-price volatility, counterparty and settlement risk, currency risk, derivatives risk, emerging markets risk, foreign securities risk, high-yield bond exposure, index investing risk, exchange-traded notes risk, industry concentration risk, leveraging risk, real estate investment risk, master limited partnership risk, master limited partnership tax risk, energy infrastructure companies risk, sector risk, short sale risk, direct investment risk, hard assets sector risk, active trading and "overlay" risks, event-driven investing risk, global macro strategies risk, temporary defensive positions and large cash positions. If you are considering investing in alternative investment funds, you should ensure that you understand the complex investment strategies sometimes employed and be prepared to tolerate the risks of such asset classes. For a complete list of risks, as well as a discussion of risk and investment strategies, please refer to the fund's prospectus. The fund may invest in derivatives, including futures, options, forwards and swaps. Investments in derivatives may cause the fund's losses to be greater than if it invested only in conventional securities and can cause the fund to be more volatile. Derivatives involve risks different from, or possibly greater than, the risks associated with other investments. The fund's use of derivatives may cause the fund's investment returns to be impacted by the performance of securities the fund does not own and may result in the fund's total investment exposure exceeding the value of its portfolio.

[11] Target-date funds
The target date is the approximate date when investors plan to retire or start withdrawing their money. Some target-date funds make no changes in asset allocation after the target date is reached; other target-date funds continue to make asset allocation changes following the target date. (See the prospectus for the funds allocation strategy.) The principal value is not guaranteed at any time, including at the target date. An asset allocation strategy does not guarantee performance or protect against investment losses. A "fund of funds" may be more expensive than other types of investment options because it has additional levels of expenses.

[12] Manager of managers funds
Subject to approval of the fund's board, Lincoln Investment Advisors Corporation (LIAC) has the right to engage or terminate a subadvisor at any time, without a shareholder vote, based on an exemptive order from the Securities and Exchange Commission. LIAC is responsible for overseeing all subadvisors for funds relying on this exemptive order.

[13] Managed Volatility Strategy
The fund's managed volatility strategy is not a guarantee, and the fund's shareholders may experience losses. The fund employs hedging strategies designed to reduce overall portfolio volatility. The use of these hedging strategies may limit the upside participation of the fund in rising equity markets relative to unhedged funds, and the effectiveness of such strategies may be impacted during periods of rapid or extreme market events.

[14] Multimanager
For those funds that employ a multimanager structure, the funds advisor is responsible for overseeing the subadvisors. While the investment styles employed by the funds subadvisors are intended to be complementary, they may not, in fact, be complementary. A multimanager approach may result in more exposure to certain types of securities risks and in higher portfolio turnover.

[15] Floating rate funds
Floating rate funds should not be considered alternatives to CDs or money market funds and should not be considered as cash alternatives.

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[16] Risk Management Strategy
The fund's risk management strategy is not a guarantee, and the funds shareholders may experience losses. The fund employs hedging strategies designed to provide downside protection during sharp downward movements in equity markets. The use of these hedging strategies may limit the upside participation of the fund in rising equity markets relative to other unhedged funds, and the effectiveness of such strategies may be impacted during periods of rapid or extreme market events.

[17] Money Market Funds
You can lose money by investing in the fund. Although the fund seeks to preserve the value of your investment at $1.00 per share (or, for the LVIP Government Money Market Fund, at $10.00 per share), it cannot guarantee it will do so. An investment in the fund is not insured or guaranteed by the Federal Deposit Insurance Corporation or any other government agency. The funds sponsor has no legal obligation to provide financial support to the fund, and you should not expect that the sponsor will provide financial support to the fund at any time.

[18] Index
An index is unmanaged, and one cannot invest directly in an index. Indices do not reflect the deduction of any fees.

[19] Emerging Markets
Investing in emerging markets can be riskier than investing in well-established foreign markets. International investing involves special risks not found in domestic investing, including increased political, social and economic instability, all of which are magnified in emerging markets.

[20] MSCI
The fund described herein is indexed to an MSCI® index. It is not sponsored, endorsed, or promoted by MSCI®, and MSCI®; bears no liability with respect to any such fund or to an index on which a fund is based. The prospectus and statement of additional information contain a more detailed description of the limited relationship MSCI®; has with Lincoln Investment Advisors Corporation and any related funds.

[21] S&P
The Index to which this fund is managed is a product of S&P Dow Jones Indices LLC (SPDJI) and has been licensed for use by one or more of the portfolio's service providers (licensee). Standard & Poor's®; and S&P® are registered trademarks of Standard & Poor's Financial Services LLC (S&P); Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC (Dow Jones); and these trademarks have been licensed for use by SPDJI and sublicensed for certain purposes by the licensee. S&P®, S&P GSCI® and the Index are trademarks of S&P and have been licensed for use by SPDJI and its affiliates and sublicensed for certain purposes by the licensee. The Index is not owned, endorsed, or approved by or associated with any additional third party. The licensee's products are not sponsored, endorsed, sold or promoted by SPDJI, Dow Jones, S&P, their respective affiliates, or their third party licensors, and none of these parties or their respective affiliates or third party licensors make any representation regarding the advisability of investing in such products, nor do they have liability for any errors, omissions, or interruptions of the Index®.

[22] Exchange-traded funds
Exchange-traded funds (ETFs) in this lineup are available through collective trusts or mutual funds. Investors cannot invest directly in an ETF.

Important Disclosures

Variable products are issued by The Lincoln National Life Insurance Company, Fort Wayne, IN, distributed by Lincoln Financial Distributors, Inc., and offered by broker/dealers with an effective selling agreement. The Lincoln National Life Insurance Company is not authorized nor does it solicit business in the state of New York. **Contractual obligations are backed by the claims-paying ability of The Lincoln National Life Insurance Company.**

Limitations and exclusions may apply.

Lincoln Financial Group is the marketing name for Lincoln National Corporation and its affiliates. Affiliates are separately responsible for their own financial and contractual obligations.

Asset Categories

- MCA = Maximum Capital Appreciation
- LTG = Long Term Growth
- GI = Growth and Income
- I = Income
- PC = Preservation of Capital
- RM = Risk Managed - Asset Allocation
- RM = Risk Managed - US Large Cap
- AsA = Asset Allocation
- RM = Risk Managed - US Mid Cap
- RM = Risk Managed - Global/International

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DISTRICT CORRESPONDENCE

Board Meeting of January 6, 2020

Date: **Correspondence Sent To:**

1. 12/17/2019 Mark Mintz, CEO
   Innovative Micro Technology, Inc.
   Subject: Goleta Sanitary District Permitted Capacity Discharge Innovative Micro Technology
   APN 073-050-041

2. 12/30/2019 Eric Geeb, General Manager
   Cathedral Oaks Athletic Club
   Subject: Goleta Sanitary District Permitted Capacity Discharge Cathedral Oaks Athletic Club
   5800 Cathedral Oaks Rd., Goleta, CA

3. 01/03/2020 Jeff McKee
   Santa Barbara Airport
   Subject: Notice of Violation – Discharging without a valid Industrial User Permit

Date: **Correspondence Received From:**

1. 12/13/2019 State of California
   Employment Development Department
   Subject: Assembly Bill 5 (AB 5) Effective January 1, 2020

2. 12/23/2019 Goleta Old Town Christmas Parade
   Subject: Thank you of Support to Goleta Sanitary District

Hard Copies of the Correspondence are available at the District's Office for review