I hereby certify that the following agenda was posted at least 72 hours prior to the time of the meeting so noticed below at 24251 Los Alisos Boulevard, Lake Forest, California.

DENNIS P. CAFFERTY, Secretary
of the El Toro Water District and
the Board of Directors thereof

AGENDA

EL TORO WATER DISTRICT

REGULAR MEETING OF THE BOARD OF DIRECTORS

FINANCE AND INSURANCE COMMITTEE MEETING AND ENGINEERING COMMITTEE MEETING

FEBRUARY 22, 2022

7:30 a.m.

Members of the public who wish to comment on any item within the jurisdiction of the District or on any item on the agenda, attend the meeting in person at the District's office or may observe and address the Meeting by joining at this link: Monhttps://us02web.zoom.us/j/81210634915 (Meeting ID: 812 1063 4915).

Members of the public who wish only to listen to the telephonic meeting may dial in at the following numbers (669) 900-6833 or (346) 248-7799 with the same Meeting ID noted above. Please be advised the Meeting is being recorded.

CALL TO ORDER – President Freshley

PLEDGE OF ALLEGIANCE – Director Monin

ORAL COMMUNICATIONS/PUBLIC COMMENTS

Members of the public may address the Board at this time or they may reserve this opportunity with regard to an item on the agenda until said item is discussed by the Board. Comments on other items will be heard at the times set aside for "COMMENTS REGARDING NON-AGENDA ENGINEERING COMMITTEE ITEMS" or for "COMMENTS REGARDING NON-AGENDA FIC ITEMS." The public may identify themselves when called on and limit their comments to three minutes.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED

Determine need and take action to agendize item(s) which arose subsequent to the posting of the Agenda. (ROLL CALL VOTE: Adoption of this recommendation requires a two-thirds vote of the Board members present, or, if less than two-thirds of the Board members are present, a unanimous vote of those members present.)

FINANCE AND INSURANCE COMMITTEE MEETING

CALL MEETING TO ORDER – Director Monin

1. Consent Calendar (Reference Material Included)

(All matters under the Consent Calendar will be approved by one motion unless a Board member or a member of the public requests separate action or discussion on a specific item)

a. Consider approving the minutes of the January 24, 2022 Finance and Insurance Committee meeting (Minutes Included)

Recommended Action: The Board will be requested to approve the above Consent Calendar.

APPROVAL OF ITEMS REMOVED FROM TODAY'S FINANCE AND INSURANCE COMMITTEE CONSENT CALENDAR

The Board will discuss items removed from today's Finance and Insurance Committee Consent Calendar requiring further discussion.

Recommended Action: The Board will be requested to approve the items removed from today's Finance and Insurance Committee Consent Calendar.

2. Quarterly Review of the District's 401(k) Retirement Savings Plan (Reference Material Included)

A HighMark representative will review and comment on the investment performance of the District's 401(k) Retirement Savings Plan.

FINANCIAL INFORMATION ITEMS

3. **Tiered Water Usage and Revenue Tracking** (Reference Material Included)

Staff will review and comment on monthly and year to date Tiered Water Usage and Revenue tracking.

4. **Update on the Implementation of the Springbrook Software System** (Reference Material Included)

Staff will provide an update on the status of the implementation of the Springbrook Software System.

5. **Update on Financing Plan for Near-term Future Capital Projects** (Oral Report)

Staff will provide an update on the status of the financing plan for upcoming large capital projects.

6. **2022/23 Fiscal Year Budget Preparation and Tentative Schedule Status Report** (Reference Material Included)

Staff will review and comment on the 2022/23 fiscal year Budget Preparation and Tentative Schedule.

FINANCIAL ACTION ITEMS

7. **Financial Package - Authorization to Approve Bills for Consideration dated February 22, 2022 and Receive and File Financial Statements as of January 31, 2022** (Reference Material Included)

The Board will consider approving the Bills for Consideration dated February 22, 2022 and Receive and File Financial Statements as of January 31, 2022.

Recommended Action: Staff recommends that the Board 1) approve, ratify and confirm payment of those bills as set forth in the schedule of bills for consideration dated February 22, 2022, and 2) receive and file the Financial Statements for the period ending January 31, 2022.

COMMENTS REGARDING NON-AGENDA FIC ITEMS

CLOSE FINANCE AND INSURANCE COMMITTEE MEETING

ENGINEERING COMMITTEE

CALL MEETING TO ORDER – Director Vergara

8. Consent Calendar

(All matters under the Consent Calendar will be approved by one motion unless a Board member or a member of the public requests separate action or discussion on a specific item)

a. Consider approving the minutes of the January 27, 2022 Engineering Committee meeting. (Minutes Included)

Recommended Action: The Board will be requested to approve the subject minutes.

APPROVAL OF ITEMS REMOVED FROM TODAY'S ENGINEERING COMMITTEE CONSENT CALENDAR

The Board will discuss items removed from today's Engineering Committee Consent Calendar requiring further discussion.

Recommended Action: The Board will be requested to approve the items removed from today's Engineering Committee Consent Calendar.

ENGINEERING ACTION ITEMS

9. WRP Effluent Pump Station Rehabilitation Project (Reference Material Included)

Staff will review and comment on the bids submitted for the construction of the Water Recycling Plant Effluent Pump Station Rehabilitation Project.

Recommended Action: Staff recommends that the Board of Directors authorize the General Manager to enter into a contract with J.R. Filanc Construction Company, Inc. in the amount of $387,000 for the construction of the Water Recycling Plant Effluent Pump Station Rehabilitation Project. Staff further recommends that the Board authorize the General Manager to fund the project costs from the District's Capital Reserves in accordance with the District's adopted Capital Reserve Policy.

10. **R-6 Floating Cover Project Valves Pre-Purchase Contract** (Reference Material Included)

Staff will review and comment on the proposal received for the pre-purchase of the underwater valves to be replaced as part of the R-6 Floating Cover and Liner Replacement Project.

Recommended Action: Staff recommends that the Board of Directors authorize the General Manager to issue a purchase order to Henry Pratt in the amount of $183,084 for the purchase of several valves to be replaced as a component of the R-6 Floating Cover and Liner Replacement Project. Staff further recommends that the Board authorize the General Manager to fund the project costs from the District's Capital Reserves in accordance with the District's adopted Capital Reserve Policy.

11. **Master Plan Update** (Reference Material Included)

Staff will review and comment on the proposals received in response to a Request for Proposals for the Master Plan Update Project.

Recommended Action: Staff recommends that the Board of Directors authorize the General Manager to enter into a contract with Carollo Engineers, Inc. in the amount of $349,951 for the update of the District's Water and Sewer Master Plan. Staff further recommends that the Board authorize the General Manager to fund the project costs from the District's Capital Reserves in accordance with the District's adopted Capital Reserve Policy.

GENERAL INFORMATION ITEMS

12. **Board Room Expansion Project** (Reference Material Included)

Staff will provide an update on the evaluation of the potential expansion and upgrade of the District Board Room to meet evolving needs.

13. **Energy Efficiency Analysis Update** (Reference Material Included)

Staff will provide an update on the on-going energy efficiency analysis.

14. **El Toro Water District Capital Project Status Report** (Reference Material Included)

Staff will review and comment on the El Toro Water District Capital Project Status Report.

15. Engineering Items Discussed at Various Conferences and Meetings
(Oral Report)

The Committee will discuss any pertinent Engineering items discussed at Conferences.

COMMENTS REGARDING NON-AGENDA ENGINEERING COMMITTEE ITEMS

CLOSE ENGINEERING COMMITTEE MEETING

ATTORNEY REPORT

CLOSED SESSION

At this time the Board will go into Closed Session as follows:

1. Pursuant to Government Code Section 54956.9 (d) (1) to consult with legal counsel and staff on a matter of pending litigation. *Kessner et al. v. City of Santa Clara, et al. (Santa Clara County Superior Court - Case No. 20 CV 364054*).
2. Pursuant to Government Code Section 54956.9 (d) (2) to consult with legal counsel and staff – Anticipated Litigation (two matters).

REGULAR SESSION

REPORT ON CLOSED SESSION (Legal Counsel)

Mr. Granito will provide an oral report on the Closed Session.

ADJOURNMENT

The agenda material for this meeting is available to the public at the District's Administrative Office, which is located at 24251 Los Alisos Blvd., Lake Forest, Ca. 92630. If any additional material related to an open session agenda item is distributed to all or a majority of the board of directors after this agenda is posted, such material will be made available for immediate public inspection at the same location.

Request for Disability-Related Modifications or Accommodations

If you require any disability-related accommodation, including auxiliary aids or services, in order to participate in this public meeting, please telephone the District's Recording Secretary, Polly Welsch at (949) 837-7050, extension 225 at least forty-eight (48) hours prior to said meeting. If you prefer, your request may be submitted in writing to El Toro Water District, P.O. Box 4000, Laguna Hills, California 92654, Attention: Polly Welsch.

MINUTES OF THE REGULAR MEETING
OF THE
FINANCE & INSURANCE COMMITTEE

January 24, 2022

At approximately 7:30 a.m. President Freshley called the regular meeting to order.

Director Monin led in the Pledge of Allegiance to the flag.

Committee Members KATHRYN FRESHLEY, KAY HAVENS, MIKE GASKINS, JOSE VERGARA (via zoom), and MARK MONIN participated.

Also participating were DENNIS P. CAFFERTY, General Manager, JASON HAYDEN, CFO, GILBERT J. GRANITO, General Counsel, SCOTT HOPKINS, Operations Superintendent, HANNAH FORD, Engineering Manager, and RICHARD BABBE, CAMP Representative.

POLLY WELSCH, Recording Secretary was absent.

Oral Communications/Public Comments

There were no comments.

Items Received Too Late to be Agendized

President Freshley asked if there were any items received too late to be agendized. Mr. Cafferty replied no.

Finance & Insurance Committee Meeting

At approximately 7:32 a.m. Vice President Havens called the Finance meeting to order.

Consent Calendar

Vice President Havens asked for a Motion.

Motion: Director Gaskins made a motion, seconded by President Freshley and unanimously carried across the Board to approve the Consent Calendar.

Roll Call Vote:

Vice President Havens	aye
President Freshley	aye
Director Vergara	aye
President Gaskins	aye
Director Monin	aye

CAMP

Mr. Babbe stated that conditions have changed significantly due to rebounds from the pandemic, and an uneven labor market recovery. He further stated that the economy is expected to transition back to economic trend growth which would be 2-2.5%.

Mr. Babbe stated that the labor market has recovered from the pandemic even though some people have not returned to work.

Mr. Babbe stated that the Consumer Price Index in December was also the highest rate since 1982. He further stated that the components of the index are still increasing and this may be a concern in future months.

Mr. Babbe stated that the implied Federal Reserve Funds Rate projects that the Federal Reserve will increase short term rates a total of four times in 2022. He further stated that in December of 2020 the implied Federal Reserve Funds Rate forecasted no need to raise the Rate through 2023.

Mr. Babbe stated that the yield on Treasuries increased rapidly in the later months of 2021 and therefore the District's portfolio composition shifted funds from the CAMP pool into managed investments and corporate sectors.

Mr. Babbe stated that the District's portfolio contains ample liquidity in LAIF for on-going needs and projects. He further stated that market value earnings were negative for the 12-month period so the return on the portfolio for the year on a total return basis including unrealized losses was negative. He further stated that the book value strips away unrealized gains and losses, so the portfolio earned $33,000 for the 12-month period.

Mr. Babbe stated that for the quarter, total return performance was negative. He further stated that it will take time for the portfolio to catch up and achieve a higher yield.

Mr. Babbe stated that the portfolio yield will adjust to current market levels and the District's portfolio has shifted into individual securities to take advantage of the higher yields available on those securities.

Director Monin asked if Mr. Babbe had any thoughts on the yield curve. Mr. Babbe replied that rates in the 1-5 year range have increased significantly as the market recognizes that the Federal Reserve anticipates an increase in short term rates to get inflation under control.

Director Monin asked to include a yield curve in the next portfolio update. Mr. Babbe replied that he will include it.

Director Monin asked what is the average rating of the bonds in the investment portfolio. Mr. Babbe replied that it is measured by S&P and is a double A.

At approximately 8:00 a.m. Mr. Babbe left the meeting.

Financial Information Items

Tiered Water Usage and Revenue Tracking

There were no comments.

Update on the Implementation of the Springbrook Software System

Mr. Hayden stated that the business questionnaires are complete, and staff continues to work on the chart of accounts for the Springbrook Finance module which will be the first to be implemented.

President Freshley suggested that staff include a bar chart in the staff paper showing the modules, progress, and expected completion dates

Update on Financing Plan for Near-Term Future Capital Projects

Mr. Hayden stated that staff is working with NHA Advisors, Bank of America, and Stradling Bond Counsel to implement the next steps in the issuing of debt process.

President Freshley asked to be reminded of whether the AMI project was included in the financing of future capital projects. Mr. Cafferty replied that the Board had previously directed staff to include the AMI project.

President Freshley asked what happens to the $6 million if we decide not to pursue the AMI project. Mr. Hayden replied that staff could direct the funds to other capital projects.

Moratorium on Service Disconnection for Nonpayment

Mr. Cafferty stated that on December 31st the State moratorium on disconnection of services expired. He further stated the District should be receiving funds from the State through the arrearages program which will be applied to all of the existing account delinquencies.

Mr. Cafferty stated that the District will be notifying customers that the District would begin service discontinuations for non-payment on March 1, 2022. He further stated that the District works with customers to provide payment plans for those who have financial hardships.

Director Monin would like to know how other Districts are handling past-due accounts. Vice President Havens stated that the Board would like to review what is being sent to the customers.

Director Vergara stated that he feels the current District policy is sufficiently effective.

Update to Annual Comprehensive Financial Report

Mr. Cafferty stated that the Board previously approved the CAFR but there were two tables that were inadvertently left out of the report. He further stated that they were supplementary tables that were not required to be in the document but they were added to the 2021 Financial Statements to provide additional information for all stakeholders.

Mr. Cafferty stated that this document is posted on the District's website.

Mr. Hayden stated that the reason the "Annual" and "Comprehensive" were switched in the title is that the old acronym "CAFR" is no longer being used, and will now be referred to as "ACFR".

President Freshley suggested adding a column that reflects percentages of total expenditures and revenue.

Financial Action Items

Joint Exercise of Powers Agreement Between El Toro Water District and California Statewide Communities Development Authority – Resolution No. 22-1-1

Mr. Cafferty stated that the Board previously approved the use of Revenue Bonds for the purpose of financing future capital projects. He further stated that staff has been working with NHA Advisors and the California Statewide Communities Development Authority (CSCDA) to develop a joint exercise of powers agreement to

jointly exercise any power common to them and additional powers granted under the JPA act.

Mr. Cafferty stated that staff has been working with Stradling and the District's General Counsel and has prepared a draft JPA Agreement which has been provided to CSCDA for consideration at their February 3rd Board meeting.

Vice President Havens asked for a Motion.

Motion: Director Gaskins made a Motion, seconded by Director Monin, and unanimously carried across the Board to approve Resolution No. 21-1-1 authorizing the creation of the El Toro Water District Financing Authority and approving the Joint Exercise of Powers Agreement with the California Statewide Communities Development Authority (CSCDA).

Roll Call Vote:

Director Vergara	aye
Director Monin	aye
Director Gaskins	aye
Vice President Havens	aye
President Freshley	aye

Resolution No. 22-1-2 Adopting El Toro Water District Policy Statement 2022-23 (IV) Debt Management Policy

Mr. Cafferty stated that because the District is publicly traded debt in the form of Revenue Bonds, the District is required by the State to have a debt management policy. He further stated that although this policy is new, it documents the District's current debt management practices.

President Freshley pointed out E.2. which states that the District will not issue debt to cover operating or minor routine repair and replacement needs. All Directors were in agreement with this statement in the policy.

Vice President Havens asked for a Motion.

Motion: President Freshley made a Motion, seconded by Director Monin, and unanimously carried across the Board to approve Resolution No. 21-1-2 adopting El Toro Water District Policy Statement 2022-23 (IV) Debt Management Policy.

Roll Call Vote:

Director Vergara	aye
Director Monin	aye
Director Gaskins	aye
Vice President Havens	aye
President Freshley	aye

Resolution No. 22-1-3 Amending El Toro Water District Policy Statement 1985-3 (IV) Investment Policy

Mr. Cafferty stated that staff has reviewed the Investment Policy and made a few recommended changes.

Vice President Havens asked for a Motion.

Motion: Director Gaskins made a Motion, seconded by Director Monin, and unanimously carried across the Board to approve Resolution No. 21-1-3 amending the El Toro Water District Policy Statement 1985-3 (IV) Investment Policy.

Roll Call Vote:

Director Vergara	aye
Director Monin	aye
Director Gaskins	aye
Vice President Havens	aye
President Freshley	aye

Quarterly Insurance Report

Director Gaskins asked if the increase in the premium for the Dam insurance is because as they get older they are more likely to fail. Mr. Cafferty replied no, it's due to market costs as this insurance has become more difficult to acquire.

Vice President Havens commended staff on their hard and diligent work on maintaining this report and its effect on customers.

Ms. Cimorell stated that the District's Wellness Program utilized by employees for the Longevity employee body scans, benefited several employees' health.

Vice President Havens asked for a Motion.

Motion: Director Monin made a Motion, seconded by Director Gaskins, and unanimously carried across the Board to Receive and File the Quarterly Insurance Report for the period of October 1, 2021 through December 31, 2021.

Roll Call Vote:

Director Vergara	aye
Director Monin	aye
Director Gaskins	aye
Vice President Havens	aye
President Freshley	aye

Financial Package – Authorization to Approve Bills for Consideration dated January 24, 2022 and Receive and File Financial Statements as of December 31, 2021

Mr. Hayden stated that the District's 401(k) Plan is looking good but may be less favorable next month due to market fluctuations.

Vice President Havens asked for a Motion.

Motion: President Freshley made a Motion, seconded by Director Monin and unanimously carried across the Board to approve, ratify, and confirm payment of those bills as set forth in the schedule of bills for consideration dated January 24, 2022, and receive and file the financial statements for the period ending December 31, 2021.

Roll Call Vote:

Director Havens	aye
Vice President Freshley	aye
Director Vergara	aye
President Gaskins	aye
Director Monin	aye

Comments Regarding Non-Agenda FIC Items

There were no comments.

Close Finance and Insurance Committee Meeting

There being no further business the Finance Committee meeting was closed at approximately 9:30 a.m.

Respectfully submitted,

_____
POLLY WELSCH
Recording Secretary

APPROVED:

_____
KATHRYN FRESHLEY, President
of the El Toro Water District and the
Board of Directors thereof

_____
DENNIS P. CAFFERTY, Secretary
of the El Toro Water District and the
Board of Directors thereof

El Toro Water District 401(k) Plan

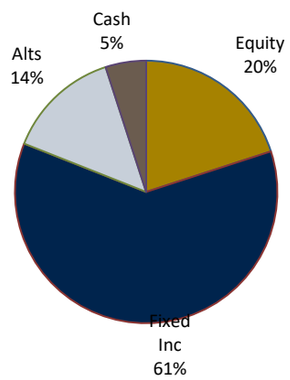
Fourth Quarter 2021

Keith Stribling, CFA
Vice President and Senior Portfolio Manager
HighMark Capital Management
(949) 553-2591
keith.stribling@unionbank.com

INVESTMENT POOLS - ASSET ALLOCATION

El Toro Water District - 401(k) Plan

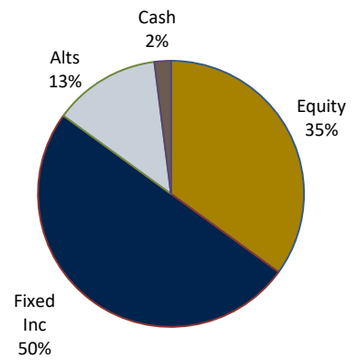
Capital Preservation



65+ years old

Equity:	10% - 30%
Fixed Income:	40% - 80%
Alternatives:	10% - 20%
Cash:	0% - 20%

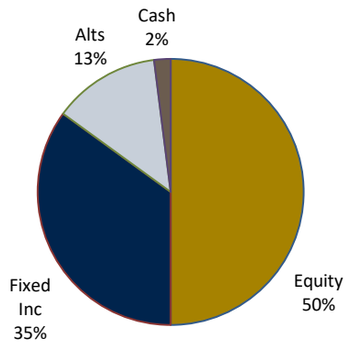
Income



60-64 years old

Equity:	25% - 45%
Fixed Income:	30% - 70%
Alternatives:	10% - 20%
Cash:	0% - 20%

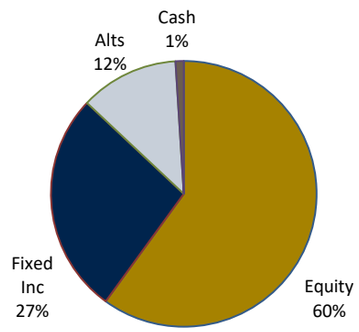
Income & Growth



55-59 years old

Equity:	40%-60%
Fixed Income:	20% - 60%
Alternatives:	10% - 20%
Cash:	0% - 20%

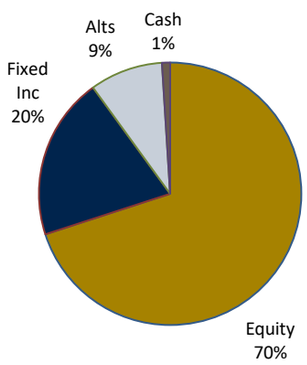
Balanced Income



50-54 years old

Equity:	50% - 70%
Fixed Income:	15% - 35%
Alternatives:	10% - 20%
Cash:	0% - 20%

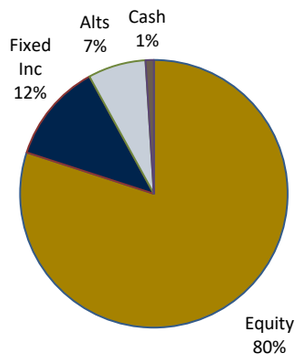
Balanced



45-49 years old

Equity:	60% - 80%
Fixed Income:	10% - 30%
Alternatives:	5% - 15%
Cash:	0% - 20%

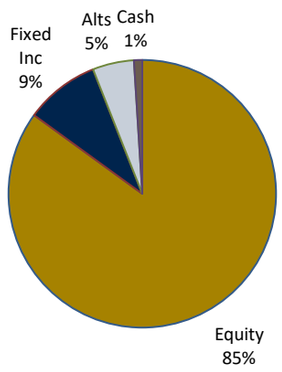
Capital Appreciation



40-44 years old

Equity:	70% - 90%
Fixed Income:	5% - 20%
Alternatives:	5% - 15%
Cash:	0% - 20%

Growth



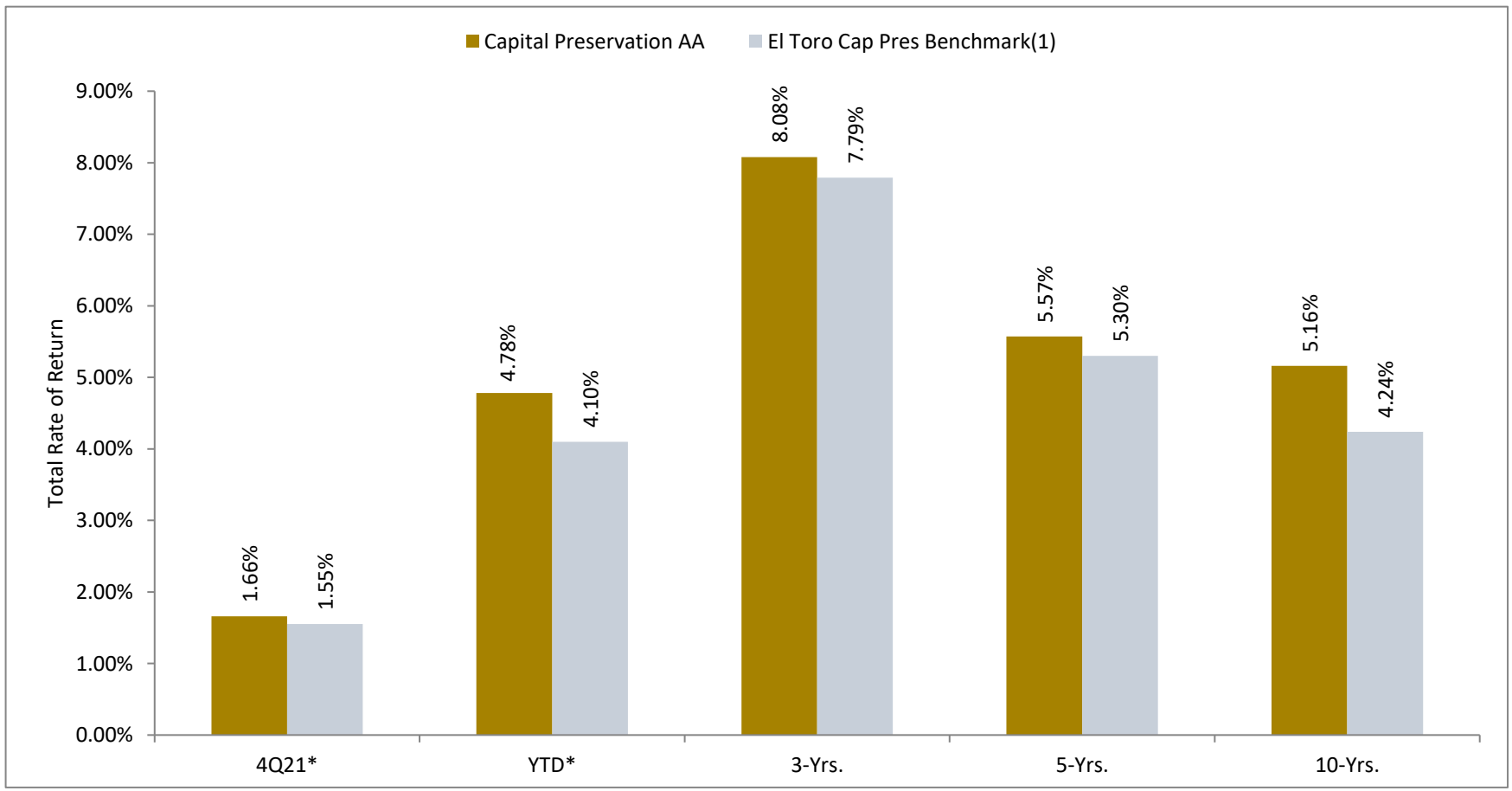
< 40 years old

Equity:	75% - 95%
Fixed Income:	5% - 15%
Alternatives:	2% - 10%
Cash:	0% - 20%

INVESTMENT RETURNS - CAPITAL PRESERVATION PORTFOLIO

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return
as of December 31, 2021



**Returns for periods under one year are not annualized*

***Inception date: January 2006*

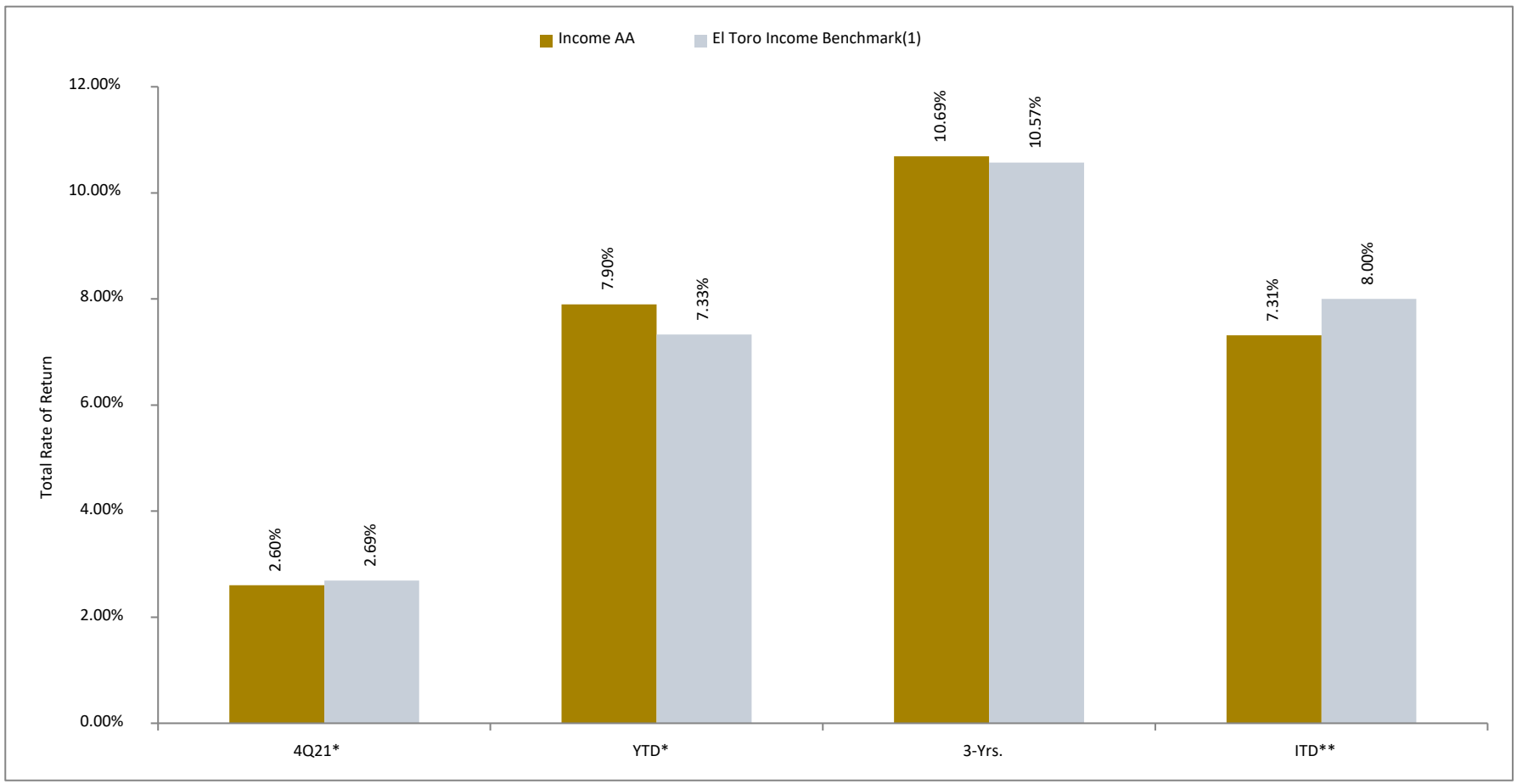
(1) El Toro Cap Pres Benchmark: 12% S&P 500, 2% Russell MidCap, 2% Russell 2000, 3% MSCI EAFE, 1% MSCI Emerging Markets, 44% Barclays US Aggregate Bond, 17% Barclays 1-3 Year Government/Credit Bond, 14% Wilshire Liquid Alternatives, 5% ICE BofAML 3 Mo US T-Bill

Note: Alternatives benchmark was changed from HFRI FOF Index to Wilshire Liquid Alternatives Index as of 5/31/18

INVESTMENT RETURNS - INCOME PORTFOLIO

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return
as of December 31, 2021



**Returns for periods under one year are not annualized*

***Inception date: August 2018*

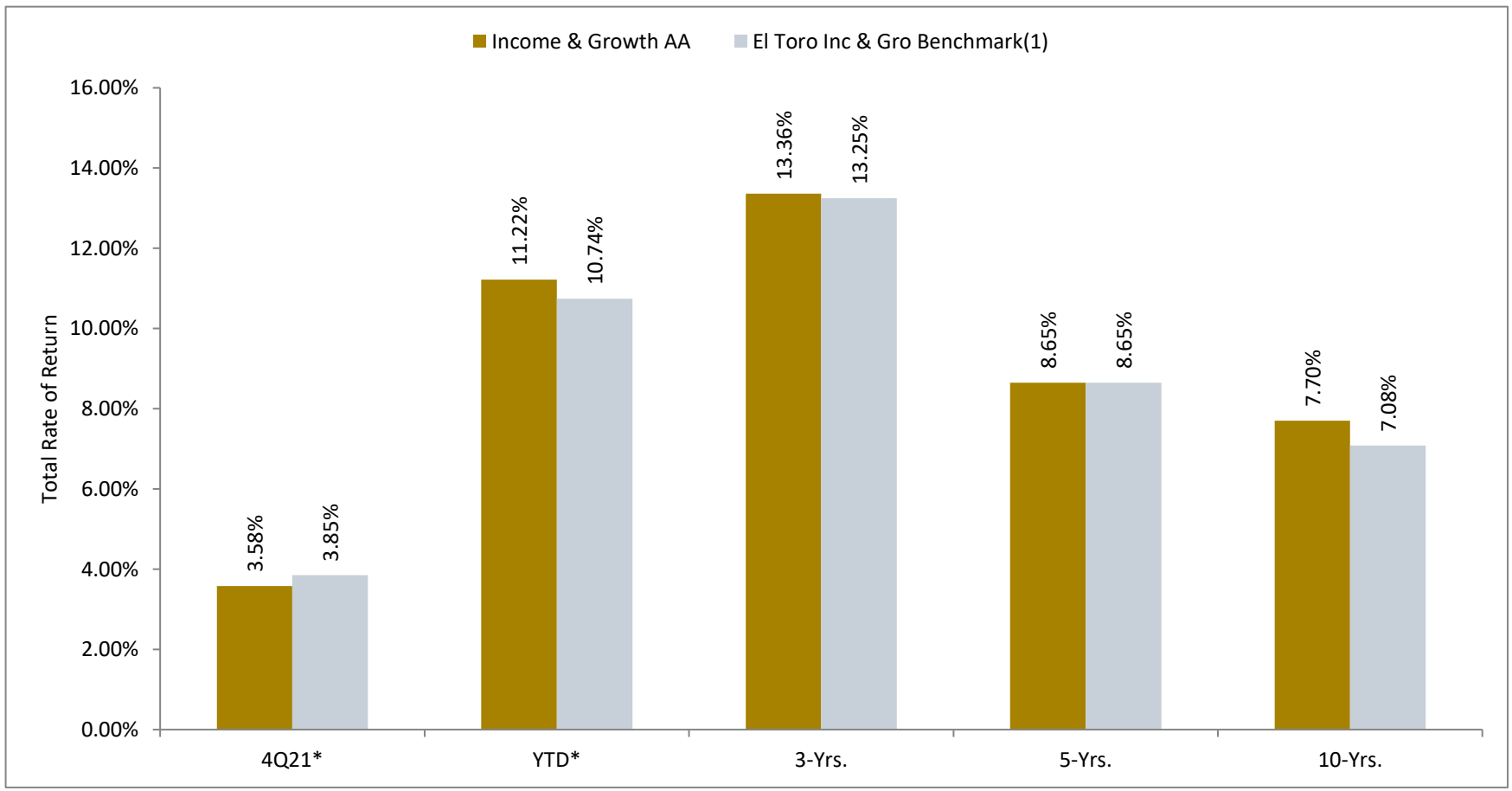
(1) El Toro Income Benchmark: 21% S&P 500, 3% Russell MidCap, 3% Russell 2000, 6% MSCI EAFE, 2% MSCI Emerging Market, 36% Barclays US Aggregate Bond, 14% Barclays 1-3 Year Government/Credit Bond, 13% Wilshire Liquid Alternatives, 2% ICE BofAML 3 Mo US T-Bill

Note: Alternatives benchmark was changed from HFRI FOF Index to Wilshire Liquid Alternatives Index as of 5/31/18

INVESTMENT RETURNS - INCOME & GROWTH PORTFOLIO

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return
as of December 31, 2021



**Returns for periods under one year are not annualized*

***Inception date: January 2006*

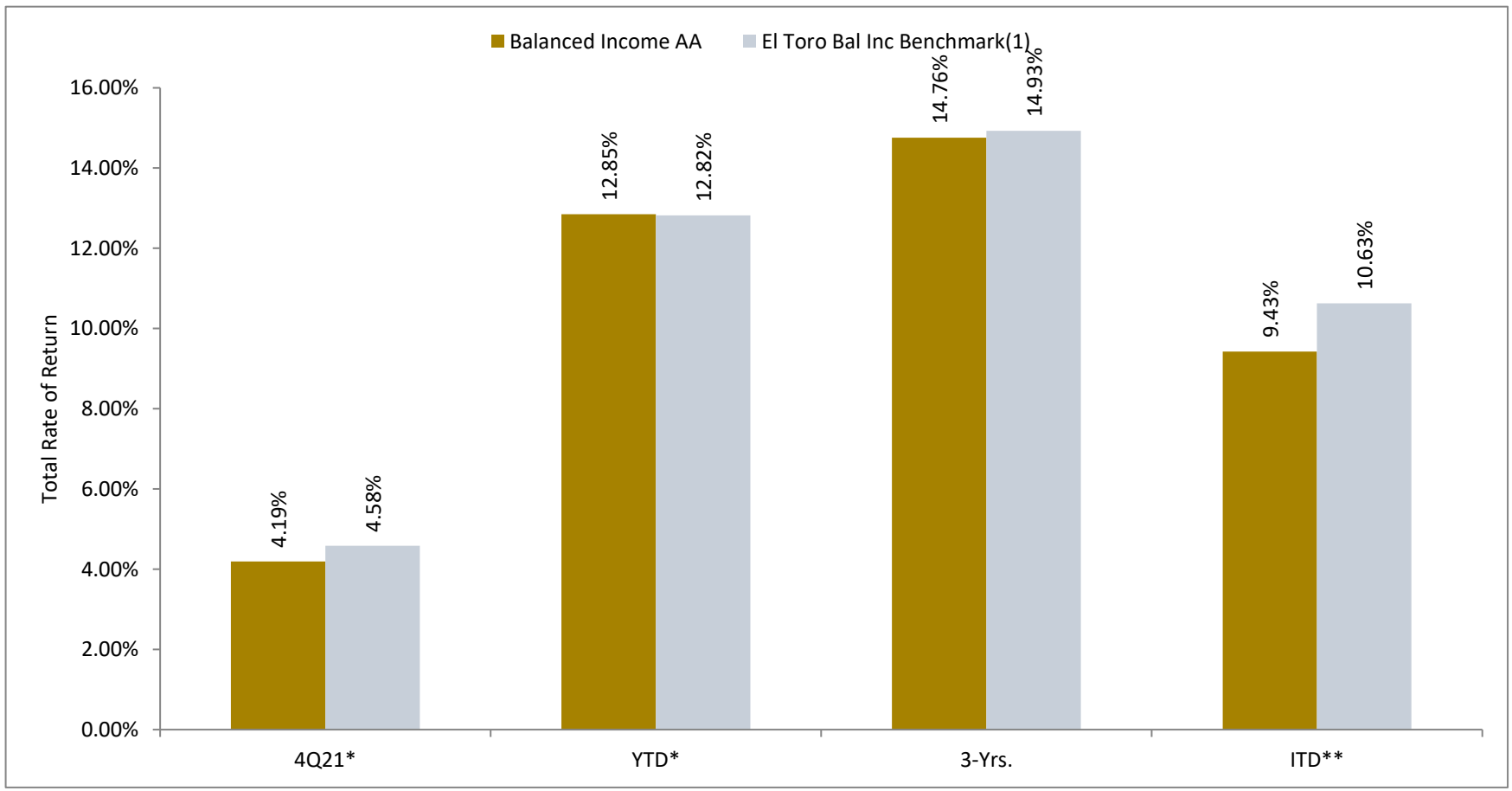
(1) El Toro Inc & Gro Benchmark: 30% S&P 500, 4% Russell MidCap, 4% Russell 2000, 9% MSCI EAFE, 3% MSCI Emerging Market, 25% Barclays US Aggregate Bond, 10% Barclays 1-3 Year Government/Credit Bond, 13% Wilshire Liquid Alternatives, 2% ICE BofAML 3 Mo US T-Bill

Note: Alternatives benchmark was changed from HFRI FOF Index to Wilshire Liquid Alternatives Index as of 5/31/18

INVESTMENT RETURNS - BALANCED INCOME PORTFOLIO

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return
as of December 31, 2021



**Returns for periods under one year are not annualized*

***Inception date: August 2018*

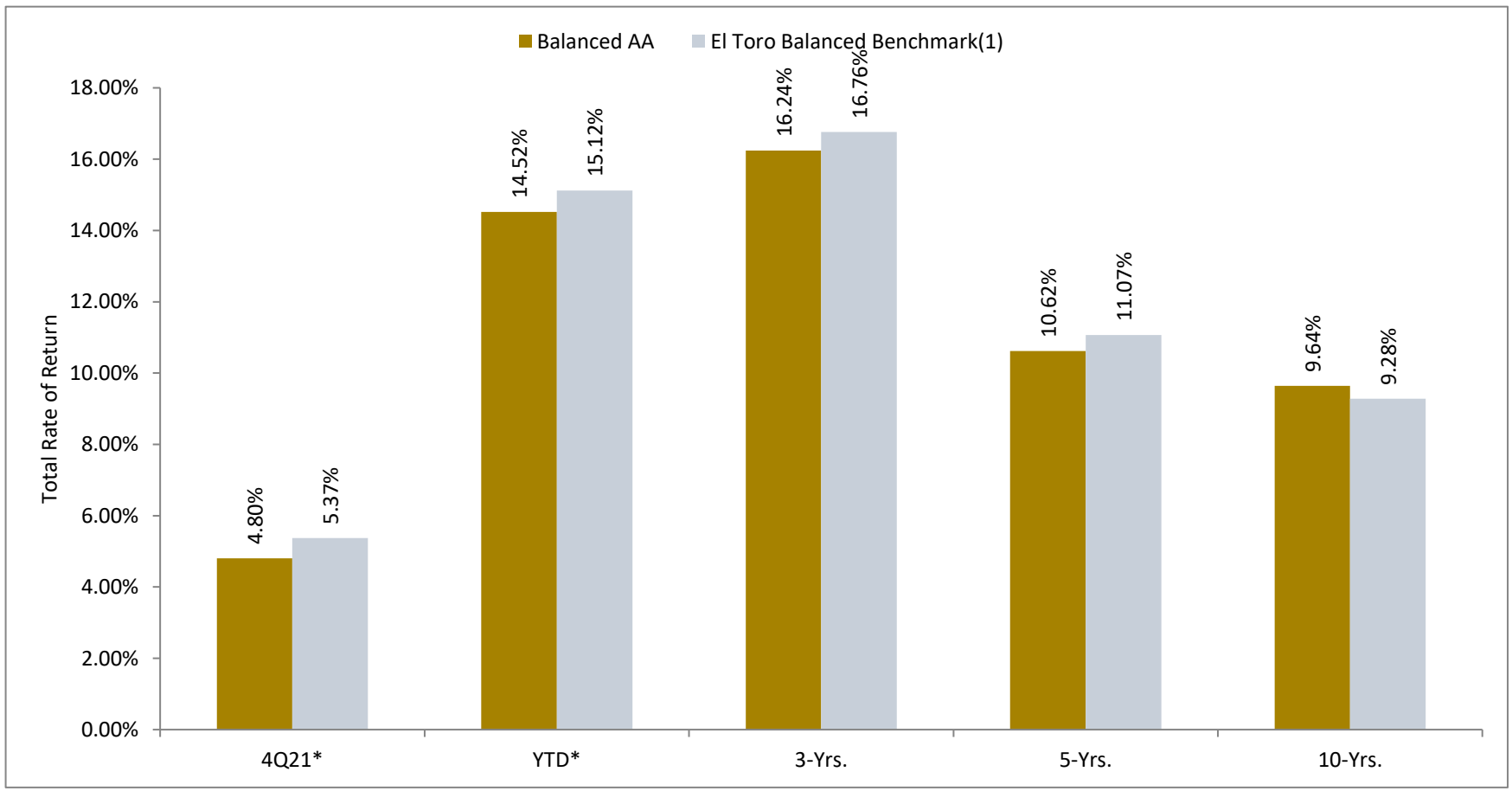
(1) El Toro Bal Inc Benchmark: 36% S&P 500, 4% Russell MidCap, 4% Russell 2000, 12% MSCI EAFE, 4% MSCI Emerging Market, 19% Barclays US Aggregate Bond, 8% Barclays 1-3 Year Government/Credit Bond, 12% Wilshire Liquid Alternatives, 1% ICE BofAML 3 Mo US T-Bill

Note: Alternatives benchmark was changed from HFRI FOF Index to Wilshire Liquid Alternatives Index as of 5/31/18

INVESTMENT RETURNS - BALANCED PORTFOLIO

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return
as of December 31, 2021



**Returns for periods under one year are not annualized*

***Inception date: January 2006*

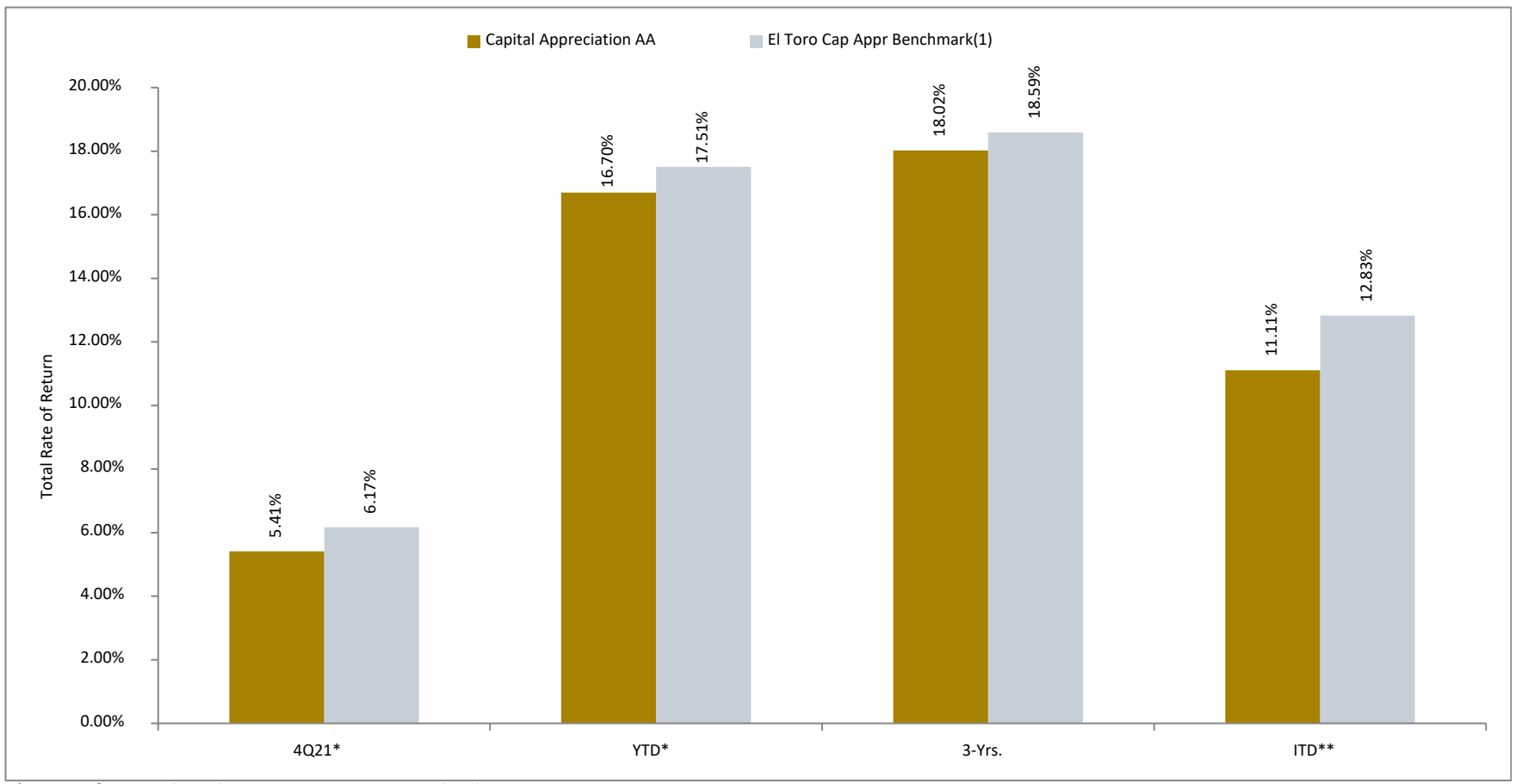
(1) El Toro Balanced Benchmark: 42% S&P 500, 5% Russell MidCap, 5% Russell 2000, 14% MSCI EAFE, 4% MSCI Emerging Market, 14% Barclays US Aggregate Bond, 6% Barclays 1-3 Year Government/Credit Bond, 9% Wilshire Liquid Alternatives, 1% ICE BofAML 3 Mo US T-Bill

Note: Alternatives benchmark was changed from HFRI FOF Index to Wilshire Liquid Alternatives Index as of 5/31/18

INVESTMENT RETURNS - CAPITAL APPRECIATION PORTFOLIO

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return
as of December 31, 2021



**Returns for periods under one year are not annualized*

***Inception date: August 2018*

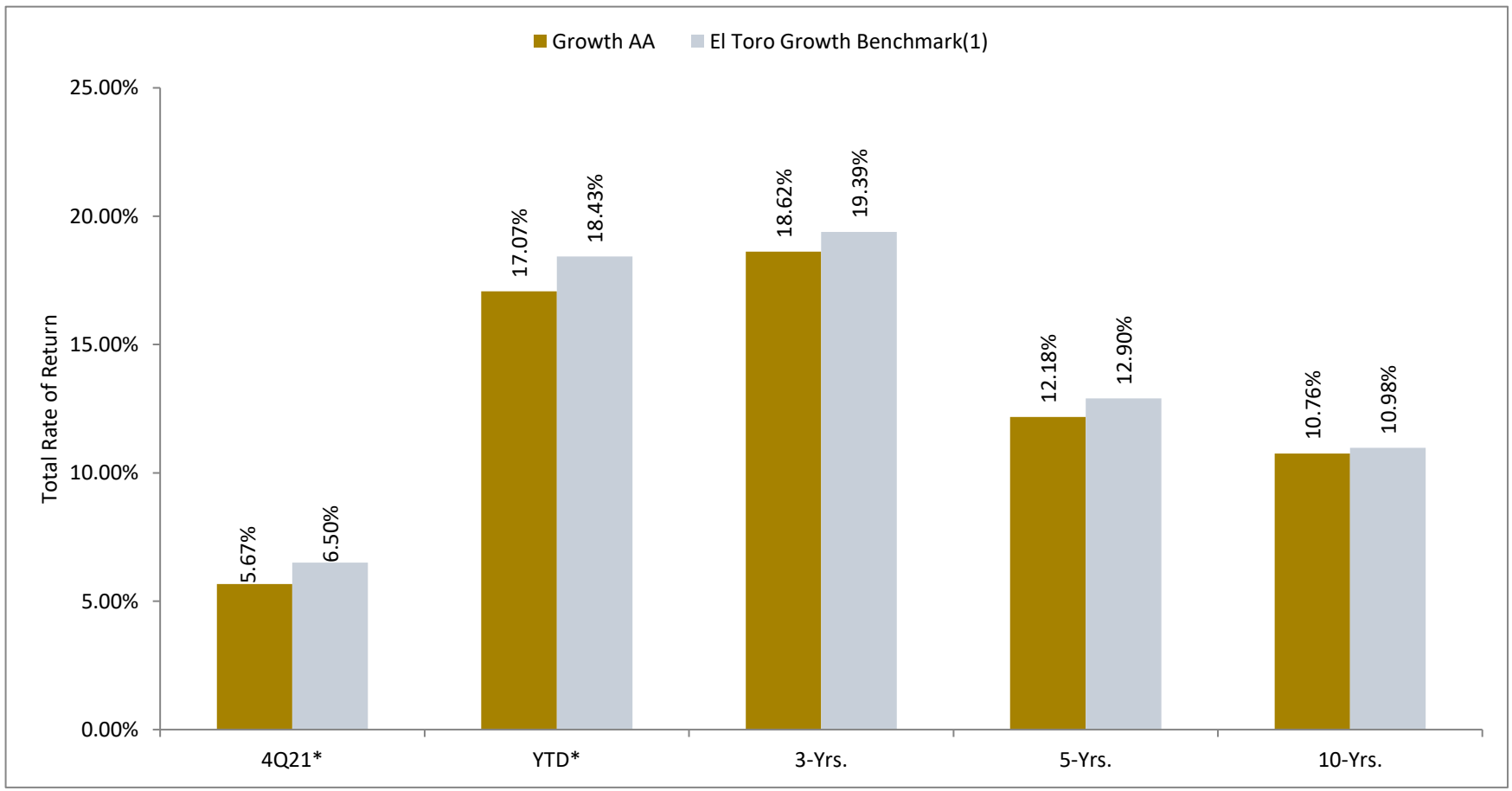
(1) El Toro Cap Appr Benchmark: 48% S&P 500, 6% Russell MidCap, 6% Russell 2000, 16% MSCI EAFE, 4% MSCI Emerging Market, 8% Barclays US Aggregate Bond, 4% Barclays 1-3 year Government/Credit, 7% Wilshire Liquid Alternatives, 1% ICE BofAML 3 Mo US T-Bill

Note: Alternatives benchmark was changed from HFRI FOF Index to Wilshire Liquid Alternatives Index as of 5/31/18

INVESTMENT RETURNS - GROWTH PORTFOLIO

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return
as of December 31, 2021



**Returns for periods under one year are not annualized*

***Inception date: January 2006*

(1) El Toro Growth Benchmark: 51% S&P 500, 6% Russell MidCap, 6% Russell 2000, 17% MSCI EAFE, 5% MSCI Emerging Market, 6% Barclays US Aggregate Bond, 3% Barclays 1-3 year Government/Credit, 5% Wilshire Liquid Alternatives, 1% ICE BofAML 3 Mo US T-Bill

Note: Alternatives benchmark was changed from HFRI FOF Index to Wilshire Liquid Alternatives Index as of 5/31/18

INVESTMENT RETURNS - FIXED INCOME FUNDS

El Toro Water District - 401(k) Plan

			Annualized Total Rate of Return (%) as of 12/31/2021					
Ticker	**Name**	**MStar Rating***	**3-Mos.****	**YTD****	**1-Yr.**	**3-Yrs.**	**5-Yrs.**	**10-Yrs.**
Ultra Short-Term Bond								
VUSFX	Vanguard Ultra-Short-Term Bond Admiral	4	-0.21	0.18	0.18	1.88	1.82	--
Short-Term Bond								
VFSUX	Vanguard Short-Term Investment-Grade Adm	4	-0.69	-0.33	-0.33	3.55	2.74	2.52
Intermediate-Term Bond								
DODIX	Dodge & Cox Income	4	-0.43	-0.91	-0.91	5.97	4.37	4.07
DBLFX	DoubleLine Core Fixed Income I	3	-0.23	-0.34	-0.34	4.36	3.53	3.59
PTTRX	PIMCO Total Return Instl	3	0.16	-0.61	-0.61	5.42	4.20	3.70
PTRQX	PGIM Total Return Bond R6	4	0.29	-1.16	-1.16	5.89	4.71	4.44
Multi-Sector Bond								
PIMIX	PIMCO Income Instl	4	0.17	2.61	2.61	5.46	5.08	6.97

**Morningstar overall rating*

***Returns for periods under one year are not annualized*

Returns are shown net of embedded expense ratios

Source: Morningstar Direct

INVESTMENT RETURNS - EQUITY FUNDS

El Toro Water District - 401(k) Plan

			Annualized Total Rate of Return (%) as of 12/31/2021					
Ticker	**Name**	**MStar Rating***	**3-Mos.****	**YTD****	**1-Yr.**	**3-Yrs.**	**5-Yrs.**	**10-Yrs.**
Large Blend								
COFYX	Columbia Contrarian Core Inst3	3	8.34	24.45	24.45	26.57	17.65	16.55
VGIAX	Vanguard Growth & Income Adm	4	11.43	29.11	29.11	25.54	17.92	16.55
Large Value								
DODGX	Dodge & Cox Stock	4	5.85	31.73	31.73	20.78	14.14	15.57
PKAIX	PIMCO RAE US Instl	3	9.16	27.78	27.78	18.36	12.44	--
IVE	iShares S&P 500 Value ETF	4	8.28	24.67	24.67	18.46	11.72	13.10
Large Growth								
HNACX	Harbor Capital Appreciation Retirement	4	5.02	15.74	15.74	33.63	26.43	20.04
LSITX	ClearBridge Large Cap Growth IS	3	9.05	22.02	22.02	28.43	21.62	19.39
Mid Blend								
VO	Vanguard Mid-Cap ETF	5	7.97	24.52	24.52	24.48	15.87	15.12
Small Blend								
DCZRX	Delaware Small Cap Core R6	4	5.91	23.35	23.35	21.59	12.73	14.44
VB	Vanguard Small-Cap ETF	5	3.86	17.72	17.72	21.32	13.48	14.16

**Morningstar overall rating*

***Returns for periods under one year are not annualized*

Returns are shown net of embedded expense ratios

Source: Morningstar Direct

INVESTMENT RETURNS - EQUITY FUNDS

El Toro Water District - 401(k) Plan

			Annualized Total Rate of Return (%) as of 12/31/2021					
Ticker	**Name**	**MStar Rating***	**3-Mos.****	**YTD****	**1-Yr.**	**3-Yrs.**	**5-Yrs.**	**10-Yrs.**
Small Growth								
RSEJX	Victory RS Small Cap Growth R6	2	-0.55	-10.74	-10.74	19.55	16.42	15.00
VBK	Vanguard Small-Cap Growth ETF	3	0.58	5.71	5.71	23.82	16.90	14.83
Small Cap Value								
UBVFX	Undiscovered Managers Behavioral Val R6	3	7.27	34.34	34.34	19.66	10.49	13.98
Foreign Large Value								
DODFX	Dodge & Cox International Stock	4	2.40	11.03	11.03	11.65	7.19	7.58
Foreign Large Blend								
DFALX	DFA Large Cap International I	3	3.32	12.81	12.81	14.18	9.88	8.02
HEFA	iShares Currency Hedged MSCI EAFE ETF	4	4.31	19.38	19.38	14.99	10.00	--
Foreign Large Growth								
MGRDX	MFS International Growth R6	3	4.94	9.65	9.65	17.37	14.35	10.09
Diversified Emerging Markets								
HHHFX	Hartford Schroders Emerging Mkts Eq F	4	-2.93	-4.93	-4.93	12.91	11.41	6.50
VWO	Vanguard FTSE Emerging Markets ETF	3	-0.39	0.96	0.96	11.92	9.49	5.39

**Morningstar overall rating*

***Returns for periods under one year are not annualized*

Returns are shown net of embedded expense ratios

Source: Morningstar Direct

INVESTMENT RETURNS - ALTERNATIVE FUNDS

El Toro Water District - 401(k) Plan

			Annualized Total Rate of Return (%) as of 12/31/2021					
Ticker	**Name**	**MStar Rating***	**3-Mos.****	**YTD****	**1-Yr.**	**3-Yrs.**	**5-Yrs.**	**10-Yrs.**
Market Neutral								
BSIKX	BlackRock Strategic Income Opps K	4	-0.19	1.06	1.06	5.35	4.08	4.06
BILPX	BlackRock Event Driven Equity Instl	4	0.71	1.94	1.94	5.15	5.61	8.49
Managed Futures								
AHLIX	American Beacon AHL Mgd Futs Strat R5	4	-2.10	5.12	5.12	5.36	4.75	--
AMFNX	AlphaSimplex Mgd Futs Strat N	4	-1.17	3.63	3.63	8.54	3.63	3.20
Fund of Hedge Funds								
BSTKX	BlackRock Total Factor K	2	4.56	16.73	16.73	2.20	2.82	--
QSPIX	AQR Style Premia Alternative I	1	3.37	24.83	24.83	-3.66	-2.56	--
REITs								
ICF	iShares Cohen & Steers REIT ETF	3	17.16	43.99	43.99	19.56	11.84	11.39
Precious Metals								
IAU	iShares Gold Trust	--	4.37	-3.99	-3.99	12.12	9.17	1.49

**Morningstar overall rating*

***Returns for periods under one year are not annualized*

Returns are shown net of embedded expense ratios

Source: Morningstar Direct

INVESTMENT RETURNS & RANKINGS - FIXED INCOME FUNDS

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return (%) as of 12/31/2021

Ticker	Name	Exp Ratio	MStar Rtg*	3-Mos** Tot ROR	3-Mos** Mstar Rnkg	3-Mos** Lipper Rnkg	YTD** Tot ROR	YTD** Mstar Rnkg	YTD** Lipper Rnkg	1-Year Tot ROR	1-Year Mstar Rnkg	1-Year Lipper Rnkg	3-Years Tot ROR	3-Years Mstar Rnkg	3-Years Lipper Rnkg	5-Years Tot ROR	5-Years Mstar Rnkg	5-Years Lipper Rnkg	10-Years Tot ROR	10-Years Mstar Rnkg	10-Years Lipper Rnkg	3 Yr Shrp%	3 Yr SD	Lipper Category
Ultra Short-Term Bond																								
VUSFX	Vanguard Ultra-Short-Term Bond Admiral	0.10	4	-0.21	70	52	0.18	37	15	0.18	37	15	1.88	26	48	1.82	24	38	--	--	n.a.	1.22	0.94	Lipper Ultra Sht Obligation Funds
Peer Group	US Fund Short-Term Bond			0.13			n.a.			n.a.			n.a.			n.a.			n.a.			0.69	2.52	
Index	Bloomberg US Govt/Credit 1-3 Yr TR USD			-0.56			-0.47			-0.47			2.28			1.85			1.39			1.78	0.96	
Short-Term Bond																								
VFSUX	Vanguard Short-Term Investment-Grade Adm	0.10	4	-0.69	75	78	-0.33	53	66	-0.33	53	66	3.55	25	12	2.74	21	12	2.52	17	8	0.95	2.74	Lipper Sht Inv Grade Debt Funds
Peer Group	US Fund Short-Term Bond			0.13			n.a.			n.a.			n.a.			n.a.			n.a.			0.69	2.52	
Index	Bloomberg US Govt/Credit 1-3 Yr TR USD			-0.56			-0.47			-0.47			2.28			1.85			1.39			1.78	0.96	
Intermediate-Term Bond																								
DBLFX	DoubleLine Core Fixed Income I	0.42	3	-0.23	64	62	-0.34	28	24	-0.34	28	24	4.36	84	91	3.53	75	80	3.59	45	48	0.56	4.81	Lipper Core Plus Bond Funds
DODIX	Dodge & Cox Income	0.42	4	-0.43	82	90	-0.91	55	31	-0.91	55	31	5.97	30	18	4.37	27	13	4.07	23	8	1.08	3.86	Lipper Core Bond Funds
PTTRX	PIMCO Total Return Instl	0.47	3	0.16	40	41	-0.61	50	45	-0.61	50	45	5.42	55	68	4.20	39	48	3.70	39	40	0.97	3.63	Lipper Core Plus Bond Funds
PTRQX	PGIM Total Return Bond R6	0.39	4	0.29	6	4	-1.16	68	61	-1.16	68	61	5.89	32	44	4.71	15	18	4.44	11	11	0.61	6.02	Lipper Core Plus Bond Funds
Peer Group	US Fund Intermediate Core Bond			-0.01			n.a.			n.a.			n.a.			n.a.			n.a.			1.05	3.68	
Index	Bloomberg US Agg Bond TR USD			0.01			-1.54			-1.54			4.79			3.57			2.90			0.93	3.56	
Multi-Sector Bond																								
PIMIX	PIMCO Income Instl	0.62	4	0.17	33	28	2.61	44	35	2.61	44	35	5.46	59	63	5.08	25	25	6.97	1	1	0.60	5.78	Lipper Multi-Sector Income Fds
Peer Group	US Fund Multisector Bond			-0.18			n.a.			n.a.			n.a.			n.a.			n.a.			0.44	6.84	
Index	Bloomberg US Agg Bond TR USD			0.01			-1.54			-1.54			4.79			3.57			2.90			0.93	3.56	

**Morningstar overall rating*

***Returns for periods under one year are not annualized*

Returns are shown net of embedded expense ratios. Mstar Rnkg - Fund's ranking within Morningstar's category ("Peer Group"). Funds are ranked in descending order by return. For example, a Fund with a 20 ranking indicates that it is ranked in the top 20th percentile.

Source: Morningstar Direct; Wilshire Compass (Lipper Rankings)

INVESTMENT RETURNS & RANKINGS - EQUITY FUNDS

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return (%) as of 12/31/2021

				3-Mos**			YTD**			1-Year			3-Years			5-Years			10-Years					
Ticker	Name	Exp Ratio	MStar Rtg*	Tot ROR	Mstar Rnkg	Lipper Rnkg	Tot ROR	Mstar Rnkg	Lipper Rnkg	Tot ROR	Mstar Rnkg	Lipper Rnkg	Tot ROR	Mstar Rnkg	Lipper Rnkg	Tot ROR	Mstar Rnkg	Lipper Rnkg	Tot ROR	Mstar Rnkg	Lipper Rnkg	3 Yr Shrp%	3 Yr SD	Lipper Category
Large Blend																								
COFYX	Columbia Contrarian Core Inst3	0.63	3	8.34	77	85	24.45	75	77	24.45	75	77	26.57	15	18	17.65	41	18	16.55	10	n.a.	0.88	19.08	Lipper Large-Cap Core Funds
VGIAX	Vanguard Growth & Income Adm	0.22	4	11.43	18	15	29.11	18	17	29.11	18	17	25.54	36	43	17.92	34	41	16.55	9	16	0.83	18.76	Lipper Large-Cap Core Funds
Peer Group	US Fund Large Blend			-0.15			n.a.			n.a.			n.a.			n.a.			n.a.			0.75	18.21	
Index	Russell 1000 TR USD			9.78			26.45			26.45			26.21			18.43			16.54			0.86	18.99	
Index	S&P 500 TR USD			11.03			28.71			28.71			26.07			18.47			16.55			0.86	18.40	
Large Value																								
DODGX	Dodge & Cox Stock	0.52	4	5.85	91	86	31.73	10	12	31.73	10	12	20.78	18	23	14.14	16	5	15.57	2	2	0.60	23.40	Lipper Large-Cap Value Funds
PKAIX	PIMCO RAE US Instl	0.40	3	9.16	33	37	27.78	34	27	27.78	34	27	18.36	42	27	12.44	36	50	--	--	43	0.57	20.89	Lipper Large-Cap Core Funds
IVE	iShares S&P 500 Value ETF	0.18	4	8.28	53	58	24.67	69	64	24.67	69	64	18.46	40	48	11.72	47	57	13.10	31	39	0.59	19.60	Lipper Large-Cap Value Funds
Peer Group	US Fund Large Value			-1.03			n.a.			n.a.			n.a.			n.a.			n.a.			0.52	19.75	
Index	Russell 1000 Value TR USD			7.77			25.16			25.16			17.64			11.16			12.97			0.55	19.97	
Large Growth																								
HNACX	Harbor Capital Appreciation Retirement	0.57	4	5.02	74	73	15.74	79	78	15.74	79	78	33.63	17	15	26.43	12	11	20.04	11	n.a.	1.02	21.93	Lipper Large-Cap Growth Funds
LSITX	ClearBridge Large Cap Growth IS	0.62	3	9.05	37	33	22.02	54	50	22.02	54	50	28.43	61	72	21.62	58	66	19.39	19	n.a.	0.97	18.98	Lipper Large-Cap Growth Funds
Peer Group	US Fund Large Growth			0.00			n.a.			n.a.			n.a.			n.a.			n.a.			0.99	19.00	
Index	Russell 1000 Growth TR USD			11.64			27.60			27.60			34.08			25.32			19.79			1.09	19.41	
Mid Core																								
VO	Vanguard Mid-Cap ETF	0.04	5	7.97	19	35	24.52	31	38	24.52	52	38	24.48	8	26	15.87	7	26	15.12	8	26	0.68	21.54	Lipper Mid-Cap Core Funds
Peer Group	US Fund Mid-Cap Blend			2.68			n.a.			n.a.			n.a.			n.a.			n.a.			0.56	22.07	
Index	Russell Mid Cap TR USD			6.44			22.58			22.58			23.29			15.10			14.91			0.67	22.02	

**Morningstar overall rating*

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Source: Morningstar Direct; Wilshire Compass (Lipper Rankings)

INVESTMENT RETURNS & RANKINGS - EQUITY FUNDS

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return (%) as of 12/31/2021

Ticker	Name	Exp Ratio	MStar Rtg*	3-Mos** Tot ROR	3-Mos** Mstar Rnkg	3-Mos** Lipper Rnkg	YTD** Tot ROR	YTD** Mstar Rnkg	YTD** Lipper Rnkg	1-Year Tot ROR	1-Year Mstar Rnkg	1-Year Lipper Rnkg	3-Years Tot ROR	3-Years Mstar Rnkg	3-Years Lipper Rnkg	5-Years Tot ROR	5-Years Mstar Rnkg	5-Years Lipper Rnkg	10-Years Tot ROR	10-Years Mstar Rnkg	10-Years Lipper Rnkg	3 Yr Shrp%	3 Yr SD	Lipper Category
Small Value																								
UBVFX	Undiscovered Managers Behavioral Val R6	0.90	3	7.27	28	27	34.34	33	19	34.34	33	19	19.66	26	37	10.49	20	36	13.98	5	n.a.	0.45	31.71	Lipper Small-Cap Value Funds
Peer Group	US Fund Small Value			-2.03			n.a.			n.a.			n.a.			n.a.			n.a.			0.44	27.64	
Index	Russell 2000 Value TR USD			4.36			28.27			28.27			17.99			9.07			12.03			0.49	26.96	
Small Blend																								
DCZRX	Delaware Small Cap Core R6	0.71	4	5.91	46	57	23.35	57	87	23.35	57	87	21.59	25	17	12.73	21	9	14.44	10	n.a.	0.59	24.50	Lipper Small-Cap Core Funds
VB	Vanguard Small-Cap ETF	0.05	5	3.86	74	72	17.72	81	70	17.72	80	70	21.32	24	41	13.48	12	29	14.16	12	26	0.64	24.67	Lipper Small-Cap Core Funds
Peer Group	US Fund Small Blend			-2.21			n.a.			n.a.			n.a.			n.a.			n.a.			0.50	25.15	
Index	Russell 2000 TR USD			2.14			14.82			14.82			20.02			12.02			13.23			0.61	25.70	
Small Growth																								
RSEJX	Victory RS Small Cap Growth R6	1.06	2	-0.55	73	74	-10.74	98	74	-10.74	98	98	19.55	90	90	16.42	62	n.a.	15.00	54	n.a.	0.69	25.85	Lipper Small-Cap Growth Funds
VBK	Vanguard Small-Cap Growth ETF	0.07	3	0.58	70	63	5.71	73	63	5.71	76	66	23.82	56	52	16.90	56	47	14.83	58	58	0.80	24.11	Lipper Small-Cap Growth Funds
Peer Group	US Fund Small Growth			-2.42			n.a.			n.a.			n.a.			n.a.			n.a.			0.80	24.61	
Index	Russell 2000 Growth TR USD			0.01			2.83			2.83			21.17			14.53			14.14			0.70	25.53	

**Morningstar overall rating*

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Source: Morningstar Direct; Wilshire Compass (Lipper Rankings)

INVESTMENT RETURNS & RANKINGS - EQUITY FUNDS

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return (%) as of 12/31/2021

Ticker	Name	Exp Ratio	MStar Rtg*	3-Mos** Tot ROR	3-Mos** Mstar Rnkg	3-Mos** Lipper Rnkg	YTD** Tot ROR	YTD** Mstar Rnkg	YTD** Lipper Rnkg	1-Year Tot ROR	1-Year Mstar Rnkg	1-Year Lipper Rnkg	3-Years Tot ROR	3-Years Mstar Rnkg	3-Years Lipper Rnkg	5-Years Tot ROR	5-Years Mstar Rnkg	5-Years Lipper Rnkg	10-Years Tot ROR	10-Years Mstar Rnkg	10-Years Lipper Rnkg	3 Yr Shrp%	3 Yr SD	Lipper Category
Foreign Large Blend																								
DFALX	DFA Large Cap International I	0.22	3	3.32	29	40	12.81	19	33	12.81	19	33	14.18	38	45	9.88	38	38	8.02	44	49	0.34	18.56	Lipper International Large-Cap Core
HEFA	iShares Currency Hedged MSCI EAFE ETF	0.03	4	4.31	11	53	19.38	1	20	19.38	1	20	14.99	26	91	10.00	33	93	--	--	n.a.	0.53	15.95	Lipper International Multi-Cap Core
Peer Group	US Fund Foreign Large Blend			-1.89			n.a.			n.a.			n.a.			n.a.			n.a.			0.33	17.57	
Peer Group	US Fund Europe Stock			4.96			n.a.			n.a.			n.a.			n.a.			n.a.			0.36	19.16	
Index	MSCI EAFE NR USD			2.69			11.26			11.26			13.54			9.55			8.03			0.34	17.74	
Index	MSCI ACWI Ex USA NR USD			6.68			18.54			18.54			20.38			14.40			11.85			0.37	17.65	
Foreign Large Value																								
DODFX	Dodge & Cox International Stock	0.63	4	2.40	48	65	11.03	58	59	11.03	58	59	11.65	25	45	7.19	34	45	7.58	15	16	0.22	23.35	Lipper International Large-Cap Growth
Peer Group	US Fund Foreign Large Value			-1.96			n.a.			n.a.			n.a.			n.a.			n.a.			0.19	19.55	
Index	MSCI EAFE Value NR USD			1.17			10.89			10.89			7.82			5.34			5.81			0.12	20.77	
Index	MSCI ACWI Ex USA Value NR USD			6.03			18.21			18.21			20.19			14.10			11.84			0.15	20.23	
Foreign Large Growth																								
MGRDX	MFS International Growth R6	0.71	3	4.94	22	47	9.65	46	75	9.65	46	75	17.37	77	79	14.35	40	52	10.09	43	70	0.66	15.68	Lipper International Multi-Cap Growth
Peer Group	US Fund Foreign Large Growth			-1.54			n.a.			n.a.			n.a.			n.a.			n.a.			0.60	16.68	
Index	MSCI EAFE Growth NR USD			4.09			11.25			11.25			18.95			13.59			10.08			0.58	15.80	
Index	MSCI ACWI Ex USA Growth NR USD			2.37			5.09			5.09			17.82			13.06			9.13			0.60	16.20	
Diversified Emerging Markets																								
HHHFX	Hartford Schroders Emerging Mkts Eq F	1.08	4	-2.93	80	67	-4.93	78	54	-4.93	78	54	12.91	32	38	11.41	24	n.a.	6.50	31	n.a.	0.47	19.48	Lipper Emerging Markets Funds
VWO	Vanguard FTSE Emerging Markets ETF	0.08	3	-0.39	17	31	0.96	38	24	0.96	47	24	11.92	39	49	9.49	48	55	5.39	52	61	0.35	18.94	Lipper Emerging Markets Funds
Peer Group	US Fund Diversified Emerging Mkts			-6.95			n.a.			n.a.			n.a.			n.a.			n.a.			0.32	19.15	
Index	MSCI EM NR USD			-1.31			-2.54			-2.54			10.94			9.87			5.49			0.35	19.16	

**Morningstar overall rating*

***Returns for periods under one year are not annualized*

Returns are shown net of embedded expense ratios. Mstar Rnkg - Fund's ranking within Morningstar's category ("Peer Group"). Funds are ranked in descending order by return. For example, a Fund with a 20 ranking indicates that it is ranked in the top 20th percentile.

Source: Morningstar Direct; Wilshire Compass (Lipper Rankings)

INVESTMENT RETURNS & RANKINGS - ALTERNATIVE FUNDS

El Toro Water District - 401(k) Plan

Annualized Total Rate of Return (%) as of 12/31/2021

Ticker	Name	Exp Ratio	MStar Rtg*	3-Mos** Tot ROR	3-Mos** Mstar Rnkg	3-Mos** Lipper Rnkg	YTD** Tot ROR	YTD** Mstar Rnkg	YTD** Lipper Rnkg	1-Year Tot ROR	1-Year Mstar Rnkg	1-Year Lipper Rnkg	3-Years Tot ROR	3-Years Mstar Rnkg	3-Years Lipper Rnkg	5-Years Tot ROR	5-Years Mstar Rnkg	5-Years Lipper Rnkg	10-Years Tot ROR	10-Years Mstar Rnkg	10-Years Lipper Rnkg	3 Yr Shrp%	3 Yr SD	Lipper Category
Market Neutral																								
BSIKX	BlackRock Strategic Income Opps K	0.63	4	-0.19	48	48	1.06	56	58	1.06	56	58	5.35	22	30	4.08	19	35	4.06	16	n.a.	0.67	5.08	Lipper Alt Credit Focus Funds
BILPX	BlackRock Event Driven Equity Instl	1.18	4	0.71	38	39	1.94	56	56	1.94	56	56	5.15	48	58	5.61	32	32	8.49	10	12	1.09	4.74	Lipper Alt Event Driven Funds
Managed Futures																								
AHLIX	American Beacon AHL Mgd Futs Strat R5	1.54	4	-2.10	67	74	5.12	35	42	5.12	35	42	5.36	39	35	4.75	12	7	--	--	n.a.	0.63	9.13	Lipper Alt Managed Futures
AMFNX	AlphaSimplex Mgd Futs Strat N	1.35	4	-1.17	49	62	3.63	52	58	3.63	52	58	8.54	13	12	3.63	16	n.a.	3.20	11	n.a.	0.45	10.82	Lipper Alt Managed Futures
Fund of Hedge Funds																								
BSTKX	BlackRock Total Factor K	0.50	2	4.56	13	20	16.73	9	5	16.73	9	5	2.20	83	92	2.82	68	n.a.	--	--	n.a.	-0.40	8.11	Lipper Alt Multi-Strategy Funds
QSPIX	AQR Style Premia Alternative I	1.78	1	3.37	19	32	24.83	4	25	24.83	4	25	-3.66	92	93	-2.56	94	98	--	--	n.a.	-1.00	10.46	Lipper Absolute Return
REITs																								
ICF	iShares Cohen & Steers REIT ETF	0.33	3	17.16	14	16	43.99	23	22	43.99	23	22	19.56	51	54	11.84	39	37	11.39	33	33	0.59	16.57	Lipper Real Estate Funds
Precious Metals																								
IAU	iShares Gold Trust	0.25	--	4.37	38	37	-3.99	60	24	-3.99	60	24	12.12	38	41	9.17	7	8	1.49	8	9	0.54	13.96	Lipper Commodities Precious Metals

**Morningstar overall rating*
***Returns for periods under one year are not annualized*

Returns are shown net of embedded expense ratios. Mstar Rnkg - Fund's ranking within Morningstar's category ("Peer Group"). Funds are ranked in descending order by return. For example, a Fund with a 20 ranking indicates that it is ranked in the top 20th percentile.
Source: Morningstar Direct; Wilshire Compass (Lipper Rankings)

TARGET FUND ALLOCATIONS

El Toro Water District - 401(k) Plan

	Capital Preservation	Income	Income & Growth	Balanced Income	Balanced	Capital Appreciation	Growth		
Equity	***20%***	***35%***	***50%***	***60%***	***69%***	***77%***	***83%***	**Ticker**	**Fund Name**
Large Cap Blend	3.22%	5.51%	8.19%	9.50%	10.55%	12.02%	12.28%	COFYX	Columbia Contrarian Core Inst3
	3.35%	5.72%	8.51%	9.35%	10.98%	12.39%	12.80%	VGIAX	Vanguard Growth & Income Adm
Large Cap Growth	1.45%	2.56%	3.41%	5.05%	4.95%	6.04%	6.62%	HNACX	Harbor Capital Appreciation Retirement
	1.50%	2.61%	3.05%	4.05%	5.12%	5.71%	6.05%	LSITX	ClearBridge Large Cap Growth IS
Large Cap Value	1.47%	2.86%	3.61%	4.04%	5.56%	5.66%	6.60%	PKAIX	PIMCO RAE US Instl
	1.54%	2.79%	4.01%	4.28%	5.32%	6.65%	6.97%	DODGX	Dodge & Cox Stock
	0.21%	0.51%	0.50%	0.93%	1.51%	1.69%	1.36%	IVE	iShares S&P 500 Value ETF
Mid Cap Blend	0.28%	0.74%	0.61%	0.99%	1.01%	0.99%	1.29%	VO	Vanguard Mid-Cap ETF
Small Cap Blend	0.65%	1.39%	1.66%	1.32%	1.79%	1.96%	1.98%	DCZRX	Delaware Small Cap Core R6
	0.50%	0.98%	1.61%	1.62%	1.75%	1.90%	1.69%	VB	Vanguard Small-Cap ETF
Small Cap Growth	0.24%	0.35%	0.83%	0.78%	1.18%	1.41%	1.36%	RSEJX	Victory RS Small Cap Growth R6
	0.36%	0.57%	0.47%	1.10%	1.25%	1.38%	1.95%	VBK	Vanguard Small-Cap Growth ETF
Small Cap Value	0.78%	1.02%	1.81%	2.50%	3.13%	3.78%	3.90%	UBVFX	Undiscovered Managers Behavioral Val R6
Foreign Large Blend	0.61%	0.81%	1.08%	1.56%	1.44%	1.18%	1.83%	HEFA	iShares Currency Hedged MSCI EAFE ETF
	2.01%	3.46%	5.78%	6.36%	7.22%	9.05%	7.87%	DFALX	DFA Large Cap International I
Foreign Large Growth	0.54%	1.01%	1.37%	1.77%	1.93%	1.32%	2.15%	MGRDX	MFS International Growth R6
Foreign Large Value	0.59%	0.98%	1.34%	1.70%	1.88%	1.33%	2.12%	DODFX	Dodge & Cox International Stock
Emerging Markets	0.72%	1.49%	2.19%	2.62%	2.81%	2.12%	4.17%	HHHFX	Hartford Schroders Emerging Mkts Eq F
	0.33%	0.46%	0.36%	0.62%	1.08%	2.18%	0.60%	VWO	Vanguard FTSE Emerging Markets ETF
Alternatives	***11%***	***10%***	***10%***	***9%***	***6%***	***5%***	***4%***	**Ticker**	**Fund Name**
Managed Futures	1.44%	1.46%	1.31%	1.34%	0.83%	0.45%	0.30%	AHLIX	American Beacon AHL Mgd Futs Strat R5
	1.45%	1.46%	1.31%	1.35%	0.82%	0.45%	0.56%	AMFNX	AlphaSimplex Mgd Futs Strat N
Market Neutral	1.98%	1.69%	1.59%	1.42%	0.95%	0.70%	0.64%	BSIKX	BlackRock Strategic Income Opps K
	1.49%	1.45%	1.22%	1.00%	0.76%	0.70%	0.65%	BILPX	BlackRock Event Driven Equity Instl
Multi-Strategy / Fund of Funds	0.32%	0.45%	0.54%	0.53%	0.30%	0.15%	0.17%	BSTKX	BlackRock Total Factor K
	0.22%	0.41%	0.84%	0.63%	0.48%	0.29%	0.23%	QSPIX	AQR Style Premia Alternative I
REITs	3.60%	3.24%	2.85%	2.83%	2.14%	1.88%	1.72%	ICF	iShares Cohen & Steers REIT ETF
Precious Metals	0.85%	0.73%	0.63%	0.81%	0.44%	0.37%	0.24%	IAU	iShares Gold Trust
Fixed Income	***61%***	***46%***	***34%***	***25%***	***16%***	***10%***	***7%***	**Ticker**	**Fund Name**
Ultra Short-Term Bond	1.98%	1.06%	0.97%	1.34%	0.00%	0.96%	0.67%	VUSFX	Vanguard Ultra-Short-Term Bond Admiral
Short-Term Bond	7.88%	6.95%	5.84%	4.80%	2.89%	1.86%	1.18%	VFSUX	Vanguard Short-Term Investment-Grade Adm
Intermediate-Term Bond	12.81%	9.58%	6.70%	4.67%	3.23%	1.81%	1.28%	DBLFX	DoubleLine Core Fixed Income I
	12.85%	9.60%	6.75%	4.83%	3.32%	1.86%	1.32%	PTTRX	PIMCO Total Return Instl
	12.83%	9.59%	6.84%	4.91%	3.33%	1.89%	1.34%	PTRQX	PGIM Total Return Bond R6
	12.79%	9.56%	6.85%	4.86%	3.36%	1.90%	1.34%	DODIX	Dodge & Cox Income
Multi-Sector Bond	2.00%	1.71%	1.22%	1.16%	0.94%	0.50%	0.44%	PIMIX	PIMCO Income Instl
Cash	***5%***	***5%***	***4%***	***3%***	***6%***	***5%***	***4%***	**Ticker**	**Fund Name**
Cash & Equivalents	5.16%	5.24%	4.14%	3.40%	5.76%	5.44%	4.32%	FIGXX	Fidelity Money Market Government Portfolio I
TOTAL	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**		

Target Allocations are subject to change without notice.

INVESTMENT PORTFOLIO SUMMARY - CAPITAL PRESERVATION

El Toro Water District - 401(k) Plan

Data as of: 12/31/2021

Portfolio Manager:
Keith Stribling, CFA

Account Snapshot

Asset Class	Market Value	Tax Cost	Est. Annual Income	Current Yield (%)
Cash & Equivalents	$93,128.76	$93,128.76	$27.94	0.03%
Fixed Income	$1,139,679.60	$1,156,535.97	$28,651.55	2.51%
Equities	$367,282.51	$297,565.97	$4,018.07	1.09%
Alternatives	$204,954.59	$192,201.66	$4,117.54	2.01%
Other	$0.00	$0.00	$0.00	0.00%
Total	**$1,805,045.46**	**$1,739,432.36**	**$36,815.09**	**2.04%**

Yields are gross of any fees and reflect the reinvestment of dividends and other income

Asset Allocation

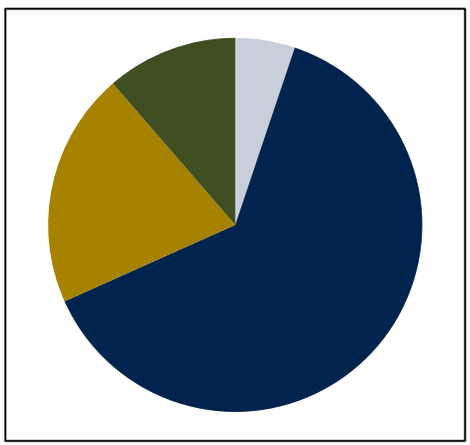
5.2% Cash & Equivalents

63.1% Fixed Income

20.3% Equities

11.4% Alternatives

0.0% Other



Income Summary (1, 2)

Cash & Equivalents Income Earned YTD	$6
Taxable Fixed Income Income Earned YTD	$28,906
Tax-Exempt Fixed Income Income Earned YTD	$0
Equity Income Earned YTD	$29,692
Alternative Income Earned YTD	$6,550
Other Income Earned YTD	$0
Total	**$65,154**

Net Gain/Loss Summary (3)

	Realized	Unrealized
Net Short Term Gain/Loss	$5,702	
Net Long Term Gain/Loss	$43,164	
Total	**$48,867**	**$65,613**

(1) As of 12/31/2021

(2) Information is calculated on a calendar year basis and includes income, dividends, and capital gain distributions

(3) Gain/Loss information is for informational purposes only.

HOLDINGS REPORT

El Toro Water District 401(k) - Capital Preservation

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
CASH EQUIVALENTS								
MONEY MARKET FUNDS/CASH								
n.a.	n.a.	CASH	(1,353.2300)	($1,353.23)	1.00	($1,353.23)	-1.45%	-0.08%
FPZXX	n.a.	CASH FUND	94,481.99	$94,481.99	1.00	$94,481.99	101.45%	5.25%
TOTAL CASH				**$93,128.76**		**$93,128.76**		**5.18%**
FIXED INCOME								
Ultra Short-Term Bond Funds								
VUSFX	922031711	Vanguard Ultra-Short-Term Bond Admiral	1,781.51	35,902.75	20.06	35,737.09	3.14%	1.99%
Short-Term Bond Funds								
VFSUX	922031836	Vanguard Short-Term Investment-Grade Adm	13,208.11	143,505.33	10.77	142,251.39	12.48%	7.91%
Intermediate-Term Bond Funds								
DBLFX	258620301	DoubleLine Core Fixed Income I	21,141.61	233,659.94	10.94	231,289.17	20.29%	12.86%
DODIX	256210105	Dodge & Cox Income	16,420.07	232,938.05	14.06	230,866.23	20.26%	12.83%
PTRQX	74440B884	PGIM Total Return Bond R6	15,984.94	234,917.92	14.49	231,621.78	20.32%	12.87%
PTTRX	693390700	PIMCO Total Return Instl	22,576.38	239,269.46	10.27	231,859.39	20.34%	12.89%
				$940,785.37		$925,636.57		51.45%
Multi-Sector Bond Funds								
PIMIX	72201F490	PIMCO Income Instl	3,019.64	36,342.52	11.94	36,054.55	3.16%	2.00%
TOTAL FIXED INCOME				**$1,156,535.97**		**$1,139,679.60**		**63.35%**
EQUITY								
Large Cap Blend Funds								
COFYX	19766M709	Columbia Contrarian Core Inst3	1,707.85	47,868.80	34.07	58,186.55	16.10%	3.23%
VGIAX	921913208	Vanguard Growth & Income Adm	579.39	49,569.01	104.29	60,425.00	16.72%	3.36%
				$97,437.81		$118,611.55		6.59%
Large Cap Value Funds								
DODGX	256219106	Dodge & Cox Stock	113.49	21,193.77	245.26	27,835.54	7.70%	1.55%
PKAIX	72202L462	PIMCO RAE US Instl	1,963.08	22,047.30	13.52	26,540.84	7.34%	1.48%
IVE	464287408	iShares S&P 500 Value ETF	24.00	2,970.37	156.63	3,759.12	1.04%	0.21%
				$46,211.44		$58,135.50		3.23%

HOLDINGS REPORT

El Toro Water District 401(k) - Capital Preservation

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
Large Cap Growth Funds								
HNACX	411512528	Harbor Capital Appreciation Retirement	258.81	21,405.91	100.9	26,113.63	7.23%	1.45%
LSITX	52469H255	ClearBridge Large Cap Growth IS	361.33	21,145.64	74.7	26,991.35	7.47%	1.50%
				$42,551.55		$53,104.98		2.95%
Mid Cap Blend Funds								
VO	922908629	Vanguard Mid-Cap ETF	20.00	3,330.01	254.77	5,095.40	1.41%	0.28%
Small Cap Value Funds								
UBVFX	904504479	Undiscovered Managers Behavioral Val R6	169.76	10,580.73	83.47	14,169.53	3.92%	0.79%
Small Cap Blend Funds								
DCZRX	24610B826	Delaware Small Cap Core R6	372.14	8,421.72	31.32	11,655.27	3.23%	0.65%
VB	922908751	Vanguard Small-Cap ETF	40.00	7,370.98	226.01	9,040.40	2.50%	0.50%
				$15,792.70		$20,695.67		1.15%
Small Cap Growth Funds								
RSEJX	92647Q363	Victory RS Small Cap Growth R6	55.44	4,567.57	79.37	4,400.27	1.22%	0.24%
VBK	922908595	Vanguard Small-Cap Growth ETF	23.00	5,568.16	281.79	6,481.17	1.79%	0.36%
				$10,135.73		$10,881.44		0.60%
Foreign Large Value Funds								
DODFX	256206103	Dodge & Cox International Stock	224.86	9,046.01	47.29	10,633.82	2.94%	0.59%
Foreign Large Blend Funds								
DFALX	233203868	DFA Large Cap International I	1,325.16	29,680.75	27.39	36,296.02	10.04%	2.02%
HEFA	46434V803	iShares Currency Hedged MSCI EAFE ETF	310.00	8,354.39	35.33	10,952.30	3.03%	0.61%
				$38,035.14		$47,248.32		2.63%
Foreign Large Growth Funds								
MGRDX	552746356	MFS International Growth R6	224.54	7,899.69	43.65	9,801.00	2.71%	0.54%
Diversified Emerging Markets								
HHHFX	41665X859	Hartford Schroders Emerging Mkts Eq F	680.49	10,215.60	19.06	12,970.10	3.59%	0.72%
				$10,215.60		$12,970.10		0.72%
TOTAL EQUITY				**$291,236.41**		**$361,347.31**		**20.08%**

HOLDINGS REPORT

El Toro Water District 401(k) - Capital Preservation

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
ALTERNATIVES								
Market Neutral								
BILPX	09250J734	BlackRock Event Driven Equity Instl	2,710.50	26,869.35	9.92	26,888.20	7.44%	1.49%
BSIKX	09260B374	BlackRock Strategic Income Opps K	3,511.85	35,837.68	10.16	35,680.41	9.87%	1.98%
				$62,707.03		$62,568.61		3.48%
Managed Futures								
AHLIX	024525669	American Beacon AHL Mgd Futs Strat R5	2,486.30	27,406.24	10.49	26,081.33	7.22%	1.45%
AMFNX	63873P825	AlphaSimplex Mgd Futs Strat N	2,597.74	26,599.90	10.06	26,133.27	7.23%	1.45%
				$54,006.14		$52,214.60		2.90%
Fund of Hedge Funds								
BSTKX	09258N380	BlackRock Total Factor K	599.80	5,261.62	9.65	5,788.05	1.60%	0.32%
QSPIX	00203H420	AQR Style Premia Alternative I	577.50	5,361.01	7.03	4,059.80	1.12%	0.23%
				$10,622.63		$9,847.85		0.55%
REITs								
ICF	464287564	iShares Cohen & Steers REIT ETF	854.00	49,201.64	76.08	64,972.32	17.98%	3.61%
Precious Metals								
IAU	464285204	iShares Gold Trust	441.00	15,664.22	34.81	15,351.21	4.25%	0.85%
TOTAL ALTERNATIVES				**$192,201.66**		**$204,954.59**		**11.39%**
TOTAL - ALL ASSETS				**$1,733,102.80**		**$1,799,110.26**		**100.00%**

INVESTMENT PORTFOLIO SUMMARY - INCOME

El Toro Water District - 401(k) Plan

Data as of: 12/31/2021

Portfolio Manager:
Keith Stribling, CFA

Account Snapshot

Asset Class	Market Value	Tax Cost	Est. Annual Income	Current Yield (%)
Cash & Equivalents	$373,780.40	$373,780.40	$112.13	0.03%
Fixed Income	$3,426,498.70	$3,431,173.80	$86,142.18	2.51%
Equities	$2,555,244.82	$2,124,638.04	$27,954.38	1.09%
Alternatives	$776,392.83	$733,410.69	$15,597.73	2.01%
Other	$0.00	$0.00	$0.00	0.00%
Total	**$7,131,916.75**	**$6,663,002.93**	**$129,806.42**	**1.82%**

Yields are gross of any fees and reflect the reinvestment of dividends and other income

Asset Allocation

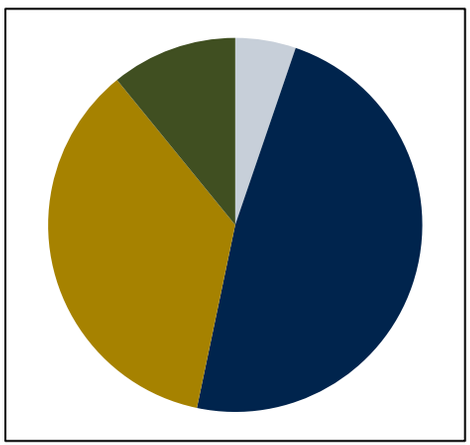
5.2% Cash & Equivalents

48.0% Fixed Income

35.8% Equities

10.9% Alternatives

0.0% Other



Income Summary (1, 2)

Cash & Equivalents Income Earned YTD	$29
Taxable Fixed Income Income Earned YTD	$83,907
Tax-Exempt Fixed Income Income Earned YTD	$0
Equity Income Earned YTD	$203,402
Alternative Income Earned YTD	$26,453
Other Income Earned YTD	$0
Total	**$313,791**

Net Gain/Loss Summary (3)

	Realized	Unrealized
Net Short Term Gain/Loss	$30,749	
Net Long Term Gain/Loss	$183,412	
Total	**$214,161**	**$468,914**

(1) As of 12/31/2021

(2) Information is calculated on a calendar year basis and includes income, dividends, and capital gain distributions

(3) Gain/Loss information is for informational purposes only.

HOLDINGS REPORT

El Toro Water District 401(k) - Income

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
CASH EQUIVALENTS								
MONEY MARKET FUNDS/CASH								
n.a.	n.a.	CASH	(4,169.8600)	($4,169.86)	1.00	($4,169.86)	-1.12%	-0.06%
FPZXX	n.a.	CASH FUND	377,950.26	$377,950.26	1.00	$377,950.26	101.12%	5.32%
TOTAL CASH				**$373,780.40**		**$373,780.40**		**5.27%**
FIXED INCOME								
Ultra Short-Term Bond Funds								
VUSFX	922031711	Vanguard Ultra-Short-Term Bond Admiral	3,760.24	75,766.63	20.06	75,430.49	2.20%	1.06%
Short-Term Bond Funds								
VFSUX	922031836	Vanguard Short-Term Investment-Grade Adm	46,007.50	497,562.26	10.77	495,500.76	14.46%	6.98%
Intermediate-Term Bond Funds								
DBLFX	258620301	DoubleLine Core Fixed Income I	62,441.33	685,143.81	10.94	683,108.13	19.94%	9.62%
DODIX	256210105	Dodge & Cox Income	48,495.97	677,314.10	14.06	681,853.27	19.90%	9.60%
PTRQX	74440B884	PGIM Total Return Bond R6	47,213.90	684,608.97	14.49	684,129.40	19.97%	9.64%
PTTRX	693390700	PIMCO Total Return Instl	66,685.78	688,243.82	10.27	684,862.99	19.99%	9.65%
				$2,735,310.70		$2,733,953.79		38.51%
Multi-Sector Bond Funds								
PIMIX	72201F490	PIMCO Income Instl	10,185.40	122,534.21	11.94	121,613.66	3.55%	1.71%
TOTAL FIXED INCOME				**$3,431,173.80**		**$3,426,498.70**		**48.27%**
EQUITY								
Large Cap Blend Funds								
COFYX	19766M709	Columbia Contrarian Core Inst3	11,531.43	336,975.05	34.07	392,875.75	15.57%	5.53%
VGIAX	921913208	Vanguard Growth & Income Adm	3,912.59	344,170.66	104.29	408,043.70	16.18%	5.75%
				$681,145.71		$800,919.45		11.28%
Large Cap Value Funds								
DODGX	256219106	Dodge & Cox Stock	812.65	160,806.13	245.26	199,310.29	7.90%	2.81%
PKAIX	72202L462	PIMCO RAE US Instl	15,072.30	179,058.61	13.52	203,777.43	8.08%	2.87%
IVE	464287408	iShares S&P 500 Value ETF	232.00	29,351.92	156.63	36,338.16	1.44%	0.51%
				$369,216.66		$439,425.88		6.19%

HOLDINGS REPORT

El Toro Water District 401(k) - Income

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
Large Cap Growth Funds								
HNACX	411512528	Harbor Capital Appreciation Retirement	1,810.98	149,085.09	100.9	182,727.38	7.24%	2.57%
LSITX	52469H255	ClearBridge Large Cap Growth IS	2,489.40	145,976.96	74.7	185,957.88	7.37%	2.62%
				$295,062.05		$368,685.26		5.19%
Mid Cap Blend Funds								
VO	922908629	Vanguard Mid-Cap ETF	207.00	34,702.54	254.77	52,737.39	2.09%	0.74%
Small Cap Value Funds								
UBVFX	904504479	Undiscovered Managers Behavioral Val R6	872.29	56,968.93	83.47	72,810.05	2.89%	1.03%
Small Cap Blend Funds								
DCZRX	24610B826	Delaware Small Cap Core R6	3,175.53	75,120.21	31.32	99,457.63	3.94%	1.40%
VB	922908751	Vanguard Small-Cap ETF	310.00	58,201.04	226.01	70,063.10	2.78%	0.99%
				$133,321.25		$169,520.73		2.39%
Small Cap Growth Funds								
RSEJX	92647Q363	Victory RS Small Cap Growth R6	316.05	25,244.05	79.37	25,084.89	0.99%	0.35%
VBK	922908595	Vanguard Small-Cap Growth ETF	143.00	34,851.40	281.79	40,295.97	1.60%	0.57%
				$60,095.45		$65,380.86		0.92%
Foreign Large Value Funds								
DODFX	256206103	Dodge & Cox International Stock	1,478.59	61,011.27	47.29	69,922.33	2.77%	0.98%
Foreign Large Blend Funds								
DFALX	233203868	DFA Large Cap International I	9,012.55	200,678.55	27.39	246,853.77	9.79%	3.48%
HEFA	46434V803	iShares Currency Hedged MSCI EAFE ETF	1,637.00	47,194.81	35.33	57,835.21	2.29%	0.81%
				$247,873.36		$304,688.98		4.29%
Foreign Large Growth Funds								
MGRDX	552746356	MFS International Growth R6	1,654.74	59,609.65	43.65	72,229.31	2.86%	1.02%
Diversified Emerging Markets								
HHHFX	41665X859	Hartford Schroders Emerging Mkts Eq F	5,573.53	90,786.18	19.06	106,231.52	4.21%	1.50%
				$90,786.18		$106,231.52		1.50%
TOTAL EQUITY				**$2,089,793.05**		**$2,522,551.76**		**35.53%**

HOLDINGS REPORT

El Toro Water District 401(k) - Income

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
ALTERNATIVES								
Market Neutral								
BILPX	09250J734	BlackRock Event Driven Equity Instl	10,441.27	103,061.09	9.92	103,577.35	4.11%	1.46%
BSIKX	09260B374	BlackRock Strategic Income Opps K	11,844.50	120,392.81	10.16	120,340.15	4.77%	1.70%
				$223,453.90		$223,917.50		3.15%
Managed Futures								
AHLIX	024525669	American Beacon AHL Mgd Futs Strat R5	9,901.39	109,597.51	10.49	103,865.53	4.12%	1.46%
AMFNX	63873P825	AlphaSimplex Mgd Futs Strat N	10,318.20	103,112.11	10.06	103,801.08	4.11%	1.46%
				$212,709.62		$207,666.61		2.93%
Fund of Hedge Funds								
BSTKX	09258N380	BlackRock Total Factor K	3,337.44	29,277.11	9.65	32,206.30	1.28%	0.45%
QSPIX	00203H420	AQR Style Premia Alternative I	4,154.86	37,116.14	7.03	29,208.65	1.16%	0.41%
				$66,393.25		$61,414.95		0.87%

HOLDINGS REPORT

El Toro Water District 401(k) - Income

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
REITs								
ICF	464287564	iShares Cohen & Steers REIT ETF	3,040.00	177,343.86	76.08	231,283.20	9.17%	3.26%
REITs								
IAU	464285204	iShares Gold Trust	1,497.00	53,510.06	34.81	52,110.57	2.07%	0.73%
TOTAL ALTERNATIVES				**$733,410.69**		**$776,392.83**		**10.94%**
TOTAL - ALL ASSETS				**$6,628,157.94**		**$7,099,223.69**		**100.00%**

INVESTMENT PORTFOLIO SUMMARY - INCOME & GROWTH

El Toro Water District - 401(k) Plan

Account Number:
Data as of: 12/31/2021

Portfolio Manager:
Keith Stribling, CFA

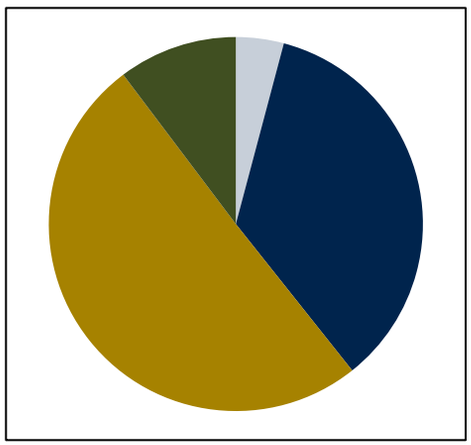
Account Snapshot

Asset Class	Market Value	Tax Cost	Est. Annual Income	Current Yield (%)
Cash & Equivalents	$362,199.55	$362,199.55	$108.66	0.03%
Fixed Income	$3,080,143.79	$3,097,621.69	$77,434.81	2.51%
Equities	$4,413,630.88	$3,363,899.78	$48,417.53	1.10%
Alternatives	$900,071.52	$869,406.51	$18,082.44	2.01%
Other	$0.00	$0.00	$0.00	0.00%
Total	**$8,756,045.74**	**$7,693,127.53**	**$144,043.44**	**1.65%**

Yields are gross of any fees and reflect the reinvestment of dividends and other income

Asset Allocation

4.1% Cash & Equivalents
35.2% Fixed Income
50.4% Equities
10.3% Alternatives
0.0% Other



Income Summary (1, 2)

Cash & Equivalents Income Earned YTD	$23
Taxable Fixed Income Income Earned YTD	$82,778
Tax-Exempt Fixed Income Income Earned YTD	$0
Equity Income Earned YTD	$356,924
Alternative Income Earned YTD	$36,222
Other Income Earned YTD	$0
Total	**$475,947**

Net Gain/Loss Summary (3)

	Realized	Unrealized
Net Short Term Gain/Loss	$50,218	
Net Long Term Gain/Loss	$485,874	
Total	**$536,092**	**$1,062,918**

(1) As of 12/31/2021

(2) Information is calculated on a calendar year basis and includes income, dividends, and capital gain distributions

(3) Gain/Loss information is for informational purposes only.

HOLDINGS REPORT

El Toro Water District 401(k) - Income & Growth

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
CASH EQUIVALENTS								
MONEY MARKET FUNDS/CASH								
n.a.	n.a.	CASH	(3,810.5300)	($3,810.53)	1.00	($3,810.53)	-1.05%	-0.04%
FPZXX	n.a.	CASH FUND	366,010.08	$366,010.08	1.00	$366,010.08	101.05%	4.18%
TOTAL CASH				**$362,199.55**		**$362,199.55**		**4.14%**
FIXED INCOME								
Ultra Short-Term Bond Funds								
VUSFX	922031711	Vanguard Ultra-Short-Term Bond Admiral	4.00	85,137.12	20.06	84,777.99	2.75%	0.97%
Short-Term Bond Funds								
VFSUX	922031836	Vanguard Short-Term Investment-Grade Adm	4.00	514,110.94	10.77	511,436.96	16.60%	5.84%
Intermediate-Term Bond Funds								
DBLFX	258620301	DoubleLine Core Fixed Income I	53,616.44	586,485.64	10.94	586,563.84	19.04%	6.70%
DODIX	256210105	Dodge & Cox Income	42,672.13	591,751.03	14.06	599,970.12	19.48%	6.85%
PTRQX	74440B884	PGIM Total Return Bond R6	41,354.76	604,970.72	14.49	599,230.41	19.45%	6.84%
PTTRX	693390700	PIMCO Total Return Instl	57,559.24	607,612.51	10.27	591,133.38	19.19%	6.75%
				$2,390,819.90		$2,376,897.75		27.15%
Multi-Sector Bond Funds								
PIMIX	72201F490	PIMCO Income Instl	4.00	107,553.73	11.94	107,031.09	3.47%	1.22%
TOTAL FIXED INCOME				**$3,097,621.69**		**$3,080,143.79**		**35.18%**
EQUITY								
Large Cap Blend Funds								
COFYX	19766M709	Columbia Contrarian Core Inst3	21,060.99	523,232.24	34.07	717,548.07	16.26%	8.19%
VGIAX	921913208	Vanguard Growth & Income Adm	7,145.85	558,875.59	104.29	745,240.80	16.88%	8.51%
				$1,082,107.83		$1,462,788.87		16.71%
Large Cap Value Funds								
DODGX	256219106	Dodge & Cox Stock	1,432.64	275,835.26	245.26	351,370.02	7.96%	4.01%
PKAIX	72202L462	PIMCO RAE US Instl	23,358.31	264,003.94	13.52	315,804.35	7.16%	3.61%
IVE	464287408	iShares S&P 500 Value ETF	282.00	36,824.32	156.63	44,169.66	1.00%	0.50%
				$576,663.52		$711,344.03		8.12%

HOLDINGS REPORT

El Toro Water District 401(k) - Income & Growth

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
Large Cap Growth Funds								
HNACX	411512528	Harbor Capital Appreciation Retirement	2,956.82	218,338.43	100.9	298,342.94	6.76%	3.41%
LSITX	52469H255	ClearBridge Large Cap Growth IS	3,573.66	188,181.00	74.7	266,952.40	6.05%	3.05%
				$406,519.43		$565,295.34		6.46%
Mid Cap Blend Funds								
VO	922908629	Vanguard Mid-Cap ETF	210.00	34,115.93	254.77	53,501.70	1.21%	0.61%
Small Cap Value Funds								
UBVFX	904504479	Undiscovered Managers Behavioral Val R6	1,898.46	121,678.13	83.47	158,464.46	3.59%	1.81%
Small Cap Blend Funds								
DCZRX	24610B826	Delaware Small Cap Core R6	4,649.77	110,798.41	31.32	145,630.89	3.30%	1.66%
VB	922908751	Vanguard Small-Cap ETF	625.00	101,023.06	226.01	141,256.25	3.20%	1.61%
				$211,821.47		$286,887.14		3.28%
Small Cap Growth Funds								
RSEJX	92647Q363	Victory RS Small Cap Growth R6	915.80	74,589.23	79.37	72,686.73	1.65%	0.83%
VBK	922908595	Vanguard Small-Cap Growth ETF	146.00	32,372.57	281.79	41,141.34	0.93%	0.47%
				$106,961.80		$113,828.07		1.30%
Foreign Large Value Funds								
DODFX	256206103	Dodge & Cox International Stock	2,476.33	100,955.49	47.29	117,105.46	2.65%	1.34%
Foreign Large Blend Funds								
DFALX	233203868	DFA Large Cap International I	18,489.37	393,316.94	27.39	506,423.71	11.47%	5.78%
HEFA	46434V803	iShares Currency Hedged MSCI EAFE ETF	2,680.00	68,633.78	35.33	94,684.40	2.15%	1.08%
				$461,950.72		$601,108.11		6.87%
Foreign Large Growth Funds								
MGRDX	552746356	MFS International Growth R6	2,746.22	83,535.97	43.65	119,872.63	2.72%	1.37%
Diversified Emerging Markets								
HHHFX	41665X859	Hartford Schroders Emerging Mkts Eq F	10,054.16	143,955.62	19.06	191,632.29	4.34%	2.19%
VWO	922042858	Vanguard FTSE Emerging Markets ETF	643.00	33,633.87	49.46	31,802.78	0.72%	0.36%
				$177,589.49		$223,435.07		2.55%
TOTAL EQUITY				**$3,363,899.78**		**$4,413,630.88**		**50.41%**

HOLDINGS REPORT

El Toro Water District 401(k) - Income & Growth

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
ALTERNATIVES								
Market Neutral								
BILPX	09250J734	BlackRock Event Driven Equity Instl	10,775.52	107,119.52	9.92	106,893.20	2.42%	1.22%
BSIKX	09260B374	BlackRock Strategic Income Opps K	13,700.20	138,176.94	10.16	139,193.99	3.15%	1.59%
				$245,296.46		$246,087.19		2.81%
Managed Futures								
AHLIX	024525669	American Beacon AHL Mgd Futs Strat R5	10,910.00	120,167.37	10.49	114,445.92	2.59%	1.31%
AMFNX	63873P825	AlphaSimplex Mgd Futs Strat N	11,368.02	119,598.99	10.06	114,362.24	2.59%	1.31%
				$239,766.36		$228,808.16		2.61%
Fund of Hedge Funds								
BSTKX	09258N380	BlackRock Total Factor K	4,939.63	43,332.07	9.65	47,667.47	1.08%	0.54%
QSPIX	00203H420	AQR Style Premia Alternative I	10,432.50	100,661.00	7.03	73,340.44	1.66%	0.84%
				$143,993.07		$121,007.91		1.38%

HOLDINGS REPORT

El Toro Water District 401(k) - Income & Growth

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
REITs								
ICF	464287564	iShares Cohen & Steers REIT ETF	3,276.00	183,197.22	76.08	249,238.08	5.65%	2.85%
REITs								
IAU	464285204	iShares Gold Trust	1,578.00	57,153.40	34.81	54,930.18	1.24%	0.63%
TOTAL ALTERNATIVES				**$869,406.51**		**$900,071.52**		**10.28%**
TOTAL - ALL ASSETS				**$7,693,127.53**		**$8,756,045.74**		**100.00%**

INVESTMENT PORTFOLIO SUMMARY -BALANCED INCOME

El Toro Water District - 401(k) Plan

Data as of: 12/31/2021

Portfolio Manager:
Keith Stribling, CFA

Account Snapshot

Asset Class	Market Value	Tax Cost	Est. Annual Income	Current Yield (%)
Cash & Equivalents	$134,942.59	$134,942.59	$40.48	0.03%
Fixed Income	$1,055,751.99	$1,037,909.17	$26,541.61	2.51%
Equities	$2,388,835.07	$1,930,986.15	$26,205.52	1.10%
Alternatives	$393,612.61	$370,467.48	$7,907.68	2.01%
Other	$0.00	$0.00	$0.00	0.00%
Total	**$3,973,142.26**	**$3,474,305.39**	**$60,695.29**	**1.53%**

Yields are gross of any fees and reflect the reinvestment of dividends and other income

Asset Allocation

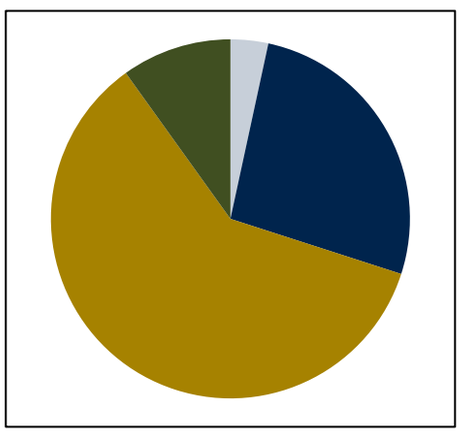
3.4% Cash & Equivalents

26.6% Fixed Income

60.1% Equities

9.9% Alternatives

0.0% Other



Income Summary (1, 2)

Cash & Equivalents Income Earned YTD	$17
Taxable Fixed Income Income Earned YTD	$35,190
Tax-Exempt Fixed Income Income Earned YTD	$0
Equity Income Earned YTD	$197,418
Alternative Income Earned YTD	$15,912
Other Income Earned YTD	$0
Total	**$248,537**

Net Gain/Loss Summary (3)

	Realized	Unrealized
Net Short Term Gain/Loss	$26,655	
Net Long Term Gain/Loss	$579,300	
Total	**$605,955**	**$474,839**

(1) As of 12/31/2021

(2) Information is calculated on a calendar year basis and includes income, dividends, and capital gain distributions

(3) Gain/Loss information is for informational purposes only.

HOLDINGS REPORT

El Toro Water District 401(k) - Balanced Income

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
CASH EQUIVALENTS								
MONEY MARKET FUNDS/CASH								
n.a.	n.a.	CASH	(1,329.8900)	($1,329.89)	1.00	($1,329.89)	-0.99%	-0.03%
FPZXX	n.a.	CASH FUND	136,272.48	$136,272.48	1.00	$136,272.48	100.99%	3.43%
TOTAL CASH				**$134,942.59**		**$134,942.59**		**3.40%**
FIXED INCOME								
Ultra Short-Term Bond Funds								
VUSFX	922031711	Vanguard Ultra-Short-Term Bond Admiral	2,653.32	53,490.17	20.06	53,225.54	5.04%	1.34%
Short-Term Bond Funds								
VFSUX	922031836	Vanguard Short-Term Investment-Grade Adm	17,715.82	190,394.65	10.77	190,799.41	18.07%	4.80%
Intermediate-Term Bond Funds								
DBLFX	258620301	DoubleLine Core Fixed Income I	16,950.82	182,356.30	10.94	185,441.94	17.56%	4.67%
DODIX	256210105	Dodge & Cox Income	13,745.50	186,495.38	14.06	193,261.79	18.31%	4.86%
PTRQX	74440B884	PGIM Total Return Bond R6	13,472.30	191,047.20	14.49	195,213.55	18.49%	4.91%
PTTRX	693390700	PIMCO Total Return Instl	18,678.66	187,948.97	10.27	191,829.86	18.17%	4.83%
				$747,847.85		$765,747.14		19.27%
Multi-Sector Bond Funds								
PIMIX	72201F490	PIMCO Income Instl	3,850.89	46,176.24	11.94	45,979.64	4.36%	1.16%
TOTAL FIXED INCOME				**$1,037,908.91**		**$1,055,751.73**		**26.57%**
EQUITY								
Large Cap Blend Funds								
COFYX	19766M709	Columbia Contrarian Core Inst3	11,078.46	309,121.20	34.07	377,443.00	15.80%	9.50%
VGIAX	921913208	Vanguard Growth & Income Adm	3,560.44	300,798.96	104.29	371,318.18	15.54%	9.35%
				$609,920.16		$748,761.18		18.85%
Large Cap Value Funds								
DODGX	256219106	Dodge & Cox Stock	692.55	137,698.49	245.26	169,854.32	7.11%	4.28%
PKAIX	72202L462	PIMCO RAE US Instl	11,886.05	137,637.75	13.52	160,699.34	6.73%	4.04%
IVE	464287408	iShares S&P 500 Value ETF	236.00	30,175.54	156.63	36,964.68	1.55%	0.93%
				$305,511.78		$367,518.34		9.25%

HOLDINGS REPORT

El Toro Water District 401(k) - Balanced Income

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
Large Cap Growth Funds								
HNACX	411512528	Harbor Capital Appreciation Retirement	1,987.23	161,660.10	100.9	200,511.51	8.39%	5.05%
LSITX	52469H255	ClearBridge Large Cap Growth IS	2,155.88	116,848.21	74.7	161,044.24	6.74%	4.05%
				$278,508.31		$361,555.75		9.10%
Mid Cap Blend Funds								
VO	922908629	Vanguard Mid-Cap ETF	154.00	25,026.03	254.77	39,234.58	1.64%	0.99%
Small Cap Value Funds								
UBVFX	904504479	Undiscovered Managers Behavioral Val R6	1,191.65	82,052.64	83.47	99,467.28	4.16%	2.50%
Small Cap Blend Funds								
DCZRX	24610B826	Delaware Small Cap Core R6	1,670.63	41,528.26	31.32	52,324.23	2.19%	1.32%
VB	922908751	Vanguard Small-Cap ETF	284.00	41,217.68	226.01	64,186.84	2.69%	1.62%
				$82,745.94		$116,511.07		2.93%
Small Cap Growth Funds								
RSEJX	92647Q363	Victory RS Small Cap Growth R6	390.09	31,709.40	79.37	30,961.52	1.30%	0.78%
VBK	922908595	Vanguard Small-Cap Growth ETF	155.00	33,152.37	281.79	43,677.45	1.83%	1.10%
				$64,861.77		$74,638.97		1.88%
Foreign Large Value Funds								
DODFX	256206103	Dodge & Cox International Stock	1,429.14	61,477.30	47.29	67,584.22	2.83%	1.70%
Foreign Large Blend Funds								
DFALX	233203868	DFA Large Cap International I	9,231.40	197,041.72	27.39	252,848.10	10.58%	6.36%
HEFA	46434V803	iShares Currency Hedged MSCI EAFE ETF	1,750.00	51,794.09	35.33	61,827.50	2.59%	1.56%
				$248,835.81		$314,675.60		7.92%
Foreign Large Growth Funds								
MGRDX	552746356	MFS International Growth R6	1,607.98	57,675.01	43.65	70,188.37	2.94%	1.77%
Diversified Emerging Markets								
HHHFX	41665X859	Hartford Schroders Emerging Mkts Eq F	5,465.24	88,567.90	19.06	104,167.55	4.36%	2.62%
VWO	922042858	Vanguard FTSE Emerging Markets ETF	496.00	25,803.50	49.46	24,532.16	1.03%	0.62%
				$114,371.40		$128,699.71		3.24%
TOTAL EQUITY				**$1,930,986.15**		**$2,388,835.07**		**60.12%**

HOLDINGS REPORT

El Toro Water District 401(k) - Balanced Income

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
ALTERNATIVES								
Market Neutral								
BILPX	09250J734	BlackRock Event Driven Equity Instl	4,008.47	39,683.95	9.92	39,763.97	1.66%	1.00%
BSIKX	09260B374	BlackRock Strategic Income Opps K	5,558.66	55,510.78	10.16	56,476.00	2.36%	1.42%
				$95,194.73		$96,239.97		2.42%
Managed Futures								
AHLIX	024525669	American Beacon AHL Mgd Futs Strat R5	5,084.95	55,955.32	10.49	53,341.09	2.23%	1.34%
AMFNX	63873P825	AlphaSimplex Mgd Futs Strat N	5,316.98	52,403.73	10.06	53,488.78	2.24%	1.35%
				$108,359.05		$106,829.87		2.69%
Fund of Hedge Funds								
BSTKX	09258N380	BlackRock Total Factor K	2,162.31	18,968.46	9.65	20,866.26	0.87%	0.53%
QSPIX	00203H420	AQR Style Premia Alternative I	3,567.39	32,667.24	7.03	25,078.75	1.05%	0.63%
				$51,635.70		$45,945.01		1.16%

HOLDINGS REPORT

El Toro Water District 401(k) - Balanced Income

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
REITs								
ICF	464287564	iShares Cohen & Steers REIT ETF	1,476.00	81,290.93	76.08	112,294.08	4.70%	2.83%
Precious Metals								
IAU	464285204	iShares Gold Trust	928.00	33,987.07	34.81	32,303.68	1.35%	0.81%
TOTAL ALTERNATIVES				**$370,467.48**		**$393,612.61**		**9.91%**
TOTAL - ALL ASSETS				**$3,474,305.13**		**$3,973,142.00**		**100.00%**

INVESTMENT PORTFOLIO SUMMARY - BALANCED

El Toro Water District - 401(k) Plan

Data as of: 12/31/2021

Portfolio Manager:
Keith Stribling, CFA

Account Snapshot

Asset Class	Market Value	Tax Cost	Est. Annual Income	Current Yield (%)
Cash & Equivalents	$59,513.11	$59,513.11	$17.85	0.03%
Fixed Income	$176,579.25	$177,455.86	$4,439.20	2.51%
Equities	$728,561.59	$576,731.10	$7,992.32	1.10%
Alternatives	$69,448.09	$65,935.85	$1,395.21	2.01%
Other	$0.00	$0.00	$0.00	0.00%
Total	**$1,034,102.04**	**$879,635.92**	**$13,844.59**	**1.34%**

Yields are gross of any fees and reflect the reinvestment of dividends and other income

Asset Allocation

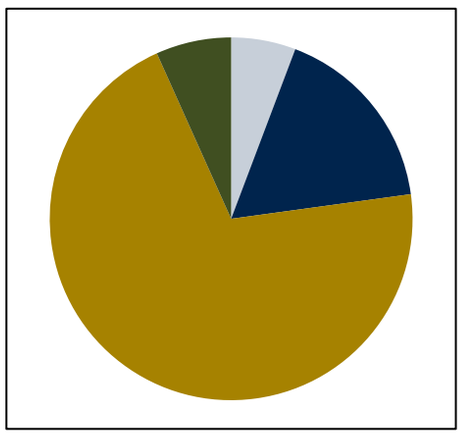
5.8% Cash & Equivalents

17.1% Fixed Income

70.5% Equities

6.7% Alternatives

0.0% Other



Income Summary (1, 2)

Cash & Equivalents Income Earned YTD	$5
Taxable Fixed Income Income Earned YTD	$4,428
Tax-Exempt Fixed Income Income Earned YTD	$0
Equity Income Earned YTD	$57,466
Alternative Income Earned YTD	$2,609
Other Income Earned YTD	$0
Total	**$64,508**

Net Gain/Loss Summary (3)

	Realized	Unrealized
Net Short Term Gain/Loss	$7,309	
Net Long Term Gain/Loss	$44,557	
Total	**$51,866**	**$154,466**

(1) As of 12/31/2021

(2) Information is calculated on a calendar year basis and includes income, dividends, and capital gain distributions

(3) Gain/Loss information is for informational purposes only.

HOLDINGS REPORT

El Toro Water District 401(k) - Balanced

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
CASH EQUIVALENTS								
MONEY MARKET FUNDS/CASH								
n.a.	n.a.	CASH	(235.4100)	($235.41)	1.00	($235.41)	-0.40%	-0.02%
FPZXX	n.a.	CASH FUND	59,748.52	$59,748.52	1.00	$59,748.52	100.40%	5.78%
TOTAL CASH				**$59,513.11**		**$59,513.11**		**5.76%**
FIXED INCOME								
Ultra Short-Term Bond Funds								
VUSFX	922031711	Vanguard Ultra-Short-Term Bond Admiral	0.00	0.00	20.06	0.00	0.00%	0.00%
Short-Term Bond Funds								
VFSUX	922031836	Vanguard Short-Term Investment-Grade Adm	2,771.56	29,989.70	10.77	29,849.68	16.90%	2.89%
Intermediate-Term Bond Funds								
DBLFX	258620301	DoubleLine Core Fixed Income I	3,053.38	33,449.51	10.94	33,403.98	18.92%	3.23%
DODIX	256210105	Dodge & Cox Income	2,474.17	34,449.03	14.06	34,786.76	19.70%	3.36%
PTRQX	74440B884	PGIM Total Return Bond R6	2,379.59	34,787.21	14.49	34,480.29	19.53%	3.33%
PTTRX	693390700	PIMCO Total Return Instl	3,347.35	35,045.32	10.27	34,377.31	19.47%	3.32%
				$137,731.07		$137,048.34		13.25%
Multi-Sector Bond Funds								
PIMIX	72201F490	PIMCO Income Instl	810.82	9,735.09	11.94	9,681.23	5.48%	0.94%
TOTAL FIXED INCOME				**$177,455.86**		**$176,579.25**		**17.08%**
EQUITY								
Large Cap Blend Funds								
COFYX	19766M709	Columbia Contrarian Core Inst3	3,202.17	81,324.81	34.07	109,097.83	14.97%	10.55%
VGIAX	921913208	Vanguard Growth & Income Adm	1,088.75	88,843.51	104.29	113,545.53	15.58%	10.98%
				$170,168.32		$222,643.36		21.53%
Large Cap Value Funds								
DODGX	256219106	Dodge & Cox Stock	224.22	43,152.13	245.26	54,992.44	7.55%	5.32%
PKAIX	72202L462	PIMCO RAE US Instl	4,252.79	49,192.30	13.52	57,497.71	7.89%	5.56%
IVE	464287408	iShares S&P 500 Value ETF	100.00	13,376.04	156.63	15,663.00	2.15%	1.51%
				$105,720.47		$128,153.15		12.39%

HOLDINGS REPORT

El Toro Water District 401(k) - Balanced

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
Large Cap Growth Funds								
HNACX	411512528	Harbor Capital Appreciation Retirement	507.48	38,639.51	100.9	51,205.14	7.03%	4.95%
LSITX	52469H255	ClearBridge Large Cap Growth IS	708.63	39,238.70	74.7	52,934.96	7.27%	5.12%
				$77,878.21		$104,140.10		10.07%
Mid Cap Blend Funds								
VO	922908629	Vanguard Mid-Cap ETF	41.00	7,304.38	254.77	10,445.57	1.43%	1.01%
Small Cap Value Funds								
UBVFX	904504479	Undiscovered Managers Behavioral Val R6	387.77	25,414.77	83.47	32,367.50	4.44%	3.13%
Small Cap Blend Funds								
DCZRX	24610B826	Delaware Small Cap Core R6	589.42	15,037.44	31.32	18,460.51	2.53%	1.79%
VB	922908751	Vanguard Small-Cap ETF	80.00	13,387.48	226.01	18,080.80	2.48%	1.75%
				$28,424.92		$36,541.31		3.53%
Small Cap Growth Funds								
RSEJX	92647Q363	Victory RS Small Cap Growth R6	153.11	13,134.77	79.37	12,152.26	1.67%	1.18%
VBK	922908595	Vanguard Small-Cap Growth ETF	46.00	9,844.22	281.79	12,962.34	1.78%	1.25%
				$22,978.99		$25,114.60		2.43%
Foreign Large Value Funds								
DODFX	256206103	Dodge & Cox International Stock	411.10	16,976.84	47.29	19,440.78	2.67%	1.88%
Foreign Large Blend Funds								
DFALX	233203868	DFA Large Cap International I	2,727.35	60,173.96	27.39	74,702.03	10.25%	7.22%
HEFA	46434V803	iShares Currency Hedged MSCI EAFE ETF	421.00	11,069.29	35.33	14,873.93	2.04%	1.44%
				$71,243.25		$89,575.96		8.66%
Foreign Large Growth Funds								
MGRDX	552746356	MFS International Growth R6	456.76	15,153.89	43.65	19,937.36	2.74%	1.93%
Diversified Emerging Markets								
HHHFX	41665X859	Hartford Schroders Emerging Mkts Eq F	1,525.36	23,648.10	19.06	29,073.40	3.99%	2.81%
VWO	922042858	Vanguard FTSE Emerging Markets ETF	225.00	11,818.96	49.46	11,128.50	1.53%	1.08%
				$35,467.06		$40,201.90		3.89%
TOTAL EQUITY				**$576,731.10**		**$728,561.59**		**70.45%**

HOLDINGS REPORT

El Toro Water District 401(k) - Balanced

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
ALTERNATIVES								
Market Neutral								
BILPX	09250J734	BlackRock Event Driven Equity Instl	791.01	7,862.24	9.92	7,846.86	1.08%	0.76%
BSIKX	09260B374	BlackRock Strategic Income Opps K	962.95	9,609.72	10.16	9,783.59	1.34%	0.95%
				$17,471.96		$17,630.45		1.70%
Managed Futures								
AHLIX	024525669	American Beacon AHL Mgd Futs Strat R5	816.85	9,080.13	10.49	8,568.76	1.18%	0.83%
AMFNX	63873P825	AlphaSimplex Mgd Futs Strat N	846.09	8,893.39	10.06	8,511.71	1.17%	0.82%
				$17,973.52		$17,080.47		1.65%
Fund of Hedge Funds								
BSTKX	09258N380	BlackRock Total Factor K	319.91	2,806.33	9.65	3,087.10	0.42%	0.30%
QSPIX	00203H420	AQR Style Premia Alternative I	709.17	6,712.42	7.03	4,985.49	0.68%	0.48%
				$9,518.75		$8,072.59		0.78%

HOLDINGS REPORT

El Toro Water District 401(k) - Balanced

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
REITs								
ICF	464287564	iShares Cohen & Steers REIT ETF	291.00	16,268.24	76.08	22,139.28	3.04%	2.14%
Precious Metals								
IAU	464285204	iShares Gold Trust	130.00	4,703.38	34.81	4,525.30	0.62%	0.44%
TOTAL ALTERNATIVES				**$65,935.85**		**$69,448.09**		**6.72%**
TOTAL - ALL ASSETS				**$879,635.92**		**$1,034,102.04**		**100.00%**

INVESTMENT PORTFOLIO SUMMARY - CAPITAL APPRECIATION

El Toro Water District - 401(k) Plan

Data as of: 12/31/2021

Portfolio Manager:
Keith Stribling, CFA

Account Snapshot

Asset Class	Market Value	Tax Cost	Est. Annual Income	Current Yield (%)
Cash & Equivalents	$92,034.32	$92,034.32	$27.61	0.03%
Fixed Income	$182,452.72	$183,163.06	$4,586.86	2.51%
Equities	$1,332,663.68	$1,192,672.63	$14,619.32	1.10%
Alternatives	$84,650.47	$79,220.84	$1,700.63	2.01%
Other	$0.00	$0.00	$0.00	0.00%
Total	**$1,691,801.19**	**$1,547,090.85**	**$20,934.42**	**1.24%**

Yields are gross of any fees and reflect the reinvestment of dividends and other income

Asset Allocation

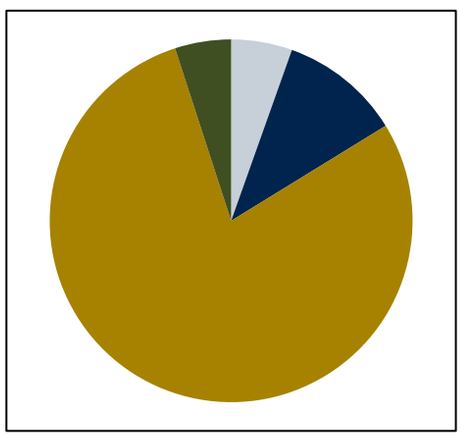
5.4% Cash & Equivalents

10.8% Fixed Income

78.8% Equities

5.0% Alternatives

0.0% Other



Income Summary (1, 2)

Cash & Equivalents Income Earned YTD	$7
Taxable Fixed Income Income Earned YTD	$3,522
Tax-Exempt Fixed Income Income Earned YTD	$0
Equity Income Earned YTD	$104,033
Alternative Income Earned YTD	$2,561
Other Income Earned YTD	$0
Total	**$110,122**

Net Gain/Loss Summary (3)

	Realized	Unrealized
Net Short Term Gain/Loss	$12,495	
Net Long Term Gain/Loss	$80,426	
Total	**$92,920**	**$144,710**

(1) As of 12/31/2021

(2) Information is calculated on a calendar year basis and includes income, dividends, and capital gain distributions

(3) Gain/Loss information is for informational purposes only.

HOLDINGS REPORT

El Toro Water District 401(k) - Capital Appreciation

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
CASH EQUIVALENTS								
MONEY MARKET FUNDS/CASH								
n.a.	n.a.	CASH	(226.0100)	($226.01)	1.00	($226.01)	-0.25%	-0.01%
FPZXX	n.a.	CASH FUND	92,260.33	$92,260.33	1.00	$92,260.33	100.25%	5.45%
TOTAL CASH				**$92,034.32**		**$92,034.32**		**5.44%**
FIXED INCOME								
Ultra Short-Term Bond Funds								
VUSFX	922031711	Vanguard Ultra-Short-Term Bond Admiral	810.54	16,338.21	20.06	16,259.35	8.91%	0.96%
Short-Term Bond Funds								
VFSUX	922031836	Vanguard Short-Term Investment-Grade Adm	2,922.41	31,847.38	10.77	31,474.40	17.25%	1.86%
Intermediate-Term Bond Funds								
DBLFX	258620301	DoubleLine Core Fixed Income I	2,802.95	30,781.32	10.94	30,664.22	16.81%	1.81%
DODIX	256210105	Dodge & Cox Income	2,281.41	32,067.51	14.06	32,076.55	17.58%	1.90%
PTRQX	74440B884	PGIM Total Return Bond R6	2,212.05	32,059.73	14.49	32,052.58	17.57%	1.89%
PTTRX	693390700	PIMCO Total Return Instl	3,072.00	31,648.64	10.27	31,549.48	17.29%	1.86%
				$126,557.20		$126,342.83		7.47%
Multi-Sector Bond Funds								
PIMIX	72201F490	PIMCO Income Instl	701.52	8,420.27	11.94	8,376.14	4.59%	0.50%
TOTAL FIXED INCOME				**$183,163.06**		**$182,452.72**		**10.78%**
EQUITY								
Large Cap Blend Funds								
COFYX	19766M709	Columbia Contrarian Core Inst3	5,969.61	185,618.87	34.07	203,384.54	15.26%	12.02%
VGIAX	921913208	Vanguard Growth & Income Adm	2,010.26	189,448.84	104.29	209,649.81	15.73%	12.39%
				$375,067.71		$413,034.35		24.41%
Large Cap Value Funds								
DODGX	256219106	Dodge & Cox Stock	459.06	97,367.28	245.26	112,588.81	8.45%	6.65%
PKAIX	72202L462	PIMCO RAE US Instl	7,078.47	86,493.28	13.52	95,700.91	7.18%	5.66%
IVE	464287408	iShares S&P 500 Value ETF	183.00	24,529.63	156.63	28,663.29	2.15%	1.69%
				$208,390.19		$236,953.01		14.01%

HOLDINGS REPORT

El Toro Water District 401(k) - Capital Appreciation

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
Large Cap Growth Funds								
HNACX	411512528	Harbor Capital Appreciation Retirement	1,013.55	95,648.89	100.9	102,266.79	7.67%	6.04%
LSITX	52469H255	ClearBridge Large Cap Growth IS	1,292.77	84,487.33	74.7	96,569.92	7.25%	5.71%
				$180,136.22		$198,836.71		11.75%
Mid Cap Blend Funds								
VO	922908629	Vanguard Mid-Cap ETF	66.00	13,284.67	254.77	16,814.82	1.26%	0.99%
Small Cap Value Funds								
UBVFX	904504479	Undiscovered Managers Behavioral Val R6	765.90	53,167.27	83.47	63,929.34	4.80%	3.78%
Small Cap Blend Funds								
DCZRX	24610B826	Delaware Small Cap Core R6	1,059.73	29,027.38	31.32	33,190.87	2.49%	1.96%
VB	922908751	Vanguard Small-Cap ETF	142.00	25,752.15	226.01	32,093.42	2.41%	1.90%
				$54,779.53		$65,284.29		3.86%
Small Cap Growth Funds								
RSEJX	92647Q363	Victory RS Small Cap Growth R6	301.15	27,197.50	79.37	23,901.96	1.79%	1.41%
VBK	922908595	Vanguard Small-Cap Growth ETF	83.00	20,529.44	281.79	23,388.57	1.76%	1.38%
				$47,726.94		$47,290.53		2.80%
Foreign Large Value Funds								
DODFX	256206103	Dodge & Cox International Stock	475.78	19,562.57	47.29	22,499.54	1.69%	1.33%
Foreign Large Blend Funds								
DFALX	233203868	DFA Large Cap International I	5,588.88	134,974.28	27.39	153,079.51	11.49%	9.05%
HEFA	46434V803	iShares Currency Hedged MSCI EAFE ETF	564.00	16,449.29	35.33	19,926.12	1.50%	1.18%
				$151,423.57		$173,005.63		10.23%
Foreign Large Growth Funds								
MGRDX	552746356	MFS International Growth R6	512.54	18,534.58	43.65	22,372.37	1.68%	1.32%
Diversified Emerging Markets								
HHHFX	41665X859	Hartford Schroders Emerging Mkts Eq F	1,878.04	31,333.43	19.06	35,795.39	2.69%	2.12%
VWO	922042858	Vanguard FTSE Emerging Markets ETF	745.00	39,265.95	49.46	36,847.70	2.76%	2.18%
				$70,599.38		$72,643.09		4.29%
TOTAL EQUITY				**$1,192,672.63**		**$1,332,663.68**		**78.77%**

HOLDINGS REPORT

El Toro Water District 401(k) - Capital Appreciation

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
ALTERNATIVES								
Market Neutral								
BILPX	09250J734	BlackRock Event Driven Equity Instl	1,196.12	11,818.55	9.92	11,865.54	0.89%	0.70%
BSIKX	09260B374	BlackRock Strategic Income Opps K	1,165.54	11,788.31	10.16	11,841.87	0.89%	0.70%
				$23,606.86		$23,707.41		1.40%
Managed Futures								
AHLIX	024525669	American Beacon AHL Mgd Futs Strat R5	732.47	8,228.72	10.49	7,683.60	0.58%	0.45%
AMFNX	63873P825	AlphaSimplex Mgd Futs Strat N	763.22	7,808.31	10.06	7,678.01	0.58%	0.45%
				$16,037.03		$15,361.61		0.91%
Fund of Hedge Funds								
BSTKX	09258N380	BlackRock Total Factor K	260.60	2,345.32	9.65	2,514.74	0.19%	0.15%
QSPIX	00203H420	AQR Style Premia Alternative I	701.26	5,921.56	7.03	4,929.85	0.37%	0.29%
				$8,266.88		$7,444.59		0.44%

HOLDINGS REPORT

El Toro Water District 401(k) - Capital Appreciation

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
REITs								
ICF	464287564	iShares Cohen & Steers REIT ETF	418.00	24,734.33	76.08	31,801.44	2.39%	1.88%
Precious Metals								
IAU	464285204	iShares Gold Trust	182.00	6,575.74	34.81	6,335.42	0.48%	0.37%
TOTAL ALTERNATIVES				**$79,220.84**		**$84,650.47**		**5.00%**
TOTAL - ALL ASSETS				**$1,547,090.85**		**$1,691,801.19**		**100.00%**

INVESTMENT PORTFOLIO SUMMARY - GROWTH

El Toro Water District - 401(k) Plan

Data as of: 12/31/2021

Portfolio Manager:
Keith Stribling, CFA

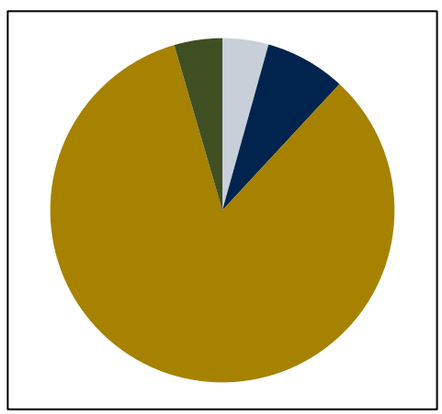
Account Snapshot

Asset Class	Market Value	Tax Cost	Est. Annual Income	Current Yield (%)
Cash & Equivalents	$87,435.66	$87,435.66	$26.23	0.03%
Fixed Income	$153,348.06	$153,905.62	$3,753.96	2.45%
Equities	$1,689,918.52	$1,329,363.01	$18,538.41	1.10%
Alternatives	$91,287.86	$83,910.33	$1,833.97	2.01%
Other	$0.00	$0.00	$0.00	0.00%
Total	**$2,021,990.10**	**$1,654,614.62**	**$24,152.57**	**1.19%**

Yields are gross of any fees and reflect the reinvestment of dividends and other income

Asset Allocation

- 4.3% Cash & Equivalents
- 7.6% Fixed Income
- 83.6% Equities
- 4.5% Alternatives
- 0.0% Other



Income Summary (1, 2)

Cash & Equivalents Income Earned YTD	$10
Taxable Fixed Income Income Earned YTD	$4,140
Tax-Exempt Fixed Income Income Earned YTD	$0
Equity Income Earned YTD	$136,011
Alternative Income Earned YTD	$3,218
Other Income Earned YTD	$0
Total	**$143,379**

Net Gain/Loss Summary (3)

	Realized	Unrealized
Net Short Term Gain/Loss	$21,515	
Net Long Term Gain/Loss	$124,926	
Total	**$146,441**	**$0**

(1) As of 12/31/2021

(2) Information is calculated on a calendar year basis and includes income, dividends, and capital gain distributions

(3) Gain/Loss information is for informational purposes only.

HOLDINGS REPORT

El Toro Water District 401(k) - Growth

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
CASH EQUIVALENTS								
MONEY MARKET FUNDS/CASH								
n.a.	n.a.	CASH	(198.8100)	($198.81)	1.00	($198.81)	-0.23%	-0.01%
FPZXX	n.a.	CASH FUND	87,634.47	$87,634.47	1.00	$87,634.47	100.23%	4.35%
TOTAL CASH				**$87,435.66**		**$87,435.66**		**4.34%**
FIXED INCOME								
Ultra Short-Term Bond Funds								
VUSFX	922031711	Vanguard Ultra-Short-Term Bond Admiral	673.48	13,577.17	20.06	13,510.01	9.36%	0.67%
Short-Term Bond Funds								
VFSUX	922031836	Vanguard Short-Term Investment-Grade Adm	2,219.52	24,043.13	10.77	23,904.18	16.55%	1.19%
Intermediate-Term Bond Funds								
DBLFX	258620301	DoubleLine Core Fixed Income I	2,373.54	25,938.79	10.94	25,966.52	17.98%	1.29%
DODIX	256210105	Dodge & Cox Income	1,928.53	26,803.46	14.06	27,115.06	18.78%	1.35%
PTRQX	74440B884	PGIM Total Return Bond R6	1,875.82	27,369.72	14.49	27,180.63	18.82%	1.35%
PTTRX	693390700	PIMCO Total Return Instl	2,603.26	27,155.76	10.27	26,735.48	18.51%	1.33%
				$107,267.73		$106,997.69		5.32%
TOTAL FIXED INCOME				**$144,888.03**		**$144,411.88**		**7.17%**
EQUITY								
Large Cap Blend Funds								
COFYX	19766M709	Columbia Contrarian Core Inst3	7,286.15	188,377.06	34.07	248,239.16	14.69%	12.33%
VGIAX	921913208	Vanguard Growth & Income Adm	2,480.80	201,809.91	104.29	258,722.53	15.31%	12.85%
				$390,186.97		$506,961.69		25.18%
Large Cap Value Funds								
DODGX	256219106	Dodge & Cox Stock	574.97	110,785.96	245.26	141,016.90	8.34%	7.01%
PKAIX	72202L462	PIMCO RAE US Instl	9,866.80	112,421.06	13.52	133,399.14	7.89%	6.63%
IVE	464287408	iShares S&P 500 Value ETF	175.00	22,708.66	156.63	27,410.25	1.62%	1.36%
				$245,915.68		$301,826.29		14.99%

HOLDINGS REPORT

El Toro Water District 401(k) - Growth

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
Large Cap Growth Funds								
HNACX	411512528	Harbor Capital Appreciation Retirement	1,325.92	104,606.98	100.9	133,785.53	7.92%	6.65%
LSITX	52469H255	ClearBridge Large Cap Growth IS	1,636.97	89,041.13	74.7	122,281.36	7.24%	6.07%
				$193,648.11		$256,066.89		12.72%
Mid Cap Blend Funds								
VO	922908629	Vanguard Mid-Cap ETF	102.00	18,457.66	254.77	25,986.54	1.54%	1.29%
Small Cap Value Funds								
UBVFX	904504479	Undiscovered Managers Behavioral Val R6	944.40	60,074.70	83.47	78,829.40	4.66%	3.92%
Small Cap Blend Funds								
DCZRX	24610B826	Delaware Small Cap Core R6	1,277.62	31,137.60	31.32	40,015.03	2.37%	1.99%
VB	922908751	Vanguard Small-Cap ETF	151.00	22,369.63	226.01	34,127.51	2.02%	1.70%
				$53,507.23		$74,142.54		3.68%
Small Cap Growth Funds								
RSEJX	92647Q363	Victory RS Small Cap Growth R6	347.09	29,142.68	79.37	27,548.45	1.63%	1.37%
VBK	922908595	Vanguard Small-Cap Growth ETF	140.00	31,110.06	281.79	39,450.60	2.33%	1.96%
				$60,252.74		$66,999.05		3.33%
Foreign Large Value Funds								
DODFX	256206103	Dodge & Cox International Stock	907.18	37,445.51	47.29	42,900.40	2.54%	2.13%
Foreign Large Blend Funds								
DFALX	233203868	DFA Large Cap International I	5,808.15	125,392.72	27.39	159,085.12	9.41%	7.90%
HEFA	46434V803	iShares Currency Hedged MSCI EAFE ETF	1,050.00	27,744.15	35.33	37,096.50	2.20%	1.84%
				$153,136.87		$196,181.62		9.75%
Foreign Large Growth Funds								
MGRDX	552746356	MFS International Growth R6	997.52	32,476.21	43.65	43,541.75	2.58%	2.16%
Diversified Emerging Markets								
HHHFX	41665X859	Hartford Schroders Emerging Mkts Eq F	4,426.27	71,483.35	19.06	84,364.65	4.99%	4.19%
VWO	922042858	Vanguard FTSE Emerging Markets ETF	245.00	12,777.98	49.46	12,117.70	0.72%	0.60%
				$84,261.33		$96,482.35		4.79%
TOTAL EQUITY				**$1,329,363.01**		**$1,689,918.52**		**83.95%**

HOLDINGS REPORT

El Toro Water District 401(k) - Growth

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
ALTERNATIVES								
Market Neutral								
BILPX	09250J734	BlackRock Event Driven Equity Instl	1,323.13	13,017.84	9.92	13,125.47	0.78%	0.65%
BSIKX	09260B374	BlackRock Strategic Income Opps K	1,268.51	12,663.34	10.16	12,888.04	0.76%	0.64%
				$25,681.18		$26,013.51		1.29%
Managed Futures								
AHLIX	024525669	American Beacon AHL Mgd Futs Strat R5	568.66	6,229.58	10.49	5,965.24	0.35%	0.30%
AMFNX	63873P825	AlphaSimplex Mgd Futs Strat N	1,133.68	11,724.32	10.06	11,404.78	0.67%	0.57%
				$17,953.90		$17,370.02		0.86%
Fund of Hedge Funds								
BSTKX	09258N380	BlackRock Total Factor K	360.26	3,160.30	9.65	3,476.49	0.21%	0.17%
QSPIX	00203H420	AQR Style Premia Alternative I	665.01	6,398.24	7.03	4,674.99	0.28%	0.23%
				$9,558.54		$8,151.48		0.40%

HOLDINGS REPORT

El Toro Water District 401(k) - Growth

As of Fourth Quarter 2021

TICKER	CUSIP	ASSET NAME	SHARES/UNITS	COST BASIS	PRICE	MARKET VALUE (MV)	MV AS % OF ASSET TYPE	MV AS % OF TOTAL
REITs								
ICF	464287564	iShares Cohen & Steers REIT ETF	458.00	25,478.64	76.08	34,844.64	2.06%	1.73%
Precious Metals								
IAU	464285204	iShares Gold Trust	141.00	5,238.07	34.81	4,908.21	0.29%	0.24%
TOTAL ALTERNATIVES				**$83,910.33**		**$91,287.86**		**4.53%**
TOTAL - ALL ASSETS				**$1,645,597.03**		**$2,013,053.92**		**100.00%**

DISCLOSURES

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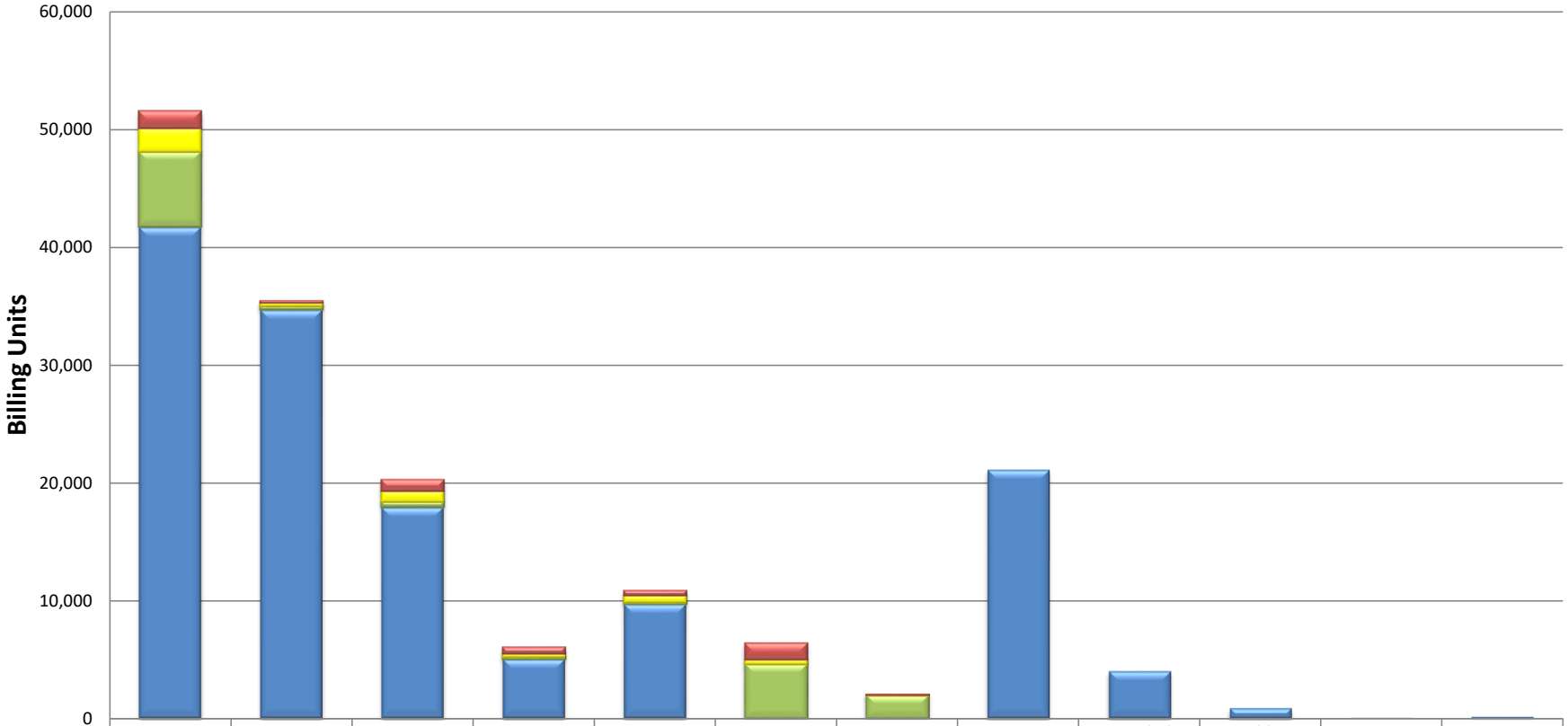
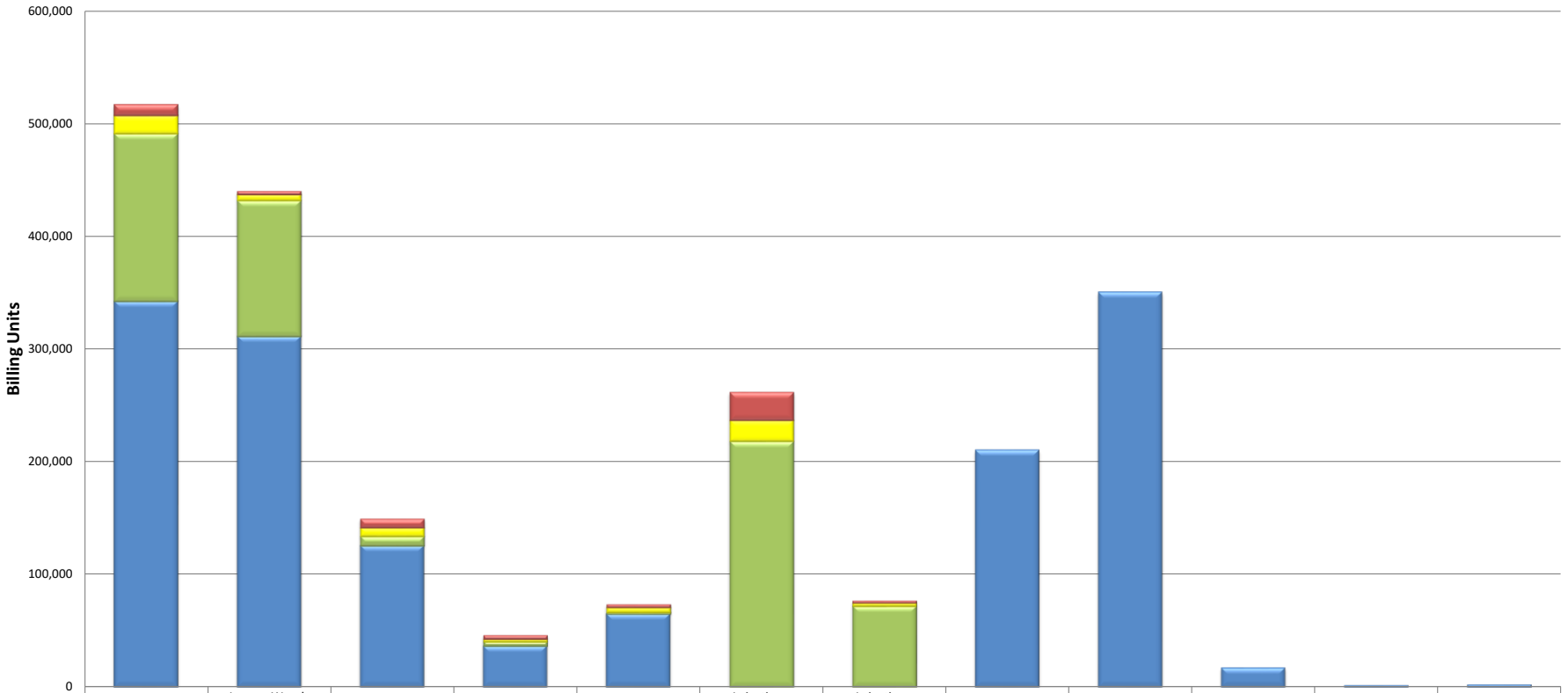
January 2022 Water Sales

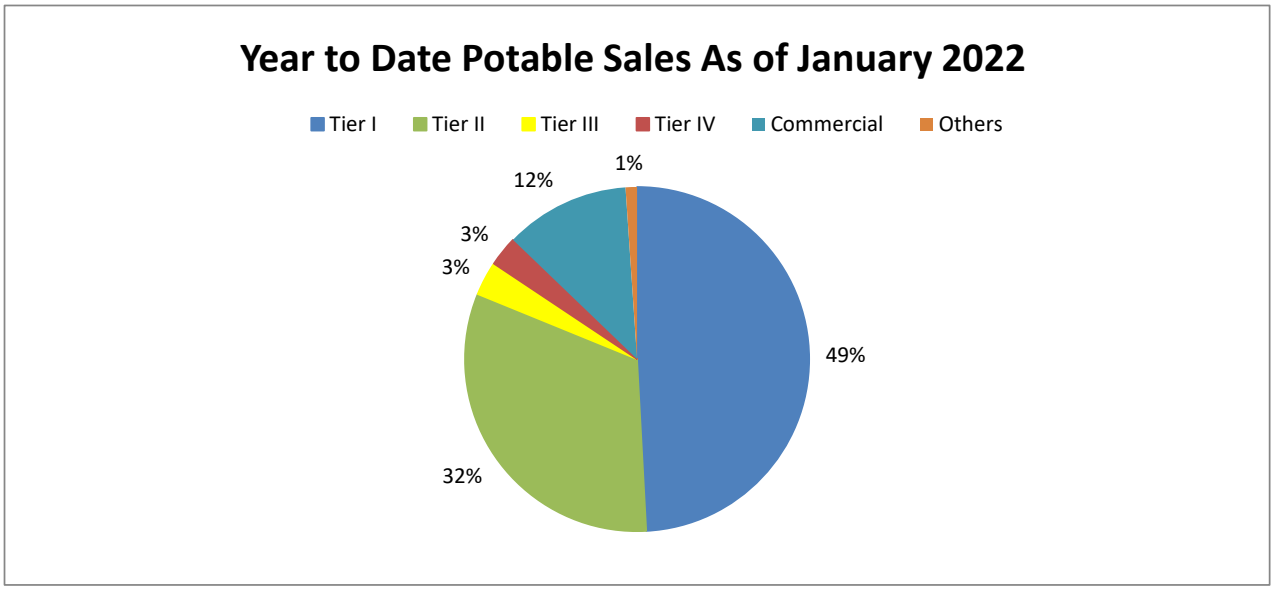


	Residential	Laguna Woods Village	Multi Family	Trailer Parks	Condo	Irrigation - Functional	Irrigation - Recreational	Commercial	Recycled Water	Public Authority	Private Fire	Flooding
Tier IV	1,450	142	964	521	391	1,388	34	0	0	0	0	0
Tier III	2,030	323	930	320	602	402	52	0	0	0	0	0
Tier II	6,403	337	482	193	189	4,625	1,973	0	0	0	0	0
Tier I	41,661	34,648	17,915	5,029	9,694	0	0	21,106	4,008	875	32	127

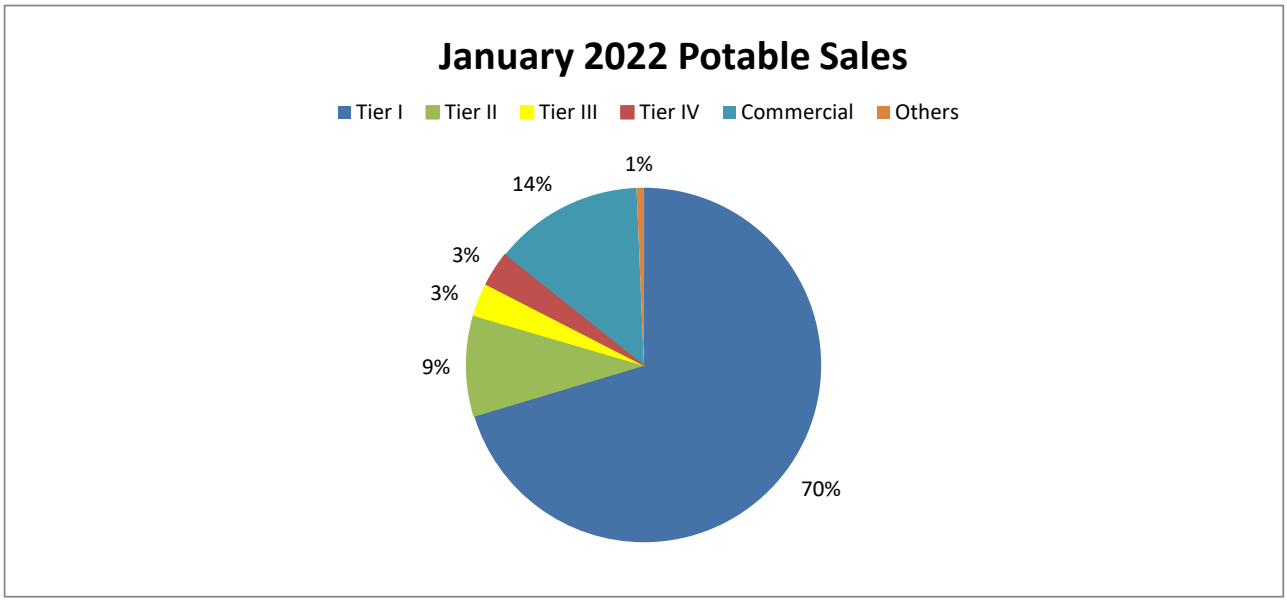
Year-to-Date Water Sales as of January 2022



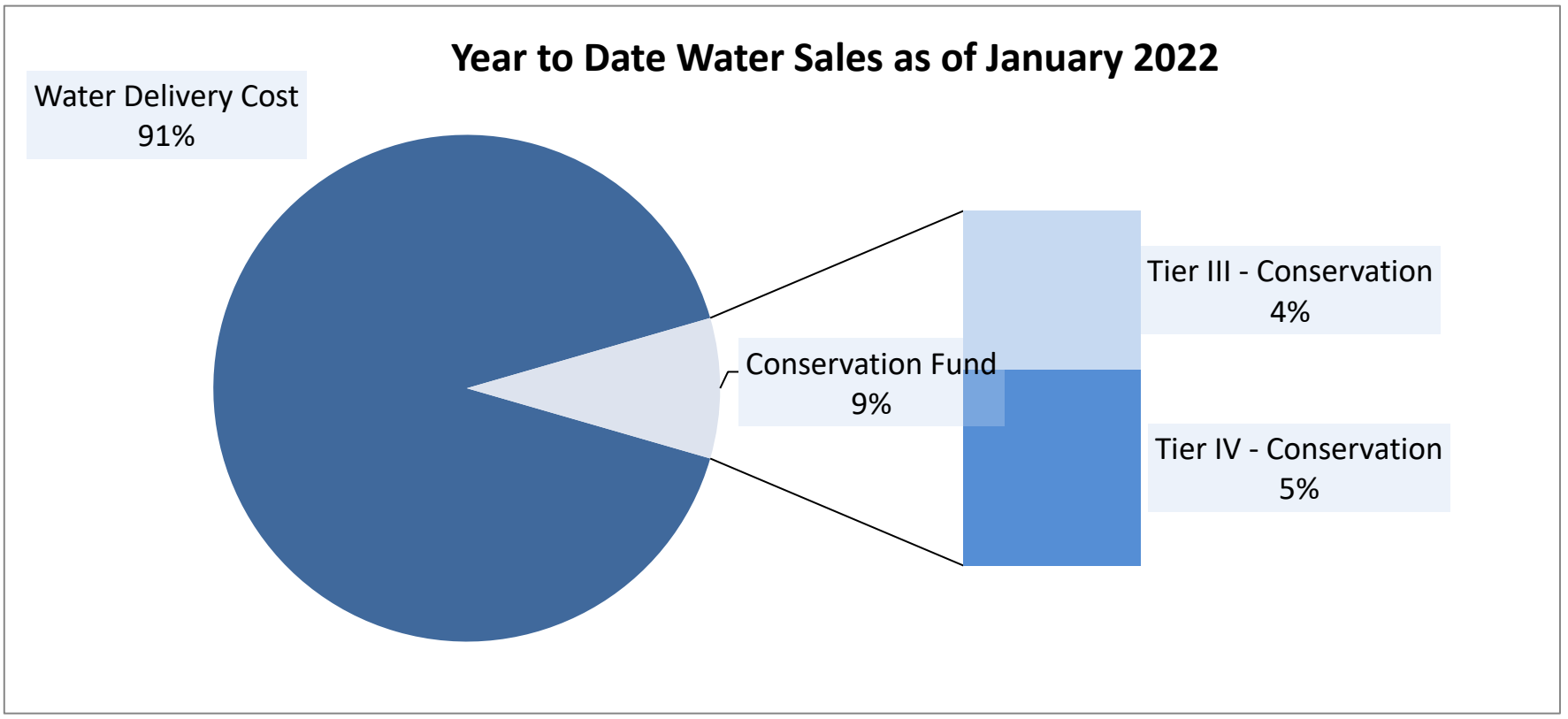
	Residential	Laguna Woods Village	Multi Family	Trailer Parks	Condo	Irrigation - Functional	Irrigation - Recreational	Commercial	Recycled Water	Public Authority	Private Fire	Flooding
Tier IV	9,562	2,467	7,347	3,018	2,135	24,568	1,466	0	0	0	0	0
Tier III	16,279	5,449	7,601	1,966	4,363	18,609	2,770	0	0	0	0	0
Tier II	148,661	120,498	8,365	4,076	1,401	217,889	71,627	0	0	0	0	0
Tier I	341,970	310,907	125,207	36,183	64,652	0	0	210,010	350,163	16,709	945	1,519



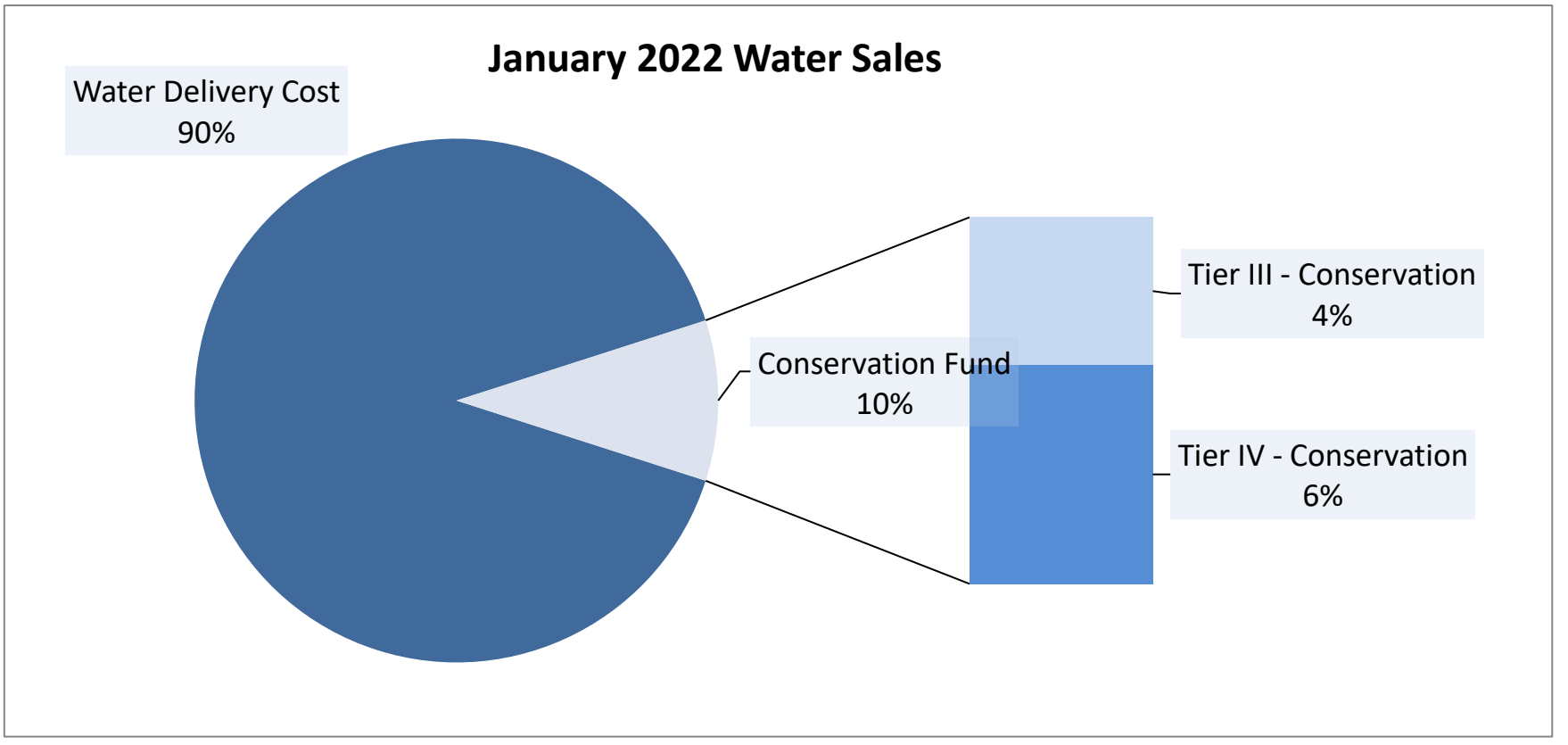
Year To Date Sales in ccf		
Tier I	878,919	49.15%
Tier II	572,517	32.02%
Tier III	57,037	3.19%
Tier IV	50,563	2.83%
Commercial	210,010	11.74%
Others	19,173	1.07%
Total	1,788,219	100.00%



Current Month Sales in ccf		
Tier I	108,947	70.36%
Tier II	14,202	9.17%
Tier III	4,659	3.01%
Tier IV	4,890	3.16%
Commercial	21,106	13.63%
Others	1,034	0.67%
Total	154,838	100.00%

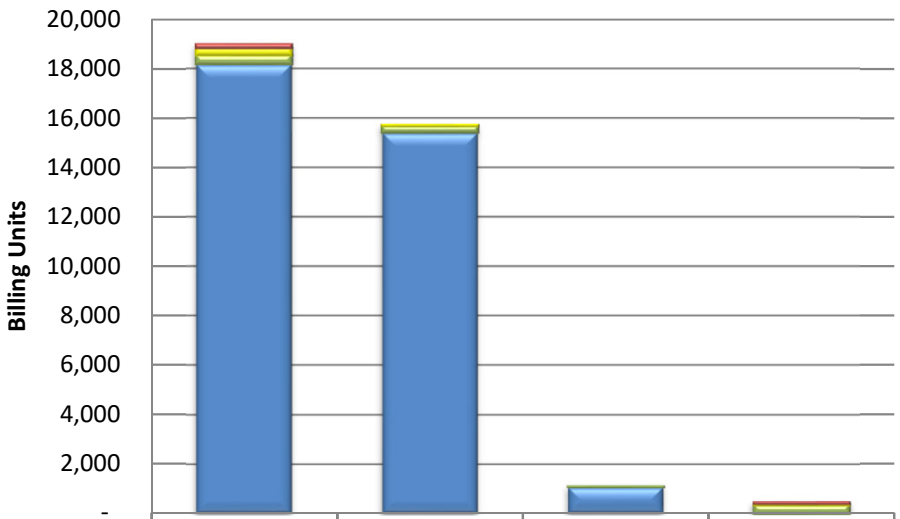


Category	Billings	Percentage
Water Delivery Cost	$4,510,283.99	91.05%
Tier III - Conservation	$198,038.48	4.00%
Tier IV - Conservation	$245,147.00	4.95%
	$4,953,469.47	100.00%



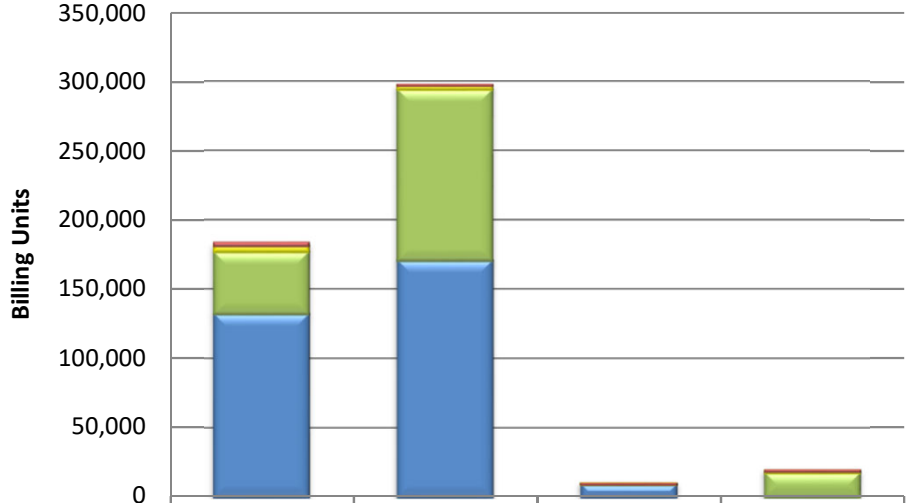
Category	Billings	Percentage
Water Delivery Cost	$372,469.72	90.10%
Tier III - Conservation	$16,492.86	3.99%
Tier IV - Conservation	$24,450.58	5.91%
	$413,413.16	100.00%

Laguna Woods Village
January 2022 Water Sales



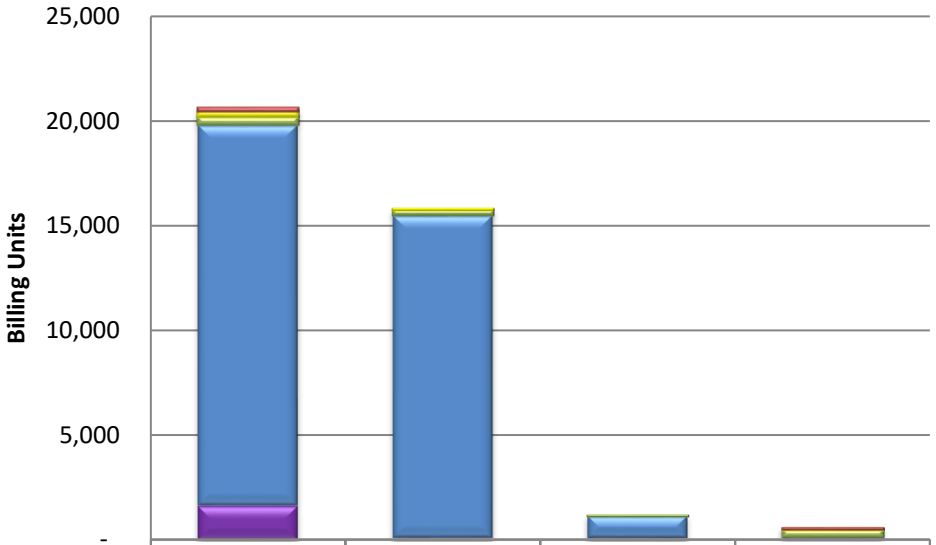
	Third	United	Mutual 50	GRF
Total	18,963	15,698	1,075	438
Tier 4	142	-	-	34
Tier 3	285	38	-	52
Tier 2	369	252	2	352
Tier 1	18,167	15,408	1,073	-

Laguna Woods Village
Year-to-Date Water Sales
January 2022



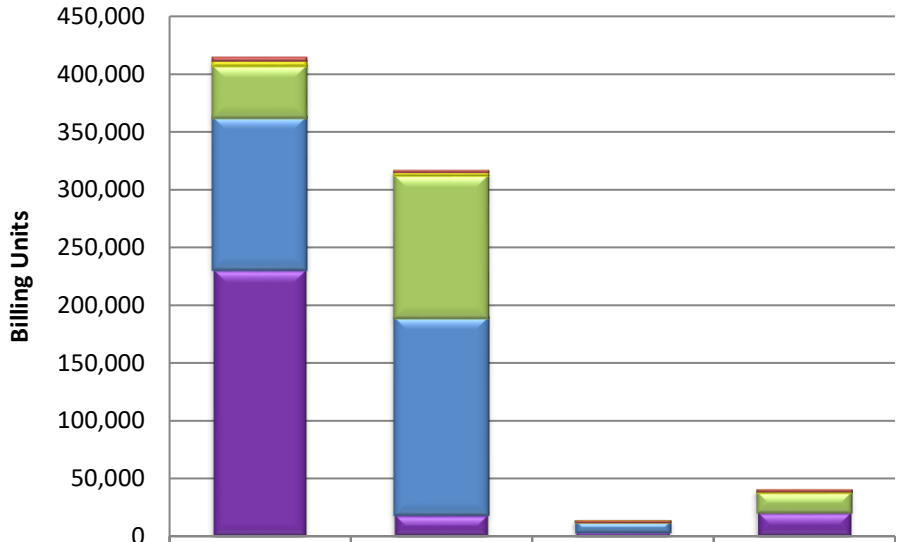
	Third	United	Mutual 50	GRF
Total	183,093	296,885	9,195	19,109
Tier 4	2,268	489	20	684
Tier 3	4,185	2,727	166	1,260
Tier 2	44,924	123,394	93	17,165
Tier 1	131,716	170,275	8,916	0

Laguna Woods Village
January 2022 Water & RW Sales



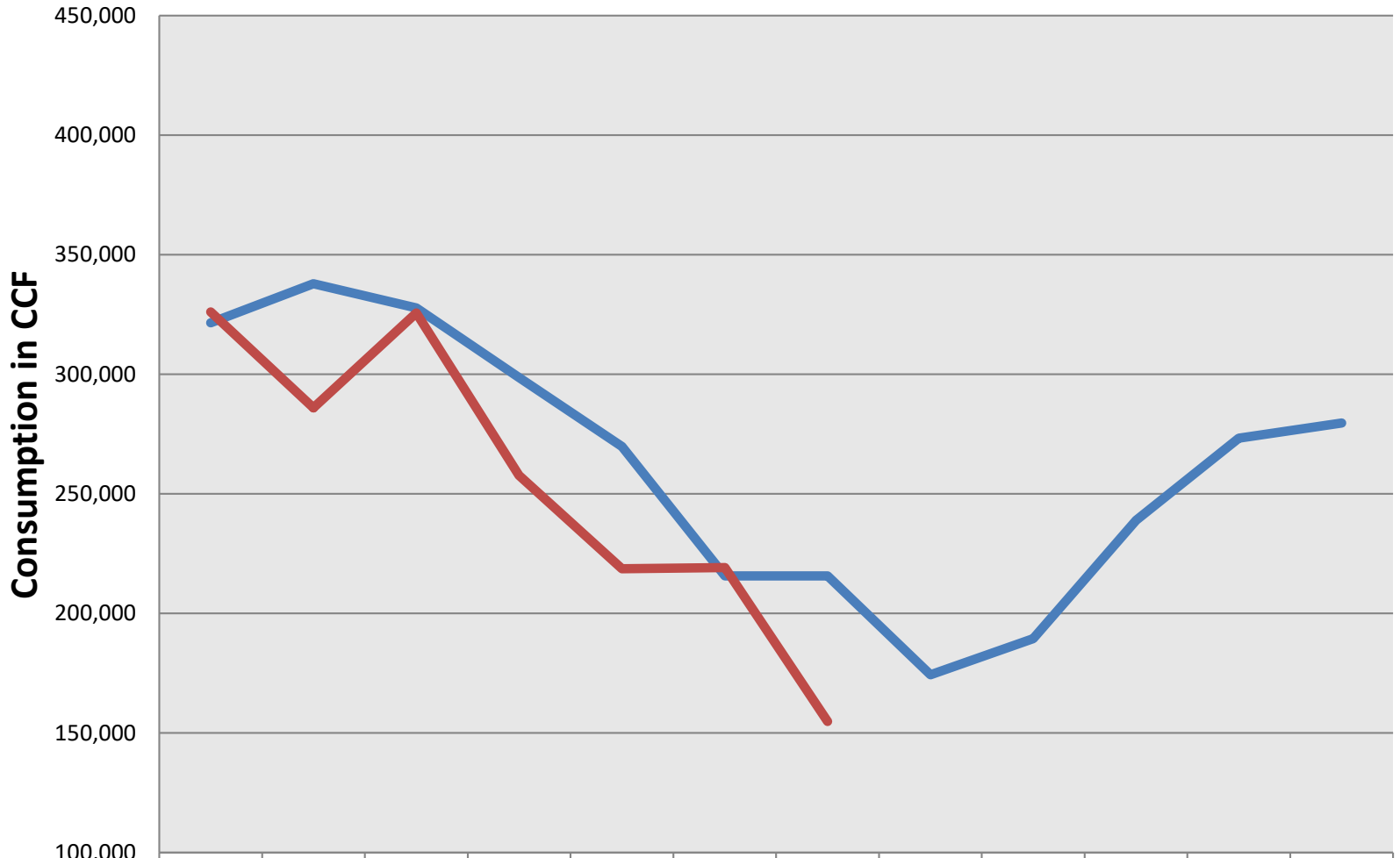
	Third	United	Mutual 50	GRF
Total	20,573	15,758	1,125	569
Tier 4	142	-	-	34
Tier 3	285	38	-	52
Tier 2	369	252	2	352
Tier 1	18,167	15,408	1,073	-
RW	1,610	60	50	131

Laguna Woods Village
Year-to-Date Water & RW Sales
January 2022



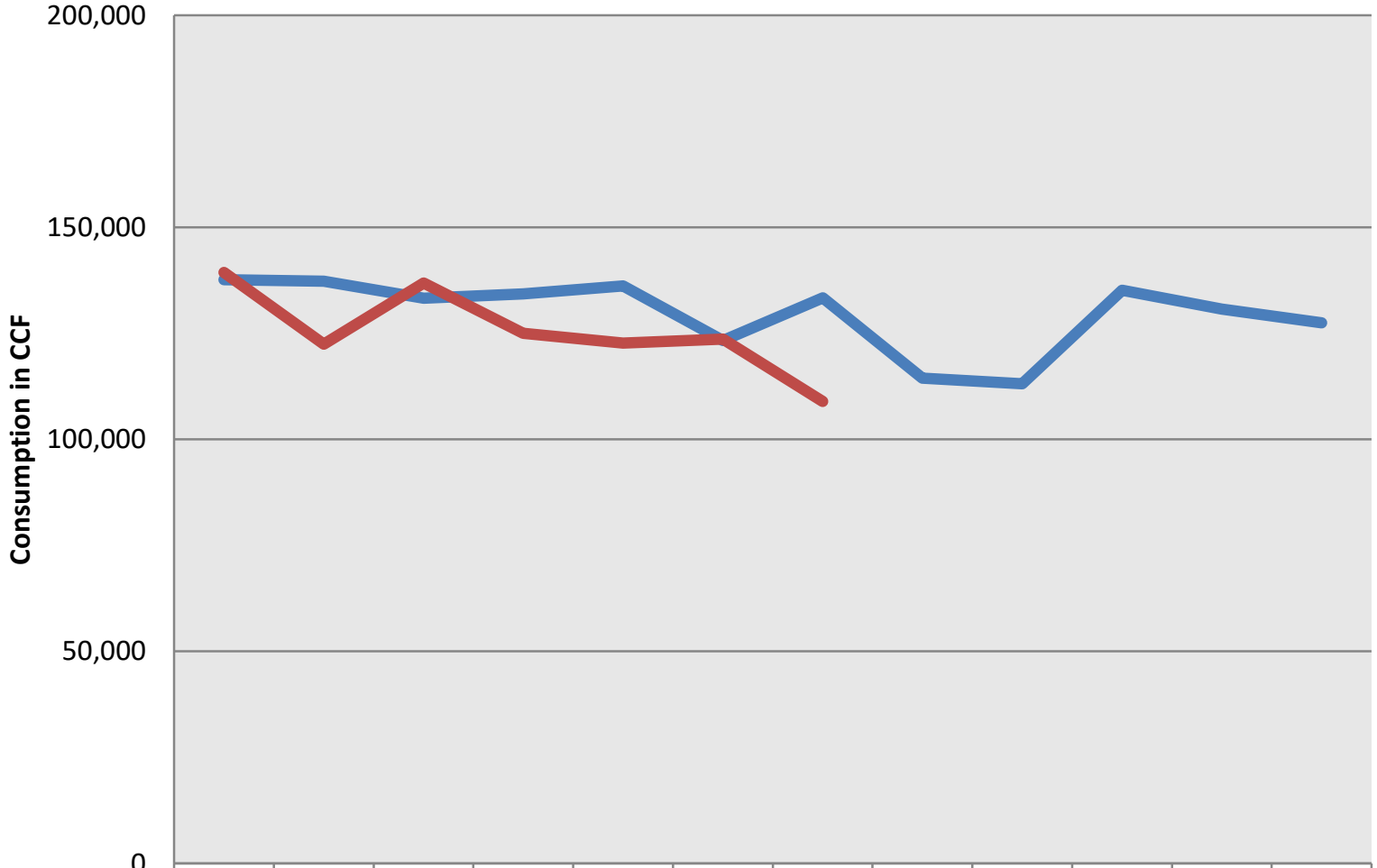
	Third	United	Mutual 50	GRF
Total	413,265	315,322	12,546	39,804
Tier 4	2,268	489	20	684
Tier 3	4,185	2,727	166	1,260
Tier 2	44,924	123,394	93	17,165
Tier 1	131,716	170,275	8,916	0
RW	230,172	18,437	3,351	20,695

ETWD Total Consumption



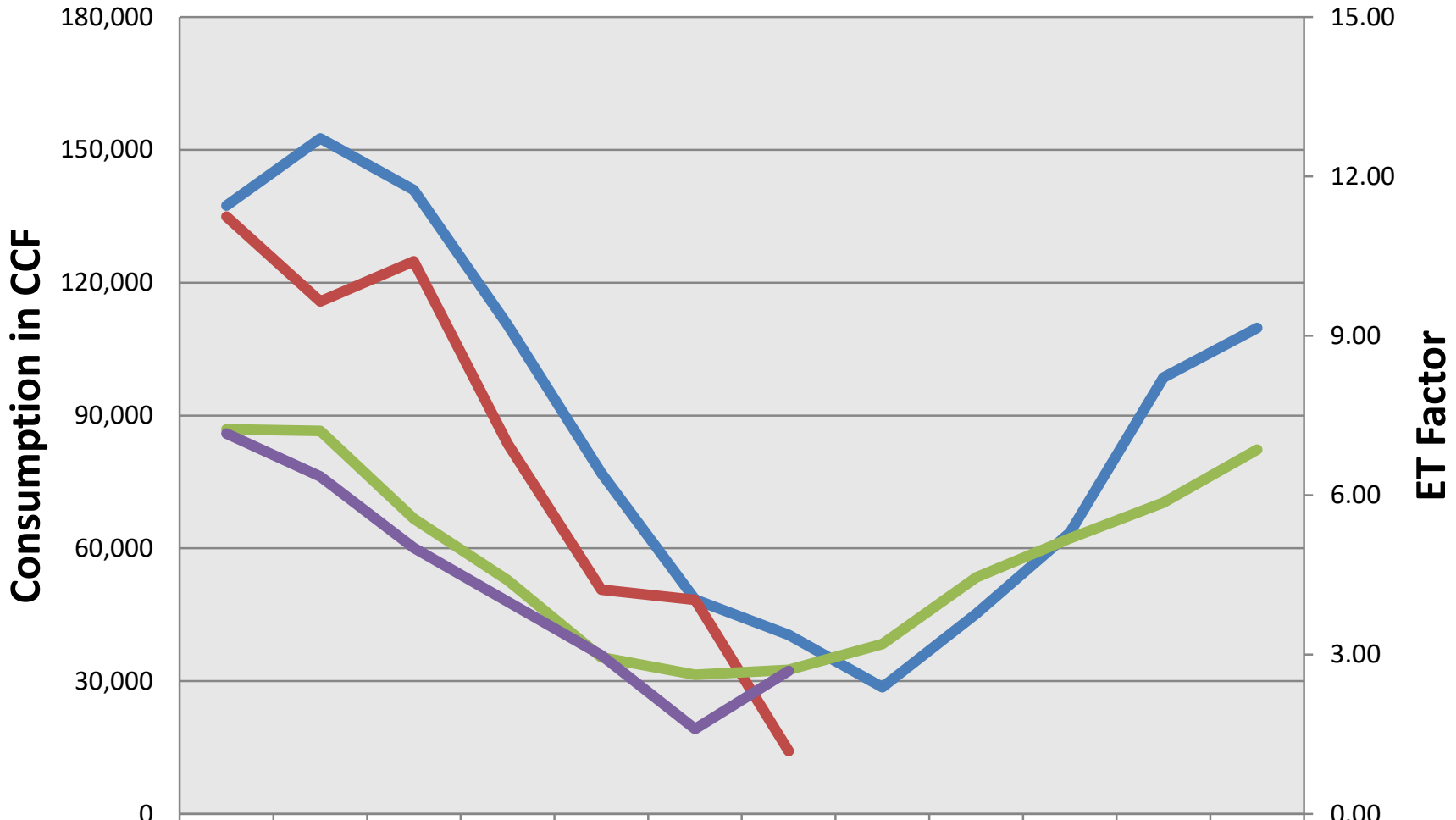
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	321,599	337,881	327,731	298,688	269,822	215,708	215,719	174,359	189,493	239,022	273,284	279,630
2021-2022	326,076	285,955	325,642	257,784	218,693	219,231	154,838					
%	101%	85%	99%	86%	81%	102%	72%	0%	0%	0%	0%	0%

Tier I Consumption



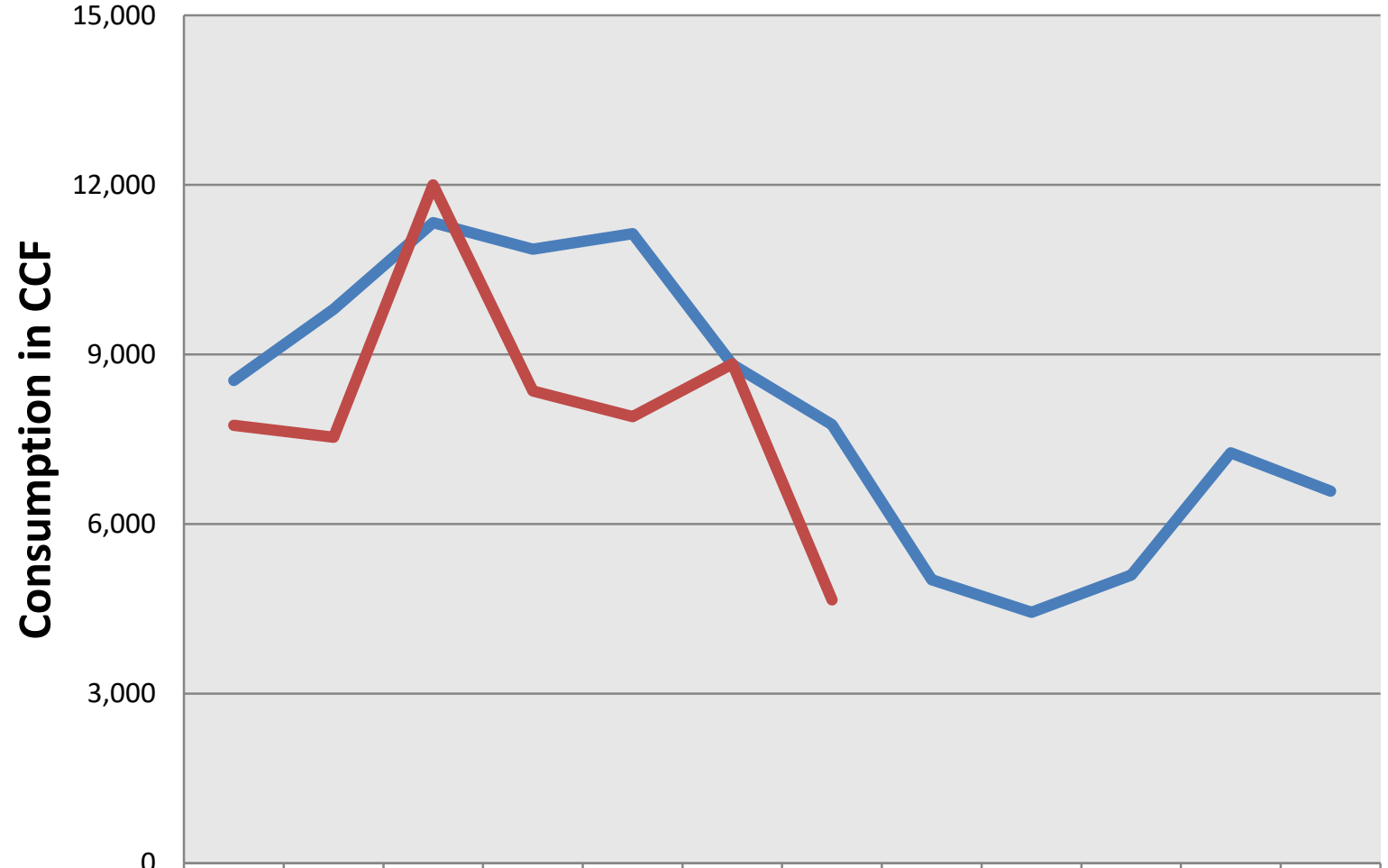
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	137,646	137,282	133,239	134,309	136,195	123,315	133,386	114,443	113,103	135,147	130,701	127,482
2021-2022	139,359	122,453	136,854	124,965	122,664	123,677	108,947					

Tier II Consumption



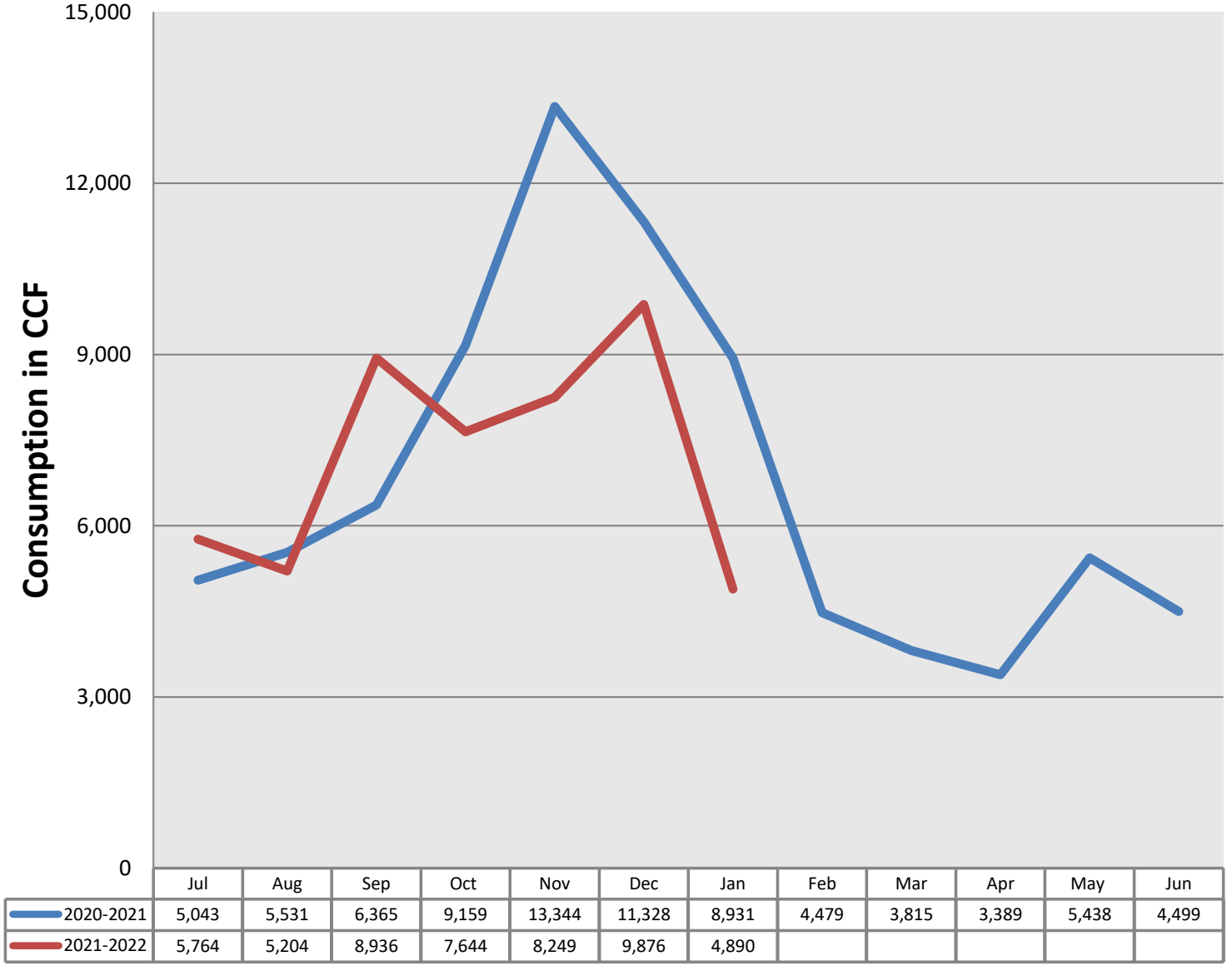
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	137,408	152,593	140,982	110,443	76,968	48,415	40,480	28,615	45,213	63,524	98,547	109,792
2021-2022	134,929	115,782	124,822	83,711	50,681	48,390	14,202					
20/21 ET	7.24	7.21	5.56	4.40	2.95	2.62	2.71	3.20	4.45	5.19	5.86	6.86
21/22 ET	7.16	6.35	5.01	4.00	2.99	1.60	2.69					

Tier III Consumption



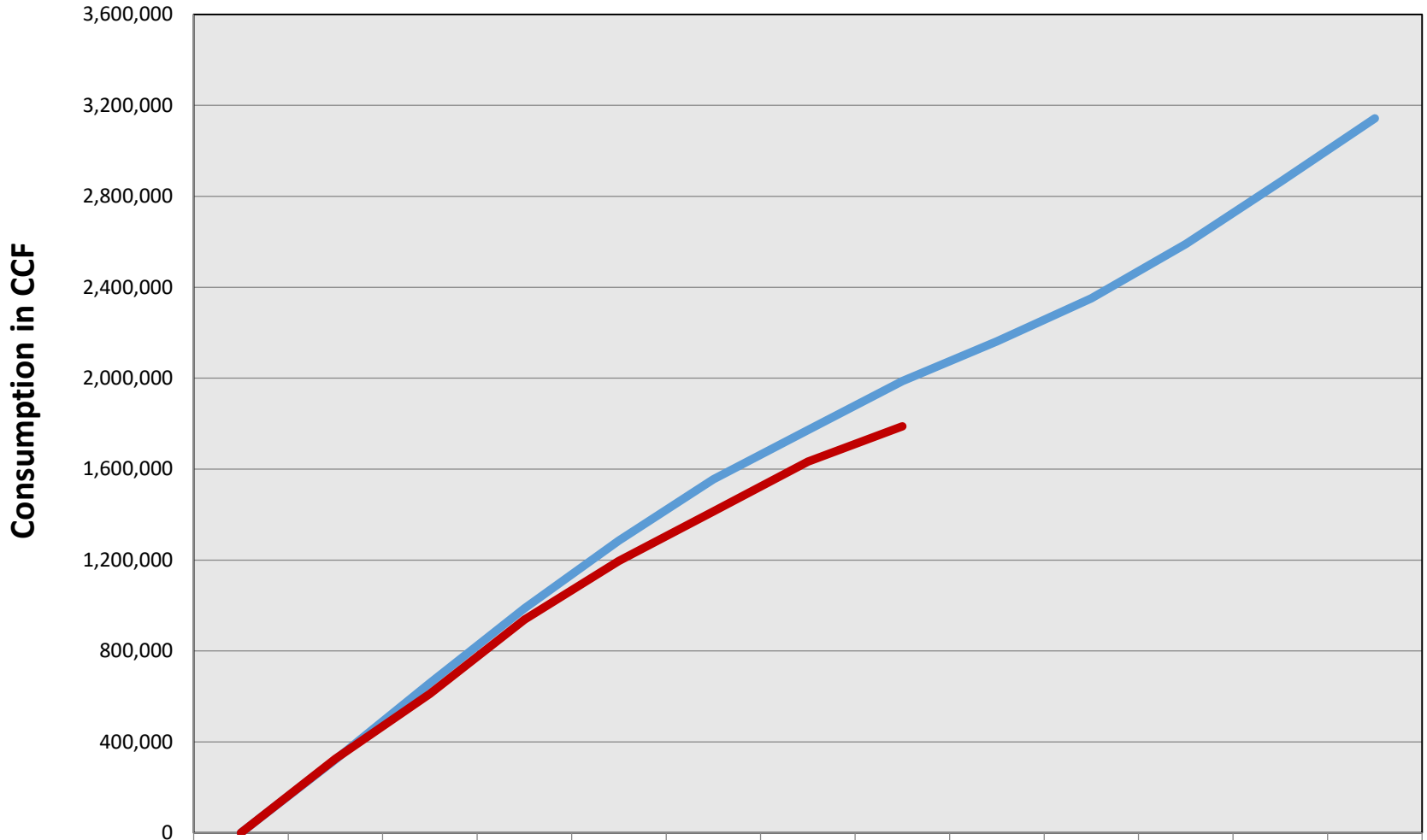
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	8,539	9,799	11,333	10,865	11,140	8,820	7,758	5,016	4,439	5,101	7,261	6,584
2021-2022	7,745	7,539	12,001	8,353	7,903	8,837	4,659					

Tier IV Consumption



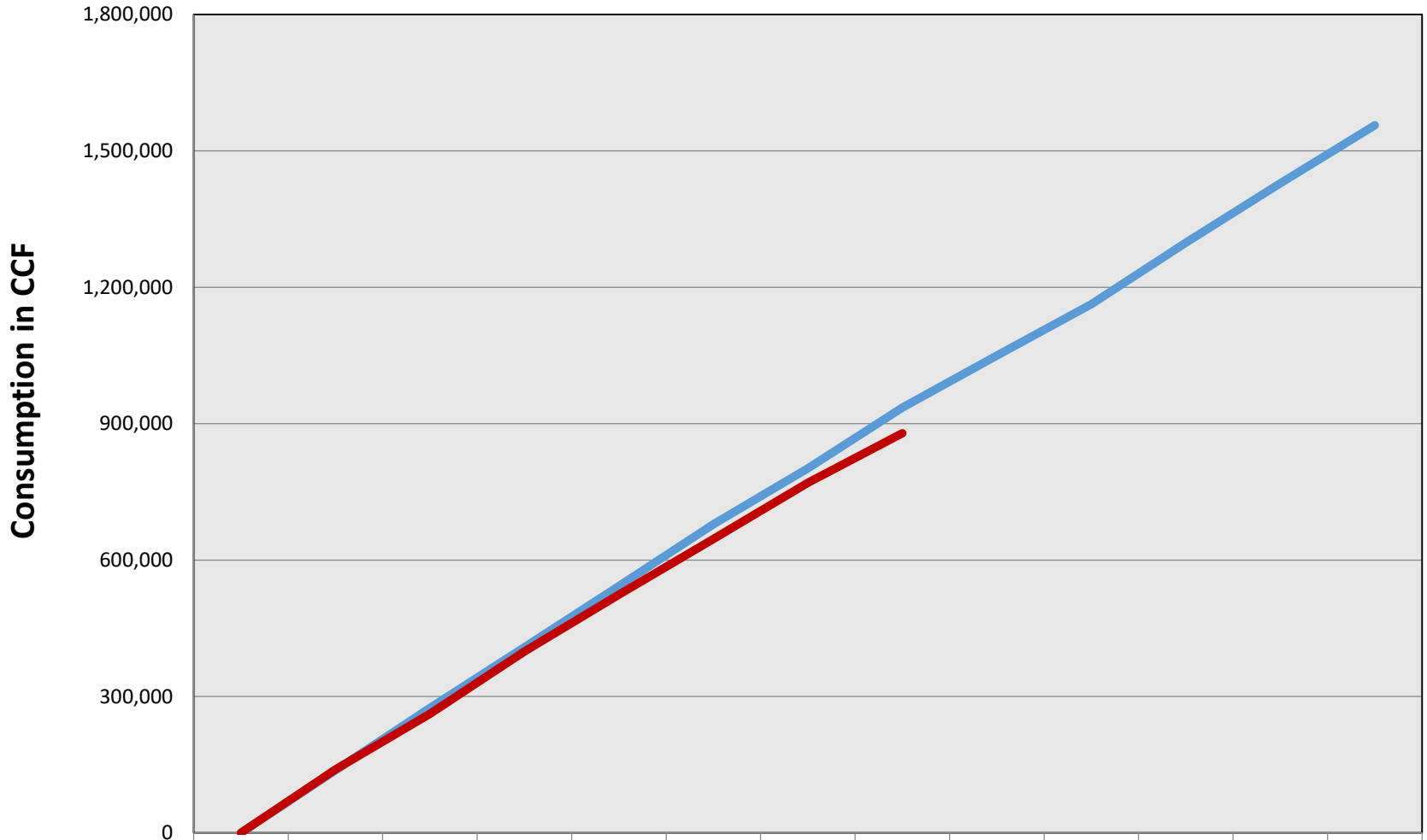
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	5,043	5,531	6,365	9,159	13,344	11,328	8,931	4,479	3,815	3,389	5,438	4,499
2021-2022	5,764	5,204	8,936	7,644	8,249	9,876	4,890					

ETWD YTD Consumption



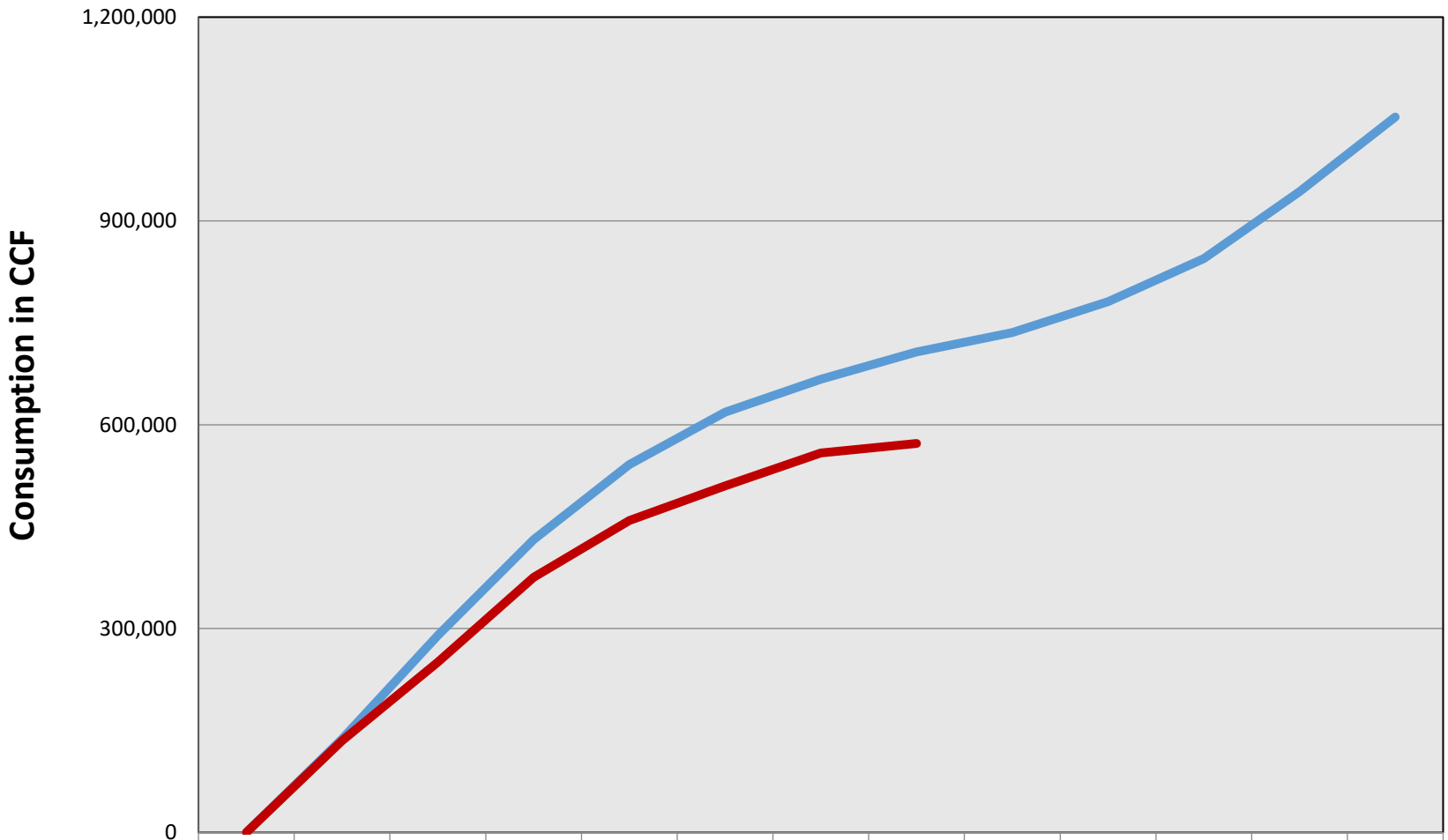
	YTD Start	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	0	321,599	659,480	987,211	1,285,899	1,555,721	1,771,429	1,987,148	2,161,507	2,351,000	2,590,022	2,863,306	3,142,936
2021-2022	0	326,076	612,031	937,673	1,195,457	1,414,150	1,633,381	1,788,219					

Tier I YTD Consumption



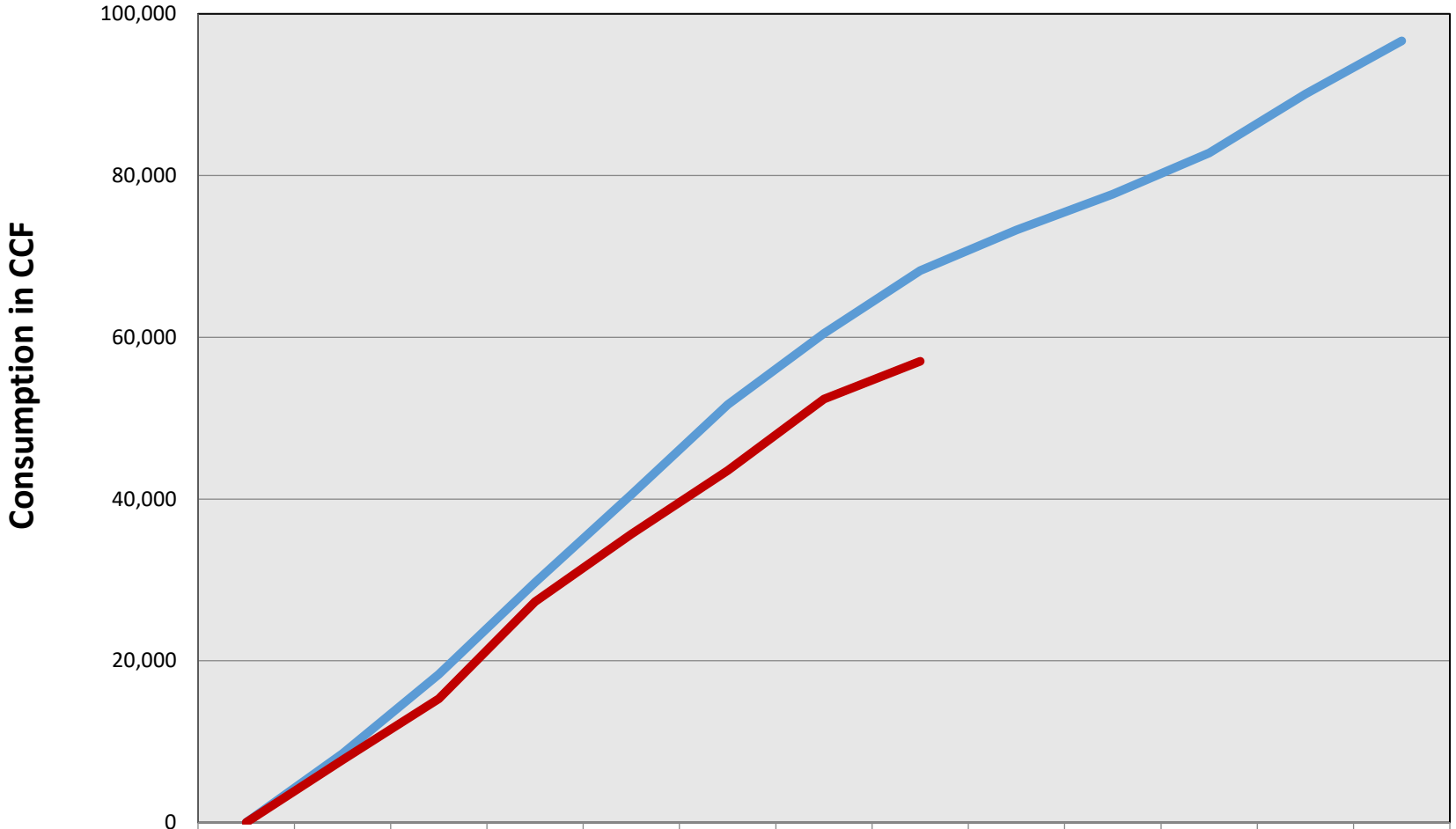
	YTD Start	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	0	137,646	274,928	408,167	542,476	678,671	801,986	935,372	1,049,815	1,162,918	1,298,065	1,428,766	1,556,248
2021-2022	0	139,359	261,812	398,666	523,631	646,295	769,972	878,919					

Tier II YTD Consumption



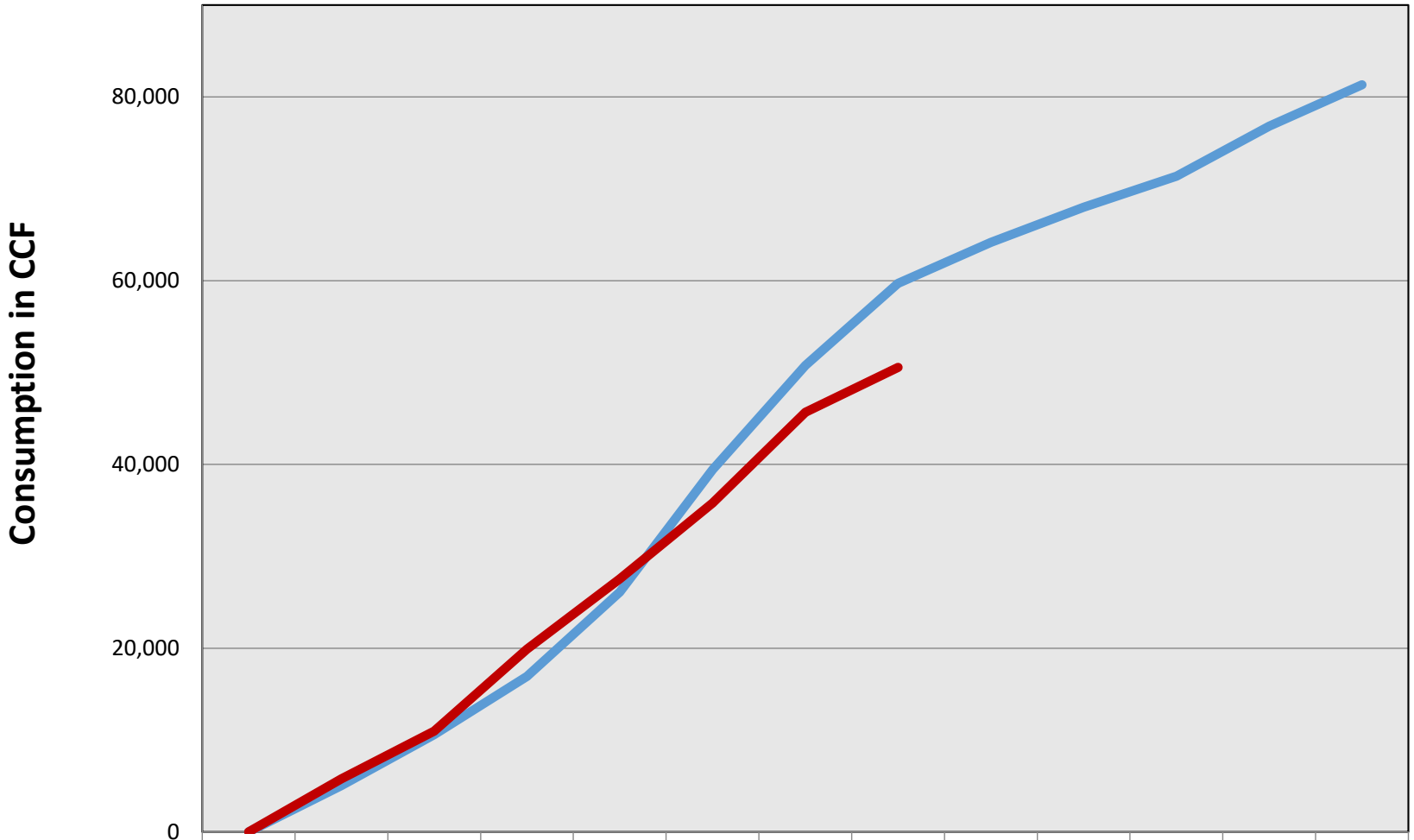
	YTD Start	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	0	137,408	290,001	430,983	541,426	618,394	666,809	707,289	735,904	781,117	844,641	943,188	1,052,980
2021-2022	0	134,929	250,711	375,533	459,244	509,925	558,315	572,517					

Tier III YTD Consumption



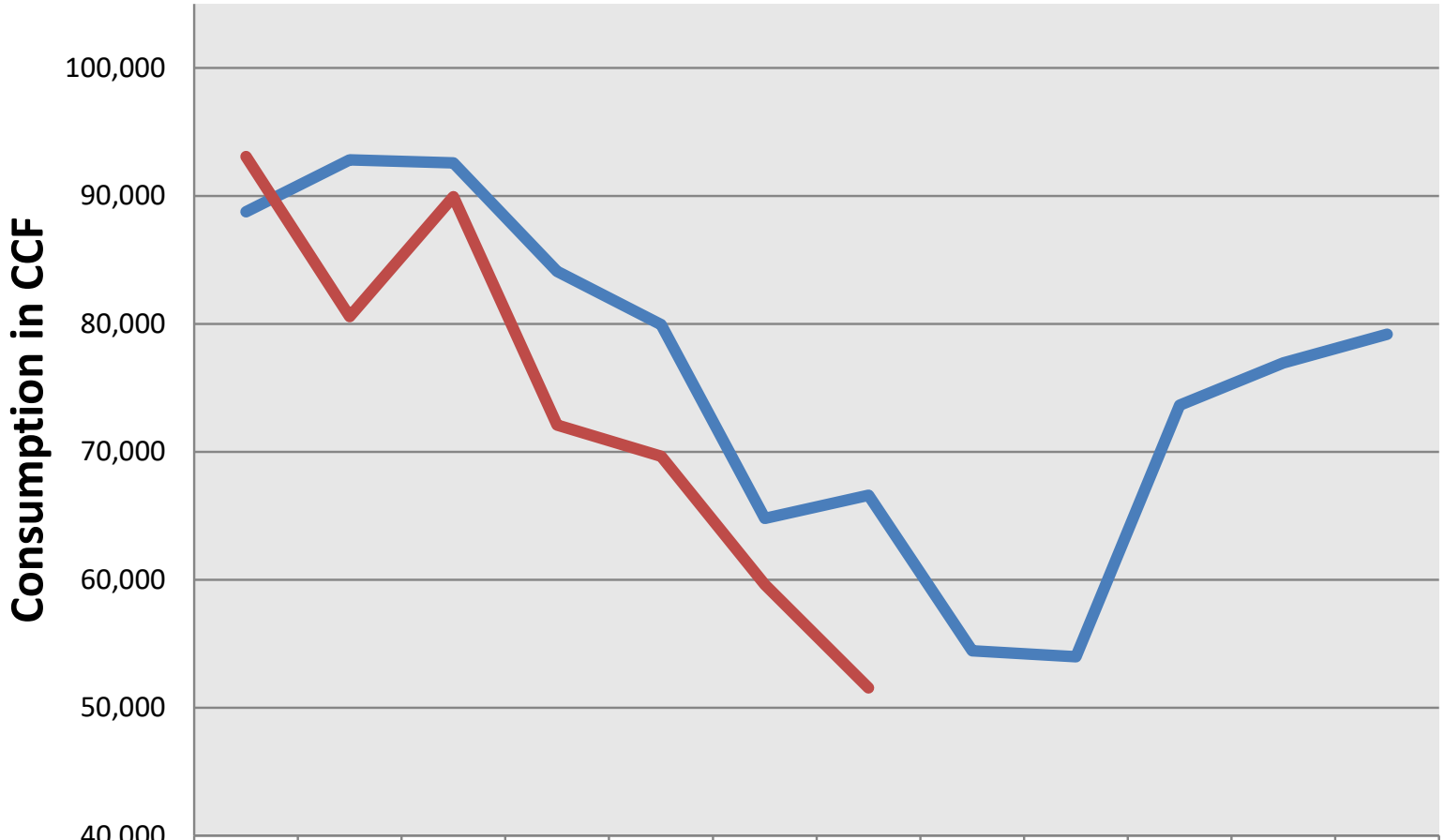
	YTD Start	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	0	8,539	18,338	29,671	40,536	51,676	60,496	68,254	73,270	77,709	82,810	90,071	96,655
2021-2022	0	7,745	15,284	27,285	35,638	43,541	52,378	57,037					

Tier IV YTD Consumption



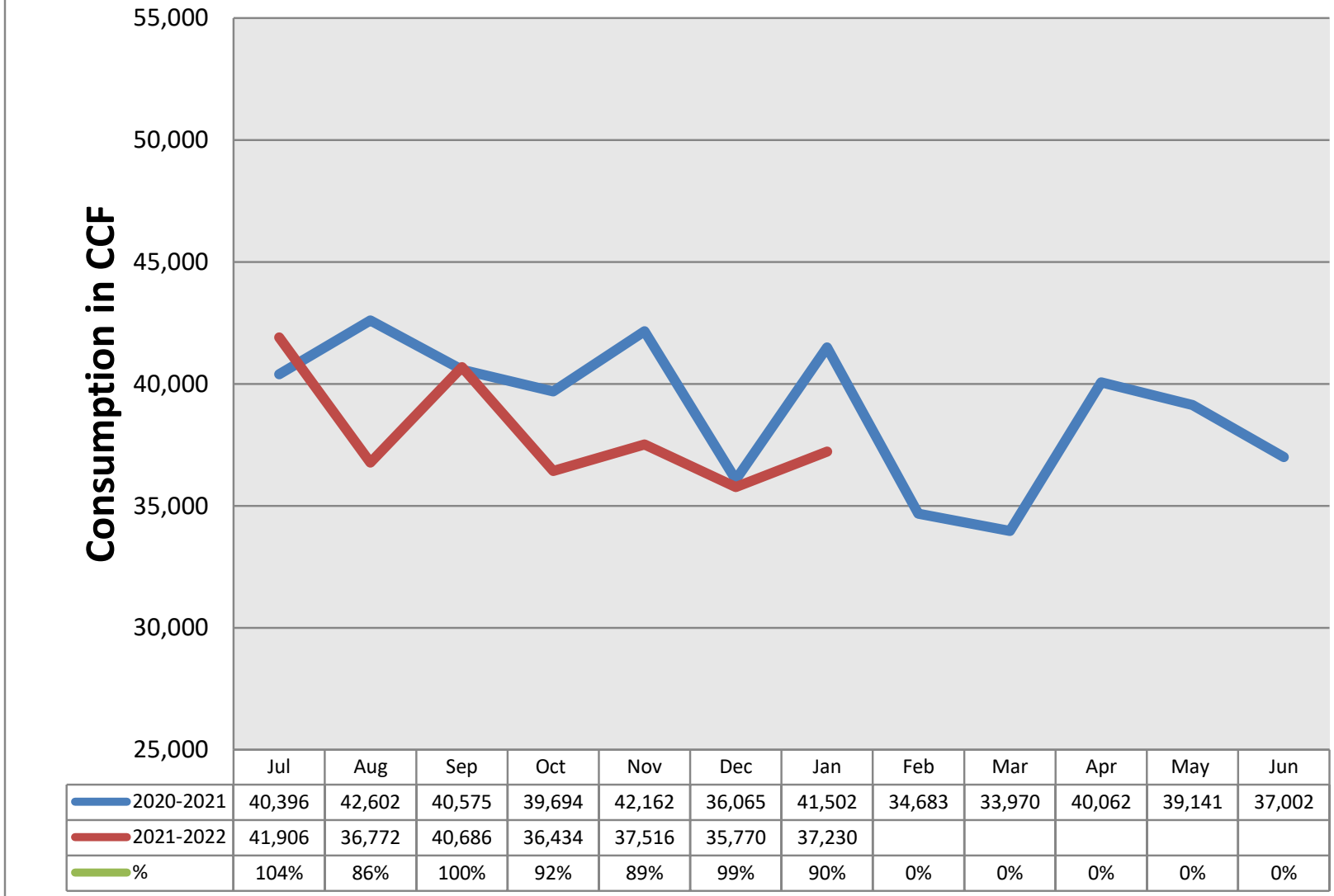
	YTD Start	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	0	5,043	10,574	16,939	26,098	39,442	50,770	59,701	64,180	67,995	71,384	76,822	81,321
2021-2022	0	5,764	10,968	19,904	27,548	35,797	45,673	50,563					

Single Family Residents Consumption



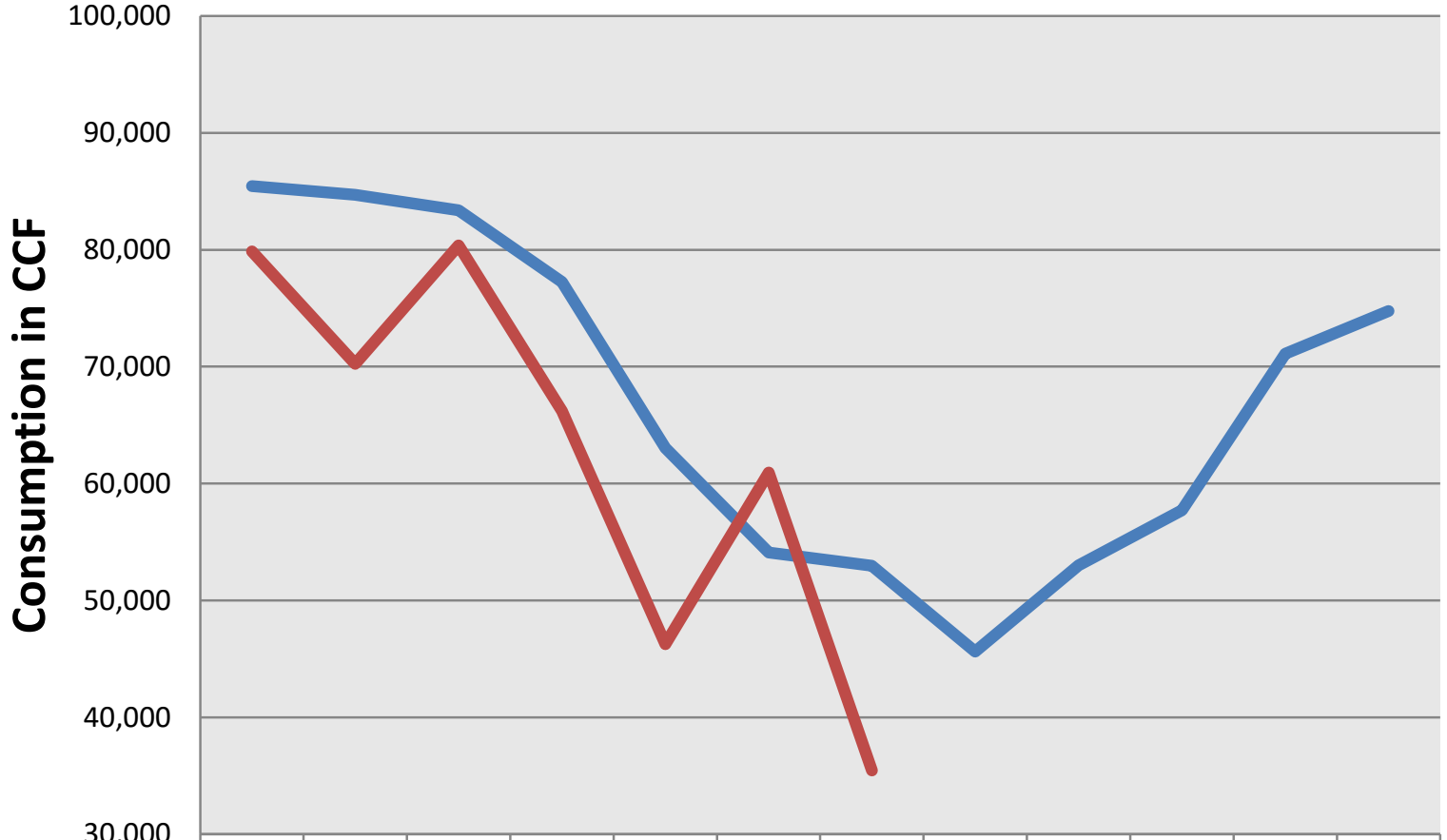
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	88,770	92,815	92,568	84,099	79,933	64,791	66,587	54,456	53,977	73,644	76,949	79,192
2021-2022	93,074	80,564	89,925	72,091	69,650	59,624	51,544					
%	105%	87%	97%	86%	87%	92%	77%	0%	0%	0%	0%	0%

Multi Family Residents Consumption



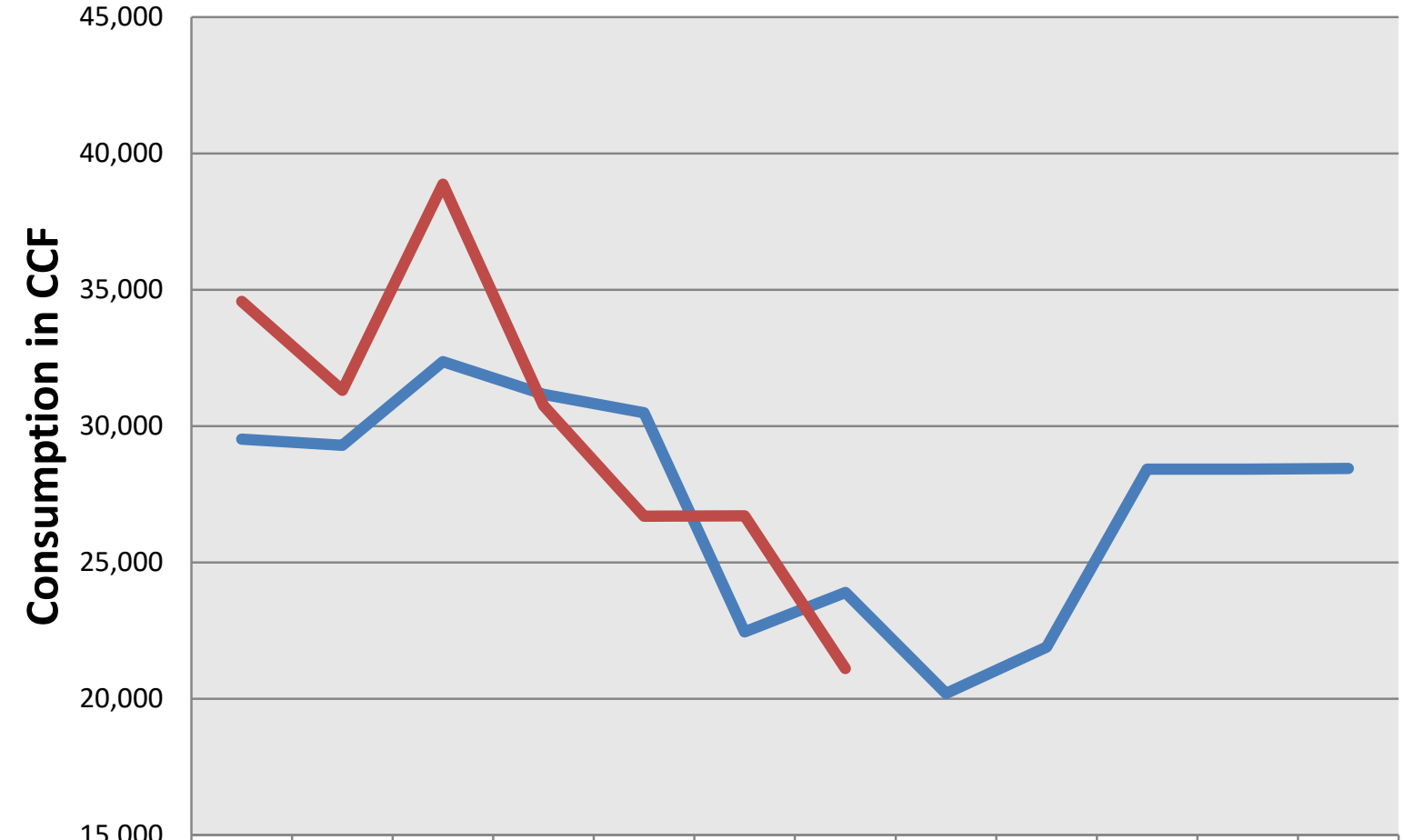
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	40,396	42,602	40,575	39,694	42,162	36,065	41,502	34,683	33,970	40,062	39,141	37,002
2021-2022	41,906	36,772	40,686	36,434	37,516	35,770	37,230					
%	104%	86%	100%	92%	89%	99%	90%	0%	0%	0%	0%	0%

Laguna Woods Village Consumption
(Excluding Dedicated Irrigation)



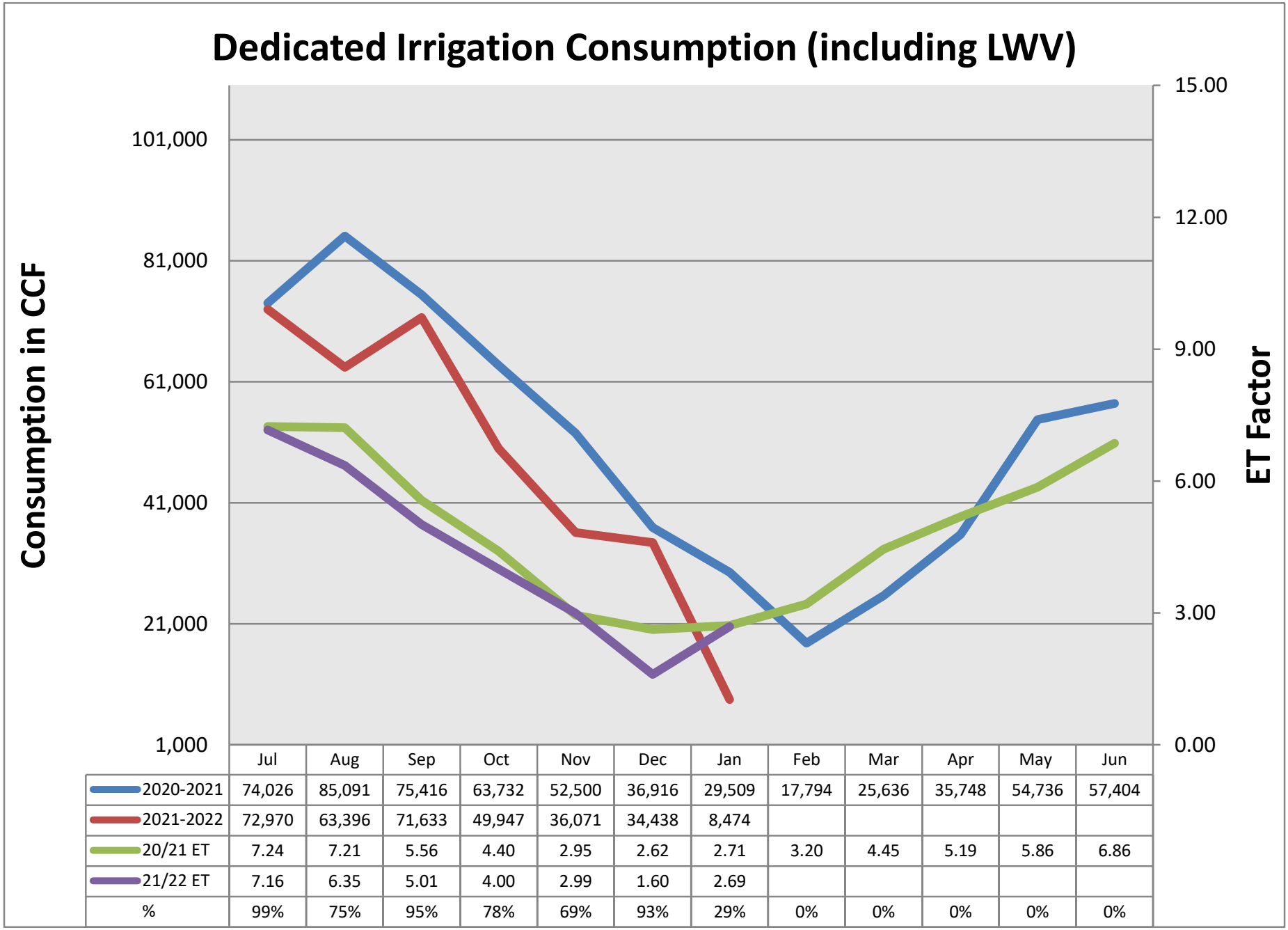
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	85,444	84,697	83,360	77,251	63,052	54,106	52,957	45,620	52,987	57,707	71,121	74,759
2021-2022	79,847	70,246	80,369	66,201	46,260	60,948	35,450					
%	93%	83%	96%	86%	73%	113%	67%	0%	0%	0%	0%	0%

Commercial Consumption



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	29,513	29,290	32,362	31,164	30,493	22,444	23,895	20,192	21,899	28,412	28,421	28,438
2021-2022	34,571	31,313	38,871	30,750	26,696	26,703	21,106					
%	117%	107%	120%	99%	88%	119%	88%	0%	0%	0%	0%	0%

Dedicated Irrigation Consumption (including LWV)



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2020-2021	74,026	85,091	75,416	63,732	52,500	36,916	29,509	17,794	25,636	35,748	54,736	57,404
2021-2022	72,970	63,396	71,633	49,947	36,071	34,438	8,474					
20/21 ET	7.24	7.21	5.56	4.40	2.95	2.62	2.71	3.20	4.45	5.19	5.86	6.86
21/22 ET	7.16	6.35	5.01	4.00	2.99	1.60	2.69					
%	99%	75%	95%	78%	69%	93%	29%	0%	0%	0%	0%	0%

Agenda Item No. 4

STAFF REPORT

To: BOARD OF DIRECTORS **Meeting Date: February 22, 2022**

From: Jason Hayden, Chief Financial Officer

Subject: Springbrook Implementation – Progress Update

Since the last update on the Springbrook implementation process on January 24, 2021, District Staff has continued with implementation tasks, including:

- ETWD Staff completed initial consulting meetings with Springbrook Staff to discuss and begin implementation tasks for the Finance Module (the Finance Module includes the General Ledger, Bank Reconciliation, and Accounts Payable modules).
- During the week of January 31, ETWD Staff had extensive meetings with Springbrook Staff to develop the Business Process Plan for the Finance Systems.
- During the week of February 7, ETWD Staff had meetings with Springbrook Staff to review the set up parameters and data import files for the chart of accounts and accounts payable vendors.
- ETWD staff is currently working to complete the chart of accounts for the Springbrook Finance module which will be the first module that will be implemented.
- ETWD staff has also created a new Vendor Information Form and is sending this form along with a W-9 form to all vendors so the District's vendor information will be updated when it is entered into Springbrook.
- The next milestones occur on March 4, 2022 when the chart of accounts and accounts payable conversion datasets and the Payroll business process questionnaire are due.
- Please note, an implementation schedule for Utility Billing has not been set yet because we are working with Springbrook to complete the modifications to their utility billing module to accommodate our water budget based billing process. Implementation process will really begin in March after the software enhancements have been completed.

Springbrook Finance/Payroll Systems Project Schedule as of 2/1:

Week/Day	System	Description	Complete
1/13	Finance	Project Kick-off Conference Call	Yes
1/17 – 1/21	Finance	Business Process Questionnaire Review	Yes
1/31 – 2/4	Finance	Discovery Session Meetings	Yes
2/7 – 2/11	Finance	General Ledger/Chart of Accounts Consulting Session	Yes
3/4/22	Finance	Chart of Accounts/Accounts Payable Vendor List Due	
3/4/22	Payroll	Payroll Business Process Questionnaire Due	
3/7 – 3/11	Payroll	Payroll Questionnaire Review	
3/14 – 3/18	Finance	General Ledger & Accounts Payable – Data Review and Load	
3/14 – 3/18	Payroll	Discovery Session between ETWD and Sprbrk	
3/21 – 3/25	Finance	Setup & Configuration Session	
4/8	Payroll	Payroll Data / Templates Due	
5/23 – 5/27	Finance	Go Live Sessions	
6/28 – 7/7	Payroll	Go Live Sessions	
7/7 – 7/20	Both	Post Go Live Support	

REVISED BUDGET SCHEDULE

FY 2022/2023

DESCRIPTION	DATE	DAY
Board Budget Committee #1	4/19/2022	Tuesday
Board Budget Committee #2	5/9/2022	Monday
CAG	5/12/2022	Thurs
Board Budget Workshop	5/24/2022	Tuesday
Distribute Prop 218 Notice	5/25/2022	Wednesday
Publish Public Hearing Notice - Newspaper	6/6/2022	Fri
FIC Meeting Budget Update	6/20/2022	Mon
Conduct Public Hearing - Regular Board Meeting	7/28/2022	Thurs
Implement Board Action	8/1/2022	Thurs

Note: Board Budget Committee #1, Committee #2, and Workshop are at 7:30 am

EL TORO WATER DISTRICT
FINANCIAL REPORT
February 22, 2022

EL TORO WATER DISTRICT
BALANCE SHEET

	1/31/22 (Unaudited)	June 30, 2021 (Audited)
ASSETS		
Current Assets		
Cash	$2,086,541	$3,118,166
Investments:		
Investments Cash	6,164,846	7,043,535
Investments FMV Adjustment	604	604
Receivables:		
Accounts Receivable	3,467,462	3,633,876
Inventories	681,758	714,751
Prepaid Expenses	479,393	159,944
Total Current Assets	$12,880,604	14,670,875
Restricted Assets		
Cash & Investments	10,595,050	9,787,357
Total Restricted Assets	10,595,050	9,787,357
Non-Current Assets		
Utility Plant:		
Land & Easements	7,451,585	7,451,585
Long Term Leases	342,382	342,382
Equipment	122,023,074	121,940,111
Collection & Impound Reservoirs	6,243,706	6,243,706
Structure & Improvements	34,977,506	34,950,613
Total Utility Plant	171,038,254	170,928,398
Less Accumulated Depreciation & Amortization	(86,435,555)	(83,944,167)
Net Utility Plant	84,602,699	86,984,231
Construction Work in Progress	3,931,196	3,064,334
Deffered Outflow OPEB	5,469,108	5,469,108
Total Non-current Assets	94,003,003	95,517,673
TOTAL ASSETS	$117,478,657	$119,975,906

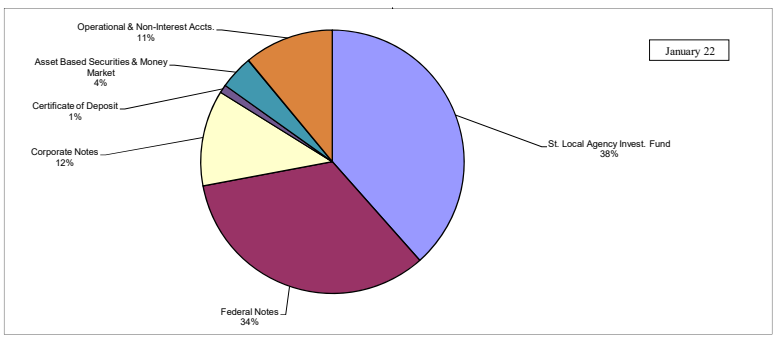
EL TORO WATER DISTRICT
BALANCE SHEET

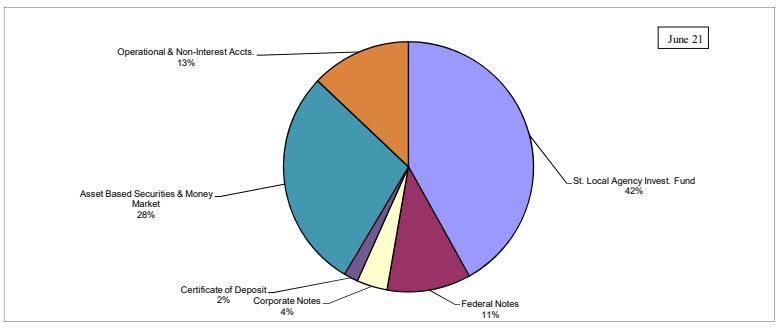
	1/31/22 (Unaudited)	June 30, 2021 (Audited)
LIABILITIES and EQUITY		
Liabilities		
Current Liabilities Payable		
Accounts Payable	$1,236,147	$2,732,736
Current Portion of Long-Term Debt	439,035	2,249,058
Other Current Liabilities	2,097,568	2,342,021
Total Current Liabilities Payable From Current Assets	3,772,751	7,323,815
Long Term Debt		
Long Term Debt	51,798,466	51,798,466
Total Long Term Debt	51,798,466	51,798,466
Total Liabilities	55,571,217	59,122,282
Fund Equity		
Retained Earnings - Reserved	17,034,893	17,034,893
Contributed Capital	8,744,767	8,744,767
Retained Earnings - Unreserved	35,073,964	36,959,626
Net Income	1,053,816	(1,885,662)
Total Fund Equity	61,907,440	60,853,624
Total Liabilites & Fund Equity	$117,478,657	$119,975,906

CASH & INVESTMENTS (General Fund)

SUMMARY OF INVESTMENTS BY TYPE

	Maturity Dates	Par	Market Value 1/31/22	Financial Institution	YTM 1/31/22	Original Cost 1/31/22
State Local Agency Investment Fund	NA	NA	$7,292,154	LAIF	0.23%	$7,292,154
US Treasury N/B - Coupon Rate 1.875%	5/31/2022	450,000	452,320	US Bank/CAMP	0.09%	457,400
US Treasury N/B - Coupon Rate 0.125%	7/31/2022	495,000	494,149	US Bank/CAMP	0.11%	495,097
US Treasury N/B - Coupon Rate 0.125%	9/30/2022	420,000	418,753	US Bank/CAMP	0.11%	420,082
US Treasury N/B - Coupon Rate 1.875%	10/31/2022	250,000	252,305	US Bank/CAMP	0.10%	256,328
US Treasury N/B - Coupon Rate 1.875%	10/31/2022	400,000	403,688	US Bank/CAMP	0.12%	410,422
US Treasury N/B - Coupon Rate 0.125%	11/30/2022	200,000	199,063	US Bank/CAMP	0.11%	200,055
US Treasury N/B - Coupon Rate 0.125%	12/31/2022	400,000	397,688	US Bank/CAMP	0.11%	400,125
US Treasury N/B - Coupon Rate 0.125%	1/31/2023	200,000	198,625	US Bank/CAMP	0.13%	199,977
US Treasury N/B - Coupon Rate 0.125%	1/31/2023	400,000	397,250	US Bank/CAMP	0.11%	400,141
US Treasury N/B - Coupon Rate 0.250%	6/15/2023	400,000	396,125	US Bank/CAMP	0.14%	401,047
US Treasury N/B - Coupon Rate 0.125%	7/15/2023	200,000	197,438	US Bank/CAMP	0.19%	199,688
US Treasury N/B - Coupon Rate 0.125%	7/15/2023	400,000	394,875	US Bank/CAMP	0.14%	399,828
US Treasury N/B - Coupon Rate 0.125%	8/15/2023	500,000	492,969	US Bank/CAMP	0.23%	498,809
US Treasury N/B - Coupon Rate 0.250%	11/15/2023	90,000	88,608	US Bank/CAMP	0.26%	89,982
US Treasury N/B - Coupon Rate 0.125%	2/15/2024	300,000	293,625	US Bank/CAMP	0.27%	298,734
US Treasury N/B - Coupon Rate 0.375%	8/15/2024	165,000	161,210	US Bank/CAMP	0.42%	164,807
US Treasury N/B - Coupon Rate 0.375%	9/15/2024	35,000	34,152	US Bank/CAMP	0.52%	34,854
Intl BK of Recon and Dev Note - Coupon Rate 0.126%	4/20/2023	135,000	133,681	US Bank/CAMP	0.23%	134,721
Inter-American Devel BK Note - Coupon Rate 0.500%	9/23/2024	185,000	180,982	US Bank/CAMP	0.52%	184,863
NJ TPK Auth -B- Txbl Muni Bond - Coupon Rate 0.897%	1/1/2025	20,000	19,594	US Bank/CAMP	0.90%	20,000
FHMS K724 A2 - Coupon Rate 3.062%	11/1/2023	60,000	61,362	US Bank/CAMP	0.58%	64,052
FHMS K133 A1 - Coupon Rate 0.440%	12/1/2025	5,287	5,189	US Bank/CAMP	0.44%	5,286
Federal Farm Credit Bank Note - Coupon Rate 0.125%	2/3/2023	230,000	228,580	US Bank/CAMP	0.15%	229,871
Freddie Mac Notes - Coupon Rate 0.250%	11/6/2023	155,000	152,612	US Bank/CAMP	0.23%	155,087
Fannie Mae Notes - Coupon Rate 0.250%	11/27/2023	250,000	245,933	US Bank/CAMP	0.24%	250,107
Federal Notes		6,345,287	6,300,774			6,371,362
Toyota Motor Credit Corp Corporate Note - Coupon Rate 0.450%	1/11/2024	70,000	68,687	US Bank/CAMP	0.45%	69,996
John Deere Corp Notes - Coupon Rate 0.450%	1/17/2024	55,000	54,100	US Bank/CAMP	0.48%	54,961
Morgan Stanley Corp Notes - Coupon Rate 0.529%	1/25/2024	55,000	54,515	US Bank/CAMP	0.53%	55,000
PACCAR Financial Corp Corporate Note - Coupon Rate 0.350%	2/2/2024	65,000	63,592	US Bank/CAMP	0.39%	64,925
Microsoft Corp (Callable) Note - Coupon Rate 2.875%	2/6/2024	45,000	46,277	US Bank/CAMP	0.95%	46,864
National Rural Util Coop Corporate Note - Coupon Rate 0.350%	2/8/2024	25,000	24,412	US Bank/CAMP	0.37%	24,983
Apple Inc (Callable) Note - Coupon Rate 3.000%	2/9/2024	50,000	51,478	US Bank/CAMP	0.87%	52,381
Goldman Sachs Corp Notes - Coupon Rate 4.000%	3/3/2024	40,000	41,791	US Bank/CAMP	0.69%	44,062
Merck & Co Inc Corp Notes - Coupon Rate 2.900%	3/7/2024	30,000	30,898	US Bank/CAMP	0.88%	31,377
Goldman Sachs Corp Notes - Coupon Rate 0.673%	3/8/2024	20,000	19,819	US Bank/CAMP	0.67%	20,000
JPMorgan Chase & Co Corp Note Call - Coupon Rate 0.697%	3/16/2024	70,000	69,470	US Bank/CAMP	0.70%	70,000
Charles Schwab Corp Note - Coupon Rate 0.750%	3/18/2024	30,000	29,499	US Bank/CAMP	0.77%	29,985
Suntrust Bank (Callable) Corp Note - Coupon Rate 3.200%	4/1/2024	60,000	62,022	US Bank/CAMP	0.96%	63,197
Comcast Corp (Callable) Corp Note - Coupon Rate 3.700%	4/15/2024	50,000	52,188	US Bank/CAMP	0.96%	53,305
Bank of NY Mellon Corp Note - Coupon Rate 0.500%	4/26/2024	55,000	53,781	US Bank/CAMP	0.54%	54,941
Novartis Capital Corp Note - Coupon Rate 3.400%	5/6/2024	50,000	52,101	US Bank/CAMP	0.89%	53,112
Amazon.com Inc Corp Note - Coupon Rate 0.450%	5/12/2024	80,000	78,275	US Bank/CAMP	0.50%	79,883
Unitedhealth Group Inc Corp Note - Coupon Rate 0.550%	5/15/2024	30,000	29,346	US Bank/CAMP	0.59%	29,969
Unitedhealth Group Inc Corp Note - Coupon Rate 0.550%	5/15/2024	30,000	29,346	US Bank/CAMP	1.32%	29,476
Caterpiller Finl Service Corp Note - Coupon Rate 0.450%	5/17/2024	45,000	43,917	US Bank/CAMP	0.50%	44,940
Astrazeneca Finance LLc (Callable) Corp - Coupon Rate 0.700%	5/28/2024	50,000	48,974	US Bank/CAMP	0.70%	49,996
John Deere Capital Corp Notes - Coupon Rate 0.450%	6/7/2024	10,000	9,779	US Bank/CAMP	0.49%	9,988
Target Corp Notes - Coupon Rate 3.500%	7/1/2024	30,000	31,360	US Bank/CAMP	1.04%	31,879
American Express Co Corp Notes - Coupon Rate 2.500%	7/30/2024	35,000	35,702	US Bank/CAMP	1.14%	36,253
American Honda Finance Corp Notes - Coupon Rate 0.750%	8/9/2024	30,000	29,338	US Bank/CAMP	0.77%	29,980
American Honda Finance Corp Notes - Coupon Rate 0.750%	8/9/2024	35,000	34,227	US Bank/CAMP	0.72%	35,025
Caterpillar Finl Service Corp Notes - Coupon Rate 0.600%	9/13/2024	20,000	19,484	US Bank/CAMP	0.65%	19,973
Bank of NY Mellon Corp Note - Coupon Rate 0.850%	10/25/2024	25,000	24,564	US Bank/CAMP	0.87%	24,984
Apple Inc Corp Note - Coupon Rate 2.750%	1/13/2025	40,000	41,302	US Bank/CAMP	0.89%	42,786
Goldman Sachs Corp Notes - Coupon Rate 1.757%	1/24/2025	10,000	9,963	US Bank/CAMP	1.76%	10,000
Merck & Co Inc Corp Note - Coupon Rate 2.750%	2/10/2025	20,000	20,604	US Bank/CAMP	0.94%	21,389
JPMorgan Chase & Co Corp Note Call - Coupon Rate 0.563%	2/16/2025	30,000	29,258	US Bank/CAMP	0.56%	30,000
Lockheed Martin Corp Note - Coupon Rate 2.900%	3/1/2025	20,000	20,677	US Bank/CAMP	1.06%	21,422
Bank of America Corp Notes - Coupon Rate 3.458%	3/15/2025	40,000	41,177	US Bank/CAMP	1.53%	42,714
Burlington North Santa Fe Corp Note Call - Coupon Rate 3.000%	4/1/2025	20,000	20,687	US Bank/CAMP	1.07%	21,533
Bank of America Corp Notes (Callable) - Coupon Rate 0.976%	4/22/2025	70,000	68,674	US Bank/CAMP	0.98%	70,000
Bank of NY Mellon Corp Note - Coupon Rate 1.600%	4/24/2025	45,000	44,690	US Bank/CAMP	0.97%	46,148
Pepsico Inc Corp Note Call - Coupon Rate 2.750%	4/30/2025	20,000	20,593	US Bank/CAMP	1.02%	21,400
Citigroup Inc Corp Notes - Coupon Rate 0.981%	5/1/2025	35,000	34,216	US Bank/CAMP	0.98%	35,000
Morgan Stanley Corp Notes (Callable) - Coupon Rate 0.790%	5/30/2025	10,000	9,739	US Bank/CAMP	0.79%	10,000
Honeywell Intl Corp Note - Coupon Rate 1.350%	6/1/2025	20,000	19,746	US Bank/CAMP	0.91%	20,360
JPMorgan Chase & Co Corp Note - Coupon Rate 0.824%	6/1/2025	25,000	24,373	US Bank/CAMP	0.82%	25,000
Citigroup Inc Corp Notes - Coupon Rate 1.281%	11/3/2025	20,000	19,586	US Bank/CAMP	1.28%	20,000
Collat Comm Paper V Co Comm Paper - Coupon Rate 0.000%	4/4/2022	285,000	284,856	US Bank/CAMP	0.16%	284,712
Credit Agricole CIB NY Comm Paper - Coupon Rate 0.000%	4/29/2022	300,000	299,858	US Bank/CAMP	0.14%	299,686
Corporate Notes		2,200,000	2,198,936			2,233,583
Barclays Bank PLC NY CD- Coupon Rate 0.290%	2/4/2022	190,000	190,002	US Bank/CAMP	0.29%	190,000
Certificate of Deposit		190,000	190,002			190,000
MBalt 2021-1 A3 - Coupon Rate 0.250%	1/16/2024	15,000	14,896	US Bank/CAMP	0.25%	14,998
BMWLT 2021-1 A3 - Coupon Rate 0.290%	1/25/2024	15,000	14,927	US Bank/CAMP	0.29%	15,000
BMWLT 2021-1 A3 - Coupon Rate 0.290%	1/25/2024	55,000	54,731	US Bank/CAMP	0.31%	54,976
FordL 2021-A A3 - Coupon Rate 0.260%	2/15/2024	25,000	24,861	US Bank/CAMP	0.26%	24,997
Carmx 2021-1 A2A- Coupon Rate 0.220%	2/15/2024	37,909	37,882	US Bank/CAMP	0.24%	37,886
GMALT 2021-1 A3 - Coupon Rate 0.260%	2/20/2024	30,000	29,820	US Bank/CAMP	0.26%	29,997
FordO 2019-C A3 - Coupon Rate 1.870%	3/15/2024	28,992	29,081	US Bank/CAMP	1.38%	29,394
Woart 2021-C A2 - Coupon Rate 0.220%	9/16/2024	55,000	54,806	US Bank/CAMP	0.22%	54,999
FordL 2021-B A3 - Coupon Rate 0.370%	10/15/2024	60,000	59,292	US Bank/CAMP	0.38%	59,989
Harot 2021-A A3 - Coupon Rate 0.270%	4/21/2025	25,000	24,650	US Bank/CAMP	0.27%	25,000
Fordo 2021-A A3 - Coupon Rate 0.300%	8/15/2025	30,000	29,701	US Bank/CAMP	0.30%	29,997
Harot 2021-2 A3 - Coupon Rate 0.330%	8/15/2025	40,000	39,246	US Bank/CAMP	0.33%	39,998
GMCar 2021-1 A3 - Coupon Rate 0.350%	10/16/2025	15,000	14,803	US Bank/CAMP	0.35%	14,998
Harot 2021-3 A3 - Coupon Rate 0.410%	11/18/2025	40,000	39,318	US Bank/CAMP	0.41%	39,999
Carmx 2021-1 A3 - Coupon Rate 0.340%	12/15/2025	15,000	14,843	US Bank/CAMP	0.34%	14,997
Harot 2021-4 A3 - Coupon Rate 0.880%	1/21/2026	25,000	24,740	US Bank/CAMP	0.89%	24,995
TAOT 2021-D A3 - Coupon Rate 0.710%	4/15/2026	30,000	29,585	US Bank/CAMP	0.71%	29,999
Hart 2021-C A3 - Coupon Rate 0.740%	5/15/2026	20,000	19,727	US Bank/CAMP	0.75%	19,996
Fordo 2022-A A3 - Coupon Rate 1.290%	6/15/2026	25,000	24,970	US Bank/CAMP	1.29%	24,997
COPAR 2021-1 A3 - Coupon Rate 0.770%	9/15/2026	25,000	24,640	US Bank/CAMP	0.77%	25,000
DCENT 2021-A1 A1 - Coupon Rate 0.580%	9/15/2026	55,000	53,673	US Bank/CAMP	0.58%	54,988
GMCar 2021-4 A3 - Coupon Rate 0.680%	9/16/2026	25,000	24,699	US Bank/CAMP	0.68%	24,999
GMCar 2022-1 A3 - Coupon Rate 1.260%	11/16/2026	20,000	19,917	US Bank/CAMP	1.26%	19,998
Comet 2021-A3 A3 - Coupon Rate 1.040%	11/16/2026	50,000	49,294	US Bank/CAMP	1.04%	49,993
CAMP Money Market Fund	NA	NA	23,954	US Bank/CAMP	0.05%	23,954
Asset Based Securities & Money Market		761,901	778,056			786,146
Total Camp Investments		9,497,188	9,467,769			9,581,091
Operational & Non-Interest Bearing Accounts						
ETWD General Cash Account	NA	NA	2,082,947	Union Bank of Cal.	0.00%	2,082,947
ETWD Capital Facilities Reserve Account	NA	NA	2,895	Union Bank of Cal.	0.00%	2,895
ETWD Payroll Account	NA	NA	0	Union Bank of Cal.	0.00%	0
ETWD Petty Cash Account	NA	NA	700	Union Bank of Cal.	0.00%	700
Operational & Non-Interest Accts.			2,086,541			2,086,541
			$18,846,464	**Total Investments & Cash**		$18,959,786





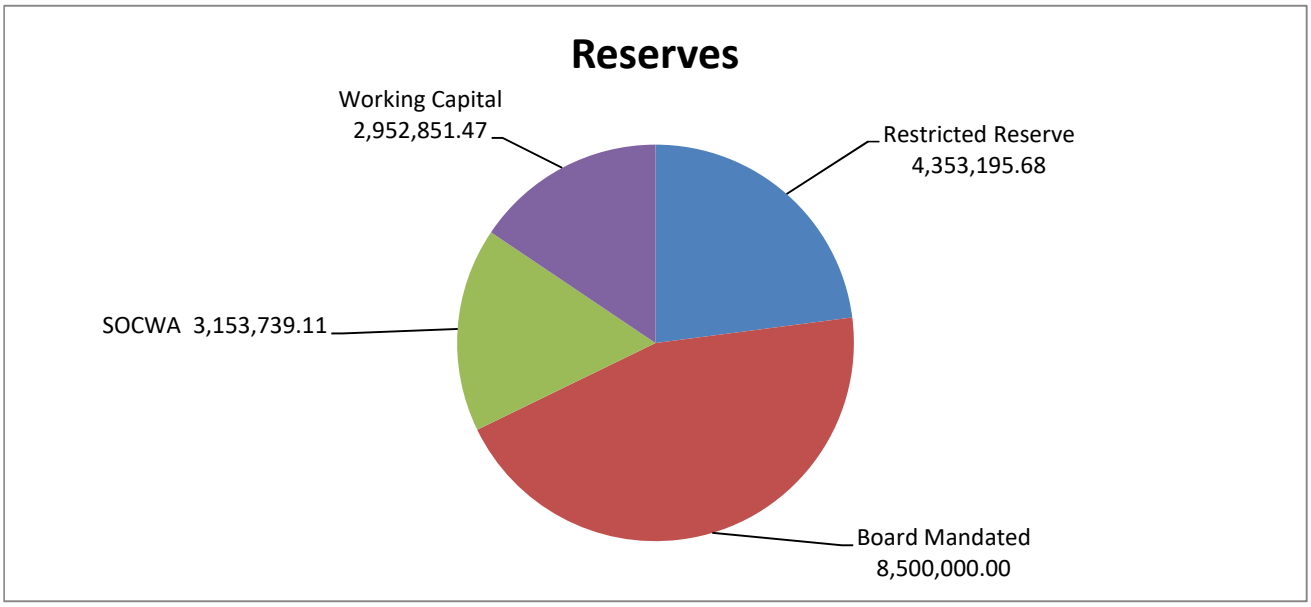
LIQUIDITY

	January 31, 2022			June 30, 2021	
	$	%		$	%
DEMAND	$ 9,402,649	49.59%		$ 12,245,220	61.74%
30 Days	$ 190,000	1.00%		$ 208,880	1.05%
31-180 Days	$ 1,041,799	5.49%		$ 1,161,829	5.86%
181 - 360	$ 2,182,108	11.51%		$ 1,771,413	8.93%
361-1800 Days	$ 6,143,229	32.40%		$ 4,447,532	22.42%
TOTAL	$ 18,959,786	100.00%		$ 19,834,874	100.00%

* The portfolio is in compliance with the investment policy.

** PFM Investment Advisory Services (10bp on first $25 mm, 8bp over) $ 480.91 for January 2020

EL TORO WATER DISTRICT
RESERVE ANALYSIS
31-Jan-22



Restricted Reserve	$	4,353,196
Board Mandated	$	8,500,000
SOCWA	$	3,153,739
Capital Cash Flow / Compliance	$	2,952,851
Total	**$**	**18,959,786**

Restricted Reserve

State Revolving Fund Loans	$	2,270,150
Capital Facilities Reserve	$	2,895
Tiered Cons Fund	$	1,211,781
Baker Funding	$	868,370
Total	**$**	**4,353,196**

Board Mandated Minimum Reserve Levels

Capital Construction	$	3,000,000
Rate Stabilization	$	2,200,000
Operations	$	1,300,000
Working Capital	$	2,000,000
Total	**$**	**8,500,000**

Six months operating expense requirement:	$12,800,791
Cash less restricted reserve on hand:	$14,606,591

ETWD has the ability to meet its expediture requirements for the next six months.

EL TORO WATER DISTRICT
CHANGE IN RESERVES

	January 31, 2022	Year to Date	Year Ended June 30, 2021
Operating Revenue	1,828,863	15,796,207	26,393,477
Non-operating Revenue	98,711	1,350,839	1,723,488
Total Revenue	1,927,574	17,147,046	28,116,965
Operating Expenses	1,756,704	13,186,781	25,497,573
Depreciation & Amortization	355,912	2,491,387	4,345,555
Non-operating Expenses	59,295	415,062	159,499
Total Expenses	2,171,911	16,093,230	30,002,627
NET INCOME	(244,337)	1,053,816	(1,885,662)
Add Depreciation & Amortization	332,566	2,381,532	4,112,113
Net Cash Provided by Operating Activities	(510,542)	(4,478,800)	604,322
Net Cash Provided by Investing Activities	(87,947)	(866,862)	(2,723,140)
Net Cash Provided by Financing Activities	-	-	(627,412)
Net Increase/(Decrease) Cash for the Period	(510,260)	(1,910,314)	(519,779)
Cash at End of Period from Balance Sheet		8,251,991	
Restricted Cash		10,595,050	
Unrealized (Gains)/Losses Fair Market Value		(604)	
Cash at End of Period		18,846,437	
Net (Increase)/Decrease Cash for the Period		510,260	
Net (Increase)/Decrease in Rescricted Cash for the Period		(90,209)	
Net Increase/(Decrease) in Unrealized Gains/(Losses) Fair Market Value		-	
Void Checks in Prior Period		-	
Cash at Beginning of Period		19,266,488	

EL TORO WATER DISTRICT
Cash Sheet
For the month ending January 31, 2022

CHECK NUMBER	PAYMENT DATE	VENDOR NAME	PAYMENT AMOUNT
91615	01/06/2022	MUNICIPAL WATER DISTRICT OF ORANGE CO.	525,485.17
91631	01/06/2022	SOUTH ORANGE COUNTY WASTEWATER AUTHORITY	260,873.00
91595	01/03/2022	STATE WATER RESOURCES CONTROL BOARD	258,145.84
91596	01/03/2022	SUNFLOWER BANK	125,703.60
91728	01/27/2022	SO. CALIFORNIA EDISON CO.	107,511.06
91653	01/13/2022	HILTS CONSULTING GROUP, INC.	68,009.35
		TOTAL CHECKS OVER $50,000	**$ 1,345,728.02**
		TOTAL CHECKS IN REGISTER	**$ 1,696,865.93**

DEBIT TRANSFERS

	01/14/2022	PAYROLL DIRECT DEPOSIT	315,694.43
	01/14/2022	FEDERAL DEPOSIT LIABILITY	67,704.51
	01/14/2022	SDI & STATE TAX	25,877.50
	01/14/2022	WAGE GARNISHMENTS	282.50
	01/14/2022	PRUDENTIAL (401K)	116,668.42
	01/14/2022	PRUDENTIAL (457)	42,769.80
	01/14/2022	HEALTH SAVINGS ACCOUNT	53.85
	01/14/2022	PAYROLL BOARD OF DIRECTOR	6,100.51
	01/14/2022	SS, MEDICARE, SDI & STATE TAX	1,805.91
	01/14/2022	PRUDENTIAL (457)	2,510.56
	01/14/2022	HEALTH SAVINGS ACCOUNT	577.50
	01/28/2022	PAYROLL DIRECT DEPOSIT	146,705.13
	01/28/2022	FEDERAL DEPOSIT LIABILITY	32,936.22
	01/28/2022	SDI & STATE TAX	12,920.86
	01/28/2022	WAGE GARNISHMENTS	282.50
	01/28/2022	PRUDENTIAL (401K)	54,231.87
	01/28/2022	PRUDENTIAL (457)	17,550.13
	01/28/2022	HEALTH SAVINGS ACCOUNT	53.85
	01/31/2022	ADP AND BANK FEES	5,979.32
		TOTAL INTERBANK WIRES / DEBIT TRANSFERS	**$ 850,705.37**
		TOTAL DISBURSEMENTS	**$ 2,547,571.30**

REIMBURSEMENTS TO ETWD EMPLOYEES

CHECK NUMBER	PAYMENT DATE	PAYEE (DESCRIPTION)	PAYMENT AMOUNT
91659	01/13/2022	RAYMUND LLADA (Education Reimbursement)	3,647.54
91656	01/13/2022	MARISOL MELENDEZ (Education Reimbursement)	2,522.63
91687	01/20/2022	PAUL GIORDANO (Reimbursement - COVID Self Tests)	511.81
91713	01/27/2022	GARTH BOTHA (Workboots)	243.45
91710	01/27/2022	DONALD BOYLES (Workboots)	242.43
91600	01/06/2022	CESAR CASSANI (Certification)	230.00
91594	01/03/2022	JUDY WILSON (Holiday Party Favors)	113.75
91610	01/06/2022	JEFF WEBSTER (Certification)	110.00
91593	01/03/2022	JEFF WEBSTER (Safety Glasses)	77.00
91626	01/06/2022	RICK BROWN (Certification)	60.00
		TOTAL CHECKS TO EMPLOYEES	**$ 7,758.61**

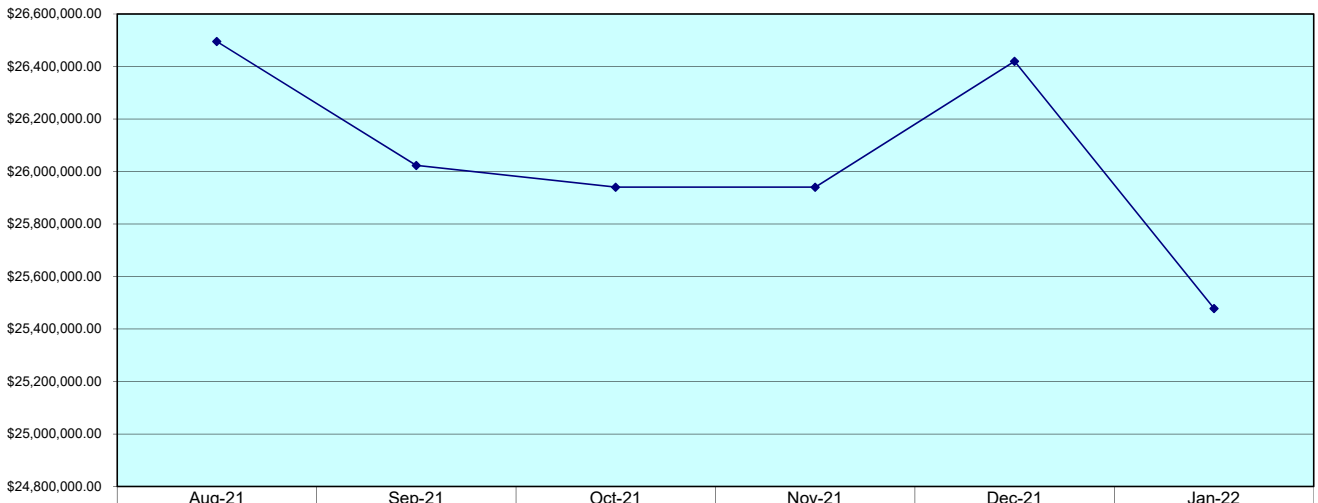
REINBURSEMENTS TO ETWD DIRECTORS

CHECK NUMBER	PAYMENT DATE	PAYEE (DESCRIPTION)	PAYMENT AMOUNT
91657	01/13/2022	MARK MONIN (Travel Expenses)	176.22
		TOTAL CHECKS TO DIRECTORS	**$ 176.22**

EL TORO WATER DISTRICT

401K PLAN SUMMARY

401K PLAN MARKET VALUE

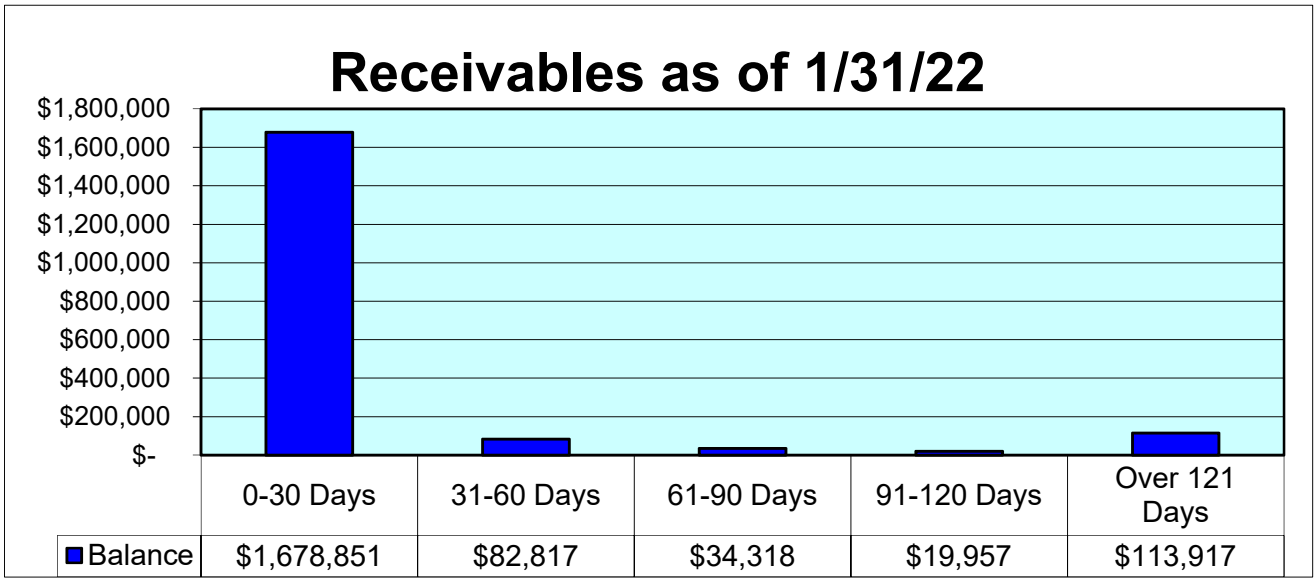


MARKET VALUE SUMMARY

	Growth Under 40 yrs. Old	Capital Appreciation 40 to 44 yrs. Old	Balanced 45 to 49 yrs. Old	Balanced Income 50 to 54 yrs. Old	Income & Growth 55 to 59 yrs. Old	Income 60 to 64 yrs. Old	Capital Pres. Port Over 65 yrs. Old
Balance at June 30, 2021	$ 2,516,132.58	$931,857.47	$871,612.09	$6,330,364.56	$8,272,782.08	$5,493,756.18	$1,392,123.44
Contributions	202,982.38	66,784.11	89,162.63	92,511.79	194,291.96	211,999.05	89,906.01
Withdrawals	0.00	0.00	0.00	0.00	(676,063.27)	(36,214.30)	(132,176.36)
Transfers	(745,997.45)	644,927.49	101,069.96	(2,550,556.21)	789,398.55	1,375,194.76	385,962.90
Interest, dividends and appreciation net of fees and charges	(27,909.26)	(28,330.51)	(72,718.18)	(53,810.48)	(116,245.93)	(100,364.76)	(34,061.07)
Balance at January 31, 2022	$ 1,945,208.25	$1,615,238.56	$989,126.50	$3,818,509.66	$8,464,163.39	$6,944,370.93	$1,701,754.92
Average return YTD January 31, 2022	-1.11%	-3.04%	-8.34%	-0.85%	-1.41%	-1.83%	-2.45%

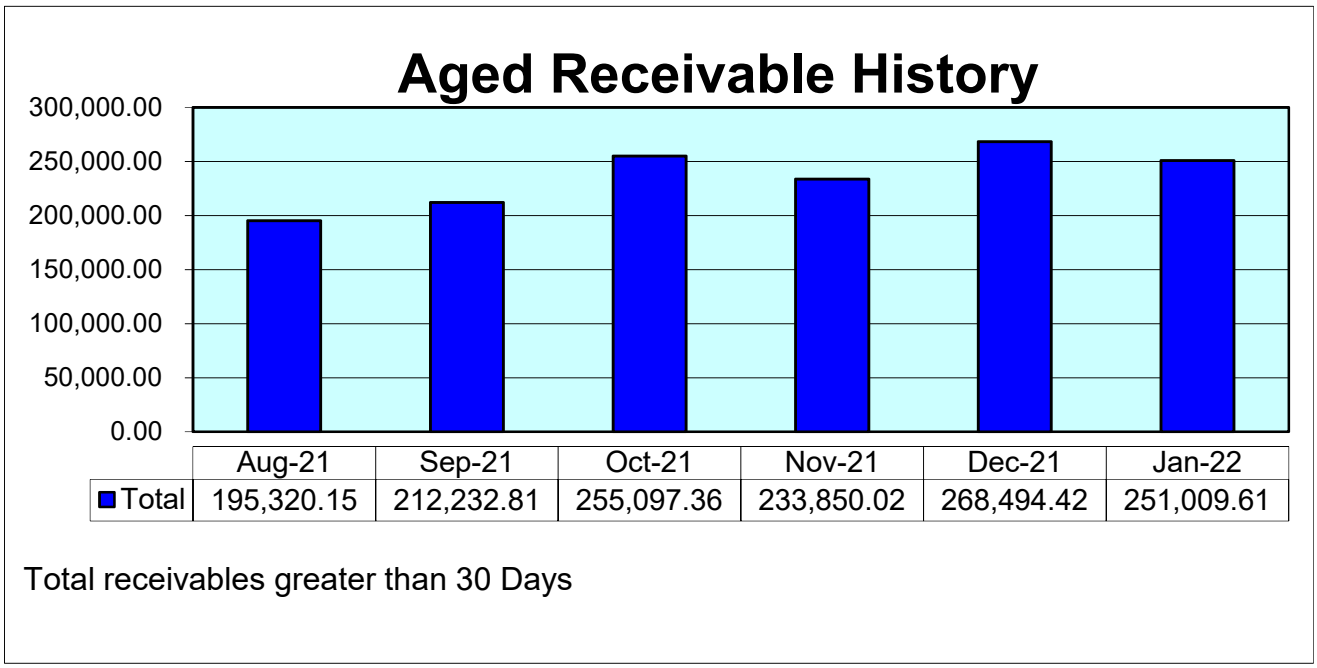
Average return is calculated by dividing the interest, dividends and appreciation, net of fees by beginning fiscal year fund balance.

RECEIVABLES AGEING



	0-30 Days	31-60 Days	61-90 Days	91-120 Days	Over 121 Days
Jan-21	1,866,331	99,528	30,527	16,241	54,150

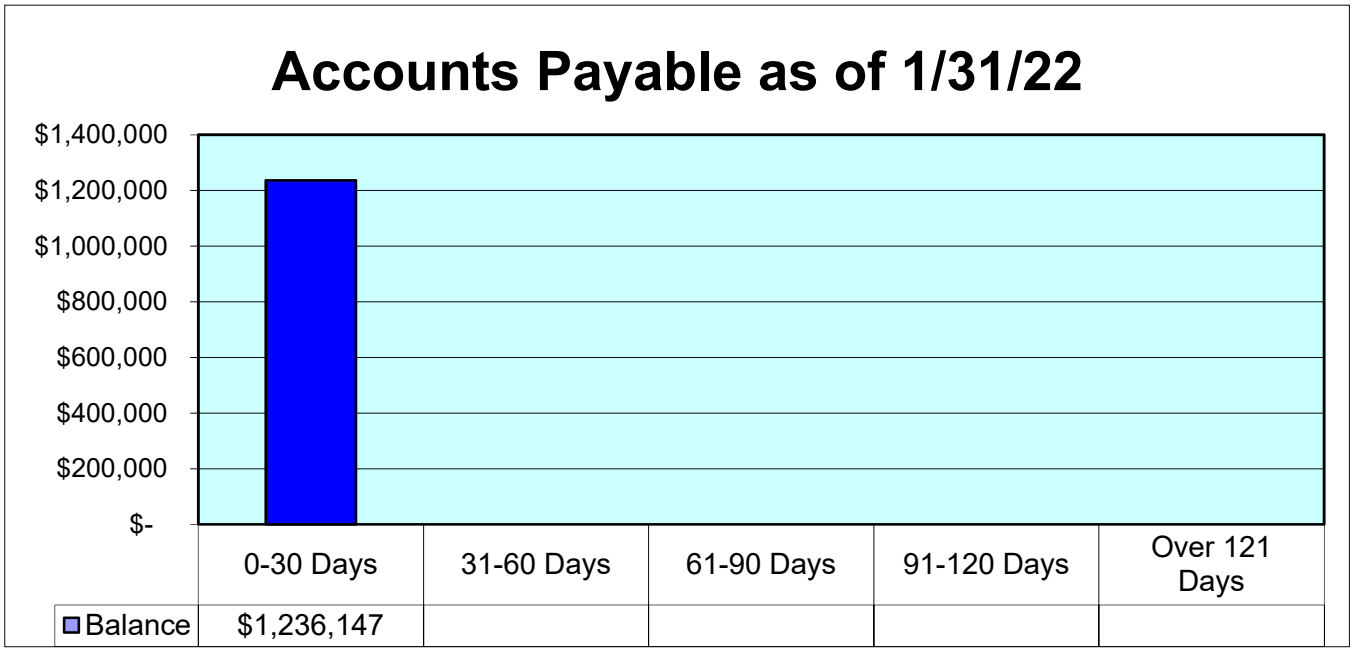
Bad Debts Year to Date: **1,199.49**



Total receivables greater than 30 Days

	31-60 Days	61-90 Days	91-120 Days	Over 121 Days	Total
Aug-21	76,551.23	30,465.15	15,824.39	72,479.38	195,320.15
Sep-21	83,213.57	32,333.09	18,923.16	77,762.99	212,232.81
Oct-21	119,232.14	30,349.44	18,901.53	86,614.25	255,097.36
Nov-21	83,432.31	35,387.77	19,531.49	95,498.45	233,850.02
Dec-21	101,816.14	37,194.34	23,213.22	106,270.72	268,494.42
Jan-22	82,816.76	34,318.43	19,957.25	113,917.17	251,009.61

PAYABLES AGEING

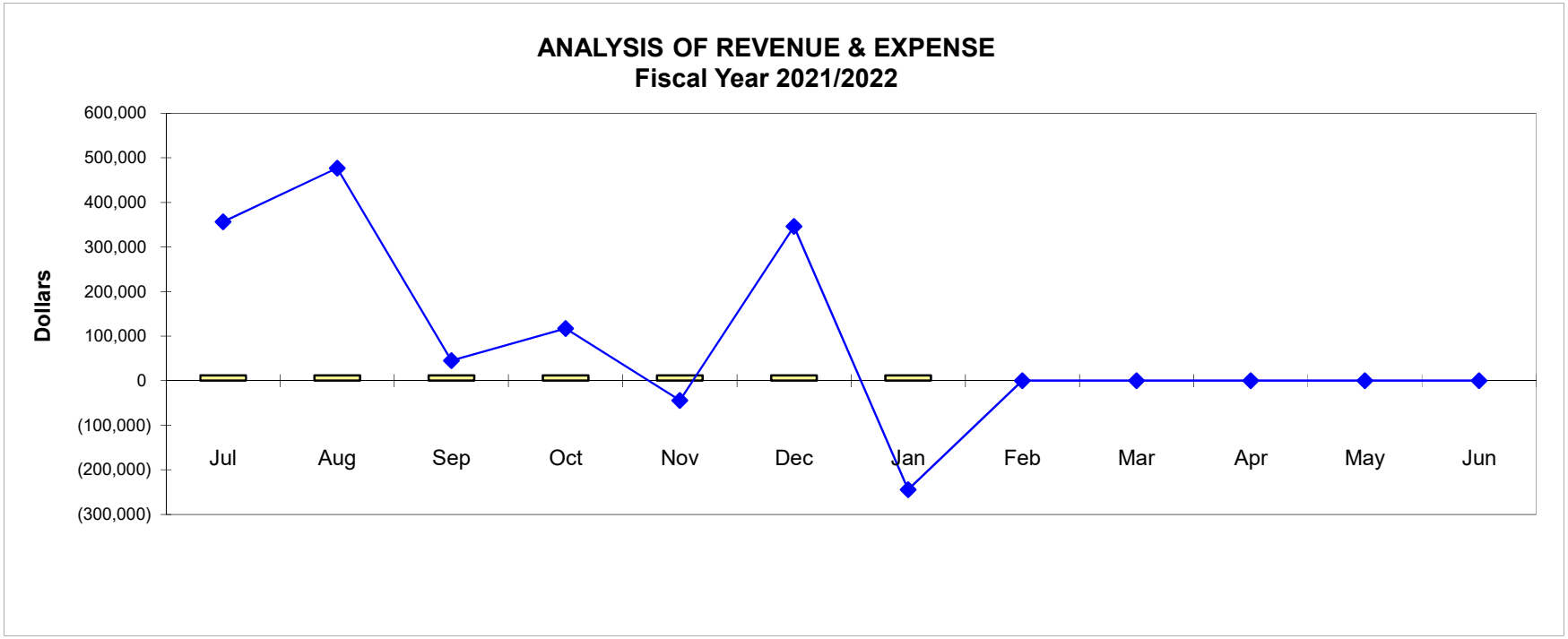


Year to Date Discounts Taken: **$619**

El Toro Water District
Income Statement
January 2022

	Jan 22	Budget	% of Budget	Jul - Jan 21	Jul '21 - Jan 22	YTD Budget	% of Budget	Annual Budget
Income								
4600 · Water Service Charge	351,055.98	352,427.49	99.61%	2,184,664.20	2,429,406.16	2,466,992.43	98.48%	4,229,130.00
4700 · Sanitary Service	649,294.63	686,461.43	94.59%	4,453,913.01	4,725,886.92	4,805,230.01	98.35%	8,237,537.00
4722 · Recycled Water Tertiary Sales	8,294.43	150,935.17	5.5%	1,083,489.73	1,091,971.75	1,056,546.19	103.35%	1,811,222.00
4724 · Service Charge - Recycled Water	31,141.60	32,325.00	96.34%	171,563.18	214,545.64	226,275.00	94.82%	387,900.00
4750 · Capital Facilities Charge	250,286.43	252,122.00	99.27%	1,753,058.68	1,753,262.68	1,764,854.00	99.34%	3,025,468.00
4800 · Commodity Charge	418,554.25	770,280.00	54.34%	5,850,666.41	5,433,441.91	5,391,960.00	100.77%	9,243,364.00
4950 · Other Operating Income	8,126.24	4,583.00	177.31%	10,008.32	24,582.70	32,081.00	76.63%	55,000.00
4960 · Other Income	40,735.28	48,469.00	84.04%	344,650.21	765,533.04	339,276.00	225.64%	581,625.00
4967 · SMWD	101,650.54	0.00	100.0%	0.00	101,650.54	0.00	100.0%	0.00
4970 · Charges for Service/Facilities	10,458.95	11,126.00	94.01%	11,000.00	21,458.95	77,870.00	27.56%	133,500.00
4980 · Investment Income	-38,882.90	8,333.00	-466.61%	68,108.14	-72,895.51	58,331.00	-124.97%	100,000.00
4990 · Property Taxes	96,858.65	90,833.00	106.63%	636,692.59	658,201.27	635,827.00	103.52%	1,090,000.00
Total Income	1,927,574.08	2,407,895.09	80.05%	16,567,814.47	17,147,046.05	16,855,242.63	101.73%	28,894,746.00
Gross Profit	1,927,574.08	2,407,895.09	80.05%	16,567,814.47	17,147,046.05	16,855,242.63	101.73%	28,894,746.00
Expense								
5100 · Personnel Cost	746,081.51	752,739.00	99.12%	4,713,329.21	5,085,047.69	5,269,105.00	96.51%	9,032,900.00
5405 · Water Purchases	493,348.19	677,626.40	72.81%	4,941,295.68	4,482,408.59	4,743,384.73	94.5%	8,131,516.73
5410 · Electrical Power	121,446.61	104,216.69	116.53%	741,785.70	881,582.54	729,516.55	120.85%	1,250,600.00
5415 · Repair Parts & Materials	69,178.49	34,308.29	201.64%	158,634.42	233,121.86	240,158.55	97.07%	411,700.00
5420 · Equipment Maintenance & Repair	5,006.02	8,283.35	60.44%	62,562.37	44,600.85	57,983.25	76.92%	99,400.00
5425 · Pump Maintenance & Repair	0.00	6,958.34	0.0%	51,002.17	12,406.50	48,708.30	25.47%	83,500.00
5430 · Motor Maintenance & Repair	3,345.25	3,375.01	99.12%	9,429.96	3,345.25	23,624.95	14.16%	40,500.00
5440 · Electrical/Contl Maint & Repair	0.00	7,641.65	0.0%	40,312.87	7,626.26	53,491.75	14.26%	91,700.00
5445 · Meter Maintenance & Repair	0.00	833.34	0.0%	1,672.52	5,173.46	5,833.30	88.69%	10,000.00
5455 · Chemicals	16,929.57	19,249.99	87.95%	124,739.64	120,426.32	134,750.05	89.37%	231,000.00
5460 · Structure Maint & Repair	1,469.63	1,862.53	78.91%	30,718.92	20,229.88	13,037.35	155.17%	22,350.00
5465 · Asphalt Maintenance & Repair	0.00	6,416.68	0.0%	37,410.00	11,454.00	44,916.60	25.5%	77,000.00
5470 · Consultants	1,207.90	5,125.00	23.57%	11,820.60	18,851.65	35,875.00	52.55%	61,500.00
5475 · Contractors	106,492.62	101,524.97	104.89%	707,399.92	705,357.31	710,675.15	99.25%	1,218,300.00
5480 · Engineers	12,208.25	5,333.33	228.91%	120,604.14	21,722.24	37,333.35	58.19%	64,000.00
5482 · Dump Fees	1,786.10	1,500.00	119.07%	8,154.86	6,822.81	10,500.00	64.98%	18,000.00
5485 · Laboratory	1,111.90	2,775.00	40.07%	14,812.18	17,790.37	19,425.00	91.59%	33,300.00
5490 · License & Permits	8,159.35	15,116.68	53.98%	108,103.96	112,995.48	105,816.60	106.78%	181,400.00
5495 · Gas & Oil	9,093.17	8,500.00	106.98%	51,913.53	64,412.71	59,500.00	108.26%	102,000.00
5500 · Equipment Rental	815.33	1,616.67	50.43%	10,361.33	7,311.40	11,316.65	64.61%	19,400.00
5505 · Landscaping	9,154.18	13,683.34	66.9%	72,801.46	83,797.78	95,783.30	87.49%	164,200.00
5510 · Small Tools & Equipment	234.81	6,116.69	3.84%	27,204.12	29,019.26	42,816.55	67.78%	73,400.00
5515 · Security	2,935.54	1,600.01	183.47%	11,224.04	4,544.38	11,199.95	40.58%	19,200.00
5520 · Operating Supplies	6,818.92	4,933.33	138.22%	45,626.52	31,388.09	34,533.35	90.89%	59,200.00
5525 · Safety Equipment	1,350.35	3,458.32	39.05%	11,334.68	18,386.20	24,208.40	75.95%	41,500.00
5530 · Temporary Help	0.00	1,458.33	0.0%	0.00	0.00	10,208.35	0.0%	17,500.00
5535 · Other Employee Cost	9,094.63	11,333.33	80.25%	110,328.48	75,162.33	79,333.35	94.74%	136,000.00
5540 · Depreciation	355,342.00	362,500.00	98.03%	2,507,995.00	2,487,394.00	2,537,500.00	98.03%	4,350,000.00
5545 · Insurance	28,184.00	27,608.33	102.09%	187,719.81	195,215.00	193,258.35	101.01%	331,300.00
5548 · Retiree Medical Insurance	20,922.00	27,083.33	77.25%	162,299.76	157,632.05	189,583.35	83.15%	325,000.00
5555 · Advertising & Publicity	0.00	166.67	0.0%	6,200.00	0.00	1,166.65	0.0%	2,000.00
5560 · Amortization	570.49	575.00	99.22%	3,993.43	3,993.43	4,025.00	99.22%	6,900.00
5570 · Annual Event	257.76	500.00	51.55%	3,866.19	10,733.89	3,500.00	306.68%	6,000.00
5575 · Audit	0.00	2,141.67	0.0%	21,965.00	19,100.00	14,991.65	127.4%	25,700.00
5580 · Bad Debts	0.00	1,666.67	0.0%	9,133.69	1,199.49	11,666.65	10.28%	20,000.00
5585 · Bank Charges	5,979.32	5,916.67	101.06%	36,239.50	43,350.23	41,416.65	104.67%	71,000.00
5590 · Data Processing Supply & Access	75.41	2,499.99	3.02%	13,262.18	5,660.95	17,500.05	32.35%	30,000.00
5595 · Data Processing Equipment	9,551.94	2,916.65	327.5%	25,277.57	34,475.80	20,416.75	168.86%	35,000.00
5600 · Data Processing Consultants	3,321.75	5,000.00	66.44%	1,800.00	9,246.33	35,000.00	26.42%	60,000.00
5605 · Directors Fees	10,731.00	10,583.33	101.4%	73,365.00	75,555.00	74,083.35	101.99%	127,000.00
5610 · Dues & Memberships	3,971.93	7,266.67	54.66%	46,799.91	73,326.33	50,866.65	144.15%	87,200.00
5615 · Education & Training	6,676.17	1,300.00	513.55%	5,773.60	14,731.61	9,100.00	161.89%	15,600.00
5620 · Election Expense	0.00			0.00	0.00	0.00	0.0%	0.00
5625 · Employee Service Awards	0.00	316.67	0.0%	2,850.00	-403.04	2,216.65	-18.18%	3,800.00
5630 · Software Maintenance & Licenses	17,522.55	15,416.67	113.66%	75,454.94	120,004.92	107,916.65	111.2%	185,000.00
5640 · Interest Expense	59,294.54	59,833.33	99.1%	441,378.00	415,061.78	418,833.35	99.1%	718,000.00
5645 · Janitorial	6,808.49	3,750.00	181.56%	46,428.25	47,498.69	26,250.00	180.95%	45,000.00
5650 · Legal	812.84	8,791.66	9.25%	88,374.25	58,624.36	61,541.70	95.26%	105,500.00
5655 · Meets, Conventions & Travel	210.62	2,416.67	8.72%	4,908.50	13,716.80	16,916.65	81.09%	29,000.00
5657 · Meets, Con & Travel - Directors	-211.99	3,658.31	-5.8%	3,338.00	11,330.53	25,608.45	44.25%	43,900.00
5660 · Office Supplies	210.05	1,650.00	12.73%	12,051.56	8,793.53	11,550.00	76.13%	19,800.00
5665 · Office Support	0.00				3,156.77			
5670 · Postage	191.35	1,716.67	11.15%	4,074.10	4,139.86	12,016.65	34.45%	20,600.00
5675 · Printing & Reproduction	865.45	1,550.00	55.84%	5,096.13	2,175.83	10,850.00	20.05%	18,600.00
5680 · Property Tax	145.31	425.00	34.19%	3,975.18	3,996.15	2,975.00	134.32%	5,100.00
5685 · Public Education & Outreach	1,316.93	19,683.33	6.69%	48,410.06	83,839.43	137,783.35	60.85%	236,200.00
5690 · Publications & Subscriptions	0.00	125.00	0.0%	0.00	0.00	875.00	0.0%	1,500.00
5695 · Communications	9,544.22	9,474.99	100.73%	63,092.69	71,233.16	66,325.05	107.4%	113,700.00
5700 · Utilities	2,348.22	2,150.00	109.22%	11,751.31	13,462.22	15,050.00	89.45%	25,800.00
Total Expense	2,171,910.67	2,396,269.55	90.64%	16,141,456.89	16,093,230.31	16,773,818.98	95.94%	28,755,266.73

	Jan 22	Budget	% of Budget	Jul - Jan 21	Jul '21 - Jan 22	YTD Budget	% of Budget	Annual Budget
Net Income	**-244,336.59**	**11,625.54**	**-2,101.72%**	**426,357.58**	**1,053,815.74**	**81,423.65**	**1,294.24%**	**139,479.27**

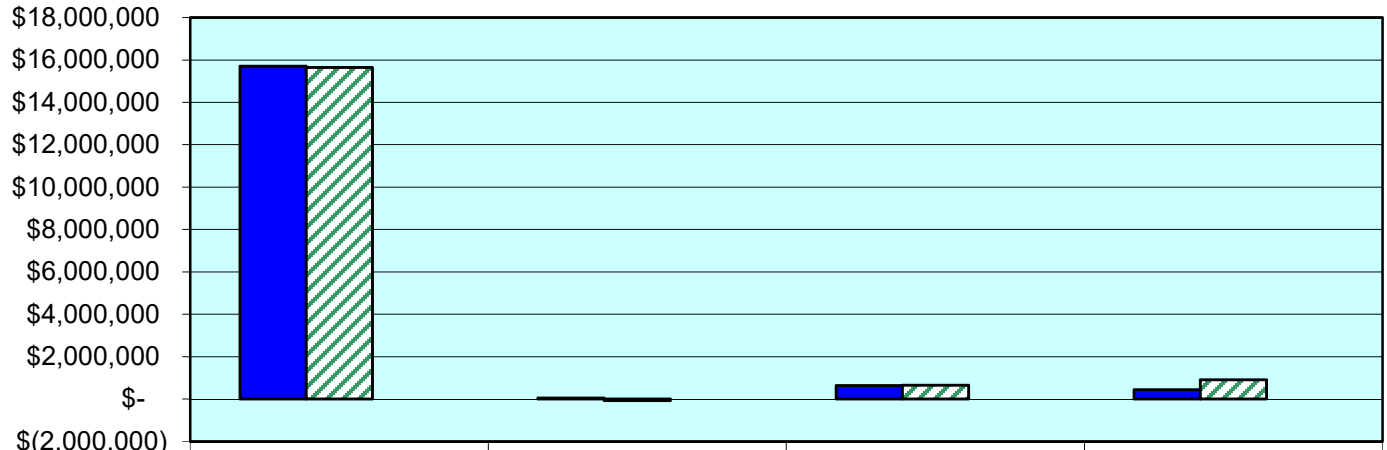


ANALYSIS OF REVENUES & EXPENSES
BUDGET COMPARED TO ACTUAL
FISCAL YEAR 2021/2022

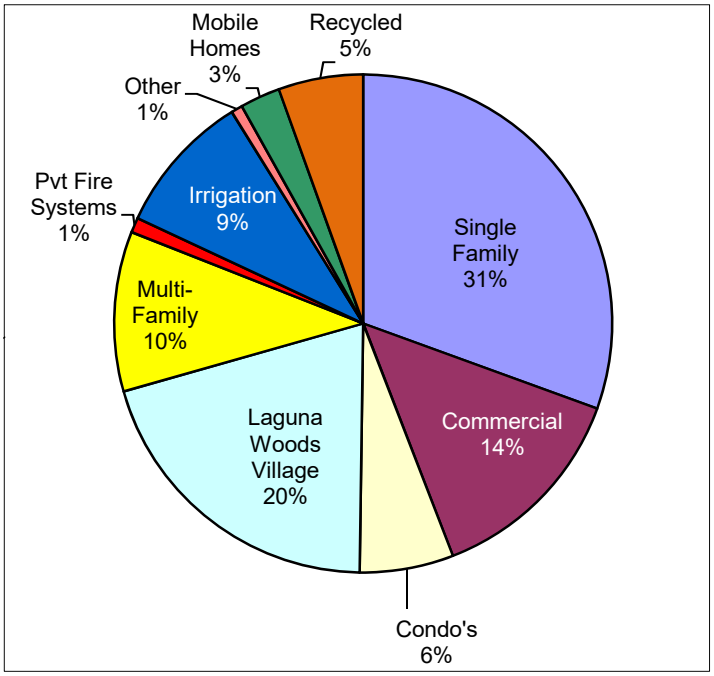
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Budget												
Revenue	2,407,889	2,407,889	2,407,889	2,407,890	2,407,895	2,407,895	2,407,895					
Expense	2,396,253	2,396,253	2,396,253	2,396,253	2,396,270	2,396,270	2,396,270					
Profit/Loss	11,636	11,637	11,637	11,638	11,626	11,626	11,626	0	0	0	0	0
Actual												
Revenue	2,694,337	2,834,487	2,557,301	2,448,880	2,137,061	2,547,406	1,927,574					
Expense	2,337,720	2,357,260	2,512,164	2,331,695	2,181,247	2,201,235	2,171,911					
Profit/Loss	356,617	477,227	45,137	117,185	(44,185)	346,171	(244,337)	0	0	0	0	0

EL TORO WATER DISTRICT
REVENUES FROM WATER & WASTE WATER SALES AS OF 1/31/22

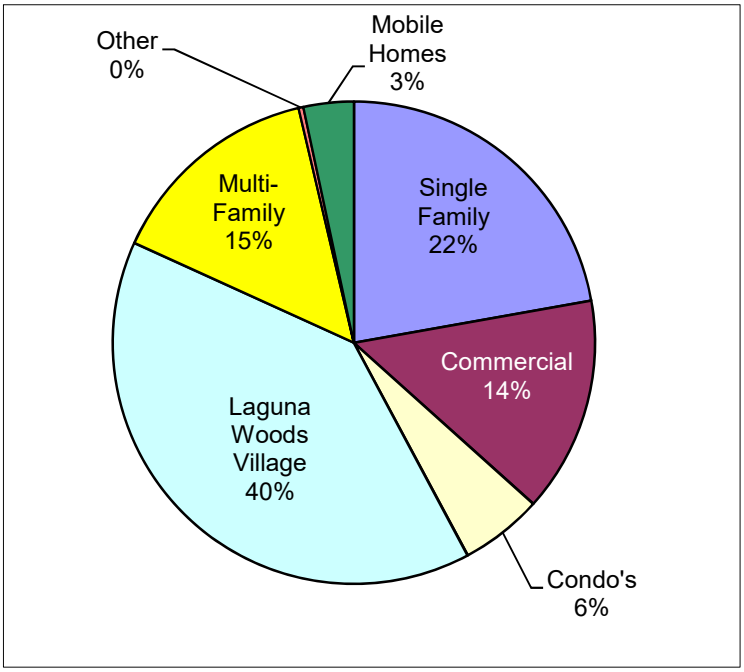
Where the Money Comes From



	Rates	Interest Income	Property Taxes	Other Non-Rate
Budget YTD	$15,711,858	$58,331	$635,827	$449,227
Actual YTD	$15,648,515	$(72,896)	$658,201	$913,225
% of Total	91.26%	-0.43%	3.84%	5.33%



WATER REVENUE YTD 2021/2022



WASTE WATER REVENUE YTD 2021/2022

EL TORO WATER DISTRICT
REVENUE COMPARISON
For the Month Ended January 31, 2022

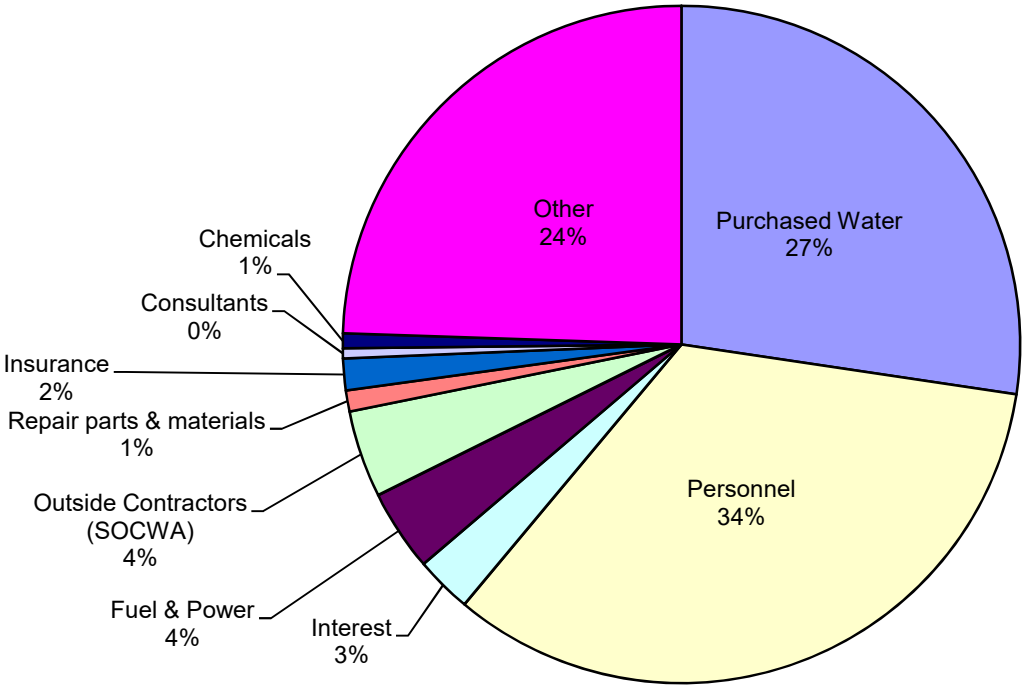
	ACTUAL	CURRENT MONTH BUDGET	VARIANCE DOLLARS	% +/-	YEAR TO DATE ACTUAL	YEAR TO DATE BUDGET	VARIANCE DOLLARS	% +/-	BUDGET	REMAINING BUDGET
From Rates										
Capital Facilities Charge	$ 250,286	$ 252,122	$ (1,836)	-1%	$ 1,753,263	$ 1,764,854	$ (11,591)	-1%	$ 3,025,468	$ 1,272,205
Water sales - Commodity	418,554	770,280	(351,726)	-46%	5,433,442	5,391,960	41,482	1%	9,243,364	3,809,922
Water sales - Fixed Meter	351,056	352,427	(1,372)	0%	2,429,406	2,466,992	(37,586)	-2%	4,229,130	1,799,724
Waste water sales	649,295	686,461	(37,167)	-5%	4,725,887	4,805,230	(79,343)	-2%	8,237,537	3,511,650
Recycled water tertiary sales	8,294	150,935	(142,641)	-95%	1,091,972	1,056,546	35,426	3%	1,811,222	719,250
Service charge - Recycled water	31,142	32,325	(1,183)	-4%	214,546	226,275	(11,729)	-5%	387,900	173,354
TOTAL FROM RATES	1,708,627	2,244,551	(535,924)	-24%	15,648,515	15,711,858	(63,343)	0%	26,934,621	11,286,106
Non-rate Revenue										
Admin fee	8,026	1,600	6,426	402%	24,248	11,200	13,048	116%	19,200	(5,048)
48 Hour notice fee	-	2,451	(2,451)	-100%	-	17,160	(17,160)	-100%	29,416.44	29,416
Restoration fee	-	370	(370)	-100%	-	2,590	(2,590)	-100%	4,440	4,440
Unpaid check fee	100	150	(50)	-33%	335	1,050	(715)	-68%	1,800	1,465
Cut lock fee	-	12	(12)	-100%	-	84	(84)	-100%	144	144
TOTAL NON-RATE	8,126	4,583	3,543	77%	24,583	32,084	(7,501)	-23%	55,000	30,418
Other Revenue										
Investment Income	(38,883)	8,333	(47,216)	-567%	(72,896)	58,331	(131,227)	-225%	100,000	172,896
Property taxes	96,859	90,833	6,026	7%	658,201	635,827	22,374	4%	1,090,000	431,799
Other	40,735	48,469	(7,735)	-16%	765,533	339,276	426,257	126%	581,625	(183,908)
TOTAL OTHER REVENUE	98,711	147,635	(48,924)	-33%	1,350,839	1,033,434	317,405	31%	1,771,625	420,786
Contract Service										
Santa Margarita W. D.	101,651	-	101,651	0%	101,651	-	101,651	0%	0	(101,651)
Moulton Niguel W. D.	10,459	11,126	(667)	-6%	21,459	77,870	(56,411)	-72%	133,500	112,041
TOTAL CONTRACT SERVICES	112,109	11,126	100,983	908%	123,109	77,870	45,239	58%	133,500	10,391
TOTAL REVENUE	$ 1,927,574	$ 2,407,895	$ (480,321)	-20%	$ 17,147,046	$ 16,855,245	$ 291,801	2%	$ 28,894,746	$ 11,747,700

EL TORO WATER DISTRICT
NON-RATE REVENUE ANALYSIS
FOR THE MONTH ENDING January 31, 2022

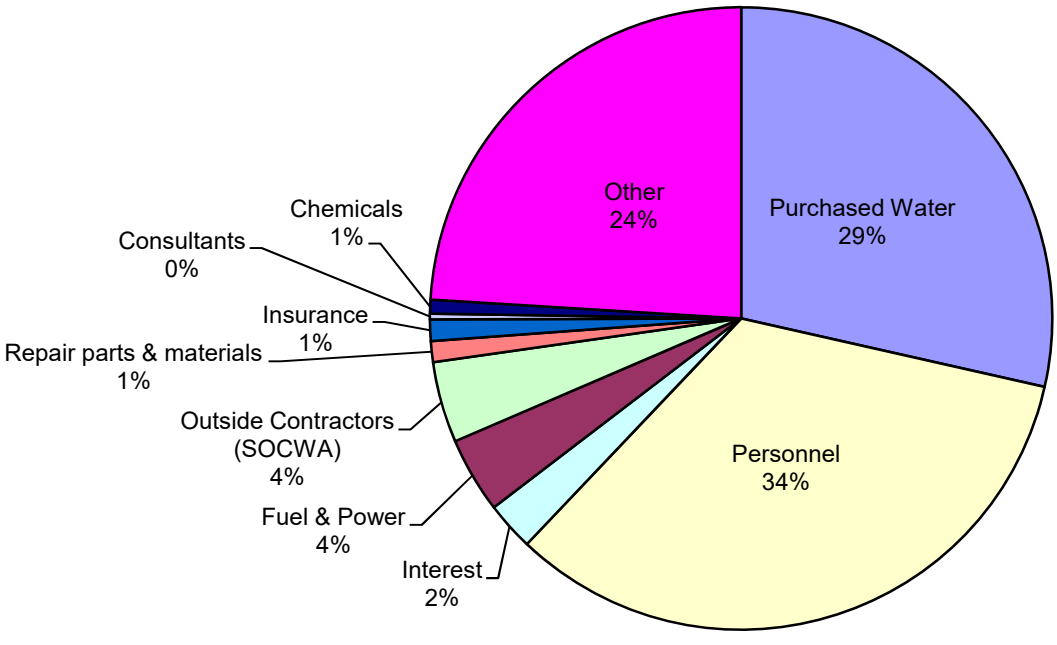
	Jan-22 Actual	Jan-22 Budget	Jul 21- Jan 22 YTD Actual	Jul 21- Jan 22 YTD Budget
Site Leases	23,153	19,582	124,214	137,074
MWD Recycled Water LRP Rebate	17,583	27,219	320,473	190,531
JPIA Refund	-	-	-	-
SOCWA Refund	-	-	317,081	-
Recycled Metal	-	-	2,367	-
Diesel Fuel Tax Refund	-	-	166	-
Sale of District Trucks	-	-	-	-
Purchase Discounts Taken		-	619	-
Misc Work for Customers	0	1,666	614	11,662
	$ 40,735	$ 48,467	$ 765,533	$ 339,267
Other Operating Income				
Sales to Santa Margarita	-		-	
Sales to Moulton Niguel	-		-	
	-		-	
Total	40,735		765,533	

WHERE THE MONEY GOES

YTD EXPENSES AT 1/31/22



EXPENSES YEAR ENDING 6/30/21



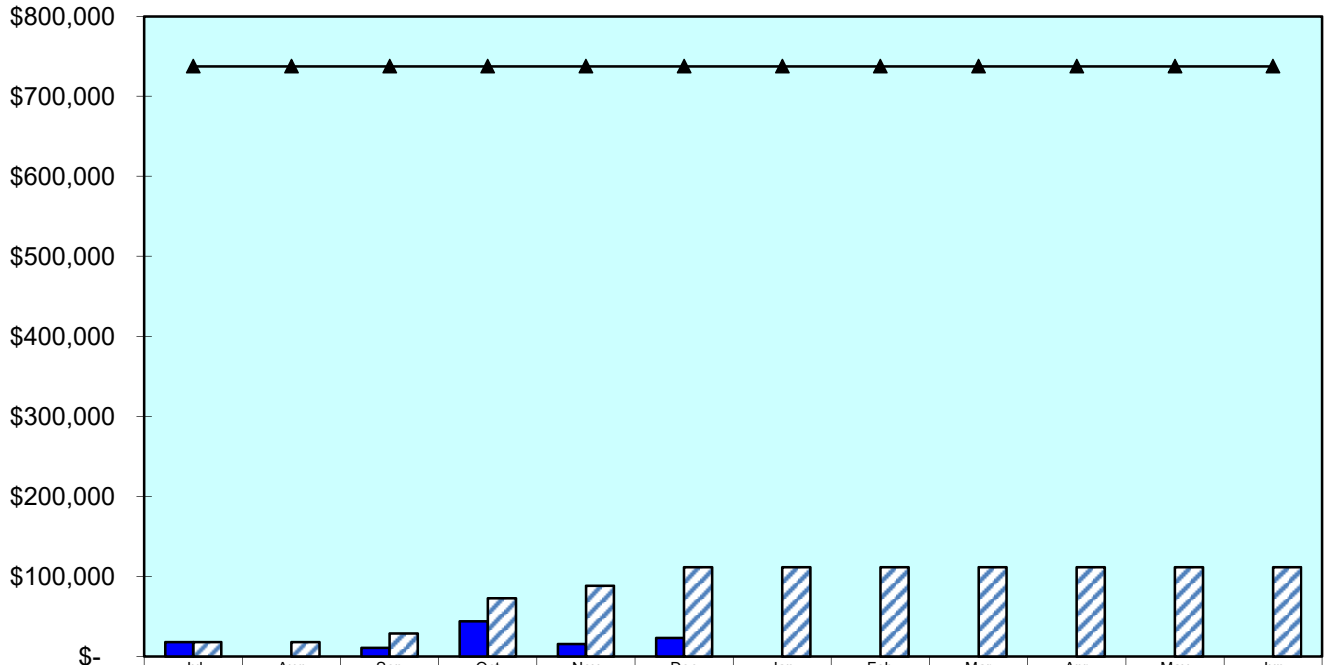
EL TORO WATER DISTRICT
Expense Comparison
For the Month Ended January 31, 2022

	ACTUAL	CURRENT MONTH BUDGET	VARIANCE DOLLARS	% +/-	YEAR TO DATE ACTUAL	YEAR TO DATE BUDGET	VARIANCE DOLLARS	% +/-	Annual BUDGET	REMAINING BUDGET
Operating Expenses										
Personnel cost	$746,082	$752,739	$6,657	1%	$5,085,048	$5,269,105	$184,057	3%	$9,032,900	3,947,852
Purchased water	493,348	677,626	184,278	27%	4,482,409	4,743,385	260,976	6%	8,131,517	3,649,108
Electrical power	121,447	104,217	(17,230)	-17%	881,583	729,517	(152,066)	-21%	1,250,600	369,017
Repair parts & materials	69,178	34,308	(34,870)	-102%	233,122	240,159	7,037	3%	411,700	178,578
Equipment repairs & maintenance	5,006	8,283	3,277	40%	44,601	57,983	13,382	23%	99,400	54,799
Pump repairs & maintenance	0	6,958	6,958	100%	12,407	48,708	36,302	75%	83,500	71,094
Motor repairs & maintenance	3,345	3,375	30	1%	3,345	23,625	20,280	86%	40,500	37,155
Electrical repairs & maintenance	-	7,642	7,642	100%	7,626	53,492	45,865	86%	91,700	84,074
Meter repairs & maintenance	0	833	833	100%	5,173	5,833	660	11%	10,000	4,827
Chemicals	16,930	19,250	2,320	12%	120,426	134,750	14,324	11%	231,000	110,574
Structure repairs & maintenance	1,470	1,863	393	21%	20,230	13,037	(7,193)	-55%	22,350	2,120
Asphalt repairs & maintenance	0	6,417	6,417	100%	11,454	44,917	33,463	74%	77,000	65,546
Consultants - outside	1,208	5,125	3,917	76%	18,852	35,875	17,023	47%	61,500	42,648
Contractors - outside	106,493	101,525	(4,968)	-5%	705,357	710,675	5,318	1%	1,218,300	512,943
Engineers - outside	12,208	5,333	(6,875)	-129%	21,722	37,333	15,611	42%	64,000	42,278
Dump fees	1,786	1,500	(286)	-19%	6,823	10,500	3,677	35%	18,000	11,177
Laboratories	1,112	2,775	1,663	60%	17,790	19,425	1,635	8%	33,300	15,510
License & permits	8,159	15,117	6,957	46%	112,995	105,817	(7,179)	-7%	181,400	68,405
Automotive fuel & oil	9,093	8,500	(593)	-7%	64,413	59,500	(4,913)	-8%	102,000	37,587
Equipment rental	815	1,617	801	50%	7,311	11,317	4,005	35%	19,400	12,089
Landscaping	9,154	13,683	4,529	33%	83,798	95,783	11,986	13%	164,200	80,402
Small tools & equipment	235	6,117	5,882	96%	29,019	42,817	13,797	32%	73,400	44,381
Security	2,936	1,600	(1,336)	-83%	4,544	11,200	6,656	59%	19,200	14,656
Operating supplies	6,819	4,933	(1,886)	-38%	31,388	34,533	3,145	9%	59,200	27,812
Safety equipment	1,350	3,458	2,108	61%	18,386	24,208	5,822	24%	41,500	23,114
Temporary help	0	1,458	1,458	100%	0	10,208	10,208	100%	17,500	17,500
Other employee cost	9,095	11,333	2,239	20%	75,162	79,333	4,171	5%	136,000	60,838
Employee service awards	0	317	317	100%	(403)	2,217	2,620	118%	3,800	4,203
Education & training	6,676	1,300	(5,376)	-414%	14,732	9,100	(5,632)	-62%	15,600	868
Total Operating Expenses	1,633,944	1,809,203	175,258	10%	12,119,314	12,664,352	545,038	4%	21,710,467	9,591,153

EL TORO WATER DISTRICT
Expense Comparison
For the Month Ended January 31, 2022

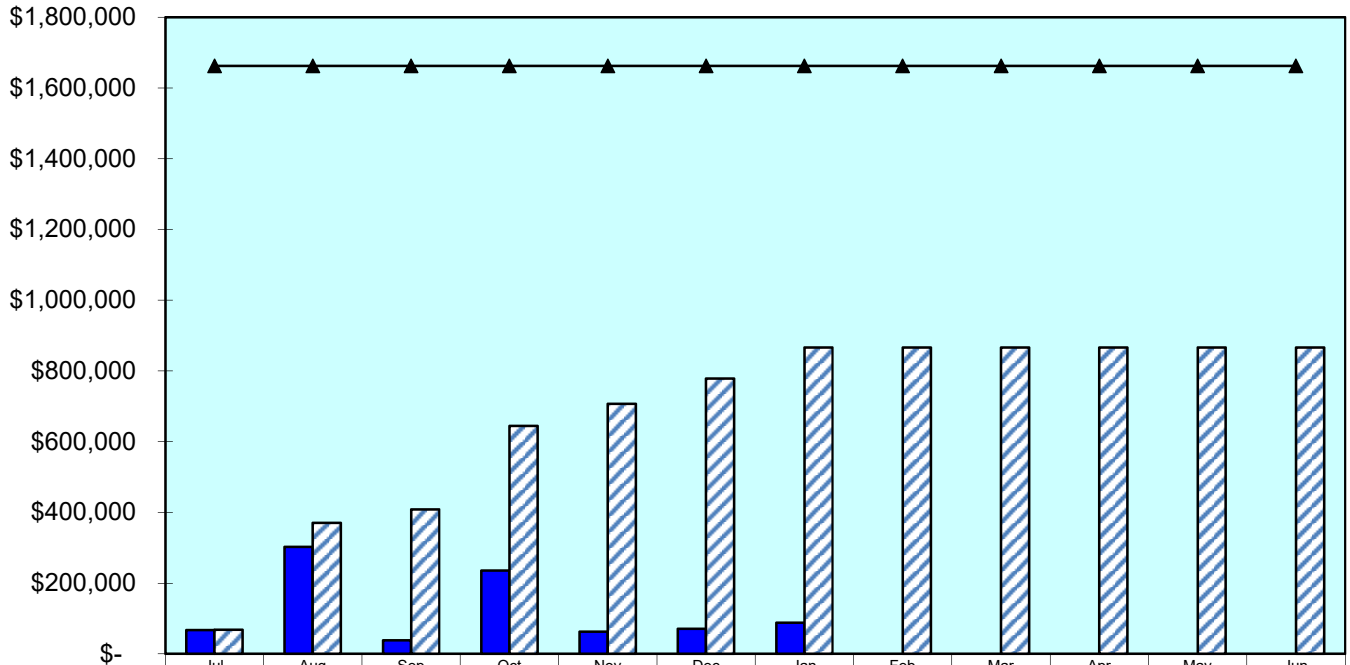
	ACTUAL	CURRENT MONTH BUDGET	VARIANCE DOLLARS	% +/-	YEAR TO DATE ACTUAL	YEAR TO DATE BUDGET	VARIANCE DOLLARS	% +/-	Annual BUDGET	REMAINING BUDGET
Indirect Cost										
Depreciation	355,342	362,500	7,158	2%	2,487,394	2,537,500	50,106	2%	4,350,000	1,862,606
Amortization	570	575	5	1%	3,993	4,025	32	1%	6,900	2,907
Insurance	28,184	27,608	(576)	-2%	195,215	193,258	(1,957)	-1%	331,300	136,085
Retiree Medical Insurance	20,922	27,083	6,161	23%	157,632	189,583	31,951	17%	325,000	167,368
Data processing supplies & assc.	75	2,500	2,425	97%	5,661	17,500	11,839	68%	30,000	24,339
Data processing equipment	9,552	2,917	(6,635)	-227%	34,476	20,417	(14,059)	-69%	35,000	524
Data processing consultants	3,322	5,000	1,678	34%	9,246	35,000	25,754	74%	60,000	50,754
Software maintenance & licenses	17,523	15,417	(2,106)	-14%	120,005	107,917	(12,088)	-11%	185,000	64,995
Janitorial	6,808	3,750	(3,058)	-82%	47,499	26,250	(21,249)	-81%	45,000	(2,499)
Printing & reproduction	865	1,550	685	44%	2,176	10,850	8,674	80%	18,600	16,424
Publications & subscriptions	0	125	125	100%	0	875	875	100%	1,500	1,500
Communications - voice	1,282	1,333	52	4%	8,735	9,333	598	6%	16,000	7,265
Communications - data	5,401	5,058	(343)	-7%	39,149	35,408	(3,741)	-11%	60,700	21,551
Communications - mobile	2,861	3,083	222	7%	23,349	21,583	(1,765)	-8%	37,000	13,651
Utilities	2,348	2,150	(198)	-9%	13,462	15,050	1,588	11%	25,800	12,338
Total Indirect Cost	455,057	460,650	5,593	1%	3,147,992	3,224,550	76,558	2%	5,527,800	2,379,808
Overhead Cost										
Annual events	258	500	242	48%	10,734	3,500	(7,234)	-207%	6,000	(4,734)
Audit	0	2,142	2,142	100%	19,100	14,992	(4,108)	-27%	25,700	6,600
Bad debts	-	1,667	1,667	100%	1,199	11,667	10,467	90%	20,000	18,801
Bank charges	5,979	5,917	(63)	-1%	43,350	41,417	(1,934)	-5%	71,000	27,650
Directors fees	10,731	10,583	(148)	-1%	75,555	74,083	(1,472)	-2%	127,000	51,445
Dues & memberships	3,972	7,267	3,295	45%	73,326	50,867	(22,460)	-44%	87,200	13,874
Election Expense	0	0	0	0%	0	0	0	0%	0	0
Interest	59,295	59,833	539	1%	415,062	418,833	3,772	1%	718,000	302,938
Legal	813	8,792	7,979	91%	58,624	61,542	2,917	5%	105,500	46,876
Meetings, conventions & travel	211	2,417	2,206	91%	13,717	16,917	3,200	19%	29,000	15,283
Meets, con & travel - Directors	(212)	3,658	3,870	106%	11,331	25,608	14,278	56%	43,900	32,569
Office supplies	210	1,650	1,440	87%	8,794	11,550	2,756	24%	19,800	11,006
Office support	-	-	0	0%	3,157	0	(3,157)	0%	0	(3,157)
Postage	191	1,717	1,525	89%	4,140	12,017	7,877	66%	20,600	16,460
Property taxes	145	425	280	66%	3,996	2,975	(1,021)	-34%	5,100	1,104
Advertising & Publicity	0	167	167	100%	-	1,167	1,167	100%	2,000	2,000
Public education & outreach	1,317	19,683	18,366	93%	83,839	137,783	53,944	39%	236,200	152,361
Total Overhead Cost	82,910	126,417	43,507	34%	825,924	884,917	58,993	7%	1,517,000	691,076
TOTAL EXPENSES	$2,171,911	$2,396,270	$224,359	9%	$16,093,230	$16,773,819	$680,589	4%	$28,755,267	$12,662,036

CAPITAL COST ANALYSIS - EQUIPMENT 1/22



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Actual	$17,882	$-	$10,762	$44,047	$15,548	$23,346	$-	$-	$-	$-	$-	$-
YTD	$17,882	$17,882	$28,644	$72,692	$88,240	$111,586	$111,586	$111,586	$111,586	$111,586	$111,586	$111,586
Budget	$737,578	$737,578	$737,578	$737,578	$737,578	$737,578	$737,578	$737,578	$737,578	$737,578	$737,578	$737,578

CAPITAL COST ANALYSIS - PROJECTS 1/22



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Actual	$67,836	$302,614	$38,281	$235,491	$62,612	$71,481	$87,947	$-	$-	$-	$-	$-
YTD	$67,836	$370,450	$408,731	$644,222	$706,834	$778,315	$866,262	$866,262	$866,262	$866,262	$866,262	$866,262
Budget	$1,662,422	$1,662,422	$1,662,422	$1,662,422	$1,662,422	$1,662,422	$1,662,422	$1,662,422	$1,662,422	$1,662,422	$1,662,422	$1,662,422

MINUTES OF THE REGULAR MEETING
& OF THE
ENGINEERING COMMITTEE MEETING

January 24, 2022

At approximately 9:40 a.m. Director Vergara called the Engineering Committee meeting to order.

Committee Members KATHRYN FRESHLEY, KAY HAVENS, MIKE GASKINS, JOSE VERGARA, and MARK MONIN participated.

Also participating were DENNIS P. CAFFERTY, General Manager, JASON HAYDEN, CFO, GILBERT J. GRANITO, General Counsel, SCOTT HOPKINS, Operations Superintendent, and HANNAH FORD, Engineering Manager.

Consent Calendar

Director Vergara asked for a Motion.

Motion: Director Monin made a Motion, seconded by Vice President Havens and carried across the Board to approve the Consent Calendar.

Roll Call Vote:

Director Vergara	aye
Director Monin	aye
Director Gaskins	aye
Vice President Haves	aye
President Freshley	aye

Engineering Action Items

There were no action items.

Engineering General Information Items

Capital Projects Status Report

R-6 Floating Cover and Liner Replacement Project

Ms. Ford stated that we are moving past the 60% design milestone, and the consultant is working on the design for the liner. She further stated that staff reviewed the 60% design submittal and conducted a site visit.

Ms. Ford stated that staff submitted the final revised design report to the Department of Drinking Water and Division Safety of Dams for review and approval. She further stated that staff is coordinating with other agencies on a contingency plan to maintain supply reliability during the time the R-6 is out of service.

Ms. Ford stated that next month staff will provide an update on the pre-purchased valve package for this project. She further stated that the cost is slightly under $200,000.

Ms. Ford stated that total project cost could be different than originally projected. Two contractors have provided their opinion of probable cost, one of which was lower than originally estimated while the other was approximately two million higher than originally estimated.

JTM Pump Station Project

Ms. Ford stated that design and CEQA coordination are underway, and staff has initiated tribal consultation.

Water and Sewer Master Plan Update

Ms. Ford stated that staff invited 6 consultants for RFP proposals for master planning services, and 5 of the consultants attended the pre-proposal meeting. She further stated that staff anticipates recommending award in February.

Ocean Outfall Pump Station (OOPS) Generator Replacement Project

Ms. Ford stated that conduit was installed and encased in concrete and the existing generator was removed. She further stated that delivery of the replacement generator is on track for April with project completion by July.

Ms. Ford stated that material delays explain higher schedule than budget expenditure, and a Change Order is anticipated for slightly over $20,000 for inclusion of an automatic transfer switch and material increases due to the pandemic delays.

WRP Effluent Pump Station Rehabilitation Project

Ms. Ford stated that staff invited 5 contractors to bid on this project, and all attended the mandatory pre-bid meeting. She further stated that bids are due next month.

Wash Press System at Headworks

Ms. Ford stated that staff expects to receive the new Wash Press equipment in March.

Aliso Creek Emergency Generator Replacement Project

Ms. Ford stated that staff is performing the design of this project and plans to invite contractors to bid next month.

Grit Chamber Rehabilitation Project

Ms. Ford stated that staff conducted a preconstruction meeting and is currently reviewing submittals.

R-2 Reservoir Interior Recoating Project

Ms. Ford stated that Associated Tank Constructors were awarded the project but plans to delay start of construction until March when the DWR grant funding is anticipated.

Filter Plant Building/WEROC EOC

Ms. Ford stated that the District and MWDOC plan to work with the architect to confirm building material type, design review, and architectural renderings.

Main Office HVAC Replacement and Improvement Project

Ms. Ford stated that Scott Wallace Structural Engineers Inc. confirmed structural requirements for roof modification to replace the 5 air conditioning units, and staff is working on obtaining pricing for the required modifications.

Director Monin asked that the engineering team investigate potential grant funding opportunities related to the pandemic for this project.

Aeration Basin Diffuser Project

Ms. Ford stated that Filanc is waiting on delivery of materials, and a preconstruction meeting will take place this month.

WRP Main Electrical Power Breakers Replacement Project

Ms. Ford stated that Schneider Electric USA Inc. is fabricating new breakers for installation in March.

Oso Lift Station Improvement Project

Ms. Ford stated that staff is reviewing project as-builts and working towards project closeout.

Mr. Cafferty indicated that staff is approaching final resolution with the City of Laguna Woods to finalize the Lot Line Adjustment for the property incorporated into the site.

Phase II Recycled Water Distribution System Expansion Project

Ms. Ford stated that MWD requested a virtual inspection of the final retrofits, and staff is working on a response to their request prior to formally closing out the project.

Energy Efficiency Analysis

Ms. Ford stated that SoCal REN provided a draft Preliminary Measure List which provided initial recommendations to optimize energy consumption. She further stated that staff reviewed the document and commented on the report and is working with SoCal REN and AESC to understand implementation costs and anticipated electrical cost savings.

Engineering Items Discussed at Various Conferences and Meetings

There were no comments.

Comments Regarding Non-Agenda Engineering Committee Items

There were no comments.

Adjournment

There being no further business, the Engineering Committee meeting was adjourned at approximately 10:15 a.m.

Attorney Report

Mr. Granito reported that there is no need for a Closed Session at today's meeting. As such, Regular Session continued.

Adjournment

At approximately 10:15 a.m. the meeting was adjourned.

Respectfully submitted,

POLLY WELSCH
Recording Secretary

APPROVED:

_____
KATHRYN FRESHLEY, President
of the El Toro Water District and the
Board of Directors thereof

_____
DENNIS P. CAFFERTY, Secretary
of the El Toro Water District and the
Board of Directors thereof

Agenda Item No. 9

STAFF REPORT

To: Board of Directors **Meeting Date: February 22, 2022**

From: Hannah Ford, Engineering Manager

Subject: Effluent Pump Station Rehabilitation Project

INTRODUCTION / BACKGROUND

Originally constructed in 1965, the Water Reclamation Plant (WRP) Effluent Pump Station (EPS) conveys excess secondary effluent to the Effluent Holding Pond. This pump station plays a critical role in the event of an Effluent Transmission Main failure, Ocean Outfall Pump Station failure, or heavy rain event when WRP flow exceeds ocean outfall capacity.

Figure 1 – Existing Condition of Effluent Pump Station

As shown in Figure 1, the aging EPS equipment is at the end of its useful life. This project would replace the existing pumps, motors, shafts, inlet isolation valves, check valves, discharge isolation valves, various connection spools, concrete pump pedestal house-keeping pads, and anchor bolts with new.

District staff self-performed this design and developed bid documents in-house. Five contractors were invited to bid in December 2021. All five attended the mandatory pre-bid meeting in January 2022. Following the pre-bid meeting and a subsequent deadline for written questions, the District issued two addenda to the original bid documents

BID EVALUATION

Staff opened three bids on Tuesday, February 8th, with the following breakdown:

J.R. Filanc Construction	$ 387,000
Pacific Hydrotech Corporation	$ 537,000
Pascal & Ludwig Constructors, Inc.	$ 516,178

The spread between the low and high bids is approximately 39 percent. Figure 3 shows the breakdown of bid costs compared to the $218,352 engineer's estimate. No additional scope has been added to the project. WRP staff are providing and facilitating the bypass pumping required as part of this project, so construction sequencing costs are minimal. However, the engineer's estimate is based on equipment quotes obtained in 2019, escalated to 2022 dollars based on 3% inflation. District staff recently learned that more recent quotes for the pumps alone (not including valves) exceeded the engineer's estimate for this project; as such, material shortages and recent market conditions account for the higher than estimated project cost.

The apparent low bid was submitted by J.R. Filanc Construction (Filanc). Staff performed a detailed evaluation of the bids and did not find any errors or other discrepancies. Filanc is a reputable contractor with whom the District has significant previous successful experience on the Oso Lift Station Rehabilitation Project and ongoing work for the Aeration Basin No. 1 Diffuser Replacement and Ocean Outfall Pump Station Generator Replacement Project.

BUDGET ANALYSIS

A summary of the total project costs is as follows:

Organization	**Description**	**Amount**
J.R. Filanc Construction	Construction Contract	$ 387,000
	Construction Contingency	$ 38,000
Total		**$ 425,000**
Project Budget		**$ 150,000**

As indicated in the previous section, the original project budget was based on old equipment quotes and did not account for recent market conditions. Despite the budget overage, the project remains an important and necessary investment in the reliability to the critical WRP treatment process. In an effort to mitigate the budget impact, staff intends to perform engineering services during construction in-house. Existing capital reserves are adequate to accommodate the budget overage.

In addition, Filanc has offered to evaluate an alternative pump type that may reduce cost for the project instead of the replace in-kind specified. District staff is working with Filanc to determine whether an alternative pump would be suitable for the WRP's needs.

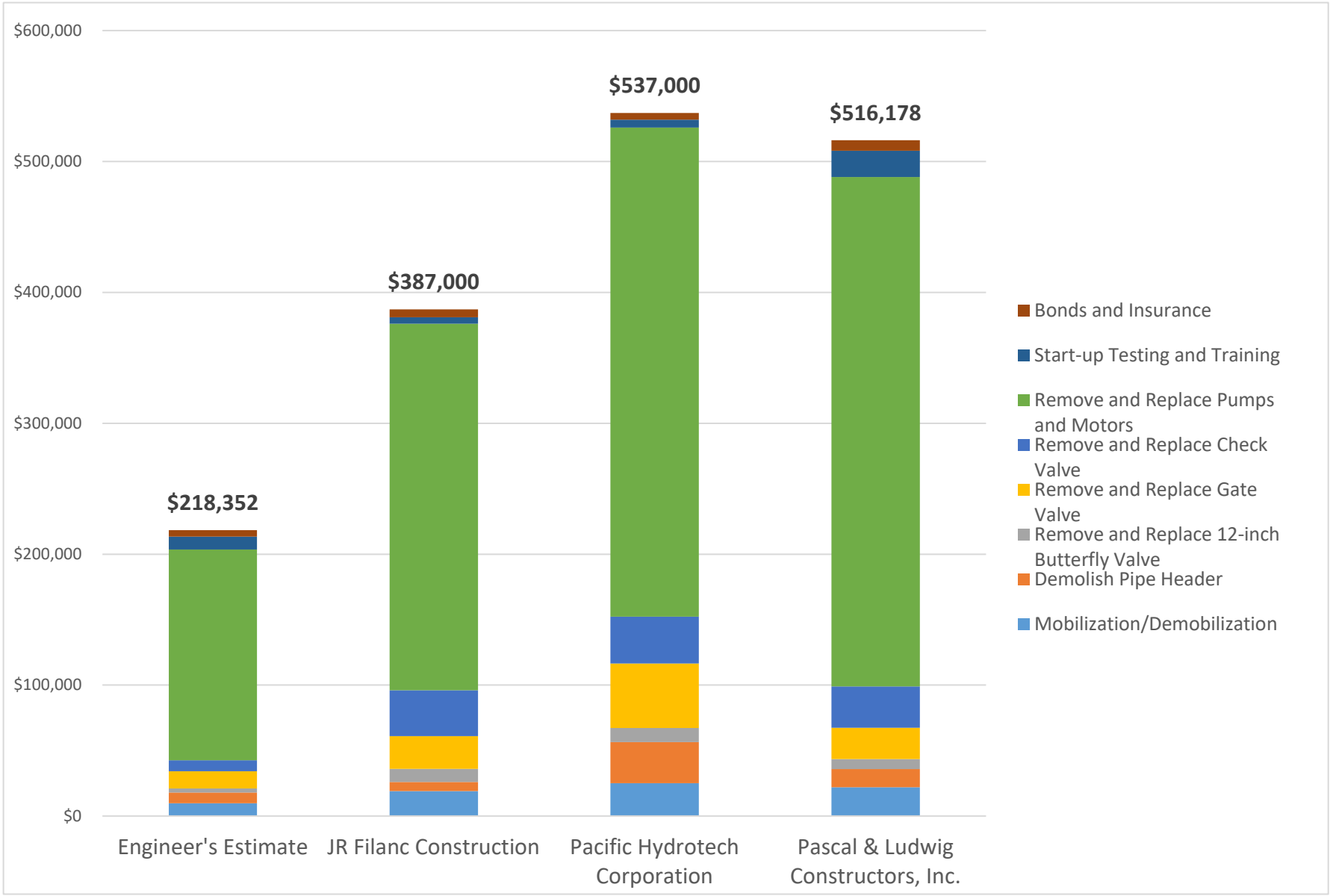


Figure 3 – Effluent Pump Station Rehabilitation Project Bid Summary

CEQA

District staff prepared and filed a Categorical Notice of Exemption with the County because the work only rehabilitates existing facilities without an increase in capacity. State CEQA Guideline Section 15301 provides exemption for the operation, repair, maintenance, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The 30-day public comment period is underway, expected to expire by the end of March 2022.

RECOMMENDATION

Recommended Action:

Staff recommends that the Board of Directors authorize the General Manager to enter into a contract with J.R. Filanc Construction Company, Inc. in the amount of $387,000 for the construction of the Water Recycling Plant Effluent Pump Station Rehabilitation Project. Staff further recommends that the Board authorize the General Manager to fund the project costs from the District's Capital Reserves in accordance with the District's adopted Capital Reserve Policy.

Agenda Item No. 10

STAFF REPORT

To: **Board of Directors** **Meeting Date: February 22, 2022**

From: **Hannah Ford, Engineering Manager**

Subject: **R-6 Reservoir Floating Cover and Liner Replacement Project**
Valves Pre-purchase Contract

BACKGROUND

Originally constructed in the 1964, the R-6 Reservoir, shown in Figure 1, provides 275 million gallons (MG) of storage for the District and its partner agencies, Santa Margarita Water District (SMWD) and Moulton Niguel Water District (MNWD). Both the liner and cover are made of reinforced polypropylene (RPP) installed 20 years ago, which equates the end of their expected useful life, so the District hired Hilts Consulting Group (HCG) to develop the final design of their replacement.

Figure 1 – Existing R-6 Reservoir

The R-6 Reservoir will be out of service during its liner and cover replacement. Because the District relies on the R-6 Reservoir for much of its operational and nearly all of its emergency storage, minimizing the duration of time the reservoir is out of service is critical. Due to market conditions, material shortages have been extending lead times and delaying construction schedules. To avoid delays and reduce the reservoir outage by two months, District staff recommend pre-purchasing long lead items (i.e., large diameter valves) for the R-6 Floating Cover and Liner Replacement Project.

PREPURCHASE PACKAGE

HCG prepared a prepurchase package including relevant drawings and specifications for the following long lead items:

- 1 x 18” Inlet Butterfly Valve with Open/Close Limit Switch and Hydraulic Actuator
- 3 x 24” Outlet Butterfly Valves with Open/Close Limit Switches and Hydraulic Actuators
- 1 x 12” Drain Ball Valve with Hydraulic Actuator
- 1 x 6” Drain Ball Valve with Hydraulic Actuator

Because the valves will be located in existing vaults with space constraints, HCG recommended sole-sourcing the valves to Henry Pratt, the existing valve manufacturer, to minimize risk of sizing conflict. To obtain optimal pricing for the District, HCG obtained an initial cost estimate from Henry Pratt and compared it to previous project cost estimates. The final proposal from Henry Pratt reflected the initial cost estimate and remained within reason compared to similar projects.

The proposed pricing is valid until February 28, 2022 and includes freight and a 24-month warranty. To maintain schedule, the manufacturer guarantees delivery in early October 2022. Table 1 summarizes the total proposed cost of the valve package. The Henry Pratt proposal is attached for reference.

Table 1 – Prepurchase Valve Package Pricing

Component	Cost
Valve Quote from Henry Pratt	$183,084
Taxes	$14,189
Total	**$197,273**

RECOMMENDATION

Recommended Action:

Staff recommends that the Board of Directors authorize the General Manager to issue a purchase order to Henry Pratt in the amount of $183,084 for the purchase of several valves to be replaced as a component of the R-6 Floating Cover and Liner Replacement Project. Staff further recommends that the Board authorize the General Manager to fund the project costs from the District’s Capital Reserves in accordance with the District’s adopted Capital Reserve Policy.

PRATT®

a MUELLER brand

401 S. HIGHLAND AVENUE, AURORA, IL 60506
TEL: (630) 844-4000 FAX:

Please reference job name or quote number on all purchase orders related to this quotation.

Date: January 28, 2022
Proposal #: Q-022-24983 **Rev:** 0
Project Name: R-6 Reservoir Floating Cover Replacement
Project Location: Lake Forrest, CA.

TO: All Bidding Contractors

Phone: TBD
Fax:TBD

Bid Date: 01/28/2022

This quotation reflects our policy of sourcing materials in the most cost effective manner. Any requirement for a specific US content may require a revised quotation.

We are pleased to submit the following proposal for your consideration:

ITEM	QTY	DESCRIPTION	UNIT PRICE	EXTENDED
1	3	24" Flange 150B Butterfly Valve, EPDM Seat, DI Body, DI Disc, 316SS Shaft, Teflon Lined Fiberglass Backing Bearing, MDT5 12x11 AWWA Non-Metallic Duracyl with Bladder Accumulator, 16 Mils Amerlock 2 Epoxy Holiday Free Interior, 16 Mils Amerlock 2 Epoxy Holiday Free Exterior, 316SS Hardware, Submersible O/C Limit Switch w/ Cable	$ 25,196.00	$ 75,588.00
2	1	18" Flange 150B Butterfly Valve, EPDM Seat, DI Body, DI Disc, 316SS Shaft, Nylatron Bearing, MDT4S 10x8 AWWA Non-Metallic Duracyl w/ Bladder Accumulator, 16 Mils Amerlock 2 Epoxy Holiday Free Interior, 16 Mils Amerlock 2 Epoxy Holiday Free Exterior, 316SS Hardware, Submersible O/C Limit Switch w/ Cable	$ 14,969.00	$ 14,969.00
3	2	Valve Panel Mounted Pilot System W/ Indicator Lights ****For Butterfly Valves.**	$ 12,200.00	$ 24,400.00
4	1	12" Flanged 150# Rubber Seated Ball Valve, Ductile Iron Body, Ductile Iron Rotor with 316 Stainless Steel Edge, 316 Stainless Shaft and Pins, EPDM Seat, Teflon Lined Fiberglass Bearings, 16 Mils Amerlock 2 Epoxy Holiday Free Interior, 16 Mils Amerlock 2 Epoxy Holiday Free Exterior, MDT4S 8x8 AWWA Non-Metallic Duracyl w/ Bladder Accumulator , 316SS Hardware	$ 29,793.00	$ 29,793.00
5	1	6" Flanged 150# Rubber Seated Ball Valve, Ductile Iron Body, Ductile Iron Rotor with 316 Stainless Steel Edge, 316 Stainless Shaft and Pins, EPDM Seat, Teflon Lined Fiberglass Bearings, 16 Mils Amerlock 2 Epoxy Holiday Free Interior, 16 Mils Amerlock 2 Epoxy Holiday Free Exterior, MDT3S 5x5.625 AWWA Non-Metallic Duracyl w/ Bladder Accumulator , 316SS Hardware	$ 17,794.00	$ 17,794.00
6	1	Valve Panel Mounted Pilot System W/O Indicator Lights ****For Rubber Seated Ball Valves.**	$ 10,200.00	$ 10,200.00
7	1	Spare 8344G54MO 4-way	$ 815.00	$ 815.00
8	1	Factory Witness Leak & Hydro Inspection	$ 2,000.00	$ 2,000.00
9	1	Start Up Includes 1 Trip(s) and 3 Day(s) of Service, Includes training.	$ 7,525.00	$ 7,525.00

Proposal Total: $ 183,084.00

****Please see below.**
****Complete package delivery will be between Oct 1st, 2022 - Oct 15th, 2022. Timely submittal review by the district is required in order to achieve this delivery date.**

DATE: 1/28/2022
PROPOSAL #: Q-022-24983
PROJECT: R-6 Reservoir Floating Cover Replacement

If you have any questions regarding this proposal, please contact our local sales representative:

Kelly Brians
Southwest Valve LLC
(714) 832-1090
,

Sincerely,

Logan Fleming
Application Engineer
lfleming@muellerwp.com

cc:
Brett Hoffman, District Manager

Commercial Terms:

FOB Point	: Kimball, TN | Cleveland, TN
Freight Terms	: PPA Pre-Pay & Allow
Payment Terms	: Net 30 Days
Price Validity	: 30 Days
Warranty	: 24 Months as defined in Terms and Conditions of Sale
Packaging	: Standard

Extended Warranty---Other than duration, Terms and Conditions of Sale shall apply
ADD 2% FOR 36 MONTH WARRANTY
ADD 3% FOR 48 MONTH WARRANTY
ADD 5% FOR 60 MONTH WARRANTY

1. Quoted Prices Exclude:

1.1 All Taxes

1.2 Flange nuts, bolts, gaskets, anchor, mounting bolts, Victaulic couplings, Mechanical Joint Accessories, thimbles, or non-standard tags.

1.3 Extension stems, soil pipes, valve boxes, covers, or “tee” wrenches

1.4 Installation.

1.5 **Exception taken to 1.3, A - We will not be obtaining certificates from or ordinances to exhibit compliance to statutes, codes, and standards from legally constituted local authorities having jurisdiction.

2. Clarifications

2.1 Standard design butterfly valve 24” and smaller have squeeze pins to affix the disc to valve shaft in lieu of taper pins with nuts and bolts.

2.2 Valves are not considered equipment, we will not be providing manufacturer’s representative for verification / written certification of proper installation, lubrication, alignment, etc.

2.3 Standard butterfly valves 20” and smaller has bonded seat-on-body design. No seat adjustment or replacement of the valve seat is required through the life of the valve, under normal conditions

2.4 Hydrostatic testing will be performed using ambient water temperature

2.5 Any additional information concerning submittals, O&M manuals, Pipe specs, etc., that were not provided at time of quote may impact price and delivery.

2.6 The quoted list of materials included herein represents our interpretation of Plans and Specifications (as provided) and is not guaranteed to be complete or correct. Prices are subject to change upon review of actual job specifications.

2.7 **Similar to Pratt Order # - S049616. El Toro Water District PO # - ETWD001880 from 2001.

**Valve Panel Mounted Pilot Systems Will Be Painted Carbon Steel.

**Limit switch cables will be provided by Pratt. Cable lengths will be per specs provided.
165’ for upper outlet valve #3
270’ for middle outlet valve #2
370’ for lower outlet valve #1
495’ for inlet valve

3. Prices are firm and proposal is valid providing:

3.1 Buyer's purchase order is received within 30 days of bid opening date. If purchase order is not received within 30 days, Seller reserves the right to re-quote and adjust price and/or delivery lead time.

3.2 Quotation assumes shipment of complete quoted material within 365 days from date of a received purchase order.

3.3 Approved drawings, if specifically required by purchase order, are returned within thirty (30) days of submittal date, with full release to manufacturing. If approved drawings are not received within 30 days, Seller reserves the right to re-quote and adjust price and/or delivery lead time.

3.4 Henry Pratt Company's Terms and Conditions of Sale apply to this quotation. A copy of our Terms and Conditions of Sale can be downloaded from https://www.henrypratt.com/sites/henrypratt.com/files/uploads/media/13313-terms-and-conditions-of-sale-pratt_9-10-2018_2.pdf.

3.5 Quoted shipping dates are estimates only based on shop loads and lead times of materials from outside vendors. Seller will meet quoted schedules or reflect currently schedules upon order acknowledgement. Lead time shall be mutually agreed to at the time of product release to manufacture and credit package approval by Seller. Seller shall not be responsible for delay in deliveries due to any cause beyond Seller's reasonable control, regardless of theory of liability.

3.6 Seller shall not be liable for Buyer's loss of profit, indirect, liquidated, incidental, or consequential damages, regardless of theory of liability. Seller's total liability shall not exceed the unit purchase price of the products supplied. Indemnification shall be limited solely to Seller's negligence.

3.7 This quotation is based on payment terms of Net 30 Days from date of invoice with no retainage. Payment terms are extended to customers who have completed a credit application, including credit agreement, and have been approved by our Credit Department. Payment must be made in advance of shipment for all other accounts.

ALL QUOTATIONS/PURCHASE ORDERS ARE SUBJECT TO RENEGOTATION IF DIFFERING TERMS AND CONDITIONS ARE STATED IN BUYER'S PURCHASE ORDER WHEN RECEIVED.

Agenda Item No. 11

STAFF REPORT

To:	**Board of Directors**	**Meeting Date: February 22, 2022**
From:	**Hannah Ford, Engineering Manager**	
Subject:	**Water and Sewer Master Plan Update**	

INTRODUCTION / BACKGROUND

Last developed in 2004, the District's Water and Sewer Master Plan is out of date an in significant need of an update. In light of demand reductions due to conservation and irrigation conversions from potable to recycled water, water age in the District's distribution system has extended, requiring frequent flushing in certain locations. Declining flows due to conservation impact the District's sewer collection system with low velocities and increased potential for odor generation. In addition, the District's water and sewer hydraulic modeling software is now obsolete and requires conversion to a supported platform.

Because the District's system and service area are essentially "built-out" (with the exception of the Laguna Hills Mall re-development), the focus of this Water and Sewer Master Plan Update will be on improving system efficiencies, correcting identified deficiencies, complying with regulatory requirements, and meeting redevelopment driven demands. In particular, the District is interested in hiring a Consultant to:

- Evaluate the efficiency and effectiveness of the existing domestic water system to continue to reduce operation, energy and maintenance costs and to maintain storage with a focus on distribution system water quality;
- Evaluate the efficiency and effectiveness of the existing sewer system to continue to reduce operation, energy and maintenance costs while maintaining or improving the integrity and reliability of the sewer collection system;
- Effectively leverage existing data, previous studies, and reports;
- Develop a fully functional and calibrated model for each of the existing water and sewer systems;
- Provide District staff with the tools to update the models in the future;
- Identify areas of improvement necessary to accommodate current and future demands, including solutions to minimize water distribution system flushing;
- Improve water quality;

- Identify projects by which the District can maintain its current level of service while reducing cost or projects which can be justified by an economic analysis depicting a reasonable payback period;
- Identify any deficiencies or maintenance problems in the District's water and sewer systems and make appropriate recommendations for improvement; and
- Address any concerns identified by District staff.

In January, the District invited a shortlist of five qualified firms to respond to a Request for Proposals (RFP) for the Water and Sewer Master Plan Update. Five consulting firms subsequently attended a pre-proposal meeting. The following describes the proposal evaluation and ultimate recommendation.

PROPOSAL EVALUATION

On Wednesday, February 9th, the District received three proposals for the Master Plan effort from Carollo Engineers, Inc. (Carollo), Arcadis U.S., Inc. (Arcadis), and Wood Rogers, Inc. (Wood Rogers). Attachment A contains a copy of each proposal, and Figure 1 summarizes the proposed fee.

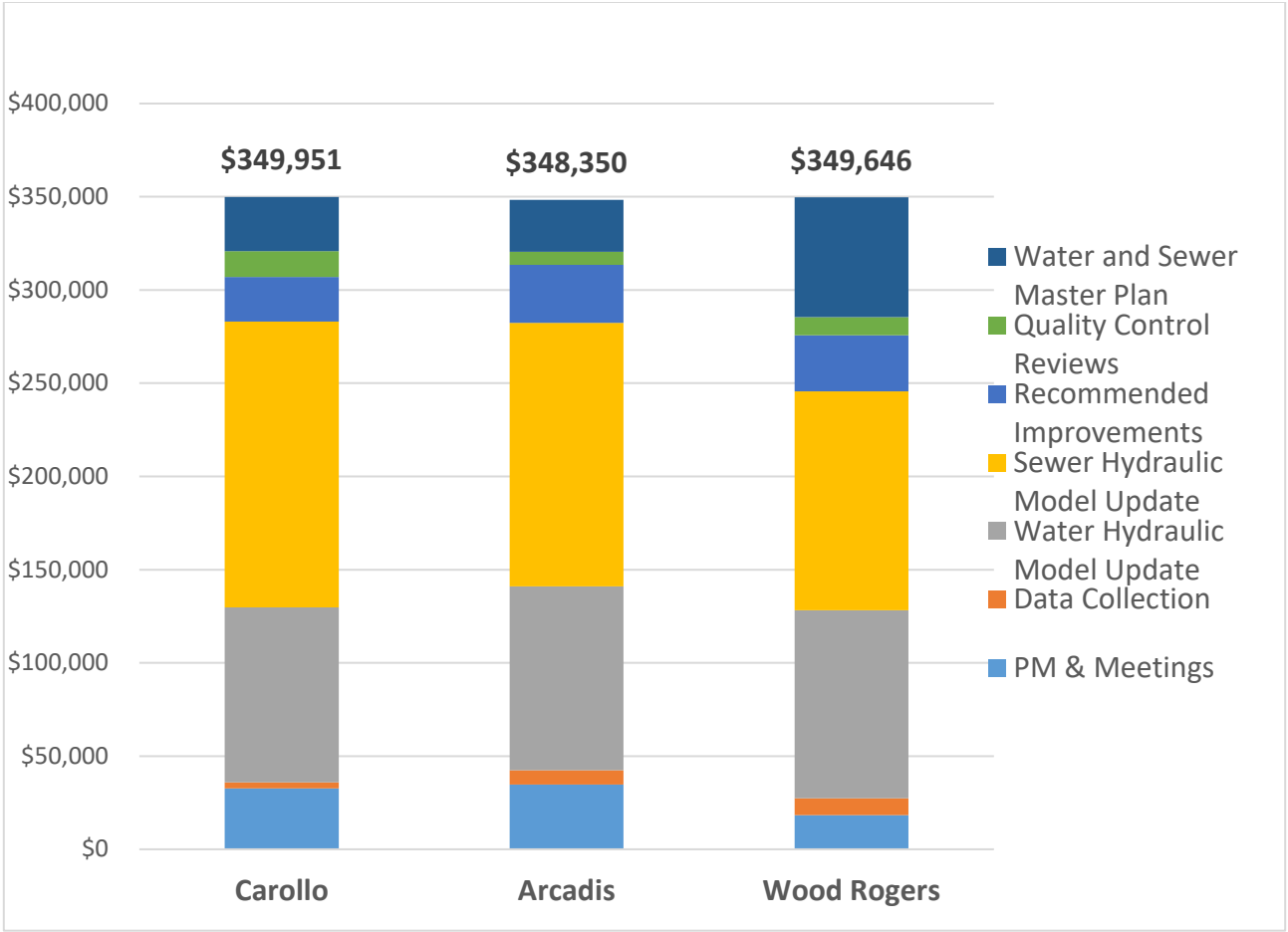


Figure 1 – Water and Sewer Master Plan Update Fee Summary

The spread between the low and high fee is incredibly low at approximately 2 percent. Each consultant that proposed is qualified to perform the work. After careful review of the proposals, District staff selected Carollo due to the following advantages:

- Extensive experience on over 400 water and sewer master plans,
- Technical project manager who has delivered over 90 similar master plans,
- Experienced team who has worked together on a multitude of similar master plans,
- High proportion of hours budgeted for experienced staff members,
- Earliest delivery schedule for recommended improvements,
- Approach to expedite sewer flow monitoring to capture this season's wet weather events,
- Approach to calibrate the water model, including installation of pressure loggers throughout the distribution system,
- Interactive, web-based visual delivery package in ESRI Story Maps to supplement the written master plan, and
- High level of quality assurance/quality control.

In addition, Carollo is a reputable consulting firm with whom the District has previous successful experience, including on the last large-scale Water Recycling Plant Improvement Project.

BUDGET

The capital budget for the Master Plan Project is $350,000. The core fee identified in the Carollo proposal is within the proposed budget.

OPTIONAL SCOPE ITEMS

The RFP requested consultants propose a scope and fee for several optional items, including a potential Board presentation and model transfer and training. The latter would serve to train District staff and transfer the selected hydraulic models for future in-house use. During the development of the Water and Sewer Master Plan Update, staff may elect to add these optional tasks to the contract for the amounts shown in Table 1. The initial award will include only the core Master Plan effort with a decision regarding the optional items to be made at a later date.

Table 1 – Water and Sewer Master Plan Update Optional Scope Items

Component	Cost
Board Presentation	$5,142
Model Transfer and Training	$11,206[1]

[1]Does not include software costs, which would be approximately $24,427 for InfoWater Pro with InfoSewer with 4,000 links each.

RECOMMENDATION

Recommended Action:

Staff recommends that the Board of Directors authorize the General Manager to enter into a contract with Carollo Engineers, Inc. in the amount of $349,951 for the update of the District's Water and Sewer Master Plan. Staff further recommends that the Board authorize the General Manager to fund the project costs from the District's Capital Reserves in accordance with the District's adopted Capital Reserve Policy.

Proposal prepared for
EL TORO WATER DISTRICT

FEBRUARY 2022

Water & Sewer Master Plan Update

carollo
Engineers...Working Wonders With Water®

Engineers...Working Wonders With Water®

3150 Bristol Street, Suite 500, Costa Mesa, California 92626
P. 714.593.5100

February 9, 2022

Hannah Ford, PE, Engineering Manager
El Toro Water District
2451 Los Alisos Boulevard
Lake Forest, California 92630

Subject: Water and Sewer Master Plan Update

Dear Ms. Ford and Selection Committee Members:

The El Toro Water District (ETWD or District) has some unique challenges to address as part of this master plan. Essentially built out, the District is focused on improving operations, water quality, and efficiency. Conducting this type of analysis requires a higher level of tool development and technical rigor exemplified by planning and modeling experts. The Carollo team is excited to have the opportunity to work with ETWD on your master plan updates for water and sewer. As such, Carollo has developed an approach and a team to address your challenges and provide you the following benefits:

- **Success through proven project leadership.** Tim Loper, Matt Huang, and Ryan Orgill are planning experts who have delivered hundreds of planning projects throughout the U.S. With a strong team of experts to support them, we offer a premier team with a history of delivering successful projects.
- **Trusted recommendations through a robust approach.** As you will see in our proposal, Carollo is specifically focused on building industry-leading tools, and conducting a focused analysis where we can develop recommendations that can be trusted. We offer a proven project approach focused on integration, as well as innovative modeling tools that provide efficient use of existing data. The recommendations provided by these plans can be trusted to provide a road map of capital projects for years to come.
- **Digital deliverables that provide flexibility and integrate with your current systems.** Carollo has focused on developing flexible digital deliverables, using ESRI Story Maps and Power BI Dashboard, which allow you to be nimble and responsive to changes in planning assumptions. These nonproprietary deliverables fit into your current planning systems and allow for easy communication to stakeholders and other key interest groups. We aren't going to recreate the wheel but we will make the systems you currently have better and more accessible.

We are excited to work with you on this critical and challenging project to develop key capital and operational improvements. At Carollo, water is all we do. Water is our passion and we are excited to continue leveraging this passion into smart, justifiable, capital programs for your water and sewer systems. We look forward to discussing our proposed scope with you in detail. Please reach out to me, project manager Tim Loper, with any questions.

Sincerely,

CAROLLO ENGINEERS, INC.

Timothy Loper, PE
Project Manager

Theresa Raasch, PE
Principal-in-Charge

Similar Experience

TAB 2

Many firms do master plans, but Carollo has perfected the approach and supporting tools to develop optimized solutions built on consensus, that are well documented and defendable.

FIRM OVERVIEW

Carollo is the largest water-focused engineering firm in the country. For more than 89 years, we have specialized in applied research, planning, design, program management and construction support for treatment facilities and infrastructure systems. We have been privileged to lead some of the most challenging projects in our business.

Our focus solely on water projects translates to a keen understanding and application of innovative and cost-effective solutions for our municipal, federal, and industrial clients. We lead with ideas and back up our work with rigorous engineering and dedication to successfully see our projects through to completion.

Because of this combination, Carollo is currently ranked in ENR's annual Source Book among the top 10 firms for water engineering services.

Integrated Master Plan Experts

Carollo is a leader in developing infrastructure master plans for cities and agencies facing complex water management challenges. We offer the District a dedicated planning team that has worked on more than 400 master plans and water resources studies. This team has prepared master plans for clients with service area populations from 5,000 to over 4 million people, ranging from small planning studies to comprehensive and even regional master plans. We have demonstrated our ability to successfully address complex technical, regulatory, and institutional issues to produce clear, cost-effective, and practical recommendations with a wide variety of stakeholders. This focused planning experience allows us to deliver high-quality reports effectively and efficiently.

Carollo has provided master planning and modeling services throughout California

Local Area Experience

As depicted above, our project team has worked on similar projects with numerous Southern California agencies and clients across the state, with a large concentration in and around the District. The tools, techniques, and recommendations developed and refined during these projects have been successfully used by our agency partners for years. As a result, the District will benefit from a resource other firms simply cannot match.

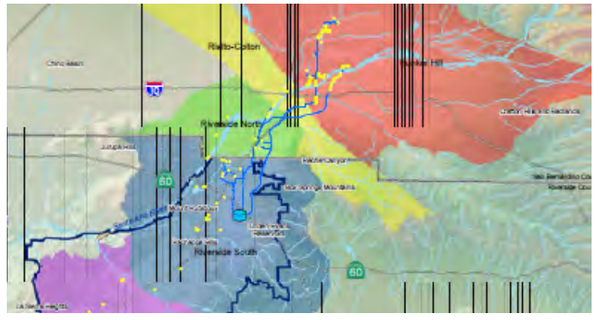
LIST OF REPRESENTATIVE PROJECTS

Carollo has established itself as a leader in the development of comprehensive and integrated utility master plans for cities and agencies facing various complex issues.

Our team has completed multiple integrated water, wastewater, and recycled water master plans for many agencies in California and hundreds of individual master plans. This integrated planning experience allows us to deliver high-quality comprehensive master plans in an efficient manner. The table below is a list of representative projects completed over the past five years. We have provided detailed project references on the following page.

SIMILAR MASTER PLANNING PROJECTS COMPLETED IN THE PAST FIVE YEARS

Client and Project Name	Water	Sewer
Padre Dam Municipal Water District, CA | Comprehensive Master Plan	●	●
City of Oceanside, CA | Integrated Master Plan	●	●
City of Riverside, CA | Integrated Water Management Plan	●	
City of Riverside, CA | Comprehensive Wastewater Master Plan	●	●
Inland Empire Utilities Agency, CA | Wastewater Facilities Master Plan Update		●
Eastern Municipal Water District, CA | Regional Water Reclamation Facility Master Plan Update		●
City of Banning, CA | Integrated Master Plan	●	●
City of Los Angeles, CA | One Water 2040 Plan	●	●
City of Oxnard, CA | Public Works Integrated Master Plan	●	●
City of Porterville, CA | Integrated Master Plans	●	●
City of Morro Bay, CA | OneWater Morro Bay Integrated Master Plan	●	●
City of Glendale, CA | Water and Recycled Water Master Plan	●	
Pasadena Water and Power, CA | Hydraulic Model Calibration	●	
City of Colton, CA | Water and Wastewater Master Plan Update	●	●
Otay Water District, CA | Integrated Resources Plan	●	●
Orange County Sanitation District, CA | Stormwater Master Plan (PS16-01)		
San Gabriel Valley Water Company, LA County and Fontana Divisions, CA | Water System Master Plan	●	
University of California, Irvine, CA | Campus-Wide Water and Recycled Water Master Plan	●	
Inland Empire Utilities Agency, CA | On-Call Hydraulic Modeling Services		●
City of South Pasadena, CA | Integrated Water and Wastewater Resources	●	●
City of Chino Hills, CA | Wastewater Master Plan		●



COMPREHENSIVE WASTEWATER MASTER PLAN AND UPDATE, RIVERSIDE, CA

Client: City of Riverside
Client Contact: Ernest Marquez, Principal Engineer
951-826-5409
emarquez@riversideca.gov
Team Members: T. Loper, R. Orgill, D. Orgill, J. Silber, V&A

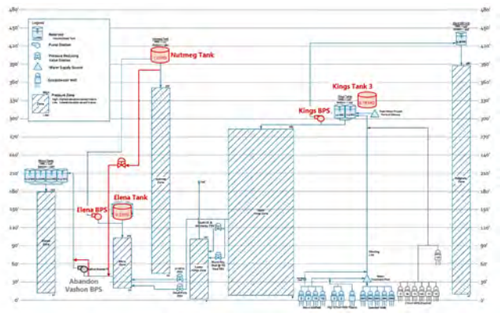
The City was facing challenges posed by aging facilities, stricter regulations, and finite resources. As a result, the City retained Carollo to update the 2008 master plan and complete a new, comprehensive collection system capacity and condition assessment to develop a well-conceived approach for near and long term City goals.

Carollo completed Riverside's Comprehensive Wastewater Master Plan, which included treatment and wastewater collection systems. Carollo built the collection system model using InfoSWMM modeling software. V&A Consulting Engineers developed a flow monitoring program with 60 flow meters and calibrated the model to the 60 metering sites, as well as flows influent to the City's 46-mgd wastewater treatment plant.

Carollo worked closely with the City to conduct a detailed review of CCTV data and incorporated the findings into the rehabilitation/replacement program funding and CIP. The system evaluation included development of a custom design rainfall event based on a significant rainfall event that occurred in the Winter of 2017. Carollo's evaluation identified existing capacity deficiencies and sized improvements based on future flows. Carollo allocated proposed project costs to existing and future users and provided guidance to the City on project prioritization and implementation.

Relevance to ETWD

- Assessment of the current and future regulatory environment.
- Flow monitoring, modeling, condition assessment, Waste Discharge Requirements GAP Analysis, and capital improvement plan development.
- Plan and development of rate/fee structure for the next five-year Proposition 218 time period.



ONE WATER MORRO BAY INTEGRATED MASTER PLAN, MORRO BAY, CA

Client: City of Morro Bay
Client Contact: Rob Livick, Public Works Director
805-772-6261
rlivick@morrobayca.gov
Team Members: T. Loper, M. Huang, R. Orgill, D. Orgill, R. Hejka, J. Silber, V&A

The City of Morro Bay contracted with Carollo to develop a OneWater Plan that evaluated the water, wastewater, and stormwater systems, as well as conducting a supply resiliency evaluation.

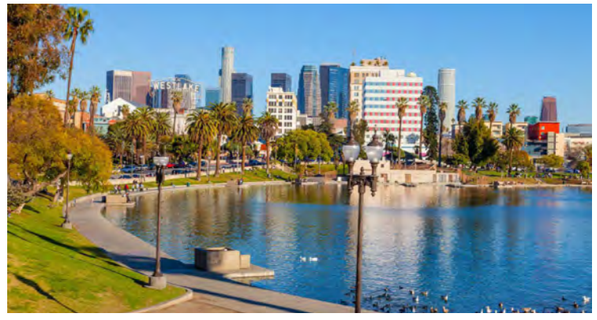
The project scope included development of hydraulic models of all three utility systems, including demand allocation, wastewater flow loading, peaking factors, and peak wet weather flow development. The water system model was calibrated to an extended period simulation using SCADA data, and data from temporary pressure loggers. The wastewater model was calibrated to flow monitoring data collected at multiple locations in the collection system as well as influent data at the wastewater treatment plant.

A significant project effort included an analysis of the City's water supply sources, including groundwater, surface water from the state water project, desalination sources, and recycled and indirect potable water source options. Carollo helped the City decide on the most resilient and cost effective source options for the future.

The project included a stakeholder involvement component where Carollo made presentations to the City Council and the Public Works Advisory Board. Through this work, Carollo was hired to assist the City in implementing the programmatic recommendations over the course of the next five years.

Relevance to ETWD

- Integrated master plan.
- Developed and calibrated hydraulic models for all three utility systems.
- Flow monitoring.



ONE WATER LA 2040 PLAN, LOS ANGELES, CA

Client: City of Los Angeles, Bureau of Sanitation
Client Contact: Ali Poosti, Division Manager, Wastewater
323-342-6228
Ali.Poosti@lacity.org
Team Members: T. Loper, M. Huang, R. Hejka, J. Silber

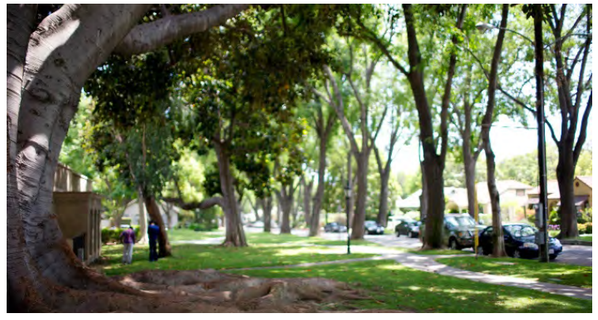
The City of Los Angeles embarked on the One Water LA 2040 Plan to provide a strategic vision and implementation plan to manage all types of water resources as "One Water." The plan ultimately guides the City with strategic and multi-billion dollar decisions for water infrastructure projects that will make Los Angeles a more water resilient and sustainable City.

The One Water LA 2040 Plan incorporates the drastic changes in the City's water landscape with increased population, substantial reductions in wastewater flows due to the success in water conservation, new stringent stormwater quality regulations, the severe statewide drought, and increasing threats of climate change on imported water supply reliability.

The Plan takes a holistic and collaborative approach, to consider all water resources from surface water, groundwater, potable water, graywater, wastewater, recycled water, and stormwater as "One Water." The plan identifies multi-departmental and multi-agency integration opportunities to manage water in a more efficient, cost effective, and sustainable manner. The project includes an extensive stakeholder outreach program involving 14 City departments, six regional agencies, NGOs, special interest groups, academia, and the general public. Carollo is the prime consultant for this project, leading a team of 20+ subconsultants, and working in close collaboration with the City.

Relevance to ETWD

- Integrated master plan.
- Developed near- and long-term policies related to water management.
- Produced a long-term alternatives analysis and strategy for integrated water management.



INTEGRATED WATER AND WASTEWATER RESOURCES MANAGEMENT PLAN, SOUTH PASADENA, CA

Client: City of South Pasadena
Client Contact: Ted Gerber, Deputy Public Works Director
626-460-6392
tgerber@southpasadenaca.gov
Team Members: T. Loper, M. Huang, R. Orgill, R. Hejka, J. Silber

The City of South Pasadena hired Carollo to prepare its first integrated water management plan, the Integrated Water and Wastewater Resources Management Plan (IWWRMP). This plan will provide a road map for the City's water, wastewater, recycled water, and stormwater infrastructure improvements through year 2050. The City was incorporated in 1888, and the majority of its water infrastructure was installed before 1950. Because of the age of the City's infrastructure, rehabilitation and replacement plans for the existing water, wastewater, and stormwater drainage system, in addition to field condition assessments of above-ground facilities and analysis of system-wide CCTV inspection of the sewer collection system, are key to the project.

Although the City is considered built out, the state has mandated building 2,200 additional housing units, which increases the population by roughly 25 percent. The master plan includes two capital improvement plan scenarios to clearly delineate the system improvements triggered by the proposed growth targets.

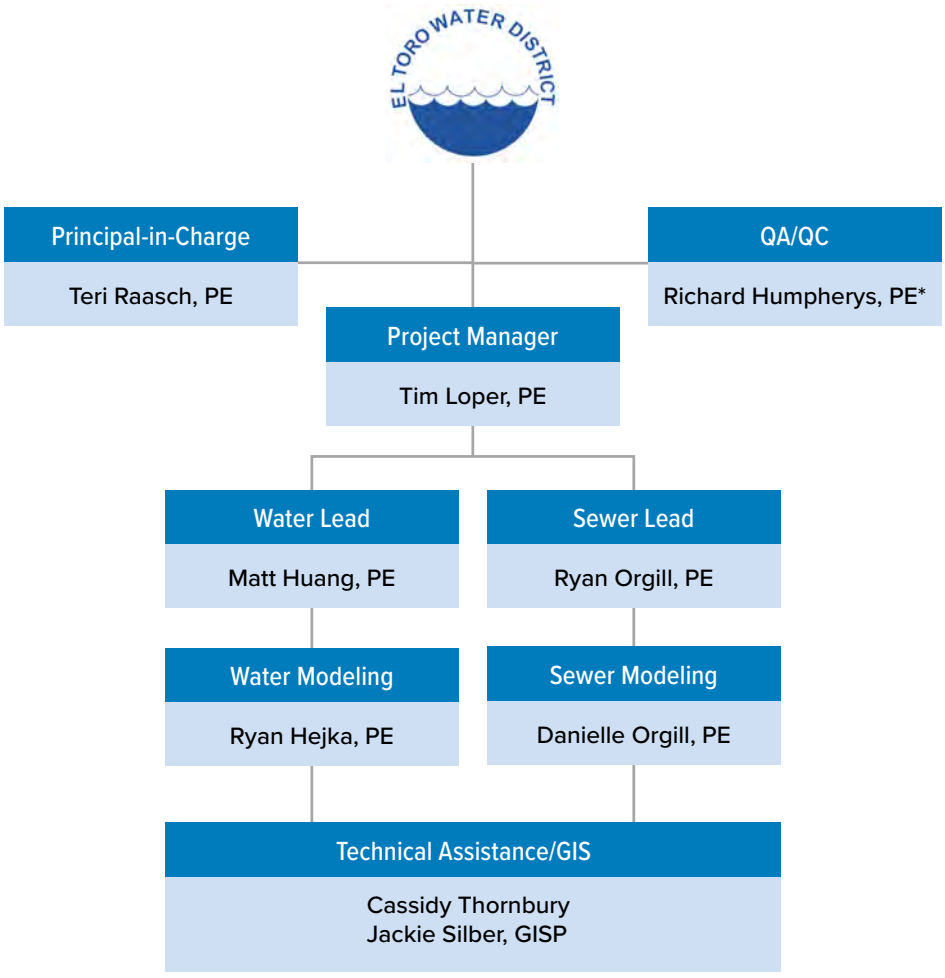
Relevance to ETWD

- Integrated master plan.
- Comprehensive water distribution model update and hydraulic analysis.
- Risk-based R&R program.
- Developed accurate sewer model based on rigorous calibration criteria.
- Developed CIP planning tool.

Key Personnel

Nothing is more important to the success of your project than the qualifications and experience of your engineering team. Simple, one-size-fits-all solutions will not meet your expectations for a thorough evaluation, sound recommendations, and quality hydraulic models to address your project needs.

Carollo is presenting a team of specialists you can trust. Our team, led by project manager Tim Loper, has worked together on past master planning and modeling projects, including the example projects provided in Tab 2. The following organization chart identifies proposed personnel and their specific roles, and illustrates how our team will work together to meet the needs of your project. Abbreviated profiles showcasing our team's qualifications and experience follow. Detailed resumes are provided in the Appendix.



Tim Loper, PE

PROJECT MANAGER

Tim is Carollo's Infrastructure Master Planning Services Lead and has been working for the past 20 years in water distribution system modeling, water system feasibility studies, and infrastructure master planning. Tim has served as project manager and/or project engineer for more than 90 water, wastewater, stormwater and/or recycled water master plans and modeling projects, with a focus on helping agencies develop capital improvement programs that help prioritize rehabilitation and replacement projects, as well as integrate capital with inspection and funding prioritization.

Tim will be your primary point of contact throughout the project. His understanding of the planning process and team management will help the District develop its guiding framework and processes for years to come.

RELEVANT EXPERIENCE

- Collection system lead for the City of Riverside, California, Comprehensive Wastewater Master Plan.
- Project engineer for the City of Oceanside, California, Integrated Master Plan.
- Project engineer for the EVMWD, California, Wastewater Master Plan.
- Project manager for the City of Torrance, California, Sewer System Master Plan and SSMP.
- Quality control engineer for the City of Banning, California, Water and Wastewater Master Plan.

Richard Humpherys, PE

QA/QC

Richard is a national modeling and master planning leader and has dedicated his 33-year career to hydraulic modeling as well as planning, asset management, and capital improvement plans for utilities. For the past 20 years, his master planning work, which includes dozens of major master plans, has given him the ability to effectively provide Carollo's team with valuable insight. During this time, he has solved many difficult hydraulic challenges in water distribution and wastewater collection systems using the leading modeling programs.

As the QA/QC reviewer, Richard will closely review each of the deliverables for technical accuracy and efficiencies.

RELEVANT EXPERIENCE

- Technical advisor for the Padre Dam Municipal Water District, California, Comprehensive Facilities Master Plan.
- Technical review for the City of Garden Grove, California, Water Master Plan.
- Project manager for the City of Goodyear, Arizona, Integrated Water Master Plan.
- Project manager for the City of Page, Arizona, Integrated Water Resources, Water, Wastewater, and Reclaimed Water Master Plan.

Teri Raasch, PE

PRINCIPAL-IN-CHARGE

Teri is a design manager with extensive experience in planning, design, and construction services for new or retrofit wastewater treatment facilities. She focuses superior client service and leading the team to produce high quality work. Teri also has expertise in hydraulic analysis and has developed hydraulic models and cost-saving hydraulic solutions for complex treatment plants across the nation.

As principal-in-charge, Teri will be available to the District to make sure your expectations are met, deliverables are of the highest quality, resources are available, and contractual obligations are met.

RELEVANT EXPERIENCE

- Design manager for the County of Hawaii, Hawaii, Hilo WWTP Digestion, Solids Handling, and Headworks Improvements Project.
- Project engineer for grit system and oversight of hydraulics modeling for the San Francisco Public Utilities Commission (SFPUC), California, Southeast Plant 250-mgd Headworks.
- Hydraulics engineer for Orange County Sanitation District, California, Facilities Master Plan.
- Assistant project manager for Orange County Sanitation District, California, Primary Sedimentation Basins Reliability Improvements.

Matt Huang, PE

WATER LEAD

With more than 20 years of experience, Matt is an expert in water and recycled water hydraulic modeling and master planning. He has provided system analysis and hydraulic modeling for more than 150 planning and design projects, with projects in 14 states and seven foreign countries.

Matt serves as Carollo's Infrastructure Planning Quality Assurance Lead, Distribution System Modeling/Master Planning Lead, and on the American Water Works Association's Engineering Management Applications Committee. He has been involved in numerous groundwater studies and water supply studies, in addition to water system hydraulic modeling and master planning.

RELEVANT EXPERIENCE

- Project engineer for the City of South Pasadena, California, Integrated Water and Wastewater Master Plan.
- Project engineer for San Gabriel Valley Water Company, Los Angeles and Fontana Divisions, California, Water System Master Plan.
- Senior hydraulic modeler for Cucamonga Valley Water District, California, Water Master Plan.
- Project engineer for City of Fountain Valley, California, Water Master Plan.
- Project engineer for Elsinore Valley Municipal Water District, California, Water System Master Plan.

Ryan Orgill, PE

SEWER LEAD

Ryan brings 17 years of experience dedicated specifically to infrastructure master planning projects and serves as Carollo's company-wide lead for sewer system modeling, calibration, and system analysis. He developed Carollo's means and methods for sewer system planning that have been adopted company-wide and is an expert in delivering projects that incorporate all critical elements of collection system capital program needs. Ryan has worked with Tim Loper on more than 40 master planning projects.

Ryan's experience working for agencies across the U.S. brings a deep understanding of the elements of supply and demand projections required to develop the guiding policies for long-term management of the District's supply portfolio.

RELEVANT EXPERIENCE

- Project engineer for the City of Riverside, California, Comprehensive Wastewater Master Plan.
- Project manager for the Padre Dam Municipal Water District, California, Integrated Master Plan.
- Project manager for the City of Chino Hills, California, Wastewater Master Plan.
- Project engineer for the City of Morro Bay, California, One Water Morro Bay Integrated Master Plan.
- Quality control engineer for the City of South Pasadena, California, Integrated Water and Wastewater Master Plan.

Ryan Hejka, PE

WATER MODELING

Ryan is a civil engineer specializing in water, wastewater, and recycled water system hydraulic modeling and master planning projects, having delivered on 25 relevant projects over his decade of experience. He is skilled in the use of a wide variety of hydraulic modeling packages including InfoWater, Mike Urban, and WaterGEMS. In addition, he has extensive experience with ArcGIS and proficient in multiple programming languages that he utilizes to build customized water optimization models and tools such as Blue Plan-it® for water agencies and integrated plan clients.

RELEVANT EXPERIENCE

- Hydraulic modeler for San Gabriel Valley Water Company's Fontana Division, California, Water Master Plan.
- Staff engineer for the City of South Pasadena, California, Integrated Water and Wastewater Master Plan.
- Staff engineer for the City of Los Angeles, California, One Water LA 2040 Plan.
- Staff engineer for UC Irvine, California, Water and Recycled Water Master Plan.
- Staff engineer/modeler for the City of Oceanside, California, Integrated Water, Wastewater, and Recycled Water Master Plan.

Danielle Orgill, PE

SEWER MODELING

Danielle will provide sewer modeling services for this project. She has eight years of experience in infrastructure design, modeling, and planning and has assisted with master planning and evaluation studies for water, sewer, and storm drainage systems. Danielle has experience in data management, analysis, hydraulic modeling, and GIS. She has extensive experience with a variety of water distribution and wastewater collection hydraulic modeling packages.

She has recently worked on water system hydraulic modeling projects for the cities of Morro Bay and Lemoore, and the Vallejo Flood and Wastewater District.

RELEVANT EXPERIENCE

- Project engineer for the City of Chino Hills, California, Wastewater Master Plan.
- Hydraulic modeler for the City of Morro Bay, California, One Water Morro Bay Integrated Master Plan.
- Hydraulic modeling engineer for the City of St. Helena, California, Integrated Utilities Master Plan.
- Project engineer for Vallejo Flood and Wastewater District, California, Wastewater Collection System Master Plan Update.
- Project engineer for the South Tahoe Public Utility District, California, Sewer System Hydraulic Model.

Jackie Silber, GISP

GIS

Jackie is a GIS lead with 20 years of professional experience in GIS and technical training. Her experience includes GIS support for water resource planning, environmental remediation sampling, and demographic forecasting projects. Her GIS skills focus on geodatabase design and optimization, manipulation and conversion of projections, CAD and KML to GIS conversion, spatial analysis, automation of repetitive analysis using Model Builder and Python, and creation of cartographic figures.

Jackie has worked on numerous master plans by preparing GIS maps as well as sophisticated GIS analysis to support land use-based water demand forecasting, model development, and spatial water system analysis.

RELEVANT EXPERIENCE

- GIS specialist for EVMWD, California, 2021 Sub basin Groundwater Sustainability Plan.
- GIS specialist for the West Basin Municipal Water District, California, 2020 Recycled Water Master Plan Update.
- GIS specialist for the San Gabriel Valley Water Company, California, Water System Master Plan Update.
- GIS specialist for the Padre Dam Municipal Water District, California, 2020 Integrated Water Master Plan and Urban Water Management Plan.

Cassidy Thornbury

TECHNICAL ASSISTANCE

Cassidy is an environmental engineer, assisting Carollo's multi-disciplinary teams on water, wastewater and infrastructure projects providing planning, modeling, designing, and cost estimating services. She participated on the project teams for the City of San Diego's Sewer System Management Plan, hydraulic modeling studies for Cucamonga Valley Water District, and the Ramona Municipal Water District's Water Master Plan.

V&A Consulting Engineers (V&A)

FLOW MONITORING

V&A consulting engineers

V&A is a multi-disciplined engineering organization specializing in evaluating, rehabilitating, and preserving municipal infrastructure in the water, wastewater, and transit industries. V&A has supported municipalities and agencies in managing their water and wastewater collection systems and mitigating sanitary system overflows.

They have completed more than 100 sanitary and stormwater flow monitoring projects in the past five years alone in support of master planning studies, totaling more than 1,200 flow monitoring locations. Carollo has worked with V&A, and specifically with **Kevin Krajewski,** on more than 50 planning and modeling projects within the last 10 years, including the City of Torrance Sewer Master Plan, the City of Chino Hills Wastewater Master Plan Update, and the West County Wastewater District's Master Plan.

CURRENT AND FUTURE WORKLOAD

Carollo actively recruits staff who share our passion and culture as a water-only engineering firm. As the top-ranked firm in ENR's Top 500 that practices exclusively water/wastewater engineering, Carollo remains the employer of choice for such candidates.

This affords us a distinct advantage in matching current and future staff levels with workload in the most efficient and practical manner. We are firmly committed to dedicating both local resources and firm-wide expertise to meet the District's needs. Not only does our team have the capacity to take on this Water and Sewer Master Plan Update project (as shown by the availability table below), we are also motivated and eager to demonstrate what we can do.

CURRENT WORKLOAD AND AVAILABILITY

Team Member	Role	Availability for ETWD
Tim Loper, PE	Project Manager	30%
Teri Raasch, PE	Principal-in-Charge	25%
Richard Humphreys, PE	QA/QC	15%
Matt Huang, PE	Water Lead	35%
Ryan Orgill, PE	Sewer Lead	30%
Danielle Orgill, PE	Sewer Modeling	30%
Ryan Hejka, PE	Water Modeling	40%
Cassidy Thornbury	Technical Assistance	50%
Jackie Silber, GISP	GIS	40%
Kevin Krajewski, PE	Flow Monitoring	30%

Carollo maintains a resource projection database that our project managers update on a monthly basis. Through this process we are able to accurately assess workloads and staff projects to meet our commitments.

Project Approach

TAB 4

The Carollo team will bring the ETWD a combination of in-depth knowledge of your existing water and sewer systems and innovative, best-in-class planning tools, and a detailed capital improvement plan (CIP).

PROJECT UNDERSTANDING

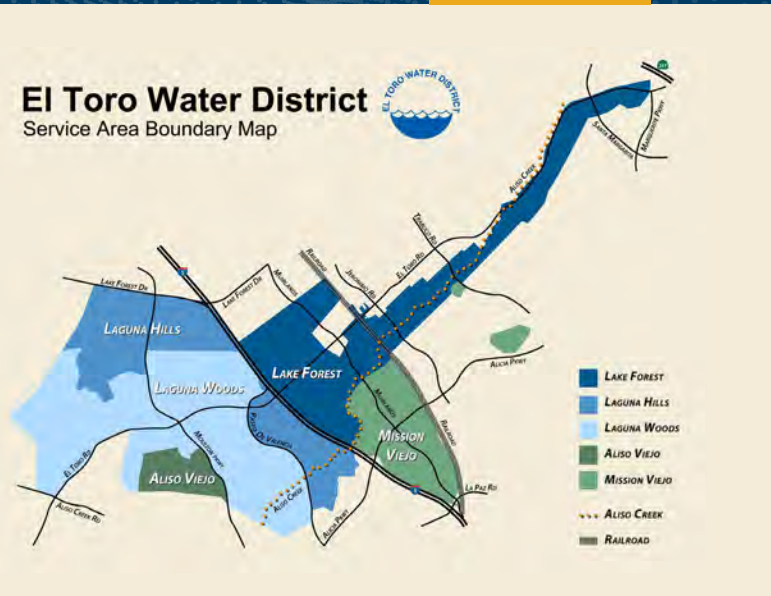
ETWD is looking to hire an engineering consultant to develop water distribution and wastewater collection system master plans. The District owns and operates water, wastewater, and recycled water systems that serve approximately 50,000 customers in the cities of Alisa Viejo, Lake Forest, Laguna Hills, Mission Viejo, and Laguna Hills.

The District utilizes three separate imported water sources. Water is distributed to its customers through 170 miles of pipelines that range from 4 to 24 inches in diameter. Collected wastewater is conveyed in 120 miles of gravity sewer ranging in diameter from 4 to 24 inches. The District also has 11 lift stations to convey flow to the ETWD Water Recycling Plant (WRP).

The District's service area is nearly built out, and growth is not a significant driver for capital project needs. The challenges moving forward for ETWD staff revolve around decreased water demand due to conservation and recycled water conversions, system operational efficiencies, mitigation of existing system deficiencies, complying with future regulatory drivers, or responding to redevelopment needs within the five incorporated cities.

The development of a long-range plan that incorporates project recommendations into a capital improvement plan requires a robust execution plan, as well as thoughtful development of advanced and accurate planning tools. The selected project team will need to meet multiple challenges:

- Execution of an efficient project workflow.
- Water and wastewater model allocation based on meter billing data.



ETWD provides service to five incorporated communities in Orange County. Diverse operational issues, redevelopment, and regulatory drivers created the need to evaluate system performance. Carollo's expert master planning team and understanding of District needs will provide efficient project execution and reliable project recommendations.

- Development of a highly accurate water model that can be used for operational and water quality analysis.
- Implementation of a sewer model calibration plan that focuses on accuracy of hydraulic grade.
- Development of a water quality modeling approach that focuses on storage.
- Development of flexible deliverables that enable the District to be nimble and adapt to proposed operational and planning changes.

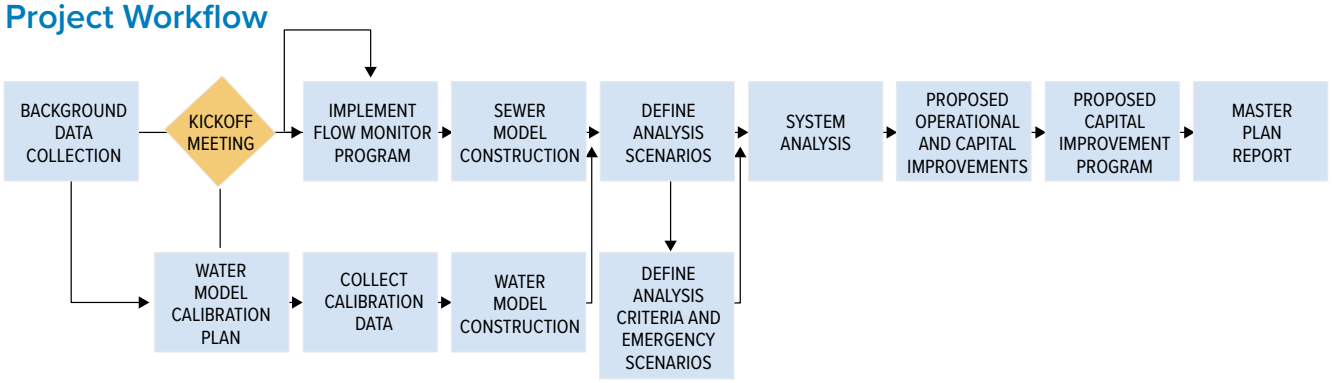
Carollo's approach focuses on the development of robust tools that allow the District to confidently develop operational changes and implement recommendations that include increased efficiencies. Unlike traditional master plans that focus on developing capital projects to serve future growth, ETWD is looking to develop a long-range plan to increase efficiencies, improve water quality, and manage its wastewater collection system based on best practices. We highlight our unique approach to helping the District reach these goals on the following pages.

PROJECT APPROACH

A Focused Workflow Paves the Way for Project Success

The development of an integrated water and sewer plan involves multiple moving parts and requires close coordination with District and Carollo staff. Carollo's focused work plan provides the road map to a successful project execution. Our focus is to build tasks with appropriate workshops and outcomes to minimize rework and provide results in a timely and efficient manner.

Project Workflow

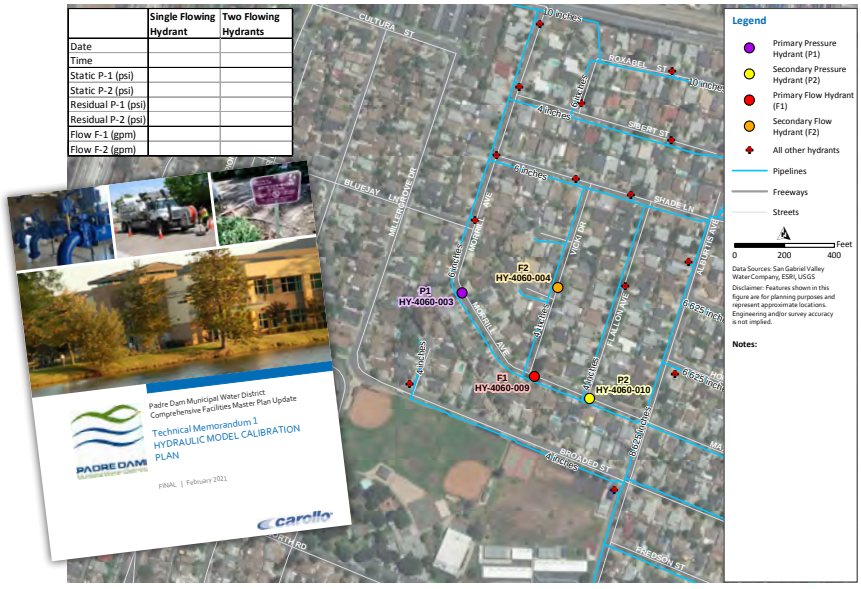


DATA AND OUTCOMES	• Data collection matrix • Agenda, minutes, action item list, and decision log	• Flow monitoring locations and durations • SCADA data requirements • Production and consumption data • Pressure logger installation • Agenda, minutes, action item list, and decision log	• Water planning and analysis criteria • Wastewater planning and analysis criterion • Workshop presentation and decision log	• Deficiencies • Emergency supply and system requirements • Sewer deficiencies • Proposed operational improvements • Agenda, minutes, action item list, and decision log	• Proposed capital projects • Proposed program costs • Meeting minutes, action item list, and decision log	• Draft and final master plan report • Electronic CIP
MEETINGS AND WORKSHOPS	• Kickoff Meeting	• Calibration Plan Workshop	• Criteria and Emergency Scenarios Workshops	• System Analysis and Proposed Improvements Workshop	• Proposed Improvements Workshop	

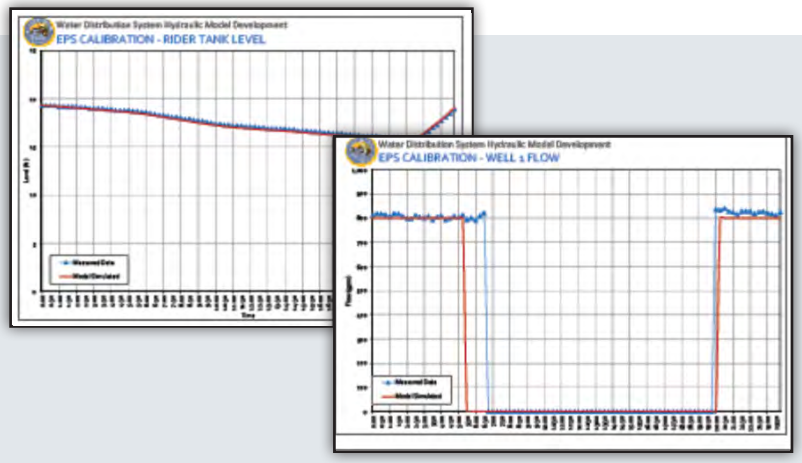
Carollo's work flow provides clear task sequences to focus effort and provide results in an efficient and timely manner.

Carollo's Water Model Development Approach Provides Detail and Rigor for Operational and Water Quality Analysis

ETWD has some unique challenges that will require a more comprehensive and robust model development process. Developing water models that will be used for operational and water quality modeling requires a higher level of calibration rigor. The model calibration process needs to include a detailed system operational review with District staff, the development of a detailed calibration plan, and detailed discussion and validation through meetings with District staff.



Carollo developed a detailed water distribution model calibration plan for the Padre Dam Municipal Water District that documented SCADA data collection specifics related to facility data needs and timing. Carollo also plans to install temporary pressure loggers in the distribution system to validate model simulation results.



The District would like to use its water system hydraulic model to conduct complex operational analyses, including simulating the impacts of operational changes to system hydraulics and water age impacts. These types of analyses require a vigorous model calibration approach to provide meaningful model simulation results. EPS calibration is a critical step for model accuracy. Our calibration approach provides confidence that the results provided by the hydraulic model are reliable.

EPS calibration performed for the City of Watsonville demonstrated how the water model can accurately predict storage levels and supply.

3-Step Water Model Calibration Process Provides Best in Class Model Accuracy

Carollo's water model extended period simulation and calibration process includes three critical steps:

1. Macro-Calibration. Initial model results will be compared with typical system pressures and water level fluctuations in reservoirs per input from the District's operations staff to verify that the model output is in the right ballpark. This stage is focused on eliminating any fatal flaws such as major connectivity or controls issues. Carollo will prepare "heat maps" to show pressure, velocity, and flow rate ranges and extremes to make it easier for ETWD staff to provide feedback on the initial model output.

2. Extended Period Simulation (EPS) Calibration. The purpose of EPS calibration is to adjust facility controls to obtain a model that accurately mimics system operations over extended periods, such as 24 hours or even multiple months for water age and water quality analysis. SCADA output in 15-minute or hourly intervals from the ETWD's water reservoir levels and pump station flows will be compared with the model results in the same time intervals. In addition, Carollo owns 16 remote pressure loggers that will be made available to the District to supplement the SCADA data for the EPS calibration.

3. Fire Flow Calibration. The purpose of this stage is to adjust pipeline roughness coefficients (C-factors) for various groups of pipelines by age, material, and diameter. Static and residual pressures from fire flow tests will be compared and model adjustments will be made to closely match model and field results.

Carollo has successfully completed EPS calibrations for dozens of water models using this three-step approach. The remote pressure loggers have proven to be extremely helpful in identifying "strange" discrepancies between field data and model results that were then resolved during the model calibration process. We will work closely with ETWD's operations staff during this project to do the necessary detective work to resolve any discrepancies between field and model data. By working together, the model not only gets more accurate, but ETWD staff will also better understand how the model works and trust the tool to perform hydraulic analysis and make important decisions.

Pulling it All Together

We understand the importance of the water model development process to the success of your long-term hydraulic modeling program. It starts with the selection of the right hydraulic modeling software program, and confirming the modeled network accurately represents the infrastructure in the ground. Configuring the hydraulic model to run complex operational scenarios is essential to help meet the District's operational challenges, such as water age issues.

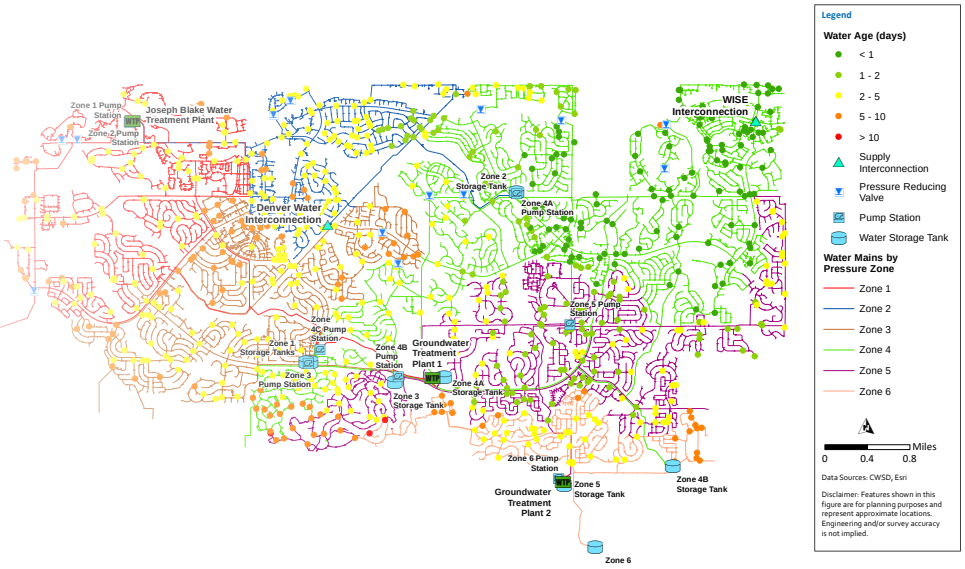
Collaboration with District staff is essential during the model construction process. Nobody knows the intricacies of the water distribution system better than your operations and engineering staff. The hydraulic model must tap into this institutional knowledge to the greatest extent possible.

As you know well, simply developing a hydraulic model does not guarantee quality analysis results. A robust model calibration process is critical to provide confidence amongst all project stakeholders in the accuracy of the hydraulic model results.

Carollo's Water Quality Modeling Experience Provides ETWD with Confidence in Operational Recommendations

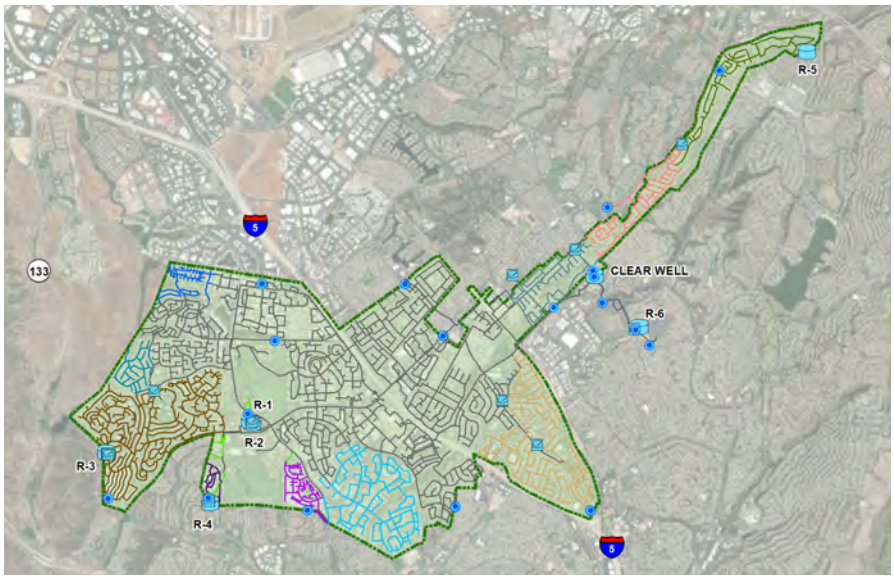
Water conservation within the District, while providing benefits to California's water future, does create operational issues that can create significant challenges for District staff. Especially considering the large storage volumes. In addition to water conservation, the recycled water system has been contributing to the reduced demand due to the potable water offset for irrigation. Water age and source tracing analysis can provide intuitive results that can drive operational changes that can reduce the existing water quality impacts.

We know the District is currently struggling with water quality issues in the distribution system due to increasing water age. Our modeling approach is designed to make critical determinations on the operational future and the potential of decommissioning storage reservoirs to reduce operational burdens of the current water quality and water age challenges.



Centennial Water Quality Monitoring

Carollo helped the City of Centennial Colorado make operational modifications based on the findings from source trace and water age model simulations. Water age and source trace evaluations can provide key insights into flushing program modifications and storage cycling for improved water quality.



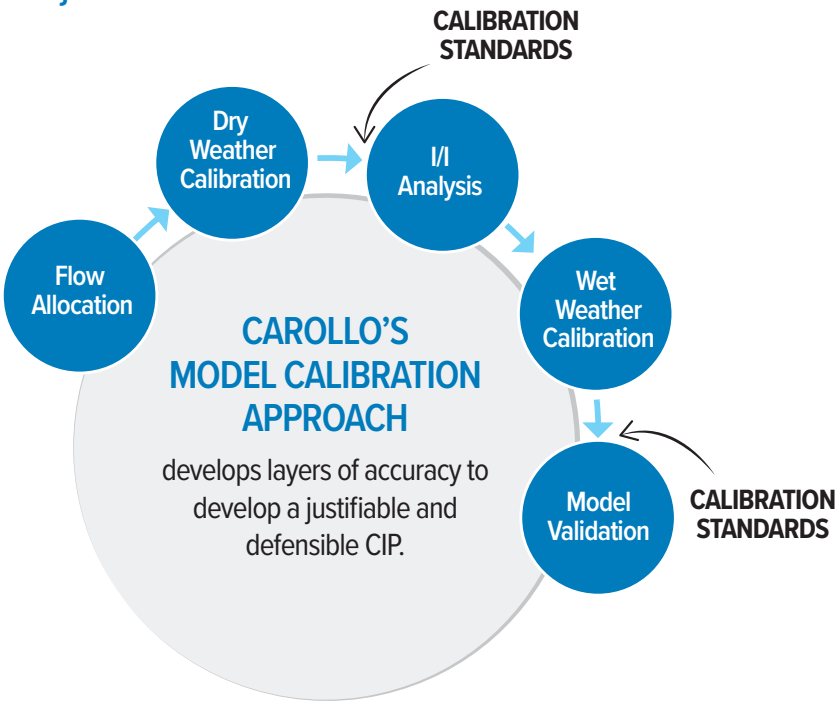
The majority of ETWD's water system storage is in R-6; its large size is necessary for emergency storage but can cause significantly increased water age depending on operations. Both R-1 and R-2 serve the same pressure zone; it may be possible to abandon one of the two tanks to reduce water age and improve water quality. There are only single tanks at R-3, R-4, and R-5, so decommissioning storage is not possible at these sites but operational changes could be enacted to reduce the storage volume kept in these tanks.

Wastewater Demand Load Allocation Utilizing Water Meter Billing Records Accurately Distributes Base Wastewater Flows

The approach used on past plans has been to estimate water demand base flow allocation using land use based flow factors. Using ETWD water billing data, we can use the winter water usage data to allocate base wastewater generation rates to distribute base flows. This will result in fewer calibration adjustments during dry weather calibration. Custom diurnal patterns for each flow monitoring basin are developed based on flow monitoring data and will be applied to the allocated water meter billing data. Baseflow conditions for extended period simulations are verified with dry weather flow monitoring data.

Wintertime water meter billing data provides a true representation of indoor water usage on a parcel level and provides an extremely accurate way to allocate dry weather wastewater flows into the model. The figure above illustrates the spatial locations of AMI data. The data can be geocoded to provide accurate distributions of base flows. Making the connection between water usage and wastewater generation through billing data allows Carollo to take the guess work out of flow allocation.

Carollo's Wastewater Model Calibration Process Provides Layers of Accuracy to Build Confidence in Project Recommendations



Conducting wastewater model calibration for both dry and wet conditions, Carollo adds layers of accuracy to the model. **Increased accuracy helps build confidence in project recommendations.**

Wastewater collection system flows are the combination of base wastewater flows and infiltration/inflow (I/I). Similar to conditions in the field, Carollo develops wastewater models through the layering of base and I/I flows.

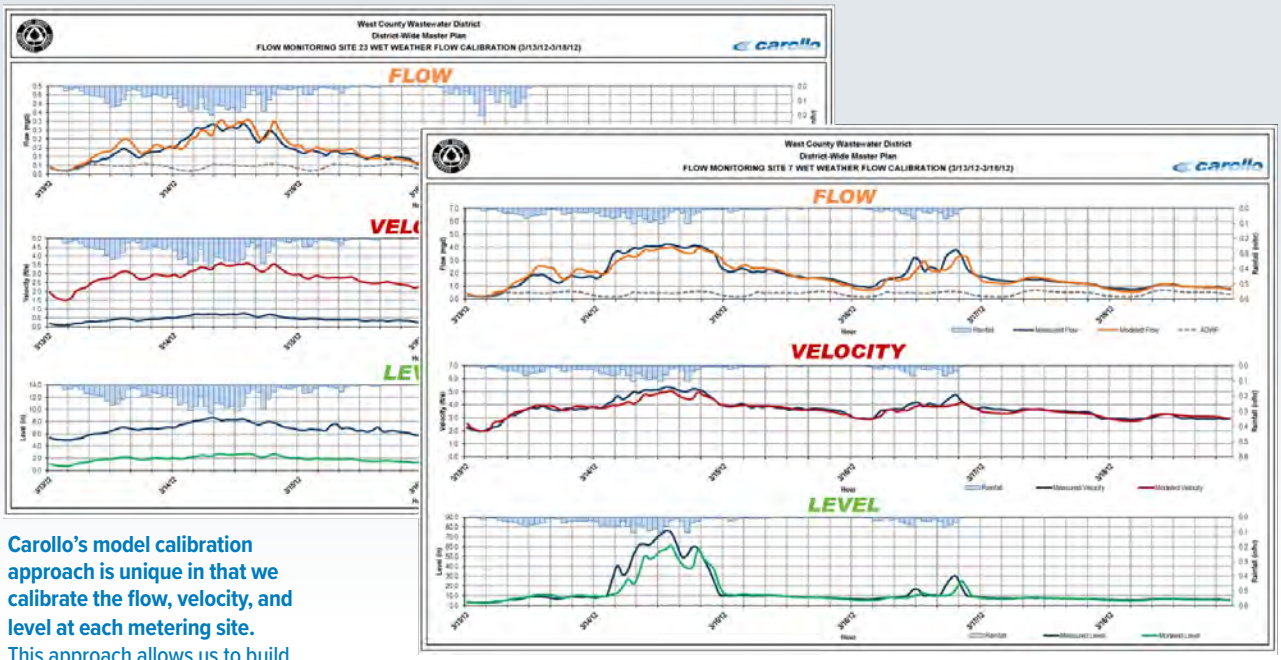
Like the development of the flows, we must also calibrate the model using the same approach. Calibrating dry (base) flows first, then calibrating to wet weather flows.

This layering approach provides confidence that modeling results accurately simulate field conditions and provides an acute assessment of where there are hydraulic conveyance bottlenecks in the sewer system that pose risks.

Carollo's flow, velocity, and level calibration go beyond collection system industry standards to provide an accurate assessment of system performance.

Typical collection system model calibration only looks at flows within the collection system. Carollo's approach is to look not only at flow but at velocity and levels. Collection system pipelines are evaluated and sized based on flow level (or hydraulic grade). By limiting calibration to flows, model developers are ignoring the single parameter that is used to evaluate and size collection system improvements.

Carollo is one of the only consultants in the U.S. that focuses collection system model calibration on all three flow components (flow, velocity, and level) to provide an accurate assessment of deficiencies and pipeline improvement sizing.

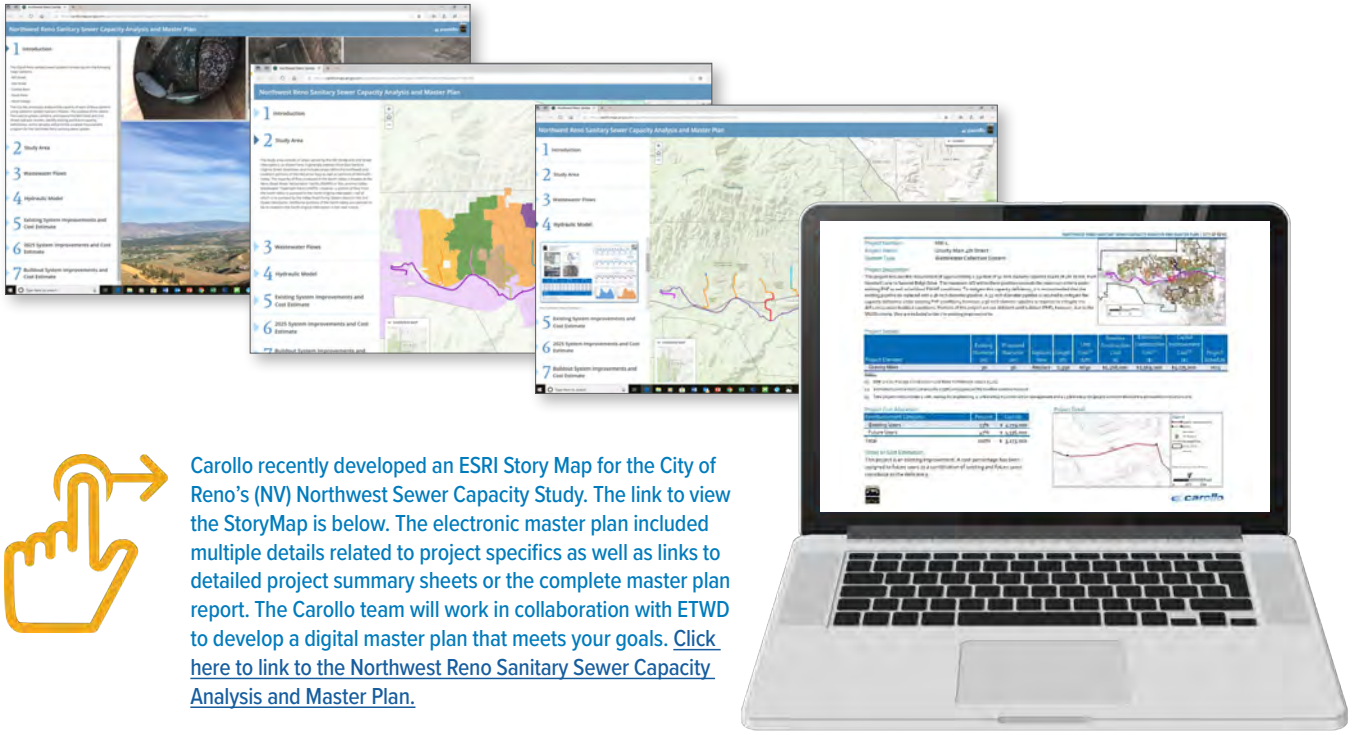


Carollo's model calibration approach is unique in that we calibrate the flow, velocity, and level at each metering site. This approach allows us to build confidence in recommendations because we have calibrated to the single parameter (level) used to size collection system improvements.

The graphics above are examples of where just looking at flow doesn't tell the whole picture of collection system model accuracy. The top graph depicts how the model captured accurate flow rates, but missed the mark on level accuracy by not matching flows. The model is not accurately simulating the key parameters for accuracy and system sizing.

Carollo's Master Plan Electronic Delivery Approach Provides the District with Advanced Tools for Communication of Plan Results and the Ability to Respond to Changes in Planning Assumptions

It has been said that master plans are out of date the moment they are printed. With that thought in mind, the Carollo team has been developing digital deliverable platforms over the last 10 years to provide master plans that can be used for communicating results without printing 900-page documents. Recently, ESRIs StoryMaps, ESRI's Web AppBuilder, and Digital Dashboards have become the web-based delivery method of choice. The Carollo team will create similar web-based deliverables as those provided for other integrated master plan clients as a means to communicate with stakeholders and the public.



Carollo recently developed an ESRI Story Map for the City of Reno's (NV) Northwest Sewer Capacity Study. The link to view the StoryMap is below. The electronic master plan included multiple details related to project specifics as well as links to detailed project summary sheets or the complete master plan report. The Carollo team will work in collaboration with ETWD to develop a digital master plan that meets your goals. Click here to link to the Northwest Reno Sanitary Sewer Capacity Analysis and Master Plan.

Carollo has created digital dashboards for many types of master and capital funding projects and programs. Carollo created the CIP dashboard for the City of Greeley's Water Pollution Control Facility. The dashboard included phasing, costs by category and year, as well as many other metrics. These dashboards can be customized to include many types of data, maps, and other metrics. Multiple platforms can be used such as Power BI or Tableau.

A detailed scope outlining our plan to meet all the challenges in this plan is provided in the appendix.

Hours / Fee

Carollo's proposed fee to perform the master plan update is in the table provided. Optional tasks are listed below the table.

Fee Proposal for: El Toro Water District's Water and Sewer Master Plan Update		Carollo Engineers										TOTAL LABOR HOURS	Labor Fee Carollo	Subconsultant Fee	Total ODCs	TOTAL PROJECT FEE
		Client Service Manager, Teri Raasch	Quality Control, Richard Humphreys	Project Manager, Tim Loper	Water Master Plan Lead, Matt Huang	Sewer Master Plan Lead, Ryan Orgill	Hydraulic Modeling (W), Ryan Hejka	Hydraulic Modeling (WW), Danielle Orgill	Technical Support, Cassidy Thornbury	GIS Analysis and Mapping, Jackie Silber	Admininstrative Staff Various					
Task No.	**Task Description**															
1	**Project Management and Meetings**	**18**	**0**	**38**	**38**	**26**	**0**	**0**	**0**	**0**	**12**	**132**	**$ 30,227**	**$ -**	**$ 2,438**	**$ 32,664**
1a	Project Management	6		12	12						12	42	$ 8,677	$ -	$ 601	$ 9,277
1b	Meetings	12		26	26	26						90	$ 21,550	$ -	$ 1,837	$ 23,387
2	**Review Existing Documents and Data Collection**	**0**	**0**	**1**	**2**	**2**	**4**	**4**	**4**	**0**	**0**	**17**	**$ 2,948**	**$ -**	**$ 243**	**$ 3,191**
	Review Existing Documents and Data Collection			1	2	2	4	4	4			17	$ 2,948	$ -	$ 243	$ 3,191
3	**Water Hydraulic Model Update**	**0**	**0**	**17**	**82**	**0**	**200**	**0**	**200**	**32**	**6**	**537**	**$ 86,138**	**$ -**	**$ 7,679**	**$ 93,817**
3a	**Evaluate Existing Water Model and Model Recommendations**			**1**	**4**		**8**				**2**	**15**	**$ 2,711**	**$ -**	**$ 215**	**$ 2,926**
3b	**Water Model Development**	**0**	**0**	**2**	**30**	**0**	**60**	**0**	**92**	**24**	**0**	**208**	**$ 32,230**	**$ -**	**$ 2,974**	**$ 35,204**
	Water Model Development			2	12		24		40	8		**86**	**$ 13,315**	$ -	$ 1,230	$ 14,545
	Allocation of Water Demands				12		20		32	8		**72**	**$ 11,134**	$ -	$ 1,030	$ 12,164
	Peaking Factors/Diurnal Curves				4		12		16			**32**	**$ 4,757**	$ -	$ 458	$ 5,214
	Fire Flow Demands				2		4		4	8		**18**	**$ 3,024**	$ -	$ 257	$ 3,281
3c	**Water Model Calibration**			**2**	**20**		**64**		**40**	**8**	**4**	**138**	**$ 22,275**	**$ -**	**$ 1,973**	**$ 24,248**
3d	**Water System Evaluation**	**0**	**0**	**12**	**28**	**0**	**68**	**0**	**68**	**0**	**0**	**176**	**$ 28,922**	**$ -**	**$ 2,517**	**$ 31,439**
	Analysis of System for Deficiencies			2	8		20		20			**50**	**$ 8,018**	$ -	$ 715	$ 8,733
	Analysis of System for Efficiencies			2	4		16		16			**38**	**$ 6,015**	$ -	$ 543	$ 6,558
	Analysis of Proposed Project Impact			2	4		6		6			**18**	**$ 3,149**	$ -	$ 257	$ 3,407
	Pump Station and Reservoir Capacity Analysis			2	4		8		8			**22**	**$ 3,722**	$ -	$ 315	$ 4,037
	Water Age/Water Quality Analysis			2	4		8		8			**22**	**$ 3,722**	$ -	$ 315	$ 4,037
	Analysis of Emergency Supply Conditions			2	4		10		10			**26**	**$ 4,296**	$ -	$ 372	$ 4,667
4	**Sewer Hydraulic Model Update**	**0**	**0**	**19**	**1**	**114**	**0**	**324**	**0**	**24**	**8**	**490**	**$ 88,572**	**$ 57,750**	**$ 8,895**	**$ 153,329**
4a	**Evaluate Existing Sewer Model and Model Recommendations**			**1**	**1**	**4**		**8**			**2**	**16**	**$ 2,872**	**$ -**	**$ 229**	**$ 3,101**
4b	**Sewer Model Development**	**0**	**0**	**10**	**0**	**46**	**0**	**128**	**0**	**8**	**0**	**192**	**$ 35,247**	**$ -**	**$ 2,746**	**$ 37,993**
	Sewer Model Development			4		32		80		4		**120**	$ 21,899	$ -	$ 1,716	$ 23,615
	Current and Projected Sewer Flows			2		8		24		4		**38**	$ 6,964	$ -	$ 543	$ 7,507
	Peaking Factors/Diurnal Curves			2		4		16				**22**	$ 4,065	$ -	$ 315	$ 4,380
	Wet Well Storage Capacity			2		2		8				**12**	$ 2,319	$ -	$ 172	$ 2,491
4c	**Sewer Model Calibration**			**2**		**40**		**120**		**12**	**4**	**178**	**$ 31,472**	**$ -**	**$ 2,545**	**$ 34,017**
4d	**Sewer Flow Monitoring**			**2**		**4**		**8**		**4**	**2**	**20**	**$ 3,670**	**$ 57,750**	**$ 286**	**$ 61,706**
4e	**Sewer System Evaluation**	**0**	**0**	**4**	**0**	**20**	**0**	**60**	**0**	**0**	**0**	**84**	**$ 15,311**	**$ -**	**$ 3,089**	**$ 16,512**
	Analysis of System for Deficiencies			2		12		40				**54**	$ 9,731	$ -	$ 772	$ 10,503
	Analysis of System for Efficiencies			2		8		20				**30**	$ 5,580	$ -	$ 429	$ 6,009
5	**Recommended Improvements**	**0**	**0**	**4**	**12**	**12**	**32**	**32**	**32**	**8**	**0**	**132**	**$ 22,176**	**$ -**	**$ 1,888**	**$ 24,064**
	Recommended Improvements			4	12	12	32	32	32	8		132	$ 22,176	$ -	$ 1,888	$ 24,064
6	**Quality Control Reviews**	**4**	**24**	**8**	**8**	**8**	**0**	**0**	**0**	**0**	**0**	**52**	**$ 13,032**	**$ -**	**$ 744**	**$ 13,775**
	Quality Control Reviews	4	24	8	8	8						**52**	$ 13,032	$ -	$ 744	$ 13,775
7	**Water and Sewer Master Plan Update**	**0**	**0**	**4**	**8**	**8**	**40**	**40**	**40**	**16**	**12**	**168**	**$ 26,709**	**$ -**	**$ 2,402**	**$ 29,111**
	Water and Sewer Master Plan Update			4	8	8	40	40	40	16	12	168	$ 26,709	$ -	$ 2,402	$ 29,111
	TOTAL (Baseline Scope Tasks 1-7)	**22**	**24**	**91**	**151**	**170**	**276**	**400**	**276**	**80**	**38**	**1,528**	**$ 269,801**	**$ 57,750**	**$ 24,288**	**$ 349,952**
	Optional Tasks	**4**	**0**	**18**	**26**	**22**	**64**	**64**	**40**	**20**	**22**	**280**	**$ 48,338**	**$ -**	**$ 28,094**	**$ 76,432**
Task 1c	Presentation to the ETWD Board of Directors	4		8	2	2					2	**18**	$ 4,335	$ -	$ 807	$ 5,142
Task 8	Hydraulic Model Transfer and Training			2	8	4	24	24				**62**	$ 11,207	$ -	$ 24,427	$ 35,633
Task 9	On-Call Hydraulic Modeling Services			8	16	16	40	40	40	20	20	**200**	$ 32,796	$ -	$ 2,860	$ 35,656
	GRAND TOTAL (with Optional Tasks)	**26**	**24**	**109**	**177**	**192**	**340**	**464**	**316**	**100**	**60**	**1,808**	**$ 318,139**	**$ 57,750**	**$ 52,382**	**$ 426,384**

Schedule

Carollo has developed a project schedule, shown below, that focuses on collaborative decision making and a collaborative-focused process to enable robust decision making. With key meetings planned after major tasks, we look to include key decision makers and stakeholders in the process to ensure buy-in on key project elements.

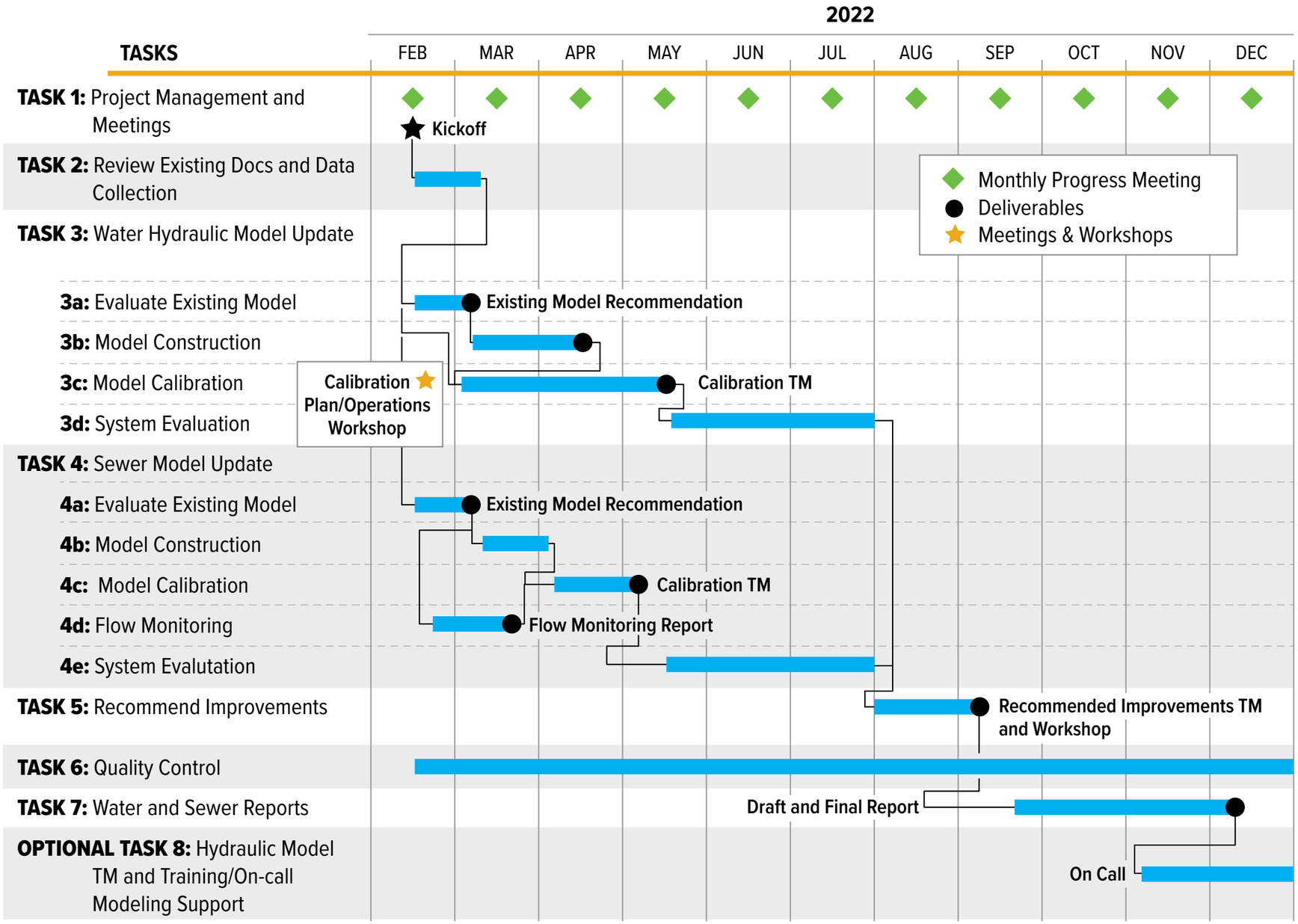
PROJECT SCHEDULE

We understand that, at minimum, the District needs to have the final CIPs completed before the end of December 2022 to start the budgeting process and planning project implementation for 2023 and beyond. This means that a lot of work needs to be done in limited time. However, with our in-depth institutional knowledge and deep bench of master planning experts we can exceed that expectation by working in parallel, yet closely coordinated, on the three master plans and I/I study.

Our team is committed to complete the entire set of master plan updates by the end of this year (2022), as shown on the adjacent detailed schedule. Based on our experience with similar projects and the availability of our team members, this schedule is realistic and achievable.

One key critical path item is the sewer flow monitoring that needs to be completed no later than the end of March 2022. With the short rainy season in Southern California but the wettest months in February and March, this can be achieved leveraging V&A's quick mobilization commitment and Carollo's accelerated development of the flow monitoring program.

If selected for this project, we propose to include the completion of the flow monitoring program as an optional task in the main scope of services and process a separate authorization for this subtask (<$25k) that would not be subject to any potential contracting delays. This way, our team can start work on this critical path task right away and get V&A ready to go as soon as the full master planning contract is finalized. With this approach, our team can capture the rain without additional cost to the District.



Insurance / Contract

TAB 7

INSURANCE

Carollo will provide ETWD the requested insurance as outlined in the sample contract. Carollo meets the insurance requirements of professional liability coverage to be a minimum of $2,000,000 and general liability and property damage to be a minimum of $2,000,000. A certificate of insurance with ETWD as the lien holder will be issued upon award.

CONTRACT EXCEPTIONS

- **Subsection 1.8:** This should be removed since the contract does not involve design services that will end up in construction.
- **New Subsection 3.5:** Add the following subsection to the end of Section 3:
  - **3.5 Delays.** ENGINEER is not responsible for damage or delay in performance caused by events beyond the reasonable control of ENGINEER. If delays occur beyond the reasonable control of ENGINEER, an equitable adjustment in ENGINEER's time of performance and cost of ENGINEER's personnel and subcontractors may be made.
- **Subsection 4.1:** Add the following to the end of the paragraph: "Notwithstanding the foregoing, ENGINEER shall be entitled to keep one (1) copy of all such furnished data that ENGINEER used, relied upon and/or incorporated into any deliverables produced hereunder."
- **Subsection 5.3:**
  - In the 2nd line, replace "that may arise from" with "to the extent caused by."
  - Add the following to the end of the paragraph: "In no event shall the cost to defend charged to ENGINEER exceed ENGINEER's proportionate percentage of fault."
- **New Subsection 5.4:** Add the following new subsection to the end of Section 5:
  - "**5.4 Warranties and Damages.** ENGINEER shall not be responsible for warranties, guarantees, fitness for a particular purpose, breach of fiduciary duty, loss of anticipated profits or for economic, incidental, liquidated, or consequential damages to the DISTRICT or any third party arising out of breach of contract, delay, termination, or for professional negligence. Additionally, ENGINEER shall not be responsible for acts and decisions of third parties, including governmental agencies, other than ENGINEER's subconsultants, that impact project completion and/or success."
- **Subsection 7.11:** Since this isn't a design contract with project construction costs, replace this subsection with the following:
  - "**7.11 Estimates and Projections.** In providing opinions of cost, financial analyses, economic feasibility projections, schedules, and quantity and/or quality estimates for potential projects, ENGINEER has no control over cost or price of labor and material; unknown or latent conditions of existing equipment or structures that may affect operation and maintenance costs; competitive bidding procedures and market conditions; time or quality of performance of third parties; quality, type, management, or direction of operating personnel; the incoming water quality and/or quantity; the way the DISTRICT's plant(s) and/or associated processes are operated and/or maintained; and other economic and operational factors that may materially affect the ultimate project elements, including, but not limited to, cost or schedule. Therefore, ENGINEER makes no warranty that the DISTRICT's actual project costs, financial aspects, economic feasibility, schedules, and/or quantities or quality realized will not vary from ENGINEER's opinions, analyses, projections, or estimates."
- **Subsections 7.12 and 7.13:** This should be removed as they are only applicable to construction resulting from our design.

ADDENDA

No addenda issued.

APPENDICES

Scope of Work
Detailed Resumes

Scope of Work

APPENDIX

Carollo proposes to perform the following scope of work for El Toro Water District's Water and Sewer Master Plan Update.

Task 1 Project Management and Meetings

Task 1a Project Management

Carollo perform project management tasks to communicate and coordinate with ETWD staff on the project. This subtask consists of communications provide updates, follow up on action items, and manage the project on budget and on schedule.

Carollo will prepare and submit a monthly status report with the monthly invoice consisting of the following:

- ETWD's standard form with a summary of expenditures by task showing total budget, billing to date, current billing, and remaining amount.
- A summary of work progress/items complete for each work task.
- An estimate of actual percent complete based on progress compared to percent complete based on budget expended.
- An updated progress schedule.

Task 1b Meetings

Carollo will coordinate and lead the following meetings for this project:

- Project Kick-Off Meeting: Introduce team members, establish lines of communications, review the scope of work and approach, and discuss the existing system.
- Staff Workshop: Carollo will hold a workshop with ETWD Operations staff to discuss any known or suspected deficiencies or potential improvements desired by staff.
- Progress Meetings: Carollo will conduct up to 11 monthly progress meetings.

Optional Task 1c Presentation to the ETWD Board of Directors

As an optional task, Carollo will present findings and recommendations on the Master Plan to the ETWD Board of Directors. If requested, Carollo will prepare a presentation, perform reviews with ETWD staff, and present the plans at a meeting of up to one hour.

Task 1 Deliverables:

- Carollo will deliver a proposed meeting agenda at least 24 hours prior to any meeting.
- Carollo will deliver meeting notes for each meeting within 3 business days of each meeting documenting discussions, action items, and decisions.

Task 1 Assumptions:

- At the kickoff meeting and the monthly progress meetings, an updated project schedule, milestones, and planned activities will be reviewed.
- Meetings will be held via Microsoft Teams when possible.

Task 2 Review Existing Documents and Data Collection

Carollo will develop a data request consisting of items needed for the master plan update. The list of expected to include the following items:

- GIS data.
- Historical water production, consumption, billing data, and wastewater flows.
- Demographic information, general plans, and planning documents from City.
- Information on conservation programs.
- Pump/lift station data (pump curves, site piping, control settings).
- Reservoir and wet well data (dimensions, operating levels).
- Pressure regulating, control valves, turnout/interconnections data (settings, elevations, status).
- Existing design or planning criteria.
- Water supply agreements.
- Water quality data (data associated with parameters indicating a long water age).
- Hydraulic schematics.
- SCADA data for model calibration.
- Historical problem areas (hot spots) and sanitary sewer overflows.

Carollo will review the existing reports and documents collected for familiarity, completeness, and use in the development of the master plan.

Task 3 Water Hydraulic Model Update

Task 3a Evaluate Existing Water Model and Model Recommendations

Carollo will review the existing model and GIS and develop recommendations for an approach for the new hydraulic model. The model will be constructed from the GIS. Carollo will develop recommendations on whether ETWD should stay with InfoWater, or upgrade to another software package (such as InfoWater Pro). Carollo will write a technical memorandum (TM) discussing the methodology used, recommended software package, and a demonstration of the software.

Task 3b Water Model Development

Carollo will develop a single model of ETWD's water distribution system containing all of ETWD's pressure zones, with pipelines 6-inch diameter and greater, reservoirs, booster pump stations, pressure reducing facilities, interconnections, and water supply sources. Static and 24-hour extended period simulation (EPS) scenarios will be developed. Elevations will be added to the model junctions.

Allocation of Water Demands

Carollo will summarize existing land use, population, and water demands for ETWD, by pressure zone and for the entire system. Carollo will identify consumption and production, identifying average day and maximum day demands. Impact of water conservation measures (existing and proposed) and recycled water conversion will be identified.

Water demands will be allocated into the hydraulic model using meter billing information based on billing data and GIS information showing the location of each meter.

Projected water demands will be developed, although there is minimal opportunity for growth except for the Laguna Hills Mall redevelopment. Carollo will contact each of the cities served ETWD to identify vacant parcels, anticipated redevelopment, projects, and potential demands.

Peaking Factors / Diurnal Curves

Carollo will develop peaking factors and diurnal curves based on data collected in the subtask above and in the water model calibration task. Peaking factors will be identified on a system wide basis, and diurnal curves will be developed for pressure zones based on available SCADA data.

Fire Flow Demands

Carollo will evaluate fire flow criteria for land use categories based on Fire Department, Insurance Services Office (ISO), and California Fire Code requirements. Carollo will develop recommended fire flows and durations, identify fire flow requirements for each pressure zone, and assign fire flow requirements to each model junction representing a fire hydrant.

Task 3c Water Model Calibration

Carollo will develop a calibration plan for field data collection. Upon review of the calibration plan, ETWD will perform up to 10 fire hydrant tests for model calibration. If desired by the District, Carollo will provide up to 10 pressure loggers for collecting pressure data for a one-week period. Using SCADA data, Carollo will calibrate the model for up to two 24-hour EPS scenarios using the SCADA data and pressure logger data. Carollo will also calibrate the model for up to 10 fire hydrant tests. Carollo will adjust the model based on the field data so that the model represents the field conditions. A technical memorandum will be developed summarizing the model calibration.

Task 3d Water System Evaluation

Carollo will use the hydraulic model to perform a hydraulic analysis of the water system. Carollo will develop planning criteria for the system and review the recommendations with ETWD. Carollo will deliver the hydraulic model to ETWD at the end of the project.

Analysis of System for Deficiencies

Carollo will use the hydraulic model to evaluate the existing water system under existing and buildout maximum day EPS conditions and maximum day plus fire flow conditions, identifying locations of low pressures, high pipelines velocities or head losses. Carollo will also evaluate pump performance, tank design and turnover time, pressure reducing valve (PRV) configurations, reservoir turnover, booster pump sizing, hydraulic settings of sub-zones supply by pumping or PRVs, and a supply and demand balance. Carollo will develop recommendations to address the deficiencies.

Analysis of System for Efficiencies

Carollo will perform an optimization evaluation of ETWD's distribution system to identify economical operation and meet water quality objectives. Carollo will perform an energy evaluation using the scheduler tool in InfoWater or InfoWater Pro as well as a water age model run as a proxy for water quality on the existing water system. Considering demands, electrical energy costs, and State and Federal water quality objectives, Carollo will recommend changes to the existing system operation to optimize system efficiency.

Analysis of Proposed Project Impact

Carollo will perform three additional conditions to evaluate the input of the following three additional projects on ETWD's existing water system:

- Startup of the JTM pump station, introducing up to 2 cfs of water from Diemer WTP on the west side of ETWD's service area.

- Potential increase in recycled water irrigation use in four areas.
- Potential introduction of purified water produced at the WRP as part of a direct potable reuse scenario.

Pump Station and Reservoir Capacity Analysis

Carollo will perform a storage and booster pump calculation to evaluate capacity of the pump stations and reservoirs under existing and build out conditions. Based on the evaluation, Carollo will make recommendations to add or eliminate storage and booster pump capacity to optimize the water system. The storage criteria will consider operational, emergency, and fire storage requirements. Review ETWD's existing pump and booster stations and distribution and emergency storage reservoirs. Both the pump stations and reservoir capacity will be analyzed based on the updated water demand projections and current design criteria to determine the need for additional pumping capacity and/or storage facilities as well as the potential to eliminate inefficient or unnecessary facilities.

Water Age / Water Quality Analysis

Carollo will perform up to three water age model runs to evaluate overall distribution system water quality and how water quality can be maintained. The water age model runs typically are run for 30 to 60 days. Carollo will review water quality data, existing distribution system sampling plan, and flushing plan, and make recommendations to modify the sampling plan to capture potential locations with degraded water quality. Recommendations will be made to maintain water quality, with recommendations for projects or operational modifications to address degraded water quality.

Analysis of Emergency Supply Conditions

Carollo will evaluate the existing and build out distribution systems to determine the impact of supply outages on the water distribution system. Carollo will perform up to six 30-day model runs to evaluate emergency scenarios. It is expected that the scenarios will evaluate the impact an evaluation of a month-long outage at Diemer WTP, Baker WTP, and both Baker and Diemer WTP. The amount of water that can be supplied during each of these scenarios will be identified. These emergency scenarios will be finalized at the project kickoff meeting.

Task 3 Deliverables:

- Model selection recommendation TM.
- Calibration plan TM.
- Model calibration summary TM.
- Hydraulic model of distribution system.
- Recommendations for planning criteria.

Task 4 Sewer Hydraulic Model Update

Task 4a Evaluate Existing Sewer Model and Model Recommendations

Carollo will review the existing model and GIS and develop recommendations for an approach for the new hydraulic model. The model will be constructed from the GIS. Carollo will develop recommendations on whether ETWD should stay with InfoSewer, or upgrade to another software package. Carollo will write a technical memorandum (TM) discussing the methodology used, recommended software package, and a demonstration of the software.

Task 4b Sewer Model Development

Carollo will develop a single model of ETWD's sewer distribution system containing pipelines 6-inch diameter and greater and ETWD's 11 sewer lift stations. The model will developed for extended period simulations. Carollo will construct the model and confirm that the model operates properly.

Carollo will develop a system map showing pipes, facilities, streets, and right of way to review of the model data by ETWD.

Current and Projected Sewer Flows

Carollo will summarize existing land use, population, and sewer flows. Carollo will identify average day and wet weather flows. Impact of water conservation measures (existing and proposed) and recycled water conversion will be identified.

Water demands will be used to developed wastewater flows. Carollo will develop future sewer flow rates based on information collected in the water task about potential growth in the ETWD service area.

Carollo will review ETWD's existing flow metering strategy, as ETWD struggles to obtain accurate flows at the Parshall flume at the WRP headworks and the magnetic flow meter from the influent equalization basin. ETWD believes flow metering at the Ocean Outfall Pump Station and Recycled Water Pump Station are more accurate. Carollo will provide recommendations to improve flow metering accuracy at the WRP/

Peaking Factors / Diurnal Curves

Carollo will develop peaking factors and diurnal curves based on data collected for existing conditions for average and wet weather flow conditions. Carollo will make recommendations for peaking factors for future redevelopment conditions.

Wet Well Storage Capacity

Carollo will tabulate existing available response times for each of ETWD's 11 sewer lift stations prior to an overflow in the event of a lift station failure. Carollo will identify potential projects to improve lift station storage capacity and system reliability based on the results of the evaluation.

Task 4c Sewer Model Calibration

Carollo will develop a calibration plan for field data collection. Upon review of the calibration plan, Carollo will calibrate the sewer model to the flow monitoring data collected in Task 4d and SCADA data collected. Carollo will adjust the model based on the field data so that the model represents the field conditions. A technical memorandum will be developed summarizing the model calibration.

Task 4d Sewer Flow Monitoring

Carollo will install five flow meters for a duration of two months in order to capture wet weather flows. The data collected as part of this procedure will be used for model calibration in Task 4c.

Task 4e Sewer System Evaluation

Carollo will use the hydraulic model to perform a hydraulic analysis of the sewer system. Carollo will develop planning criteria for the system and review the recommendations with ETWD. Carollo will deliver the hydraulic model to ETWD at the end of the project.

Analysis of System for Deficiencies

Carollo will use the hydraulic model to evaluate the existing sewer system under existing and future flow rates under average dry weather conditions, maximum day wet weather conditions, and peak hour wet weather flow conditions. Carollo will identify gravity pipelines, force mains, and

lift station with insufficient capacity to meet existing or projected future flows. Carollo will develop recommendations to address the deficiencies.

Carollo will review the "Hot Spot" list of high frequency sewer cleaning locations with ETWD staff and make recommendations as to whether cost effective capital improvements might alleviate the need for high frequency cleaning on portions of the collection system.

Analysis of System for Efficiencies

Carollo will perform an optimization evaluation of ETWD's collection system to identify economical operation. Carollo will consider flows and electrical energy costs to optimize daily and seasonal operations of ETWD's collection system, making recommendations to existing operation to optimize system efficiency.

Task 4 Deliverables:

- Model selection recommendation TM.
- Calibration plan TM.
- Model calibration summary TM.
- Hydraulic model of collection system.
- Recommendations for planning criteria.

Task 5 Recommended Improvements

Carollo will recommend updates to ETWD's CIP based on the results of the hydraulic model simulations for current and future service area development based on the evaluations performed in Tasks 3 and 4. Carollo will develop project descriptions and create an electronic CIP in ESRI's Story Map.

Carollo will prepare a preliminary cost estimate with payback schedule as appropriate for the recommended improvements for the CIP. Phasing will be developed for the recommended improvements based on the relative urgency and/or benefit of the project. Condition-based replacement will not be included in the CIP.

Task 6 Quality Control Reviews

Carollo will administer quality assurance and quality control procedures based on Carollo's standard practices. Deliverables will be reviewed by independent reviewers not directly involved in the work.

Task 7 Water and Sewer Master Plan Update Report

Carollo will develop a Water and Sewer Master Plan Update report as one document with separate sections for water and sewer. The report will consist of the following elements:

- Executive summary.
- Description of ETWD's existing water system service area, pressure zones, and water system facilities, consisting of turnouts, major transmission and distribution pipelines, reservoirs, booster pump stations, and control valves.
- Description of ETWD's existing sewer system service area and facilities, consisting of collection system pipelines, trunk sewers, siphons, lift stations and force mains.
- Water production and demand projections.
- Sewer flows and projections.
- Summary of data collected.
- Summary of evaluations performed with recommended projects and changes to operational procedures.

- Project prioritization.
- Cost estimates and payback analyses.
- Major conclusions and recommendations.

Carollo will develop a draft Water and Sewer Master Plan Update report and submit it to ETWD for review and comments. Carollo will incorporate ETWD's review and comments and prepare a final water and sewer master plan report.

Task 7 Deliverables:

- Draft Water and Sewer Master Plan Update.
- Final Water and Sewer Master Plan Update, stamped by a registered California professional engineer.

Task 7 Assumptions:

- All deliverables will be electronic.

Optional Task 8 Hydraulic Model Transfer and Training

If requested by ETWD, Carollo will assist in installation of the water and sewer hydraulic models on ETWD's water system. Carollo will use its own software for this project and does not require use of ETWD software. Carollo will provide one year subscription for ETWD for use of the hydraulic model.

Carollo will provide up to four days (32 hours) of training for the water distribution system model for two members of ETWD's staff in the use of the hydraulic model. It is expected that a two-day training course will be discuss model construction, adding or modifying model elements, model calibration, fire-flow modeling and analysis, and system evaluations. An additional two days of training is for follow up as requested by ETWD.

Task 8 Assumptions:

- The price quote is based on one year's use of InfoWater Pro with 4,000 links and one year's use of InfoSewer with 4,000 links. Licenses of ArcGIS and ArcGIS Pro is not included in the task. This also assumes that the licenses will be installed in year 2022 by Carollo at ETWD's offices and is to be conducted on a fully-functional version of the model to cover model construction, adding or modifying model elements, model calibration, fire-flow modeling and analysis, and modeling select scenarios. Carollo will also provide 16 hours of follow up training as needed by ETWD.

Optional Task 9 On-Call Hydraulic Modeling Service

If desired by ETWD, Carollo will provide as-need hydraulic modeling services on an as-requested basis from ETWD. This on-call hydraulic modeling could include fire flow evaluations, impacts of new developments, benefits of new facilities, or responses to operational changes. Carollo has budgeted 200 hours for this task in our cost proposal.

DETAILED RESUMES

Education

MS Environmental Engineering, University of California, Berkeley, 2005

BS Civil Engineering, California State University, Fresno, 2003

Licenses

Civil Engineer, California, Nevada

Professional Affiliations

Nevada Water Environment Association

American Water Works Association

Timothy J. Loper, P.E.

Timothy Loper has 20 years of experience in wastewater collection system modeling, water distribution system modeling, water system feasibility studies, wastewater treatment facilities planning, and infrastructure master planning.

Relevant Experience

→ Project engineer for the Elsinore Valley Municipal Water District, California, Wastewater Master Plan. Responsible for coordination of GIS integration into the hydraulic model environment and construction of a SWMM model incorporating four separate collection system stations with three wastewater treatment facilities. Capital project recommendations were made to serve future growth and system modifications were analyzed to eliminate lift stations and force mains with gravity sewers. The project also involved preparation of a master plan report, including a capital improvement program. The project also developed a Sewer System Management Plan for all four of the District's separate collection systems.

→ Collection system lead for the City of Riverside, California, Comprehensive Wastewater Master Plan, which included both treatment and wastewater collection systems. Carollo built the City's collection system model using the Innovyze InfoSWMM modeling software.

→ Project manager for Vallejo Flood and Wastewater District, California, Collection System Master Plan. Responsible for day-to-day management and technical direction, including District and subconsultant coordination, progress meetings, and communication. Provided technical direction for development of the flow monitoring program, hydraulic model construction and calibration, and development of the inspection and rehabilitation program.

→ Collection system lead for the West County Wastewater District, California, District-Wide Master Plan. The project included the sanitary sewer collection system, Water Pollution Control Plant, and non-process facilities, such as administration, laboratory, storage, and maintenance. Work efforts included condition and capacity assessments, alternatives evaluation, and 20-year capital improvement program development. All the District's facilities were combined in one master plan, allowing the needs of each to be prioritized in an overall program. Other work efforts included a risk-based analysis of all 12,000 assets to identify failure likelihood, BioWin modeling to assess capacity, 3-D computational fluid dynamics modeling of secondary basins to optimize performance, and a wet weather capacity improvements assessment of the 249-mile collection system.

→ Project manager for the City of Shasta Lake, California, 2016-2026 Water Master Plan. The project involved development of a new water system hydraulic model based on the City's most recent GIS database of the water distribution system. The water distribution system hydraulic model was developed using the Innovyze InfoWater hydraulic modeling software package. The hydraulic model was calibrated using a three-step calibration approach, including a macro calibration, steady state (fire flow test) calibration, and extended period simulation calibration.

→ Project manager for the City of Millbrae, California, Water System Master Plan. Carollo was contracted to complete a water master plan that provided a capital improvement program to help mitigate storage deficiencies and hydraulic constraints caused by the separation of the City's four pressure zones. Responsible for update and calibration of the hydraulic model, which was developed in InfoWater. The City's primary concern was lack of storage in the lower pressure zone and the potential for emergency outages in the event of a large earthquake. Carollo conducted a seismic evaluation of the water storage tanks, optimization of storage needs for the lower zone, and rehabilitation of existing tanks.

→ Quality control engineer for the City of Banning, California, Water and Wastewater Master Plan. The project involved updating the City's water, sewer, and recycled water master plans into an integrated master plan

to guide the City with budgeting and implementation of capital improvement projects. Responsible for quality review and project oversite and technical direction.

→ Project engineer for the City of Oceanside, California, Integrated Master Plan, which included a new collection system hydraulic model prepared from GIS data using InfoSWMM. The existing system was evaluated with respect to existing and future capacity needs. The master plan also considered a phased plan for replacement of the City's water and wastewater pipelines as part of the rehabilitation and replacement program.

→ Collection system project manager for the Central Contra Costa Sanitary District, California, Comprehensive Wastewater Master Plan. The project involved conducting a pump station condition assessment and developing a force main inspection program and a large-diameter condition and rehabilitation plan. The project also included creation of a collection system asset management plan. The master plan focused on pump stations, force mains, and collection system assets and summarized the District's assets in detail.

→ Project manager for the City of Fresno, California, Wastewater Collection System Master Plan. The project identified capacity constraints within the existing collection system and provided recommendations for infrastructure improvements necessary to accommodate densification and future growth, including future industrial growth. The master plan included an update of the City's sewer rehabilitation project capital improvement plan.

→ Project manager for City of Tulare, California, Sewer, Water, and Storm Drain Master Plans and Sewer System Management Plan. The project developed master planning documents for infrastructure improvements to serve rapid growth within the City. Responsible for coordination of the water, sewer, and storm drain computer models that integrate GIS databases into the modeling platform. The wastewater collection system included industrial and domestic collection systems with separate treatment facilities. The storm drain task required coordination with the Tulare Irrigation District for discharge of storm water from the City's drainage facilities.

→ Project manager/project engineer for the Madera County, California, Community Services Area No. 3 (CSA-3) Infiltration and Inflow (I/I) Evaluation and Sewer Capacity Study. CSA-3 is a community services district outside of the City of Madera. The wastewater generated by CSA-3 is conveyed to the City's collection system via a 10-inch-diameter sewer trunk and is metered in a 3-inch Parshall flume. Winter flows from CSA-3 are subject to high I/I rates that submerge the flume. Carollo developed a temporary flow monitoring program that identified ten metering locations and collected flow for six weeks during the winter of 2009/2010. Responsible for day-to-day project management and technical direction. Developed a hydraulic model of the system and calibrated the model to dry and wet weather conditions using flow monitoring data. Was instrumental in discussions between the City of Madera and the County of Madera on allowable wastewater flows per the agreement between the City and the County. Carollo developed capital projects to mitigate existing system deficiencies and sized a new lift station for buildout flows. Carollo also made recommendations on locations for CCTV inspection and smoke testing for detailed identification of I/I.

→ Project manager for the Santa Cruz County Sanitation District, California, 2017 Inflow and Infiltration (I/I) Study. Led the I/I study, which included a flow monitoring program, updates, and calibration of the County's InfoSWMM sewer collection system hydraulic model based on flow monitoring data, and simulation of the effect of a 10-year design storm on the County's sewer collection system.

Education

MS Civil Engineering, Hydraulics, Utah State University, 1988

BS Agricultural and Irrigation Engineering, Utah State University, 1986

Licenses

Civil Engineer, Arizona

Professional Affiliations

American Water Works Association

American Society of Civil Engineers

Arizona Water Association

Richard A. Humpherys, P.E.

Richard Humpherys has over 33 years of experience dedicated to infrastructure master planning, water resources, hydraulic modeling, asset management, and improvement /optimization studies for water distribution, wastewater, and reclaimed water systems. His work has helped managers of numerous water utilities to plan and improve the daily operation of their systems. His experience in modeling and evaluating water distribution systems in the Southwest United States, England, and Canada provides unique perspectives to identify and solve challenges associated with water distribution systems.

His project experience includes master plans, water system capacity expansions, water quality studies, field-testing and monitoring, model software training, asset management, and optimization. Mr. Humpherys is a former chair of the Engineering Modeling Applications National Committee for AWWA. While on this committee, he co-authored and edited a version of the AWWA M32 manual Computer Modeling of Water Distribution Systems.

Wastewater system modeling programs used by Mr. Humpherys include InfoSWMM, InfoSEWER, and SewerGEMS. Current water distribution system modeling programs used by Mr. Humpherys include Infowater, WaterGEMS, WaterCAD, and EPANET. Hydraulic transient modeling programs used by Mr. Humpherys include InfoSurge®, Hammer, and LIQT.

Relevant Experience

→ Technical review for the City of Garden Grove, California – Water Master Plan. The project includes development of a complete water system GIS, creation of a hydraulic model, demand projections, system analysis, CIP development, and preparation of a master plan. The model is calibrated for average and maximum day demands, as well as for water quality parameters.

→ Technical advisor for the Padre Dam Municipal Water District, California – Comprehensive Facilities Master Plan. Carollo was retained to update the 2001 Integrated Facilities Plan (IFP). The 2001 IFP addressed water, wastewater, and recycled water services within the District's region through 2020. Since the completion of this IFP, significant changes have occurred within the District's service area with respect to water use and wastewater flows.

→ Project manager for the City of Goodyear, Arizona – Integrated Water Master Plan. The City needed a major update to the previous integrated water master plan completed in 2007 and adopted by the City in 2008 due to significant changes in population and projections since the previous plan, as well as a shift by the City's personnel in an overall strategy to secure long-term assured water supply. One component of the project was to make recommendations to increase aquifer recharge capacity.

→ Project manager for the City of Page, Arizona – Integrated Water Resources, Water, Wastewater, and Reclaimed Water Master Plan. In parallel with the master plan, the City is prepared to apply for additional water resources to provide water for the City's planned future growth. Carollo assessed water resources, raw water, treatment, storage, wastewater treatment, and reclaimed water system, and tested the capacity of filters of the Page WTP, including a hydraulic capacity analysis.

→ Project engineer for the City of Prescott, Arizona – Airport Area Water Master Plan and Well 2 Study. The project includes hydrogeologic assessment and a supply well master plan for developing a well field in that area. The supply well master plan is coordinated with Arizona Department of Water Resources (ADWR), requirements related to the City's recharge facilities, and the associated water balance.

→ Project engineer for the City of Lake Havasu, Arizona – Water Master Plan Up-

date. The water system includes a high service pump station at the water treatment plant, 14 active wells, 19 booster pump stations, and 450 miles of transmission and distribution lines connecting 17 reservoir sites that are located in seven pressure zones. Develops an all mains model of the distribution system, conducts field-testing to calibrate the model, and identifies improvements to the water system to satisfy performance criteria. The Update also identifies pump stations that were not operating efficiently and recommended improvements, and provides model and software training.

→ Project manager for the City of Peoria, Arizona – Integrated Utility Master Plan. This Plan is a comprehensive master plan update that took into account continuous population and economic development growth, changes in water use and supply availability, reclaimed water use, and wastewater collection and treatment needs. As Peoria grows and strengthens economic sustainability, this Plan is intended to provide the roadmap to ensure that Peoria has the water supplies, water, wastewater, and reclaimed water infrastructure to serve the City's residents. The Plan also includes a Water Resources Master Plan Update, Water Systems Master Plan Update, Wastewater System Master Plan Update, and Reclaimed Water System Master Plan Update.

→ Project manager for the City of Avondale, Arizona – 2018 Integrated Utility Master Plan. This Plan provides recommendations from multiple studies that were consolidated to have one cohesive set of master plan recommendations that will guide the City's capital program. A cost evaluation of multiple water supply options was undertaken to determine the best way to provide a reliable water supply that uses the City's water resources effectively. One of the major decisions was to establish a teaming agreement with the City of Phoenix to wheel CAP and SRP water through the Phoenix water system so that Avondale has a direct connection to receive CAP surface water. Prior to this time, Avondale has been supplied with only groundwater. This new connection into the Garden Lakes facility will provide treatment to manage TTHM levels and provide the supplies in northern Avondale for a proposed pressure zone split to work effectively. This master plan also includes recommendations for wellhead treatment, improvements to the City's recharge facilities, and an updated, field calibrated wastewater system model.

→ Technical advisor for the City of Los Banos, California – Water Distribution, Wastewater Collection, and Storm Drainage Master Plan. Tasks include, flow monitoring, collecting wastewater and storm drain survey information, converting CAD drawings to GIS, developing pump curve information for wells, sanitary sewer lift station, and storm drainage pump station, developing/calibrating hydraulic models of each system, correcting capacity deficiencies, and developing capital projects.

→ Project manager for the City of Buckeye, Arizona – 2017 Integrated Water Resources Master Plan Update. The project includes water resources and reclaimed water evaluations, and development of alternative strategies for the City to as it considers acquiring a Designation of Assured Water Supply. The project also includes technical oversight of the water and wastewater system evaluations and capital improvement recommendations.

→ Project manager for the City of Goodyear, Arizona – Waterman Wash Area Integrated Planning Study. The purpose of this study is to provide additional wastewater planning for the wastewater system south of Pecos Road that addresses the potential for leapfrog development. This master plan addendum includes buildout transition strategy so that wastewater can be delivered to regional facilities later and the City can benefit from the economies of scale provided by operating fewer, larger treatment facilitates.

Education

MS Civil and Environmental Engineering, Stanford University, 1999

BS Applied Ecology, University of California, Irvine, 1998

Licenses

Professional Engineer, Illinois, Oregon, Washington

Civil Engineer, California

Professional Affiliations

American Water Works Association

Water Environment Federation

Matthew M. Huang, P.E.

Matthew Huang is an expert on water and recycled water hydraulic modeling and master planning, with over 150 hydraulic models, but also has a broad base of experience, also working in water quality, water and wastewater treatment, water and sewer infrastructure, water resources, and wastewater system modeling and master planning, with experience in planning, design, and construction. He has experience with projects in 15 states and seven foreign countries. In addition, Mr. Huang has experience with numerous specialized computer programs, including pressurized system hydraulic modeling pro-grams (InfoWater Pro, InfoWorks WS, and WaterGEMS), gravity system hydraulic modeling programs (InfoSewer, InfoSWMM), water balance and optimization (GoldSim and WEAP), GIS (ESRI), and a number of database, programming, scheduling, and spreadsheet programs. He currently serves on AWWA's Engineering Modeling Applications Committee.

Relevant Experience

→ Project manager for Suburban Water Systems (SWS), Hydraulic Modeling Project, California. This project includes the development and calibration of four InfoWater models for Suburban's four hydraulically separate water systems: San Jose Hills, Whittier-La Mirada, Glendora, and Covina Hills. The project also includes software training for SWS.

→ Project reviewer for Integrated Water and Wastewater Master Plan, Padre Dam Municipal Water District, California. Project is a comprehensive water master plan for the District including demands, supply analysis, hydraulic modeling, infrastructure development, and CIP development for water, wastewater, and recycled water systems.

→ Project engineer for Water System Master Plan for the Ramona Municipal Water District, California. Project is a comprehensive water master plan for the District including demands, supply analysis, hydraulic modeling, infrastructure development, and CIP development.

→ Project engineer for the Hydraulic Model Calibration for the City of Lebanon, Oregon. Project included review of the hydraulic model used for prior analysis during planning for the new WTP. Review includes potential connectivity issues, system demands, model node elevations, identifications of closed isolation valves and water system facilities with attribute data on all elements. The project also included the development of a systematic flushing plan to improve water quality of the City's water system.

→ Project engineer for San Gabriel Valley Water Company's two water system master plans, for their Los Angeles County Division and for the Fontana Water Company, California. Mr. Huang served as the hydraulic modeling lead for this fast-paced project, completing two water system master plans within a five-month period. This project was in preparation for San Gabriel's rate case to the CPUC, providing project justifications for use in the rate case.

→ Project engineer for Antelope Valley East Kern Water Agency's Water System Master Plan, California. This first-ever master plan for AVEK provides a comprehensive evaluation of AVEK's demands, water supply reliability, water banks, water system, staffing, replacement programs, SCADA system, water quality, design standards, and seismic reliability. These recommendations were combined into a Capital Improvement Program.

→ Project engineer for the OneWater Plan for the City of South Pasadena, California. The plan consists of a water, recycled water, wastewater, and stormwater master plan for the City, integrating all water-related utility services for the City. The project includes water and wastewater hydraulic modeling, supply alternatives evaluation, recommendations, and capital improvement program development.

→ Task engineer for One Water Los Angeles, California, Alternatives Evaluation. In OWLA, the project looked at the integration of all the City's water assets, including imported water, groundwater, wastewater, recycled water, stormwater, and river flows. Mr. Huang was responsible for identifying

large scale projects, identifying major criteria, and evaluating the projects based on that criterion to create portfolios of projects for the City. The portfolios were evaluated to create a recommended plan for the City.

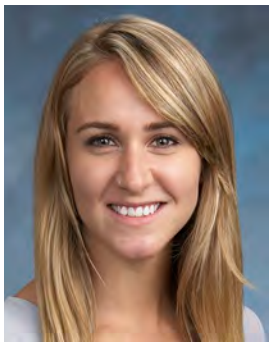
→ Technical manager for the Los Angeles County Department of Public Works District 29 Water System Master Plan, covering the communities of Malibu and Topanga, California. He was responsible for the technical execution of the high-profile project, which was driven by community concern due to the inability for the community to obtain building permits in certain communities due to the lack of fire flow. The project included demand projection, criteria development, development of the first hydraulic model for the system, hydraulic evaluation of the water system, energy optimization evaluation, water quality evaluation, asset management evaluation, and development of a Capital Improvement Program including impacts on rates.

→ Project manager and technical lead for California Water Service Company Westlake Water Supply and Facilities Master Plan. The project included demand projections, water supply evaluation, facility assessment, hydraulic modeling, and system evaluation. In the water supply evaluation, the reliability of the existing water supply was evaluated, with recommendations for future study, expanding other potential supply sources and expansion of recycled water. The facility assessment included an evaluation of useful life of remaining facilities and a recommended replacement program. The model included the creation and calibration of a new model in InfoWater, and the model was used for hydraulic evaluation under existing and future demand conditions. Recommendations were made and a Capital Improvement Program was developed to address system deficiencies and future growth.

→ Task leader for the City of Ontario Water and Recycled Water Master Plan, California. Evaluated the existing potable water system, as well as development of potable and recycled water for a proposed development with an estimated 100,000 population. Directed a team performing the demand forecast and projection, hydraulic model development and calibration, and the hydraulic system evaluation for the potable water system. He also provided technical review for the master plan.

→ Project engineer for the City of Riverside Water Master Plan, California. Responsible for leading the project team and technical aspects of the project. The project included the development of a 24-hour H2OMAP Water model from the City's GIS. Existing demands were evaluated, and future demands were projected based on empty parcels. The water distribution system was evaluated for hydraulic deficiencies and future growth once the model was developed, and a $160 million Capital Improvement Program developed. An infrastructure replacement program was also developed in addition to the CIP. The project also included a non-potable supply assessment, evaluating the feasibility of using out-of-service groundwater wells for use as non-potable supply for irrigation. After the completion of the project, he provided on-call hydraulic modeling and master planning services to the City to address developments or other pending issues.

→ Project engineer for the City of Fountain Valley Water Master Plan, California. Leading the project team, he oversaw the technical aspects of the project. The project included the development of a water system GIS from paper maps and creation of a hydraulic model. The study also included a full water supply evaluation, focusing on reliability and quality of the water supplies. Evaluation of the water system included not only a hydraulic evaluation through buildout, but a condition assessment of existing facilities, an asset register compliant with GASB34, and development of a Capital Improvement Program. Subsequent to the completion of the report, Mr. Huang provided additional hydraulic evaluation services to the City.



Education

BS (Hons) Environmental Engineering, Florida Gulf Coast University, 2012

Licenses

Civil Engineer, California

Professional Affiliations

California Water Environment Association

American Water Works Association

Awards

Florida Gulf Coast University Alumni Soaring Eagle Award, 2021

Water For People's Kenneth J. Miller Volunteer Award, 2018

Theresa A. Raasch, P.E.

Teri Raasch is an environmental engineer with experience in the design and planning of water and wastewater treatment facilities. She has provided engineering design and construction services for several treatment facilities for clients such as the Orange County Sanitation District, City of Lubbock, Texas, and City of Palm Springs, California. Her areas of expertise include hydraulic analysis, design for headworks and solids handling facilities, life-cycle evaluations, alternatives analysis, and cost estimating.

Relevant Experience

→ Design manager for the County of Hawaii, Hawaii, Hilo WWTP Digestion, Solids Handling, and Headworks Improvements Project. This project includes new headworks, DAFT retrofit, new digesters, rehabilitating the existing solids handling building, and cost saving ideas to meet funding limitations. It investigates serious corrosion concerns and includes robust design to meet ultimate buildout flow of 20 mgd.

→ Assistant project manager for Orange County Sanitation District, California, Primary Sedimentation Basins No. 6-31 Reliability Improvements at Plant No. 1. This project included tight budget constraints and routine cost estimate updates during fluctuating markets. She led the team to design upgrades to primary sludge pumping system, primary influent splitter box, and foul air sump condensate.

→ Project engineer for the San Francisco Public Utilities Commission (SFPUC), California, Southeast Plant's New 250-mgd Headworks. The project replaces two existing headworks facilities with a single new headworks to significantly increase screening and grit removal and to provide plant staff and the surrounding community with the highest level of standards for reliability, aesthetics, odor control, and noise abatement. The project addresses major challenges including very tight site space, high groundwater, poor soils, heavy urban setting, extremely high influent grit loads from this combined sewer system and protecting SFPUC's major investment in state-of-the art solids treatment and handling facilities. Her responsibilities include design of new grit basins, grit handling, and primary influent distribution structures, hydraulic profile development and cost estimation. She also oversees the computational fluid dynamic (CFD) and physical modeling of various hydraulic structures that confirms the innovative solutions which optimize process performance and hydraulics of the new facilities.

→ Project engineer for grit system for El Pasto Water, Texas, Roberto R. Bustamante Wastewater Treatment Plant Headworks Improvements. She developed the hydraulic profile of the treatment plant at increased capacity of 120 mgd. She was also responsible for developing ideas to increase hydraulic flexibility for operations and identify hydraulic risks during construction.

→ Assistant project engineer for the City of Sunnyvale, California, Primary Treatment Facility Headworks. This project replaces aging headworks and primary sedimentation tanks with 60 mgd capacity. She led the design of a new screening facility, grit removal basins, and a grit and screenings handling and loading facility. She also assisted with design of the new influent pump station, performed hydraulic profile calculations, and developed the engineer's construction cost estimate for those areas.

→ Design engineer for the City of Palm Springs and Veolia Water West Operating Services, California, Wastewater Treatment Plant Upgrade Project. The project's tight budget incorporated necessary upgrades of the plant's headworks screenings and grit removal, primary clarifiers, primary sludge pump station, primary influent pump station, digester dome replacement, odor control, and sludge dewatering. She assisted in developing cost-saving alternatives for the primary influent pump station, digester dome replacement, odor control, and sludge dewatering facilities. She set the new plant's hydraulic profile and completed detailed design of influent metering and pumping, primary sludge degritting, and modifications to gravity thickeners and digester covers.

Theresa A. Raasch, P.E.

→ Hydraulics engineer for Orange County Sanitation District, California, 120-Inch Diameter Ocean Outfall Condition Assessment and Scoping Study (PS18-09). She led low flow hydraulics evaluation of the diffuser and identified mitigation measures for seawater intrusion and marine biofouling.

→ Hydraulics engineer for the Metro Wastewater Reclamation District, Denver, PAR 1225 South Headworks and Grease Processing Facility Improvements Project. This work involves extensive modifications to the existing screening, grit removal, and grease processing facilities for the 145-mgd South plant. She analyzed the hydraulics of the existing plant and developed a complete hydraulic profile for the preliminary design phase of the project.

→ Hydraulics engineer for the RP-1 Solids and Liquids Capacity Improvements project. She was responsible for developing hydraulic profile of plant at increased capacity of 80 mgd. She was also responsible for identifying solutions for improving influent plant metering, improving screen capture, achieving primary splitting, and simplifying plant operation.

→ Hydraulics engineer for the South Orange County Wastewater Authority, California, J.B. Latham Treatment Plant Facility Plan. The Facility Plan provided a 20-year planning window for liquid and solids treatment, flow analysis, odor control, energy management, site planning, and regulatory issues. Project included flow and plant capacity analysis, development and calibration of hydraulic profile, and report preparation.

→ Hydraulics engineer for Schneider Electric, California, Valencia Water Reclamation Plant ECM. She developed plant wide hydraulic model for exploring feasibility to expand plant flow to 48 mgd and manage flow splits to meet process goals under various conditions. She identified hydraulic constraints and developed cost-saving solutions to junction boxes which simplified plant hydraulics and resulted in desired flow splits.

→ Hydraulics engineer for Eastern Municipal Water District, California, San Jacinto Valley Water Reclamation Facility Plant 1 Rehabilitation. Her duties included analyzing influent flow data and developing the 23 mgd plant-wide hydraulic model to evaluate various rehabilitation alternatives.

→ Hydraulics engineer for Eastern Municipal Water District, California, Equipping of Plant 2B at Moreno Valley Regional Water Reclamation Facility. Her duties included analyzing influent flow data and developing the 28 mgd plant-wide hydraulic model to evaluate new splitter box locations and option for upgraded secondary treatment processes.

→ Engineer for San Luis Obispo County, California, Los Osos Water Recycling Facility Project. The project included a new plant, designed from headworks through tertiary treatment, with the effluent to be stored in a 37-acre-foot capacity reclaimed water storage pond. She assisted with chemical pump equipment evaluation and selection and was responsible for developing the engineer's construction cost estimate for the project. The $46 million estimate included extensive civil and yard work, a headworks facility, an oxidation ditch, secondary clarifiers, a return activated sludge/ waste activated sludge pump station, a filter influent pump station, tertiary filtration, ultraviolet disinfection, reclaimed water storage ponds, an effluent pump station, sludge storage tanks, a chemical facility, and a new dewatering facility.

Presentations/Publications

→ Lytle, T., Karam, W., Esquer, M.E., Hetherington, M. "So You Have a Grit Problem? Case Studies for Developing Customized and Successful Grit Removal Systems." *WE&T Journal*, Volume 30, Number 8, pp: 44-48, August 2018.

→ Lytle, T., Karam, W., Esquer, M.E., Hetherington, M. "So You Have a Grit Problem? Case Studies for Developing Customized and Successful Grit Removal Systems." *Presented at 2017 WEFTEC*, Chicago, IL, September 30-October 4, 2017.

→ Raasch, T., Karam, W., Esquer, M.E., Desai, J., Shih, V. "Moving and Removing Mountains of Grit at SFPUC's New 250 MGD Headworks." *Presented at 2021 WEFTEC*, Chicago, IL, October 15-20, 2021.

Education

BS Civil Engineering, California State University, Fresno, 2006

Licenses

Civil Engineer, Nevada, California

Professional Affiliations

American Water Works Association

California Water Environment Association – Central San Joaquin Section

Ryan F. Orgill, P.E.

Ryan Orgill has 17 years of experience in master planning, hydraulic modeling, sewer system management planning, urban water management planning, and geographic information systems (GIS).

Relevant Experience

→ Project engineer for the City of Cotati, California, Sewer and Water System Master Plans. Responsible for hydraulic model development and calibration, existing and buildout analysis of the water and sewer systems, development of capital improvements to mitigate existing deficiencies and serve future growth, development of a staged capital improvement plan, and development of the final Sewer and Water System Master Plan reports.

→ Project engineer for the Elsinore Valley Municipal Water District, California, Sewer System Management Plan, which involved development and review of all applicable SSMP requirements, including a system evaluation and capacity assurance plan.

→ Staff engineer for the Elsinore Valley Municipal Water District, California, Wastewater Master Plan Update. Responsible for development and calibration of the District's hydraulic computer model, evaluation of the District's existing collection systems, development of improvement recommendations to mitigate existing deficiencies and serve future growth, and preparation of the Master Plan report.

→ Project engineer for the City of Porterville Integrated Master Plan for water, wastewater, and storm drainage. The wastewater element also included an evaluation of the condition of the wastewater treatment plant. Carollo conducted a water demand analysis by looking at historical water production and consumption data as well as conducting an evaluation of per capita consumption.

→ Project manager/project engineer for the Padre Dam Municipal Water District's 2001 Integrated Facility Plan that addressed water, wastewater, and recycled water needs through 2020.

→ Hydraulic modeling lead for the City of Modesto, California, Wastewater Collection System Master Plan. The hydraulic model was originally constructed in H2OMap Sewer as part of the previous master plan. In advance of the wastewater collection system master plan update, the City contracted with Carollo to convert the hydraulic model from H2OMap Sewer to the more advanced InfoSWMM platform. Responsible for updating and recalibrating the InfoSWMM hydraulic model, which involved more sophisticated simulation of storm drainage system cross connections within the InfoSWMM model. Also responsible developing existing and future wastewater flow projections, improvement alternatives to mitigate existing capacity deficiencies and serve future growth, and a capital improvement plan.

→ Project engineer for the City of Fresno, California, Collection System Master Plan. Responsible for hydraulic model update and calibration of the City's all-pipe sewer system hydraulic model under dry and wet weather conditions, development of improvement projects to mitigate capacity deficiencies, and development of a capital improvement plan for the City.

→ Project engineer for the City of Oakland, California, Sanitary Sewer Collection System Master Plan. Responsible for construction of the City's hydraulic computer model using the InfoSWMM modeling software package, model calibration, capacity analysis, development of improvement projects to mitigate capacity deficiencies, capital improvement cost estimate, and preparation of a technical report documenting the results of the analysis for submission to the U.S. Environmental Protection Agency in accordance with the City's Stipulated Order. Construction of the City's hydraulic model included digitization of the major collection system facilities into the InfoSWMM hydraulic modeling software program, with several complex overflow structures and connections to the East Bay Municipal Utility District (EBMUD) interceptor. The model was calibrated to 140 flow monitoring locations for both dry and wet weather flow conditions,

approximately half of which recorded flow at City connection points to the EBMUD interceptor system.

→ Collection system engineer for the West County Wastewater District, California, District-Wide Master Plan. Responsible for preparation and calibration of a dynamic collection system model to evaluate wet weather storm events to simulate existing flow conditions.

→ Project engineer for the City of Tulare, California, Sewer, Water, and Storm Drainage Master Plans and Sewer System Management Plan. Tasks included creation and calibration of a dynamic hydraulic sewer system model to evaluate flow monitoring data, development of flow routing criteria, and evaluation of the existing sanitary sewer system to mitigate deficiencies and serve future growth.

→ Project engineer for the City of Turlock, California, Sanitary Sewer and Storm Water Master Plans. Responsible for overseeing the construction of the City's sewer and storm drainage system hydraulic models. The City's sewer collection system includes numerous direct storm drainage connections to the sewer system in the City's downtown area. As part of the analysis, several improvement alternatives were considered to alleviate capacity deficiencies in the majority of the sewer collection system in the downtown area, including replacing existing sewer pipelines with larger diameter sewers or removal of the direct storm drainage connections to the sewer. Costs associated with each alternative were prepared and presented to City staff, along with the pros and cons of each approach. Ultimately, the City's preferred alternative was to segregate the sewer and storm drainage collection systems. Preferred improvements to the sewer and storm drainage systems were incorporated into the Sanitary Sewer and Storm Water Master Plan reports.

→ Project engineer for the City of Chico, California, Sanitary Sewer Master Plan Update. Responsible for conversion and update of the City's previous HYDRA collection system model to the InfoSWMM hydraulic modeling software application. Current average and peak wet weather flows were developed based on the City's historical flow data and results of temporary flow monitoring projects. Buildout average and peak flows were projected for future land use areas, as identified in the City's General Plan Update. The project was calibrated to dry and wet weather flow conditions, and the collection system was analyzed under current and buildout peak flow conditions. Several pipeline improvement routing options were considered and analyzed based on costs and non-cost factors, and the preferred improvement alternatives were included in the Master Plan report.

→ Project engineer for the City of Cotati, California, Sewer and Water System Master Plans. Responsible for hydraulic model development and calibration, existing and buildout analysis of the water and sewer systems, development of capital improvements to mitigate existing deficiencies and serve future growth, development of a staged capital improvement plan, and development of the final Sewer and Water System Master Plan reports.

→ Staff engineer for the City of Galt, California, Wastewater Collection, Water Distribution, and Storm Drainage Master Plans. Responsible for calibration of the hydraulic computer model to both dry weather and wet weather conditions, assistance with preparation of the Master Plan report, and development of a staged capital improvement plan for the City.

→ Project engineer for the City of Tulare, California, Sewer System Master Plan. Responsible for hydraulic model creation and calibration, development of analysis criteria, evaluation of the City's existing sewer collection system, development of improvement projects to mitigate existing deficiencies and serve future growth, and development of a staged capital improvement plan.

→ Project engineer for the City of Tulare, California, Sewer System Management Plan, which included development and review of a system evaluation and capacity assurance plan, overflow emergency response plan, and a fats oils, and grease control plan.

Education

BS Civil & Environmental Engineering, University of South Florida, 2012

BS Microbiology, University of South Florida, 2006

Licenses

Civil Engineer, California

Professional Affiliations

American Society of Civil Engineers

- Truckee Meadows Branch YMF Director at Large 2016-2017

Florida Water Environment Association

- Manasota Chapter YP Coordinator 2013-2014
- Students and Young Professionals Committee Chair 2014-2016

ACE Mentors of Sarasota, Treasurer 2014-2015

Danielle M. Orgill, P.E.

Danielle Orgill joined Carollo in 2014. Her experience includes hydraulic modeling, planning, asset management, water, and wastewater treatment, and infrastructure design.

Relevant Experience

→ Project engineer for City of Chino Hills, California, Citywide Wastewater Master Plan Update. This ongoing project will update and evaluate the City's wastewater collection system hydraulic model. The project scope also included coordinating with a pipe inspection contractor to inspect up to 20 miles of pipeline. Responsible for evaluating the City's existing collections system and providing a recommended list of prioritized pipelines for inspection.

→ Modeler for the City of Riverside, California, Comprehensive Wastewater Master Plan, which included both treatment and wastewater collections. Carollo built the City's collection system model using the Innovyze InfoSWMM modeling software.

→ Hydraulic modeling for the City of Morro Bay, California, OneWater Morro Bay Plan. Responsible for overseeing the development of hydraulic models of the water distribution, sewer collection, and storm drainage systems. Improvement projects and a capital improvement plan were developed to mitigate capacity deficiencies.

→ Project engineer for the South Tahoe Public Utility District, California, Sewer System Hydraulic Model. Work included developing a permanent flow monitoring program, evaluating flow monitoring data to determine ADWF and wet weather components for each basin, identifying basins to target for further I/I analysis and potential I/I reduction, converting the District's hydraulic model from InfoSewer to InfoSWMM, updating the hydraulic model based on recent GIS, calibrating the hydraulic model based on data gathered from the permanent flow monitoring program, evaluating the existing collection system and identifying recommended capacity improvements, and conducting hydraulic model training for District staff.

→ Project engineer for Vallejo Flood and Wastewater District, California, Wastewater Collection System Master Plan Update. This project involved developing a multi-year flow monitoring program, targeting basins with increases I/I rates, developing a hydraulic model in Innovyze's InfoWorks ICM, calibrating the model to ADWF and wet weather conditions (based on 2 years' worth of flow monitoring data), and a desktop condition assessment of more than 375 miles of collection system pipeline. A final capital improvement program will be developed to include recommended capacity upgrades as well as R&R projects based on the condition assessment.

→ Project engineer for City of Pinole, California, Sanitary Sewer Master Plan Update. This project included developing an all-pipe model in InfoSWMM, calibrating to historical flow monitoring data, identifying capacity deficiencies, evaluating alternatives, and developing recommended improvements. Specific improvements were developed to address SSO's in a particular area of the City to meet requirements set by the regional water quality board.

→ Project engineer for the City of Reno, Nevada, Northwest Reno Sewer Capacity Analysis and Master Plan. Carollo was retained to conduct a sanitary sewer capacity analysis and develop a master plan for the City's Northwest area. The team developed a temporary flow monitoring program; reviewed the existing SewerGEMS model to expand the City's wastewater collection system hydraulic computer model, including nine major trunk lines; calibrated the model using flow monitoring data; reviewed planning documents to determine existing and buildout wastewater flow projections; modeled existing and future system capacity evaluations; and developed prioritized, recommended capacity projects based on deficiencies.

→ Project engineer for the ongoing Collier County, Florida, Wastewater Collection System Model Update. Responsible for converting the SewerGEMS (Bentley) model to

InfoSWMM (Innovyze), calibrating the model under dry and wet weather conditions, evaluating the existing collection system, and developing future scenarios (to be evaluated under separate work assignment).

→ Project engineer for the City of King City, California, Wastewater Collection System Master Plan. Responsible for hydraulic model development and calibration under dry and wet weather conditions, evaluation of existing infrastructure, development of a capital improvement plan to mitigate existing deficiencies and serve future growth, and development of the master plan report.

→ Project engineer for the City of Cotati, California, Sewer System Master Plan Addendum. Responsible for flow monitoring data review; hydraulic model update and calibration; evaluation of previously identified improvements under existing, near-term, and buildout conditions; update of the capital improvement plan; and development of a technical report.

→ Project engineer for the Manatee County, Florida, Wastewater Collection System Master Plans. Responsible for coordinating field testing with a subcontractor (to install temporary flowmeters and pressure loggers), updating and calibrating complex collection system models for three service areas in SewerGEMS software (each with 150 or more active lift stations), and determining future infrastructure requirements for the 2020, 2025, 2035, and buildout planning periods based on model results. Assisted the project manager in preparing recommended capital improvement projects and completing the final master plan report.

→ Assistant project engineer for the Manatee County, Florida, Wastewater Collection System Master Plan Cost Estimate. Responsible for evaluating utility infrastructure in GIS and hydraulic models to identify existing, major infrastructure improvements (transmission force mains and master lift stations) for a planning level cost estimate.

→ Project engineer for the West County Wastewater District, California, Inflow, and Infiltration Reduction Evaluation. Responsible for evaluation and classification of January 2017 rainfall events, development of an estimate of the influent flow hydrograph for the January 2017 rainfall events using the District's hydraulic model, review of the current status of the ongoing flow monitoring program, and estimation of the potential reduction in peak flow that could be achieved through the District's ongoing infiltration/inflow reduction program.

→ Hydraulic modeling engineer for the City of St. Helena, California, Integrated Utilities Master Plan.

→ Project engineer for Marin Municipal District, California, Kastania Pump Station Recommissioning. The current condition of the Kastania Pump Station was assessed to determine its usefulness to the District and to identify rehabilitation requirements to place the facility back in service. Rehabilitation options were developed and evaluated and the option that would bring the pump station back into service the quickest was selected. Recommended improvements include installing approximately 200 feet of new discharge piping, replacing the original 30-inch butterfly valves, and replacing the existing soft starter with a variable frequency drive.

→ Project engineer for the ongoing Truckee Sanitary District, California, 2017 Hydraulic Modeling Assistance. The District hired Carollo to provide assistance with development and calibration of three of the four existing wastewater collection system models. The models are being calibrated to peak dry and peak wet weather flow conditions using flow monitoring data from the 2016 and 2017 storm season.

→ Project engineer for the ongoing Truckee Sanitation District, California, Hydraulic Model Updates. Responsible for evaluating and updating three separate sanitary sewer hydraulic models (InfoSewer), calibrating the model under dry and wet weather conditions, evaluating the collection system under existing and buildout flows, and identifying improvements necessary to mitigate capacity deficiencies.

Education

BS Civil Engineering, California State Polytechnic University, Pomona, 2012

Licenses

Civil Engineer, California

Professional Affiliations

American Society of Civil Engineers

California Water Environment Association

Other Accomplishments

Permaculture Design Apprentice

Ryan M. Hejka, P.E.

Ryan Hejka is a civil engineer with four years of professional experience. He is specialized in water and recycled water system hydraulic modeling and master planning projects and is skilled in the use of a wide variety of hydraulic modeling packages including InfoWater, H_2OMAP, Mike Urban, and Water GEMs. In addition, he has extensive experience with ArcGIS and proficient in multiple programming languages that he utilized to build several customized water optimization models and tools for water agencies. Recently, Ryan has been involved in designing pump stations, pipelines, and reservoirs. In addition, he has extensive experience with AutoCAD and Sketchup and has developed models and tools to visualize the layouts of facilities in 3D.

Relevant Experience

→ Staff engineer for the Water and Recycled Water Master Plan for UC Irvine, California. The project includes the creation of water system and recycled water system models from AutoCAD maps, as well as a blueprint for additional facilities for UC Irvine to handle their projected growth and development on campus. This is the first water and recycled water master plan for UC Irvine. He was responsible for the model network creation from UCI's water system maps in AutoCAD, as well as the preparation of the model calibration plan.

→ Staff engineer/modeler for the 2015 Comprehensive Facilities Master Plan for Padre Dam Municipal Water District, California. This integrated master plan involved the District's water, wastewater, and recycled water infrastructure. The project included (recycled) water demand/sewer flows forecasting, water supply analysis, hydraulic model updates for the water and recycled water systems, development and calibration of a new sewer system model, and field condition assessment of key findings. He was responsible for the modeling of the existing and future infrastructure. The feasibility of the wastewater plant expansion for an IPR project was also evaluated. The findings were combined into a comprehensive CIP and water master plan report.

→ Staff engineer/modeler for the Integrated Water, Wastewater, and Recycled Water Master Plans for the City of Oceanside, California. He was responsible for coordinating data gathering, supply analysis, and preparing the report on this $1.2 million assignment. The project involved water demand/sewer flows forecasting, water supply analysis, hydraulic model updates for the water and wastewater systems, and development of a new recycled water system model. In addition, the infrastructure needs of the development of the agricultural Morro Hills area, including soil percolation testing for feasibility analysis of septic tanks, were evaluated. CCTV of 60 sewer and 30 water pipeline segments was conducted. The findings were combined in a CIP and water master plan report.

→ Staff engineer/water system planner for the 2014 Water Master Plan Update for Mesa Water District, California. He was responsible for coordinating data gathering, designing the custom water supply and demand optimization model (WSDOM) in Microsoft® Excel, supply analysis, and preparing the report. This project involved demand projections, water supply analysis, hydraulic model update and calibration, extensive field condition assessment, and development of an optimization model. As part of the field condition assessment, all water system facilities (8 groundwater wells, 1 treatment plant, 2 reservoirs, 2 booster stations, and imported water connections) were visited. In addition, 2 miles of non-destructive pipeline testing was done. The findings of the modeling and condition assessment analysis were combined into a comprehensive CIP and water master plan report.

→ Staff engineer for the 2015 Water Master Plan for the City of Oxnard, California. This project included water demand forecasting, hydraulic modeling analysis using WaterGEMS, existing and future system analysis, development of a CIP including a rehabilitation and replacement program. The

findings were presented in a comprehensive water master plan report that was part of the overall Integrated Master Plan.

→ Staff engineer for the 2016 Water Master Plan for the City of Colton, California. This project included water demand forecasting, hydraulic model development and EPS calibration using field fire flow testing. Existing and future system analysis was conducted to develop a CIP including a rehabilitation and replacement program. The findings were presented in a comprehensive water master plan report that was developed in conjunction with the 2016 Sewer Master Plan.

→ Staff engineer for system-wide hydraulic model development for the Metropolitan Water District of Southern California. As subconsultant to DHI, Carollo assisted in the development, calibration, and validation of four separate hydraulic models that collectively cover Metropolitan's entire conveyance system. The models were developed from existing GIS data in Mike Urban modeling software. Ryan assisted in the model development, model calibration, model validation, and model development documentation.

→ Staff engineer/modeler for the on-call hydraulic modeling services for the expansion of the Los Angeles International Airport (LAX), California. Various fire flow scenarios were analyzed using the InfoWater hydraulic model developed by Carollo. He was responsible for updating the hydraulic model with their current facilities, hydraulic model analysis of pipeline velocities and residual fire flow pressures and providing future infrastructure recommendations. The modeling results were used to advise the design team on layout and sizing of pipelines, valve configuration, and residual pressure.

→ Staff engineer/modeler for the water and fire water system analysis for the Utilities Infrastructure (UIP) master plan for LAX. The UIP included analyzing future water demand projections based on passenger counts. As part of this effort, As-Builts were utilized to update the existing LAX hydraulic model. Alternatives were then developed in the model to analyze existing and future water and fire water system deficiencies. Improvement projects were then prioritized into a phased CIP within the UIP.

→ Project engineer for the on-call hydraulic modeling for the City of South Pasadena, California. The project consisted of various hydraulic modeling evaluations to the hydraulic impact and new water system infrastructure requirements when new developers are connected to the existing distribution system. The model that was developed and calibrated during a previous project was utilized for these studies.

→ Staff engineer/modeler for the Metropolitan Water District hydraulic model development and calibration. He was part of a team responsible for building the District's hydraulic model from existing GIS data. He also assisted in the calibration of the model using historic data, as well as the calibration the model to utilize active controls.

→ Assistant engineer for the planning, design, and construction services for the gravity sewer, lift station, and force main within approximately 0.5 square miles surrounding the Diamond Stadium in Lake Elsinore. The influent piping into Diamond Regional Lift station ranges from a 48-inch diameter pipeline to tributary pipelines as small as 8-inch diameter. The effluent pipeline was a dual system with a 24-inch diameter pipeline and a 36-inch diameter pipeline. The ultimate capacity of the lift station is designed at 20.0 mgd. His role involved using Elsinore Valley's Hydraulic model to analyze sewer flows to properly size and phase the development of the sewer pipelines into and out of the lift station. Additionally, he sized the wet well, pumps, and force main in the lift station. He was also involved in the design of the civil, structural, and mechanical drawings of the lift station and yard piping.

Education

MGIS, Penn State University, 2017

BA Geography, California State University, Northridge, 2001

AA Geology, Pasadena City College, 1997

Certifications

Certified Geographic Information Systems Professional (GISP), Geographic Information Systems Certification Institute, 2012

Jackie M. Silber, GISP

Jackie Silber is a geographic information systems (GIS) lead with 20 years of professional experience in GIS and technical training. Her experience includes geospatial GIS analysis for water resource planning, environmental remediation sampling, and demographic forecasting projects. Her GIS skills focus on geodatabase design and optimization, manipulation and conversion of projections, CAD and KML to GIS conversion, spatial analysis, automation of repetitive analysis using Model Builder and Python, and creation of cartographic figures.

Relevant Experience

→ GIS specialist for the 2021 Elsinore Valley Subbasin Groundwater Sustainability Plan. Provided mapping of well monitoring and septic tank conversion priority areas.

→ GIS specialist for the Charleston Water System (CWS), South Carolina, Water Distribution Master Plan Update. The project involves the update of the master plan and the development of the next 20-year Capital Improvement Plan (CIP) for the water distribution system. The project includes review and calibration of the existing all-pipes, development of water demand projections, and use of the calibrated model to support the existing and future system evaluation, criticality analysis, and development of CIP projects.

→ GIS specialist for the 2020 Recycled Water Master Plan update for West Basin Municipal Water District, California. As subconsultant, Carollo conducted a customer survey within multiple jurisdictions to prepare a recycled water demand forecast and update Capital Implementation Plan for Recycled Water Systems. The recycled water model, system analysis, and CIP were updated as part of this project that extends the planning horizon to year 2050.

→ GIS specialist for Long Beach Water Department's West Long Beach Advanced Treated Water Feasibility Study, California. As a subconsultant, Carollo led a team to evaluate and interview potential recycled water customers that could be served with recycled water or higher quality advanced treated water.

→ GIS lead for the GIS and Hydraulic Model Hosting and Maintenance Services project for Mesa Water District, California. Carollo is providing ongoing GIS support services until 2025.

→ GIS lead for the Mesa Water District, California, Free Chlorine Conversion Study. Ms. Silber developed figures to illustrate the supply sources at different demand conditions.

→ GIS specialist for the San Gabriel Valley Water Company Water System Master Plan Update, California. In addition to developing figures illustrating system deficiencies, Ms. Silber also developed a Python script to loop through an 11 million record table and sum the total water demands for every customer.

→ GIS specialist for the 2020 Integrated Water Master Plan and Urban Water Management Plan for Padre Dam Municipal Water District, California.

→ GIS specialist for the City of Banning, California. As part of the Integrated Master Plan, Ms. Silber developed figures representing the existing recycled water system as well as the proposed non-potable reuse system.

→ GIS specialist for the University of California, Irvine, Recycled Water System Analysis and Capital Improvement Program. Ms. Silber worked with hydraulic modelers to illustrate future system pressure deficiencies and pipeline velocities.

→ GIS specialist for the Stormwater Capture BMP Site Suitability Analysis for the Upper San Gabriel River Enhanced Watershed Management Program, California. Using a uniform grid, performed a multi-criteria decision analysis of valued and binary constraints to identify potential stormwater BMP sites in the Watershed as part of the Los Angeles County MS4 Permit Compliance. The constraints were scored and weighted to rank the locations. Iterative tasks such as classifying the locations were automated using python scripts.

Jackie M. Silber, GISP

→ GIS specialist for the Mission Creek and Garnet Hill Subbasins Water Management Plan for the Coachella Valley Water District, Desert Water Agency, and Mission Springs Water Districts, California. As part of a collaborative groundwater replenishment program, analyzed population and other demographic projections and mapped the watersheds and multi-habitat conservation areas.

→ Lead cartographer for the Los Angeles Department of Water and Power (LADWP), California, Owens Lake Groundwater Evaluation Program, which is a collaborative program between LADWP and the Inyo County Water Department to evaluate use of groundwater for dust mitigation on Owens Lake. Provided GIS support for well location identification and was responsible for managing the GIS data for the project. Working with hydrgeologists and modelers, mapped surface geology, groundwater contours, consumptive use, and water quality surrounding the Owens Lakebed. Also produced well log illustrations.

→ ArcGIS online administrator for the City of Reno, Nevada, Northwest Model Expansion and Capacity Analysis and Master Plan Story Map project. Ms. Silber created an interactive web-based Story Map to provide access to the proposed CIP projects and modeling results.

→ ArcGIS online administrator/technical advisor for the City of Houston, Texas, Northeast Water Purification Plant. Ms. Silber managed user access and advised Carollo staff on data management in ArcGIS Online/Collector.

→ GIS lead for the Condition Assessment of Buried Water Assets - Metallic Pipe, WSSC Water, Maryland. This project involves the development a condition assessment program for metallic water mains that includes evaluating innovative technologies for water main condition assessment. The program is to provide condition assessment of 75 miles of mains per year in diameters ranging from 6-inch to 96-inch. Integral to the program, is providing the analysis for identifying and prioritizing water mains for assessment as well as integrating the results into WSSC Water's asset management program. Ms. Silber coordinated GIS updates and supported asset management.

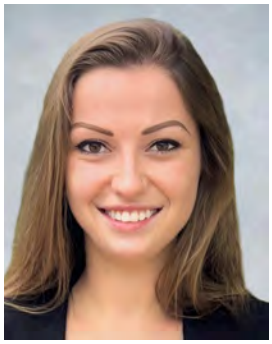
→ GIS specialist for the City of Medford, Oregon, Sanitary Sewer Master Plan. To help the City anticipate future needs, Ms. Silber, developed figures illustrating the locations of high I/I due to sewer trunk line deficiencies. Also investigated existing and future land use changes per parcel as part of a wastewater capital charge per equivalent residential unit analysis.

→ GIS specialist for the Hillsborough County, Florida, Capital Improvement Program. As part of the on-call potential Septic Replacement/Water Line Extension Program, Ms. Silber performed geospatial analysis to determine the number of septic parcels within wellhead protection and high hazard coastal areas. Additionally, produced figures of wastewater facilities and parcels served by current infrastructure.

→ GIS lead for the City of West Linn Stafford Area Sewer Evaluation. Ms. Silber developed watershed drainage basins based on DEMs to determine the urban reserve areas that could be served by the City's existing sanitary sewer system by gravity.

→ GIS specialist for the 2019 Financial Master Plan Outdoor Budget Allocation for Monte Vista Water District in Montclair, California. Ms. Silber led the GIS image analysis to determine the area of permeable surface area by parcel based on economic community type. This analysis helped the District to determine the amount of potable water used for irrigation.

→ GIS specialist for the Los Angeles County Waterworks District 29, California, Water System Master Plan. Compiled and developed a water infrastructure geodatabase and geocoded the water billing data to correlate metered usage data with parcels. Using current land use and future zoning parcel data, analyzed water demands for private customers. Also created pressure zones and allocated commercial demands for fire flow in InfoWater.



Education

BS Environmental Engineering, San Diego State University, 2020

AA Liberal Arts, Mira Costa College, 2017

Licenses

Engineer-in-Training, California

Professional Affiliations

American Water Works Association

San Diego County Engineers Council

Society of Women Engineers

Water Environment Federation

Cassidy Thornbury, E.I.T.

Cassidy Thornbury is an environmental engineer with three years of experience. She assists Carollo's multi-disciplinary teams on water, wastewater and infrastructure projects providing planning, designing and cost estimating services.

Relevant Experience

→ Staff engineer for the County of San Diego Public Works Department, California, Sewer System Management Plan (SSMP). To prevent sewage spills for the mutual protection of surface waters and overall health and safety, the SSMP was designed to confirm the continuous improvement of system performance, response, monitoring, data recording, and documentation for future system assessments. The project included an action plan implemented by the County to comply with permitting and government requirements.

→ Staff engineer for the Encina Wastewater Authority, California, Odor Control Master Plan. The project evaluated long-term planning for the odor treatments used at the Encina Water Pollution Control Facility. The existing odor control facilities and the sewer collection systems were investigated for operational issues, ventilation based on NFPA 820, removal efficiency, and evaluation of technologies for near-term and long-term measurements to control odors. Various odor control technologies, including liquid chemical and vapor phase treatment, were evaluated and Carollo also assisted in updating the air quality permits.

→ Staff engineer for the Ramona Municipal Water District, California, 2019 Water Master Plan. The project included data collection and evaluation of the existing water system, water demand projections, potable water resources planning and supply, hydraulic modeling, and improvement program development.

→ Staff engineer for the City of San Diego, California, North City Pure Water Facility (NCPWF). Carollo provided the final design of $30M NCPWF, the Pure Water Program's premier project and the first of its kind in California. The project included the design of the first potable water reuse advanced water treatment plant in the program, NCPWF, that will purify 34-mgd of tertiary effluent from the North City WRP to meet Title 22 California Code of Regulations for surface water augmentation indirect potable reuse (IPR) to discharge to Miramar Reservoir.

→ Staff engineer for the City of San Diego, California, Alvarado Water Treatment Plant (WTP) Biofilter Chlorine Piping. Design for chemical piping installation through existing pipe tunnels and galleries.

→ Staff engineer for the Las Virgenes Triunfo Joint Powers Authority (JPA), California, Pure Water Demonstration. JPC constructed an advanced water treatment plant (AWTP) to provide a new local water supply for the region and eliminate discharges of recycled water into Malibu Creek. Carollo constructed a purified water demonstration facility which required establishment of demonstration facility design and operational criteria, research and development of innovative technologies, development of public outreach, and demonstration of purified water that is in accordance with existing regulations. Each of these key elements is being incorporated into the process design and demonstration scale procurement of UF/NF, RO, and UV/AOP.

→ Staff engineer for the Elsinore Valley Municipal Water District (EVMWD), California, Program Management Services. As part of this $150M capital program spanning two water reclamation facilities, Carollo prepared the recovery program schedule to get the program back on-track and maintain the schedule to assist with the day-to-day management of the consultants hired by the District. Carollo was retained to take over this program from another program management firm and has not only helped the District re-secure their funding source that was in jeopardy, but also brought several program management dimensions back into compliance and proactive management.

→ Staff engineer for the City of Barstow, California, EDA/EPA Grant Wastewater

Cassidy Thornbury, E.I.T.

Treatment Plant (WWTP) Improvements. The Project involves design reports and a rapid assessment of existing conditions at the WWTP.

→ Staff engineer for the Encina Wastewater Authority, California, Major Plant Rehabilitation Project. Carollo provided engineering services during construction (ESDC) for general improvements that included aeration basin upgrades, diffuser replacement, grit upgrades, upgrades to three odor reduction facilities, and primary effluent conveyance system rehabilitation.

→ Staff engineer for the Irvine Ranch Water District, California, Primary Disinfection Facility (PDF) Sodium Hypochlorite. The District is replacing existing chlorine as facilities with bulk sodium hypochlorite as a disinfectant, and this project replaced the chlorine gas system at the PDF. The project included sodium hypochlorite storage and feed and surge tank layout and configuration, structural evaluation, HVAC/mechanical evaluation, EI&C, and project management.

→ Staff engineer for the County of San Diego Public Works Department, California, Los Coches Streambed Stabilization. To prevent future spills during storms, the County retained Carollo to perform a detailed evaluation of the facilities and the Creek. Originally constructed with Vitrified Clay Pipe (VCP), sections of piping have been repaired and replaced with Polyvinyl Chloride (PVC) pipe prior to evaluation. The evaluation assessed the existing cover over the identified vulnerable sewer assets by confirming elevations, locations, encasement, and overall condition assessment. Design and construction of Carollo's recommendations followed. The project included lining the reach using cured in place pipe (CIPP) liner, manhole improvements, traffic control planning, erosion control, and environmental planning.

→ Staff engineer for the County of San Diego Public Works Department, California, San Diego River Basin Sewer Improvements. This phased project included removing approximately 13,000 feet of Techite pipe from the conveyance system to make improvements to the other sewer main pipe and manholes as needed. The Polyvinyl Chloride (PVC) and Vitrified Clay Pipe (VCP) sewer mains were assessed and Carollo provided rehabilitation and replacement.

→ Staff engineer for a Confidential Client, Oregon, Semiconductor Facility Expansion Design. Carollo designed the expansion of an existing industrial wastewater and recovery plant that meets Client water quality goals and to ensure that reclaimed water is sent to their facilities with 100% uptime. Design for the plant expansion consists of additional lanes for BNR, MBR, EQ; evaluation of new flows and loads; optimization of salt storage facility and dewatering facility; addition of odor control; cathodic protection on new/existing steel tanks; new pilot building; expansion of RO system. This project was design-build and Carollo's scope of work consisted of pre-planning/programming, design, and services during construction.

→ Staff engineer for the Hi-Desert Water District, California, Collection System Phase 1. Design and construction of three sewage lift stations.

→ Staff engineer for the Eastern Municipal Water District, California, Warm Springs Lift Station Rehabilitation (WSLS). Replacement of the existing WSLS with a new lift station constructed adjacent to the existing WSLS site that incorporated submersible variable speed pumps utilizing constant level control and will have an invert level in the wet well similar to the existing station. The project included site planning, EI&C, manhole replacement, assessment, cost estimating, preliminary and final design, construction sequencing, project management, and QA/QC.

Kevin Krajewski, PE

Role: Flow Monitoring Technical Lead

Education
B.S., Mechanical Engineering,
University of California – Davis, 1995

Registration
Mechanical Engineer, CA (M31744)

Joined V&A
1996

Total Years of Experience
27 years

Training and Certifications

- Asbestos Awareness
- Confined Space Entry-Certified
- Basic CPR/First Aid

Publications

- "You Can't Squeeze Wine from a Stone: The Success of Napa Sanitation District's I&I Reduction Program," WEFTEC Annual Conference, 2017 (Damron A., Winkelman M)
- "Collection System Flow Monitoring Technology at EBMUD," WEFTEC Annual Conference, 2009
- "Sacramento Regional County Sanitation District Interceptor Sulfide Generation Model," WEFTEC Annual Conference, 2007
- "Ahead of The Flow," Public Works Magazine, 2006
- "Oro Loma Sanitary District Bockman Lift Station: Flow Monitoring and I/I Analysis – A Case Study," CWEA Conference, 2004
- "Cost-Effective Collection System Assessment," HWEA Collection Systems Conference, 2003

Professional Summary

Kevin's expertise includes flow monitoring and analysis of inflow and infiltration (I/I) into collection systems, including development of synthetic I/I hydrographs and estimate of peak wet weather flows for design storm events. He has served as the QA/QC advisor and data manager and project manager on hundreds of projects for V&A throughout California and the Western United States. Kevin has been the project manager and technical advisor for all the following flow monitoring projects:

Relevant Experience

Eastern Municipal Water District (EMWD) Flow Monitoring & Model Calibration, Moreno Valley, CA

V&A completed sanitary sewer flow monitoring and rainfall monitoring with inflow and infiltration analysis over a period of approximately one month at 55 open-channel flow monitoring sites and five rain gauge locations. The purpose of this study was to measure sanitary sewer flows that can be used to calibrate the District's hydraulic model to prevent sanitary sewer overflow. V&A also performed a condition assessment on the diversion structures to confirm the flow routing in the system. V&A was retained the following year to conduct a similar flow monitoring and I/I analysis study on a different area of the EMWD system, which included 60 flow monitoring locations for approximately one month.

San Bernardino Municipal Water District 2018 Sewer Flow Monitoring and Inflow/Infiltration Study. San Bernardino, CA

V&A provided flow monitoring services at 20 sites for the San Bernardino Municipal Water District to assist with establishing baseline sanitary sewer flows, collect information pertaining to the capacity of the City's collection system, and perform rain-dependent infiltration and inflow (RDI/I) analysis. The flow monitoring was performed in a phased approach. Phase 1 consisted of 10 locations for 6.5 weeks on large-diameter pipelines intended to capture flows through main trunk lines and isolating major sewage basins. Phase 2 consisted of 10 locations for 4.5 weeks on small-diameter pipelines intended to measure flow rates within isolated smaller basins of specific usage types (i.e., residential, commercial, etc.). V&A prepared a technical report to summarize the field study and present results of monitoring and RDI/I analysis.

City of Anaheim West Anaheim 2015 Sanitary Sewer Flow Monitoring at 15 Sites for 3 Months. Anaheim, CA

V&A has completed sanitary sewer flow monitoring and rainfall monitoring within the west area of the City of Anaheim collection system. The analysis was performed over a consecutive 3-month period with open-channel flow meters at 15 sites and rain data collected from four rain gauge locations. This study established the baseline sanitary sewer flows at

the flow monitoring sites, estimated available sewer capacity, isolated inflow and infiltration (I/I) response, and included I/I analysis.

West Valley Sanitation District 2015 Flow Monitoring & I/I Study

V&A was retained by West Valley Sanitation District (District) to perform seasonal flow monitoring and inflow/infiltration (I/I) analysis throughout the District. Flow monitoring was performed at 19 locations from February to April in 2015. The purpose of this study is to establish baseline sewer flows at the established monitoring sites, estimate available sewer capacity, and isolate I/I response and perform I/I analysis. The study is part of an ongoing I/I reduction effort by the District.

Port of Oakland - Oakland International Airport Sanitary Sewer and Lift Station Flow Monitoring. Oakland, CA

The objective of the flow monitoring project was to verify actual sanitary sewer flow rates at key nodes within the Port of Oakland (Port) collection system and perform infiltration/inflow (I/I) analysis. Five flow meters and two rain gauges were installed for two months to capture wet weather flows which discharge into the EBMUD left station. Additionally, V&A performed lift station flow monitoring at Sanitary Sewer Lift Station No. 6 and No. 8 within the at the Oakland International Airport in Terminal 2 in Oakland, California. Lift station monitoring included installing state loggers on the pump station leads to monitor pump lead/lag On/Off timing, and level loggers to verify wet well fill volume and fill rates. The flow monitoring and lift station data was analyzed for I/I response and submitted in a final report.

City of Riverside Master Plan Flow Monitoring, Riverside, CA

V&A performed wet weather sanitary sewer flow monitoring services within the City of Riverside (City) to establish average dry weather flows and evaluate the inflow and infiltration (I/I) response at 60 open-channel flow monitoring sites within the City's sanitary sewer system. The duration of the work was 1 month; pipe sizes ranged from 8 inches to 51 inches in diameter. This project was in support of a master planning effort.

City of Banning Master Plan Flow Monitoring, Banning, CA

V&A performed wet weather sanitary sewer flow monitoring services within the City of Banning (City) to establish average dry weather flows and evaluate the inflow and infiltration (I/I) response at 9 open-channel flow monitoring sites within the City's sanitary sewer system. The duration of the work was 1 month; pipe sizes ranged from 12 inches to 30 inches in diameter. This project was in support of a master planning effort.

Napa Sanitation District: Flow Monitoring & I/I Mitigation Services, Napa, CA

V&A has been conducting yearly, ongoing flow monitoring and I/I investigation services within the Napa Sanitation District (NSD) since 2005. In 2015, flow and rainfall monitoring were performed over a period of approximately one month at 23 open-channel flow monitoring sites and two rain gauge locations. The purpose of this study was to measure sanitary sewer flows at the flow monitoring sites, estimate available sewer capacity and conduct analyses pertaining to infiltration and inflow (I/I) occurring in the basins upstream from the flow monitoring sites. The final report also included recommendations regarding examination of reduction needs to determine a future I/I reduction program. V&A performed additional night-time I/I reconnaissance to investigate the collection system for sources of infiltration.

Cupertino Sanitary District—Wet Weather Open Channel Flow Monitoring at 28 Sites for 6 weeks. Cupertino, CA

V&A was retained to monitor 28 open channel sanitary sewer flow monitoring and 3 rain gauge locations with inflow and infiltration (I/I) analysis within the District. The purpose of this study was to measure sanitary sewer flows at the flow monitoring sites, estimate available sewer capacity and conduct analyses pertaining to infiltration and inflow (I/I) occurring in the basins upstream from the flow monitoring sites.

Downtown City of Santa Monica Flow Monitoring. Santa Monica, CA

V&A performed sanitary sewer flow monitoring at for the City of Santa Monica 25 open-channel sites over a two-week period in November 2015. The purpose of this study was to establish the baseline and peak flow conditions with results used for an Environmental Impact Report. V&A prepared a report summarizing peak recorded dry weather flows, levels, d/D ratios, peaking factors, and rim-to-invert measurements per site during the flow monitoring period.

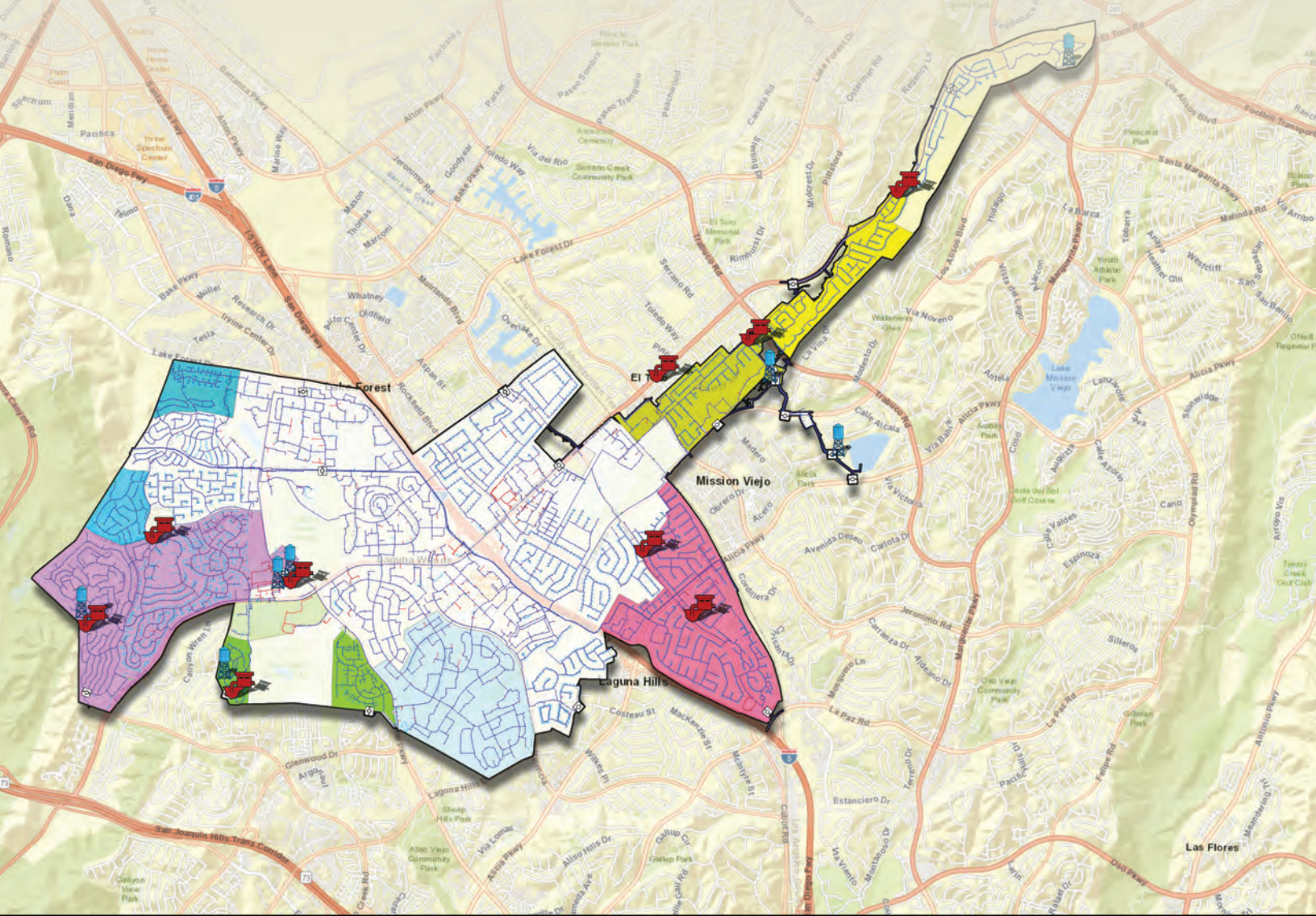
ARCADIS

Proposal

El Toro Water District

Design Engineering Services
Water and Sewer Master Plan Update

February 2022



February 9, 2022

Arcadis U.S., Inc.
320 Commerce
Suite 200
Irvine, California 92602
T: 714 730 9052
F: 714 730 9345
W: arcadis.com

Hannah Ford, PE, Engineering Manager
El Toro Water District
24251 Los Alisos Boulevard
Lake Forest, California 92630

Subject: Proposal for Water and Sewer Master Plan Update

Dear Ms. Ford and Evaluation Committee Members,

El Toro Water District's (ETWD's) goal is to update or build new hydraulic models to evaluate its water distribution and sewer collection system with the objectives to **reduce operations and maintenance and energy costs, correct identified deficiencies, comply with regulatory requirements, and meet redevelopment driven demands.**

Since the completion of ETWD's last Water and Sewer Master Plan in 2005, water and wastewater utility planning and operations have become more complex. Agencies are now "operating in a different world". For ETWD, water conservation efforts have resulted in reduced water demand and wastewater generation. Reduction in demand and increase recycled water use has caused longer residence time in the water pipes leading to loss of chlorine residual, increased microbial activity and nitrification potentially compromising compliance with the Safe Drinking Water Act, particularly for nitrite, coliform bacteria and chlorine residual. At least one location requires frequent flushing (up to three times a week) to avoid nitrification and maintain target chlorine residual.

Recognizing ETWD's objectives, Arcadis has been following the progress since completing your Urban Water Management Plan in 2021. Acknowledging ETWD's existing challenges and its desire to optimize operation, Arcadis has assembled a team of experts in distribution system and collection planning, operations, and modeling to assist.

Arcadis brings the following features to assist ETWD:

Focus on Project Priorities. Finding the best path forward for the hydraulic models, solving water quality especially flushing issues, and identifying cost-effective solutions to improve operations - optimizing energy use and reducing O&M costs.

Streamline and Coordinate Efforts. Finding synergies in data collection, project meetings and interim deliverables for the Water and Sewer Master Plan. Having a local project manager and dedicated data coordinator who are familiar with ETWD.

Bring Top Notch Quality Control Review. Using Arcadis' top national experts to provide technical advisory guidance from the beginning as well as independent quality control review for each project milestone.

Think Beyond This Project. Laying the path for ETWD's long-term success by ensuring that the processes and work produced as part of this master planning effort dovetail with ETWD's future work.

Thank you for the opportunity to respond and demonstrate our capabilities for this project. We look forward to continuing to support ETWD in its mission to provide a safe, and reliable supply of water, and wastewater service in the most efficient manner.

Sincerely,

Arcadis U.S., Inc.

Sarina Sriboonlue, PE, ENV SP
Project Manager
T: 714 508 2682 | E: sarina.sriboonlue@arcadis.com

Christine Cotton, PE
Senior Vice President | *Authorized Officer*
T: 213 797 5304 | E: christine.cotton@arcadis.com

Section A:
Project Experience

A Project Experience

This project requires a wealth of expertise in water and sewer master planning, demand forecasting, hydraulic model calibration, operations evaluation and optimization, water quality modeling, sewer flow monitoring, CIP planning as well as financial planning experience. ETWD plans for this project to be the predecessor to developing its asset management plan. Arcadis brings many advantages to deliver the best project for ETWD, these advantages include:

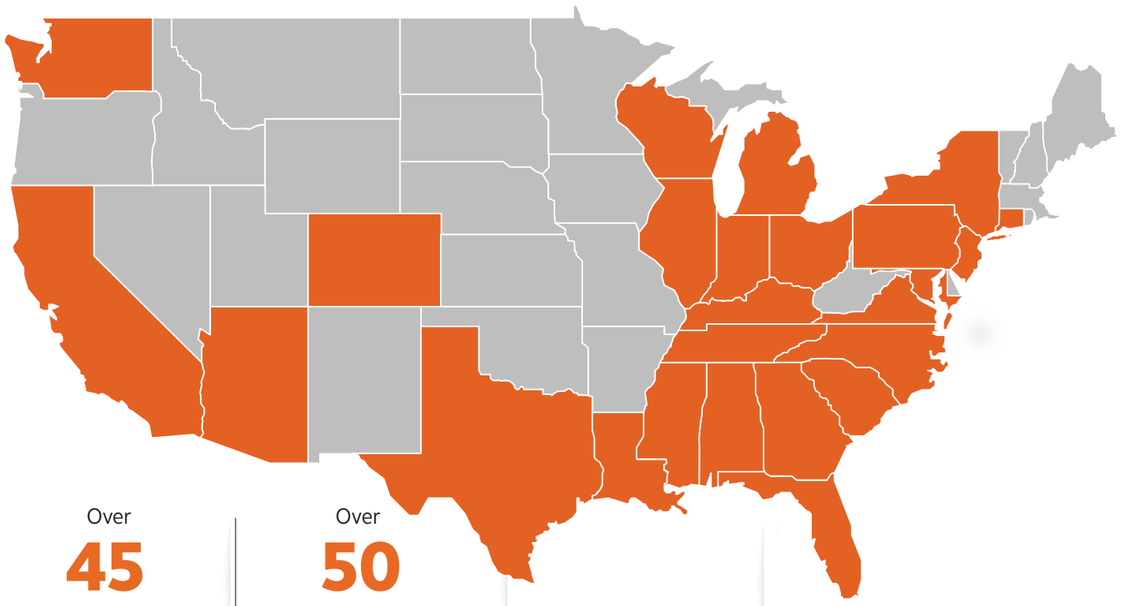
Wealth of Water and Sewer Master Planning Portfolio
Arcadis has completed more than 50 water master plans and 45 sewer master plans for utilities in combined 25 states, including many in southern California, for Newport Beach, Laguna Beach County Water District, Buena Park, MWDOC, among many others.

Industry-Leading Distribution System and Collection System Modeling Experience
Arcadis is well-versed in public and proprietary industry standard models, including Innovyze, CHI, and Bentley software's for hydraulic analysis, water quality analysis, and asset management.

Capital Improvement Program and Financial Advisory Expertise
Arcadis has proven processes for CIP planning that includes project definition, justification, prioritization, optimization, and streamlined execution.

Asset Management Expertise
Arcadis will engage our asset management experts in this effort to ensure that processes and work products dovetails with subsequent work.

Water Distribution and Collection System Modeling and Planning Experience



Over **45** Sewer Master Plans

Over **50** Water Master Plans

Relevant Project Descriptions

MWDOC and Retail Agencies' 2010, 2015, and 2020 Urban Water Management Plans and 2020 Water Shortage Contingency Plan

Arcadis assisted Municipal Water District of Orange County (MWDOC) and 21 retail agencies, including ETWD in the development of their 2010, 2015, and 2020 Urban Water Management Plans (UWMPs) and 2020 Water Shortage Contingency Plans (WSCP). Arcadis worked with MWDOC and retail agencies to create the following:

- Comprehensive UWMP documents that present an evaluation of the water supplier's reliability over a long-term (25-year) horizon
- An assessment of the present and future water supply sources and demand projections within the Supplier's service area
- An update on the Supplier's water resource needs, water use efficiency programs, water reliability assessment and strategies to mitigate water shortage conditions
- A WSCP designed to prepare for and respond to water shortages resulting from drought as well as emergency situations

Relevance to ETWD

- ☑ ETWD's 25-year water demand projections
- ☑ ETWD's 25-year water supply projections
- ☑ ETWD's evaluation of water sources
- ☑ ETWD's reliability assessment

Client Reference
Alex Heide, Water Resources Analyst | 714 916 0753 | aheide@mwdoc.com

Key Team Members
Sarina Sriboonlue, Shivani Shrotriya, Francesca DePrima

City of Newport Beach Water Master Plan and On-Call Hydraulic Modeling

Arcadis supported the City to develop its 2019 water master plan. This master plan included analysis of Newport Beach's water supply portfolio, land use based water system demand projections, hydraulic model development and calibration, and risk based CIP development, including Facility Assessment.

The project team analyzed historical water consumption data for every billing account in the City's service area for a 10-year period. A calibrated hydraulic model and design criteria were used to evaluate the existing and future system under current and built out demands to assess system performance. Deficiencies, if any, were identified during this hydraulic analysis and were incorporated in the CIP development process. The system was analyzed under existing demands against the design criteria.

The system storage and pumping were compared against the criteria to identify any deficiencies. The distribution system was analyzed using the hydraulic model under ADD, MDD and fire flow scenarios. The City's 30-year CIP was developed using a risk-based approach. To identify projects that should be incorporated into the City's CIP, a field assessment was performed to evaluate all facilities and a desktop analysis was performed on all pipes within the distribution system.

Relevance to ETWD

- ☑ Water demand analysis
- ☑ Distribution system hydraulic model development
- ☑ Existing and future system hydraulic analysis
- ☑ CIP development & prioritization
- ☑ Pump station sizing evaluation

Client Reference
Andy Tran, Senior Engineer | 949 644 3315 | atran@newportbeachca.gov

Key Team Members
Sarina Sriboonlue, Venkat Radhakrishnan, Celine Hyer, Ben Chenevey

ETWD's Five Lagunas and Village at Laguna Hills Water Supply Assessments

Arcadis prepared two Water Supply Assessments (WSA) for the proposed redevelopment of Laguna Hills Mall area – first for the proposed Five Lagunas Project and more recently for the Village at Laguna Hills Project which proposed to modernize the existing Laguna Hills Mall property.

The assessment addressed whether the projected supply for the next 20 years, based on normal, single dry, and multiple dry years would meet the demand projected for the project plus existing and planned future use within the ETWD's service area per requirements of Senate Bill 610. This experience and knowledge will be an asset to support this project since this is an objective for this master plan.

Relevance to ETWD

- ☑ Redevelopment scope and water demand and supply projections to 2040
- ☑ Evaluation of water sources for Laguna Hills redevelopment

Client Reference
Dennis Cafferty, General Manager | 949 837 7050
dcafferty@etwd.com

Key Team Members
Sarina Sriboonlue, Shivani Shrotriya

City of Buena Park 2018 Sewer Master Plan

Arcadis assisted the City of Buena Park in the development of its 2018 Sewer Master Plan. One objective of this Sewer Master Plan was to develop wastewater flow projections to determine the impact of the change in wastewater flow on future collection system capacities.

Arcadis selected a methodology that provided wastewater flow projections that are spatially distributed throughout the wastewater service area sufficient for hydraulic modeling and determination of required system improvements and expansions. The wastewater flow projection methodology involved developing wastewater flow factors based on wastewater flow patterns determined during the flow monitoring process, expressed as gallons per capita per day (gpcd) for the range of land uses present in the service area, and applying the flow factors to existing and anticipated future land use acreages.

Relevance to ETWD

- ☑ Vetting of hydraulic modeling software options
- ☑ Collection system model development
- ☑ Sewer flow monitoring
- ☑ Sewer generation factor update
- ☑ Collection system evaluation & hydraulic analysis
- ☑ CIP development and prioritization

Client Reference
Francisco Gutierrez, PE (formerly Associate Engineer with the City) | 714 860 8963 | fjgutierrez18@yahoo.com

Key Team Members
Sarina Sriboonlue, Venkat Radhakrishnan

LADWP Nitrification Mitigation Program

LADWP converted from chlorine to chloramines in their distribution system to reduce regulated disinfection byproduct formation. Chloraminated distribution systems are prone to nitrification when a combination of key factors are at hand, including low chloramine residual, warm water temperatures, and high cumulative water age.

Arcadis assisted with the plan to convert to chloramines, the nitrification sampling and monitoring plan, and ongoing nitrification mitigation efforts after conversion. Arcadis' specific roles included automating and improving LADWP's monitoring data analysis, identifying tank improvements at frequently nitrifying tanks, and running or facilitating bench, pilot, and demonstration studies of methods to control nitrification.

Relevance to ETWD

- ☑ Water quality issues in chloraminated distribution systems
- ☑ Nitrification prevention and control
- ☑ Nitrification sampling and monitoring plan
- ☑ Identifying distribution system improvements

Client Reference
Nancy Huynh | 213 367 3604 | nancy.huynh@ladwp.com

Key Team Members
Greg Imamura, Christine Cotton

LADWP Distribution System Hydraulic Modeling and Griffith Park Master Plan

Arcadis developed water distribution system hydraulic models for LADWP. The project team built and calibrated 23 individual models which accounted for complete representation of fifty-four pressure zones (with another twenty-one being model builds only)with a total mileage modeled of over 6,800. To help calibrate the models, three annual pressure surveys were performed, which included simultaneous hydrant pressure recorders (120) installed throughout the distribution system. The team installed the digital devices, tracked their location and status through smart field data collection tools and online dashboards, and processed the results to identify suitable calibration times and periods of peak water demands.

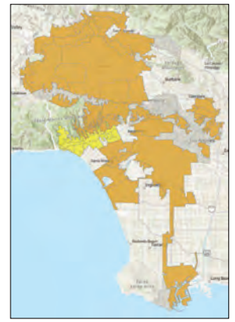
In the process of building and calibrating the models using the latest industry standards and advanced analytic techniques, the team has created standard operating procedures that have been adopted by LADWP staff. This documentation includes step-by-step process of model development, calibration, and future model updates and merges. The models are actively being used by LADWP for multiple purposes including developer requests, supporting leak detections, water age evaluations, and seismic resiliency analysis.

Griffith Park Master Plan

LADWP retained Arcadis to develop a master plan by creating a hydraulic model, calibrating based on field data collection, and developing distribution improvement alternatives for Griffith Park. The existing conditions of the park's distribution system were evaluated against multiple KPI's (hydraulics, water age, fire flow), while developing alternatives to maintain and improve the performance of the system.

Relevance to ETWD

- ☑ Distribution system model development and calibration
- ☑ Model training and as-needed analysis
- ☑ Water age evaluations
- ☑ CIP and master plan development
- ☑ Modeling software conversion
- ☑ Pump station sizing evaluation



Client Reference
Salman Sufi, PE, Project Manager | 213 367 1251 | Salman.Sufi@ladwp.com

Key Team Members
Venkat Radhakrishnan, Ben Chenevey, Greg Imamura, Christine Cotton

Distribution System DBP Mitigation

Arcadis worked closely with this Utility to develop cost-effective solutions in the distribution system for their rising TTHM levels. As part of developing and evaluating alternatives, the project team refined the Utility's hydraulic model and added a water quality modeling component (chlorine and TTHM formation) to evaluate mitigation technologies for the distribution system. By utilizing the water quality model, mitigation techniques were quantitatively assessed by comparing disinfection-by product concentrations to the Utility's level of service goals and regulatory requirements.

The team continues to develop more advanced water quality models for the utility to aid in future planning; some specific areas where the team has used modeling to evaluate effectiveness on reducing water age and TTHM formation including:

- Hydrant Flushing
- Tank Aeration
- Operational Adjustments
- Pipe Looping

Relevance to ETWD

- ☑ Distribution system model development and calibration
- ☑ Water quality modeling
- ☑ Evaluation of options to reduce water age
- ☑ Water age modeling
- ☑ Storage gap analysis
- ☑ Water source alternatives

Client Reference
Confidential Client, California

Key Team Members
Ben Chenevey, Greg Imamura, Jim Cooper

Sewer System Master Plan and Hydraulic Modeling On-Call

The City of Santa Rosa enlisted Arcadis to expand their existing hydraulic model to support their comprehensive master plan update. The model was recalibrated for dry and wet weather conditions to 34 flow meters. The updated model and the level of service criteria were used to evaluate the system capacity and identify portions of the system requiring improvements for existing and future (2035) conditions. Two sets of improvements (conveyance and conveyance/storage) were developed and sized to develop planning level cost estimates for eliminating capacity constraints throughout the system. The proposed improvements were then prioritized based upon the scale and severity of the system impact of the hydraulic bottleneck and the timing of the project need (existing or future conditions). The model results and recommended CIP were provided in an online, web enabled modeling and planning service iPS Capacity Management System.

Relevance to ETWD

- ☑ Collection system model calibration
- ☑ Level of Service criteria update
- ☑ System capacity evaluation and improvement recommendations
- ☑ CIP development and prioritization

Client Reference
Casey Claborn, Associate Civil Engineer | 707 494 2729
CClaborn@srcity.org

Key Team Members
Sarina Sriboonlue, Venkat Radhakrishnan, Pradeep Sudini

Laguna Beach County Water District Water Master Plan

Arcadis assisted LBCWD to develop its 2018 Water Master Plan. Arcadis updated LBCWD's distribution system hydraulic model (InfoWater) and validated it using SCADA data. Arcadis worked with LBCWD to update its system performance criteria that were used to analyze available storage and pumping capacities, and identify pipe / pressure improvements. Recommended operational changes focused on improving pressures (increasing Pressure Reducing Station setpoint and increasing number of pumps under peak demands).

To develop a holistic 10-year CIP, Arcadis used a risk-based approach based on an in-person condition assessment of six pump stations and a desktop analysis of pipe break history to determine conditions and Effective Useful Life (EUL) of these assets. Facilities and pipelines with the highest risk scores were prioritized and planning level budgets assigned.

Relevance to ETWD

- ☑ Demand analysis for a built-out service area (only redevelopment expected)
- ☑ Hydraulic model (InfoWater) update and calibration
- ☑ Identify operational changes at pump stations
- ☑ CIP development

Client Reference
David Youngblood, Former District Engineer | 714 538-5815 | dyoungblood@eocwd.com

Key Team Members
Sarina Sriboonlue, Venkat Radhakrishnan, Celine Hyer

City of Marysville Sewer Master Plan

Arcadis performed collection system modeling and master planning services to develop a Sanitary Sewer master plan for City. The master plan included CIP for sanitary sewer improvements to beyond year 2030. Arcadis developed a SWMM model for the City's existing collection system using available GIS information. A flow monitoring program and rainfall monitoring program for three months were conducted. Arcadis led the efforts of selecting and installing eight flowmeters and two rain gauges.

The model extent included the main sewer pipes in the City collection system with diameters ranges. After calibrating the model to the flowmeters data, the model was used to plan for potential solution to mitigate current and future hydraulic deficiencies. Alternatives to improve system conditions were evaluated, and feasible alternatives were costed and presented to the City. The result was a CIP that increases system capacity.

Relevance to ETWD

- ☑ Sewer flow monitoring
- ☑ Collection system modeling
- ☑ System improvement evaluations
- ☑ Sewer Master Plan development
- ☑ CIP development

Client Reference
Kyle Hoyng, PE Assistant City Engineer | 937 645 7376
khoyng@marysvilleohio.org

Key Team Members
Hazem Gheith

Section B:

Project Team Qualifications

B Project Team Qualifications

Arcadis has assembled a qualified team that is ready to work hand in hand with ETWD to meet its project goals. Our Project Manager, Sarina Sriboonlue has successfully delivered numerous projects for ETWD since 2010 (three Urban Water Management Plans and two Water Supply Assessments). Our Principal-In-Charge, Ufuk Erdal has successfully delivered four projects for ETWD with great knowledge of ETWD's expectations and delivery standards. Ms. Sriboonlue and Dr. Erdal are joined by a team of experts that has assisted ETWD's neighboring agencies, such as LBCWD and Newport Beach, to develop their master plans; built and calibrated hydraulic models and performed system analyses for agencies similar to ETWD as well as for large and complex local systems like for the OC San collection system and LADWP distribution system; and developed cost-effective solutions for distribution system water quality issues.

A brief synopsis of our proposed key personnel is provided below. Detailed resumes of the entire project team are provided in the appendix.

Project Management and Technical Advisory

Sarina Sriboonlue, PE, ENV SP | Project Manager

Ms. Sriboonlue's 16 years of consulting experience spans a wide range of water and wastewater planning projects in southern California. She assisted numerous water agencies in Orange County, including ETWD to develop their 2010, 2015, and 2020 Urban Water Management Plans. She prepared two Water Supply Assessments (WSA) for the proposed redevelopment of Laguna Hills Mall area (Five Lagunas and Village at Laguna Hills Projects). The UWMP and WSA work involve examining water demand and supply projections for ETWD's entire service area and for Laguna Hills redevelopment area, respectively. The work led by Ms. Sriboonlue will provide a foundation to the demand analysis for ETWD's Water Master Plan Update. Ms. Sriboonlue's other local planning projects include City of Newport Beach and Laguna Beach County Water District Water Master Plans, City of Buena Park's Sewer Master Plan and the City of Huntington Beach Water Use Efficiency Plan among others. Ms. Sriboonlue's strength is working collaboratively with large groups of stakeholders, guiding a diverse group to a common solution, and managing our experts to meet schedule and budget expectations.

Value to ETWD

- ☑ Project manager and technical lead for ETWD's 2020 UWMP and WSA for Laguna Hills redevelopment
- ☑ Familiarity with ETWD and neighboring agencies
- ☑ Collaborative management style to meet scope, budget & schedule
- ☑ **40+** Studies/Planning Projects Completed
- ☑ **70+** UWMPs Completed

Ufuk Erdal, PhD, PE | Principal-in-Charge and Technical Advisor (Water Quality)

Dr. Erdal will be responsible for all work executed under the project contract, guide Arcadis team with foresight, while coordinating and communicating with you, to see that your best interests are heard and served throughout the project. Dr. Erdal has 26 years of diverse experience and has successfully delivered four ETWD projects having a great knowledge of the ETWD's staff, facilities and more importantly knowing their expectations and delivery standards for every project executed. **In each ETWD project, he has led the development of the innovative solutions for upgrading El Toro Water Recycling Plant and identifying the upgrades and operational changes needed for handling biosolids generated at the Water Recycling Plant resulted in operational efficiencies and substantial cost savings.** He was instrumental for mitigating and resolving various water quality issues linked to water age, disinfection stability and nitrification in storage tanks and water distribution systems and control of disinfection by products formation at San Diego County Water Authority and a number of agencies across the US. He served as the director on the WRF Board of Directors between 2017 and 2020 to develop sustainable water management solutions.

Venkat **Radhakrishnan, PE, ENV SP** | Technical Advisor (Hydraulic Modeling)

Mr. Radhakrishnan is a water utility planning leader with over 15 years of experience with proficiency in utility water planning, hydraulic modeling, asset management, and data analytics. **He has extensive local modeling experience (LBCWD, Newport Beach, LADWP, Buena Park, Santa Rosa, among others) along with wide-ranging national and international knowledge in water/wastewater master plans, water resources, asset management, condition assessment, water reuse, pump station sizing and treatment plant hydraulics.** He will ensure that all industry leading and appropriate modeling practices are implemented on this project.

Celine **Hyer, PE, IAM** | Technical Advisor (Asset Management)

Ms. Hyer has over 32 years of experience in asset management planning, design and implementation for utilities using the EPA, WERF and ISO 55000 frameworks. She has led inventory, condition and risk assessments for water, wastewater, and recycled water infrastructure. totaling over 1,500,000 discrete assets. Ms. Hyer has created short-and long-range capital plans using business case templates and triple bottom line analysis. She has led the development of comprehensive asset management plans and asset management strategies for utilities across the U.S.

Robert **Ryall, PE** | Technical Advisor (Financial Analysis)

Mr. Ryall is a nationally recognized consultant with 20 years of expertise in financial and strategic planning across the US. He has assisted with over $2 billion in water and wastewater financing and has extensive experience in utility rate-making, impact fees, bond feasibility studies and acquisition/valuation analysis. Mr. Ryall has been involved in many strategic planning studies for water and wastewater utilities, including grant funding, master plans, capacity analysis, consolidation studies and asset management-related engagements.

Water Master Plan and Distribution System Hydraulic Modeling

Ben **Chenevey, PE** | Lead Distribution System Modeler

Mr. Chenevey has 10 years of experience as an environmental engineer serving as the Arcadis community of practice leader for water distribution system modeling, and vice-chair of the AWWA Engineering Modeling Applications Committee. **His national experience includes extensive knowledge of water distribution hydraulic modeling software with experience ranging from field testing for model development and calibration to advanced water quality and transient modeling.** Mr. Chenevey has used this experience to lead numerous modeling projects in California, including for LADWP, where he managed the development of 23 hydraulic models, three annual pressure surveys, and provided technical expertise and training.

Jim **Cooper, PE, ENV SP, CPM, CWO** | QC Reviewer (Water Modeling and Master Plan)

Mr. Cooper has 18 years of experience and is a certified operator in multiple states who balances technical expertise and practical field experience by leading teams to deliver innovative, practical and sustainable solutions with a career focused on water distribution systems. **He is a trustee for the AWWA, lead author for the latest edition of AWWA Manual of Practice 32, Computer Modeling of Water Distribution Systems and a AWWA Vernon Lucy national award recipient for his management of a team of over 50 experts in water distribution system modeling.**

Jim Cooper and Ben Chenevey, have provided InfoWater software training, hydraulics and water quality theory modeling training throughout the US and internationally. Our modeling process training and software training includes development of modeling manual, development of hands-on step-by-step exercises performed by ETWD staff, and question and answer sessions throughout the training. **Ben Chenevey** is also the lead author for the Journal AWWA feature article, Water Quality Modeling in Distribution Systems to be published in March 2022.

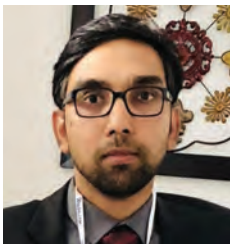
Greg Imamura, PE | Lead Water Quality Engineer

Mr. Imamura has 11 years of experience as a civil engineer and a certified water distribution system operator specializing in drinking water treatment and water quality throughout Southern California. He has conducted alternative analyses ranging from new and existing treatment systems to distribution system nitrification/DBP mitigation, allowing him to develop tools to allow for increasing objectivity in the selection process. He also has experience with a variety of water quality issues—including nitrification planning, corrosion analyses, and extensive work developing viable hexavalent chromium treatment for drinking water—and a strong background in work process optimization and large dataset analysis via projects with LADWP, PG&E, and other Southern California public and private utilities.

Christine Cotton, PE | QC Reviewer (Water Quality)

Ms. Cotton has 25 years of experience managing complex programs over her career, including program master plans, stakeholder development, capital improvements, and facilities start-up. The most recent program she led assisted a large Los Angeles client to develop its long-term source water treatment program for future regulatory requirements. She combines her talent of managing large multi-stakeholder programs with being a nationally recognized UV treatment expert and specializing in drinking water and recycled water treatment.

Sewer Master Plan and Collection System Hydraulic Modeling



Pradeep Sudini, PE | Lead Collection System Modeler

Mr. Sudini is a technical contributor to the WEF Collection system modeling technical group and has 15 years of extensive urban hydraulic and hydrology (H&H) planning experience for clients nationwide. His expertise includes developing H&H models, data management and analytics, flow monitoring, model calibration and validation, flow projections for sanitary sewer applications, and modeling manifolded pump stations and force mains. He is experienced in developing sanitary sewer models for master planning and consent order-driven projects. In Southern California, Mr. Sudini's current local projects include hydraulic modeling on-call services for the City of Santa Rosa and hydraulic modeling support for OC SAN Bay Bridge pump station design.

Hazem Gheith, PhD, PE | QC Reviewer (Collection System Modeling)

Dr. Gheith has 35 years of experience in hydrologic and hydraulics modeling of urban drainage. His specialized experience in mathematical modeling, combined with a solid background in hydraulics and applied physics resulted in key enhancements in hydraulic modeling methods. Dr. Gheith has used his vast expertise in hydrologic and hydraulics applications to evaluate and mitigate street flooding, water-in-basement, sanitary sewer overflows and combined sewer overflows. He has presented and authored several technical research papers on advancing the planning activities for tunnels, GI and RDII reduction.

Arcadis' quality control reviewers are accomplished authorities in their field of expertise:

Hazem Gheith is a leader in the collection system industry with many papers regarding RDII response in sewer systems. **Jim Cooper** is the lead author for the latest edition of AWWA M32 4th edition the most referenced manual for development, calibration, analysis, and maintenance of water distribution system models. **Christine Cotton** is a co-author for the USEPA's Ultraviolet Disinfection Guidance Manual.

Subconsultant | ADS Environmental Services (Sewer Flow Monitoring)

Founded in 1975, ADS is now the largest and longest serving flow services provider in the U.S. ADS has assisted thousands of municipalities around the world providing critical flow and rainfall monitoring data, including many hundreds of monitoring projects in California. ADS and Arcadis have partnered on numerous projects coast to coast, including for the City of Buena Park and Santa Cruz, CA. ADS is an organization with both a product and service offerings with internal functions ranging from product design and manufacturing, field services, data analysis and web-based reporting. ADS is committed to continuous improvement and has developed and adhere to the strenuous ISO 9001 quality management program for procedures including field services, data analysis services, project management, and R&D.

Section C & D:

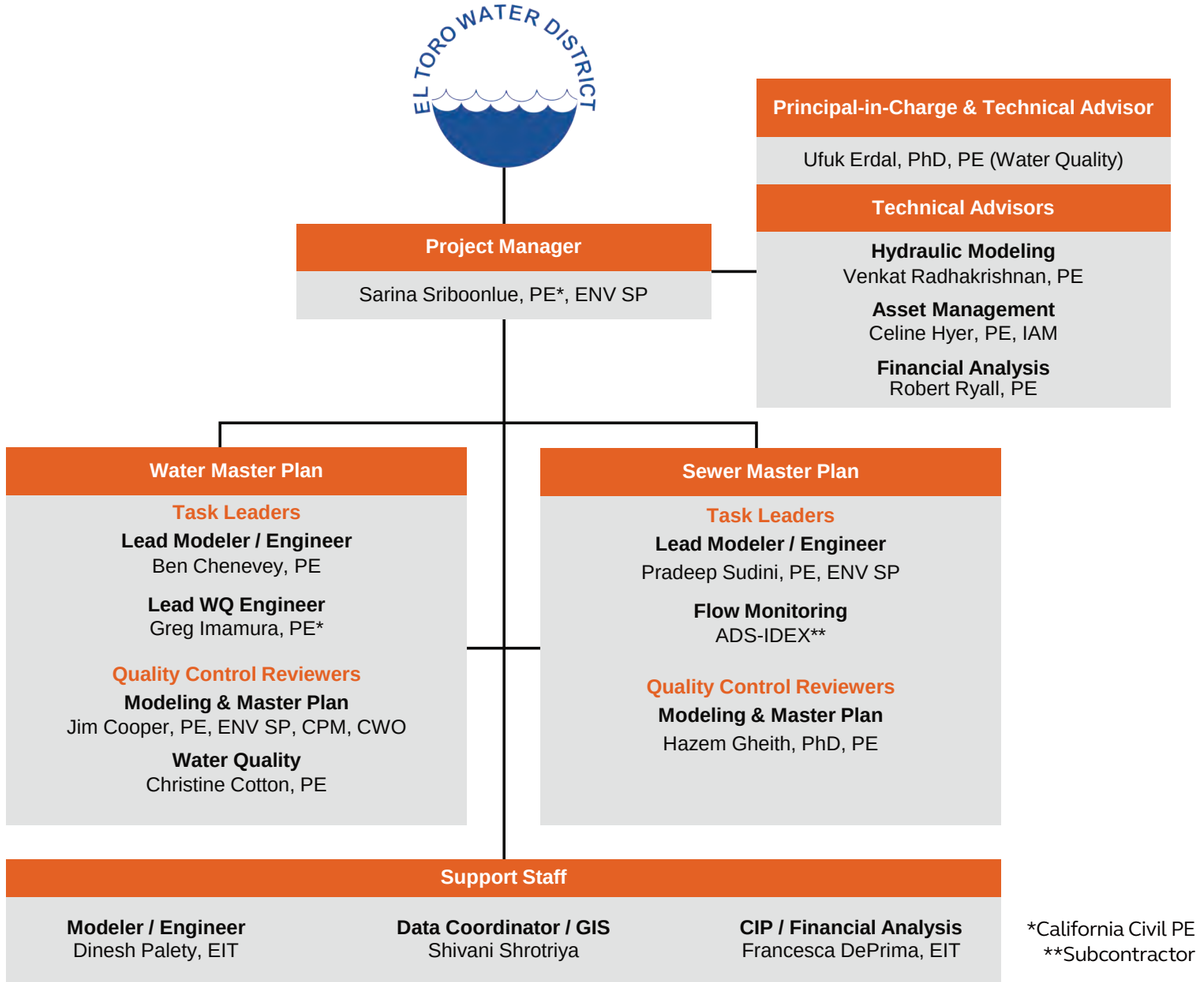
Organizational Chart and Project Team Workload

C & D Organizational Chart and Project Team Workload

Organizational Chart

The Arcadis core team consists of a local project manager, technical leaders, and project engineers. Our local team will collaborate with our national technical advisors to stay on top of industry and regulatory trends. Our integrated team will work seamlessly to apply the lessons learned by other communities to this project. Our proposed team members are presented on the organizational chart below.

The team shown on this organizational chart has successfully delivered multiple projects together, including all recent hydraulic modeling and master planning projects for southern California agencies.



*California Civil PE
**Subcontractor

Project Team Workload

We are committed to serving ETWD. We have the required personnel and availability to begin work immediately and successfully complete this project. Furthermore, we commit to providing additional resources as needed to supplement the proposed team to meet your needs.

The graphic below represents a projection of the Arcadis team's availability.

Arcadis Key Personnel % Availability

Project Manager and Principal-in-Charge

- 75% — **Sarina Sriboonlue,** PE, ENV SP
- 30% — **Ufuk Erdal**, PhD, PE

Task Leaders

- 50% — **Pradeep Sudini**, PE
- 50% — **Ben Chenevey**, PE
- 50% — **Greg Imamura**, PE

Support Staff

- 100% — **Dinesh Palety, EIT**
- 100% — **Shivani Shrotriya**
- 100% — **Francesca DePrima, EIT**

Technical Advisors and Quality Control Reviewers

- 30% — **Venkat Radhakrishnan**, PE
- 5% — **Celine Hyer**, PE, IAM
- 5% — **Robert Ryall**, PE
- 5% — **Jim Cooper**, PE, ENV SP, CWO
- 5% — **Christine Cotton**, PE
- 5% — **Hazem Gheith**, PhD, PE

Orange - availability for ETWD
Gray - current commitments

Section E:

Project Approach

E Project Approach

Project Understanding

Arcadis understands that ETWD's most recent Water and Sewer Master Plan was completed in 2005. Almost 20 years have passed and water / wastewater agencies in Southern California, ETWD included, are now "operating in a different world" namely:

- **Reduced Water Demand and Wastewater Generation -** Water conservation efforts have resulted in reduced water demand and wastewater generation. In the early 2000s, average flows going into ETWD's Water Recycling Plant (WRP) were around 5.2 mgd. In recent years, average influent flows have reduced to closer to 3.6 mgd – roughly 10 mgd below its design hydraulic capacity.
- **Recycled Water Has Reduced Potable Water Demand -** ETWD upgraded El Toro Water Recycling Plant and constructed recycled water conveyance systems in 2014 which helped District to partially offset its potable water demand. As District plans to expand recycled water production in future, it will further reduce potable water demand.
- **Chloramines Require More Attention -** While chloramines last longer and minimize disinfection by product formation such as total halomethanes (TTHMs), it requires more monitoring and action due to its susceptibility to nitrification.
- **Water Quality Issues in Distribution System -** Decrease in water demand and the shift of irrigation water from potable to recycled water have created a water quality issue for ETWD's distribution system. At least one location on the western side requires frequent flushing (up to three times a week) to avoid nitrification and maintain chlorine residual. ETWD desires to find a cost-effective and less labor-intensive solution. When constructed, the Joint Transmission Main (JTM) may mitigate water quality issues occurring on the western side of the service area.
- **Existing Hydraulic Models are Out-of-Date -** The two models were globally updated in 2009. However, they still carried over demand factors from the 2005 Water and Sewer Master Plan with minimal updates. ETWD is looking for updated modeling tools that are reliable and usable.
- **Current Distribution System Monitoring is Labor Intensive -** Key water quality parameters are currently monitored manually by frequent sampling which is labor intensive. Our hydraulic and water quality modeling can pave the way for ETWD to incorporate on-line monitoring, telemetry and SCADA all together to assess water quality (e.g. chlorine, nitrite or ammonia) and initiate corrective actions to reliably meet regulatory requirements.

What We Have Heard

- Priority for the distribution system is finding an alternative to labor-intensive flushing to maintain chlorine residual.
- Reduction in wastewater flows may have led to slightly different loading but there are no treatment process or capacity issues in the collection system.
- While the system continues to age, both water and sewer systems are in good shape. Key question becomes: What are the ways to improve their operational efficiency?

With these key drivers, ETWD's focus for this project is on **improving system efficiencies to reduce O&M and energy costs, correcting identified deficiencies, complying with regulatory requirements, and meeting redevelopment driven demands.** ETWD is looking for recommended near-term and long-term priorities with a justifiable payback period.

Project Approach

Based on our understanding of ETWD's project objectives, Arcadis proposes the following approach to delivering the Water and Sewer Master Plan Update.

Arcadis' Project Approach

Focus On Project Priorities by providing ETWD with Technical Leaders and QC Reviewers to review/ recommend the best path to update the hydraulic models, solve water quality especially flushing issues, and identify cost-effective ways to improve operations optimizing energy use and reducing O&M costs.

Streamline and Coordinate Efforts by assigning a dedicated Data Coordinator and by looking for synergies in data collection, project meetings and interim deliverables for the Water and Sewer Master Plan. For example, a combined Water-Sewer hydraulic model vetting workshop and technical memorandum may make sense.

Bring Top-Notch Technical Experts by tapping into Arcadis' top national experts to provide technical advisory from the get-go of the project and quality control review for each project milestone.

Think Beyond This Project by laying the path for ETWD's long-term success and ensuring that the processes and work products generated as part of this master planning effort dovetail with ETWD's future work, for example, ease of use and updating of hydraulic models and other tools, development of Asset Management Plans.

Detailed Scope of Work

Arcadis' scope of work aligns with ETWD's scope outlined in the RFP. We have provided enhancements throughout the project to meet ETWD's objectives.

Task 1 Objectives:

- To successfully deliver the project and work products to meet scope, schedule, and budget and establish excellent coordination with ETWD staff.

Task 1 Meetings:

- Project Kick-off (virtual)
- Staff Workshop (virtual) technical session
- Progress Meetings (virtual/in-person as needed)

Task 1 Deliverables:

- Progress summary with monthly invoice
- Meeting agenda and minutes

Task 1 Project Management and Meetings

Task 1a Project Management

The Project Management and Meetings task includes project administration and key meetings.

Ms. Sriboonlue, will act as the main point of contact. She will monitor project progress, budget, and schedule, and keep ETWD's Project Manager informed throughout the project duration.

Task 1b Meetings

Project meetings between ETWD and Arcadis will include a kickoff meeting, staff workshop, and progress meetings. Arcadis will prepare all meeting agendas for distribution prior to each meeting as well as meeting minutes to capture key points/decisions and action items after each meeting.

Kickoff Meeting will be a virtual working meeting to review scope and schedule, review preliminary data needs, and start vetting options for hydraulic models and establishing a game plan to address critical paths items (especially flow monitoring).

Staff Workshop will be technical session(s) to review and vet hydraulic models (both water and sewer). Arcadis will demonstrate hydraulic modeling software packages to help ETWD determine the options best fit to ETWD's requirements.

Progress Meetings will be monthly to keep the project on schedule and to maintain all key stakeholders' awareness of project status. Ms. Sriboonlue will facilitate project progress meetings together with relevant technical staff. Arcadis assumes 10 monthly one-hour virtual progress meetings with ETWD.

Task 1c Presentation to the ETWD Board of Directors (Optional)

If requested, Arcadis can present project findings and key highlights to the ETWD Board of Directors and answer any questions. If preferred, we will prepare a concise PowerPoint using materials from project meetings for efficiency and create new content if needed.

Task 2 Document Review

Task 2 Objectives:

- To collect and review necessary data and documents.

Task 2 Meetings:

- Data Request Review Meeting

Task 2 Deliverables:

- Data Request Log

Task 2a Review Existing Documents

As part of the RFP, ETWD provided numerous key background documents. The key insights from each document are summarized in Table 1 on the following page. Arcadis will review these in more detail as needed.

Task 2b Data Collection

Arcadis will develop a draft Data Request Log to be reviewed with ETWD at the project kick-off meeting (an expansion of Tables 1 and 2. We will discuss availability of the data, quality of data, data collection timeline, and if possible, assign ETWD staff responsible for each data category.

Streamlined Data Coordination, Sharing, and Organization

Arcadis will assign a dedicated data coordinator who will be our team's point of contact and liaison to interface with ETWD staff and ensure a smooth data collection process and organized data storage. Arcadis will create and maintain a secured Microsoft SharePoint site for data management and exchange between ETWD and our team. This will provide for seamless exchange of information between multiple staff on both sides as well as document retention for all meetings. Arcadis is highly committed to cyber security and will implement strong security measures using established business platform, such as MS SharePoint.

Our streamlined data collection and coordination process was proven efficient and very successful in our 2020 UWMP project with MWDOC and ETWD that involved managing data from 20+ agencies.

ETWD's existing key documents help inform District level goals and available data. ETWD's Strategic Plan Update set an objective to develop a Water and Sewer Master Plan Update (and an Asset Management Plan) to better inform future capital planning. ETWD's 2005 Master Plan provides methodologies and data that can be used as a starting point and the 2020 UWMP provides service area level demand and population projections that will inform model development. Arcadis has preliminarily identified additional data needs in Table 1 and 2.

Table 1: Example Data Request Log for Water Master Plan (Partial)

Category	Description
GIS data	• Latest water system GIS data (pipes, isolation valves, control valves, pumps, tanks, hydrants, meters, service lines, sampling points, etc.) • Background GIS data (pressure zone boundaries, customer types, service area boundaries, land use, water quality sampling locations, etc.)
Water Production and Demand Forecasting	• Historic annual average, max, min day finished water production data (2011-2021) • Plant production records (2015 to present) • Customer billing data for 2021 along with spatial information • Future water demand information (per capita water use, population projections, land use, population density etc.)
Facility and Operational Information	• Information regarding current City flushing programs • Manufacturer pump curves • Pump station controls, set points, and operational information • Facility drawings (tanks, pump stations, PRVs) and associated equipment details (such as tank mixing systems or inlet/outlet configurations)

Table 2: Example Data Request Log for Sewer Master Plan (Partial)

Category	Description	Comments
Lift Station and WWTP As-Built and Operation Data	• Lift station wet wells and WWTP headworks as-builts • Pump information such as no of pumps, type of pumps, pump curves, and pump operation settings • Lift stations drawdown tests (if available)	Review and update lift station hydraulic model network and model boundary conditions at the WWTP
Flow Monitoring and SCADA Data	• Flow monitoring data for one year at existing flow monitoring locations • Rainfall data* (if available) • Flow or/and pressure monitoring data at lift stations (if available)	Flow projections, flow monitoring plan and calibration
Prior Operations Records	• Prior sanitary sewer overflow records • Prior field flow measurements • Prior operations data collected such as CCTV etc • Sewer cleaning records	Model calibration
Study Reports	• Prior model study reports and Sewer Master Plans (if available) • Other study reports	Support model building and model calibration

Task 3 Water Hydraulic Model Update

Task 3 Objectives:

- To determine the best approach for the distribution system hydraulic model.
- To develop a new or update the model capable of future revision by others.
- To analyze the distribution system's capability, deficiencies, and efficiencies (water quality, emergency supply conditions, and other scenarios).

Task 3 Meetings:

- Model Vetting Workshop (same as Staff Workshop in Task 1)

Task 3 Deliverables:

- Water Model Software Selection TM
- Final Calibrated Water Model
- Water Model Development and Calibration TM

Task 3a Evaluate Existing and Propose Methodology for New Water Model

Arcadis reviewed ETWD's current InfoWater model using a standard checklist to verify model inputs such as diameter, demand, connectivity and operational data, junction elevation and comparison with ETWD's GIS among other things.

Based on our preliminary review, the model seems to be in good shape and an update based on the latest demands, GIS, and updated operational data along with calibration will prepare the model for the master planning effort.

Our modeling team has extensive experience with all the industry leading distribution modeling software including InfoWater. We understand ETWD's current modeling needs (identifying deficiencies and creating efficiencies) and your future vision (support in Asset Management and advanced modeling). Arcadis will develop a Model Vetting Matrix compiling information on different software options with evaluation/selection criteria for ETWD's review. We will brainstorm and develop these criteria together with ETWD at the kick-off meeting. Arcadis will facilitate a Model Vetting Workshop (as part of Staff Workshop in Task 1) to receive ETWD's input and answer any questions ETWD may have to have a comfort level to make a model selection. Arcadis will also prepare a Model Recommendations Technical Memorandum (TM) to document, selection criteria, and reasons for selection of the recommended software package.

Arcadis developed PowerBI dashboard using Python scripts to accelerate calibration by reading directly from InfoWater databases to save time and eliminate human error.

Table 3: Distribution System Modeling Software Packages

Model Software	InfoWater (current software)	InfoWater Pro	EPANET	WaterGEMS
Vendor	Innovyze	Innovyze	US EPA	Bentley
Hydraulic Engine	EPANET w/ Innovyze Enhancements	EPANET w/ Innovyze Enhancements	EPANET	EPANET w/ Bentley Enhancements
Base Interface	ESRI ArcMap	ESRI ArcPro	Standalone	Standalone (or optional as add-ins)
Package Options	Standard, Executive Suite, Unidirectional Flushing, Mult-Species	Standard, Suite (w/ previous add-ons included)	Version 2.1, Version 2.2, MSX, RTX	WaterGEMS, WaterCAD
Overall Cost for license and annual	Moderate	Moderate	Free	Moderate

Task 3b Develop Water Model

Depending on the review of ETWD's current model, there may be physical updates and software conversions necessary during the model development. ETWD's water model is a demand-driven model and the accuracy of model simulations at any point in the system is directly related to the demand applied to the model locally and throughout the system. The allocation of demand, including billed consumption and non-revenue water, and the demand multiplication pattern applied to each demand are critical steps in the development and calibration of a hydraulic model.

Allocation of Water Demands

Arcadis will analyze recent demand data to develop annual average demand for each meter, allocate demand to each customer location, analyze demand patterns based on available operational data, billing data, and field data collected, and allocate demand and non-revenue water (NRW) strategically throughout the system. **Arcadis is familiar with ETWD's 2020 UWMP demand data and will use those data as a starting point supplemented by billing data (about five years).** Arcadis will update land use by reviewing the most current General Plans and interview cities served by ETWD to gather data regarding anticipated redevelopment plans (scale of redevelopment and timeline).

Peaking Factors / Diurnal Curves

Arcadis will use existing consumption data to analyze existing peaking factors and diurnal flow patterns for specific water uses (residential, commercials, and irrigation).

Fire Flow Demands

Arcadis will evaluate current fire flow criteria and duration criteria for each pressure zone based on land use and stakeholder needs or requirements. Various guidance manuals are relied on to support fire protection requirements, including AWWA M32, AWWA M17, and NFPA 291. Agencies like the fire department and ISO can also have their own desires or requirements that must be balanced during infrastructure sizing so distribution system water quality is not negatively impacted.

Task 3c Calibration of Water Model

Model calibration is believed by the water industry to be the most technically challenging aspect of modeling (per a survey by the AWWA Engineering Modeling Applications Committee). Arcadis will calibrate the model to current demand conditions by first developing a calibration plan and testing protocol for the model to capture necessary flow, pressure, and water quality data necessary for the 24-hour period typically required for model calibration. Recommended testing will establish hydrant flow measurements and water quality sampling for ETWD (it is assumed ETWD will perform testing as-needed). Arcadis will calibrate (as per industry standards) the final model to both summer and winter operating conditions and carry out any recalibration to correct errors and discrepancies which will be coordinated and communicated with ETWD.

Task 3d Hydraulic Network Analysis

Arcadis has created a draft Hydraulic Network Analysis Plan outlining the analyses to be conducted, our approach, and key assumptions (Table 4).

Table 4: Hydraulic Network Analysis Plan for ETWD's Water Distribution System

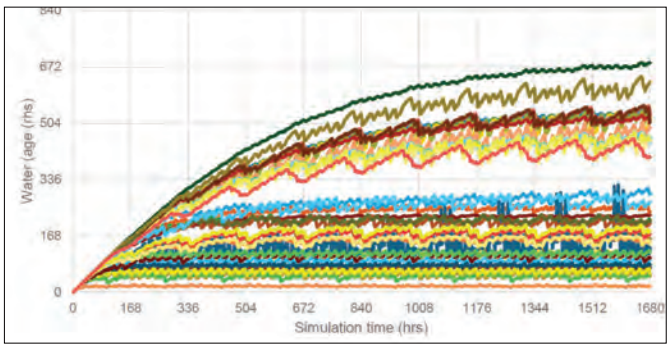
Hydraulic Analysis	Types of Evaluation	Approach and Assumptions
System Deficiencies	• Peak hour • Max day + fire flow • Pump performance, tank design, and turnover time	• Collaborate on Level of Service Criteria • Identify and Evaluate Improvements • Use Model Dashboards for Collaboration
System Efficiencies	• Energy use and cost • State and federal water quality objectives • JTM pump station startup • Increased recycled water use for irrigation • Purified water from WRP (Direct Potable Use)	• Compare baseline (current) to alternative operations • Optimize based on energy and water quality constraints • Evaluate planned projects from the District
Pump Station and Reservoir Capacity	• Capacity based on updated water demand projections and current design criteria • Current and future operational, emergency, and fire storage requirements • Water quality with respect to storage and reservoir turnover	• Storage and pumping gap analysis • Storage turnover assessment following system efficiencies evaluations
Water Age / Water Quality	• Identify areas of degraded water quality • Flushing program and system dead ends • Water quality sensor placement assessment	• Water age simulations • Correlations of modeled water age to water quality sampling data • Improvements from pipe looping and operations
Emergency Water Supply	• Compare neighbor agencies' approaches to import outages • Flexibility of existing and ultimate distribution system emergency supply conditions • Monthly long outage at Diemer, Baker, and both Diemer and Baker • **Seismic risk evaluations of most critical transmission mains out of service, one more tanks out of service, and limited pumping capacity**	• Emergency modeling and simulations • Comparison of results to baseline and requirements • Evaluation of other modeling tools as needed (e.g. EPA's WNTR tool)

Water Quality Modeling Approach and Potential Solutions to Flushing

Arcadis has developed and successfully incorporated tailored solutions for more than 50 utilities across the US to mitigate water aging and nitrification issues while reducing water usage and/or intensive labor during flushing with the ultimate objectives by providing safe drinking water that meets regulatory requirements and customer's satisfaction. Some solutions include:

- ☑ Reduce size of inlet piping to storage tanks or provide active mixing in storage tanks
- ☑ Perform periodic storage tank cleaning or deep cycles to help preserve water quality
- ☑ Provide unidirectional flushing (usually reduced water use than conventional flushing)
- ☑ Use automatic flushing devices for dead-ends to reduce labor efforts
- ☑ Add chlorine booster stations to locations to maintain chlorine residual
- ☑ Provide on-line chlorine and nitrite analyzer for automated and accurate chemical dosing
- ☑ Take into account the impact of JTM on water age nitrification potential when it is operational

Since one does not fit all, we will work with ETWD to collaboratively develop a best nitrification control and mitigation practice to maximize ETWD's benefits.



Task 4 Sewer Hydraulic Model Update

Task 4 Objectives:

- To determine the best approach for the collection system hydraulic model.
- To develop a new or update the model capable of future revision by others.
- To analyze the collection system's capability,
- deficiencies, and efficiencies.

Task 4 Meetings:

- Model Vetting Workshop (as part of Staff Workshop in Task 1)
- Model Calibration and Level of Service Criteria

Task 4 Deliverables:

- Sewer Model Software Selection TM
- Final Calibrated Sewer Model
- Sewer Model Development and Calibration TM

Task 4a Evaluate Existing and Propose Methodology for New Sewer Model

Arcadis will review ETWD's existing model (InfoSewer) and partner with ETWD to determine the best modeling solution suited to ETWD's sewer system and modeling requirements. Some of the factors to consider include:

- Underlying computational programs (e.g., static versus dynamic)
- Internal quality control checks
- Software and annual maintenance cost
- Data management and ease of use
- Future use

A workshop will be scheduled with ETWD staff to demonstrate three industry-leading modeling software packages and InfoSewer (see Table 5) to determine the best option. Arcadis will prepare a Model Recommendations TM to document the selection criteria and rationale for the recommended software package.

Based on Arcadis' preliminary review of ETWD's InfoSewer model, it will be most efficient to build a new model than to update the existing. The current sewer model network is significantly different than that in GIS.

Task 4b Develop Sewer Model

Arcadis proposes to use ETWD's GIS data supplemented by record drawings for missing inverts. The GIS database has excellent data for pipes and manholes owned by ETWD. The model will include all major trunk sewers and tributary sewers (6-inches and larger) owned by ETWD as well as 11 sewer lift stations. Special attention will be given to modeling larger lift stations like Aliso Creek and Northline to make sure their operation mimics reality.

Current and Projected Sewer Flow Development

ETWD service area is fairly built out and not much land-use change is expected. Although ETWD service area population is not expected to change too much in the next 25-years, a population based approach to flow development is still appropriate because of the following:

- Require fewer flow meters than land use approach
- Is used widely in southern California
- Support future projects using per capita flow to estimate future flows for development, plans, or designs.

Table 5: Sewer Modeling Software Packages

Model Software	InfoSewer (current software)	InfoSWMM	PCSWMM	SewerGEMS
Vendor	Innovyze	Innovyze	CHI	Bentley
Hydraulic Engine	Enhanced USEPA SWMM engine (by MWHSoft)/ Modified SWMM Explicit	Enhanced USEPA SWMM engine/ SWMM Explicit	USEPA SWMM engine/ Explicit	Enhanced USEPA SWMM or Haestad Methods engines/ Implicit or SWMM explicit
Momentum and Continuity Conservation	Static	Dynamic	Dynamic	Dynamic
Hydrologic Options	None	USEPA SWMM, SCS, RTK, and other unit hydrograph methods	USEPA SWMM, SCS, RTK, and other unit hydrograph methods	USEPA SWMM, SCS, RTK
Overall Cost for License and Annual	Moderate	Moderate	Low	Moderate

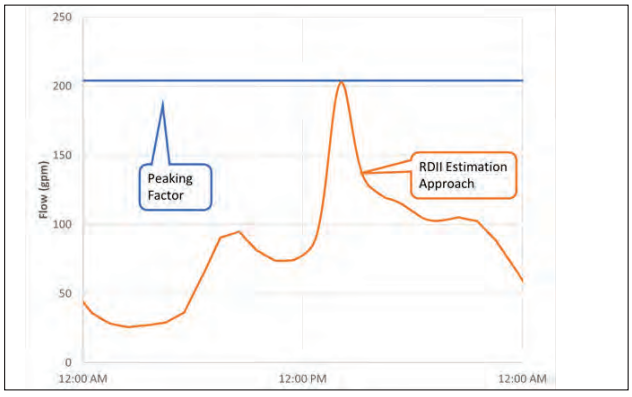
Current Sewer Flow Development: Arcadis will use flow monitoring data (Task 4d), flows into the WRP (accounting for inaccuracies), and major lift stations to estimate dry weather flow by using EPA Sanitary Sewer Overflow Analysis and Planning (SSOAP) toolbox. The estimated dry weather comprises base sanitary flow with weekday and weekend diurnal patterns and base infiltration. The estimated dry weather flow components will then be distributed to the parcels based on water consumption data. Flow from each parcel will then be allocated to the manhole closest to the parcel centrode.
Arcadis will analyze the flow data from field meters and WRP with care. We may suggest approaches to improve metering accuracy at WRP as well as the use of flow data from Ocean Outfall Pump Station and Recycled Water Pump Station to support Per-Capita generation. Flow data from the lift stations could also be used to confirm the Per-Capita generation factors.

Projected Sewer Flow Development: Arcadis will use ETWD's planning data (e.g. re-development) along with population projections to estimate future flows within the service area. The projected water demands from the service area will be used to truth check future wastewater flow from the service area. Future flow projections will be calculated in 10-year increments to 2050.

Peaking Factors

Arcadis will use previous flow studies, ETWD lift station SCADA data and WRP wastewater treatment plant flow records to estimate the peaking factors. The peaking factors will also be compared with factors used by neighboring and similar sized systems. The estimated peaking factors will be applied to the sewershed in addition to the dry weather flows in the model.

Figure 4: Peaking Factor versus RDII Approach to Estimating Peak Flow



RDII Estimation (Optional Task)

If flow metering is able to collect two or more significant rainfall events, Arcadis suggests using Rainfall Driven Inflow and Infiltration (RDII) estimation methods instead of peaking factor analysis.

Key advantages of using the RDII estimation methodology are:

- Mimic real-life lift station operation where the system head and pump operating points vary throughout the storm event
- Use available wet well and upstream gravity storage before manhole overflows
- Provide dynamic model results
- Distribute RDII parameters upstream of the flow meter location based on the sewer miles

Wet Well Storage Capacity

During the deficiency analysis, Arcadis will evaluate surcharging of the lift stations pumps and wet wells for both existing and build-out conditions. The result of a surcharge is that water level in the wet well rises above an acceptable limit. The wet wells drawings will be reviewed along with ETWD staff interview to define existing available response times prior to an overflow in the event of a lift station failure. Potential projects to improve lift station storage capacity and system reliability will be identified to meet ETWD objectives.

Task 4c Calibration of Sewer Model

In keeping with EPA guidance, Arcadis' approach relies primarily on graphical "goodness of fit" comparisons of model and monitored data to assess model calibration. In addition, we provide suggested quantitative figures for assessing model calibration. Close collaboration with ETWD's Operations staff is essential to our approach to model calibration. Calibration will be comprised of dry and wet weather calibration.

The flow data will be loaded into the models and simulation will be performed for the period in which flows are monitored. The model or simulated results will be compared to the observed flow monitoring data.

Dry Weather Calibration

At the selected monitoring locations and lift stations, the model will be calibrated to dry weather flows, including weekend and weekday diurnal patterns and base ground water infiltration. Arcadis will:

- Verify that the model is routing dry weather flows correctly. Review system for possible connectivity errors.
- Compare measured and modeled flow depths adjusting Manning's "n" as needed, or identifying the cause of discrepancies.

Wet Weather Calibration

Wet weather calibration will depend on the storms that occur during flow monitoring. If storms are captured during the flow monitoring, wet weather calibration will consist of:

- Storm events at the installed flow meters on a single event basis.
- Adjusting parameters to simulate the rainfall-induced flow response of the system for each storm event.
- Adjusting hydrologic parameters as needed to generate volume and peak flow.
- Comparing peak flow, total volume and surcharge depth to develop a robust planning tool for future flow projections and system analyses.

If no significant rain events are captured during the flow monitoring period, wet weather calibration will not be performed. Peaking factors will be used for capacity analysis after validation (WRP and lift station flow data).

Task 4d Sewer Flow Monitoring

Arcadis will prioritize flow monitoring as an early milestone to hopefully capture the impact of wet weather flows. Arcadis in collaboration with ADS Environmental Services (ADS) will provide temporary sewer flow monitoring services at five monitoring locations for at least 60 days March-May. The flow monitoring program will be conducted concurrently with rainfall monitoring. Accurate and reproducible flow metering data are critical to all subsequent evaluations and form the basis for modeling.

Selection criteria for flow monitoring locations include:

- Critical locations in the sewer system
- Far from the existing monitoring locations
- Isolate a specific land use where possible
- Has no drop connections, backwater conditions, and hydraulic jumps
- Easy to access

Additional Sewer Flow Monitoring (Optional Task)

Per our proposed base scope, a two-month sewer flow monitoring event will occur between mid-to-late March and May. We may not capture significant rainfall events during these two months. A longer sewer flow monitoring duration presents a greater opportunity to capture multiple rainfall events. This will allow wet weather calibration using actual rainfall events instead of peaking factors. During the hydraulic analysis, the wet weather calibrated model will mimic wet weather response to the named storm events (2-year, 5-year, and 10-year storm events) and mimic the real-life operation of lift stations. We suggest a 6-month flow monitoring period from November 2022 through April 2023 to obtain three to four significant rain events for wet weather calibration and validation. The sewer model will be adjusted based on new data accordingly.

Example Level of Service goals for ETWD:

- Allow an existing pipe to surcharge within two feet of manhole rim during wet weather.
- Gravity pipes with d/D > 80% are flagged as deficient.
- Lift stations with a peak flow greater than firm capacity, or lift stations with model predicted overflows are flagged as deficient
- The dry weather lift station pumps run time > 10 hours are flagged for potential operational issues.
- Force mains where velocity exceeds 10 feet per second (fps) are identified as deficient.
- Force mains with a velocity <2 fps are identified for ETWD to observe condition and sediment buildup in the pipe.

Task 4e Hydraulic Network Analysis

Level of Service Goals

Not specifically discussed in the RFP scope, Level of Service (LOS) goals are necessary to define acceptable conditions for ETWD under specified situations. The acceptability may change based on location, size of pipe, and weather conditions. Arcadis will work with ETWD to establish the LOS criteria that will be used to trigger a recommended improvement.

Capacity Assessment or Analysis of System Deficiencies

Once the LOS criteria are established, the calibrated model will be used to evaluate the collection system's response during dry and wet weather events for both existing conditions and future redevelopment conditions.

Peaking Factor (base approach): The following dynamic scenarios will be created for evaluating sewer capacity with both existing and future flows.

- Existing Average Flows
- Existing Peak Flows
- Future Average Flows
- Future Peak Flows

Arcadis has created a draft Hydraulic Network Analysis Plan outlining the analyses to be conducted for ETWD's sewer collection system as well as our approach and key assumptions (Table 6).

RDII Estimation Approach (Optional Task)

A design rainfall event will be developed for evaluating capacity for the 10-year, 24-hour rainfall recurrence frequency (10 -year Design Storm) for both existing conditions and future conditions.

Table 6: Hydraulic Network Analysis Plan for ETWD's Sewer Collection System

Hydraulic Analysis	Types of Evaluation	Approach and Assumptions
System Deficiencies	• Current vs future development • Dry weather day flow • Max wet weather day flow • Peak hour flow • ETWD's sewer cleaning program • Hot Spot list	Collaborate with cities in the service area to identify future development and check that with population data. Identify areas of low flow (less than 2 ft/s) Identify capacity constraints and level of service violations and compare it with the sewer cleaning program and Hot Spots to develop improvements.
System Efficiencies	• Demands • Energy cost	Analyze lift station performance under current and future flow including pump run times, number of start/stops, set points, wet well size, force main sizing, etc.

Task 5 Recommended Improvements

Task 5 Objectives:

- To provide recommendations to update ETWD's existing CIP based on the results of the hydraulic model simulations.

Task 5 Meetings:

- Draft CIP and Economic Analysis Review

Task 5 Deliverables:

- Draft CIP (spreadsheets and as a section in the Master Plan)
- Final CIP

The ultimate deliverable of a master plan project is a concise, defensible, economical and implementable Capital Improvement Program (CIP). The CIP will include identified hydraulic and other improvements and incorporate other projects identified by ETWD. Arcadis will work with ETWD to develop a prioritized CIP with a reasonable payback period.

Planning level capital costs will be developed for all identified projects using recent bid tabs, project budgets and contractor costs to calculate unit costs for replacement or rehabilitation. If the information is not available, Arcadis will develop unit costs based on experience with similar projects in California and/ or manufacturer's cost opinions.

Task 6 Consultant Quality Control Reviews

Task 6 Objectives:

- To administer a program of quality assurance and quality control procedures for producing quality work.

Task 6 Meetings:

- None beyond regular Progress Meetings

Task 6 Deliverables:

- Schedule and deliverable trackers

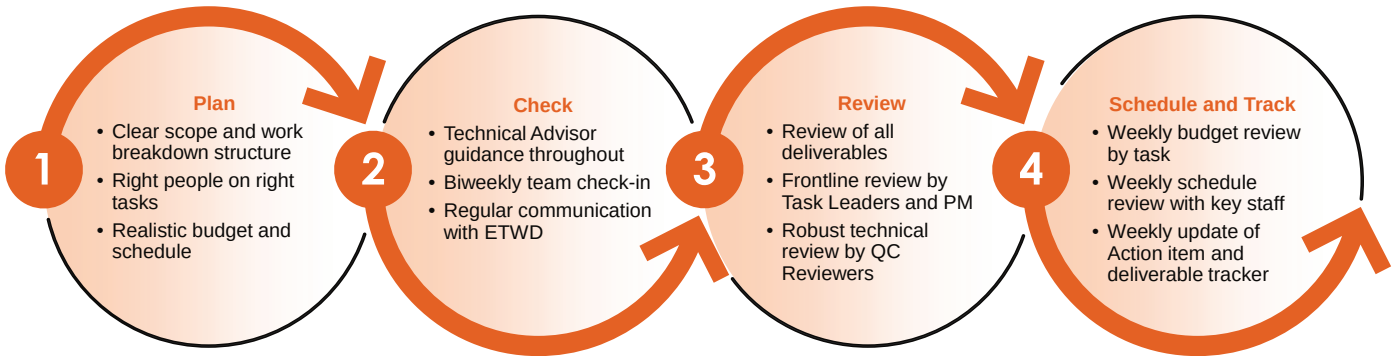
Arcadis values the importance of quality in every work product we deliver. We will implement the following quality assurance and quality control process.

Quality Assurance: Arcadis will lay out the best process and approach to take on each task. **Our technical advisors will provide guidance and sound judgment for "best" solutions** given their broad involvement nationally. They will be involved from the beginning of the project and attend internal project check-in calls regularly.

Quality Control: Our subject-specific Quality Control Reviewers will provide a robust and focused review of key deliverables and remain independent.

At the heart of any project success is a well-planned approach executed through team collaboration. Arcadis plans to deliver a successful project using the following procedures in Figure 3.

Figure 3: Arcadis QA/QC Procedures for ETWD Master Plan Project



Task 7 Water and Sewer Master Plan Update Report

Task 7 Objectives:

- To develop a comprehensive yet concise Water and Sewer Master Plan Update report.

Task 7 Meetings:

- Selected Sections Review
- 50% Draft Master Plan Review
- 90% Draft Master Plan Review

Task 7 Deliverables:

- Selected Master Plan Sections
- 50% Draft Master Plan
- 90% Draft Master Plan
- Final Master Plan

Arcadis will provide a comprehensive yet concise Water and Sewer Master Plan Update report. Arcadis plans to submit 50% and 90% Master Plan draft reports for ETWD review and approval. Prior to these milestone deliverables, **Arcadis may submit drafts of individual sections of the Master Plan for ETWD review (in lieu of a separate TM).** Prime examples include sections related to Sewer Flow Monitoring and Projection or methodology and findings of Water Quality Analysis. This will allow ETWD to provide input sooner and may lessen review time for the 50% and 90% deliverables.

Optional Task 8 Hydraulic Model Transfer and Training

Task 8 Objectives:

- To provide a minimum of two days of training to at least two members of ETWD's staff in the use of the water and sewer models.

Task 8 Meetings:

- Water model training session (in-person)
- Sewer model training session
- As-needed Follow up training

Task 8 Deliverables:

- Model Reference Manuals

Arcadis intends to help ETWD become familiar with the hydraulic models from the vetting process onward and help build its understanding of the software as the project develops. **Our goal is for ETWD staff to have a comfort level before the hand off occurs.** Arcadis will advise ETWD of any hardware, software, or licensing requirements necessary to efficiently use the model for future system analysis.

While in-person training sessions are preferred as the trainer can better read the room and provide the train more efficiently, Arcadis is prepared to provide virtual training, in lieu of or in addition to the in-person training. We have training materials ready-to-go for Innovyze and Bentley software and others that can be tailored to ETWD's specific requirements. The training will cover distribution system modeling theory and sewer system theory, software use, model functionality, system analysis, and model maintenance. The two-day training per software will include a variety of instructor-led presentations, hands-on model use exercises, review or training documentation and manuals, and Q&A sessions.

Arcadis will develop a Model Reference Manual for each of the models to identify details of all model facilities, controls, summary of scenarios, model basis and assumptions, and critical users. The manual will also address maintenance by identifying components, such as defining triggers for updates, who performs the updates, and specific process for performing the updates.

Arcadis can also assist ETWD coordinate the purchase of new model software packages.

Optional Task 9 Hydraulic Model On-Call Services

Based on the resource needs of ETWD, Arcadis can assist in continued on-call hydraulic modeling services for the water and sewer models. We would provide a senior and junior modeler to develop the model(s) maintenance plan, provide model updates of existing system and new construction, perform developer requests analysis, and other analysis. This would be performed on a time and material basis per assignment.

Section F:

Estimated Hours

Estimated Hours

Task	Task Name and Activities	Hours										
		Project Manager	Principal-in-Charge	Technical Advisor	Quality Control Reviewer	Lead Modeler (Water)	Lead Modeler (Sewer)	Senior Engineer	Engineer II	Engineer I	Admin	Total
1	**Project Management and Meetings**											
1a	Project Management	20	-	-	-	-	-	-	-	-	24	44
1b	Meetings	28	8	8	-	16	16	-	40	40	-	156
	Subtotal	***48***	***8***	***8***	***0***	***16***	***16***	***0***	***40***	***40***	***24***	***200***
2	**Document Review**											
2a	Review Existing Documents	4	-	-	-	2	2	-	8	8	-	24
2b	Data Collection & Review (Other Data)	4	-	-	-	2	2	-	8	8	-	24
	Subtotal	***8***	***0***	***0***	***0***	***4***	***4***	***0***	***16***	***16***	***0***	***48***
3	**Water Hydraulic Model Update**											
3a	Evaluate Existing and Propose Methodology for New Water Model	2	-	-	-	8	-	-	-	12	-	22
3b	Develop Water Model	2	-	-	-	24	-	-	8	72	-	106
3c	Calibration of Water Model	2	-	2	-	32	-	-	-	136	-	172
3d	Hydraulic Network Analysis	2	2	2	-	120	-	24	-	200	-	350
	Subtotal	***8***	***2***	***4***	***0***	***184***	***0***	***24***	***8***	***420***	***0***	***650***
4	**Sewer Hydraulic Model Update**											
4a	Evaluate Existing and Propose Methodology for New Sewer Model	2	-	-	-	-	12	-	-	56	-	70
4b	Develop Sewer Model	2	-	-	-	-	50	-	-	224	-	276
4c	Calibration of Sewer Model	2	-	2	-	-	64	-	-	88	-	156
4d	Sewer Flow Monitoring	2	-	-	-	-	10	-	-	16	-	28
4e	Hydraulic Network Analysis	2		2	-	-	40	-	-	130	-	174
	Subtotal	***10***	***0***	***4***	***0***	***0***	***176***	***0***	***0***	***514***	***0***	***704***
5	**Recommended Improvements**											
	CIP Update, Project Descriptions, Cost Estimate	40	-	16	-	4	4	-	60	60	-	184
	Subtotal	***40***	***0***	***16***	***0***	***4***	***4***	***0***	***60***	***60***	***0***	***184***
6	**Consultant Quality Control Reviews**											
	QC Review	2	-	-	24	-	-	-	-	-	-	26
	Subtotal	***2***	***0***	***0***	***24***	***0***	***0***	***0***	***0***	***0***	***0***	***26***
7	**Water and Sewer Master Plan Update Report**											
	Draft and Final Master Plan	24	-	-	-	6	6	-	80	60	-	176
	Subtotal	***24***	***0***	***0***	***0***	***6***	***6***	***0***	***80***	***60***	***0***	***176***
	Total	**140**	**10**	**32**	**24**	**214**	**206**	**24**	**204**	**1110**	**24**	**1988**
Estimated Hours for Optional Tasks												
1c	Presentation to ETWD Board of Directors (assume 1 presentation)	6	-	-	-	-	-	-	2	-	-	8
4b	Develop Sewer Model											
	RDII Estimation	1	-	-	1	-	8	-	-	40	-	50
4d	Sewer Flow Monitoring											
	Additional Flow Monitoring (assume 6 months @ 5 sites)	2	-	-	-	-	12	-	12	-	-	26
8	Hydraulic Model Transfer and Training											
	Water Model Transfer and Training	2	-	-	-	48	-	-	-	-	-	50
	Sewer Model Transfer and Training	2	-	-	-	-	48	-	-	-	-	50
	Water Model Software Purchase	1	-	-	-	2	-	-	-	-	-	3
	Sewer Model Software Purchase	1	-	-	-	-	2	-	-	-	-	3
9	**Hydraulic Model On-Call**	Hours to be estimated once scope is known.										

Section G:

Proposed Fee

Submitted in a separate file

Project Schedule

Task	Task Name and Activities	Project Timeline									
		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10
		Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
1	**Project Management and Meetings**										
1a	Project Management										
1b	Meetings										
2	**Document Review**										
2a	Review Existing Documents										
2b	Data Collection & Review (Other Data)										
3	**Water Hydraulic Model Update**										
3a	Evaluate Existing and Propose Methodology for New Water Model										
3b	Develop Water Model										
3c	Calibration of Water Model										
3d	Hydraulic Network Analysis										
4	**Sewer Hydraulic Model Update**										
4a	Evaluate Existing and Propose Methodology for New Sewer Model										
4b	Develop Sewer Model										
4c	Calibration of Sewer Model										
4d	Sewer Flow Monitoring										
4e	Hydraulic Network Analysis										
5	**Recommended Improvements**										
	CIP Update										
	Develop Project Descriptions										
	Prelim Cost Estimate										
6	**Consultant Quality Control Reviews**										
	QC Review										
7	**Water and Sewer Master Plan Update Report**										
	Draft Master Plan										
	Final Master Plan										

Meeting ★ Workshop TM & Report Deliverable

I, J & K Acknowledgments

The proposal must state that the Consultant will provide ETWD the requested insurance as outlined in the sample contract. ETWD requires professional liability coverage to be a minimum of $2,000,000 and general liability and property damage to be a minimum of $2,000,000. Any premium required by an insurance carrier for such coverage should be included in the proposed fee. ETWD will not pay a separate insurance surcharge for the required coverage.
Arcadis will obtain and provide ETWD the requested professional liability coverage of $2,000,000 and general liability and property damage of $2,000,000.

A sample of ETWD's standard contract for Professional Services is included for information in Attachment B. The Proposal shall identify whether or not the submitting firm agrees to the contract language. Any discrepancies should be identified.
Arcadis agrees to the terms listed in ETWD's standard contract for professional services.

All addenda issued during the proposal period shall be noted and acknowledged in the Consultant's proposal.
No addenda were issued.

Section H, I, J & K:

Project Schedule and Acknowledgments

Appendix:
Resumes and Supplementary Information

Sarina Sriboonlue, PE, ENV SP

Project Manager

Key Information

Education/Qualifications

- MS, Agricultural & Biosystems Engineering, University of Arizona, 2005
- BE, Civil Engineering University of Canterbury, Christchurch, New Zealand, 2003

Years of Experience

16 with Arcadis

16 Total

Professional Registrations and Certifications

- Professional Engineer – CA
- ENVISION® Sustainability Professional

Ms. Sriboonlue's 16 years of consulting experience spans a wide range of water and wastewater planning projects for municipal and industrial clients in southern California. She assisted numerous retail water agencies in Orange County, including ETWD to develop their 2010, 2015, and 2020 Urban Water Management Plans. She prepared two Water Supply Assessments (WSA) for the proposed redevelopment of Laguna Hills Mall area (Five Lagunas and Village at Laguna Hills Projects). The UWMP and WSA work involve examining water demand and supply projections for ETWD's entire service area and for Laguna Hills redevelopment area, respectively. The work led by Ms. Sriboonlue will provide a foundation to the demand analysis for ETWD's Water Master Plan Update. Ms. Sriboonlue's other local planning projects include City of Newport Beach and Laguna Beach County Water District Water Master Plans, City of Buena Park's Sewer Master Plan and the City of Huntington Beach Water Use Efficiency Plan.

Relevant Experience

2020 Urban Water Management Plans (UWMPs) and Water Shortage Contingency Plans (WSCPs)

Municipal Water District of Orange County, Fountain Valley, California

Ms. Sriboonlue was the project manager working closely with MWDOC and 21 retail water agencies in Orange County, including El Toro Water District to prepare their 2020 UWMPs and their 2020 WSCPs. Ms. Sriboonlue manages a team of 10 Arcadis staff and a subconsultant with the commitment to execute the project efficiently, improve upon previous UWMPs delivery, and produce the highest quality deliverables within budget and time constraint that meet all California Water Code compliance.

Water Supply Assessments for The Village at Laguna Hills Project

El Toro Water District, Lake Forest, California

Ms. Sriboonlue was the project manager for the development of the WSA for the Village at Laguna Hills Project which proposed to modernize the existing Laguna Hills Mall property. The assessment addressed whether the projected supply for the next 20 years, based on normal, single dry, and multiple dry years would meet the demand projected for the project plus existing and planned future use within the El Toro Water District's service area per requirements of Senate Bill 610.

Water Supply Assessments for Village Activities Center Specific Plan and Five Lagunas Project

El Toro Water District, Lake Forest, California

Ms. Sriboonlue was the lead engineer for the assessment of water supply and demand projections to meet the needs of two new proposed developments within the El Toro Water District's service area per requirements of Senate Bill

Sarina Sriboonlue, PE, ENV SP
Continued

610. The assessment addressed whether the projected supply for the next 20 years, based on normal, single dry, and multiple dry years would meet the demand projected for the project plus existing and planned future use.

2015 and 2010 Urban Water Management Plans
Municipal Water District of Orange County and Member Agencies, Fountain Valley, California

As Task Leader, Ms. Sriboonlue assisted in the preparation the 2015 and 2010 UWMP for MWDOC and 21 retail agencies in Orange County, including El Toro Water District. She took over as project manager and through close communication with the Department of Water Resources ensured that all UWMPs were completed and in compliance with the California Water Code.

2019 Water Master Plan and Hydraulic Modelling On-Call Services
City of Newport Beach Public Works Department, Newport Beach, California

Ms. Sriboonlue led the water supply and demand analysis, including developing a land-use based demand projection and took over as Project Manager for the Hydraulic Modelling On-Call services for the City of Newport Beach after the Water Master Plan was completed in 2019. The Water Master Plan scope of work included a water supply and demand analysis, hydraulic model development, supply and distribution system analysis, condition assessment of water facilities, and a comprehensive capital improvement program (CIP) development.

2019 Sewer Master Plan
City of Buena Park, Orange County, California

Ms. Sriboonlue was Project Manager for the development of the 2019 Sewer Master Plan for the City of Buena Park to update flow projections to reflect current conditions, procure a new hydraulic model, and evaluate impacts of future redevelopment and decreased wastewater flow trend due to reduced potable water demand stemming from the prolonged California drought.

Ralph W. Chapman Water Reclamation Facility Master Plan
Otay Water District, Otay, California

Ms. Sriboonlue was project engineer for the development of a Facility Master Plan for OWD's Ralph W. Chapman Water Reclamation Facility, a scalping wastewater treatment plant. The Facility Master Plan supported OWD in better prioritizing upgrades to various treatment processes to ensure OWD can plan, budget, and deliver necessary capital improvements in an orderly approach.

Leading Water and Wastewater Utility Innovation
Water Research Foundation, Denver, Colorado

Ms. Sriboonlue is team member that is working with the Water Research Foundation and 70 water/wastewater utilities from the US, Australia, Canada, and the UK to achieve three main goals: 1) equip utilities with knowledge/network/tools to assess and encourage broad engagement in innovation; 2) provide guidance for building powerful innovation partnerships for early wins; and 3) develop a user-friendly tool for building an innovation strategy for utilities.

Utility Innovation Program Review
Metropolitan Water District of Southern California, Los Angeles, California

Ms. Sriboonlue was project manager for the Arcadis team that assisted Metropolitan in the assessment of its organization's innovation program and organizational culture through a series of surveys, individual and focus group interviews, and facilitated workshops. The objectives were to define Metropolitan's Innovation Program expectations and future aspirations and to develop recommendations for enhancing Metropolitan's Innovation Program.

Ufuk Erdal, PhD, PE

Principal-in-Charge and Technical Advisor (Water Quality)

Dr. Erdal will be responsible for all work executed under the project contract, guide Arcadis team with foresight, while coordinating and communicating with you, to see that your best interests are heard and served throughout the project. Dr. Erdal has 26 years of diverse experience and has successfully delivered four ETWD projects having a great knowledge of the ETWD's staff, facilities and more importantly knowing their expectations and delivery standards for every project executed. In each ETWD project, he has led the development of the innovative solutions for upgrading El Toro Water Recycling Plant and identifying the upgrades and operational changes needed for handling biosolids generated at the Water Recycling Plant resulted in operational efficiencies and substantial cost savings. He was instrumental for mitigating and resolving various water quality issues linked to water age, disinfection stability and nitrification in storage tanks and water distribution systems and control of disinfection by products formation at San Diego County Water Authority and a number of agencies across USA. He served as the director on the WRF Board of Directors between 2017 and 2020 to develop sustainable water management solutions.

Key Information

Education/Qualifications

- PhD, Civil Engineering, Virginia Tech, 2002
- MS, Civil Engineering, Ohio State University, 1996
- BS, Environmental Engineering, Istanbul Technical University, 1988

Years of Experience

3 with Arcadis

26 Total

Professional Registrations and Certifications

- Professional Engineer – CO

Relevant Experience

Evaluating the Impact of Blending Desalinated Seawater with Treated Surface Water at Twin Oak Valley Water Treatment Plant

San Diego County Water Authority, San Diego, California

Project manager and process lead for the development and execution of a comprehensive bench testing program to evaluate the impact of blending desalinated seawater with the treated surface water on disinfection byproduct (DBP) formation, disinfection stability, and nitrification potential in the distribution systems. Developed a decay rate based model to chloramine bosting locations and doses to maintain disinfection stability and avoid nitrification in the distribution systems.

Preliminary and Final Design Services for the Tertiary Treatment Upgrades at El Toro Water Recycling Plant

El Toro Water District, Laguna Woods, California

Process design lead for developing cost effective strategies to improve secondary effluent quality to allow qualification of the multiple filtration technologies. He led process design and procurement tasks to select efficient and most cost effective cloth disc filtration and chlorine disinfection technologies to produce 3.7 mgd disinfected tertiary recycled water for land scape irrigation. During design, developed innovative approaches (recycled water storage tank with integrated chlorine contact basin, testing and validation of new and improved cloth filters) to further reduce the cost. Also led the tracer testing and Engineering Report development to help District to amend Recycled Water Permit from Santa Ana RWQCB.

Ufuk Erdal, PhD, PE
Continued

Evaluation of Solids Reduction Options at El Toro Water Recycling Plant

El Toro Water District, Laguna Woods, California

Project manager for the evaluation of various solids reduction options to reduce or eliminate costs associated with transportation and further processing of solids at SOCWA's Regional Plant. The evaluation (hydraulic, pipe layout and cost) also included construction of a new conveyance system to pump sludge to the Regional Plant. The evaluation favored upgrades at the WRP to allow increased SRT operation to reduce solids production at the WRP.

Chlorine Boosting Station Design for The Distribution System Stability

San Diego County Water Authority, San Diego, California

Process design lead for the implementation of a chemical boosting station to add chlorine to maintain target chlorine residual in the distribution system.

City of Los Angeles Bureau of Sanitation Blending and Finished Water Disinfection Standard Study at Terminal Island Water Reclamation Plant

Water Replenishment Water District, Lakewood, California

Process lead for evaluating the use of free chlorine in lieu of chloramines as a residual disinfectant for the injection of 100 percent, or near 100 percent, 75 percent of advanced treated recycled water to the Dominguez Gap Barrier. Should a free chlorine residual be desired at each well at all times, breakpoint chlorination facility would be required at the MWDSC connection point for 75 percent and less advanced treatment contribution.

Water Quality Assessment and Sea Water Desalination Facility Design at San Clemente Island

US Navy, Washington DC, California

Process design lead and water quality specialist for identifying water age and disinfection by products (DBPS) issues. Because providing tank mixing, more accurate chlorine dosing and boosting strategies were temporary solution, the study identified construction of a new desalination facility at the Navy Island was the best solution to combat water quality issues. He later served as the design lead for designing pretreatment (DAF and ultrafiltration), two pass RO system with energy recovery, decarbonation, calcite contactor and chlorine disinfection systems.

Perris Water Filtration Plant Phase 2 Expansion Preliminary and Final Design Services

Eastern Municipal Water District, Perris, California

Process design lead for raw water pump station, pretreatment, submerged membrane filtration, UV and chlorine disinfection and chemical feed and storage facilities. Identified chemical addition for coagulation-flocculation thru a bench testing to reduce precursors causing membrane fouling and improve UV transmittance of the State Project Water. This strategy helped District to cost effectively use both State Project and Colorado River Waters as the source water. He also worked with California Department of Public Health to use dual disinfection system to minimize DBP concerns associated with chlorine use.

Sustainable Water Infrastructure Design Build Services for Potable Reuse

City of Santa Monica, Santa Monica, California

QA/QC lead for reviewing the design basis, procurement, and 60 and 90% design documents for an advanced treatment facility that will treat stormwater and wastewater through membrane bioreactor (MBR), reverse osmosis (RO), chlorine-based UV advanced oxidation process (UVAOP) and post treatment via calcium chloride and caustic to produce recycled water for indirect potable reuse (IPR) via sub surface injection.

Water Reuse Master Plan and Advanced Water Treatment Plant Preliminary Design Services for IPR

Big Bear Regional Wastewater Agency, Big Bear, California

Project design lead and task manager for development of potable reuse master plan and preliminary design development for an IPR train consisting of pretreatment, MF, RO, UVAOP, post-treatment and chemical facilities. Evaluated and pilot tested several RO concentrate reduction and disposal technologies. He reviewed hydraulic models developed for the recycled water and RO concentrate conveyance systems.

City of Carlsbad Recycled Water Master Planning

City of Carlsbad, Carlsbad, California

Technical advisor for helping project team to develop a comprehensive planning effort to project future (20 years) water demand, supply availability analysis for rainy, moderate, severe and extreme drought conditions and how those scenarios can be managed using alternative water sources. Reviewed reclaimed water storage, pumping, and conveyance system hydraulics.

Venkat Radhakrishnan, PE, ENV SP

Technical Advisor (Hydraulic Modeling)

Mr. Radhakrishnan is a water utility planning leader with over 15 years of experience with proficiency in utility water planning, hydraulic modeling, asset management, and data analytics. He has extensive local modeling experience (Laguna Beach, Newport Beach, Los Angeles DWP, Buena Park, Santa Rosa, among others) along with wide-ranging national and international knowledge in water/wastewater master plans, water resources, asset management, condition assessment, water reuse, pump station sizing and treatment plant hydraulics. He will ensure that all industry leading and appropriate modeling practices are implemented on this project.

Key Information

Education/Qualifications

- BE, Mechanical Engineering, VJTI, University of Mumbai, India, 2004
- MSE, Mechanical Engineering, Arizona State University, 2006
- MBA, Global Management and Finance, UCLA Anderson, 2018

Years of Experience

13 with Arcadis

15 Total

Professional Registrations and Certifications

- Professional Engineer – AZ
- ENVISION® Sustainability Professional

Relevant Experience

Water Master Plan

City of Newport Beach, Newport Beach, California

Lead engineer and hydraulic modeler for the water master plan to study the impact of reduction in water demands over the last 10 years on long-term water system planning, and how to prioritize repair and replacement of aging infrastructure into capital improvement planning. Work included field investigation of all the City's facilities including reservoirs, pump stations, PRVs, and MWD interconnects.

Water Master Plan Update

City of Laguna Beach, Laguna Beach, California

Lead engineer and hydraulic modeler for the water master plan update to update the demand projections. The updated model was re-calibrated and used to identify fire flow and capacity deficiencies. The deficiencies along with asset management data was used to develop a CIP using risk-based approach. Improvements to fire flow was also recommended.

Wastewater Master Plan Update

City of Buena Park, Buena Park, California

Hydraulic modeler for the master plan update including developing field monitoring plan, developing Per Capita flow factors, calibration, and identifying improvements.

Development of Hydraulic Models

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

Project manager for a multi-year multi-million-dollar project to develop hydraulic models for 29 pressure zone across the City of Los Angeles. The project also includes developing methodologies to implement latest technologies in hydraulic modeling to DWP models.

Venkat Radhakrishnan, PE, ENV SP
Continued

Wet Weather Design Storm and Per Capita Flow Generation Rate Analysis
LA Sanitation, Los Angeles, California

Assistant project and task manager overseeing the development of dynamic design storm, wastewater per capita generation rates and wastewater flow projections for the City of Los Angeles.

Griffith Park Master Plan and Alternatives
Los Angeles Department of Water and Power, Los Angeles, California

Assistant project manager and lead modeler for the water distribution system around the iconic Griffith Park. The project includes development of the hydraulic model for the system and identifying system alternatives for master planning and water quality.

Urban Water Management Plan and Demand Modeling
Inland Empire Utilities Agency, Chino, California

Task manager responsible for building a dynamic water demand projections tool using GIS and Microsoft Access for seven water purveyors in the Inland Empire based on land use, redevelopment, and population projections.

Water Master Plan Update
Indio Water Authority, Indio, California

Task leader and lead hydraulic modeler to investigate the existing system performance distribution system model under varying domestic and fire demand conditions. Evaluate the supply and conveyance capacities associated with system pump stations, wells and storage. Develop the system configuration and operation under futures demands

On-Call Hydraulic Modeling Services
Santa Cruz County Sanitation District, Santa Cruz, California

Assistant project manager and lead hydraulic modeler to provide on-call support for collections system modeling services. Task includes enhancement and calibration of the existing collection system model and identify deficiencies (using SewerGEMS). Prepare a set of Standard Operating Procedure (SOP) documents for district engineers to use as a reference in ongoing model use and maintenance.

On-Call Hydraulic Modeling Services
City of Santa Rosa, Santa Rosa, California

Task manager and lead modeler to supporting modeling services provided to the City of Santa Rosa for various development and evaluation activities.

Operational Energy Cost Optimization Evaluation
Mesa Water District, Costa Mesa, California

Lead hydraulic modeler to evaluate current operational practices for opportunities to reduce energy costs through no-cost or low-cost improvements in the use of its production wells, reservoirs, pump station, and treatment facilities.

Plant I and Plant II Hydraulic Modeling
Orange County Sanitation District, Newport Beach, California

Hydraulic modeler focused on building a hydraulic model of the plant's primary effluent piping and pumping facilities impacted by existing operational issues (using Infoworks). Analyze the hydraulic behavior of existing operational scenarios to develop operational and capital improvement solutions.

Celine Hyer, PE, IAM

Technical Advisor (Asset Management)

Ms. Hyer has over 32 years of experience in asset management planning, design and implementation for utilities using the EPA, WERF and ISO 55000 frameworks. She has led inventory, condition and risk assessments for water, wastewater, and recycled water infrastructure. totaling over 1,500,000 discrete assets. Ms. Hyer has created short-and long-range capital plans using business case templates and triple bottom line analysis. She has led the development of comprehensive asset management plans and asset management strategies for utilities across the U.S.

Key Information

Education/Qualifications

- MS, Engineering Management, Florida Institute of Technology, 1989
- BS, Chemical Engineering, Florida Institute of Technology, 1988

Years of Experience

15 with Arcadis

32 Total

Professional Registrations and Certifications

- Professional Engineer – FL
- Institute of Asset Management Certificate

Relevant Experience

Asset Management and Capital Improvement Program

Los Angeles Department of Water & Power, Los Angeles, California

Expert professional consulting services related to asset management and capital improvement program planning. Assignments have included support in preparing a strategic asset management plan, as well as asset type specific asset management plans and overall goals, levels of service and governance structure.

IAM Enterprise Asset Management

San Diego, California

Lead technical support to evaluate the current asset management practices Citywide compared to best practices in preparation for implementation of SAP for work and asset management processes. Gap analysis included the WERF Strategic Asset Management Gap Analysis Questionnaires as well as the ISO 55000 Gap Analysis Tool for City Departments including water, public works, stormwater and parks. Extensive process mapping was performed in phase II of the project to identify the "to be" processes for asset management utilizing SAP.

Comprehensive Asset Management Plan Metropolitan

Sewer District of Greater Cincinnati, Ohio

Quality assurance lead for developing an asset management plan to provide a defensible, risk-based capital planning program to increase reliability and minimize life-cycle costs for sewer treatment and pumping facilities. Project activities included developing risk assessment guidelines, including asset hierarchy, condition assessment, consequence of failure and asset risk, conducting field condition and risk assessments for seven treatment plants and 100 pump stations, developing and implementing a process to identify necessary capital projects and prioritize them, and configuring a custom asset management system tool to assess risk, develop projects and produce project nomination forms.

Celine Hyer, PE, IAM
Continued

Asset Management Program Implementation SUEZ North America

Paramus, New Jersey

Technical lead for developing a Strategic Asset Management Plan (SAMP), as well as developing methodology for condition and risk assessments for facility and pipeline assets for all Suez owned utilities. The SAMP included developing an asset management policy that related to the overall vision and mission, establishing service levels as well as developing goals and a roadmap for improvements based on a formal gap analysis. Asset Management Program Governance including organization structure, communications and roles and responsibilities was also addressed.

Asset Management Program Implementation and Energy Use Decision Support Tool

Tarrant Regional Water District, Ft. Worth, Texas

Task leader for the condition and risk assessment and asset management plans for water and sub-systems including transmission mains, pumping stations, pressure reducing stations and outlet works, and reservoirs. This work includes establishing the table of contents for the asset management plans, establishing service levels, gathering existing program information and holding workshops with TRWD staff for improvements related to operations and maintenance procedures, asset hierarchy and definitions, vertical asset condition, criticality and risk assessments, capital planning, and Maximo improvements. Pilot programs were developed to test the condition and risk methodology for each asset class prior to full implementation and configuration in Maximo. Support with developing a strategic asset management plan was also provided. This project is being implemented in a phased manner and has continued over the last five years with the goals of achieving an ISO 55000 full maturity rating.

Asset Management Implementation Phase I and II

Toho Water Authority, Kissimmee, Florida

Program manager for asset management program implementation work for Toho Water Authority's overall asset management program. Tasks included establishing asset hierarchy and definitions, performance measures, performing inventory, condition and risk assessments of 15 water and wastewater treatment plant and 300 lift station assets, creating procedures for prioritizing capital projects, analyzing asset criticality and consequence of failure and modifications to Infor EAM to produce capital planning reports. Phase II task activities will include writing a strategic asset management plan and individual asset management plans by asset class.

Risk Assessment, Project Prioritization and Asset Management

New York City Department of Environmental Protection, New York

Task leader for the condition and risk assessment of assets covering water, wastewater, stormwater, and all facilities owned and operated by NYCDEP, including over 50,000 equipment assets at treatment and pumping facilities and 200,000 pipe assets, including water, sewer and stormwater mains. The outcome of the data collection and evaluation was a 4-and 10-year capital plan for renewal and replacement of assets based on risk and remaining life. Business case templates and prioritization using a custom Arcadis-designed tool facilitated the CIP creation. Guidelines documents, tools and staff training will allow NYCDEP staff to make this an ongoing program. Tools included a custom asset management information system that stored all risk data and created business cases. Phase III is underway and will update the CIP through new risk assessment and business cases for treatment plant and pumping assets.

Robert Ryall, PE

Technical Advisor (Financial Analysis)

Key Information

Education/Qualifications

- MBA, Business Administration, Wake Forest University, 2002
- BS, Environmental Engineering, University of Central Florida, 1998

Years of Experience

3 with Arcadis

20 Total

Professional Registrations and Certifications

- Professional Engineer – FL

Mr. Ryall is a nationally recognized consultant with 20 years of expertise in financial and strategic planning across the US. He has assisted with over $2 billion in water and wastewater financing and has extensive experience in utility rate-making, impact fees, bond feasibility studies and acquisition/valuation analysis. Mr. Ryall has been involved in many strategic planning studies for water and wastewater utilities, including grant funding, master plans, capacity analysis, consolidation studies and asset management-related engagements.

Relevant Experience

Water Bank Participation Assessment Model

Chino Basin Water Bank (CBWB), Chino, California

The CBWB engaged Mr. Ryall to evaluate banking participate scenarios including developing operating frameworks and costs associated with the scenarios. The assessment model was developed to support CBWB pricing and financial evaluation of alternative banking scenarios. The model and evaluation focused on three key factors considered when evaluating participant scenarios:

1. Developing proposed Put and Take fees that recover functional costs of the water bank
2. Evaluating the life cycle cost of the participant scenario, cost per acre-foot of banked water
3. Evaluating the impact of other alternatives such as:
   - **Contributed or Capital Investment of a Participant -** evaluating the fee and life cycle cost impact if Participant's provide an initial investment in the CBWB,
   - **Leave Behind Water -** beyond capital and operating expenses, evaluating the impact of leave behind water,
   - **Grants -** evaluating the impact of grant on fee and life cycle costs, and
   - **Alternative Put and Take Fee Structures -** evaluating the feasibility of structured fees; building Put and Take fees around a Participants needs and capabilities.

The Chino Groundwater Basin (Chino Basin) is one of the largest groundwater basins in southern California. Located in the Inland Empire, it houses a total groundwater capacity of about six million acre-feet.

Water and Sewer Revenue Sufficiency Evaluation

DeKalb County Department of Watershed Management, Georgia

DeKalb County, Georgia's second largest water and sewer utility, engaged Mr. Ryall to complete a series of financial planning workshops to develop a five-year plan for funding the Department of Watershed Management's $2.7 billion capital program. The results of the revenue sufficiency evaluation were used to help secure $265,000,000 in Water Infrastructure Finance and Innovation

Robert Ryall, PE
Continued

Authority (WIFIA) low interest funding. Arcadis is next reviewing DeKalb County's water and sewer rates to explore options to achieve the rate revenue increases forecasted as part of the revenue sufficiency evaluation.

Review of Rate Structure and Customer Assistance Programs

District of Columbia Water, Washington DC

Mr. Ryall lead an independent review of DC Water's rate structure and customer assistance programs. The engagement including preparing an Independent Review of DC Water's cost of service approach, water and sewer rate structure, and customer assistance programs. The primary objective of the engagement was to provide DC Water an independent review and provide recommendations for improving the cost of service approach used to develop the existing rate structure, and to provide options to improve customer assistant programs. The results of the engagement provided DC Water information used to help continue to provide rate equity and long-term financial sustainability. The engagements also included a benchmarking survey of the Nation's largest water and sewer utilities.

Connection Charge and Miscellaneous Fees

NMB Water, North Miami Beach, Florida

Mr. Ryall prepared a review of NMB Water's water and sewer Connection Charges as well as Miscellaneous. Connection Charges for the system we developed using the "Average Cost" methodology, incorporating the cost of both NMB Water's existing system and planned expansions. The Connection Fees also included a debt service credit to ensure new customers of the system were not double charged for expansion related costs. Miscellaneous Fees were developed primarily on a time and material basis; however, a regional comparison of fees was also completed and used to identify fee updates.

Rate and Cost of Service Services

Miami-Dade Water and Sewer Department, Florida

Mr. Ryall serves as project manager for this engagement, which involves a comprehensive water and sewer cost-of-service and rate study for both retail and wholesale customers. Miami-Dade Water and Sewer Department (MDWASD) is the largest water system in Florida and serves approximately 2 million customers. MDWASD has more than 3,600 miles of sewage pipes, a service area of 341 square miles and 954 pump stations. This engagement includes the development of cost based rates for MDWASD's 15 water and 13 sewer wholesale customers. The rates to wholesale customers include an annual true-up as well as development of annual rates for the preceding year. Mr. Ryall works with MDWASD and wholesale customers to ensure understanding of the process for developing the cost based rates.

Expert Witness – Fire Service Rates

Confidential Client (Top 15 Municipal Statistical Area)

Mr. Ryall was retained to provide expert testimony relative to fire service rates. Mr. Ryall's testimony focused on his opinion of the reasonableness of the cost-of-service analysis supporting the City's fire service rates. As part of this effort, Mr. Ryall relied on his experience with large utilities and his industry leadership in establishing water and sewer rates.

Water Utility Rates and Contract Negotiations

City of Norfolk, Norfolk, Virginia

Mr. Ryall prepared comprehensive studies of water and sewer utility rates in for the City. The studies covered multi-year projections of revenue and revenue requirements, long-range financial planning, cost of service by customer class, design rate schedules of rates for the sale of water to retail and wholesale service customers, and inside City sewer service. Mr. also has prepared biennial true-up calculations of wholesale customer rates in using audited figures to test the formula driven rates included by provisions in the wholesale service contracts. In addition, Mr. Ryall has also prepared annual estimates of true-up for fiscal years for inclusion in year-end financial audits.

Ben Chenevey, PE

Lead Distribution System Modeler / Engineer (Water Master Plan)

Mr. Chenevey has 10 years of experience as an environmental engineer serving as the Arcadis community of practice leader for water distribution system modeling, and vice-chair of the AWWA Engineering Modeling Applications Committee. His national experience includes extensive knowledge of water distribution hydraulic modeling software with experience ranging from field testing for model development and calibration to advanced water quality and transient modeling. Mr. Chenevey has used this experience to lead numerous modeling projects in California, including for LADWP, where he managed the development of twenty-three hydraulic models, three annual pressure surveys, and provided technical expertise and training.

Key Information

Education/Qualifications

- MS, Environmental Engineering, University of Cincinnati, 2013
- BS, Civil Engineering, University of Dayton, 2009

Years of Experience

7 with Arcadis

10 Total

Professional Registrations and Certifications

- Professional Engineer – OH

Relevant Experience

Hydraulic Model Development and Calibration

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

Project engineer for hydraulic model development and creation for pressure zones within the Los Angeles Department of Power and Water distribution system. Multiple models have been created as part of this project, and models were developed with a one-to-one relationship with GIS data. Led the entire development and calibration process for multiple large-scale models and led other groups during separate zone's model builds. Also developed pressure survey plans for gathering field data, lead actual field efforts, and analysed resulting that is being used for regional model development. Mr. Chenevey also led several tasks for additional technical services including real-time modeling and seismic evaluations.

Evaluation of DBP Treatment and Control Strategies

Confidential Client, California

Project engineer for the evaluation of disinfection-by- production treatment and control systems that could be implemented for the client to help improve recent high TTHM concentration issues. Developed a multi-species water quality model for the client which was then used to help evaluate multiple reduction strategies alternatives for the distribution system. Model results were ultimately used to help screen and select the best mitigation technologies that will be utilized by the client moving forward. Mr. Chenevey also performed additional water quality modeling to help with predicting water quality conditions, operational planning, developed a storage gap analysis for the distribution system, aided in the design of existing and planned tank aeration improvements, and evaluated pipe looping improvements based on local and regional water age impact.

Ben Chenevey, PE
Continued

Distribution System Master Plan
City of Newport Beach, Newport Beach, California

Lead engineer for field work for the city of Newport Beach. Organized a field effort to collect pressure data throughout the city as well as perform numerous flow tests. Lead and performed the field effort, analyzed flow test results which were used for model calibration and analysis, and provided technical support for as-needed investigations.

Griffith Park Water Master Plan
Los Angeles Department of Water and Power, Los Angeles, California

Project engineer and field expert for development of a hydraulic model for Griffith Park in Los Angeles. Led the field effort to install and manage pressure recorders to be used for model calibration. Performed several roughness and fire flow tests in the system to help with calibration. Continued with system evaluations using the developed model after calibration was complete. Recommendations were developed for long-term planning to improve hydraulics, fire-fighting capacity and water age in the park based on close coordination with the Los Angeles Department of Public Works. Final documentation for the project included support of a complete master plan for the park's distribution system as well as a detailed report and complete user guide for the model.

Reclaimed Water Model Update
Loudoun Water, Loudoun County, Virginia

Technical advisor to model update project focused on a reclaimed water distribution system that is primarily utilized for irrigation and industrial/data center cooling. Assisted with hydraulic model updates and validation, along with analysis of the distribution system in order to identify improvements that will reduce pressure fluctuations and account for anticipated increases in reclaimed water usage in the area.

Demand Forecasting and Distribution System Model Update
Greater Cincinnati Waterworks, Cincinnati, Ohio

Project engineer for a comprehensive model update for the city of Cincinnati. Coordinated, lead, and performed multiple field efforts which included roughness testing and hydraulic grade line testing throughout the greater Cincinnati area which were used to update and calibrate the model. Also coordinated extensive model updates including one-to-one updates with GIS and chlorine decay and TTHM water quality analysis and parameter updates. Also developed and utilized a transient model of one of their service areas to help identify operation and infrastructure changes to help mitigate historic main breaks in the area.

Water Distribution System Optimization Program
City of Flint, Flint, Michigan

Project engineer for calibration and analysis using a hydraulic model developed for the City of Flint. Participated in a field data collection and the model was calibrated with assistance and coordination from USEPA and other subconsultants. Once calibrated, the model was used for numerous analysis tasks including storage analysis, water age assessment, asset management through modeling criticality, and transient analysis.

Water Distribution System Study, Water Model and Capital Improvement Plan
City of Toledo, Toledo, Ohio

Project engineer for project including model development and capital improvement analysis. Provided technical support for model development, calibration, and model alternative analysis. Created customized online dashboards to analyze model results and propagate findings and recommendations to the client. Developed advanced water quality model to simulate free chlorine and total THM concentrations so that future conditions and alternative storage evaluations included understanding of regulated water quality. Mr. Chenevey also led tasks on system-wide transient evaluations and a pilot unidirectional flushing program.

Greg Imamura, PE

Lead Water Quality Engineer (Water Master Plan)

Key Information

Education/Qualifications

- MS, Civil Engineering, University of California, Los Angeles, 2010
- BS, Civil Engineering, University of California, Los Angeles, 2009

Years of Experience

11 with Arcadis

11 Total

Professional Registrations and Certifications

- Professional Engineer – CA
- D2 Certified Operator – CA
- WAV Level 1

Mr. Imamura has 11 years of experience as a civil engineer and a certified water distribution system operator specializing in drinking water treatment and water quality throughout Southern California. He has conducted alternative analyses ranging from new and existing treatment systems to distribution system nitrification/DBP mitigation, allowing him to develop tools to allow for increasing objectivity in the selection process. He also has experience with a variety of water quality issues—including nitrification planning, corrosion analyses, and extensive work developing viable hexavalent chromium treatment for drinking water—and a strong background in work process optimization and large dataset analysis via projects with LADWP, PG&E, and other Southern California public and private utilities.

Relevant Experience

Distribution System DBP Mitigation

Confidential Client, California

Mr. Imamura led the team that worked closely with the Utility to develop cost-effective solutions in the distribution system for their rising TTHM levels. As part of developing and evaluating alternatives, the project team refined the Utility's hydraulic model and added a water quality modeling component (chlorine and TTHM formation modeling) to assist in visualization and decision making. The team continues to develop more advanced water quality models for the Utility to aid in future planning.

Fairmont Reservoir Planning

Los Angeles Department of Water and Power, California

Mr. Imamura evaluated historical water quality within the Los Angeles Aqueduct to characterize existing and project future conditions and their potential impacts at LAAFP. He then supported the development of alternatives for treatment redundancy, which eventually culminated in the Fairmont Reservoir project. He also estimated maintenance requirements for the plant to allow LADWP to plan for staffing and developed liquidated damage proposals for the progressive design-build contract.

Water System Alternatives Evaluation for Griffith Park

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

Mr. Imamura supported in the development of a water distribution model for the Griffith Park area in Los Angeles. He was responsible for managing and collecting field data and calibrating the computer hydraulic model used to perform water quality analysis. He also assisted with identifying system alternatives for master planning and water quality.

Greg Imamura, PE, ENV SP
Continued

Development of a Uniform Approach to Prepare Drinking Water Hexavalent Chromium Compliance Plans
Water Research Foundation and Coachella Valley Water District, Coachella, California

Mr. Imamura led the field work and report for Tailored Collaboration projects 4445 and 4516, which tested three different WBA resins, an SBA resin, and modified RCF using chlorine and MF to remove Cr(VI) from two different wells at CVWD, as well as removal of Cr(VI) in the full-scale SBA arsenic treatment systems currently being operated by CVWD. He developed and evaluated brine disposal alternatives for CVWD's current and planned full-scale SBA treatment systems. He designed, procured equipment, oversaw construction and operation of the pilot units, and estimated scaled-up costs based on performance.

Water Infrastructure Network
Los Angeles Department of Water and Power, Los Angeles, California

Mr. Imamura was the project engineer for the team that supported development of the Department's water system's data master plan, which aims to consolidate their disparate data sources under one roof as part of a larger plan to streamline workflow and free up staff to perform higher-level tasks. Greg and the team support the Department by documenting current and future workflows, estimating and planning implementation efforts, and using process and programming experience to provide a stable bridge to the implementation effort. He also developed the use case prioritization framework to aid with allocating resources as the program continues to grow.

Integrating Desalinated Seawater into Municipal Distribution Systems
Water Environment Research Foundation, Carlsbad, California

Mr. Imamura developed a user-friendly system to input, store, and analyze data from varying sources. The study examined the effects of integrating RO-treated water into existing supplies in San Diego county, with specific emphasis on corrosion indicators, residual stability, and DBP formation. His system allowed for his ensuing analysis to encompass a large scope under the same budget constraints to ensure many factors were considered.

Tank Light Study Support
Los Angeles Department of Water and Power, Los Angeles, California

Mr. Imamura led the pilot of a novel nitrification mitigation system for LADWP. He supported test plan development, oversaw rehabilitation/refurbishment of the testing facility (consisting of four ~17,000 gal tanks), and oversaw the operation, sampling, and analysis throughout. He worked collaboratively with LADWP to ensure that the project plan recalibrated appropriately as additional technology performance characteristics came to light.

Groundwater System Improvement Study
Los Angeles Department of Water and Power, Los Angeles, California

Mr. Imamura supported this study of groundwater sources affected by multiple contaminants including hexavalent chromium. He conducted a thorough literature review for treatment options (including GAC) for perchlorate and 1,4-dioxane and was responsible for data management and analysis for the water quality, during which he guided practices for dealing with non-detect results that improperly skewed statistics. He was involved with assessing the feasibility of Packed Tower Aeration for VOC removal at the sites and comparing treatment costs over the long term between alternative methods.

Seawater Reverse Osmosis Plant Tracer Study
Poseidon Water, Carlsbad, California

Mr. Imamura developed the test plan for the tracer study confirming CT compliance in the product water tank of the Carlsbad Seawater Reverse Osmosis plant using fluoride. He oversaw execution of the plan, coordinated with the Department of Drinking Water, and analyzed the results on two separate occasions, as his analysis of the initial results revealed structural issues with the baffle walls. The walls were repaired before conducting the tracer study a second time, allowing Poseidon to operate their facility as designed.

Jim Cooper, PE, ENV SP, CPM, CWO

QC Reviewer (Water Modeling and Master Plan)

Mr. Cooper has 18 years of experience and is a certified operator in multiple states who balances technical expertise and practical field experience by leading teams to deliver innovative, practical and sustainable solutions with a career focused on water distribution systems. He is a trustee for the AWWA, lead author for the latest edition of AWWA Manual of Practice 32, Computer Modeling of Water Distribution Systems and a AWWA Vernon Lucy national award recipient for his management of a team of over 50 experts in water distribution system modeling.

Key Information

Education/Qualifications

- Artificial Intelligence: Implications for Business Strategy, MIT, 2019
- MS, Civil Engineering, University of Akron-Main Campus, 2009
- BS, Civil Engineering, University of Akron-Main Campus, 2008

Years of Experience

16 with Arcadis

18 Total

Professional Registrations and Certifications

- Professional Engineer – GA, OH, IN, WI, KY, VA, FL
- Water Distribution System Operator, Class II
- Envision Sustainability Professional
- Construction Documents Technologist

Relevant Experience

Downtown Water Storage and Pumping Facility Design

City of Atlanta Department of Watershed Management, Atlanta, Georgia

Technical advisor and hydraulic modeler on a storage and pumping system to support the downtown area focused on operations, preliminary engineering and design via a design-build delivery using the City's hydraulic model.

Demand Forecasting and Distribution Model Update

Greater Cincinnati Water Works, Ohio

Project manager of demand forecasting, hydraulics and water quality, field data collection program, wholesale customers coordination, system evaluation and model maintenance and training program.

Development of Water Distribution Models

Los Angeles Department of Water and Power, California

Project manager and technical advisor for implementation of a data collection program, hydraulic model development and calibration throughout the entire LADWP service area.

Hydrant Flow Testing and Hands-On Training

Nevada National Security Site, US Dept. of Energy

Technical expert providing training on pipe network hydraulics, fire protection system design, capacity, testing, and maintenance for facility personal.

Regional Model Development and Calibration to Support Corrosion Control

Great Lakes Water Authority, Detroit, Michigan

Technical advisor and task manager for development of a regional water distribution model combining over 50 consecutive systems into a single model, consisting of 8,800 miles of water main and 158,000 links, including calibration, hydraulic and water quality evaluation.

Jim Cooper, PE, ENV SP, CPM, CWO
Continued

Water Master Plan

City of Tallahassee, Tallahassee, Florida

Technical advisor for a comprehensive water master plan and evaluation of various system improvements leading to the development of a 20-year capital improvements plan.

Intelligent Water Strategic Planning

Cobb County-Marietta Water Authority, Georgia

Subject matter expert supporting development of a strategic roadmap guiding the organization toward a human-focused future empowered by the latest technology aligning with their mission and vision.

Distribution System Fire Flow Testing Prioritization and Training

Greater Cincinnati Water Works, Cincinnati, Ohio

Project manager and technical lead to develop a methodology to prioritize testing of 10,500 hydrants and to provide technical and hands-on training to water utility and fire department staff on various methods to test and understand fire suppression capacity within the water distribution network.

Water Planning Basic Ordering Agreement

Washington Suburban Sanitary Commission, Maryland

Technical advisor for multiple task orders focused on planning, modeling and optimizing the water distribution network consisting of over 5,500 miles of pipe, 86 pressure zones and 18 pumping stations.

Hydraulic Model Update and Calibration

City of Hollywood, Hollywood, Florida

Project manager and technical advisor for the data collection consisting of available fire flow and pipe roughness testing, hydraulic model calibration, and training.

Water Distribution System Model and Master Plan

City of Toledo, Toledo, Ohio

Project manager and technical advisor of model update, calibration, and system master plan. Tasks include demand forecasting, water quality modeling, unidirectional flushing pilot, pressure transient analysis, software training and a regulatory-driven storage alternatives evaluation.

Water Distribution Technical Assistance

Citizens Energy Group, Indianapolis, Indiana

Technical advisor for water conveyance planning and management practices. Tasks include evaluating existing practices and recommending process improvements, resource optimization based on latest industry best practices, and assistance with internal and contract staff.

Water Distribution System Optimization

City of Flint, Flint, Michigan

Task manager and project technical advisor focused on model calibration, storage optimization, water quality sensor placement evaluations, pumping transient evaluations, and criticality assessment.

Intelligent Water Opportunities Assessment

Halifax Regional Water Commission, Nova Scotia, Canada

Project manager and technical expert performing a benchmarking and opportunities identification for advancement of water, wastewater, and stormwater technology (equipment, systems, processes) and development of a prioritized implementation roadmap aligned with their mission and strategic goals.

Design Thinking for Long Term Strategic Planning

Buffalo Sewer Authority, Buffalo, New York

Subject matter expert for a design sprint to develop ideas to support operation and maintenance of the sewer system to meet the current and future needs of the City. This included discussion of strategic planning, workforce development, performance measures and benchmarking as well as communications.

Review of Water Security, Resilience and Response Tools

US Environmental Protection Agency, Cincinnati, Ohio

Technical expert serving as an advisor on use of existing tools, water sector needs and the role of the US EPA in providing software and solutions to public utilities.

Christine Cotton, PE

QC Reviewer (Water Quality)

Key Information

Education/Qualifications

- BS, Civil and Environmental Engineering, University of Texas, 1994
- MS, Civil and Environmental Engineering, University of Texas, 1996

Years of Experience

25 with Arcadis

25 Total

Professional Registrations and Certifications

- Professional Engineer – AZ, VA

Ms. Cotton has 25 years of experience managing complex programs over her career, including program master plans, stakeholder development, capital improvements, and facilities start-up. The most recent program she led assisted a large Los Angeles client to develop its long-term source water treatment program for future regulatory requirements. She combines her talent of managing large multi-stakeholder programs with being a nationally recognized UV treatment expert and specializing in drinking water and recycled water treatment.

Relevant Experience

Professional and Technical Services for Ultraviolet and Chloramine Facilities and Disinfection Integration

Los Angeles Department of Water and Power, California

Program manager for the Los Angeles Reservoir Ultraviolet Facility. The projected added ultraviolet disinfection facilities and converted from chlorine to chloramine residual disinfectant to comply with the Stage 2 Disinfectants and Disinfection By-Products Rule (D-DBPR) and the Long Term2 Enhanced Surface Water Treatment Rule (LT2ESWTR).

Assistance with LAR Ultraviolet Treatment Project

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

Program manager for the Los Angeles Reservoir Ultraviolet Facility. The projected added ultraviolet disinfection facilities and converted from chlorine to chloramine residual disinfectant to comply with the Stage 2 Disinfectants and Disinfection By-Products Rule (D-DBPR) and the Long Term2 Enhanced Surface Water Treatment Rule (LT2ESWTR).

Los Angeles Source Water Treatment Master Plan, Fairmont Treatment Plant Design, and Owner's Agent Services

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

Project Manager and technical lead for the evaluation of the current treatment strategies and operational practices for source waters conveyed through the Los Angeles Aqueduct (LAA), and source waters from the State Water Project East Branch (SWP-E) and State Water Project West Branch (SWP-W).

The project was planned, and a roadmap was developed through a series of workshops that included individual workshops with Water Engineering, WQ, Water Operations, and Water Resources to review and screen alternatives and develop a roadmap for construction of the Fairmont Sedimentation Plant.

1. Preliminary Screening Evaluation Workshops – In this phase, a list of all treatment alternatives was developed, including a no-action alternative, which could potentially address the objectives. Alternatives were ranked

Christine Cotton, PE
Continued

in a workshop format against an established criteria list for water quality, operations, cost, and implementability.

2. Detailed Alternatives Evaluation Workshops – In this phase, the top three alternatives identified in phase 1 were further evaluated and compared against each other in workshops with LADWP stakeholders in different Divisions.

After the source water treatment and location was selected, she led the team to complete the 30% design and serve as the owner's agent for a progressive design build team (to be selected). The 30% design and the Preliminary Design Report are complete, and our team is assisting LADWP as needed to procure the Progressive Design Builder.

Santa Monica Sustainable Water Infrastructure Project

City of Santa Monica, Santa Monica, California

Project manager for the design team to create a sustainable water supply to move closer to water self-sufficiency by 2020. She is also the technical lead for evaluating the Santa Monica Urban Runoff Recycling Facility (SMURRF) upgrades and expansion of treatment of stormwater and brackish water. The expanded SMURRF treated water will augment drinking water supplies through groundwater injection and continue reclaimed water delivery. Designing the UV advanced oxidation facility for the and a below-grade Advanced Water Treatment Facility (AWTF) with the ability to treat 1 million gallons per day (mgd) of wastewater or harvested stormwater.

Water Quality and Implementation Program

Tucson Water, Tucson, Arizona

Project manager for technical and public involvement efforts intended to resolve key decision points in Tucson's "Water Plan: 2000-2050." Worked with the utility's customers to determine long-range water quality goals that are acceptable to the community in terms of both aesthetics and cost. She helped to plan facilities for complete utilization of the city's water allocation from the Central Arizona Project and expand the already extensive reclaimed water system. Indirect use of effluent to supplement potable water supplies may be pursued and may include implementation of an advanced treatment facility. This multi-year program has spanned multiple task orders and several projects including public outreach; multiple treatment evaluations and designs; pilot testing; indirect potable reuse master planning; arsenic treatment; and chemical feed designs, construction management, and start-up activities.

Asset Management Program

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

Project manager assisting LADWP to increase awareness of the benefits of Asset Management through workshops. Presented functionalities of Maximo and the process to develop a business case and prioritize projects prior to inclusion in CIP list. Develop and led brainstorming sessions, exercises and training materials for engaging Asset Management training for LADWP staff. Evaluating and updating current LADWP asset management reports for main lines, pump stations and regulatory stations. Analysis of existing data for each asset classes and conducted a respective gap analysis in order to identify missing data and coordinate with LADWP in order to collect necessary missing information.

Griffith Park Hydraulic Computer Model and Distribution Improvements

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

Contract manager for the water distribution system around the iconic Griffith Park in LA. The project includes development of the hydraulic model for the system and identifying system alternatives for master planning and water quality.

Pradeep Sudini, PE

Lead Modeler / Engineer (Sewer Master Plan)

Mr. Sudini is a technical contributor to the WEF Collection System modeling technical group and has 15 years of extensive urban hydraulic and hydrology (H&H) planning experience for clients nationwide. His expertise includes developing H&H models, data management and analytics, flow monitoring, model calibration and validation, flow projections for sanitary sewer applications, and modeling manifolded pump stations and force mains. He is experienced in developing sanitary sewer models for master planning and consent order-driven projects. In Southern California, Mr. Sudini's current local projects include hydraulic modeling on-call services for the City of Santa Rosa and hydraulic modeling support for OC SAN Bay Bridge pump station design.

Key Information

Education/Qualifications

- MS, Civil and Environmental Engineering, Old Dominion University, 2007
- BS, Civil Engineering, Osmania University, 2003

Years of Experience

3 with Arcadis

15 Total

Professional Registrations and Certifications

- Professional Engineer – VA, MD

Relevant Experience

Harford County Sewer Model Study

Department of Public Works, Harford County, Maryland

Technical manager for the development and calibration of a system-wide hydraulic and hydrologic model using Sewer GEMS. The County sewer system consists of 800 miles of pipes and 50 pump stations that convey flow to two wastewater treatment plants. The project includes a GIS data review, flow and rainfall analysis, review of more than 50 pump stations design drawings, and operations data to facilitate the development of the model. The model was calibrated for dry-and wet-weather flows and applied to evaluate the capacity of the sewers to convey peak flows simulated for 2-year and 10-year design storm events.

Sewer Modeling Support Service On-Call

DeKalb County, Decatur, Georgia

Technical manager for the evaluation of capacity requests from developers for tie-ins to the County's sanitary sewer system. Reviewed protocols and discussed thresholds for defining acceptable capacity requests. Support the County as the evaluation protocol evolves due to regulatory demands. The analysis uses the County's seven hydraulic and hydrologic InfoWorks ICM models representing three overarching basins within the County. The ICM Models consists of 1,800 miles of pipe with 53 pump stations.

On another work order under this contract, Mr. Sudini was the technical manager to determine design flow and peaking factor for site specific sources such as residential, commercial etc. The project included reviewing literature in combination with the County's water consumption data to refine the sanitary flow contributions from site-specific sources for the purpose of design.

Pradeep Sudini, PE
Continued

Regional Hydraulic Model and Other Consent Order Requirements
Hampton Roads Sanitation District, Hampton Roads, Virginia

Task manager and senior modeler for the development and calibration of a regional hydraulic model, the development of a Regional Wet Weather Management Plan, and other services necessary to meet the requirements specified in a Consent Decree with EPA and a Special Order by Consent with the Virginia Department of Environmental Quality. The HRSD fully dynamic sanitary sewer model consists of an extensive manifolded force main system with more than 1,000 pump stations and 16 booster pump stations. The model includes system information from fourteen localities, extends over a 3,100-square-mile service area, and serves approximately 1.6 million people.

JCUA Utilities Master Plan
US Army Corps of Engineers, Mobile District, Alabama

Technical manager for the development and calibration of a Jackson County Utility Authority (JCUA) regional collection system model using Infoworks ICM. Oversaw the GIS development to facilitation hydraulic and hydrologic model building and lead the development and calibration of four JUCA collection system models. The models were used to address potential capacity-related wet-weather overflows in the collection system and evaluate pump station capacities. The JCUA collection system consists of a largely manifolded forcemain network with 123 miles of pipes, 37 pump stations, and 23 lift stations that convey flow to four wastewater treatment plants.

Kline's Island Sewer System (KISS) Model Recalibration
Lehigh County Authority, Pennsylvania

Technical manager for the model update and recalibration of a dynamic sewer system KISS Model using InfoWorks ICM. The project includes network data review, flow analysis for over 50 flow monitoring locations, rainfall analysis, developing industrial and residential dry weather flow patterns, incorporating field inspection data, verifying pump station configurations, and model calibration and validation. Continuous period simulations were performed to ensure antecedent conditions were accounted for in the calibration. The models were used to address potential capacity-related wet-weather overflows in the collection system, assess the impact of the proposed development on large sewers, and evaluate pump station capacities.

Various Basins Capacity Analysis Study
Washington Suburban Sanitary Commission (WSSC), Maryland

Technical manager for the model development and calibration of a dynamic sewer system model using InfoWorks ICM. The model was calibrated for wet- and dry- weather flows and applied to evaluate the capacity of the sewers to convey the peak flows simulated for 2-year and 10-year design storm events. The models were used to address potential capacity-related wet-weather overflows in the collection system, assess the impact of the proposed development on the WSSC CIP-sized sewers, and evaluate pump station capacities.

Bay Bridge Pump Station and Force Main Replacement
Orange County Sanitation District, California

Senior engineer for the hydraulic analysis of the Bay Bridge Pump Station (BBPS) and force mains in the Newport Force Main (NFM) system. BBPS is the upstream-most pump station of the NFM maninfolded force main system with four wastewater pump stations interconnected by two parallel force mains. The project includes developing a model for the NFM network using InfoWorks ICM (10.0) software to select new pumps at the BBPS. The project includes developing the system curve envelope and analyzing proposed pump station facilities with single and dual-size pump selections. The project also includes determining peak discharge capacity from each pump station operating alone and in combination with the other pumping facilities in the NFM network.

Hazem Gheith, PhD, PE

QC Reviewer (Modeling and Master Plan)

Dr. Gheith has 35 years of experience in hydrologic and hydraulics modeling of urban drainage. His specialized experience in mathematical modeling, combined with a solid background in hydraulics and applied physics resulted in key enhancements in hydraulic modeling methods. Dr. Gheith has used his vast expertise in hydrologic and hydraulics applications to evaluate and mitigate street flooding, water-in-basement, sanitary sewer overflows and combined sewer overflows. He has presented and authored several technical research papers on advancing the planning activities for tunnels, GI and RDII reduction.

Key Information

Education/Qualifications

- PhD, Engineering Mechanics, Ohio State University-Main Campus, 2005
- MS, Engineering Physics, Cairo University, 1990
- BS, Civil Engineering, Cairo University, 1986

Years of Experience

10 with Arcadis

35 Total

Professional Registrations and Certifications

- Professional Engineer – OH

Relevant Experience

Sanitary Sewer Capacity Model (SSCM) 2012 Update

City of Columbus, Ohio

Project and technical manager for the City's system-wide model (46,000 manholes) enhancement and application to the City's integrated plan. Enhanced the city-wide model by applying source-level modeling approach to plan system-wide green infrastructure program and RDII reduction plan to mitigate over 120 CSOs and SSOs. The new approach supported a new integrated plan, which is $800 million less than the previous wet weather management plan. The project includes statistical analysis to data from 72 rain gauges and comparison to processed radar rainfall data to generate a 20-year continuous rainfall records for usage in evaluation of the recurrence of deficiencies and mitigation plans. Calibrated the collection system to more than 180 flow monitoring points.

St. Paul's Watershed Master Plan

City of Norfolk, Virginia

Lead modeler for development of an H&H model using PCSWMM that provides a two-dimensional flow routing computation protocol for flood analysis. The enhanced model is being used to identify areas and extents of surface flooding at normal and high tide conditions and at different storm returns up to and including the 100-yr design storm. Advanced digital elevation data and processing application tools are being used to achieve a high-resolution urban stormwater planning model that improves planning quality at a reduced cost.

West Fork Watershed Model and Analysis Update

Metropolitan Sewer District of Greater Cincinnati, Cincinnati, Ohio

Technical manager for the West Fork model update using the SWMM groundwater module and continuous calibration approach to better estimate runoff in the collection system and overflows from 15 CSOs. After calibration, the West Fork watershed wet weather projects were analyzed for sizing of sewer separation, stormwater detention basins and basin discharge pipe. After additional flow monitoring, calibration and validation were updated and refined.

Hazem Gheith, PhD, PE
Continued

Continuous Distributed Rainfall Record
Metropolitan Sewer District of Greater Cincinnati, Cincinnati, Ohio

Technical manager in collecting and reviewing the rainfall data from 35 MSDGC rain gauges. Developed the continuous rainfall record for all radar grids and water by filling the gaps between Gauge-Adjusted Radar Rainfall (GARR) events from 2003 to present.

Facilities Planning Services
Allegheny County Sanitary Authority (ALCOSAN), Allegheny County, Pennsylvania

Technical manager for the hydraulic modeling and improvements planning. Supported ALCOSAN in its Consent Decree to mitigate more than 100 CSOs in the Main Rivers Basin. Responsible for building hydraulic model for affected portions of Pittsburgh Water and Sewer Authority (combined flow) and Reserve Township (separate flow) collections systems. Used innovative continuous calibration technique and radar processed data to calibrate the basin wide H&Hmodel to more than 300 flow meters. Evaluated system performance in a continuous typical year storms condition. Screened mitigation technologies and compiled a cost-effective facility plan. The recommended capital projects involved approximately $3.5 billion worth of system upgrades and improvements.

Big Darby Creek Water Quality Accord
The Group of Four (G4), Ohio

Developed a watershed model to evaluate the impacts of various future development scenarios on Big Darby Creek water quality. Applied the integrated hydrology, hydrogeology, and hydraulics modeling tool, Soil and Water Assessment Tool (SWAT), to trace loads of nitrogen, phosphorus and sedimentation throughout the Big Darby Creek watershed. Evaluated three future development scenarios to achieve BMPs to satisfy Ohio EPA pollution attenuation levels. Presented results to Columbus, Franklin County, townships, and suburban municipalities.

Third Ave Combined Sewer Overflow Increased Capture and GI
City of Columbus, Columbus, Ohio

As lead hydraulic modeler, used the City's system-wide model to plan the implementation of a comprehensive green infrastructure program. Planning activities included site planning, GI sizing and hydrologic and hydraulic modeling. The hydraulic modeling integrated the runoff catchment hydraulics, the GI units and the collection system to mitigate CSO activations from five CSO structures located along the Olentangy River. Also, evaluated a comprehensive program to reduce RDII in the separate system to eliminate over 90 SSO activations up to 10-year level of service.

Combined Sewer Overflow Long Term Control Plan
City of Columbus, Columbus, Ohio

As hydraulic modeling task leader, developed the SWMM H&H model for the city's combined wastewater collection system for evaluating existing and predicted future collection system conditions. Managed the calibration and validation of the model and evaluated storage, conveyance and treatment alternatives. Conducted modeling and calibration activities to evaluate the city's 30 CSO structures for overflow frequencies and volumes.

Blueprint Columbus
City of Columbus, Columbus, Ohio

Technical manager to plan and design green infrastructure (GI) program to mitigate additional surface stormwater due to Blueprint Columbus I/I Mitigation program. As member of the Pilot Area Technical Committee, prepared Blueprint Columbus Stormwater Modeling Guidelines to construct enhanced model platform to allow educated planning of the GI program.

Dinesh Palety, EIT

Modeler / Engineer

Mr. Palety has leadership and teamwork experience in a variety of projects involving hydraulic modeling, water quality modeling (including MSX), unidirectional flushing modeling, storage analysis, data mining and analysis, and programming. He has experience working with larger utilities like the City of Toledo, Greater Cincinnati Water Works, and Great Lakes Water Authority, as well as smaller utilities like City of Lake Charles and Franklin County, OH. He used his InfoWater, Python, Excel, and Power BI skills to produce a model calibration dashboard for the City of Toledo that directly connected to a model output and produced visuals of model pressures, flow rates at key sites, and pump station flow patterns for multiple scenarios. He also used InfoWater, Power BI, and Excel skills for a corrosion control project with Great Lakes Water Authority. He used Power BI and Excel to create a dashboard that provided a visual comparison between the model output and SCADA data for flows at meter locations. He also used his InfoWater skills to audit, update, calibrate, and merge over 30 models.

Key Information

Education/Qualifications

- BS, Civil (Environmental) Engineering, Arizona State University, 2019

Years of Experience

4 Total

Professional Registrations and Certifications

- Fundamentals of Engineering

Relevant Experience

Water Distribution System Model and Master Plan

City of Toledo, Toledo, Ohio

System modeler responsible for supporting calibration and data analysis efforts. Produced a model calibration dashboard that used Python programming and excel skills to provide visual comparisons between SCADA data and model outputs. The dashboard provided visuals for pressure recorders, pump station pressures, flow rates, and patterns, and treatment plant pressures and flow. The dashboard allowed the user to seamlessly visualize changes in the model while also comparing model output to SCADA data and receive feedback for calibration accuracy.

Comprehensive Corrosion Control Optimization Study

Great Lakes Water Authority, Detroit, Michigan

System modeler responsible for supporting data gathering, model audits, updates, calibration, and merge efforts. Lead effort to gather basic model information for over 30 communities near the Detroit area, all served by Great Lakes Water Authority (GLWA). Also lead effort to audit, update/standardize, and calibrate all 30+ communities prior to merging all community models to GLWA transmission lines. Also provided support for water quality modeling and assisted in any data mining and analysis necessary to produce chloride decay and TTHM formation curves.

Dinesh Palety, EIT
Continued

Unidirectional Flushing Program Development

Franklin County, Ohio

Project engineer responsible for producing Unidirectional Flushing (UDF) program for the purpose of maintaining water quality within the Franklin County (County) distribution system distribution system. Lead effort to gather basic model information, cleaning hydraulic information to ensure model completeness, and comparing existing GIS attributes associated with the model components to corresponding information in the existing model and address any discrepancies to County. Produced a UDF Standard Operating Procedures (SOP) for use by the County in conducting UDF activities along with a field journal that outlines the sequence of pipes to be flushed and presents specific procedures for flushing each pipe segment in the system.

Demand Forecasting and Distribution System Model Update

City of Cincinnati, Cincinnati, Ohio

Project engineer responsible for supporting water quality model development and HGL measurement for the Greater Cincinnati Water Works (City) distribution model. The water quality model development was conducted using a combination of multi-year sampling data from City and a previous water quality model study. Chlorine bulk and wall decay coefficients were produced and then used to calculate Trihalomethane (THM) formation using first order growth kinetics in the EPANET multi-species extension (MSX) tool. Water quality runs were produced for each of the two water treatment plants within the distribution system. HGL testing was developed using recorder data that was processed and analysed using multiple operational scenarios vs. flow-based data. A combination of Microsoft Excel and Microsoft Power BI were used to conduct data analysis to visualize HGL for multiple paths within the distribution system.

Shivani Shrotriya

Data Coordinator / GIS

Ms. Shrotriya is a water resources engineer at Arcadis with a Master's degree in Civil Engineering from University of California, Los Angeles (UCLA). Since joining the Arcadis Irvine team in 2018, she has supported a variety of local water resources planning projects, water management plans (UWMPs), water bank development, operation plans, water and wastewater master plans, sewer master plans, condition assessment plans, green infrastructure conceptual design and stormwater management, and water treatment.

Key Information

Education/Qualifications

- MS, Civil Engineering, University of California-Los Angeles, 2018
- BTech, Civil Engineering Technology, Aligarh Muslim University, 2017

Years of Experience

4 Total

Relevant Experience

Laguna Hills Water Supply Assessment

El Toro Water District, Lake Forest, California

Reviewed the water supply planning and other documents applicable to estimating demand for the development project, 'The Village at Laguna Hills' and assessing demand and supply conditions, and documented the findings in the water supply assessment (WSA) report.

2020 Urban Water Management Plans

Municipal Water District of Orange County and Member Agencies, Fountain Valley, California

Assisted in the preparation of the 2020 UWMPs for the District and its 21 retail agencies. Worked with the client to ensure that all UWMPs were completed and in compliance with the California Water Code.

Operation Plan Development for FPUD SMRCUP Treatment Plant

Fallbrook Public Utility District, Fall Brook, California

Led the effort to develop the operation plan for the groundwater treatment plant. Investigated the technical specifications, design drawings and preliminary design report for the treatment plant design criteria, and system operating procedures, and conducted chemical dosage calculation.

OMMP Development for 99th Street Chloramination Station and Filtration Plant

Los Angeles Dept. of Water & Power, Los Angeles, California

Prepared the operation, maintenance, and monitoring plans for the chloramination station and filtration plant in the distribution system. Investigated the design drawings for the system design criteria and investigated system operating procedures.

Shivani Shrotriya
Continued

OMMP Development for Disinfection Facilities
Los Angeles Dept. of Water & Power, Los Angeles, California

Developed the operation, maintenance, and monitoring Plans for the chloramination station and ammoniation station in the distribution system. Investigated the as built and design drawings for the chloramination design criteria and investigated system operating procedures.

Chino Basin Water Bank Development
Inland Empire Utilities Agency, Chino, California

Helped develop the report on the evaluation of the existing facilities required for operating the Water Bank, generated GIS figures for the proposed water banking scenarios, put together the Operations Plan for the Water Bank development, helped in the project management tasks like managing project budget, scope and so on, prepared reports, presentations and other documents for the project meetings.

Los Angeles River Pro Bono project
The Nature Conservancy, San Francisco, California

Developed the GIS basemaps for the entire Los Angeles River watershed that laid the ground work for the evaluation of individual sites to implement green infratsructure; generated maps and data for the potential sites for implementing green infrastructure; prepared the conceptual designs for the proposed green infrastructure elements at selected locations.

Sustainable Water Infrastructure Project (SWIP)
City of Santa Monica, Los Angeles, California

Shivani conducted the Visual Impact Assessment (VIA) to analyze the potential visual impacts resulting from the proposed upgrade and changes to Santa Monica Urban Runoff Recycling Facility (SMURRF), assisted in providing the summary of findings for the SMURRF's condition assessment, that was conducted to quantify the remaining useful life of facilities and prioritize rehabilitation at the SMURRF and its adjacent Moss Avenue Pump Station. Helped project team in developing technical specifications for the proposed upgrades and changes at SMURRF.

91st Avenue Wastewater Treatment Plant (WWTP) Facility Assessment
City of Phoenix, Phoenix, Arizona

Summarized the findings of the physical condition assessment of the facility in a report, developed a GIS model to summarize the findings of the roadway condition assessment, that was performed to assess the pavement condition for the 91st Avenue WWTP area.

Francesca DePrima, EIT

CIP and Financial Analysis

Ms. DePrima has experience in a range of projects ranging from water resources and drought planning to drinking water treatment and treatment plant commissioning. She has technical experience in data analysis, geographic information systems (GIS), and water quality analysis. Ms. DePrima has background experience in research on emerging contaminants, green infrastructure, and stormwater treatment.

Key Information

Education/Qualifications

- MS, Civil Engineering Specialization in Environmental and Water Resources Engineering University of California, Los Angeles, 2022
- BS, Environmental Science Minor in Environmental Engineering, University of California, Los Angeles, 2021

Years of Experience

1 Total

Professional Registrations and Certifications

- Engineer-in-Training (EIT) - Certificate No. 175404

Relevant Experience

2020 Urban Water Management Plans and Water Shortage Contingency Plans

Municipal Water District of Orange County, Fountain Valley, California

Ms. DePrima aided in the preparation of the 2020 Urban Water Management Plans (UWMPs) and Water Shortage Contingency Plans (WSCPs) for the Municipal Water District of Orange County (MWDOC) and 21 of its member agencies. Ms. DePrima wrote sections of the standalone WSCP for each agency, based on aligning their toolbox of regulatory actions available to close gaps between standardized water shortage levels and supply. She reviewed agencies' master plans, capital improvement plans, and other existing reports to assess agencies' water supply sources and complete the drought risk assessment. She also performed calculations to project the agencies' water supplies needed to meet demands under various conditions. Following the submittal of the UWMPs, Ms. DePrima evaluated agencies' current Ordinances, WSCPs, and current drought regulations to write updated Water Shortage Response Ordinances for participating agencies.

Los Angeles Reservoir Ultraviolet Disinfection Plant Commissioning and Water Quality Treatment Support

City of Los Angeles Department of Water and Power, Los Angeles, California

Ms. DePrima provides commissioning support to the Engineering Services On-Call for the Los Angeles Reservoir Ultraviolet Disinfection Plant (LARUV) by performing calculations to validate data tags within the plant's supervisory control and data acquisistion (SCADA) system and identify parameters to adjust. Ms. DePrima was responsible for generating monthly facility reports, and worked on creating an automatic reporting system to generate monthly facility reports with Dream Report software.

Carlsbad Desalinated Seawater Integration

Water Research Foundation, Carlsbad, California

Ms. DePrima was responsible for organizing Carlsbad Desalination Plant operations data from multiple utilities in San Diego, and created a functional and user-friendly database with all applicable sampling data for water quality analysis. She completed data analysis of all utility data using both Excel and

Francesca DePrima, EIT
Continued

MATLAB, including creating a master database for all chemical analytes and writing a MATLAB program to generate plots for all chemical analyte measurements for every utility participating in the project. Ms. DePrima also contributed to the creation of a salinity model that calculates salinity loading from the desalination plant to evaluate water quality entering the distribution system.

Disinfection Integration Plan
City of Los Angeles Department of Water and Power, Los Angeles, California

Ms. DePrima assisted in drafting an updated Disinfection Integration Plan based on various backup scenarios at Los Angeles Department of Water and Power's (LADWP's) Van Norman Complex to ensure that the water treated in the complex can meet all drinking water disinfection requirements in emergency situations. Ms. DePrima completed CT calculations, verified the plans for different backup scenarios would meet treatment requirements, and updated plant information within plan.

Los Angeles Aqueduct Filtration Plant Filter Assessment Training
City of Los Angeles Department of Water and Power, Los Angeles, California

Ms. DePrima inspected the Los Angeles Aqueduct Filtration Plant (LAAFP) filters to ensure proper functionality for water treatment at the plant, including taking measurements of media levels, identifying and recording irregularities within the filters, and identifying any locations of concern within the filters. Ms. DePrima also provided support in instructing the client's staff on how to properly assess the filters for use in the future.

Past Experience

UCLA Subsurface Engineering and Analysis Laboratory

As a Research Assistant, Ms. DePrima constructed biofilters to remove microplastic pollution in stormwater runoff to study the transport and removal of microplastics through biofilters and the effects of weathering on the efficiency of the removal processes. She collected and analyzed microplastic content of water samples from rivers in Los Angeles to study the transport and contamination of microplastics through rivers in urban areas and the effects of microplastics on soil microbial communities. Ms. DePrima also conducted studies using related research to perform mass balances of microplastics in wastewater sludge to quantify undetected microplastics within wastewater treatment and evaluate the global distribution of microplastics in terrestrial environments.

About Arcadis

Arcadis is the leading global Design & Consultancy firm for natural and built assets. Applying our deep market sector insights and collective design, consultancy, engineering, project and management services we work in partnership with our clients to deliver exceptional and sustainable outcomes throughout the lifecycle of their natural and built assets. We are 27,000 people, active in over 70 countries that generate $4.2 billion in revenues. We support UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world.

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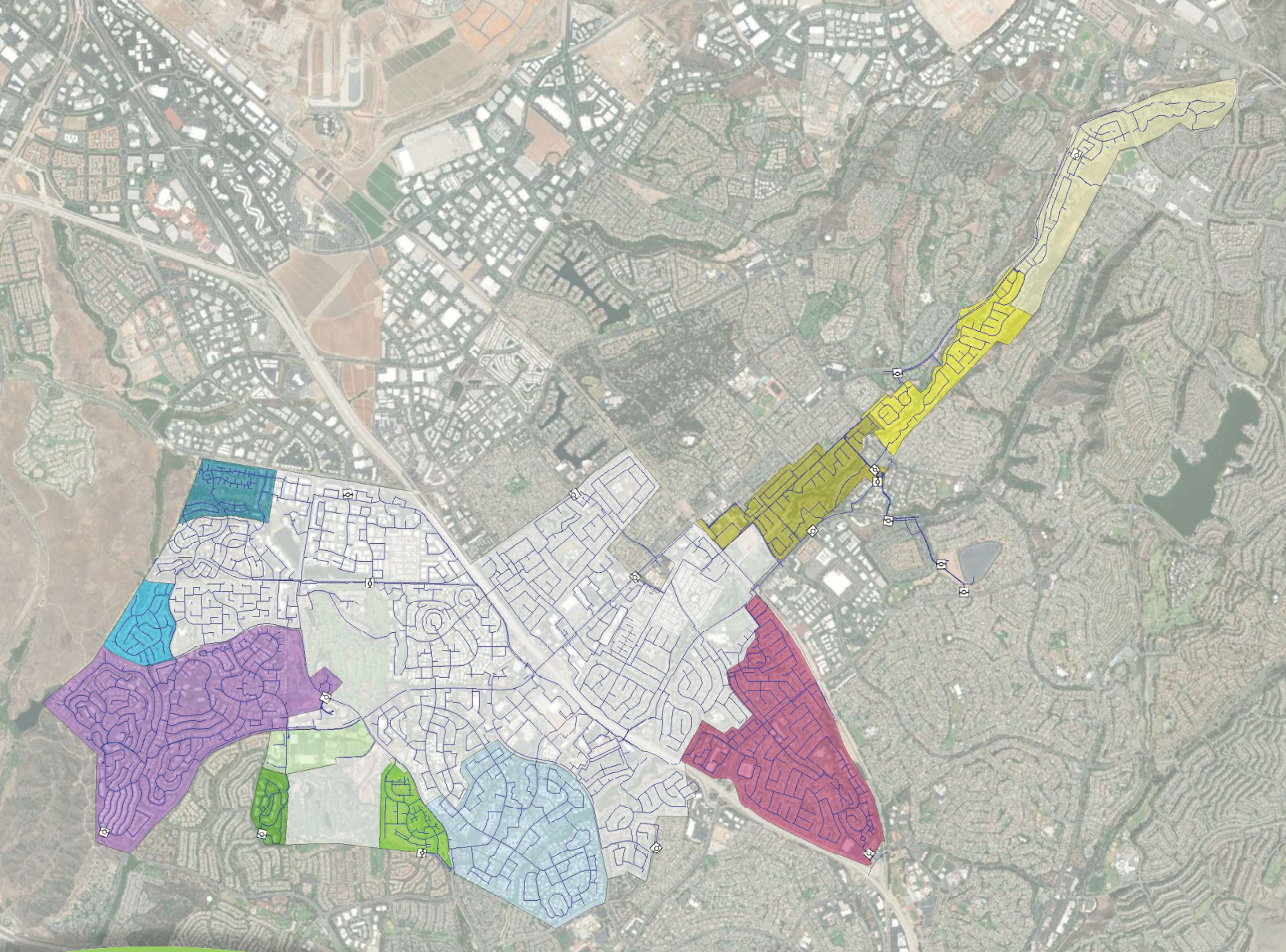


CELEBRATING 25 YEARS

WOOD RODGERS

Proposal for Engineering Services for the

Water and Sewer Master Plan Update

Prepared for

EL TORO WATER DISTRICT

February 9, 2022

February 9, 2022

Ms. Hannah Ford, PE | Engineering Manager
El Toro Water District
24251 Los Alisos Blvd.
Lake Forest, CA 92630

RE: Proposal for the Water and Sewer Master Plan Update

Dear Ms. Ford:

Wood Rodgers, Inc. (Wood Rodgers) is pleased to submit our Proposal to the El Toro Water District (ETWD or District) to demonstrate our experience and expertise in preparing Water and Sewer Master Plans. We are confident that ETWD will find our team of dedicated professionals and technical experts more than capable of successfully delivering all the elements of this Water and Sewer Master Plan Update Project.

The Wood Rodgers Team will utilize a proven approach to successfully deliver this project for ETWD. The approach has been developed and refined over 20 years of water and sewer master planning experience throughout California. A few of the benefits that the Wood Rodgers Team provides ETWD are as follows:

- **Extensive Master Planning Experience |** Our proposed principal-in-charge, Mr. Kevin Gustorf, PE, has over 22 years of experience in water and sewer system modeling, analysis and master planning for public agencies and our proposed Project Manager, Mr. Karl Meier, PE, has over 19 years of experience. Karl previously served as the Engineering Manager for the Montecito Water District, providing him with valuable experience managing the operation and maintenance of a public water system.

  Kevin and Karl have worked together on water and sewer planning projects for over 19 years. Previous relevant projects and experience include the development of water and wastewater system hydraulic models and master plans for the El Toro Water District, Monte Vista Water District, City of Thousand Oaks, City of Santa Barbara, Montecito Water District, City of Del Mar, City of Ventura, City of Simi Valley, California American Water Company – Ventura District, Scotts Valley Water District, Laguna Beach County Water District, City of Beverly Hills, City of Glendora, and the Groveland Community Services District.
- **ETWD Master Planning and Design Experience |** Both Kevin and Karl were heavily involved in the preparation of ETWD's previous Water and Sewer Master Plan in 2005. Kevin was the lead Project Engineer for the project, and Karl was the lead hydraulic modeler for the sewer system. Both Kevin and Karl provided additional on-call hydraulic modeling support to ETWD for several years following the Master Plan and prepared design plans to implement several of the recommendations from the Master Plan. We have a thorough understanding of both the ETWD water and sewer systems.

I, Mr. Kevin Gustorf, PE will serve as the principal-in-charge for the project. As a Principal with Wood Rodgers, I have full authority to contractually bind the firm and allocate additional staff resources as needed to ensure the project's success. Wood Rodgers takes no exception to the ETWD standard contract language and will provide the requested insurance.

We look forward to discussing this project more thoroughly in person or at an interview and welcome any questions you may have in the meantime. I can be reached by phone at (916) 341-7425 or can be contacted via email at kgustorf@woodrodgers.com. We look forward to the opportunity to work with the ETWD Team and successfully delivering this important project.

Sincerely,

Kevin Gustorf, PE | Vice President

Karl Meier, PE | Principal

Firm Background

Wood Rodgers, Inc. | is a California corporation with a diversified staff of over 340 employees to support and deliver projects throughout California and Nevada. For over 20 years Wood Rodgers has developed a highly capable water resources practice with a focus on water systems, sewer systems, flood control, and groundwater development. Our Water Resources team currently employs over 50 people throughout California, with licensed professionals in civil, mechanical, and structural engineering. Wood Rodgers water resources capabilities include technical expertise in water and sewer system hydraulic modeling, system analysis, project development, and master planning.

ADS Environmental Services | Founded in 1975, ADS currently maintains 21 offices throughout the Country with local offices in Huntington Beach and San Diego, CA. ADS is the largest and longest serving flow services provider in the Country. They have assisted thousands of municipalities around the world providing critical flow and rainfall monitoring data, including many hundreds of monitoring projects in California. ADS is an organization with both a product and service offerings; with internal functions ranging from product design and manufacturing, field services, data analysis, and web-based reporting.

Project Understanding

The El Toro Water District (ETWD or District) provides domestic water, recycled water and sanitary sewer services to a population of nearly 50,000 persons in a service area that covers approximately 8.5 square miles in portions of the cities of Aliso Viejo, Lake Forest, Laguna Hills, Mission Viejo and all of the City of Laguna Woods. ETWD is requesting professional engineering services to prepare a Water and Sewer Master Plan Update (Master Plan Update). ETWD last prepared a Water and Sewer Master Plan in 2005. In the 17 years since the last Master Plan was prepared, several significant changes have occurred within the District that is driving the need for this Master Plan Update, including the following:

- **Development of a Recycled Water System |** ETWD developed a recycled water distribution system to provide water for irrigation purposes to 276 metered connections. The recycled water system has reduced the overall demand placed on the domestic water system.
- **Water Conservation |** Several significant droughts that have occurred since the last Master Plan was prepared has led to new legislation in California that has resulted in significant water conservation. The water conservation measures in place has resulted in lower domestic water demand and lower sewer generation rates.
- **Eliminated Reduced Mid Pressure Zone |** The District eliminated a water pressure zone, the Reduced Mid Zone, which reduced the number of pressure reducing valves in the system.
- **New Water Supply Source |** The District participated in a new regional water supply project, the Baker Water Treatment Plant. The Baker WTP provides ETWD with 5 cubic feet per second (cfs) of new water supply.
- **Additional Interties with Neighboring Agencies |** The District has constructed several new inter-ties with the neighboring Moulton Niguel Water District (MNWD). These new inter-ties provide access to the Baker WTP supply source, as well as water for emergencies.
- **Addition of Reservoir Management Systems (RMS) |** ETWD has installed RMS at the R-1 and R-5 reservoirs to improve circulation within each tank, thereby improving the water quality.
- **Oso Lift Station Rehabilitation |** The District recently rehabilitated the Oso Lift Station, which resulted in changed hydraulic conditions.

- **JTM Pump Station (in design) |** ETWD is currently designing a new water pump station that will introduce 2 cfs of imported water into the west side of the District's service area. Currently, the imported water supply enters the District system in the northeast portion of the system.

The District's service area is primarily built-out, with no new major developments planned. The largest known project is the redevelopment of the former Laguna Hills Mall. Since "growth" is not the driving force behind this Master Plan Update, the focus of the project will be to improve the water and sewer system operation, improve deficiencies, comply with regulatory requirements, and meet the demands generated by redevelopment projects.

This project will include a detailed evaluation of ETWD's water distribution and sewer collection systems, and will include the following key elements:

- Develop current and accurate water demands and sewer generation
- Flow monitoring to identify sewer flows and hopefully inflow + infiltration
- Develop a fully functional and calibrated model for the water and sewer systems
- Analyze the models to reduce operation, energy + maintenance costs
- Maintain water storage with a focus on distribution system water quality
- Improve the integrity + reliability of the sewer collection system
- Identify areas of improvement necessary to accommodate current and future demands
- Minimize water distribution system flushing
- Improve water quality
- Analyze emergency water supply conditions
- Identify projects to maintain the current level of service while reducing costs
- Identify projects which can be justified by an economic analysis depicting a reasonable payback period
- Provide training / support for hydraulic modeling in the future

Project Approach

Wood Rodgers has thoroughly reviewed the Request for Proposal (RFP) and subsequent material provided by the District. Based on our experience with water and sewer master planning, and our understanding of the ETWD water and sewer systems, we have identified a few key project issues and our approach to addressing those key issues. The Wood Rodgers Project Approach is based on the following principles:

- Leverage Existing / Historical Data
- Gather input from ETWD Management
- Engage Engineering + Operations Staff Early in Project
- Develop Accurate Demands from Metered Billing / Production Data
- Expedite Sewer Flow Monitoring
- Spend the Extra Effort to Develop Well-Calibrated Hydraulic Models
- Reduce the Burden on District Field Staff (i.e., eliminate flushing program, fire flow testing, etc.)
- Identify Practical Solutions
- Consider Regional Issues / Neighboring Agency Input
- Be Diligent about Project Documentation
- Provide Robust Quality Assurance / Quality Control Reviews
- Communicate with the District

During our review of the RFP materials, Wood Rodgers has identified several key issues for this project. The key issues are discussed in detail below.

Key Issue #1 | Water Model Development + Calibration Plan

Wood Rodgers understands the importance of developing and calibrating the new water model as an early Project task to allow the District to perform fire flow and water quality analyses and reduce staff workload and water waste related to these field activities. Our team will leverage its familiarity with the District's water system, extensive experience in model development and calibration, and will follow model development and calibration best practices as outlined in *AWWA M32 – Computer Modeling of Water Distribution Systems.*

We also want to highlight that our team has experience using a variety of modeling software platforms. We will review the available modeling software platforms, with an emphasis on the Innovyze software packages. This software is the most prevalent in the southern California market, which will allow for others to use and update the model in the future. Our staff uses both InfoWater and InfoWater Pro daily and can develop this project in either software platform.

The following provides our approach to developing and calibrating the District's new water model. We have reviewed the District's existing InfoWater Model as well as the District's GIS data, from which we have developed the customized plan below which is geared towards rapidly developing a calibrated hydraulic model for District use prior to the completion of the Master Plan Update.

The timeline on the following page provides an overview of the steps and duration of model development and is followed by our modeling approach.

Key Issue #1

Develop the calibrated water model quickly to reduce the burden on ETWD field staff.

Key Issue #2

Identify flow monitoring plan / locations now to expedite field installation immediately after the Notice to Proceed is issued.

Key Issue #3

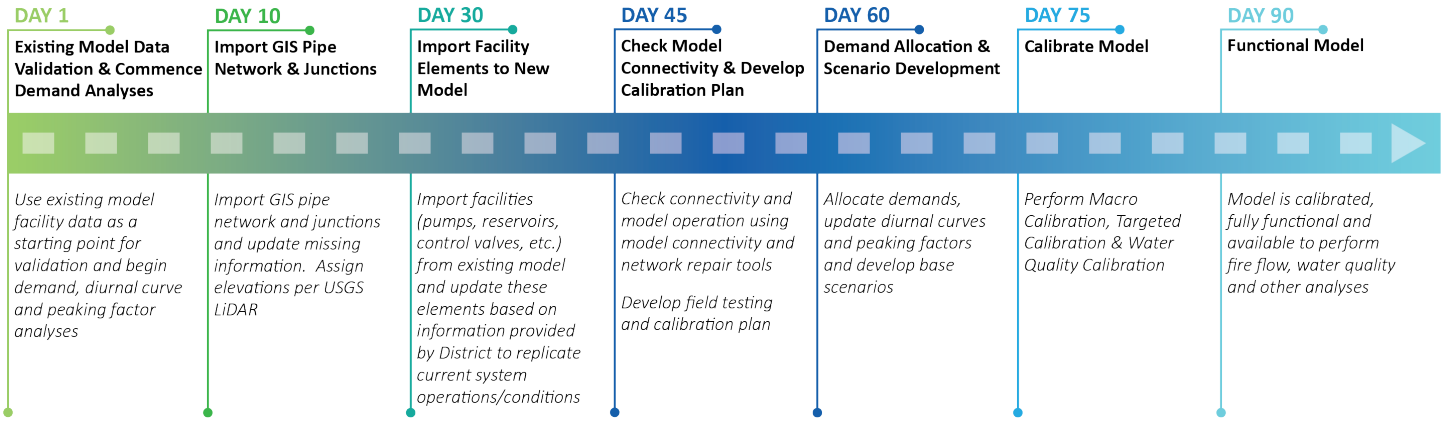
Develop a well-calibrated sewer model.

Key Issue #4

Identification of emergency water supply scenarios.

Key Issue #5

Approach to hydraulic model training and/or on-call model support.



Water Model Development Approach

Based on our understanding of the existing water model and GIS database, we recommend developing a new hydraulic model using the GIS pipe network and supplementing the new model with information from the existing model such as pump station and reservoir facility data. Critical to this approach will be the validation/verification of the various facility (pump station, reservoir, control valve, etc.) operational parameters currently within the existing model. Wood Rodgers has implemented this same approach for other model builds and will develop a succinct database that compiles all facility operational data to allow for swift review/validation by District staff and our team.

This workflow will ensure that the model is updated with current information to accurately reflect system operations and provide a high level of confidence in analysis results.

Pipes | The District's GIS database is comprehensive, well developed and will provide an excellent platform from which to build the new water model. Wood Rodgers recommends importing the existing pipe network from the GIS database into the model to incorporate all pipelines 6-inches and larger. The GIS database contains the majority of the pipe attribute information needed for the hydraulic analysis, with the exception of the roughness factors. For this data, Wood Rodgers will populate the pipes within the model with roughness factors that correlate to the material and pipe age contained within the GIS and will also cross reference the previous roughness factors from the existing model to use as a starting point for model development.

Junctions | The District's GIS database also contains main line valves that will be imported into the model to serve as junctions. Where pipeline attributes differ between connected pipelines, junctions will be inserted if a mainline or other District GIS feature doesn't exist. These junctions will also serve to carry system demands. Wood Rodgers will assign elevations to all nodes using available USGS 1-meter digital elevation model LiDAR data.

Pumps | While the District's GIS database contains points indicating where pump stations are located, the GIS data doesn't have the pumping facilities digitized to the level required for modeling. Wood Rodgers will import the pump stations from the original hydraulic model into the new model to carry forward the pumping facility arrangement, pump attributes and operational controls. All attributes will be verified with District staff to ensure the new model contains up to date information capturing actual pump station operational data.

Reservoirs | Similar to the pump stations, reservoirs will be imported from the existing model as the attributes related to these facilities such as elevation, volume, and operational levels can be imported and then verified with District staff to ensure these reservoirs accurately reflect the operational conditions.

PRVs + Control Valves | The District has numerous pressure reducing, flow control and other specialized valves throughout the distribution system. These specialized valves and their operational settings will also be imported from the

existing model, with all set points and other operational data verified with District staff and modified as needed to replicate current operations.

Sources of Supply | All supply sources including turnouts and interconnections will be modeled first by importing the existing modeled sources as well as any proposed sources based on information provided by the District. Critical to this item will be the validation of the supply sources and how they are controlled to ensure field operations match that of the new model.

Demand Allocation / Peaking Factors / Diurnal Curve | Wood Rodgers will utilize the last three (3) complete calendar years of billing data (2019-2021) to develop demands for allocation to the model. Demand allocation will be accomplished by creating a join between the District's billing data and the GIS meter data. Once the join is established, the demands will be assigned to the GIS meter file and Wood Rodgers will use tools within the InfoWater software platform to allocate demands to the appropriate nodes.

The existing peaking factors will be evaluated and compared to the last three (3) years of purchase/production data. Using this data, Wood Rodgers will develop peaking factors as they relate to Average Day demand conditions. Peaking factors will be developed for Maximum Day, Summer Average Day, and Winter Average Day. The Peak Hour factor will be defined by the peaking factor within the diurnal curves under a Maximum Day condition.

The existing model has diurnal patterns for residential, commercial/industrial and irrigation demands. These diurnals will be validated against current available information and will be adjusted as needed to reflect current demand conditions.

While somewhat anecdotal, we recently completed a similar modeling update for a water district within a coastal community that had a model built and calibrated in 2006. Since then, this water district has seen a decrease in customer water usage by about 35%. However, when comparing production values between an average day, maximum day, summer average day and winter average day condition, the peaking factors from 2006 to 2020 were nearly identical.

Scenarios| Wood Rodgers will develop the following base scenarios for the new model to allow for analysis of the system under existing demand conditions and to evaluate water quality as well as reliability and redundancy of the system. These scenarios will incorporate not only the demands for each scenario, but also any operational control differences to reflect seasonal operation of the District's facilities.

- ✓ Average Day Demand (Instantaneous and Extended Period Simulation)
- ✓ Maximum Day Demand (Instantaneous and Extended Period Simulation)
- ✓ Peak Hour Demand (Instantaneous)
- ✓ Summer Average Day Demand (Instantaneous and Extended Period Simulation)
- ✓ Winter Average Day Demand (Instantaneous and Extended Period Simulation)

In addition to these base scenarios, separate scenarios will be developed to conduct the focused analyses for emergency supply, and specific projects such as the JTM pump station, increase in recycled water use and potential direct potable reuse and will be built upon the base scenarios.

Fire Flow Demands| While we will evaluate current fire flow criteria per the RFP, we also recommend using the model under the Maximum Day Demand scenario to determine available fire flows throughout the District's entire distribution system, which ranges across several jurisdictions. We have used this same approach to develop clear graphical results that correlate directly with the National Fire Protection Association (NFPA) 291 fire hydrant color coding classification. This analysis and mapping exercise provides a concise understanding of available fire flows to guide inquiries before formal fire flow requests are made by developers, etc.

Water Model Calibration Approach

Our model calibration plan will be well documented and will succinctly outline any field-testing requirements needed from District staff. We understand that District staff resources are limited, therefore our calibration and field-testing plan will be geared to use historical data where appropriate and have a proactive approach to ensure field tests conducted yield beneficial results for the calibration process. Below are some key points for successful calibration of the water model.

- **Macro Calibration |** To ensure success during the calibration process, we will begin with the macro calibration processes to confirm boundary conditions including reservoir levels, pump station operations, closed valves, pressure reducing valve settings and supply sources are accurately representing field conditions. This will entail using SCADA and other available data sources from the District. Completing the macro calibration process will streamline the remaining calibration process and will allow our team to focus on the micro (targeted) calibration process.
- **Targeted Calibration |** We will continue the calibration process using available historical fire flow tests from the last two (2) years to allow us to perform preliminary model calibration/validation. This process will allow us to strategically identify the areas that require new field fire flow tests, in turn limiting the total number of flow tests and the associated wasted water and staff time.
- **Water Quality |** Our team has been directly responsible for the development and calibration of hydraulic models used for the Division of Drinking Water compliance activities, including models used for disinfection by-product monitoring/compliance. These compliance models require field tracer studies with extensive around the clock field testing paired with laboratory testing to define various parameters. This new water model will be calibrated for summer and winter operations from a hydraulic perspective (including mimicking reservoir level, pump, valve and other facility controls), which in our experience yields a highly reliable and accurate model as it relates to water age. To accelerate the schedule and minimize staff field time, we recommend calibrating the model using available SCADA data and using the model to generate preliminary water age results throughout the distribution system. These preliminary results would be shared with District operations staff to gain input from their institutional knowledge of poor water quality areas and would also be used to select areas for targeted water quality (chlorine) field samples to compare and confirm the model results.

Key Issue #2 – Sewer Flow Monitoring Plan

A critical path item for this project is to install the sewer flow monitors immediately after receiving the notice to proceed, in the hopes of capturing some wet-weather in either March or April. This would allow for the sewer model development and calibration to proceed in mid-2022, with goal of project completion by the end of 2022.

To be able to do so, we have conducted a preliminary analysis of the sewer collection system and selected flow monitoring sites. Wood Rodgers has partnered with ADS Environmental Services to conduct the flow monitoring. Wood Rodgers and ADS recently teamed up on a similar sewer flow monitoring effort in Beverly Hills.

The purpose of the sewer flow monitoring is to capture real-time sewer flows and flow patterns over an extended period. This will allow us to develop more accurate sewer flow generation and peaking factors, inflow and infiltration (I/I) rates, and diurnal patterns, which results in a more accurate hydraulic model and more confidence in the recommended improvements.

Flow monitoring locations are typically selected to get a wide cross-section of flows across the system, targeting areas where there are known hot spots, potential for high I/I due to pipe age/material, and the common land uses in the District. Flow monitoring will be performed at five (5) locations for a period of two months. Wood Rodgers has reviewed the ETWD sewer collection system and has preliminarily selected the following sites to install the flow monitors:

- **LV503-MH06 |** Cherry Avenue west of Jeronimo Road. 21-inch Pipe Diameter. Lake Forest. This location was selected to capture a large area of primarily single-family residential land use in the panhandle that flows entirely by gravity.
- **LW495-MH05 |** Gowdy Avenue at Cavanaugh Park. 18-inch Pipe Diameter. Lake Forest. This location was selected because it captures flows from a mix of residential and commercial land use, is downstream of the north leg of the flow split to the Northline / Aliso Creek lift stations and is immediately upstream of one of the District's two I-5 Freeway crossings.
- **LX485-MH06 |** Avenida Del Sol and Miembro. 15-inch Pipe Diameter. Laguna Woods. This location was selected because is captures a large residential area of the Laguna Woods Village.
- **MC497-MH04 |** Via Estrada south of Paseo de Valencia. 15-inch Pipe Diameter. Lake Forest. This location was selected because it captures the Laguna Hills Mall area, is downstream of the District's second I-5 Freeway crossing and is downstream of the south leg of the flow split to the Northline / Aliso Creek lift stations.
- **LU489-MH08 |** West of Mill Creek Road. 15-inch Pipe Diameter. Laguna Hills. This location was selected because it captures a large area of primarily industrial / warehouse / office space.

In addition to the reasons stated above, all sites were selected because they do not require extensive traffic control measures, allowing for easier installation and permitting. In order to successfully execute and initiate the flow monitoring process, **Wood Rodgers will implement the following immediate action items:**

- **Wood Rodgers / ADS contract |** As soon as we know we are being recommended for this Project, we will initiate the subconsultant agreement process with ADS. We have already executed agreements between our two companies before, so there will be no delay with contract review, insurance requirements, etc.
- **Confirm Sites with ETWD Staff |** We will meet with ETWD Engineering and Operation staff to confirm the selected site locations or select a different location due to known hot spots.
- **Reach out to Local Cities / Permits |** Wood Rodgers will reach out and coordinate with the local jurisdictions to notify them of the project and submit any encroachment permit paperwork.
- **Site Visit |** ADS field crews will perform a site visit to verify the field conditions and install requirements.
- **Install |** Install the five flow monitors and begin gathering data.

We are confident that this process will allow for the flow monitors to be installed within ten (10) days of receiving the notice to proceed. Wood Rodgers will utilize the flow monitoring data, coupled with flow data from the 11 lift stations and the WRP to develop flow generation data to allocate within, and calibrate, the hydraulic model.

Key Issue #3 | Sewer Model Development + Calibration Plan

Our approach to the sewer model development and calibration will closely follow that deployed for the water model, whereby we will develop a new model using the District's GIS database for manhole and pipe data. This backbone data will be supplemented with information from the existing model such as lift station data after it is validated by our team and District staff.

We have developed and calibrated several complex sewer models for municipalities, and this past experience has provided us with an understanding of the key issues related to sewer model development and how to successfully execute these projects. The following briefly summarizes these items, and how our team successfully addresses these to provide a reliable and accurate model.

- **Adverse Pipe Slopes |** The District's GIS database contains invert information on both the pipes and manholes, and also contains slope information on the pipes. While the GIS data may contain this information, at times the pipe connectivity can be reversed, which leads to adverse slopes that show pipeline deficiencies. Our team will scrub

the GIS database to identify any possible adverse slopes at the outset of the project and will use available record drawings or other District provided data to correct these items to ensure the model is reflecting actual field conditions.

- **Flow Split Manholes |** There are several locations within the District's collection system where the flow from a manhole is split into two directions downstream. How the flow splits can have a major impact on the capacity analysis. Wood Rodgers will utilize record drawings, and survey data if available, to determine how the flow splits and the model is accurately reflecting the split.
- **Lift Station Operations |** Another key element is modeling the operations of the sewer lift stations correctly. This includes having the correct dimensions of the wet well modeled as well as the on/off set points for the pumps to ensure the model analysis captures any deficiencies attributed to these facilities, especially when conducting wet weather capacity analyses.
- **Flow Monitoring Data |** This Project will include a flow monitoring effort to gather actual field flow conditions over an extended period of time (2 months). The flow monitoring effort will target specific land uses and specific areas of the system to develop current and accurate flow generation factors, diurnal and peaking factors, for use in the model development and calibration.
- **Model Simulation Duration |** We have found that a sewer model needs to run much longer than 24-hours to ensure that flow attenuation and travel time is adequately addressed. To ensure we model the system accurately, we will run the extended period simulation (EPS) as long as necessary to ensure flow has equalized throughout the entire system and patterns are repeating within the model (typically 72 to 96 hours). To simplify reporting, we analyze and report results for only the last 24-hours of the EPS run.

Key Issue #4 | Emergency Water Supply Scenarios

Historically, south Orange County has relied almost entirely upon on imported water from the Metropolitan Water District of Southern California for potable water supply. In recent years, the collective water agencies of south Orange County have made great investments in securing additional water supplies and storage. However, there is still a heavy reliance on imported water and a significant risk if one of the major water transmission or treatment facilities were to be out of service for an extended period of time.

A portion of the water system analysis for this Project includes evaluating the emergency water supply conditions. The emergency supply conditions will include a month-long outage of the Diemer WTP, the Baker WTP and both at the same time. In addition to those three scenarios, Wood Rodgers recommends including the following additional water supply scenarios in the analysis:

- No Diemer WTP and No R-6 for 1-month
- No Baker WTP and No R-6 for 1-month
- No Diemer WTP for 6-months (w/ JTM PS)
- No Diemer for 6-months (w/o JTM PS)

Key Issue #5 | Hydraulic Model Training / On-Call Support

Wood Rodgers currently provides on-call hydraulic modeling support services for multiple southern California water districts. We currently have five (5) staff members that are very familiar with the InfoWater and InfoSewer modeling platforms (including the Pro version). We also have a dedicated GIS team that works in the ArcMap and ArcGIS world on a daily basis there to provide additional support.

On-call hydraulic modeling support services would be coordinated through our Project Manager, Karl Meier, PE, who is an expert in hydraulic modeling and has been performing hydraulic modeling services for his entire 20-year career. Karl was responsible for the preparation and calibration of the ETWD sewer model in 2005.

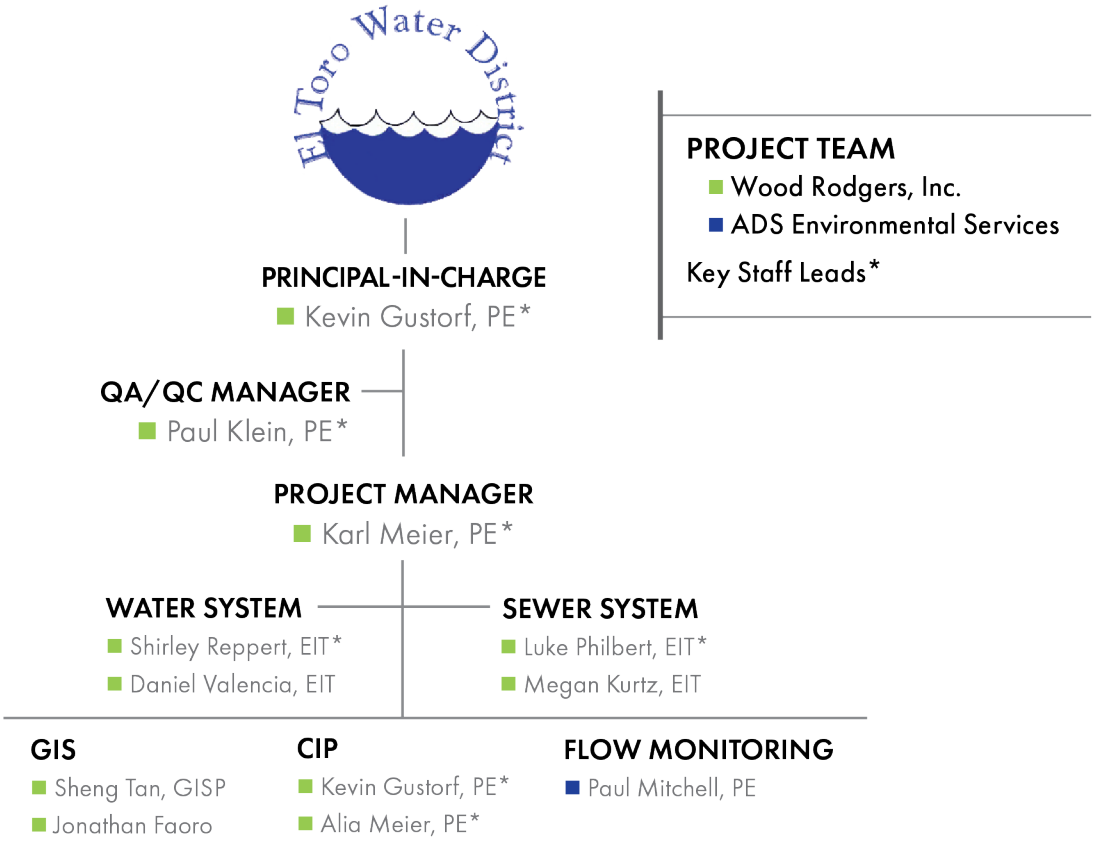
Karl will be supported by Kevin Gustorf, PE, who has been working with water and sewer models his entire 23-year career. Kevin has an extensive understanding of the ETWD system, having been intimately involved in the development of the ETWD water and sewer models in 2005, and several model updates since then.

Hydraulic modeling on-call task orders will be performed by one of our young engineers (experience levels from 2 – 10 years), depending upon availability. With a current pool for four (4) young engineers, we are always able to assign an engineer to take on a modeling task within days of a request. All of our hydraulic modelers are literate in both water and sewer modeling, as well as facility design.

Since our team will have built and calibrated the models, we will be very familiar with the model set-up, scenarios, data sources, etc. and can undertake task orders quickly with no learning curve. In our experience, fire flow scenarios are the most common type of task order requested for on-call modeling support services. The effort to run a fire flow scenario and prepare a summary technical memorandum can typically be completed in 4-8 hours, depending upon the complexity of the project.

Project Team

Wood Rodgers is a multi-disciplined firm that prides itself on providing our clients with the resources and expertise to deliver all elements of a project. The team assembled for this project provides expertise in all elements of water and sewer system planning and analysis. Each team member will be made available for the duration of the project and will not be reassigned without prior written approval from ETWD.



Current workload | Key personnel

Kevin Gustorf, PE | PIC + CIP

- Sonoma Developmental Center Water System Assessment | State of California | Sonoma County, CA
- Reservoir 20B | Dublin San Ramon Services District | Dublin, CA
- Crows Landing Industrial Business Park Water Well, Tank and Pump Station | Stanislaus County, CA
- Emeryville Sewer System CCTV and Improvements | City of Emeryville, CA

Paul Klein, PE | QA/QC

- Crows Landing Industrial Business Park Water Well, Tank and Pump Station | Stanislaus County, CA
- Amoruso Ranch Project | Roseville, CA
- Natomas North Precinct Grand Park | Natomas, CA

Karl Meier, PE | Project Manager

- As Needed Modeling and Engineering | Montecito Water District | Montecito, CA
- As Needed Hydraulic Modeling | Otay Water District | San Diego County, CA
- Mission Hospital Pipeline Replacement | South Coast Water District | Laguna Beach, CA
- Walnut Avenue Pump Station | VCWWD #8 | Simi Valley, CA

Shirely Reppert, EIT | Water System Lead

- Crows Landing Industrial Business Park Water Well, Tank and Pump Station | Stanislaus County, CA
- Walnut Avenue Pump Station | VCWWD #8 | Simi Valley, CA
- Wells NLB 13 & NLB 14 Well Drilling and Equipping | Long Beach Water Department | Long Beach, CA
- Commission 14 & Citizens 10 Well Upgrades | Long Beach Water Department | Long Beach, CA

Luke Philbert, EIT | Sewer System Lead

- Crows Landing Industrial Business Park Water Well, Tank and Pump Station | Stanislaus County, CA
- Sonoma Developmental Center Water System Assessment | State of California | Sonoma County, CA
- Water System Assessment | Cacheville Community Services District | Yolo, CA
- Southeast Policy Area Recycled Water System Analysis | City of Elk Grove, CA

Team Qualification Table

	Master Plan	Domestic Water System Analysis	Sewer System Analysis	Water Hydraulic Modeling	Sewer Hydraulic Modeling	GIS	CIP	Flow Monitoring	Water Quality
Kevin Gustorf, PE | PIC + CIP	X	X	X	X	X		X	X	X
Karl Meier, PE | Project Manager	X	X	X	X	X	X	X	X	X
Paul Klein, PE | QA/QC Manager	X	X	X				X		X
Shirley Reppert, EIT | Water System Lead	X	X	X	X	X	X			X
Daniel Valencia, EIT | Water Modeler	X	X	X	X	X	X			X
Luke Philbert, EIT | Sewer System Lead	X		X	X	X	X			
Megan Kurtz, EIT | Sewer Modeler	X		X	X	X	X			
Sheng Tan, GISP | GIS Lead	X					X			
Jonathan Faoro | GIS Analyst	X					X			
Alia Meier, PE | CIP	X					X	X		
Paul Mitchell, PE | Flow Monitoring								X	

Relevant Projects

The Wood Rodgers project team's recent relevant experience with water and sewer hydraulic model development, calibration and analysis, and water and sewer master planning are listed below.

Ventura County Waterworks District - No. 8 Hydraulic Model Update and Capacity Study | Simi Valley | CA | 2021

Client Reference	Michael Kang, PE | Principal Engineer | Ventura County Waterworks District No. 8 | 805.583.6809 | mkang@simivalley.org		
Project Relevance	InfoWater | Hydraulic Model Update | Model Calibration | System Capacity Analysis | Fire Flow Analysis | GIS Integration	**Key Staff**	Kevin Gustorf (PIC/PM) | Karl Meier (Lead Engineer) | Shirley Reppert (Hydraulic Modeler) | Megan Kurtz (Assistant Engineer) | Jonathan Faoro (GIS)

The Ventura County Waterworks District No. 8 contracted with Wood Rodgers to perform a capacity evaluation of the water distribution system. This project included an evaluation of the current minimum design criteria, adequacy of the existing water distribution system, and identification of improvements to ensure the system can serve existing and future water demands. Wood Rodgers tasks included the following: 1) Evaluate and Establish District Planning and Analysis Criteria, 2) Determine Existing and Future Water Demands, 3) Update and Calibrate the Existing Hydraulic Model, 4) Water Distribution System Capacity Analysis, 6) Evaluate Existing Service Area Pressure Boundaries, 7) Analyze Supply and Capacity with Offline Supply Sources, 8) Evaluate Facility Reliability and Redundancy, and 9) Analyze Water System for Pipeline Replacement. The results were documents in a final report.

Integrated Water + Wastewater Master Plan | Groveland | CA | Ongoing

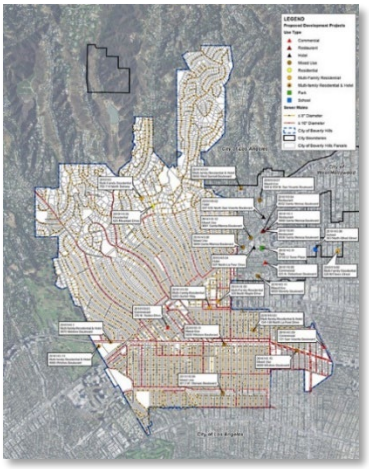
Client Reference	Peter Kampa | General Manager | Groveland Community Services District | 209.962.7161 | pkampa@gcsd.org		
Project Relevance	Prepared Sewer System + Water System Models for Master Plan | Capacity + Condition Analysis | GIS Geodatabase development | CIP | InfoWater & InfoSewer	**Key Staff**	Kevin Gustorf (PIC) | Karl Meier (Project Engineer) | Luke Philbert (Project Engineer) | Megan Kurtz (Assistant Engineer) | Sheng Tan + Jonathan Faoro (GIS)

Wood Rodgers, Inc. is the Prime Consultant providing an Integrated Water and Wastewater Master Plan (referred hereafter as the GCSD Master Plan or Master Plan) to provide a 20-year roadmap for the water and wastewater services provided by the GCSD.

The Master Plan will help determine the projects needed to repair, replace, and/or upgrade the GCSD's aging infrastructure to increase system operating efficiencies and reliability, while improving cost predictability and maintaining a high level of customer satisfaction into the future. The Master Plan will proactively address increasingly stringent water quality and environmental regulations to protect public health and promote stewardship of the Sierra Nevada and Sacramento/San Joaquin River Delta; and it will serve as a guide to establish future rates and charges to allow GCSD to prioritize available funding and the pursuit of grants to complete the required projects. The Master Plan will outline a strategy to improve maintenance and asset management, prioritize new facilities and interweave the necessary upgrade or decommission of existing facilities.

Integrated Water Resources Master Plan | Beverly Hills | CA | 2020

Client Reference	Josette Descalzo | Environmental Compliance + Sustainability Manager | City of Beverly Hills | 310.285.2554 | jdescalzo@beverlyhills.org		
Project Relevance	Prepared Sewer System + Storm Drain System Models for Master Plan | Capacity Analysis | Flow Monitoring (by ADS) | GIS Geodatabase Updates | CIP | InfoSewer	**Key Staff**	Kevin Gustorf (PIC) | Luke Philbert (Project Engineer) | Sheng Tan + Jonathan Faoro (GIS)



The City of Beverly Hills prepared an Integrated Water Resources Master Plan that included the evaluation of all their wet infrastructure systems, with the goal of identifying opportunities to efficiently utilize their water resources and develop integrated projects. Wood Rodgers, as a subconsultant to Hazen & Sawyer, prepared the sewer system and storm drain system sections of the Master Plan. The sewer collection system consists of approximately 100 miles of gravity pipelines and approximately 2,200 manholes. Wood Rodgers completed a detailed analysis of the City's sewer system, which included flow monitoring that was used to develop sewer generation rates, peaking factors, and diurnal patterns. The system analysis included updates to the GIS geodatabase and the development of an extended period simulation hydraulic model using the InfoSewer modeling platform. Wood Rodgers also conducted a detailed analysis of the storm drain system developed in InfoWorks ICM to analyze the capacity of the storm drain conveyance system within the City limits to accommodate a 10-year, 25-year and 50-year storm event. The results of the capacity and condition analysis resulted in proposed capital improvement projects to upgrade the system capacity and rehabilitate aging infrastructure.

Cowan Heights System Hydraulic Model Update + Zone Realignment Study | Orange County | CA | 2020

Client Reference	Chae Chin Pak | Senior Engineer | Golden State Water Company | 714.535.7711 ext. 237 | ccpak@gswater.com		
Project Relevance	InfoWater | Pressure Zone Conversion | Hydraulic Model Update | Model Calibration | System Analysis | CIP Development + Validation | GIS Integration	**Key Staff**	Kevin Gustorf (PIC/PM) | Karl Meier (QA/QC) | Shirley Reppert (Project Engineer/Hydraulic Modeler) | Jonathan Faoro (GIS)

Wood Rodgers recently completed this project which included validating, calibrating, and updating the Golden State Water Company's (GSWC's) Cowan Heights Water System InfoWater model to analyze this distribution system which consists of 16 pressure zones, 7 booster pump stations, and 33 pressure regulating valves. This modeling project and study provided recommendations to modify pressure zone alignment(s) and boundaries, address hydraulic constraints, and develop a capital improvement plan. Work included the analysis of consumption and production records to re-allocate demands within the entire distribution system, validation of existing elevations within the model using GPS and LiDAR data and analysis of the existing infrastructure and its performance related to potential pressure zone boundary modifications.

The detailed study and hydraulic modeling analyses were performed, and a system-wide operational plan was developed to develop a comprehensive program for addressing low- and high-pressure issues (such as realigning pressure zones,

adjusting PRV settings, etc.). The resulting project addressed the pressure fluctuations in the Cowan Heights System and reduced customer costs by eliminating unnecessary pumping and bringing the system into compliance with General Order 103A.

Sewer Evaluation and Capacity Assurance Plan | City of Colfax | CA | 2021

Client Reference	Wes Heathcock | City Manager | City of Colfax | 530.346.2313 | Wes.Heathcock@colfax-ca.gov		
Project Relevance	InfoSewer | Model Development, Calibration & Analysis | System Analysis | Master Plan | CIP	**Key Staff**	Kevin Gustorf (QA/QC Manager) | Karl Meier (Project Engineer) | Megan Kurtz (Project Engineer) | Jonathan Faoro (GIS)

The City of Colfax (City) owns, operates, and maintains a wastewater collection system (WCS) and a wastewater treatment plant (WWTP) to which all flows from the WCS are conveyed. The WCS consists of approximately 9 miles of gravity sewer mains, 281 manholes, four sewer lift stations and force mains (approximately 9,132 feet in total length). The system currently serves a total of 714 residences and businesses.

The California State Water Resource Control Board, through the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems Order No. 2006-003-DWQ, requires the City to prepare a Sewer System Management Plan (SSMP). Element 8 of the SSMP requires a Sewer Evaluation and Capacity Assurance Plan (SECAP or Plan) to be prepared with a Capital Improvement Plan that provides hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate design storm or wet weather event.

In order to assess the capacity of the system during dry and wet weather flows, Wood Rodgers developed, calibrated and analyzed a hydraulic model of the WCS and prepared the SECAP. The SECAP report contains the methodology and results of the model analysis as well recommended capital improvements to resolve the system deficiencies identified.

As-Needed Hydraulic Modeling Services | Otay Water District | CA | Ongoing

Client Reference	Stephen Beppler, PE | Senior Civil Engineer | Otay Water District | 619.670.2209 | steve.beppler@otaywater.gov		
Project Relevance	InfoWater | InfoSewer| Hydraulic Model Updates | Fire Flow Analyses | Alternatives Analysis | Pipeline Sizing	**Key Staff**	Kevin Gustorf (PIC) | Karl Meier (PM) | Daniel Valencia (Project Engineer) | Jonathan Faoro (GIS)

Wood Rodgers is currently providing as-needed hydraulic modeling services to the Otay Water District. Under this contract, Wood Rodgers is responsible for providing water, recycled water and sewer hydraulic modeling analyses to assist the District in evaluating existing and proposed infrastructure and impacts to the District's systems. These modeling analyses are typically accompanied by a technical memorandum describing the modeling approach, results, and recommendations.

Hydraulic modeling tasks completed to date have included performing over sixty (60) fire flow analyses to determine available fire flow for planned development, analyzing an existing pump station and its surge tank to determine pressure vessel requirements for planned pump station improvements, evaluating and reporting water system distribution pressures to allow for compliance with AWWA reporting requirements, updating pump station controls to replicate field conditions, pressure zone conversion analyses to determine the feasibility of converting areas of the water distribution system from a higher to a lower pressure zone and an analysis to evaluate the potential expansion of the District's service boundary to serve additional planned development.

On-Call Hydraulic Modeling Services | Montecito Water District | CA | Ongoing

Client Reference	Adam Kanold, PE | Asst. General Manager / Engineering Manager | Montecito Water District | 805.969.2271 | akanold@montecitowater.com		
Project Relevance	InfoWater | Hydraulic Model Updates | Model Calibration | Fire Flow Analysis | Alternatives Analysis | Facility/Pipeline Sizing	**Key Staff**	Kevin Gustorf (PIC) | Karl Meier (PM) | Daniel Valencia (Project Engineer) Shirley Reppert (Project Engineer) Jonathan Faoro (GIS)

Wood Rodgers is currently supporting the Montecito Water District through an on-call / as-needed professional engineering contract for a variety of water system engineering analyses. The work typically requires analysis of the system operations using the District's calibrated hydraulic model. Our team's efforts support the District in making quick decisions and recommendations with respect to their water system operation.

Hydraulic modeling tasks completed for the District have included upgrading their model to InfoWater, demand re-allocation, fire flow analyses, simulations to determine how the distribution system will respond with various facility improvements including pump stations, wells and pressure reducing station improvements. Wood Rodgers has also conducted complex system-wide analyses to determine the effects to significant distribution system facilities and pipelines being out of service due to disaster related events.

Elk Grove Water + Sewer Studies | City of Elk Grove | CA | Ongoing

Client Reference	Christopher Jordan | Director of Strategic Planning & Innovation | City of Elk Grove | 916.478.2222 | cjordan@elkgrovecity.org		
Project Relevance	Demand Projections | InfoWater | InfoSewer | System Analysis | Facility Optimization	**Key Staff**	Kevin Gustorf (PIC/PM) | Karl Meier (QA/QC) | Daniel Valencia (Hydraulic Modeler) | Megan Kurtz (Hydraulic Modeler) | Luke Philbert (Project Engineer)

The City of Elk Grove (City) contracted with Wood Rodgers to prepare various water and sewer studies throughout the City, including the "Elk Grove Multi-Sport Complex and Grant Line Industrial Annexation Area Water Study," the "Southeast Industrial Area," and the "Southeast Policy Area." The water studies were prepared to evaluate, optimize and recommend the proposed backbone water system to serve the various proposed developments and project areas and meet the design requirements of the Sacramento County Water Agency. The sewer studies were prepared to evaluate, optimize and recommend the proposed backbone sewer system to serve the various proposed developments and project areas and meet the design requirements of the Sacramento Area Sewer District. The projects included hydraulic model development and analysis, facility optimization, coordination with local agencies and developers, recommended projects, cost estimates and report preparation.

Team Members Local + Relative Experience

In addition to the Wood Rodgers company projects listed above, to complement our firm experience, we have included a list of relevant projects that our key project team members (Kevin and Karl) have performed that are directly related to this project:

- **El Toro Water District Water and Sewer Master Plans – Orange County, California.** Prepared the District's 2005 Water and Sewer Master Plan. The project included a thorough evaluation of the water distribution and sewer collection systems, including a comprehensive review of all existing data and analysis of the two systems via computer models to identify items for improvement.

- **City of San Buenaventura Master Plan – City of Ventura, California.** Development of a comprehensive system-wide water master plan and facility condition assessment. The project included a detailed condition assessment of each of the city's wells, pump stations, reservoirs, and treatment facilities. The project included the development and calibration of a hydraulic model of the City's domestic water distribution system.
- **Water Quality Model – Santa Barbara, California.** Project to calibrate the hydraulic model and development of a water quality model to be utilized for compliance with the Stage 2 Disinfection Byproduct Rule.
- **Water System Master Plan and GIS – Thousand Oaks, California. City of Thousand Oaks.** Provided engineering services to the City of Thousand Oaks for the development of the hydraulic model, the water system analysis, preparation of the master plan report, and preparation of the capital improvement program.
- **Domestic Water Master Plan – Laguna Beach, California. Laguna Beach County Water District.** Developed the domestic water master plan. Services included evaluation of the District's existing computer system network; implementation of InfoWater software; training of District personnel; evaluation of water supply sources and recommendations for the most cost-effective means of meeting the District's ultimate demands; and preparation of a list of recommended capital improvements projects.
- **Montecito Water District Model Analysis and Water Quality Model Project – Santa Barbara County, California.** Preparation and calibration of a hydraulic model of the water distribution system for the Montecito Water District. The model was built from geographic information system (GIS) information and was constructed with a one-to-one relationship with the GIS. The model includes every pipe, pump station, control valve, reservoir, and well in the system.
- **Monte Vista Water District Water Master Plan Update – Montclair, California.** Updated MVWD's Water Master Plan. A detailed evaluation of MVWD's wholesale distribution system and the retail distribution system was performed, identified specific capital improvement projects, and O&M programs to be implemented over the next 30 years to improve the District's system.
- **Ventura County Water Works District No. 8 Water Master Plan – Simi Valley, California.** A new water master plan was prepared to identify capital improvements and operating changes over the next 20 years. A hydraulic model using Innovyze software was created from the GIS of the water system.
- **Sewer and Water Master Plan Updates – City of Del Mar, California.** As part of an on-call services contract with the City of Del Mar (City), prepared Sewer and Water Master Plan Updates and prepared a Sewer and Water Master Plan Update for the City to aid in identifying improvement projects that will help each system operate more efficiently.
- **Port of Long Beach Sewer Master Plan and Capital Improvement Program – Long Beach, California.** Provided engineering services to the Port of Long Beach for its sewer master plan and capital improvement program within the Harbor District. Services included developing and analyzing a hydraulic model of the sewer system, updating the geographic information systems (GIS), performing closed circuit television (CCTV) inspection of 24 miles of pipeline, performing a condition assessment of 449 manholes and 40 lift stations, performing a flow monitoring and inflow and infiltration (I&I) study, and preparing a sewer master plan and capital improvement program.
- **Sewer Master Plan – City of Glendora, California.** The project objective was to develop a comprehensive sewer master plan that assessed current and future conditions of the system and identified capital improvement projects for its 19.5 square-mile service area.

Scope of Work

Wood Rodgers has thoroughly reviewed and acknowledges the Scope of Work contained in Section VI of the Request for Proposal (RFP). Our Project Approach has been developed to deliver the Scope of Work requested by ETWD. Included herein are clarifications and additions to the Scope of Work and should be considered as supplemental to the Scope of Work provided in the RFP and discussions above in the Project Approach.

Supplemental Information	Tasks | Deliverables
Task 1a | Project Management The Wood Rodgers Project Manager will schedule a bi-weekly check-in call with the ETWD Project Manager to go over project progress and status. This will be an informal meeting, with no agenda or notes, to discuss any immediate project action items. The intent is to keep the project moving forward by having regular check-ins and making decisions as needed.	**1a |** Monthly Status Report / Invoice / Progress Schedule **1b |** Meeting Agendas (Kick-off, Workshop & Progress Meetings); Meeting Minutes (Kick-off, Workshop & Progress Meetings) **1c |** Board Presentation (Optional)
Task 1b | Meetings It is assumed that the Kick-off Meeting and Workshop will be held in person. It is assumed that the monthly progress meetings will be held virtually, and a total of 9 monthly progress meetings will be required.	**2a |** Project Data Log **3a + 4a |** Hydraulic Model Software Recommendation TM (Water & Sewer) **3b |** Water Demand, Peaking Factor, Diurnal Curves, Fire Flow Criteria TM
Task 2a | Review Existing Documents Wood Rodgers will prepare and maintain a project data log documenting all materials collected and reviewed for the Project.	**3b + 4b |** Meeting Notes - Proposed Redevelopment Projects / Plans from Cities **3c |** Water Model Calibration Plan; Water Model Calibration Results TM
Task 3b | Develop Water Model Wood Rodgers will prepare and submit a technical memorandum that documents the existing and future water demands, peaking factors, diurnal patterns and fire flow rates and durations for ETWD review and acceptance.	**3d + 4e** | Water + Sewer Design Criteria TM **3d |** Meeting Notes - Neighboring Agency Supply Outage Approach **4b |** Color Map of Sewer System; Sewer Generation, Peaking Factors, Diurnal Curves TM
Task 3d + 4e | Hydraulic Network Analysis Wood Rodgers will develop a technical memorandum that defines the proposed design criteria to be used to analyze both the water and sewer systems and identify potential deficiencies.	**4c |** Sewer Model Calibration Plan; Sewer Model Calibration Results TM **4d |** Sewer Flow Monitoring Plan
Task 4d | Sewer Flow Monitoring Wood Rodgers has proposed to implement five (5) flow monitors for a 2-month duration for this Project and includes two (2) rain gauges.	**5 |** List of Recommended Improvements w/ Cost + Payback (Water + Sewer) **6 |** QA/QC Log

Task 5 | Recommended Improvements

The recommended improvements and CIP will be based on a 10-year planning horizon, with near-term priorities in years 0-5, and long-term priorities in years 6-10. It is assumed that the CIP will be a part of the Master Plan Update, and not a separate document.

Optional Task 8 | Hydraulic Model Transfer + Training

Wood Rodgers currently owns and maintains several water and sewer hydraulic modeling licenses and does need to purchase anything specifically for this Project. Our fee proposal does not include the cost to purchase hardware or the modeling software for ETWD. It is assumed that if the District decides to own, operate, and maintain the models in-house, ETWD will purchase the software and maintenance package separately. Wood Rodgers will advise the District on the software and hardware needs to own the models in-house and will help coordinate with the software vendors.

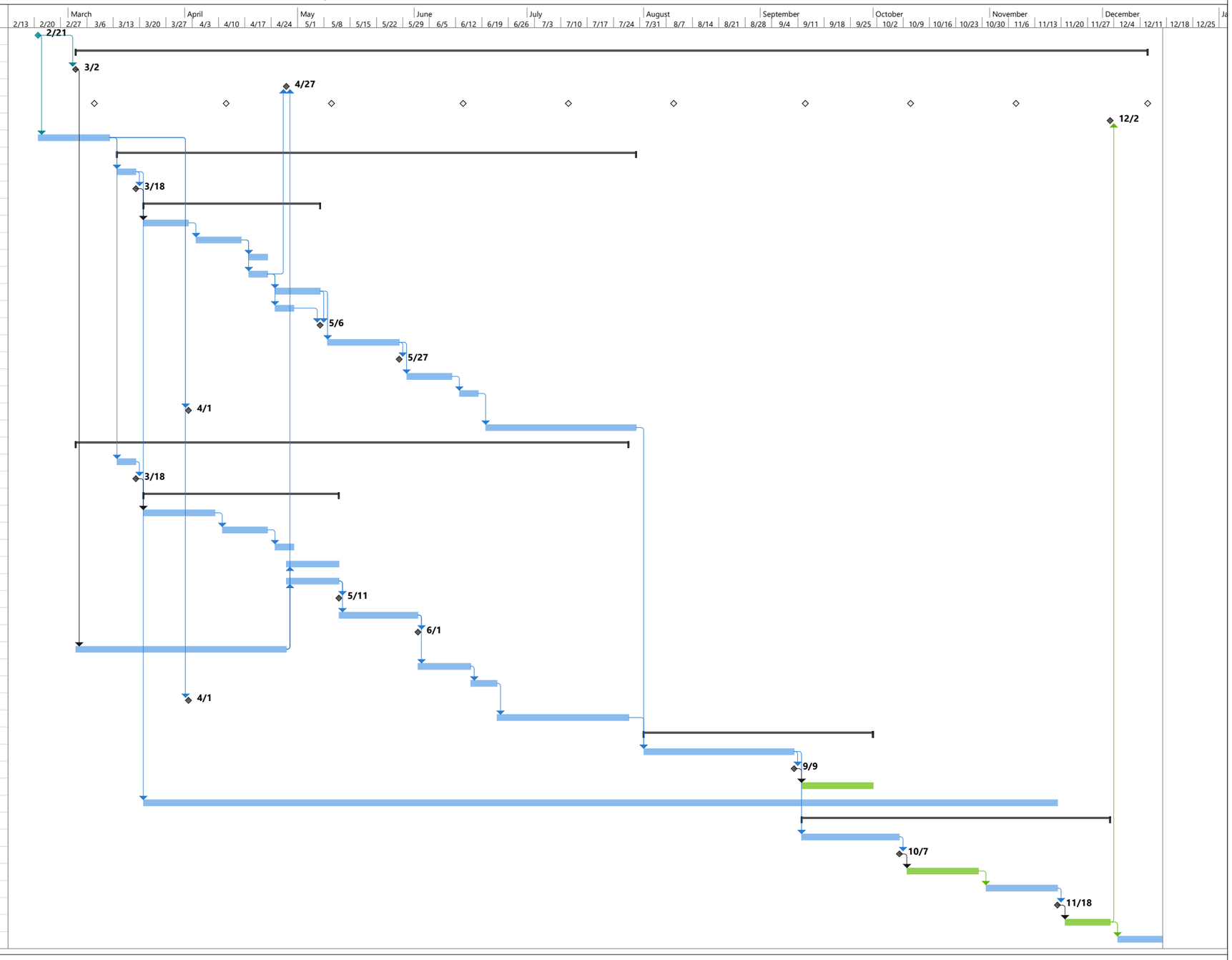
7 | Draft Water + Sewer Master Plan; Draft MP Comment Response Log; Final Water + Sewer Master Plan

8 | Hydraulic Model Training Agenda + Materials (Optional)

Final | Water + Sewer Model Files; All Master Plan Files (original format)

El Toro Water District
Water and Sewer Master Plan Update
Proposed Schedule

ID	Task Name	Duration	Start	Finish
1	Notice of Award	0 days	Mon 2/21/22	Mon 2/21/22
2	**Task 1 - Project Management and Meetings**	**203 days**	**Wed 3/2/22**	**Tue 12/13/22**
3	Kick-off Meeting	0 days	Wed 3/2/22	Wed 3/2/22
4	Staff Workshop	0 days	Wed 4/27/22	Wed 4/27/22
5	**Progress Meetings**	**200 days**	**Tue 3/8/22**	**Tue 12/13/22**
16	Board Presentation (Optional)	0 days	Fri 12/2/22	Fri 12/2/22
17	**Task 2 - Data Collection and Review**	3 wks	Mon 2/21/22	Fri 3/11/22
18	**Task 3 - Water Hydraulic Model Update**	**100 days**	**Mon 3/14/22**	**Fri 7/29/22**
19	Water Model Methodology	1 wk	Mon 3/14/22	Fri 3/18/22
20	Submit Model Tech Memo	0 days	Fri 3/18/22	Fri 3/18/22
21	**Develop Water Model**	**35 days**	**Mon 3/21/22**	**Fri 5/6/22**
22	Import Pipes and Nodes	2 wks	Mon 3/21/22	Fri 4/1/22
23	Digitize Facilities	2 wks	Mon 4/4/22	Fri 4/15/22
24	Allocate Elevations	1 wk	Mon 4/18/22	Fri 4/22/22
25	Allocate Demands	1 wk	Mon 4/18/22	Fri 4/22/22
26	Peaking Factors / Diurnal Curves	2 wks	Mon 4/25/22	Fri 5/6/22
27	Determine Fire Flow Requirements	1 wk	Mon 4/25/22	Fri 4/29/22
28	Submit Demand, Factor, Curve, Fire Flow TM	0 days	Fri 5/6/22	Fri 5/6/22
29	Calibrate Water Model	3 wks	Mon 5/9/22	Fri 5/27/22
30	Submit Water Calibration Tech Memo	0 days	Fri 5/27/22	Fri 5/27/22
31	Assign Facility Controls	2 wks	Mon 5/30/22	Fri 6/10/22
32	Build Scenarios	1 wk	Mon 6/13/22	Fri 6/17/22
33	Submit Design Criteria Tech Memo	0 days	Fri 4/1/22	Fri 4/1/22
34	Water Network Analysis	6 wks	Mon 6/20/22	Fri 7/29/22
35	**Task 4 - Sewer Hydraulic Model Update**	**105 days**	**Thu 3/3/22**	**Wed 7/27/22**
36	Sewer Model Methodology	1 wk	Mon 3/14/22	Fri 3/18/22
37	Submit Model Tech Memo	0 days	Fri 3/18/22	Fri 3/18/22
38	**Develop Sewer Model**	**38 days**	**Mon 3/21/22**	**Wed 5/11/22**
39	Import Pipes and Manholes	3 wks	Mon 3/21/22	Fri 4/8/22
40	Digitize Facilities	2 wks	Mon 4/11/22	Fri 4/22/22
41	Allocate Elevations	1 wk	Mon 4/25/22	Fri 4/29/22
42	Allocate Demands	2 wks	Thu 4/28/22	Wed 5/11/22
43	Peaking Factors / Diurnal Curves	2 wks	Thu 4/28/22	Wed 5/11/22
44	Submit Generation, Factor, Curve TM	0 days	Wed 5/11/22	Wed 5/11/22
45	Calibrate Sewer Model	3 wks	Thu 5/12/22	Wed 6/1/22
46	Submit Sewer Calibration Tech Memo	0 days	Wed 6/1/22	Wed 6/1/22
47	Sewer Flow Monitoring	2 mons	Thu 3/3/22	Wed 4/27/22
48	Assign Facility Controls	2 wks	Thu 6/2/22	Wed 6/15/22
49	Build Scenarios	1 wk	Thu 6/16/22	Wed 6/22/22
50	Submit Design Criteria Tech Memo	0 days	Fri 4/1/22	Fri 4/1/22
51	Water Network Analysis	5 wks	Thu 6/23/22	Wed 7/27/22
52	**Task 5 - Recommended Improvements**	**45 days**	**Mon 8/1/22**	**Fri 9/30/22**
53	Prepare Project and Cost Data	6 wks	Mon 8/1/22	Fri 9/9/22
54	Submit List of Projects	0 days	Fri 9/9/22	Fri 9/9/22
55	District Review	3 wks	Mon 9/12/22	Fri 9/30/22
56	**Task 6 - Quality Reviews**	35 wks	Mon 3/21/22	Fri 11/18/22
57	**Task 7 - Water and Sewer Master Plan Update**	**60 days**	**Mon 9/12/22**	**Fri 12/2/22**
58	Prepare Draft MP	4 wks	Mon 9/12/22	Fri 10/7/22
59	Submit Draft MP	0 days	Fri 10/7/22	Fri 10/7/22
60	District Review	3 wks	Mon 10/10/22	Fri 10/28/22
61	Prepare Final MP	3 wks	Mon 10/31/22	Fri 11/18/22
62	Submit Final MP	0 days	Fri 11/18/22	Fri 11/18/22
63	District Review	2 wks	Mon 11/21/22	Fri 12/2/22
64	**Task 8 - Hydraulic Model Transfer and Training**	2 wks	Mon 12/5/22	Fri 12/16/22



Project: Project Schedule
Date: Tue 2/8/22

Task	Summary	Inactive Milestone	Duration-only	Start-only	External Milestone	Manual Progress
Split	Project Summary	Inactive Summary	Manual Summary Rollup	Finish-only	Deadline	
Milestone	Inactive Task	Manual Task	Manual Summary	External Tasks	Progress	

Water and Sewer Master Plan Update

El Toro Water District

Estimated Project Labor Hours

Task Description	Wood Rodgers Staff								TOTAL HOURS BY TASK
	Principal Engineer II	Principal Engineer I	Principal Engineer I	GIS II	Project Engineer I	Engineer II	Engineer I	Project Coordinator	
Task 1: Project Management and Meetings	**12**	**60**	**0**	**0**	**0**	**0**	**0**	**0**	**72**
Task 1a: Project Management	4	40							44
Task 1b: Meetings	8	20							28
Task 1c: Board Presentation (Optional)	***4***	***16***							***20***
Task 2: Document Review	**2**	**16**	**0**	**0**	**0**	**0**	**24**	**0**	**42**
Task 2a: Review Existing Documents	2	16							18
Task 2b: Data Collection							24		24
Task 3: Water Hydraulic Model Update	**4**	**50**	**0**	**28**	**0**	**456**	**0**	**0**	**538**
Task 3a: Propose Methodology for New Water Model		2		4		16			22
Task 3b: Develop Water Model		16		24		160			200
Task 3c: Calibrate Water Model		8				60			68
Task 3d: Hydraulic Network Analysis	4	24				220			248
Task 4: Sewer Hydraulic Model Update	**4**	**44**	**0**	**4**	**0**	**0**	**416**	**0**	**468**
Task 4a: Propose Methodology for New Sewer Model		2		4			16		22
Task 4b: Develop Sewer Model		16					140		156
Task 4c: Calibrate Sewer Model		8					60		68
Task 4d: Sewer Flow Monitoring		2							2
Task 4e: Hydraulic Network Analysis	4	16					200		220
Task 5: Recommended Improvements	**6**	**24**	**0**	**0**	**120**	**0**	**0**	**0**	**150**
Task 5a: Describe & Prioritize Recommended Projects	4	16			80				100
Task 5b: Develop Cost Estimates & Payback Periods	2	8			40				50
Task 6: Quality Control Reviews	**0**	**0**	**40**	**0**	**0**	**0**	**0**	**0**	**40**
Task 6a: QA/QC Reviews			40						40
Task 7: Water and Sewer Master Plan Update	**6**	**60**	**0**	**32**	**56**	**80**	**80**	**12**	**326**
Task 7a: Draft Master Plan Update	4	40		24	40	60	60	12	240
Task 7b: Final Master Plan Update	2	20		8	16	20	20		86
Task 8: Hydraulic Model Transfer and Training (Optional)	***0***	***16***	***0***	***0***	***0***	***16***	***0***	***0***	***32***
Task 8a: Model Transfer Support		*16*							*16*
Task 8b: Model Training						*16*			*16*
TOTAL HOURS	**34**	**254**	**40**	**64**	**176**	**536**	**520**	**12**	**1,636**

OPTIONAL ITEMS ONLY

TOTAL HOURS	**4**	**32**	**0**	**0**	**0**	**16**	**0**	**0**	**52**

Resumes

KEVIN GUSTORF, PE

PROJECT ROLE
Principal in Charge

TITLE

Principal II

EDUCATION

BS, Civil Engineering, Loyola Marymount University, 1999

REGISTRATIONS/ CERTIFICATIONS

Registered Professional Engineer, California No. 64755

Registered Professional Engineer, Nevada No. 018880

Qualified SWPPP Developer (QSD)

PROFESSIONAL AFFILIATIONS

American Council of Engineering Companies (ACEC), Sierra Chapter President

American Society of Civil Engineers (ASCE), Member, 337465

American Water Works Association (AWWA), Member, 00511135

Association of Water Agencies Ventura County, Member

Orange County Water Association (OCWA), Member, 861

Water Environment Federation (WEF), Member, 17557223

Certified Trainer for Accredited Project Management Training Program

Mr. Gustorf is a registered professional engineer with over 22 years of leadership and expertise in the water resources field. His experience in water resource engineering includes the planning, design, construction and management of a wide variety of projects for local municipal public works agencies, special districts and private sector clients throughout the state of California. His diverse project experience includes water and wastewater master planning, hydraulic modeling, hydraulic analysis and studies. He is an expert on several different modeling platforms and has conducted presentations on modeling throughout the Western U.S. Mr. Gustorf's design experience includes the design of water and wastewater pipelines, pump stations, lift stations, flow/pressure control facilities, wells, tanks and reservoirs. His projects have included both new designs, as well as the repair and rehabilitation of existing facilities.

Mr. Gustorf has managed projects ranging from small task orders, to large multi-discipline, complex projects with multi-million-dollar design fees. As project manager, he has maintained the goal to deliver quality projects for clients, meeting the financial expectations of the firm. He has managed hundreds of projects, all of which have met or come below budgets. In addition, clients have executed follow-up on-call agreements due to the high-level of service and quality.

His Leadership style is built on integrity, trust and commitment. He collaborates and communicates well and is dynamic and adaptable while maintaining quality and timely delivery of project services.

EXPERIENCE

Cowan Heights System Hydraulic Model Update and Zone Realignment Study – Golden State Water Company, California. Serving as the Principal in Charge responsible for validating and calibrating a hydraulic model of the entire Cowan Heights water distribution system to conduct an evaluation of Golden State Water Company's system operations. Wood Rodgers is providing recommendations to modify pressure zone alignment(s) and boundaries, address hydraulic constraints, and develop a capital improvement plan.

Water System Assessment - Cacheville Community Services District – Town of Yolo, California. Project Manager. Wood Rodgers was contracted by the Cacheville Community Service District (CCSD) to prepare an assessment and analysis of the existing water distribution system. CCSD provides domestic water supply for the residents and businesses in the Town of Yolo, CA, located approximately 5 miles north of the City of Woodland. Yolo is situated immediately east of Interstate 5 (I-5). Wood Rodgers analyzed the water distribution system to determine its ability to meet the current and future demands of the CCSD service area. The analysis considers upsizing existing water mains, increasing water supply and adding storage to improve fire flow capacities within the distribution system and benefit future development areas. This Study includes the preparation of a hydraulic model and modeling effort to determine the existing system deficiencies and recommend improvements. This study also identifies the existing system assets, demands and operations, calculates future system demands, identifies deficiencies, and recommends projects.

Groveland Integrated Water and Wastewater Master Plan – Groveland, California. Mr. Gustorf is the Principal-in-Charge of this Integrated Water and Wastewater Master Plan (referred hereafter as the GCSD Master Plan or Master Plan) to provide a 20-year roadmap for the water and wastewater services provided by the GCSD. The Master Plan will help determine the projects needed to repair, replace, and/or upgrade the GCSD's aging infrastructure to increase system operating efficiencies and reliability, while improving cost predictability and maintaining a high level of customer satisfaction into the future. The Master Plan will proactively address increasingly stringent water quality and environmental regulations to protect public health and promote stewardship of the Sierra Nevada and Sacramento/San Joaquin River Delta; and it will serve as a guide to establish future rates and charges to allow GCSD to prioritize available funding and the pursuit of grants to complete the required projects. The Master Plan will outline a strategy to improve maintenance and asset management, prioritize new facilities and interweave the necessary upgrade or decommission of existing facilities. The work effort included the development of a Geodatabase of the District's water supply and distribution system, and the wastewater water collection system. The geodatabases were then developed into a hydraulic model of each system, utilizing the InfoWater and InfoSewer platforms. The hydraulic models were evaluated to identify system deficiencies, and opportunities

WOOD RODGERS, INC. START DATE

April 23, 2018

to improve operational efficiency. The project included a condition assessment of the District's WWTP, three (3) Water Treatment Plants, five pump stations, five tanks, and sixteen (16) lift stations.

City of San Buenaventura Master Plan – City of Ventura, California. Served as Project Manager for the development of a comprehensive system-wide water master plan and facility condition assessment. The project included a detailed condition assessment of each of the city's wells, pump stations, reservoirs and treatment facilities. Th project included the development and calibration of a hydraulic model of the City's domestic water distribution system. The hydraulic model was utilized to evaluate a more efficient use of the City's two water supply sources, groundwater and imported water. A capacity analysis and condition analysis were performed to support the development of a comprehensive Master Plan to aid the City in analyzing existing capital improvement projects and identifying deficiencies throughout the system to develop future capital improvement projects.

El Toro Water District Water and Sewer Master Plans – Orange County, California. Project Manager. Responsible for project management. Provided updates to the district's water and sewer master plans. The project included thorough evaluation of the water distribution and sewer collection systems, including a comprehensive review of all existing data and analysis of the two systems via computer models to identify items for improvement. Performed surveys and review of operating data, operational reporting, configuration of water and sewer network data for capacity and flow analysis, rehabilitation and development planning, and update of the 10-year capital improvement program. The focus of the district had shifted from new development to mainly improving system efficiencies, correcting identified deficiencies, identifying infrastructure replacement schedules, meeting increasing regulatory requirements, and meeting future demand or redevelopment-driven demand.

Water Quality Model – Santa Barbara, California. Project Manager for the calibration of the hydraulic model and development of a water quality model to be utilized for compliance with the Stage 2 Disinfection Byproduct Rule. Initiated, organized and coordinated a comprehensive field tracer study to monitor water age, chlorine residual and water movement throughout the distribution system. The project included gathering of chlorine residual data at approximately 30 locations for a period of one week, performing bulk chlorine decay tests, and gathering extensive SCADA data on reservoir and pump station operations. The field data collected was simulated in the hydraulic model to accurately simulate water movement throughout the distribution system. A 45-day simulation was developed in the model to evaluate water age, chlorine residual and reservoir levels. The calibrated water quality model will be utilized to select monitoring locations to comply with the Stage 2 DBP Rule.

Water System Master Plan and GIS – Thousand Oaks, California. City of Thousand Oaks. Project Engineer responsible for development of the hydraulic model, the water system analysis, preparation of the master plan report, and preparation of the capital improvement program. Provided engineering services to the City of Thousand Oaks for development of a comprehensive water system master plan and GIS. The city encompasses an area of approximately 56 square miles with over 14,000 acres designed as open space. Also provided a capital improvement program; hydraulic model; GIS; condition assessment of each water facility; corrosion study; structural analysis; water quality evaluation; computer maintenance management system (CMMS); evaluation of the city's remote facility control system; and vulnerability assessment. The effort also included scrubbing as-builts, digitizing, and data entry for various attributes into the new GIS system.

Domestic Water Master Plan – Laguna Beach, California. Laguna Beach County Water District. Project Manager for development of a domestic water master plan. Services included evaluation of the District's existing computer system network and make recommendations for upgrading the existing system; implementation of InfoWater software, including model and calibration of the existing water system and hydraulic and water quality analysis; training of District personnel and follow-on support services for two years; evaluation of water supply sources and recommendations for the most cost-effective means of meeting the District's ultimate demands; and preparation of a list of recommended capital improvements projects, including preliminary cost estimates for facilities to be constructed; and preparation of a financial plan for identified improvement facilities that will include developer fees, potential financial sources, and possible water rate impacts.

Montecito Water District Model Analysis and Water Quality Model Project – Santa Barbara County, California. Project Manager for the preparation and calibration of a hydraulic model of the water distribution system for the Montecito Water District. The model was built from geographic information system (GIS) information and was constructed with a one-to-one relationship with the GIS. The model includes every pipe, pump station, control valve, reservoir, and well in the system. The project consisted of building an extended period simulation hydraulic model using MWH Soft, Inc.'s H2OMAP hydraulic modeling software. The model included scenarios for summer and winter average day and maximum day demands. The model included various demand sets, control sets, and supply conditions. The model was later used to perform a detailed hydraulic analysis of the district's system and operation. Utilized the calibrated hydraulic model to conduct an evaluation of the Montecito Water District's water distribution system and system operation. The project consisted of a detailed evaluation of the District's supply sources, storage, pumping operations and efficiency, pressure zone boundaries, pipeline looping and redundancy and reliability. The analysis resulted in a list of recommendations to help the District operate their system more efficiently and reliably. The second phase of this project was to further develop and calibrate the hydraulic model to function as a water quality model. Initiated and coordinated a field tracer study to monitor water movement throughout the distribution system. The model was closely calibrated to the conditions observed during the field study to accurately predict water age and chlorine residual.

Monte Vista Water District Water Master Plan Update – Montclair, California. Project Manager for the preparation of the Water Master Plan Update for the Monte Vista Water District (MVWD), a domestic water wholesaler and retailer in the County of San Bernardino, CA. MVWD provides approximately 20 MGD of wholesale supply to regional water retailers, and is responsible for an average delivery of 11 MGD to its own retail customers. Performed a detailed evaluation of MVWD's wholesale distribution system and the retail distribution system, and identified specific capital improvement projects and O&M programs to be implemented over the next 30 years to improve the District's system. The project included the update and calibration of the District's hydraulic model; a condition assessment of the District's major supply, storage and distribution facilities; an extensive flow and pressure study in the field; a water age analysis; a useful life analysis; an energy analysis; the development of a 90-year pipeline replacement program; the preparation of a 10-year and 30-year capital improvement program; and the preparation of the Master Plan Update.

Sewer and Water Master Plan Updates – City of Del Mar, California. Project Manager providing engineering and related professional services to the Public Works Department under an on-call contract. Under this contract, staff have provided plan checking services on over 30 projects. The firm provides the full range of disciplines to support these on call efforts including plan checking for water and sewer systems. As part of the on-call services contract, prepared Sewer and Water Master Plan Updates, which were completed in 2015; and prepared a Sewer and Water Master Plan Update for the City of Del Mar to help the City identify improvement projects that will help each system operate more efficiently. The City is primarily built out and significant increases in demand are not expected. Performed a condition assessment of the tanks and reservoirs within the system, and analyzed the hydraulic model to determine if the existing storage and pump station operation was the most efficient and reliable for the City. For the wastewater collection system, provided evaluation of the capacity of the system to be able to convey a majority of the wastewater flow to a new outlet discharge, on the opposite side of the City. This required a comprehensive hydraulic model and pump station capacity analysis. The project included the following tasks: Documenting and Analyzing Historical and Existing Water Demands and Wastewater Flows; Updating and Calibrating a Water Hydraulic Model using InfoWater; Developing and Calibrating Sewer Hydraulic Model using InfoSewer; Performing a Condition Assessment of the Water Facilities; Analyzing the Capacity and Operational Efficiency of the Water Distribution System; Analyzing the Capacity of the Sewer Collection System Documenting the Results, Findings and Recommendations and Preparing a combined Master Plan Report; Preparing a 10-Year Capital Improvement Program.

Integrated Water Resources Master Plan – City of Beverly Hills, California. Project Manager. The City of Beverly Hills prepared an Integrated Water Resources Master Plan that included the evaluation of all of their wet infrastructure systems, with the goal of identifying opportunities to efficiently utilize their water resources and develop integrated projects. Wood Rodgers, as a

subconsultant to Hazen & Sawyer, prepared the sewer system and storm drain system sections of the City's Integrated Water Resources Master Plan. The City owns and operates the sewer collection system within the City limits serving approximately 34,000 residents and businesses. The sewer collection system consists of approximately 100 miles of gravity pipelines and approximately 2,200 manholes. The City's collection system ranges in diameter from 6-inch to 36-inch pipe. Approximately half of the City's collection system was constructed in the 1930's. Wood Rodgers completed a detailed analysis of the City's sewer collection system, which included four weeks of flow monitoring that was used to develop sewer generation rates, peaking factors and diurnal patterns. The system analysis included updates the GIS geodatabase the development of an extended period simulation hydraulic model using the InfoSewer modeling platform. The results of the capacity and condition analysis resulted in proposed capital improvement projects to upgrade the system capacity and rehabilitate aging infrastructure. Wood Rodgers also conducted a detailed analysis of the storm drain system. The City's owns and operates the storm drain conveyance network within the City limits, which conveys local runoff and storm water flows to the Los Angeles County drainage channels which run through the City. The storm drain analysis included the review and coordination between the City's geodatabase and the County storm drain geodatabase. A 2-dimensional model was developed in InfoWorks ICM to analyze the capacity of the storm drain conveyance system within the City limits to accommodate a 10-year, 25-year and 50-year storm event. Proposed projects were coordinated with the City's water quality project list. The results of the capacity and condition analysis resulted in proposed capital improvement projects to upgrade the system capacity and rehabilitate aging infrastructure.

Port of Long Beach Sewer Master Plan and Capital Improvement Program – Long Beach, California. Responsible for project management in providing engineering services to the Port of Long Beach for its sewer master plan and capital improvement program within the Harbor District. Services included developing and analyzing a hydraulic model of the sewer system, updating the geographic information systems (GIS), performing closed circuit television (CCTV) inspection of 24 miles of pipeline, performing a condition assessment of 449 manholes and 40 lift stations, performing a flow monitoring and inflow and infiltration (I&I) study, and preparing a sewer master plan and capital improvement program.

Sewer Master Plan – City of Glendora, California. Project Manager for preparation a Master Plan for the City of Glendora's wastewater collection system. The project objective was to develop a comprehensive sewer master plan that assessed current and future conditions of the system and identified capital improvement projects for its 19.5 square-mile service area. The work included flow monitoring, closed circuit television inspection, creation of a hydraulic model, system analysis, recommending system improvements, a capital cost analysis, and preparation of a master plan report. In addition, the City planned to take over operation and maintenance of its wastewater collection system that was being maintained by the County of Los Angeles. Portions of the system required rehabilitation and / or replacement, as improvements had not been made in many years. The wastewater master plan provided City staff with a thorough understanding of the capital requirements for the collection system as well as funding alternatives.

City of Colfax Sewer Evaluation and Capacity Assurance Plan (SECAP) – Colfax, CA. QA/QC Manager. The City of Colfax requires an update to their SECAP to reflect recent sewer system improvements and changes in wastewater flows over the past 10-years. The project includes flow monitoring, wastewater generation calculations, the development and calibration of an updated hydraulic model of the entire sewer system (including 5 lift stations) using the Innovyze InfoSewer modeling platform, and the preparation of a summary report of the analysis and findings. The model was developed as a 72-hour extended period simulation, and includes scenarios for the average dry-weather and peak wet-weather flow conditions for both the existing and Year 2040 condition. The peak wet-weather scenario simulates a 10-year 36-hour storm event. The model was calibrated to simulate actual conditions observed through SCADA data and flow monitoring data. The model was evaluated to identify system deficiencies and recommended improvements. The project also includes the preparation of the Sewer Evaluation and Capacity Assurance Plan (SECAP).

PAUL KLEIN, PE

PROJECT ROLE

QA/QC Manager

TITLE

Principal

EDUCATION

BS, Civil Engineering, Loyola Marymount University, 1988

REGISTRATIONS/ CERTIFICATIONS

Registered Professional Engineer, California No. 48367

WOOD RODGERS, INC. START DATE

June 25, 2018

Mr. Klein has over 30 years of diverse experience in the preparation and management of public works and water resources projects for public agencies, including regional multi-agency jurisdictions. For these projects, his work includes site investigations, plans and specifications, cost estimates, identification of grant funding opportunities, agency coordination and approvals, permitting, and construction assistance.

As a principal-in-charge and project manager, Mr. Klein has been responsible for coordinating and directing the work of multidisciplinary project teams that included both in-house staff and multiple outside subconsultants. He has proven his ability on numerous public works projects to communicate effectively with public agency staff, permitting and approval agencies, and community stakeholder groups, while maintaining compliance with budget and schedule goals.

He has particular expertise in the analysis and design of water reclamation systems for both local and regional applications, including preparation of studies, customer demand projections. Mr. Klein has also served as project manager on major pipeline design projects, pumping station and well projects, reservoirs, and treatment facilities.

EXPERIENCE

Folsom Ranch Backbone Sewer Improvements – Folsom, California. Project Manager providing engineering design services for approximately 17,000 feet of backbone sewer for the Folsom Ranch Plan Area. This project will be one of the first improvements to help jump start the development of the approximately 3,500-acre master planned community in Folsom. The project included design of the sanitary sewer main, access roadway, grading, interim and final stormwater improvements, and the development of the project Stormwater Pollution Prevent Plan (SWPPP).

Lincoln Metering Station – Lincoln, California, and Placer County Water Agency. Project Manager providing engineering design services for this flow control and metering facility that will serve the City of Lincoln, Placer County Water Agency, and Bickford Ranch. The facility includes two phases of improvements. The first phase includes 60-inch piping and 48-inch flow control valves. A large pipe gallery allows operation and maintenance access to all the valving and appurtenances. The building and piping were designed to allow ease of expansion for Phase 2 at a later date.

Quest Pipeline, Santa Margarita Water District – San Juan Capistrano, California. Project Manager for this two-mile cross-country, above- and below-grade (HDPE and PVC) pipeline serving Quest Diagnostics facility off Ortega Highway in San Juan Capistrano, CA. The pipeline is required to replace a domestic water well that has run dry due to the drought conditions. The pipeline is scheduled to be placed into operation in April 2018.

Morada Water Interconnect Project – San Joaquin County, California. Principal-in-Charge. Responsible for the design of interconnect pipeline connections between nine separate water distribution systems. Services included system modeling, evaluation of alternative pipeline alignments, surveying and mapping, and preparation of final plans and specifications for pipelines and metering stations. The project was completed on a fast-track schedule in order to secure project funding.

Wastewater Facility Plan Studies - Alpine, Lakeside and Spring Valley Sanitation Districts – San Diego County, California. Under contract to the County of San Diego, served as Project Manager and principal author for the development of the facility plan studies for two distinct wastewater master plans and capital improvements plans. The project included the combined Alpine and Lakeside Sanitation Districts as one overall plan and the Spring Valley Sanitation District as a second plan. The project included the evaluation of available wastewater modeling programs for use in the master plan efforts, development of system-wide hydraulic models using hundreds of "As-Constructed" plans dating to 1952, integration of GIS databases into the models, coordination with the County's General Plan 2020 to forecast future flows, field monitoring of flows to benchmark the existing conditions, evaluation of eight separate sewer lift stations and force mains related to capacity and performance, Inflow and Infiltration (I&I) analysis, Capital Improvement

Program Development for Years 2005 and 2010, and training of County staff on use and operation of the hydraulic models.

Pechanga Domestic Water and Sewer System Upgrades – Temecula, California. Project Manager for the upgrades of the domestic water and sewer systems as part of expansion for a new casino complex that included a gaming facility, on-site hotel, parking structure, and RV park. His responsibilities included evaluation of the existing system to meet current and future domestic and fire flow demands, followed by the design of system upgrades including the installation of pipelines, two new water storage reservoirs and a relocated reservoir, and a new pump station. Sewer system improvements included trunk sewer and service connections.

Bake Parkway Sewer System for the Irvine Ranch Water District – Orange County, California. Project Manager for the design of five miles of 36-inch diameter sewer for the Irvine Ranch Water District. His responsibilities consisted of both design and construction services, including preparation of plans and specifications.

Catalina Pump Station and Standpipe Repairs and Rehabilitation – San Diego, California. Project Manager. Responsible for the repair and rehabilitation for a 1.5-million-gallon cylindrical welded steel tank and 7,200-gpm potable water pump station. The project included review of available record information, field verification of existing reservoir elements (such as tank dimensions, shell and floor thicknesses), comparison of original design criteria to current seismic design parameters, geotechnical investigation, preparation of a preliminary design report, design of standpipe connections and appurtenances, design of a recirculation system, design of an interior catwalk system, removal of existing exterior coatings and application of a new coating system, and the preparation of contract documents.

Read Reservoir for the Santiago County Water District – Orange County, California. Project Manager for engineering services for this new 1.0-MG partially buried prestressed concrete reservoir, including construction management and inspection services. The project included a study to determine the type of reservoir necessary to replace an existing reservoir, reservoir design, and extensive site work in an environmentally sensitive area, including mitigation for the Department of Fish and Game.

Woods Reservoirs for the Santa Margarita Water District – Orange County, California. Project Manager for the design of two 2.5-MG welded steel reservoirs. Work required preparation of plans, specifications, and cost estimates for the reservoirs, including the design of all mechanical systems and telemetry and instrumentation facilities.

South County Regulating Reservoir for Metropolitan Water District (MWD) and Santa Margarita Water District – Orange County, California. Project Engineer for the South County Regulating Reservoir, an above-grade circular pre-stressed concrete reservoir with a capacity of 3 million gallons. The reservoir serves as the hydraulic regulating point of the 26-mile, 66-inch diameter South County Pipeline.

Santiago Hills Reservoir for the Irvine Ranch Water District – Orange County, California. Project Manager for the design and construction of the Foothill Ranch Reservoir that serves a newer development area within the Irvine Ranch Water District's service area. The reservoir was designed as a buried pre-stressed concrete tank with a portion of the roof exposed and used as a joint-use parking area for the District's operation and maintenance personnel, minimizing the land acquisition requirements. The reservoir has a design capacity of 6 million gallons.

Nichols Institute Reservoirs for the Santa Margarita Water District – Orange County, California. Project Manager for preliminary and final design of two 330,000-gallon steel reservoirs to provide daily demands as well as fire flow for the Nichols Institute. The project also included a reservoir recirculation and chlorination system to assist in maintaining water quality to meet current State Department of Health Services Surface Water Treatment Regulations. Due to the on-site storage of chlorine gas, a chlorine leak detection, containment, and treatment system was provided for compliance with all applicable codes.

KARL F. MEIER, PE

PROJECT ROLE

Project Manager

TITLE

Senior Engineer

EDUCATION

BS, Civil Engineering, New Mexico State University, 2003

REGISTRATIONS/ CERTIFICATIONS

Registered Professional Civil Engineer, California No. 71713

Registered Professional Civil Engineer, Washington, No. 52372

United States Army Corps of Engineers, Construction Quality Management (CQM) for Contractors Certification, SPK-USACE-02-18-00060

Occupational Safety and Health Administration, OSHA 30-Hour Construction Certification, No. 4163274

WOOD RODGERS, INC. START DATE

January 7, 2019

Mr. Meier has over 18 years of experience as both a consultant and as a District Engineer for a public water agency. Mr. Meier's past public sector experience required active involvement and management of the engineering, operations, and maintenance activities for a public water system. As a consultant, he has extensive experience in the planning and design of water, recycled water and wastewater infrastructure including pipelines, force mains, pump stations, wells, pressure reducing stations and reservoirs. Mr. Meier also has significant master planning and hydraulic modeling experience for public agencies and special districts. Mr. Meier's planning and design expertise is complimented by his past construction management and inspection experience, where he was directly responsible for construction management and inspection services for public works projects ranging from water infrastructure to municipal park and ADA improvement projects. He is extremely proficient with a variety of software applications including the Microsoft Office Suite (Excel, Word, PowerPoint, Project), AutoCAD and is an expert in various modeling software platforms including Innovyze InfoWater, InfoWater Pro, InfoSewer, H2O Map Water and H2O Map Sewer.

EXPERIENCE

As-Needed Hydraulic Modeling – Otay Water District, California. Project Manager responsible for overseeing all water, recycled water, and sewer modeling task orders for this contract. Task orders completed to date have included performing over sixty (60) fire flow analyses to determine available fire flow for planned development, analyzing an existing pump station and its surge tank to determine pressure vessel requirements for planned pump station improvements, evaluating and reporting water system distribution pressures to allow for compliance with AWWA reporting requirements, updating pump station controls to replicate field conditions, pressure zone conversion analyses to determine the feasibility of converting areas of the water distribution system from a higher to a lower pressure zone and an analysis to evaluate the potential expansion of the District's service boundary to serve additional planned development.

As-Needed Engineering & Modeling – Montecito Water District, California. Serving as the Project Manager and Lead Engineer responsible for providing as-needed engineering services to the Montecito Water District at the direction of the General Manager and Engineering Manager. Responsibilities include water supply management, project management for on-going projects conducted by outside consultants, conducting technical evaluations of other projects impacting District facilities or operations, providing technical assistance to the treatment and distribution department personnel on operational matters, performing distribution system analyses utilizing a comprehensive hydraulic model and interacting with other governmental agencies as well as the public as needed.

Ventura County Water Works District No. 8 Capacity Study, California. Project Engineer. Wood Rodgers converted the District's H2O Map water model to InfoWater and then leveraged the District's GIS data to update the model elements including piping and other similar assets. A demand analysis was performed and new demands representing current demand conditions were allocated to the model. Facilities including pump stations, reservoirs, pressure reducing stations and control valves were validated to ensure they were mimicking field conditions and were adjusted within the model to match recent historical fire flow test results to achieve a calibrated model. A capacity study evaluating all pump stations, reservoirs, pipelines, and supply sources was developed with results identifying areas of deficiency.

Sewer Master Plan and Hydraulic Model Update - City of Imperial Beach, California. Served as the Project Manager responsible for overseeing and directing the update of the City's InfoSewer hydraulic model and sewer master plan and capital improvement plan. The City's sewer collection system consists of eleven lift stations and over 50 miles of sewer collection mains. The hydraulic model was developed as an extended period simulation model and was calibrated using field flow data as well as data collected during the rainy season to determine inflow and infiltration characteristics. As a part of the calibration process, base loading attributed to sea water intrusion along the coastal areas of the collection system was determined and included in the model. Specific tasks included in this project included focused evaluations of the lift station operations to

optimize system performance and minimize possible sanitary sewer overflows for this system which is adjacent to the Pacific Ocean. Other tasks included developing multiple hydraulic model scenarios to identify system upgrades required in the immediate, near term and long-term planning forecast examining both planned development and possible changes to land use/zoning.

City of San Buenaventura Master Plan – City of Ventura, California. Served as Project Engineer for the development of a comprehensive system-wide water master plan and facility condition assessment. The project included a detailed condition assessment of each of the city's wells, pump stations, reservoirs, and treatment facilities. Th project included the development and calibration of a hydraulic model of the City's domestic water distribution system. The hydraulic model was utilized to evaluate a more efficient use of the City's two water supply sources, groundwater and imported water. A capacity analysis and condition analysis were performed to support the development of a comprehensive Master Plan to aid the City in analyzing existing capital improvement projects and identifying deficiencies throughout the system to develop future capital improvement projects.

El Toro Water District Water and Sewer Master Plans, California. Project Engineer responsible for modeling and developing the water and sewer master plan. The project included a thorough evaluation of the water distribution and sewer collection systems, including a comprehensive review of all existing data and analysis of the two systems via computer models to identify items for improvement. Performed surveys and review of operating data, operational reporting, configuration of water and sewer network data for capacity and flow analysis, rehabilitation and development planning, and update of the 10-year capital improvement program. The focus of the district had shifted from new development to mainly improving system efficiencies, correcting identified deficiencies, identifying infrastructure replacement schedules, meeting increasing regulatory requirements, and meeting future demand or redevelopment-driven demand.

Water Quality Model – City of Santa Barbara, California. Project Engineer and lead modeler responsible for the calibration of the hydraulic model and development of a water quality model to be utilized for compliance with the Stage 2 Disinfection Byproduct Rule. Initiated, organized, and coordinated a comprehensive field tracer study to monitor water age, chlorine residual and water movement throughout the distribution system. The project included gathering of chlorine residual data at approximately 30 locations for a period of one week, performing bulk chlorine decay tests, and gathering extensive SCADA data on reservoir and pump station operations. The field data collected was simulated in the hydraulic model to accurately simulate water movement throughout the distribution system. A 45-day simulation was developed in the model to evaluate water age, chlorine residual and reservoir levels. The calibrated water quality model was utilized to select monitoring locations to comply with the Stage 2 DBP Rule.

Montecito Water District Model Analysis & Water Quality Model Project – Montecito, California. Project Engineer and lead modeler responsible for the preparation and calibration of a hydraulic model of the water distribution system for the Montecito Water District. The model was built from geographic information system (GIS) information and was constructed with a one-to-one relationship with the GIS. The model includes every pipe, pump station, control valve, reservoir, and well in the system. The project consisted of building an extended period simulation hydraulic model using MWH Soft, Inc.'s H2OMAP hydraulic modeling software. The model included scenarios for summer and winter average day and maximum day demands. The model included various demand sets, control sets, and supply conditions. The model was later used to perform a detailed hydraulic analysis of the district's system and operation. Utilized the calibrated hydraulic model to conduct an evaluation of the Montecito Water District's water distribution system and system operation. The project consisted of a detailed evaluation of the District's supply sources, storage, pumping operations and efficiency, pressure zone boundaries, pipeline looping and redundancy and reliability. The analysis resulted in a list of recommendations to help the District operate their system more efficiently and reliably. The second phase of this project was to further develop and calibrate the hydraulic model to function as a water quality model. Initiated and coordinated a field tracer study to monitor water movement throughout the distribution system. The model was closely calibrated to the conditions observed during the field

study to accurately predict water age and chlorine residual. The calibrated water quality model was utilized to select monitoring locations to comply with the Stage 2 DBP Rule.

Montecito Water District Water Model Update – Montecito, California. Project Manager. The District's H2O Map model was converted to InfoWater and was then updated to reflect facility upgrades and modifications including pump station upgrades, pipeline replacements, groundwater well improvements and pressure reducing station modifications. A demand analysis was also performed, and new demands were allocated to the model to reflect recent customer usage patterns. The model was then validated/calibrated to ensure results matched field conditions.

Cowan Heights System Hydraulic Model Update and Zone Realignment Study – Golden State Water Company, California. Served as a Lead Project Engineer responsible for overseeing the validation and calibration of a hydraulic model of the entire Cowan Heights water distribution system to conduct an evaluation of Golden State Water Company's system operations. Wood Rodgers provided recommendations to modify pressure zone alignment(s) and boundaries, address hydraulic constraints, and develop a capital improvement plan.

Integrated Water and Wastewater Master Plan - Groveland Community Services District. Served as Project Engineer for this Integrated Water and Wastewater Master Plan to provide a 20-year roadmap for the water and wastewater services provided by the GCSD. The Master Plan will help determine the projects needed to repair, replace, and/or upgrade the GCSD's aging infrastructure to increase system operating efficiencies and reliability, while improving cost predictability and maintaining a high level of customer satisfaction into the future. The work effort included the development of a Geodatabase of the District's water supply and distribution system, and the wastewater water collection system. The geodatabases were then developed into a hydraulic model of each system, utilizing the InfoWater and InfoSewer platforms. The hydraulic models were evaluated to identify system deficiencies, and opportunities to improve operational efficiency. The project included a condition assessment of the District's WWTP, three (3) Water Treatment Plants, five pump stations, five tanks, and sixteen (16) sewer lift stations.

Fire Hydrant Capacity Evaluation – Montecito Fire Protection District, California. Served as the Project Manager responsible for conducting a system wide hydraulic analysis utilizing a calibrated hydraulic model. The results from the hydraulic analysis were utilized to determine the approximate fire flow capacity at all Montecito Fire Protection District fire hydrants with flows classified per NFPA. Responsibilities also included coordination and oversight of GIS staff in the development of graphical output representing the results of this analysis summarizing fire flow capacity, hydrant class, and confidence level as it relates to the reliability of the data transposed from the model to the nearest fire hydrant point file.

Recycled Water Master Plan Update – West Basin Municipal Water District, California. Project Manager. Wood Rodgers assisted the West Basin Municipal Water District by providing third party review of consultant deliverables for the District's Recycled Water Master Plan and hydraulic model update project. West Basin's recycled water system provides five custom recycled water qualities to meet the needs of its customers. The District is updating its Recycled Water Master Plan and hydraulic model to allow the District to outline capital improvement projects required over the next 20 years. The hydraulic model is being developed in InfoWater and includes a water quality modeling effort. Wood Rodgers' scope of work included review of the District's consultant deliverables including technical memoranda for, Regulatory Requirements and Master Planning Criteria, Hydraulic Model Calibration Plan, Hydraulic Model User's Manual and Training Materials, Existing System Analysis for Operational Reliability, Water Quality and Criticality, and Capital Improvement Recommendations. Wood Rodgers was also responsible for reviewing the Innovyze InfoWater hydraulic model developed by the consultant.

SHIRLEY REPPERT, EIT

PROJECT ROLE

Water System

TITLE

Assistant Engineer

EDUCATION

BS, Civil Engineering, Virginia Polytechnic Institute and State University, 2010

REGISTRATIONS/ CERTIFICATIONS

Registered Professional Engineer-in-Training,

WOOD RODGERS, INC. START DATE

June 17, 2019

Ms. Reppert is an assistant engineer with over eight years of experience in the field of water resources engineering. She has experience with water, wastewater, recycled water, and large transmission pipelines. Ms. Reppert has developed complex hydraulic models and has prepared capacity studies, water studies, sewer studies, water supply assessments, and technical memos. Her range of experience includes pipeline design, trenchless design, design of sewer lift stations, and the development of hydraulic models. She is proficient in Microstation, AutoCAD, InfoSWMM, InfoSewer, InfoWater and InfoWater Pro.

EXPERIENCE

Ventura County Water Works District No. 8 Capacity Study, California. Project Engineer and lead modeler. Wood Rodgers converted the District's H2O Map water model to InfoWater and then leveraged the District's GIS data to update the model elements including piping and other similar assets. A demand analysis was performed and new demands representing current demand conditions were allocated to the model. Facilities including pump stations, reservoirs, pressure reducing stations and control valves were validated to ensure they were mimicking field conditions and were adjusted within the model to match recent historical fire flow test results to achieve a calibrated model. A capacity study evaluating all pump stations, reservoirs, pipelines and supply sources was developed with results identifying areas of deficiency.

Cowan Heights System Hydraulic Model Update and Zone Realignment Study – Golden State Water Company, California, California. Served as the Project Engineer and lead modeler responsible for validating and calibrating a hydraulic model of the entire water distribution system to conduct an evaluation of Golden State Water Company's system operations. Wood Rodgers provided recommendations to modify pressure zone alignment(s) and boundaries, address hydraulic constraints, and develop a capital improvement plan.

As-Needed Engineering & Modeling – Montecito Water District, California. Serving as a Project Engineer responsible for providing as-needed engineering services to the Montecito Water District. Responsibilities include assisting with water supply management, project management for on-going projects conducted by outside consultants, conducting technical evaluations of other projects impacting District facilities or operations, providing technical assistance to the treatment and distribution department personnel on operational matters, performing distribution system analyses utilizing a comprehensive hydraulic model and interacting with other governmental agencies as well as the public as needed.

Pechanga Wastewater Master Plan – Temecula, California. Served as the Lead Project Engineer responsible for developing wastewater hydraulic flow calculations and comprehensive master plan to evaluate the existing conditions and future flow projections for Pechanga Resort & Casino. The Master Plan included a summary of the Pechanga Resort & Casino pre-expansion wastewater infrastructure, wastewater generation evaluation for the proposed expansion, and preparation of a final report detailing analyses and recommendations based on the results of the hydraulic analysis.

Kaiser Permanente Moreno Valley Hospital Hydraulic Study – Moreno Valley, California. Served as the Lead Project Engineer responsible for validating and calibrating a hydraulic model for the onsite water distribution system and developing a sewer model for the buildout of the hospital. A water and sewer report was developed to summarize the boundary conditions and results of the models.

Shopoff Hydraulic Study – Chula Vista, California. Served as the Lead Project Engineer responsible for validating and calibrating a hydraulic model for the onsite water distribution system and developing a sanitary sewer model for the residential development. A water and sewer report was developed to summarize the boundary conditions and results of the models.

LUCAS C. PHILBERT, EIT

PROJECT ROLE

Sewer System Lead

TITLE

Engineer II

EDUCATION

MS, Water Engineering, California Polytechnic, San Luis Obispo, 2015

BA, Environmental Studies/Economics, University of California, Santa Cruz, 2008

REGISTRATIONS

Registered Engineer-in-Training, California No. 154328

PROFESSIONAL AFFILIATIONS

California Water Environment Association (CWEA), Member

American Society of Civil Engineers (ASCE), Member

WOOD RODGERS, INC. START DATE

September 19, 2018

Mr. Philbert is a Project Engineer with several years of experience in water, wastewater, and recycled water projects. His project experience covers a wide range of assignments in planning, design, and project management, including infiltration/inflow studies, hydraulic modeling, funding support, regulatory compliance, feasibility studies, plans and specifications, and construction management.

WOOD RODGERS EXPERIENCE

Integrated Water and Wastewater Master Plan - Groveland Community Services District. 2021. Project Engineer of this Integrated Water and Wastewater Master Plan (referred hereafter as the GCSD Master Plan or Master Plan) to provide a 20-year roadmap for the water and wastewater services provided by the GCSD. The Master Plan will help determine the projects needed to repair, replace, and/or upgrade the GCSD's aging infrastructure to increase system operating efficiencies and reliability, while improving cost predictability and maintaining a high level of customer satisfaction into the future. The Master Plan will proactively address increasingly stringent water quality and environmental regulations to protect public health and promote stewardship of the Sierra Nevada and Sacramento/San Joaquin River Delta; and it will serve as a guide to establish future rates and charges to allow GCSD to prioritize available funding and the pursuit of grants to complete the required projects. The Master Plan will outline a strategy to improve maintenance and asset management, prioritize new facilities and interweave the necessary upgrade or decommission of existing facilities. The work effort included the development of a Geodatabase of the District's water supply and distribution system, and the wastewater water collection system. The geodatabases were then developed into a hydraulic model of each system, utilizing the InfoWater and InfoSewer platforms. The hydraulic models were evaluated to identify system deficiencies, and opportunities to improve operational efficiency. The project included a condition assessment of the District's WWTP, three (3) Water Treatment Plants, five pump stations, five tanks, and sixteen (16) lift stations.

Integrated Water Resources Master Plan – City of Beverly Hills, California. 2020. Project Engineer. The City of Beverly Hills prepared an Integrated Water Resources Master Plan that included the evaluation of all of their wet infrastructure systems, with the goal of identifying opportunities to efficiently utilize their water resources and develop integrated projects. Wood Rodgers, as a subconsultant to Hazen & Sawyer, prepared the sewer system and storm drain system sections of the City's Integrated Water Resources Master Plan. The City owns and operates the sewer collection system within the City limits serving approximately 34,000 residents and businesses. The sewer collection system consists of approximately 100 miles of gravity pipelines and approximately 2,200 manholes. The City's collection system ranges in diameter from 6-inch to 36-inch pipe. Approximately half of the City's collection system was constructed in the 1930's. Wood Rodgers completed a detailed analysis of the City's sewer collection system, which included four weeks of flow monitoring that was used to develop sewer generation rates, peaking factors and diurnal patterns. The system analysis included updates the GIS geodatabase the development of an extended period simulation hydraulic model using the InfoSewer modeling platform. The results of the capacity and condition analysis resulted in proposed capital improvement projects to upgrade the system capacity and rehabilitate aging infrastructure. Wood Rodgers also conducted a detailed analysis of the storm drain system. The City's owns and operates the storm drain conveyance network within the City limits, which conveys local runoff and storm water flows to the Los Angeles County drainage channels which run through the City. The storm drain analysis included the review and coordination between the City's geodatabase and the County storm drain geodatabase. A 2-dimensional model was developed in InfoWorks ICM to analyze the capacity of the storm drain conveyance system within the City limits to accommodate a 10-year, 25-year and 50-year storm event. Proposed projects were coordinated with the City's water quality project list. The results of the capacity and condition analysis resulted in proposed capital improvement projects to upgrade the system capacity and rehabilitate aging infrastructure.

ALIA MEIER, PE

PROJECT ROLE

CIP

TITLE

Engineer

EDUCATION

BS, Civil Engineering, University of Nevada, Reno, 2014

REGISTRATIONS/ CERTIFICATIONS

Registered Professional Civil Engineer, California No. 88805

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers (ASCE)
Outstanding Senior Scholar Award

WOOD RODGERS, INC. START DATE

June 29, 2021

Ms. Meier is a licensed Civil Engineer with over eight years of design experience that ranges from complex site development to water and sewer infrastructure. Her background includes preparation of construction documents; obtaining regulatory approval for residential, commercial, municipal, and state-owned entities; and providing engineering support during construction. She is adept at effective written and oral communication skills with extensive experience coordinating work elements on complex multi-disciplinary projects involving internal and external design teams.

EXPERIENCE

Mission Hospital Pipeline Improvements – South Coast Water District, California. Project Engineer. Responsible for the design of this potable water pipeline replacement project consisting of over 1,800 feet of 12-inch PVC pipeline traversing residential areas of Laguna Beach. This project also includes all permitting as well as development of an MND to meet CEQA requirements for this project.

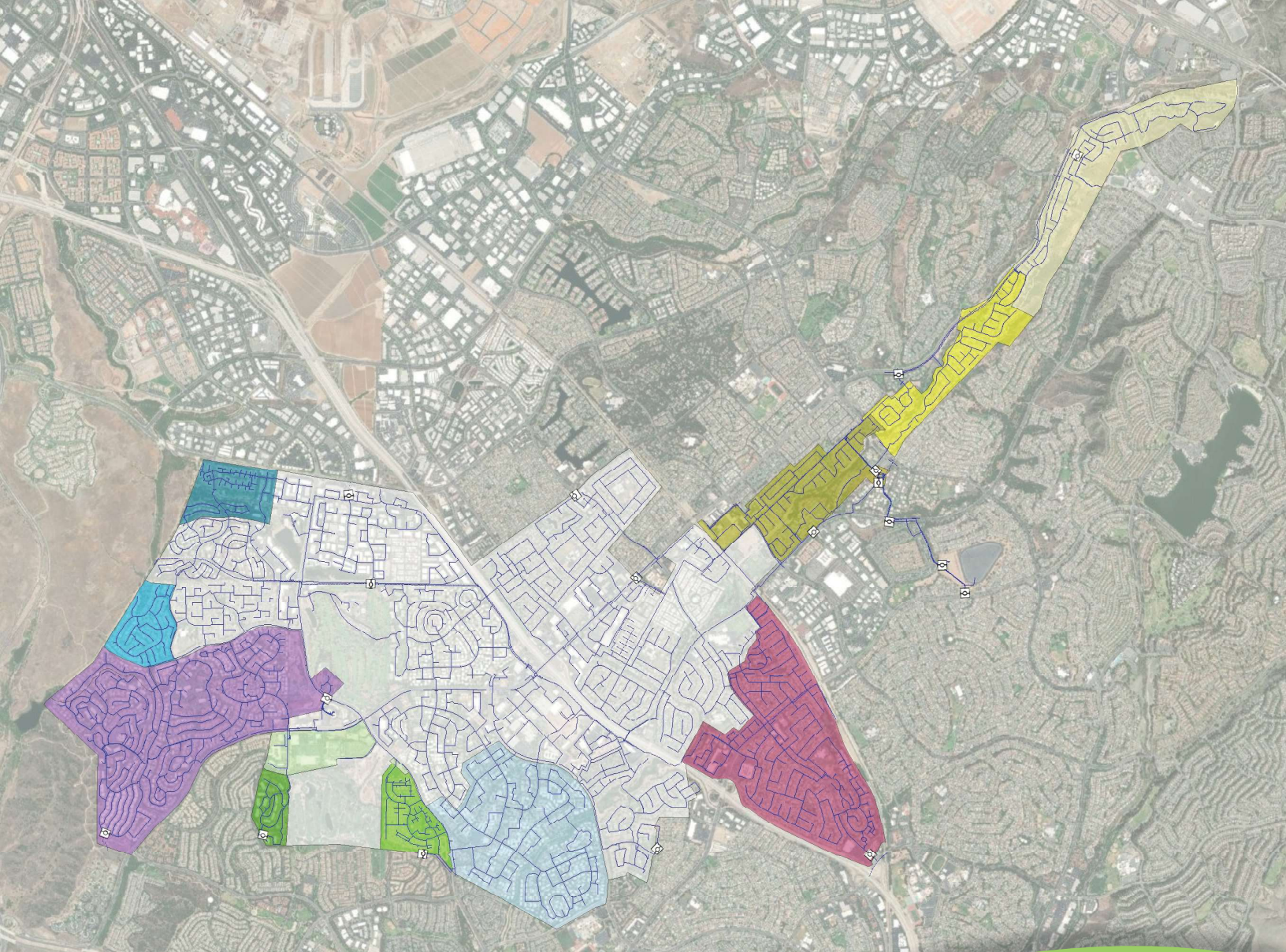
1655-1 Reservoir and Rancho Jamul Hydropneumatic Pump Station Modification Project – Otay Water District, California. Project Engineer. Providing pipeline design and grading for the project as it relates to the new 0.5-million-gallon reservoir, 12-inch welded steel pipeline and 1,000 ft long access road. Unique elements to this project include the alternatives analysis of the access roadway and steel pipeline, which has significant slopes and environmental constraint that must be addressed through the roadway grading, alignment, and design.

Strand Main Replacement – California American Water, California. Design Engineer. Ms. Meier progressed the design of this potable water pipeline project from 30% to the final bid documents. The project replaced 6.5 miles of an existing 16" cast iron water main with 16" PVC pipe in a new parallel alignment. The pipeline crossed multiple jurisdictions (Caltrans, State Parks, United States Navy, City of Coronado, MTS) within an extremely crowded corridor, crossed two seismic fault lines, and has a small section of Jack and Bore through the Caltrans Right of Way (ROW).

Eucalyptus Booster Pump Station – Eastern Municipal Water District, California. Project Engineer. The project involved design of a potable water pump station in Perris, CA. As the Project Engineer, Ms. Meier assisted the Project Manager with subconsultant and internal project team coordination. She was also responsible for the pump station civil design (both grading and yard piping) including 4" sewer, 2" potable water connection, 30" CML&C suction line, 24" CML&C discharge line, and 12" stormwater piping. Ms. Meier served as the administrator during construction and provided RFI responses, submittal and shop drawing reviews, and other necessary site civil support during construction.

P-079 Potable Water Distribution Improvements – NAVFAC Southwest, California. Project Coordinator. This project included a 7-mile, 24" diameter PVC potable water pipeline and booster pump station at Camp Pendleton. Ms. Meier coordinated between all disciplines, the client, and sub-consultants, and attended all internal and external meetings and workshops. Along with aiding the project manager, she was responsible for the pump station civil site and stormwater design and preparation of the project drainage report. Ms. Meier responded to RFIs, submittal and shop drawing reviews, and other necessary site civil support during construction.

Regional Plant No. 1 Liquids and Solids Capacity Recovery – Inland Empire Utilities Agency, California. Design Engineer. The project involved a comprehensive process upgrade at the existing Regional Plant No. 1. Ms. Meier was involved in the analysis of the existing odor control systems at the facility and the preparation of a design information memorandum to recommend the best approach, design criteria, and sizing information for the selected alternative of the foul air treatment system. She was responsible for coordination with multiple vendors, calculations of the foul air duct sizing and routing as well as odor control facility siting and technology selection. She performed her own Revit modeling for this project.



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Agenda Item No. 12

STAFF REPORT

To:	**Board of Directors**	**Meeting Date: February 22, 2022**
From:	**Hannah Ford, Engineering Manager**	
Subject:	**Potential Board Room Expansion**	

BACKGROUND

In light of the recent pandemic, adequate space in public meeting rooms has become increasingly important. Currently, the District's Board Room lacks sufficient space for social distancing and requires a techology update to better facilitate electronic presentations and virtual/hybrid meetings. Expanding the Board Room to the north would gain more functional space in the Board Room with modifications to staff parking to relocate the existing handicap parking space, as shown in Figure 1.

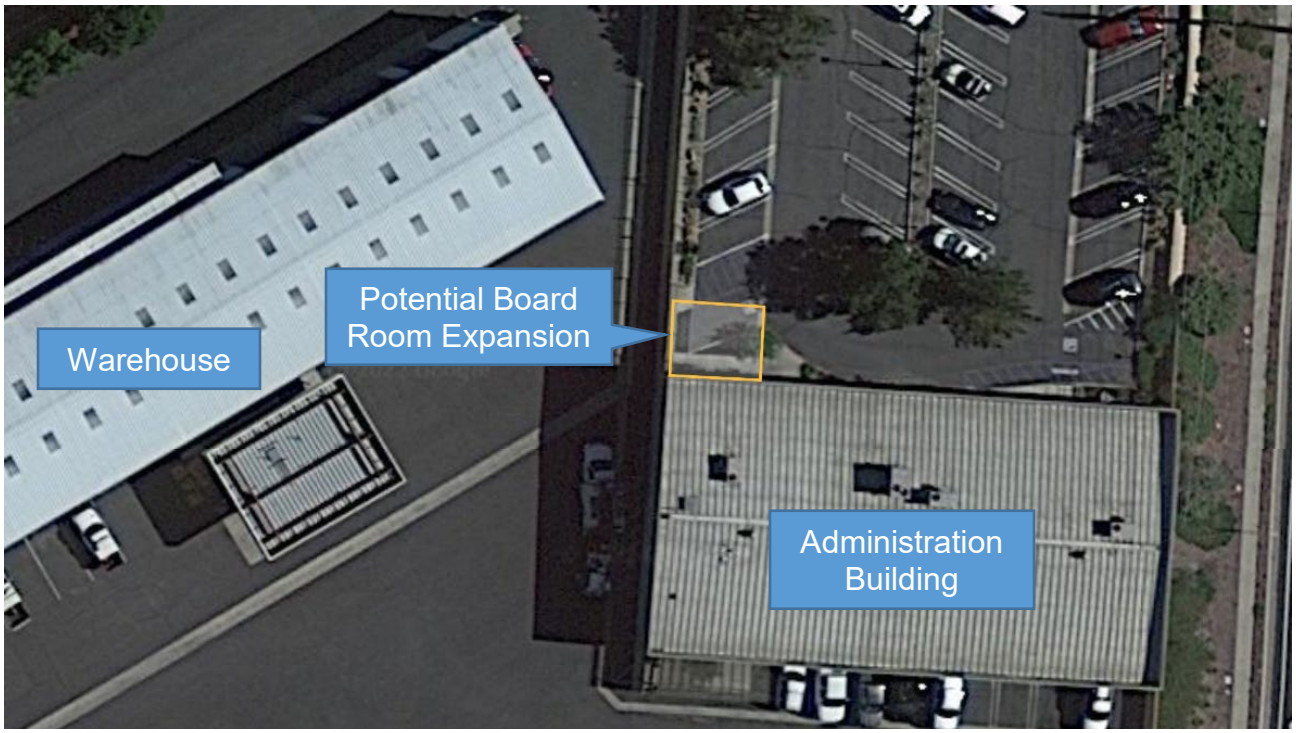


Figure 1 – Aerial View of Potential Board Room Expansion

Expanding the Board Room by 19-ft essentially doubles its existing width and allows 5-feet between each Director's seat (approximately 2-feet more than currently available), more staff seating, and improved accessibility with more space around seating. Figure 2 shows the proposed layout of the expanded board room, which also features the following technology updates:

- 100-inch flat screen to replace existing, underpowered projector,
- Wireless presentation gateway and HDMI input at podium,
- Ceiling mounted microphones, and
- Full integration with meeting room recording system.

This concept serves to develop preliminary costs for board room expansion and would be refined during detailed design.

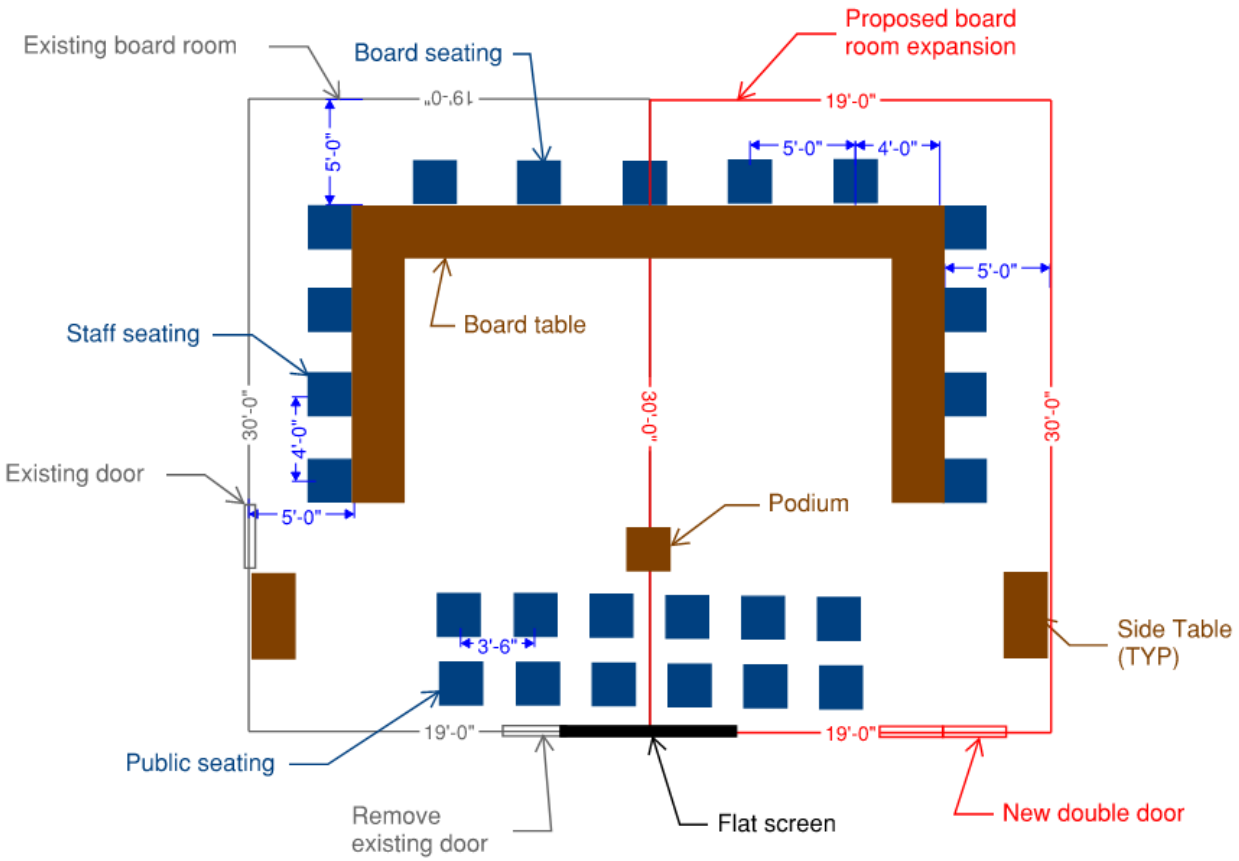


Figure 2 – Draft Layout for Potential Board Room Expansion

Staff consulted with Jeff Katz, architect for the Filter Building Site Use Project, to determine conceptual level costs for the proposed expansion. Jeff Katz verified that expanding the building seems feasible but cost depends on the expansion's impacts on the existing mechanical and electrical systems. In addition to structural modifications to expand the building, the project would include:

- Landscaping and paving adjustments
- Coordination with the City of Lake Forest regarding permitting and reduced parking
- Modifications to the existing heating, ventilation, and air conditioning system
- Modifications to the existing electrical for power and lighting
- Enhanced technology for better presentation and virtual/hybrid meeting accommodation

Table 1 summarizes a preliminary conservative estimate of project cost for consideration. An architect could evaluate the above listed considerations and firm up the project cost as a next step before final design.

Table 1 – Board Room Expansion Preliminary Cost Estimate

Component	Cost
Design of Board Room Expansion	$50,000
Construction of Board Room Expansion	$350,000
Furniture/Interiors Improvements	$50,000
Technology Improvements	$100,000
Contingency	$100,000
Total	**$650,000**

NEXT STEPS

As noted above, expanding the existing Board Room offers safer spacing between meeting attendees and an enhanced audio-visual experience to facilitate meeting presentations as well as on-going remote access by the public to District Board meetings. The expanded space will also allow the Board Room to be used as a multi-purpose space for a variety of other types of meetings. Staff proposes to contact with Jeff Katz to conduct further conceptual analysis, evaluate the implications to existing mechanical and electrical systems with the proposed building expansion, and develop a more refined cost estimate.

Agenda Item No. 13

STAFF REPORT

To:	**Board of Directors**	**Meeting Date: February 22, 2022**
From:	**Hannah Ford, Engineering Manager**	
Subject:	**Energy Efficiency Analysis**	

BACKGROUND

District staff reached out to Southern California Regional Energy Network (SoCal REN) to identify opportunities for energy savings. SoCal REN referred the District to Alternative Energy Systems Consulting, Inc. (AESC), who evaluated the District's Water Recycling Plant (WRP) and pump stations for potential energy savings opportunities.

AESC conducted a site visit of the WRP on October 26, 2021 to identify energy savings, process improvement, and resiliency opportunities. AESC drafted a list of preliminary measures list and estimated energy savings based on previous experience and data gathered at the District's WRP. District staff reviewed the shortlist of preliminary measures for potential inclusion in the 5-Year Capital Replacement and Refurbishment Program (CRRP) budget, as summarized in this report.

WRP EVALUATION

Table 1 summarizes the proposed preliminary measures for energy reduction for the WRP, ordered from lowest to highest payback period. Note that projected savings were developed by AESC and may be overly optimistic for some of the solutions. Other recommendations are not feasible for implementation due to long projected payback periods, negative impacts to other treatment processes, or inapplicability to the District's WRP. District staff will work to include solutions identified with a "Yes" in the "Implement?" column as part of the upcoming CRRP. District staff will further investigate solutions marked with "Maybe" and phase implementation of solutions marked with "Later".

Table 1 –Preliminary Measures for WRP Energy Efficiency

System	Description	Projected Savings (kWh/yr)	Budgetary Cost	Projected Payback (years)	Implement?	Justification	Notes
Secondary Clarifiers	Flow-pace RAS pumps.	34,000	$0	0	Yes	RAS pumps consume 5% of WRP energy, and optimizing control comes at no cost to the District.	Flow meters are already in place on RAS pump discharge. Will modify controls to trim based on flow.
Aeration Basins	Introduce ammonia-based aeration control.	120,000	$61,000	3.3	Yes	The aeration basin blowers are the largest energy consumer at the WRP. Although projected savings appear optimistically high, optimization of blower control makes a big difference in overall energy savings and provides additional, useful information on water quality.	Involves adding ammonia analyzer to secondary effluent channel and modifying controls to adjust aeration based on ammonia analyzer. Current controls based on dissolved oxygen (DO) will remain as a trim.
Dissolved Air Floatation	Eliminate waste activated sludge blower.	147,000	$112,000	4.9[1]	Maybe	First conduct study to evaluate polymer type and concentration required to achieve desired sludge thickness without aeration and confirm if polymer addition cost is less than aeration energy cost.	Requires piping modifications, new pump, and new polymer system. Decreases footprint and maintenance required for sludge thickening process.
Headworks	Optimize grit chamber aeration blower.	56,000	$64,000	7.3	Later	Blower was installed in 2011; install more efficient blower when equipment has reached end of useful life.	-
Recycled Water Pump Station	Overhaul pumps to regain efficiency.	75,000	$150,000	12.8	Later	Pumps were originally installed in 2014. One was rebuilt in 2018. Will overhaul once pumps have reached end of life.	-
Ocean Outfall Pump Station	Overhaul pumps to regain efficiency.	35,000	$81,000	14.9	Later	Pumps were originally installed in 2006 and are reaching the end of their useful life. Will phase in replacement in 2026.	-
Aeration Basins	Automate valves to each aeration zone for tighter control.	120,000	$305,000[2]	16.3	Maybe	Will discuss with design consultant as part of next aeration basin diffuser replacement to confirm recommendation and investigate lower cost.	-
Tertiary Effluent Transfer Pump Station	Overhaul pumps to regain efficiency.	12,000	$30,000	16.5	Later	Two of the three pumps are already being overhauled due to mechanical issues. The third (represented in this estimate) was last installed in 2014 and will be overhauled when it has reached the end of its useful life.	-
Odor Control	Vary fan speed based on H_2S concentration.	40,000	$146,000	23.5	Maybe	WRP staff have experienced issues with online H_2S analyzers and do not recommend their implementation for control. If technology develops such that more reliable analyzers are available, this solution could be pursued.	Staff are experimenting with operation only one of the two fans at a time and manually measuring the resultant H_2S concentration.
Equalization Basins	Replace mixers with large bubble mixing.	100,000	$880,000	56.5	Later	Equalization basin mixing pumps were recently rebuilt and motors rewound. Will consider replacing pumps with large bubble mixing at end of life.	-
Aeration Basins	Increase solids retention time (SRT).	100,000	-	-	No	Aeration basin SRT is set to optimize filterability. Decreasing SRT would negatively impact the recycled water system.	-
Aeration Basins	Introduce large bubble mixing.	-	-	-	No	No mixing is required in the existing aeration basins.	-

[1] Does not account for cost of polymer addition.
[2] Valves were last installed in 1997 and are reaching the end of their useful life; therefore, cost for valve replacement (approximately $62,000) is not included in the budgetary cost.

NEXT STEPS

District staff will incorporate the outcome of this energy efficiency analysis in the upcoming CRRP. As part of the current equipment replacement process, District staff will continue to consider opportunities to improve energy efficiency, even if not indicated explicitly in this report. District staff will work with AESC to identify any available utility incentive programs and other sources of project financing.

Note that this effort focuses on the WRP. In April and July of 2021, Southern California Edison (SCE) conducted pump efficiency testing at some of the District's pump stations. Next month, District staff will provide an update on the pump station energy efficiency analysis.

STAFF REPORT

To: Board of Directors **Meeting Date: February 22, 2022**

From: Hannah Ford, Engineering Manager

Subject: Capital Project Status Report

I. R-6 Floating Cover and Liner Replacement Project

The design consultant, HGC, is working on the 90% design, due early March. District staff conducted an internal design decision meeting and site visit to incorporate additional changes to the inlet/outlet structure during the upcoming reservoir outage.

As part of the effort to coordinate with other agencies on a contingency plan to maintain supply during the time the R-6 Reservoir is out of service, District staff conducted meetings with Municipal Water District of Orange County (MWDOC), Irvine Ranch Water District (IRWD), and Moulton Niguel Water District (MNWD). To reduce flow fluctuations from the Allen-McColloch Pipeline (AMP), interties with neighboring agencies may need to be online at all times. Staff is developing an operational test plan to confirm operation during the upcoming reservoir outage.

The Division of Drinking Water provided comments on the 60% design and will review again at the 90% design milestone. The Division Safety of Dams reviewed the 60% design and indicated their approval with no need to review further iterations.

Table 1 summarizes the total budget, timeframe, and percent complete for the current design contract with HGC. HGC is working to ramp up design efforts and maintain schedule to complete the bidding process by July 2022.

Table 1 – R-6 Floating Cover and Liner Design Contract Schedule and Budget Status

Current Design Contract	Total	Percent Complete
Budget	$671,236	44%
Schedule	May 28, 2021 – July 8, 2022	66%

II. Joint Transmission Main (JTM) Pump Station Project

District staff conducted an interactive kickoff workshop with the design consultant, Black & Veatch, to select pumps. Coordination with South Coast Water District is ongoing to confirm flow change notification, metering, and overall control strategy.

Staff has also been working with Dudek to develop the mitigated negative declaration documentation to comply with the California Environmental Quality Act (CEQA).

Table 2 summarizes summarizes the total budget, timeframe, and percent complete for Black & Veatch's design contract. The District has not yet received an invoice, so the budget remains at zero percent this month.

Table 2 – JTM Pump Station Design Contract Schedule and Budget Status

Current Design Contract	Total	Percent Complete
Budget	$177,845	0%
Schedule	January 7, 2022 – August 26, 2022	19%

III. Ocean Outfall Pump Station (OOPS) Generator Replacement Project

The contractor, Filanc Construction (Filanc), has completed conduit installation at the generator and behind the OOPS. Filanc awaits delivery of the safety switch to continue work on site. Filanc has cleaned and demobilized from the site until this material arrives. Delivery of the generator from the manufacturer remains on track for April 2022 with commissioning and project completion by July 2022.

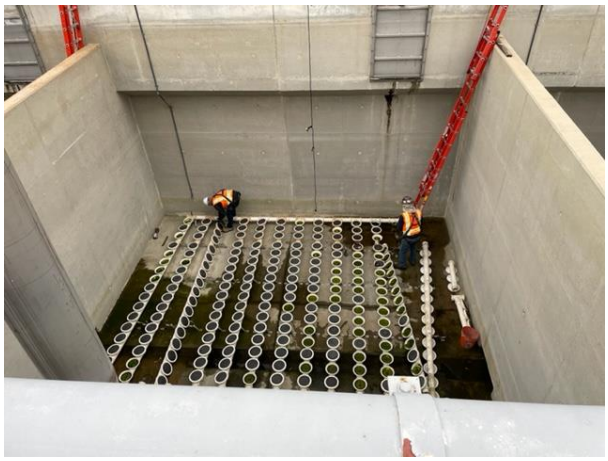
Table 3 summarizes the total budget, timeframe, and percent complete for Filanc's construction contract. Original construction completion was scheduled for November 29, 2021, but material delays have extended schedule to July 2022, which explains higher schedule than budget expenditure. Budget increased via change order due to pandemic-related material shortages, schedule delays, and additional safety design features requested by District staff after bidding.

Table 3 – OOPS Generator Replacement Construction Schedule and Budget Status

Construction Contract	Total	Percent Complete
Budget	$407,854[1]	43%
Schedule	April 19, 2021 – July 15, 2022	68%

[1]Original contract value of $384,532 plus Change Order 1 for $23,322. Because planned contingency for this project is $30,000, total project cost remains under board approved cost of $414,523.

IV. Aeration Basin Diffuser Project



The contractor, Filanc Construction (Filanc), mobilized early this month to begin demolition efforts. Filanc has also received the first shipment of diffuser material and is installing them now.

Table 4 summarizes the total budget, timeframe, and percent complete for Filanc's construction contract. Original construction completion was scheduled for December 1, 2021, but material delays have extended schedule to April 2022, which explains the schedule far exceeding budget expenditure. Only one invoice has been received so far from Filanc to cover mobilization.

Table 4 – Aeration Basin Construction Schedule and Budget Status

Construction Contract	Total	Percent Complete
Budget	$203,650	3%
Schedule	April 5, 2021 – April 29, 2022	83%

V. Aliso Creek Emergency Generator Replacement Project

District staff developed bid documents in-house and invited five contractors to bid. Three contractors attended the mandatory prebid meeting this month. Bids are due early March for potential award at the next Engineering Committee Meeting.

VI. Filter Plant Site Use / Water Emergency Response Organization of Orange County (WEROC) Emergency Operations Center (EOC)

The District and MWDOC are working with the architect to refine footprints and minimize building costs. Initial cost estimates and footprint for the MWDOC EOC have increased. The District's warehouse footprint has not substantially changed, but recent market conditions have likely driven cost higher than the 2019 alternative analysis estimate. The team is still working to maintain schedule for a 30% design review, including architectural renderings in March 2022. In parallel, the design team is developing three demolition bid packages to solicit bids this year, in advance of the building construction bid package.

District staff met with Air Quality Management District (AQMD) to confirm relocation of their facilities and timing to avoid conflicts during the EOC and Warehouse construction.

District staff has also been working with Dudek to develop supporting documentation for Class 2, Replacement or Reconstruction, and Class 32, In-Fill Development Project, categorical exemptions to comply with the California Environmental Quality Act (CEQA).

Table 5 summarizes summarizes the total budget, timeframe, and percent complete for Brady's design contract. The District has only received the December invoice so far, so budget spent lags behind schedule.

Table 5 – Filter Plant Site Use Design Schedule and Budget Status

Design Contract	Total	Percent Complete
Budget	$475,633	9%
Schedule	November 23, 2021 – October 23, 2022	27%

VII. Wash Press System at Headworks

District staff ordered the new Wash Press equipment in December and expects to receive the equipment in April. Recent for quotations for electrical components appear lower than initially estimated, so the required budget will likely be less than anticipated. Table 6 summarizes summarizes the total budget, timeframe, and percent complete for this project's construction. The District has not yet received an invoice, so the budget remains at zero percent this month.

Table 6 –Wash Press System at Headworks Construction Schedule and Budget Status

Construction Contract	Total	Percent Complete
Budget	$103,063	0%
Schedule	December 23, 2021 – May 15, 2022	42%

VIII. Grit Chamber Rehabilitation Project

This project is in the submittal review phase. The contractor, SS Mechanical, is developing a construction schedule, which may require more than the anticipated 120 calendar days to complete the work due to pandemic-related supply chain issues.

IX. R-2 Reservoir Interior Recoating Project

Staff evaluated inspection contracts and awarded CSI Services Inc for this project. The District is still anticipating receiving grant funding for this project from the Department of Water Resources (DWR) in March. At that time, the District will begin construction efforts

X. Main Office HVAC Replacement and Improvement Project

Scott Wallace Structural Engineers Inc (SWSE) confirmed the structural requirements for roof modifications in order to replace the existing five air conditioning units in kind, and staff is working on obtaining pricing for the required modifications. Once the cost is confirmed, staff will evaluate the best approach for this project and potentially put together bid documents for Board award early 2022.

District staff also investigated grant opportunities for this project, but none were available.

XI. WRP Main Electrical Power Breakers Replacement Project

Schneider Electric USA Inc. is fabricating the new breakers for installation in March 2022.

Table 4 summarizes the total budget, timeframe, and percent complete for this project. The District has not yet received the invoice for the new equipment fabrication, which explains higher schedule than budget expenditure.

Table 4 – WRP Main Electrical Power Breaker Schedule and Budget Status

Construction Contract	Total	Percent Complete
Budget	$134,491	11%
Schedule	April 29, 2021 – April 29, 2022	82%

XII. Oso Lift Station Improvement Project

Staff is reviewing record drawings and awaits final billing from the design engineer in order to close out the project. The District recorded the Lot Line Adjustment with the City of Laguna Woods for the additional property incorporated into the site as a result of this project.

Table 5 summarizes the project financials to date. Higher costs for geotechnical and Change Orders to the construction contract caused an anticipated negative contingency of $5,679. (Note that anticipated expenditure is lower than contract amount due to efficiencies in speciality inspections and engineering services during construction.)

Table 5 – Oso Lift Station Construction Cost Estimate Summary

	Contract Amount	Billed to Date	Anticipated Expenditure
Total Construction Contract Bid Amount	$1,954,236	$1,954,236	$1,954,236
Approved Change Orders	$115,798	$115,798	$115,798
Specialty Inspections (Env., Geotech)	$32,685	$24,462	$24,462
Eng. Services During Construction	$96,000	$88,035	$96,000
Property Ownership Legal Costs	$78,622	$78,622	$78,622
Utility Costs (SCE/AT&T)	$18,147	$18,147	$18,147
Permit Costs	$6,650	$6,650	$6,650
Contingency	($13,902)	$2,286	($5,679)
Total	$2,288,236	$2,288,236	$2,288,236
		Actual	**$2,293,915**

F.Y. 2021/22 CAPITAL REPLACEMENT AND REFURBISHMENT PROGRAM BUDGET ITEMS > $50,000
BOARD APPROVAL SCHEDULE

Category	Project Description	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	CRRP Budget	Board Approved Cost
2021/22 Capital Projects															
	R-2 Reservoir Interior Recoating	E	E	E	B	A			C	C	C	C		$605,000	$806,000
	Wash Press System at Headworks			E	E	E	A	O		R	C	C		$200,000	$103,063
2021/22 Capital Equipment															
	Aeration Basin No. 1 Diffusers	C	C	C	C	C	C	C	C	C	C			$245,000	$245,190
	Effluent Pump Station Rehabilitation			E	E	E	B	B	A	C	C	C	C	$150,000	-
	WRP Main Electrical Power Breaker Upgrades	A	C	C	C	C	C	C	C	C	C			$140,000	$134,491
	DAF Unit #2 Rehabilitation Project								E	E	B	A	C	$150,000	-
	Aliso Creek Emergency Generator Replacement Project					E	E	E	B	A	C	C	C	$275,000	-
Previous Fiscal Year Carryover															
	Oso Lift Station Improvement Project	C	C	C	C									$2,950,432	$2,288,236
	Grit Chamber Rehab/Recoating	E	E	E	B	A	C	C	C	C				$85,000	$416,000
	OOPS Emergency Generator Replacement	C	C	C	C	C	C	C	C	C	C	C	C	$220,000	$414,523
	Main Office/Field Office HVAC Replacement & Improvement Project	ET	ET	ET	ET	ET	ET	ET	ET	B	A	C	C	$322,500	-
	Master Plan Update			E	E	E	RFP	ET	A	E	E	E	E	$350,000	-
	Caltrans Widening Utility Relocations									C	C	C	C	$0	$769,777
Pending (Not Yet Budgeted)															
	R-6 Reservoir Floating Cover	E	E	E	E	A	E	E	E	E	E	E	B	$0	$671,236
	Filter Plant Site Use Plan Investigation and Design	RFP	RFP	ET	A	E	E	E	E	BP	E	E	E	$0	$475,633
	Phase III Recycled Water Expansion		E	E	E	BP								$0	-
	JTM Pump Station		E	E	BP	RFP	ET	A	E	E	E	B	A	$0	$177,845
													Total	$6,292,932	$6,501,994

Key:

- Water
- Wastewater
- Split between Water and Wastewater
- Board Involvement

Abbreviations:

A = Approve by Board
B = Bid
BP = Board Presentation
C = Construction
E = Engineering/Study
ET = Evaluate
L = Legal
N = Negotiate
O = Order
P = Permit
RFP = Request for Proposal
R = Receive

EL TORO WATER DISTRICT
Glossary of Water Terms

Accumulated overdraft: The amount of water necessary to be replaced in the intake area of the groundwater basin to prevent the landward movement of ocean water into the fresh groundwater body.

Acre-foot, AF: A common water industry unit of measurement. An acre-foot is 325,851 gallons, or the amount of water needed to cover one acre with water one foot deep. An acre-foot serves annual needs of two typical California families.

ACWA: Association of California Water Agencies.
A statewide group based in Sacramento that actively lobbies State and Federal Government on water issues.

Advanced treatment: Additional treatment processes used to clean wastewater even further following primary and secondary treatment. Also known as tertiary treatment.

AFY: Acre-foot per year.

Alluvium: A stratified bed of sand, gravel, silt, and clay deposited by flowing water.

AMP: Allen McCulloch pipeline.

Major pipeline transporting treated water to water districts between Yorba Linda, where it starts to El Toro Water District reservoir, where it terminates.

Annexation: The inclusion of land within a government agency's jurisdiction.

Annual overdraft: The quantity by which the production of water from the groundwater supplies during the water year exceeds the natural replenishment of such groundwater supplies during the same water year.

Aqueduct: A man-made canal or pipeline used to transport water.

Aquifer: An underground geologic formation of rock, soil or sediment that is naturally saturated with water; an aquifer stores groundwater.

Arid: Dry; deserts are arid places. Semi-arid places are almost as dry as a desert.

Artesian: An aquifer in which the water is under sufficient pressure to cause it to rise above the bottom of the overlying confining bed, if the opportunity is provided.

Artificial recharge: The addition of surface water to a groundwater reservoir by human activity, such as putting surface water into recharge basins. (See also: groundwater recharge and recharge basin.)

AWWA American Water Works Association
Nationwide group of public and private water purveyors and related industrial suppliers.

Base flow: The portion of river surface flow which remains after deduction of storm flow and/or purchased imported water.

Bay-Delta: The Sacramento-San Joaquin Bay-Delta is a unique natural resource of local, state and national significance. The Delta Is home to more than 500,000 people; contains 500,000 acres of agriculture; provides habitat for 700 native plant and animal species; provides water for more than 25 million Californians and 3 million acres of agriculture; is traversed by energy, communications and transportation facilities vital to the economic health of California; and supports a $400 billion economy.

BIA: Building Industry Association.

Biofouling: The formation of bacterial film (biofilm) on fragile reverse osmosis membrane surfaces.

Biosolids: Solid organic matter recovered from a sewage treatment process and used especially as fertilizer.

BMP: Best Management Practice. An engineered structure or management activity, or combination of these, that eliminates or reduces adverse environmental effects.

Brackish water: A mixture of freshwater and saltwater.

Brown Act: Ralph M. Brown Act enacted by the State legislature governing all meetings of legislative bodies. Also know as the Open Meeting requirements.

Canal: A ditch used to move water from one location to another.

CASA: California Association of Sanitation Agencies The sanitation equivalent of ACWA concerned solely with issues affecting the treatment and disposal of solid waste and wastewater.

CEQA: California Environmental Quality Act.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act. This federal law establishes the Superfund program for hazardous waste sites. It provides the legal basis for the United States EPA to regulate and clean up hazardous waste sites, and if appropriate, to seek financial compensation from entities responsible for the site.

CFS: Cubic feet per second.

Chloramines: A mixture of ammonia and chlorine used to purify water.

Clarify: To make clear or pure by separation and elimination of suspended solid material.

Coagulation: The clumping together of solids so they can more easily be settled out or filtered out of water. A chemical called aluminum sulfate (alum) is generally used to aid coagulation in water treatment and reclamation.

Coastkeepers: A non-profit organization dedicated to the protection and preservation of the marine habitats and watersheds of Orange County through programs of education, restoration, enforcement and advocacy.

Colored water: Groundwater extracted from the basin that is unsuitable for domestic use without treatment due to high color and odor exceeding drinking water standards.

Condensation: The process of water vapor (gas) changing into liquid water. An example of condensation can be seen in the tiny water droplets that form on the outside of a glass of iced tea as warmer air touches the cooler glass.

Confined aquifer: An aquifer that is bound above and below by dense layers of rock and contains water under pressure.

Conjunctive use: Storing imported water in a local aquifer, in conjunction with groundwater, for later retrieval and use.

Contaminate: To make unclean or impure by the addition of harmful substances.

CPCFA: California Pollution Control Financing Authority. State agency providing funds for wastewater reclamation projects.

Crisis:
1. **a:** The turning point for better or worse **b:** a paroxysmal attack of pain, distress, or disordered function **c:** an emotionally significant event or radical change of status in a person's life <a midlife *crisis*>
2. The decisive moment (as in a literary plot)
3. **a:** An unstable or crucial time or state of affairs in which a decisive change is impending; *especially* **:** one with the distinct possibility of a highly undesirable outcome <a financial *crisis*> **b:** a situation that has reached a critical phase

CTP Coastal Treatment Plant

CWPCA California Water Pollution Control Association. A 7000 member non-profit educational organization dedicated to water pollution control.

Dam: A barrier built across a river or stream to hold water.

Decompose: To separate into simpler compounds, substances or elements.

Deep percolation: The percolation of surface water through the ground beyond the lower limit of the root zone of plants into a groundwater aquifer.

Degraded water: Water within the groundwater basin that, in one characteristic or another, does not meet primary drinking water standards.

Delta: Where the rivers empty; an outlet from land to ocean, also where the rivers deposit sediment they carry forming landforms.

Delta Vision: Delta Vision is intended to identify a strategy for managing the Sacramento-San Joaquin Delta as a sustainable ecosystem that would continue to support environmental and economic functions that are critical to the people of California.

Demineralize: To reduce the concentrations of minerals from water by ion exchange, distillation, electro-dialysis, or reverse osmosis.

De-nitrification: The physical process of removing nitrate from water through reverse osmosis, microfiltration, or other means.

Desalting (or desalination): Removing salts from salt water by evaporation or distillation. Specific treatment processes, such as reverse osmosis or multi-stage flash distillation, to demineralize seawater or brackish (saline) waters for reuse. Also sometimes used in wastewater treatment to remove salts other pollutants.

Desilting: The physical process of removing suspended particles from water.

Dilute: To lessen the amount of a substance in water by adding more water.

Disinfection: Water treatment which destroys potentially harmful bacteria.

Drainage basin: The area of land from which water drains into a river, for example, the Sacramento River Basin, in which all land area drains into the Sacramento River. Also called catchment area, watershed, or river basin.

Drought: A prolonged period of below-average precipitation.

DPHS: California Department of Public Health Services. Regulates public water systems; oversees water recycling projects; permits water treatment devices; certifies drinking water treatment and distribution operators; supports and promotes water system security; provides support for small water systems and for improving technical, managerial, and financial (TMF) capacity; provides funding opportunities for water system improvements.

DVL: Diamond Valley Lake. Metropolitan's major reservoir near Hemet, in southwestern Riverside County.

DWR: California Department of Water Resources. Guides development/management of California's water resources; owns/operates State Water Project and other water facilities.

Endangered Species: A species of animal or plant threatened with extinction.

Endangered Species Act of 1973 (ESA): The most wide-ranging of the dozens of United States environmental laws passed in the 1970s. As stated in section 2 of the act, it was designed to protect critically imperiled species from extinction as a "consequence of economic growth and development untendered by adequate concern and conservation.

Ecosystem: Where living and non-living things interact (coexist) in order to survive.

Effluent: Wastewater or other liquid, partially or completely treated or in its natural state, flowing from a treatment plant.

Evaporation: The process that changes water (liquid) into water vapor (gas).

Estuary: Where fresh water meets salt water.

Evapotransporation: The quantity of water transpired (given off), retained in plant tissues, and evaporated from plant tissues and surrounding soil surface. Quantitatively, it is expressed in terms of depth of water per unit area during a specified period of time.

FCH Federal Clearing House – Environmental Review/Processing

FEMA Federal Emergency Management Agency

Filtration: The process of allowing water to pass through layers of a porous material such as sand, gravel or charcoal to trap solid particles. Filtration occurs in nature when rain water soaks into the ground and it passes through hundreds of feet of sand and gravel. This same natural process of filtration is duplicated in water and wastewater treatment plants, generally using sand and coal as the filter media.

Flocculation: A chemical process involving addition of a coagulant to assist in the removal of turbidity in water.

Forebay: A reservoir or pond situated at the intake of a pumping plant or power plant to stabilize water level; also, a portion of a groundwater basin where large quantities of surface water can recharge the basin through infiltration.

Gray water reuse: Reuse, generally without treatment, of domestic type wastewater for toilet flushing, garden irrigation and other non-potable uses. Excludes water from toilets, kitchen sinks, dishwashers, or water used for washing diapers.

Green Acres Project (GAP): A 7.5 million gallons per day (MGD) water reclamation project that serves tertiary treated recycled water to irrigation and industrial users in Costa Mesa, Fountain Valley, Huntington Beach, Newport Beach, and Santa Ana.

God Squad: A seven-member committee that is officially called the "Endangered Species Committee". Members consist of Secretary of the Interior, the Secretary of Agriculture, the Secretary of the Army, the Chairman of the Council of Economic Advisers, the Administrator of the National Oceanic and Atmospheric Administration and one individual from the affected state. The squad was established in 1978 by an amendment to the 1973 Endangered Species Act (ESA). It has only been called into action three times to deal with proposed federal agency actions that have been determined to cause "jeopardy" to any listed species. Such actions may receive an exemption from the ESA if five members of the committee determine that the action is of regional or national significance, that the benefits of the action clearly outweigh the benefits of conserving the species and that there are no reasonable and prudent alternatives to the action.

Groundwater: Water that has percolated into natural, underground aquifers; water in the ground, not water puddled on the ground.

Groundwater basin: A groundwater reservoir defined by the overlying land surface and the underlying aquifers that contain water stored in the reservoir. Boundaries of success-ively deeper aquifers may differ and make it difficult to define the limits of the basin.

Groundwater mining: The withdrawal of water from an aquifer in excess of recharge over a period of time. If continued, the underground supply would eventually be exhausted or the water table could drop below economically feasible pumping lifts.

Groundwater overdraft: The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average.

Groundwater recharge: The action of increasing groundwater storage by natural conditions or by human activity. See also: Artificial recharge.

Ground Water Replenishment System (GWRS): A joint project of the Orange County Water District and the Orange County Sanitation District that will provide up to 100,000 acre-feet of reclaimed water annually. The high-quality water will be used to expand an existing underground seawater intrusion barrier and to replenish the groundwater basin underlying north and central Orange County.

Groundwater table: The upper surface of the zone of saturation (all pores of subsoil filled with water), except where the surface if formed by an impermeable body.

GPM: Gallons per minute.

Ground Water Replenishment System (GWRS): Orange County Water District's state-of-the-art, highly advanced, waste-water treatment facility.

Hydrologic balance: An accounting of all water inflow to, water outflow from, and changes in water storage within a hydrologic unit over a specified period.

Hydrologic cycle: The process of water constantly circulating from the ocean, to the atmosphere, to the earth in a form of precipitation, and finally returning to the ocean.

Imported water: Water that has originated from one hydrologic region and is transferred to another hydrologic region.

Inflatable rubber dams: Designed to replace temporary sand levees that wash out during heavy storm flow, the dams hold back high-volume river flows and divert the water into the off-river system for percolation.

Influent: Water or wastewater entering a treatment plant, or a particular stage of the treatment process.

Irrigation: Applying water to crops, lawns or other plants using pumps, pipes, hoses, sprinklers, etc.

JPIA Joint Powers Insurance Authority. A group of water agencies providing self-insurance to members of the ACWA.

LAIF Local Agency Investment Fund. Statewide pool of surplus public agency money managed by State Treasurer.

Leach: To remove components from the soil by the action of water trickling through.

MAF: Million acre feet.

MCL: Maximum contaminant level set by EPA for a regulated substance in drinking water. According to health agencies, the maximum amount of a substance that can be present in water that's safe to drink and which looks, tastes and smells good.

MET: Metropolitan Water District of Southern California.

MGD: Million gallons per day.

Microfiltration: A physical separation process where tiny, hollow filaments members separate particles from water.

Microorganism: An animal or plant of microscopic size.

MWD: Metropolitan Water District of Southern California.

MWDOC: Municipal Water District of Orange County. Intermediate wholesaler between MWD and 27 member agencies including ETWD.

Non-point source pollution: Pollution that is so general or covers such a wide area that no single, localized source of the pollution can be identified.

NPDES National Pollution Discharge Elimination System

OCBC: Orange County Business Council.

OCEMA Orange County Environmental Management Agency

OCWD: Orange County Water District.

Opportunity:
1. A favorable juncture of circumstances.
2. A good chance for advancement or progress .

Organism: Any individual form of life, such as a plant, animal or bacterium.

PCM Professional Community Management, Inc. Property Management company providing services to Laguna Woods Village and other homeowner associations.

Perched groundwater: Groundwater supported by a zone of material of low permeability located above an underlying main body of groundwater with which it is not hydrostatically connected.

Percolation: The downward movement of water through the soil or alluvium to the groundwater table.

Permeability: The capability of soil or other geologic formations to transmit water.

Point source: A specific site from which waste or polluted water is discharged into a water body, the source of which is identified. See also: non-point source.

Potable water: Suitable and safe for drinking.

PPB: Parts per billion.

Precipitation: Water from the atmosphere that falls to the ground as a liquid (rain) or a solid (snow, sleet, hail).

Primary treated water: First major treatment in a wastewater treatment facility, usually sedimentation but not biological oxidation.

Primary treatment: Removing solids and floating matter from wastewater using screening, skimming and sedimentation (settling by gravity).

Prior appropriation doctrine: Allocates water rights to the first party who diverts water from its natural source and applies the water to beneficial use. If at some point the first appropriator fails to use the water beneficially, another person may appropriate the water and gain rights to the water. The central principle is beneficial use, not land ownership.

Pumping Plant: A facility that lifts water up and over hills.

Recharge: The physical process where water naturally percolates or sinks into a groundwater basin.

Recharge basin: A surface facility, often a large pond, used to increase the infiltration of surface water into a groundwater basin.

Reclaimed wastewater: Wastewater that becomes suitable for a specific beneficial use as a result of treatment. See also: wastewater reclamation.

Reclamation project: A project where water is obtained from a sanitary district or system and which undergoes additional treatment for a variety of uses, including landscape irrigation, industrial uses, and groundwater recharge.

Recycling: A type of reuse, usually involving running a supply of water through a closed system again and again. Legislation in 1991 legally equates the term "recycled water" to reclaimed water.

Reservoir: A place where water is stored until it is needed. A reservoir can be an open lake or an enclosed storage tank.

Reverse osmosis: (RO) A method of removing salts or other ions from water by forcing water through a semi-permeable membrane.

RFP Request for Proposal

Riparian: Of or on the banks of a stream, river, or other body of water.

RO: Reverse osmosis. See the listing under "reverse osmosis."

R-O-W Right-of-way

Runoff: Liquid water that travels over the surface of the Earth, moving downward due to gravity. Runoff is one way in which water that falls as precipitation returns to the ocean.

RWQCB Regional Water Quality Control Board. State agency regulating discharge and use of recycled water.

Safe Drinking Water Act (SDWA): The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. (SDWA does not regulate private wells which serve fewer than 25 individuals.) SDWA authorizes the United States Environmental Protection Agency (US EPA) to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. US EPA, states, and water systems work together to make sure that these standards are met.

Safe yield: The maximum quantity of water that can be withdrawn from a groundwater basin over a long period of time without developing a condition of overdraft, sometimes referred to as sustained yield.

SAFRA Santa Ana River Flood Protection Agency

Salinity: Generally, the concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids - TDS), electrical conductivity, or osmotic pressure. Where seawater is known to be the major source of salt, salinity is often used to refer to the concentration of chlorides in the water.

SAWPA: Santa Ana Watershed Project Authority.

SCADA Supervisory Control and Data Acquisition

SCAP Southern California Alliance of Publicly. Newly formed group of public agencies seeking reasonable regulation of sewer industry.

SCH State Clearing House – Environmental Review/Processing

Seasonal storage: A three-part program offered by Metropolitan Water District of Southern California:

> **STSS (Short Term Seasonal Storage)** financially encourages agencies with local groundwater production capabilities to produce a higher percentage of their demand in the summer from their local groundwater supplies, thus shifting a portion of their demand on the MWD system from the summer to winter;
>
> **LTSS (Long Term Seasonal Storage)** financially encourages retail agencies to take and store additional amounts of MWD water above their normal annual demands for later use; Replenishment Water provides less expensive interruptible water that is generally available and used to increase the operating yield of groundwater basins.

Seawater intrusion: The movement of salt water into a body of fresh water. It can occur in either surface water or groundwater basins.

Seawater barrier: A physical facility or method of operation designed to prevent the intrusion of salt water into a body of freshwater.

Secondary treatment: The biological portion of wastewater treatment which uses the activated sludge process to further clean wastewater after primary treatment. Generally, a level of treatment that produces 85 percent removal efficiencies for biological oxygen demand and suspended solids. Usually carried out through the use of trickling filters or by the activated sludge process.

Sedimentation: The settling of solids in a body of water using gravity.

Settle: To clarify water by causing impurities/solid material to sink to a container's bottom.

Sewer: The system of pipes that carries wastewater from homes and businesses to a treatment plant or reclamation plant. Sewers are separate from storm drains, which is a system of drains and pipes that carry rain water from urban streets back to the ocean. Overwatering your yard can also cause water to run into the streets and into storm drains. Storm drain water is not treated before it is discharged.

SigAlert: Any unplanned event that causes the closing of one lane of traffic for 30 minutes or more, as opposed to a planned event, like road construction, which is planned.

SJBA San Juan Basin Authority

Sludge: The solids that remain after wastewater treatment. This material is separated from the cleaned water, treated and composted into fertilizer. Also called biosolids.

SOCWA South Orange County Wastewater Authority. Regional Joint Powers Authority formed for collection and treatment of sewerage (previously known as AWMA/SERRA/SOCRA). SOCWA member agencies:

CSC – City of San Clemente

CSJC – City of San Juan Capistrano

CLB – City of Laguna Beach

ETWD – El Toro Water District

EBSD – Emerald Bay Service District

IRWD – Irvine Ranch Water District

MNWD – Moulton Niguel Water District

SCWD – South Coast Water District

SMWD – Santa Margarita Water District

TCWD – Trabuco Canyon Water District

SRF State Revolving Fund

Storm Drain: The system of pipes that carries rain water from urban streets back to the ocean. Overwatering your yard can also cause water to run into the streets and into storm drains. Storm drain

water is not treated before it is discharged. Storm drains are separate from sewers, which is a separate system of pipes to carry wastewater from homes and businesses to a treatment plant or reclamation plant for cleaning.

Storm flow: Surface flow originating from precipitation and run-off which has not percolated to an underground basin.

SWP: State Water Project. An aqueduct system that delivers water from northern California to central and southern California.

SWRCB State Water Resources Control Board

TDS: Total dissolved solids. A quantitative measure of the residual minerals dissolved in water that remain after evaporation of a solution. Usually expressed in milligrams per liter.

Tertiary treatment: The treatment of wastewater beyond the secondary or biological stage. Normally implies the removal of nutrients, such as phosphorous and nitrogen, and a high percentage of suspended solids.

THM: Trihalomethanes. Any of several synthetic organic compounds formed when chlorine or bromine combine with organic materials in water.

TMA: Too many acronyms.

TMDL: Total maximum daily load; A quantitative assessment of water quality problems, contributing sources, and load reductions or control actions needed to restore and protect bodies of water.

Transpiration: The process in which plant tissues give off water vapor to the atmosphere as an essential physiological process.

Turbidity: Thick or opaque with matter in suspension; muddy water.

Ultraviolet light disinfection: A disinfection method for water that has received either secondary or tertiary treatment used as an alternative to chlorination.

VE Value Engineering

VOC: Volatile organic compound; a chemical compound that evaporates readily at room temperature and contains carbon.

Wastewater: Water that has been previously used by a municipality, industry or agriculture and has suffered a loss of quality as a result.

Water Cycle: The continuous process of surface water (puddles, lakes, oceans) evaporating from the sun's heat to become water vapor (gas) in the atmosphere. Water condenses into clouds and then falls back to earth as rain or snow (precipitation). Some precipitation soaks into the ground (percolation) to replenish groundwater supplies in underground aquifers.

Water rights: A legally protected right to take possession of water occurring in a natural waterway and to divert that water for beneficial use.

Water-use Efficiency: The water requirements of a particular device, fixture, appliance, process, piece of equipment, or activity.

Water year (USGS): The period between October 1st of one calendar year to September 30th of the following calendar year.

Watermaster: A court appointed person(s) that has specific responsibilities to carry out court decisions pertaining to a river system or watershed.

Water Reclamation: The treatment of wastewater to make it suitable for a beneficial reuse, such as landscape irrigation. Also called water recycling.

Watershed: The total land area that from which water drains or flows to a river, stream, lake or other body of water.

Water table: The top level of water stored underground.

WEF Water Environment Federation. Formerly – Water Pollution Control Federation (WPCF). International trade group advising members of sewage treatment techniques and their effect on the environment.

Weir box: A device to measure/control surface water flows in streams or between ponds.

Wellhead treatment: Water quality treatment of water being produced at the well site.

Wetland: Any area in which the water table stands near, at, or above the land surface for a portion of the year. Wetlands are characterized by plants adapted to wet soil conditions.

Xeriscape: Landscaping that requires minimal water.