AGENDA
IRVINE RANCH WATER DISTRICT
ENGINEERING AND OPERATIONS COMMITTEE MEETING
TUESDAY, DECEMBER 9, 2025

This meeting will be held in-person at the District's headquarters located at 15600 Sand Canyon Avenue, Irvine, California. The meeting will also be broadcasted via Webex for those wanting to observe the meeting virtually.

To observe this meeting virtually, please join online using the link and information below:

Via Web: https://irwd.webex.com/irwd/j.php?MTID=m12ac41af50d20b8da060f23ece8b2bca
Meeting Number (Access Code): 2480 891 0192
Meeting password: 5y9nGZSPSF4

PLEASE NOTE: Webex observers of the meeting will be placed into the Webex lobby when the Board enters closed session. Participants who remain in the "lobby" will automatically be returned to the open session of the Board once the closed session has concluded. Observers joining the meeting while the Board is in closed session will receive a notice that the meeting has been locked. They will be able to observe the meeting once the closed session has concluded.

CALL TO ORDER 1:30 p.m.

ATTENDANCE
Committee Chair: Dan Ferons _____
Committee Member: John Withers _____

ALSO PRESENT

Paul Cook	___	Kevin Burton	___	Wendy Chambers	___
Neveen Adly	___	Paul Weghorst	___	Steve Choi	___
Jim Colston	___	Jason Manning	___	Jose Zepeda	___
Eric Akiyoshi	___	Belisario Rios	___	Jacob Moeder	___
Brian Waite	___	Lori Rigby	___	Scott Giatpaiboon	___
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PUBLIC COMMENT NOTICE

If you wish to address the Committee on any item, please submit a request to speak via the "chat" feature available when joining the meeting virtually. Remarks are limited to three minutes per speaker on each subject. Public comments are limited to three minutes per speaker on each subject. You may also submit a public comment in advance of the meeting by emailing comments@irwd.com before 8:00 a.m. on Tuesday, December 9, 2025.

COMMUNICATIONS

1. Notes: Burton
2. Public Comments
3. Determine the need to discuss and/or take action on item(s) introduced that came to the attention of the District subsequent to the agenda being posted and determine which items may be approved without discussion.

INFORMATION

4. 2025 REPLACEMENT PLANNING MODEL UPDATE – ROBINSON / AKIYOSHI / BURTON

   Recommendation: That the Committee receive and file the results from the Replacement Planning Model Treatment Plant Update.

ACTION

5. SHAW TANK REPLACEMENT CONSULTANT SELECTION – MWE / MOEDER / BURTON

   Recommendation: That the Board authorize the General Manager to execute a Professional Services Agreement with Tetra Tech in the amount of $680,000 for engineering design services for the Shaw Tank Replacement, Project 12570.

6. HOWILER WATER TREATMENT PLANT TO ZONE 5 PUMP STATION CONSULTANT SELECTION – BURK / MOEDER / BURTON

   Recommendation: That the Board authorize the General Manager to execute a Professional Services Agreement with MKN in the amount of $788,681 for engineering design services for the Howiler Water Treatment Plant to Zone 5 Pump Station, Project 13174.

OTHER BUSINESS

7. Directors' Comments
8. Adjournment

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Availability of agenda materials: Agenda exhibits and other writings that are disclosable public records distributed to all or a majority of the members of the above-named Committee in connection with a matter subject to discussion or consideration at an open meeting of the Committee are available for public inspection in the District's office, 15600 Sand Canyon Avenue, Irvine, California ("District Office"). If such writings are distributed to members of the Committee less than 72 hours prior to the meeting, they will be available from the District Secretary of the District Office at the same time as they are distributed to Committee Members, except that if such writings are distributed one hour prior to, or during, the meeting, they will be available electronically via the Webex meeting noted. Upon request, the District will provide for written agenda materials in appropriate alternative formats, and reasonable disability-related modification or accommodation to enable individuals with disabilities to participate in and provide comments at public meetings. Please submit a request, including your name, phone number and/or email address, and a description of the modification, accommodation, or alternative format requested at least two days before the meeting. Requests should be emailed to comments@irwd.com. Requests made by mail must be received at least two days before the meeting. Requests will be granted whenever possible and resolved in favor of accessibility.

December 9, 2025
Prepared by: M. Robinson / E. Akiyoshi
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

2025 REPLACEMENT PLANNING MODEL UPDATE

SUMMARY:

IRWD uses various planning tools, such as its Replacement Planning Model (RPM) and Replacement Fund Balance Model, to guide financial forecasting and capital asset planning for more than 3,700 miles of pipelines and nearly 200 major vertical facilities. The 2025 RPM project updated replacement and rehabilitation (R&R) costs for dams, pipelines, and new facilities. This updated approach increased the non-escalated 50-year replacement funding needs by $240 million: from $5.54 billion to $5.78 billion. Staff will present the analysis and results at the Committee meeting.

BACKGROUND:

Over the past eight years, IRWD has completed several major updates to the RPM, and currently uses Kayuga Solution's Infrastructure Reinvestment Intelligence System (IRIS) software package as the analysis platform. The 2025 RPM project updated replacement costs and frequencies for all dams, information technology infrastructure and enterprise software, pipe replacement schedules, and new facilities added since 2020. Major dam assets, such as the spillway, embankment and concrete structures, were assigned a 100-year replacement life, while software hardware assets reflect a periodic replacement cycle. Pipe replacement schedules were revised using the new risk-based approach which recommends replacing nine miles of pipe annually over the next 50 years, and additional annual costs were added to account for emergency breaks and condition assessments. The updated asset and cost information was migrated to Kayuga Solution's cloud version of the IRIS, which allows staff to dynamically access and analyze the RPM data. The new version of IRIS is connected to IRWD's pipeline GIS database, allowing new linear information to be captured and placed in the next 50-year R&R horizon.

The replacement cost changes resulted in an increase to IRWD's 50-year overall replacement needs by $240 million: from $5.54 billion to $5.78 billion. The following table summarizes the present value of the replacement cost changes for the facilities updated:

System	**2022 RPM: 50-Year R&R ($ in millions)**	**2025 RPM: 50-Year R&R ($ in millions)**
Non-Potable Water System	$1,930	$2,510
Potable Water System	$2,170	$1,700
Sewer System	$1,440	$1,570
Total	**$5,540**	**$5,780**

At the Committee meeting, staff will provide more detail on the analysis and results.

FISCAL IMPACTS:

The updated RPM projections will be incorporated into the financial Replacement Fund Balance Model and the updated Replacement Funding Strategy will be presented to the Finance and Personnel Committee in January 2026.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

That the Committee receive and file the results from the Replacement Planning Model Treatment Plant Update.

LIST OF EXHIBITS:

Exhibit “A” – 2025 RPM Update Presentation

DRAFT

IRWD REPLACEMENT PLANNING MODEL – 2025 UPDATE

ENGINEERING AND OPERATIONS COMMITTEE
DECEMBER 9, 2025

Irvine Ranch Water District

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AGENDA

- RPM / IRIS Update
  - IRIS Cloud
  - Results
  - Changes
- Facility Updates
  - New Facilities
  - Dams
  - Pipelines

RPM: Replacement Planning Model
IRIS: Infrastructure Reinvestment Intelligence System

Irvine Ranch Water District

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REPLACEMENT PLANNING MODEL OVERVIEW

Replacement Planning Model

- Addresses long term financial needs over the next 50 years
- Includes all vertical and linear assets
- Incorporates refurbishment strategies
- Incorporates risk-based replacement strategies

Capital Budget

- Includes 3- to 5-year capital improvement and replacement needs

Irvine Ranch Water District

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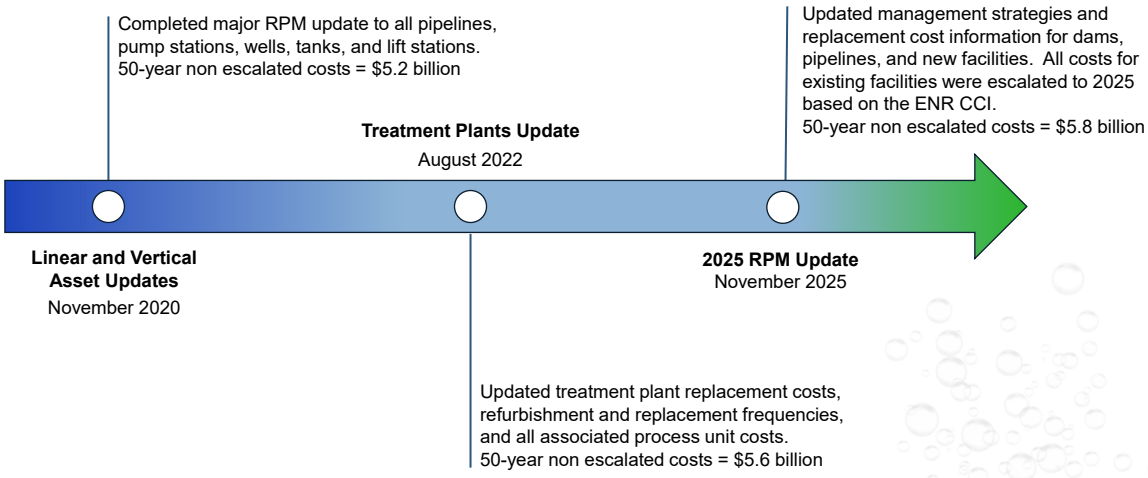
RPM UPDATES OVERVIEW



Irvine Ranch Water District

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UPDATING FACILITIES, COSTS, AND REFURBISHMENT FREQUENCIES

Irvine Ranch Water District

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UPDATE METHODOLOGY

Additions

Dams
Enterprise Software
IT Infrastructure
New Vertical Facilities
New Pipelines

Escalation

All facilities escalated to 2025

Frequency

Updated pipeline replacement frequencies to 9 miles annually

Irvine Ranch Water District

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DAM UPDATE

Irvine Ranch Water District

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DAM REPLACEMENT COST CHANGES

Asset Category	50-Year RPM Value ($ Millions)
Irvine Lake	Captured in Capital Budget
Rattlesnake Reservoir	$30
San Joaquin Reservoir	$120
Sand Canyon Reservoir	$50
Syphon Reservoir	Captured in Capital Budget
Total	**$200**

Irvine Ranch Water District

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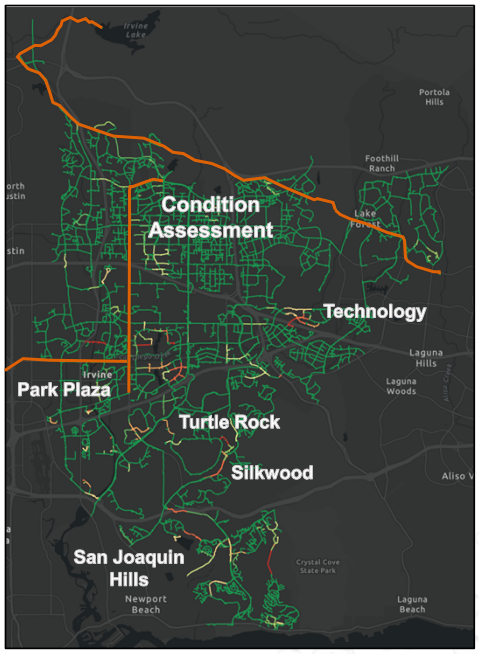
PIPELINE UPDATES

Asset Overview

- 2,100 miles of mainline pipe
- 225,000 laterals (includes sewer)

Strategy

- Pressure Pipelines: 9 miles of annual pipe replacements over the next 50 years
- Emergency pipe repairs
- Condition assessment
- Laterals



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PIPE REPLACEMENT COST CHANGES

Asset Category	2022 RPM 50-Year R&R ($ Millions)	2025 RPM 50 Year R&R ($ Millions)	Delta ($ Millions)
Pressure Pipelines	$1,310	$840	$-470
Sewer Pipes	$1,270	$1,380	$110
Asset Total	**$2,580**	**$2,220**	**-$360**

Irvine Ranch Water District

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RPM 50-YEAR NON ESCALATED COST CHANGES SUMMARY

System	2022 RPM 50-Year R&R ($ Millions)	2025 RPM 50 Year R&R ($ Millions)	Delta ($ Millions)	Major Cost Changes
Non-Potable Water System	$1,930	$2,510	+$580	+ $100M Pipes, + $150M Treatment Plants, + $220M Dams
Potable Water System	$2,170	$1,700	-$470	- $570M Pipes, + $90M Other Updated Facilities
Sewer System	$1,440	$1,570	+$130	+$110M Pipes
Total	**$5,540**	**$5,780**	**+$240**	

Enterprise software and IT Infrastructure costs are included and spread across the three systems

Irvine Ranch Water District

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ONGOING RPM MAINTENANCE

- Update RPM as new major facilities are added
- Update RPM as facilities are refurbished and replaced
- Update RPM as market conditions and construction costs dictate
- Optimize pipeline RPM based on risk and condition assessment

Irvine Ranch Water District

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NEXT STEP

- Present overall Financial Replacement Planning Model strategy to Finance & Personnel Committee in January

Irvine Ranch Water District

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December 9, 2025
Prepared by: N. Mwe / J. Moeder
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

SHAW TANK REPLACEMENT CONSULTANT SELECTION

SUMMARY:

Shaw Tank is a bolted steel tank, built by Santiago County Water District around 1994, that has reached the end of its useful life. Staff solicited proposals from seven consultants to provide engineering design services to replace the tank and received three proposals. Staff recommends that the Board authorize the General Manager to execute a Professional Services Agreement in the amount of $680,000 with Tetra Tech for engineering design services for the Shaw Tank Replacement project.

BACKGROUND:

In 2022, IRWD contracted with V&A Consulting Engineers to assess the condition of 14 steel tanks in domestic water and recycled water systems. V&A completed the condition assessment in 2023, and staff reviewed the comprehensive evaluation to determine the initial list of tank rehabilitation and replacement projects. The Shaw Tank Replacement project is one of the priority projects due to various coating failures and extensive corrosion. Shaw Tank is located in a residential community on Olive Drive near the intersection of Silverado Canyon Road, as shown on Exhibit "A."

Shaw Tank is a 0.15 million gallon (MG) tank that serves potable water to the Santiago Canyon Zone 9 and the Santiago Canyon Zones 10, 10-R, and 11 via Shaw Pump Station. The existing tank site includes the aboveground bolted steel tank, tank inlet / outlet piping assembly, SCADA control panel, radio tower, and related appurtenances. Shaw Tank is filled by pumping water from the Fleming Zone 8 to 9 Pump Station.

The project includes designing a new 0.2 MG (minimum) aboveground steel tank and associated appurtenances that will be constructed adjacent to the existing tank to allow continuous operations of the existing tank during construction. The project also includes general site civil improvements including securing the site, which is currently open to the public.

Consultant Selection Process:

IRWD invited seven consultants to submit proposals for engineering design services and received proposals from Cannon, Dudek, and Tetra Tech. Ardurra, Kleinfelder, MKN, and Stantec Consulting Services did not submit a proposal. Each firm that submitted a proposal presented unique approaches and creative engineering solutions for achieving the project objectives. Tetra Tech presented the most comprehensive approach to completing the project, demonstrated an outstanding understanding of the project issues, provided an in-depth summary of how each issue will be resolved during the design, and presented conceptual facility layouts for the proposed facilities. Tetra Tech also demonstrated the most extensive, recent experience

with the design and construction of tank replacement projects including Fleming Zone 8 Reservoir and Orange Heights Zone 6 Reservoir Improvements. The consultant selection matrix is attached as Exhibit "B," and Tetra Tech's proposal is attached as Exhibit "C."

Staff recommends that the Board authorize the General Manager to execute a Professional Services Agreement in the amount of $680,000 with Tetra Tech.

FISCAL IMPACTS:

The Shaw Tank Replacement, Project 12570, is included in the FY 2025-26 Capital Budget. The existing budget is sufficient to fund the recommendation presented herein.

ENVIRONMENTAL COMPLIANCE:

This project is subject to the California Environmental Quality Act (CEQA). In conformance with the California Code of Regulations Title 14, Chapter 3, Section 15004, the appropriate environmental document will be prepared when "meaningful information" becomes available.

RECOMMENDATION:

That the Board authorize the General Manager to execute a Professional Services Agreement with Tetra Tech in the amount of $680,000 for engineering design services for the Shaw Tank Replacement, Project 12570.

LIST OF EXHIBITS:

Exhibit "A" – Location Map
Exhibit "B" – Consultant Selection Matrix
Exhibit "C" – Tetra Tech Scope of Work and Fee Proposal

SHAW RESERVOIR AND PUMP STATION

1 inch = 50 feet

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Exhibit "B"

CONSULTANT SELECTION MATRIX

Santiago Canyon Zn 9 Shaw Tank Replacement Project								
Item	Description	Weights	Tetra Tech		Dudek		Cannon	
A	TECHNICAL APPROACH							
1	Project Understanding & Approach	40%	1		2		3	
2	Project Experience	30%	1		2		2	
3	Project Team	30%	1		3		2	
	Weighted Score		1.0		2.3		2.4	
	Ranking of Consultants							
B	SCOPE OF WORK							
TASK			Task Hours	Fee	Task Hours	Fee	Task Hours	Fee
1	Project Management		400	$110,010	150	$43,867	204	$44,376
2	Preliminary Design		877	$254,815	406	$280,408	466	$212,971
3	Final Design		1,647	$288,775	722	$302,523	799	$159,777
4	Engineering Services During Bidding		176	$26,400	68	$28,635	132	$27,432
	Total Engineering Services Fee		3,100	**$680,000**	1,346	**$655,433**	1,601	**$446,056**
5	Optional Tasks							
	Draft and Final Drainage Design Memo		Included	$0	98	$23,593	Not included	**$0**
	Total Engineering Services Fee with Optional Tasks		3,100	**$680,000**	1,444	**$679,026**	1,601	**$446,056**
C	OTHER							
	Number of Drawings		54		38		Not included	
	Engineering Design Services Fee per Drawing		$12,593		$17,248		N/A	
	Sub Consultants							
	Electrical/Control		In-house		In-house		In-house	
	Cathodic Protection/Corrosion		RF Yeager Engineering		V&A		Not Included	
	Civil/Mechanical		In-house		In-house		In-house	
	Structural		In-house		PSE		In-house	
	Geotech		Verdantas		Ninyo & Moore		Ninyo & Moore	
	Survey		Metz Surveying		GIS Surveyors		KDM Meridian	
	Hazardous Materials		National Econ Corp.		Industrial Hygiene Service		CSI Services	
	Design Potholes		Boudreau Pipeline		AirX		C Below	
	Exceptions taken to IRWD Std. Contract		Yes		None		None	
	DIR Numbers Provided		Yes		Yes		Yes	
	Insurance (Professional & General Liability)		Yes		Yes		Yes	

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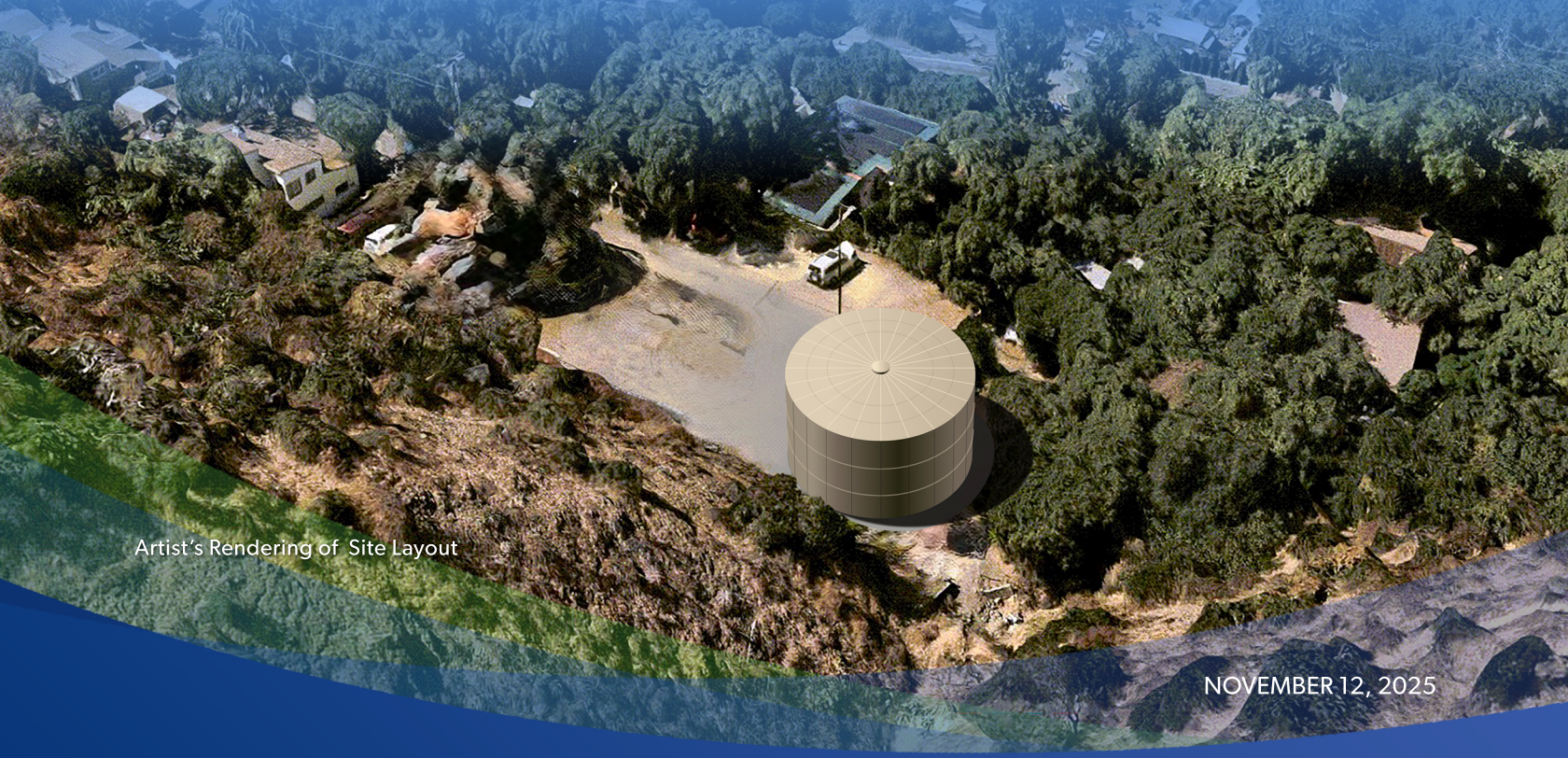
Irvine Ranch
WATER DISTRICT

PROPOSAL TO PROVIDE

ENGINEERING SERVICES FOR THE

SHAW TANK
Replacement Project



Artist's Rendering of Site Layout

NOVEMBER 12, 2025

TETRA TECH

TETRA TECH

November 12, 2025

Nang Mwe, PE, Project Manager
Irvine Ranch Water District
Engineering Department
15600 Sand Canyon Ave.
Irvine, CA 92618

Reference: Proposal to Provide Engineering Design Services for the Shaw Tank Replacement Project

Dear Ms. Mwe,

Tetra Tech is pleased to submit our proposal for engineering design services for the Shaw Tank Replacement Project. We value the relationship that has been built with Irvine Ranch Water District (IRWD) based on our past and ongoing projects. It is our desire to again provide the same diligent service to IRWD. We are offering an outstanding team that combines the experience, depth, and understanding of the design of reservoirs for the successful delivery of this project. Our team brings the following advantages:

- **Unequaled Reservoir Design Experience.** During the last 20 years, Tetra Tech has designed more than **64 reservoirs**, including **13 steel tank reservoirs** within Southern California.
- **Project Team with Extensive IRWD Experience.** The Tetra Tech Project Team offers a well-balanced blend of long-standing experience with IRWD and broad technical expertise in water and wastewater infrastructure. Ms. Erica Jenkins and I bring together more than 66 years of combined professional experience in the planning, design, and delivery of complex water, wastewater, and recycled water projects. Our collaboration builds upon Tetra Tech's decades-long partnership with IRWD, ensuring design continuity, technical consistency, and alignment with District standards and expectations.

  For over 25 years, Tetra Tech has supported IRWD in developing and improving its critical infrastructure encompassing reservoirs, pump stations, wells, pipelines, and feasibility studies. This deep, ongoing relationship has given our team a comprehensive understanding of IRWD's design procedures, electrical and P&ID standards, preferred materials, and operational practices, allowing us to produce coordinated, cost-effective, and high-quality designs that meet the District's goals for performance and constructability.
- **Local In-House Structural and Electrical and Control Capabilities.** Tetra Tech has our own in-house local team of structural and electrical engineers who have extensive experience with IRWD facilities.
- **Dedication to IRWD.** Tetra Tech believes that IRWD is an important client. Our approach will include a "teaming and partnering" relationship. We will strive to exceed your expectations through hard work, attention to detail, close communication, schedule and budget management.

Our project team is looking forward to working with you and your staff to complete this project. We are committed to providing IRWD with the highest-quality service you expect. Should you have any questions regarding our proposal, please feel free to contact us.

Sincerely,

Neha Gajjar, PE
Senior Project Manager

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CONTENTS

WHY TETRA TECH

Tetra Tech is the ***right*** team to provide the engineering design services for the Shaw Tank Replacement Project for the following reasons:

- **Reservoir Design Experience** - Over the past 15 years, Tetra Tech has designed more than 64 reservoirs, including 13 steel tank reservoirs located throughout Southern California. Most recently, we completed the 1.3 MG Fleming Zone 8 Reservoir and Zone 8 to 9 Pump Station, and we are currently working on Chapman Tank Site Master Planning and Constructability Study. The insights, design strategies, and lessons learned from these projects will directly inform our approach to this assignment. Our team's extensive experience places us high on the learning curve, enabling us to anticipate challenges and deliver cost-effective, practical, and technically sound solutions efficiently.
- **Extensive IRWD Project Experience -** Our team led by Ms. Neha Gajjar, Project Manager, Mr. Tom Epperson, QA/QC Project Manager, and Ms. Erica Jenkins, Project Team Leader, has successfully collaborated on multiple IRWD projects over the past 15 years. This longstanding partnership has given us a deep understanding of IRWD's design standards, preferred materials, operational requirements, and electrical systems**.** This familiarity allows us to deliver a complete and compliant design that meets IRWD's expectations.
- **Local, In-House Structural, Electrical, and Control Expertise -** Tetra Tech's in-house engineering team includes local structural, electrical, and control systems specialists with extensive experience supporting IRWD facilities**.** This integrated capability allows for seamless coordination, rapid response to design refinements, and consistent quality across all disciplines.
- **Commitment to IRWD's Success** – Tetra Tech values our partnership with IRWD and is fully committed to the IRWD's continued success. Our approach emphasizes collaboration, transparency, and proactive communication**,** fostering a strong **"**teaming and partnering**"** relationship throughout the project. We will strive to exceed expectations through diligent project management, technical expertise, and a focus on quality, schedule, and budget**.**

Our experience with similar reservoir projects and long-standing partnership with IRWD means we will continue to provide a high level of service from a team of qualified, knowledgeable engineering professionals. Tetra Tech's approach emphasizes the preparation of well-coordinated plans and specifications that provide benefits to IRWD. High-quality contract documents attract a greater number of competitive bidders, promote lower bid prices by reducing contractor risk and uncertainty, and ultimately yield a cost-effective, high-quality product.

While this project presents unique challenges, the draft constructability study completed in September 2025 for the Chapman Tank Site Master Planning and Constructability Study has equipped Tetra Tech with valuable insight into site constraints, access constraints, design considerations, constructability and construction sequencing while maintaining service that are directly applicable to the Shaw Tank Replacement Project. We will utilize the lessons learned from that effort to refine our approach, enhance constructability, and maintain design efficiency. Building upon this experience, Tetra Tech remains committed to providing IRWD with the same exceptional level of service, attention to detail, and collaborative project delivery that have resulted in successful, high-performing infrastructure projects completed to the IRWD's satisfaction.

PROJECT UNDERSTANDING

IRWD provides potable water to roughly 2,500 customers in the Santiago Area, a scenic but unincorporated region of eastern Orange County. Nestled east of the Eastern Transportation Corridor (SR-241), north of Lomas Ridge, and west of Portola Hills, this service area spans four distinct communities: Santiago Canyon, Silverado Canyon, Williams Canyon, and Modjeska Canyon. Each canyon relies on its own network of reservoirs and pump stations, which together depend on a single primary supply — the 1.3 MG Zone 8 Fleming steel storage reservoir and the adjacent Zone 8-to-9 booster pump station. Both facilities, located near Santiago Canyon Road and Silverado Canyon Road, were constructed this year and form the heart of the system that sustains these rural communities. From the Fleming pump station, water is pumped uphill to Shaw Tank in the Silverado Canyon service area.

Recognizing the need to ensure long-term system integrity, IRWD initiated a district-wide assessment in 2022, engaging V&A Consulting Engineers to evaluate the condition of all active steel storage tanks. The results revealed several facilities in need of attention, with the Shaw Tank identified as one of the highest-priority projects due to visible coating deterioration and widespread corrosion. In response, IRWD initiated the Shaw Tank Replacement Project to restore reliability and modernize this critical piece of infrastructure.

This project is proposed to not only replace aging components but also to enhance the overall resilience of the water system. Key elements include:

1. **Removing** the existing 0.15 MG bolted steel tank.
2. **Constructing** a new, larger 0.2 MG (minimum) steel tank equipped with an internal mixer, interior ladder, exterior staircase, overflow, and subdrain systems.
3. **Upgrading** the inlet and outlet pipelines, valving, overflow, and drain lines, while upsizing nearby piping systems to improve hydraulic performance.
4. **Relocating** the Southern California Edison (SCE) meter and AT&T service panel to accommodate the new design.
5. **Improving the site** through grading, new surfacing, a dedicated driveway and parking area, and installation of a security fence and access gate.
6. **Modernizing** electrical service and control systems for better reliability and monitoring.

Together, these improvements will help IRWD continue delivering safe, dependable water service to the Santiago Area for decades to come strengthening the system's infrastructure and ensuring it keeps pace with community needs and modern operational standards. The project includes provisions to maintain existing services and systems while the new facilities are constructed.

GENERAL APPROACH

Tetra Tech fully understands the importance of your project. We are offering an outstanding team, which combines the experience, depth, and understanding needed for the successful delivery of this project. Our core principles establish how we plan to work together with IRWD to successfully complete this project:

- **Service.** Tetra Tech puts its clients first. We listen to and better understand our clients' needs and deliver smart, cost-effective solutions that meet those needs. Our philosophy is to "Do it Right."
- **Value.** Tetra Tech takes on our clients' problems as if they were our own. We develop and implement real-world solutions that are cost-effective, efficient, and practical.

- **Excellence.** Tetra Tech brings excellent technical capability, disciplined project management, and commitment to safety and quality to our work.
- **Opportunity.** Our people are our number one asset. Our workforce is diverse and includes leading experts in our fields. Our entrepreneurial nature and commitment to success provides challenges and opportunities.

We value the relationship that has been established with IRWD and look forward to continuing and further developing this association in the future. We are committed to providing IRWD with the same high-quality service you expect. Our strength lies in our proven track record that has led to successful completion of multiple projects for IRWD, as well as other project participants or nearby agencies. The following is a summary of the distinct advantages that the Tetra Tech team brings to IRWD.

Reservoir Design Experience

Over the past 20 years, Tetra Tech has designed more than 64 reservoirs, including 13 steel tank reservoirs located throughout Southern California. The following table summarizes our reservoir project experience.

Client	Project Name	Design Complete
Reservoirs (over 64 in the last 20 years)		
Moulton Niguel Water District	Marguerite Reservoir Rehabilitation	Current
Serrano Water District	Smith Reservoir and Pump Station Replacement	Current
West Basin Municipal Water District	Chevron Nitrification Treatment Plant Sodium Hypochlorite Tank Replacement	Current
Golden State Water Company	Roseton Plant Reservoir	Current
Irvine Ranch Water District	Orange Heights Zone 6 Domestic Water Reservoir	Current
Golden State Water Company	Huntington Horn Reservoir	2023
Irvine Ranch Water District	Fleming Zone B Tank	2023
Montecito Water District	Park Lane Reservoir	2021
Moulton Niguel Water District	2018/2019 Reservoir Management System	2020
City of Tustin	Simon Ranch Reservoir	2019
City of South Gate	Elizabeth Reservoir, Booster Pump Station, and New Well No. 29	2019
Irvine Ranch Water District	3.7 MG Zone 1 Reservoir	2018
Structural Seismic Retrofit/Rehabilitation		
City of Santa Ana	Walnut Reservoir Assessment and Evaluation	2022
Montecito Water District	Reservoir Vulnerability Retrofits (6 Reservoirs)	2022
Orange County Water District	Santa Ana Gap Reservoir Assessment	2022
Golden State Water Company	Hunting Horn Reservoir Assessment	2021
City of Riverside	Condition Assessment (3 Reservoirs)	2021
City of Fullerton	Structural Rehabilitation of Lower Acacia Reservoir	2019
Montecito Water District	Toro Canyon Reservoir Roof Replacement	2017
Golden State Water Company	Structural Analysis of Mira Flores Reservoir	2016
Montecito Water District	Structural and Seismic Evaluation of Reservoirs	2015

Our Project Team is high on the learning curve and can apply their expertise to addressing and resolving your project issues in a cost-effective and timely manner.

IRWD Design Experience

Tetra Tech brings a deep legacy of experience, continuity, and technical excellence to this project. Over the past 15 years our Team has managed more than 25 IRWD projects, ensuring that each met the IRWD's high standards for quality, efficiency, and reliability. Tetra Tech's team has had much experience in water, wastewater, and reclaimed water system design for many of IRWD's most significant infrastructure improvements, including the 3.7 MG Zone 1 Reservoir, 1.3 MG Fleming Zone 8 Reservoir and Zone 8-9 Pump Station, Chapman Tank Site Master Planning and Constructability Study, Dyer Well Field Surge Tanks, Peters Canyon Reuse Pipeline, BPS Check Valve Replacement, Well 115, Well 107, and Well 78 Replacements, and other major capital facilities.

Ms. Erica Jenkins worked closely with Mr. Epperson early in her career on IRWD projects such as the Tustin Zone 5 Booster Pump Station, Tustin Zone 5 Transmission Main, Shady Canyon Booster Pump Station, Shady Canyon Zone B and Coastal Modifications, and the Chambord Pipeline Replacement, bringing over 33 years of water and wastewater design experience. After contributing to numerous IRWD projects prior to 2010, Ms. Jenkins has recently re-engaged with IRWD through her work on the IRWD Well Improvements Project and the Chapman Tank Site Master Planning and Constructability Study, the latter providing valuable insight and processes that will directly inform the approach for the Shaw Tank Replacement Project.

Ms. Neha Gajjar will serve as Project Manager, providing overall direction, coordination, and quality oversight for the design team. With more than 33 years of professional experience, Ms. Gajjar brings broad expertise in water infrastructure design, constructability, and specifications development, and is currently leading IRWD's Well Improvements Project. Together, Ms. Gajjar and Ms. Jenkins bring over a combined 66 years of collective experience, pairing Neha's leadership and recent project management with Erica's long-standing familiarity with IRWD standards and design practices.

Under our quality assurance leadership, the team will integrate institutional knowledge, technical expertise, and design continuity, ensuring that the Shaw Tank Replacement Project benefits from decades of successful collaboration, consistent quality, and a deep understanding of IRWD's operational and design requirements.

Reservoir Structural Design

The proposed 0.2 MG steel tank and foundation will be designed in accordance with applicable codes, including CBC, ASCE7, AWWA, and ACI, to ensure structural integrity, seismic performance, durability, and compliance with IRWD standards. Subgrade preparation will be based on findings from the forthcoming geotechnical investigation, which will identify bearing capacity and settlement characteristics. Depending on geotechnical recommendations, the foundation is anticipated to consist of a reinforced concrete ring footing or mat foundation designed to resist overturning, uplift, and differential settlement while accommodating site-specific soil conditions and seismic forces.

Seismic design will incorporate site-class parameters consistent with the seismic hazard of the project site. The structural design of the steel tank and tank foundation will address lateral loads, shell stability, and anchorage requirements to prevent uplift and sliding during seismic events, ensuring compliance with current AWWA D100 and CBC seismic criteria.

Because performance-based specifications are not permitted, Tetra Tech will reach out to a minimum of two (2) steel tank manufacturers to develop the steel tank design. Tetra Tech will coordinate the tank footprint dimensions, anchor bolt layout, load reactions, and appurtenance locations with the steel tank

manufacturers to ensure that everything is properly integrated into Tetra Tech's civil and structural foundation design. The steel tank manufacturers will furnish detailed tank design drawings to be included in the bid drawing set. This collaborative approach ensures that the tank structure, foundation, and site design are fully coordinated, constructible, and compliant with IRWD's design standards.

Reservoir Electrical Design

The existing site electrical service, provided by Southern California Edison (SCE), consists of a single service connection. Tetra Tech will evaluate the capacity, condition, and reliability of the existing electrical infrastructure to ensure it can adequately support the proposed site improvements and future operational needs. Based on our preliminary review, only one additional instrument (site lighting) will be integrated into the existing electrical service. Our assessment will confirm that the current system meets applicable code requirements, has sufficient load capacity, and maintains operational redundancy for long-term performance.

KEY DESIGN ISSUES

Successful implementation of the project will address several key issues. We believe Tetra Tech has an excellent grasp of these issues based on our overall experience, capabilities and familiarity with other reservoir projects as well as our experience with IRWD projects, personnel and policies. We have included a preliminary reservoir site plan (Figure 1) in the Figures portion of the proposal. Our approach to resolving project issues is summarized in the following table:

SUMMARY OF KEY ISSUES	
Issues	**Tetra Tech Approach**
Keep Existing Facilities in Service	• Evaluate construction phasing to maintain the Shaw facilities during the construction of the new reservoir.
Reservoir Siting	• Coordinate with Geotechnical Engineer on the reservoir subgrade preparation. • Determine alternatives for access around reservoir. • Confirm visual impacts from Santiago Canyon Road and Silverado Canyon Road. • Locate disposal site and sequencing reservoir grading.
Constructability and Access	• Determine size and type of equipment that can be used to travel along the narrow road and in a restricted working space. This information will help determine construction sequencing and construction duration. The information listed below provides a summary of the constraints and restrictions along the access road up to the tank site. • Along Olive Drive there are driveways to each residence with cars parked in their garage or driveway. Assuming most of these cars will be leaving for work in the morning and coming home at night, it may impact and/or reduce construction work hours. • Olive Drive is a narrow, single lane paved residential road with grades up to 10%. The alignment is straight, without curves, allowing the construction vehicles a direct path to the project site. • A preliminary site reconnaissance was conducted to identify existing conditions and potential constraints at the Shaw Tank project site. Observations indicate several limitations, including overhead electric and telephone lines ranging from approximately 16 to 30 feet above ground, restricted working space

SUMMARY OF KEY ISSUES	
Issues	**Tetra Tech Approach**
	within the site, and a narrow access road. Given these constraints, large construction vehicles such as semi-trucks or cranes **will not** be able to safely maneuver along the access route. As a result, construction of the Shaw Tank will need to be completed using smaller, more compact equipment suitable for the limited site conditions. • Due to limited roadway width and lack of turnaround space, construction vehicles will be required to perform a hammerhead maneuver within the IRWD project site to safely turn around. No alternative turnaround areas are available along Olive Drive, making on-site maneuvering essential for construction ingress and egress. • Along Olive Drive and Silverado Canyon Road, there are no suitable areas available for material or equipment staging. As a result, the Contactor will be required to secure an off-site staging location which may be located a significant distance from the project site. This limitation will likely increase construction costs and may also impact project logistics and efficiency due to additional travel time for equipment and material transport.   **Looking east onto Olive Drive**  The narrowest area along Olive Drive is at 28886 Olive Drive. The distance from the bottom of the driveway to the edged of pavement is approximately 9'-6" wide.
Work Area	• The Shaw Tank project is extremely limited in size, which will result in higher-than-normal construction costs. The confined workspace will restrict equipment access and material storage, slowing overall production and extending the construction schedule. Due to the lack of a designated laydown area, only a minimal amount of equipment and materials can be brought onto the site at any given time, further impacting efficiency and increasing costs associated with sequencing and logistics. Based on the logistics of the site, we will evaluate exactly how large the work area can be to facilitate construction.

SUMMARY OF KEY ISSUES	
Issues	**Tetra Tech Approach**
Reservoir Appurtenances	• No performance-based specifications will be utilized for the tank design. • The tank will be designed in collaboration with a minimum of two (2) qualified steel tank manufacturers during the design phase. • The tank design package will define the size and orientation of the following: o access hatches, landings, ladders and stairs o type and size of reservoir vent and manway o exterior overflow and drain piping o level equipment
Site Master Plan	• Evaluate/confirm clearances and setback design criteria including latest editions of California Building Code, California Fire Code, and Orange County Public Works. • Evaluate stability of the surrounding slopes (as steep as 1:1) and potential of rock fall that may impact the project site. • If the footprint of the tank cannot fit within the current site layout, the slope at the south side of the site may need to be cut back and a new retaining wall could be constructed. • Evaluate the potential for shallow bedrock that is mapped within the east canyon wall and immediate tank vicinity. • Determine temporary facilities that are needed during construction. • Determine site security including site lighting, addition of motorized gate entrance with keypad at all vehicular gates, and installation of all perimeter fencing.
Onsite Pipelines (Overflow/Drain)	• Based on the Orange County Flood Control District Map there is **no** existing storm drain piping system near the project area. • A creek is located east of the project site; however, discharge of water into this creek is not permitted without authorization from the California Department of Fish and Wildlife (CDFW). Even if CDFW were to consider such a discharge, the water would first need to be dechlorinated to meet environmental standards. The permitting and coordination process with CDFW is expected to be lengthy and schedule prohibitive, potentially taking up to a year to complete, with no guarantee of approval. • Since there is no existing storm drain system in the vicinity of the project site and discharge to the nearby creek is unlikely to be permitted, the overflow and drain piping may need to be designed to capture and manage water entirely on site. The proposed approach to control overflow and drain discharges in compliance with environmental regulations is challenging. However, due to limited site area, there is minimal space available for underground detention or a pump-and-haul system. To confirm the feasibility of infiltration as a long-term solution, a geotechnical infiltration test will be needed to evaluate the infiltration capacity of the underlying soils and determine if there is a feasible solution.

SUMMARY OF KEY ISSUES	
Issues	**Tetra Tech Approach**
Utility Relocations	• IRWD will contact AT&T and give notice one year in advance to relocate AT&T service panel. • IRWD will contact Southern California Edison (SCE) and give notice one year in advance to relocate SCE meter. • Tetra Tech will incorporate AT&T and SCE relocation requirements and comments in the preliminary design to verify full utility coordination.
Tank Material Options	• Each potential tank material presents distinct challenges given the site's limited access, staging restrictions, and environmental sensitivity. Tetra Tech understands that IRWD desires for us to evaluate both welded steel and bolted steel tank options. As part of the design phase, we will assess each alternative in detail considering construction logistics, safety requirements, and potential community impacts to determine the most practical and cost-effective solution for the Shaw Tank site. • Given the open space and surrounding vegetation at the project site, it may be necessary to evaluate the use of temporary barrier or fire suppression systems to prevent sparks from traveling during the welding process associated with the welded steel tank option. Implementation of such protective measures would add additional cost to the welded tank alternative. Welding operations at this site will require heightened safety precautions and careful coordination to mitigate fire risk.
Corrosion	• A galvanic cathodic protection system was utilized for the existing Shaw tank. However, based on the corrosion observed on the tank shell and associated piping, an alternative corrosion protection system may be explored to determine what would provide long-term durability and effective mitigation of future corrosion. • Evaluate type of coating to prevent premature coating failure and corrosion.  
Electrical, Controls and Operation	• Evaluate whether the existing electrical service requires modernization to improve system reliability and monitoring capabilities, given that the new instrumentation and equipment will be connected to the existing control panel. It is recommended that the existing electrical system be assessed prior to connection to determine if any upgrades are necessary to meet current electrical codes and standards.

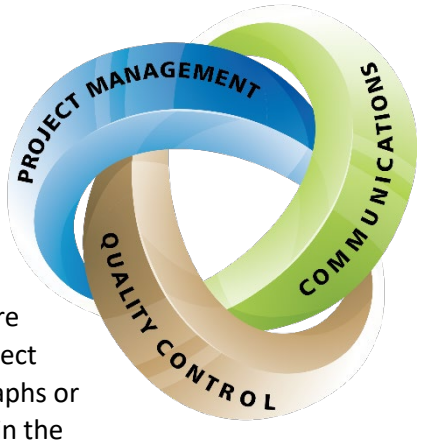
SUMMARY OF KEY ISSUES	
Issues	**Tetra Tech Approach**

Permits	• Department of Drinking Water (DDW) – Submit reservoir plans and location of existing septic tanks within the neighborhood to receive DDW's approval.
	• Provide support to IRWD for preparation of CEQA Documents and Initial Study/Mitigated Negative Declaration
	  ○ Potential effect on Biological Resources/Habitat
	  ○ Geology/Soils/Seismicity
	  ○ Cultural Resources
	  ○ Tribal Cultural Resources
	  ○ Wildland Fire
	  ○ Aesthetics (Natural Landscape)
	• Submit Orange County Public Works Permits (encroachment permit)

PROJECT MANAGEMENT

Over the years, Tetra Tech has established well defined, rigorous procedures for project management. These techniques have been developed and refined and have contributed to our success and reputation. The keys to our project management system are communications, project planning, monitoring, and quality assurance. To accomplish the project goals, we will utilize proven project management techniques and tools, clearly described in our organized and detailed work plan. From the many similar projects we have completed in the past, we have developed a methodology and philosophy that will serve as the basis for this project.

The Tetra Tech team's goal is to keep IRWD staff "in the loop" from Day One of the project. Communication tools include the formal progress reports afforded through our project management system and an informal give-and-take approach starting with **Neha Gajjar, our Project Manager,** and extending to every member of our project team. At the project's outset, the chain of command and appropriate communication methods will be agreed upon and can be as formal or as informal as IRWD desires.



We will use the entire communication spectrum. We will conduct formal meetings with agenda and typewritten notes, and we will use informal meetings with notes to file. We also will have documentation of telephone communications, with notes to file or letters of understanding as appropriate follow-up. Another important communication link will be our e-mail system.

Per the RFP, IRWD requires that we have weekly meetings, and we are proposing to use e-mail to keep IRWD aware of the status of the project on a weekly basis. Tetra Tech will prepare a brief (one or two paragraphs or bullet items) e-mail summarizing the following: activities completed in the previous week; the activities planned for the upcoming week; any critical decisions that need to be made; and schedule of upcoming events/meetings.

SCOPE OF WORK

Members of the Project team have performed an in-depth review of the project description and scope of work within the Request for Proposal (RFP) as well as the Exhibits provided within the RFP. We propose to provide the following scope of work for the preliminary design, final design and construction phase services with each phase being authorized by a separate Notice-to-Proceed.

All work performed on this project will conform to IRWD standards and requirements including, but not limited to, the following: IRWD Project Manual; IRWD Construction Manual; and IRWD Electrical and Instrumentation and Control (I&C) Design Standards. Tetra Tech will provide the following detailed scope of services:

TASK 1 – PROJECT MANAGEMENT

Tetra Tech will conduct project management activities to ensure adherence to scope, schedule, and budget; promote efficient communication between Tetra Tech, IRWD, and others as required; and implement an effective quality assurance/quality control (QA/QC) program.

A. **Preparation of Project Status Reports.** Tetra Tech will prepare weekly and monthly status reports. Each weekly status report will consist of a brief (one or two paragraphs) e-mail summarizing the activities completed the previous week, the activities planned for the upcoming week, and any critical decisions that need to be made, and a schedule of upcoming events/meetings. Each monthly status report will include more detail, summarizing the work completed and reviewing work status relative to budget and schedule. The project schedule will also be updated on a monthly basis for inclusion in the monthly status report.

B. **Meetings and Workshops.** Tetra Tech will organize, attend, and conduct meetings and workshops; prepare and submit meeting agendas for IRWD review and concurrence at least five days prior to the meeting; and prepare draft and final minutes for all meetings and workshops and submit them to IRWD within one week of the meeting.

Tetra Tech has budgeted for the following meetings:

Meeting/Workshop	Description
General project management and design development meetings. The meetings include the kick-off meeting and (3) informal design meetings required to complete the project.	Four (4) two-hour meetings (At least one in-person meeting)
Site Visits	Three (3) two-hour meetings (All in-person meetings)
Coordination activities with jurisdictional agencies including, but not limited to, relocation of Southern California Edison (SCE) meter and AT&T service panel. Tetra Tech will review one set of each agency's comments and incorporate their requirements in the design.	Two (2) two-hour meetings (Teams Meeting)
Site Layouts (3)	One (1) two-hour meeting (Teams Meeting)
Preliminary Design Workshop	One (1) two-hour meeting (In-person Meeting)
Draft Preliminary Design Report Comment Review Meeting	One (1) two-hour meeting (Teams Meeting)

Meeting/Workshop	Description
60% Design Comment Review Meeting	One (1) two-hour meeting (Teams Meeting)
90% Design Comment Review Meeting	One (1) two-hour meeting (Teams Meeting)
100% Desing Comment Review Meeting	One (1) two-hour meeting (Teams Meeting)

C. **Quality Assurance/Quality Control.** Tetra Tech will develop and implement our QA/QC measures throughout the project to ensure ongoing and consistent quality control throughout the project phases. As part of the QA/QC measures, Tetra Tech will capture comments from review meetings and submittals and thoroughly check the work product to ensure that comments are addressed.

TASK 2 – PRELIMINARY DESIGN

Tetra Tech will perform the following subtasks as part of the preliminary design phase. The subtasks will be documented and compiled into a Preliminary Design Report (PDR) that summarizes the details shown below:

A. **Background Information.** Tetra Tech will review existing reports, record drawings, historical flow data, system process, and other information related to the project. Tetra Tech will conduct a meeting with IRWD with a focus on multiple project phases, hydraulic considerations, site constraints, and facility considerations. Tetra Tech will also conduct one of the site visits indicated above to establish an initial site reconnaissance and understanding of existing facilities.

B. **Utility Research.** Tetra Tech will research and identify the location of existing underground utilities and/or other physical surface features in the immediate vicinity of the proposed facilities and appurtenances. Information on utilities, including size and horizontal and vertical locations will be identified. Tetra Tech in unison with Boudreau Pipeline has budgeted to perform 10 potholes to identify horizontal and vertical location of existing utilities.

   During the time of the utility research, Tetra Tech will work with IRWD to begin the conversation and coordination with SCE and AT&T to relocate the existing SCE meter and AT&T service panel to accommodate the upgrades to the Shaw tank site. We have assumed that a maximum of forty hours of coordination will be required to relocate the existing SCE meter and maximum of forty hours will be required for the coordination of the relocation of the AT&T service panel.

C. **Shaw Tank Siting.** Tetra Tech will analyze the feasibility and selection between bolted steel tank and welded steel tank options. The design of the tank will account for site constraints, the access road conditions, construction laydown area, environmental risks, construction equipment sizing and access, and overall site conditions and provide recommendations on the type of steel tank suitable for this site. Tetra Tech will consider the existing system operation, minimum and maximum hydraulic grade lines, and sequencing of construction to maintain service to the area when determining the siting and configuration of the proposed reservoir. Upon approval of the tank recommendation, Tetra Tech will proceed with the preparation of the construction plans.

   In accordance with the IRWD's direction, the tank will be designed in collaboration with qualified steel tank manufacturers (minimum of 2 manufacturers will be selected) during the design phase. Tetra Tech will engage the manufacturers early in the process to obtain a detailed, manufacturer-specific tank pre-designed signed package that defines the size, orientation, precise location of all

critical tank appurtenances, thickness of the shell, welding requirements, and interior/exterior coatings.

Tetra Tech will coordinate the tank footprint dimensions, anchor bolt layout, load reactions, and appurtenance locations with the steel tank subconsultant to ensure that everything is properly integrated into Tetra Tech's civil and structural foundation design.

Tetra Tech will incorporate the manufacturer's submittals and design data directly into the contract documents, ensuring that the tank geometry, penetrations, and interface points are clearly defined prior to bidding. This approach will allow IRWD to receive a fully coordinated, build-ready design, reduce design ambiguities, and provide a clear, consistent basis for construction pricing and execution.

Tetra Tech in unison with RF Yeager will provide a design to cathodically protect the new steel tank from corroding. The cathodic protection system will significantly protect the tank's strucural integrity and service life. RF Yeager will evaluate two main protection systems (Galvanic (Sacrificial Anode) or Impressed Current) that can stop the corrosion process on the steel tank during the preliminary design phase. Assume three (3) sheets. The work to be completed will inlclude the attendance of two (2) teams progress meetings.

D. **Site Master Planning.** Tetra Tech will develop an overall site master plan that provides layouts for the proposed layouts of the proposed tank, inlet/outlet piping, valves, air gap facilities, electrical and control connections, drainage, facility relocations, and existing facilities at the site. Site security will be provided at the site and will include site lighting, an entrance gate, and new fencing around the perimeter site.

   The site planning will include the proposed site configuration, site constraints, potential challenges, and other information that Tetra Tech finds relevant. We will evaluate the feasibility of the proposed larger 0.2 MG size and/or recommend a more feasible capacity. If opportunities exist to install a tank that is larger than 0.2 MG while working within the confines of the project, Tetra Tech will propose a slightly larger tank. Tetra Tech will develop and evaluate three (3) site layouts in collaboration with IRWD. As part of this task, Tetra Tech will conduct a Teams meeting with IRWD to review and evaluate the proposed layouts.

E. **Onsite Pipelines.** Tetra Tech will provide a preliminary design for size, location and orientation of the inlet/outlet pipelines and drainage/overflow pipelines.

F. **Construction Phasing.** Tetra Tech will evaluate the construction and siting requirements for the proposed facility and identify which, if any, existing facilities are required to be relocated, temporarily disabled, demolished, or modified. Tetra Tech will prepare a phasing plan and a recommended sequence of construction to maintain existing services and minimize disruption to the system. The PDR will include a discussion on construction sequencing to ensure the continuous operation of the facility.

G. **Geotechnical Investigation.** Tetra Tech in unison with Verdantas will conduct a geotechnical investigation to adequately characterize the conditions at the proposed site. The following tasks, at a minimum, will be conducted as part of the geotechnical investigation:

   1. **Literature Review:** We will review available geotechnical reports in our library and publicly available literature, historical aerial photographs, and maps relevant to the site, to look for geological hazards and potential geotechnical issues that may significantly impact the project and affect the proposed field exploration program.

2. **Pre-Field Activities:** Prior to the field exploration, we will mark the proposed boring locations and contact Underground Service Alert (USA) for utility marking.
3. **Subsurface Exploration:** We propose to drill, and sample two (2) hollow-stem auger borings at the proposed tank site to a depth of 30-feet below existing grade or auger refusal, whichever is shallower. The borings will be logged by a member of Verdantas's technical staff. Representative soil samples will be collected at selected depths from the borings and transported to our laboratory for testing. The borings will be backfilled with soil cuttings and patched with cold mix asphalt where asphalt is penetrated.
4. **Geotechnical Laboratory Testing:** We will conduct geotechnical testing on sampled earth materials in our laboratory for soil classification and to evaluate engineering properties. This testing may include moisture content and dry density, gradation, Atterberg Limits, consolidation, direct shear, and corrosivity (minimum resistivity, chloride content, sulfate content, and pH). The actual testing program will depend upon the soil type encountered and samples recovered.
5. **Geotechnical Analyses and Report Preparation:** We will review the field and laboratory data and perform engineering analysis to develop geotechnical recommendations for design and construction of the Project. We will prepare a report presenting our geotechnical findings and recommendations, which will be signed and stamped by a California Licensed Geotechnical Engineer (GE). Our report will include a boring location map, boring logs and geotechnical laboratory testing results, and address the following:

    - **Site Conditions:** We will review and summarize surface, subsurface and groundwater conditions, and engineering properties of soils encountered during our geotechnical exploration, including presence of loose soils and/or undocumented fill that may require removal and recompaction. We will discuss excavation characteristics of encountered subsurface materials, including ease or difficulty of excavation.
    - **Geologic Hazards:** We will discuss potential geologic hazards at the Project site, including the potential for surface fault rupture, ground shaking, liquefaction, and tsunami.
    - **Slope Stability:** We will discuss the stability of the surrounding slopes and potential impact on the project site, and provide recommendations for mitigation measures, as necessary.
    - **Seismicity:** We will provide site-specific seismic coefficients in accordance with the 2025 California Building Code.
    - **Surface Water Infiltration Rates:** Evaluate feasibility of an onsite surface water infiltration system based on finding from our literature review, geologic mapping, and borings, and provide recommendations for additional testing as appropriate.
    - **Foundation Design:** We will provide geotechnical parameters for foundation design of the proposed improvement, including bearing capacity and settlement of shallow foundation.
    - **Lateral Earth Pressures:** We will provide recommendations for lateral earth pressures acting on subterranean walls, and frictional and passive values for the resistance of lateral forces.
    - **Pipe Installation:** We will present recommendations for subgrade preparation, pipe bedding, materials for trench backfill, and backfill compaction.
    - **Construction Considerations:** We will present earthwork requirements, temporary excavation guidelines, subgrade preparation, geotechnical parameters for design of temporary shoring, and dewatering, if groundwater is expected to be encountered during construction.

H. **Grading Plan.** Tetra Tech will prepare grading concepts for the site for construction of the reservoir and of the completed site, access road, pipelines, and other required ancillary facilities. The plan will also address any geotechnical issues and minimize environmental and aesthetic impacts.

I. **Electrical and Controls.** Tetra Tech will develop comprehensive electrical and control design requirements to support all proposed facility improvements. All new instrumentation and equipment associated with the new tank will be connected to the existing control panel. As part of the construction phasing and implementation plan**,** Tetra Tech will ensure that existing communication, monitoring, and control systems remain operational throughout construction activities.

J. **Permits.** Tetra Tech will make applications and secure all permits with the Department of Drinking Water (DDW) and Orange County Public Works Department. The permit acquisition process will be initiated as early as practical to avoid project delay. Copies of completed permits and approvals will be inserted in the appendices of the Project Manual. IRWD will reimburse Tetra Tech for actual permit fees without surcharge. We have included a $10,000 allowance within the budget for the payment of permit fees in addition to the labor effort described above. The permitting efforts include the following agencies:

   1. ***Department of Drinking Water (DDW).*** During the site visit, Tetra Tech will reach out to the neighbors adjacent to the project site to determine where the residence's septic tank is located. Tetra Tech will submit the reservoir plans and location of the nearest septic tanks to provide DDW with the clearances between the water tank and the existing sewer septic tanks. Tetra Tech has assumed that three (3) meetings will be held with DDW via teams to first introduce the project and to review their comments and requirements throughout the design process to secure their approval.

   2. ***Orange County Public Works Permits.*** Tetra Tech has assumed that a permit will be required to construct in Olive Drive, and we will submit an application along with pertinent plans to Orange County Public Works for review and comments. We have budgeted for two (2) review submittals.

K. **CEQA Documentation.** IRWD will hire a CEQA consultant separate from this contract to prepare the CEQA documentation for this project. IRWD anticipates the preparation of a Mitigated Negative Declaration (MND). Tetra Tech will provide support to IRWD and assist with reviewing portions of the environmental documents, preparation of exhibits, attendance at one (1) virtual meeting, and providing project specific information to IRWD. We have included a budget of $10,000 to provide these support services.

L. **Hazardous Materials Inspection and Testing.** Tetra Tech in unison with National Econ Corporation will conduct a hazardous materials inspection of the existing 150,000-gallon storage reservoir to determine the potential presence of hazardous materials. We have included a budget of $5,000 for laboratory testing of potentially hazardous material samples. The following tasks are anticipated:

   1. Asbestos Containing Materials

      - Our subconsultant will perform asbestos inspection and bulk sampling of suspect asbestos containing materials by utilizing modified Asbestos Hazards Emergency Response Act (AHERA) sampling protocols.
      - Our subconsultant will analyze up to 30 utilizing Polarized Light Microscopy (PLM). Any additional samples may be performed at a cost of $25 per sample. (Excluding Point Count)

- Our subconsultant will prepare a report evaluating the findings, including remedial recommendations.

2. Lead/Lead-Based Paint

   - Our subconsultant will perform a lead-based paint inspection in accordance with modified Chapter 7 of Title X of the Housing & Community Development Act of 1992 (HUD Guidelines) 1997 Revision, of accessible spaces for lead-based paint, for compliance with the EPA Lead-Based Paint Renovation, Repair & Painting (RRP) Rule by Department of Drinking Water (DDW) certified technicians.
   - Our subconsultant will identify Lead Based Paint using X-Ray Fluorescence (XRF).
   - Our subconsultant will prepare a report evaluating the findings including submitting Form 8552 to the DDW.

3. Hazardous/Raw-Material Inspection

   - Our subconsultant will inspect the bolted tank, piping and electrical equipment for hazardous materials.
   - Our subconsultant will assess the size and construction of the steel bolted tank, piping, and electrical equipment to determine if the removal of these items will require testing of the soils beneath them.
   - Our subconsultant will provide recommendations for additional inspections and/or sampling.

M. **Surveying Services.** Tetra Tech's subconsultant, Metz Surveying, will perform a topographic survey of the Shaw Tank site located on Olive Road near the intersection of Silverado Canyon Road and Olive Road, Silverado, California. The topographic survey will collect all topographic site features as well as surface utilities within the project area extending out into the centerline of neighboring streets. We will identify or set onsite horizontal and vertical control points to assist during the construction phase of the project. A record boundary will be prepared based upon observed field monumentation and record information.

   The survey will be tied horizontally to the California State Plan Coordinate system NAD83 (2017.50 Epoch) based upon observed Orange County Public Works horizontal control points. Vertically, the survey will be tied to NAVD 88 (1995 adjustment) based upon observed Orange County Public Works benchmarks.

   All survey work performed by Metz Surveying will be under the direct supervision of a Professional Land Surveyor licensed in the State of California. An electronic copy of the topographic maps will be provided to IRWD.

N. **Project Schedule.** Tetra Tech will prepare a project schedule, including critical milestones impacting the project schedule such as permitting and coordination activities. The schedule will be prepared in Microsoft Project and will be updated monthly as described in Task 1.A.

O. **Opinion of Probable Construction Cost.** Tetra Tech will prepare an itemized opinion of probable construction cost for the proposed facilities.

P. **Preliminary Design Report (PDR).** The work described above will be summarized and compiled into a PDR. The PDR will summarize the results of the subtasks identified above along with additional design criteria identified by Tetra Tech during the preliminary design phase. We will submit the draft PDR in PDF version for review. After addressing IRWD's review comments, we will prepare and submit the Final PDR.

TASK 3 – FINAL DESIGN

The final design includes the preparation of the Contract Documents, including:

A. **Project Manual.** Tetra Tech will prepare a Project Manual in standard IRWD format. IRWD's front end documents will be utilized, and Tetra Tech will assess IRWD's documents to determine any needed supplemental General/Special Provisions that should be added to comply with IRWD's General Provisions and front-end requirements. The Project Manual will describe the allowable shutdown durations and sequencing associated with any connections and tie-ins to existing IRWD facilities. The Project Manual will also include the IRWD General Technical Specifications, including modifications, and project specific technical specifications.

B. **Construction Plans.** Tetra Tech will prepare detailed construction drawings in the latest version of AutoCAD and using NCS V4.0 layering standards, on 22-inch x 34-inch sheets utilizing IRWD's standard border template. Plan sheets will be prepared per IRWD criteria. Construction plans will be prepared using the NAVD 88 and NAD 83 survey standards.

We envision the construction drawings will consist of the following sheets:

- General and Construction Sheets (3 sheets)
- Horizontal Control Plan
- Site Demolition Plan, Sections and Details (2 sheets)
- Overall Site Plan
- Existing Site and Grading Cross Sections
- Construction Grading Plan
- Cross Sections and Site Details
- Subgrade Preparation
- Interim Site Grading Plan
- Final Grading and Drainage Details (3 sheets)
- Retaining Wall Plan and Profile (2 sheets)
- Yard Piping Plan and Profiles
- Site Details (2 sheets)
- Security Fencing and Gate Details
- Connection Details
- Piping Details
- Reservoir Piping, Appurtenances, Miscellaneous Details (2 sheets)
- Reservoir Tank Appurtenances and Details (2 sheets)
- Corrosion Protection Details (3 sheets)
- Miscellaneous Details (2 sheets)
- General Structural Notes
- Special Inspection and Structural Observations
- Reservoir Foundation Plan
- Reservoir Foundation Section
- Structural Details (3 sheets)
- Electrical Symbols and Abbreviations
- Electrical Site Plan
- Power Site Plan
- I&C Site Plan
- Grounding Plan

- Lighting Plan
- Single Line Diagram
- Schematic Diagram
- Panel Schedule
- Conduit and Fixture Schedule
- Electrical Details (2 sheets)
- I&C Symbols and Abbreviations
- Piping & Instrumentation Diagrams (P&ID)
- PLC Panel/RTU modification Plan

Total Number of Sheets: 54 sheets

C. **Project Schedule.** Tetra Tech will maintain and update the project schedule, including schedules for both design and construction activities as well as critical path items. The schedule will be prepared in Microsoft Project. A preliminary schedule outlining the preliminary and final design phase activities has been included in this proposal.

D. **Opinion of Probable Construction Cost.** Tetra Tech will prepare an itemized opinion of probable construction costs for the proposed facilities, which will be updated and submitted with each of the design deliverables described below.

E. **Design Deliverables.** We anticipate the following deliverables:

1. **60% Design Submittal.** A PDF file of the 60% submittal, including the design drawings and Project Manual. The 60% design will include components of the civil, structural, mechanical, and electrical design. It will show limits of work and location of mechanical equipment. Tetra Tech will provide preliminary plans that include the site layout, interim grading plan, on-site and off-site piping, potential location of relocated utilities, preliminary structural plan and details, preliminary electrical site plan and details, and interim grading plan, and construction phasing to confirm the basis of design. A more developed plan with high level of details will be provided during the 90% Design Submittal. The Project Manual will include the following front-end sections: contract documents, general provisions, special provisions, and general requirements. We will include a table of contents of the intended technical specifications, as well as a list of the anticipated appendices.

2. **90% Design Submittal.** A PDF file of the 90% submittal, including the design drawings and Project Manual. We will address all comments from the 60% design submittal and provide details of the various components. The Project Manual will address comments provided in the 60% submittal and will include the completed technical specifications and appendices.

3. **100% Design Submittal.** A PDF file of the 100% submittal, including the design drawings and Project Manual. We will address all comments from the 90% design submittal and provide a completed plan set. This submittal will include the completed Project Manual.

4. **Final Design Submittal.** The Final Submittal will include the AutoCAD files for the entire plan set and the MS Word version of Project Manual. We will also include one (1) full size final stamped and signed PDF file of the plan set and one (1) Project Manual for IRWD's signatures electronic signatures.

F. **Submittals in PDF Format.** Tetra Tech will submit electronic PDF files per IRWD's standardization of the use of Bluebeam Revu.

Project Manual:

- Flattened file
- Searchable PDF
- Bookmarks of major headings included in the table of contents

Plan Sets:

- Flattened file
- Searchable PDF
- Page labels that include the sheet number
- Bookmarks that include the sheet number and title for each page
- Hyperlinks for sheet numbers using Batch Link

G. **Addenda and Pre-Bid Meeting.** During the bidding period, Tetra Tech will assist with providing information and clarification of bid documents to prospective bidders. Tetra Tech will include budget for the preparation of up to two (2) addenda including revisions to the design plans and specifications and assistance with addressing bidder questions. Addenda preparation activities will include:

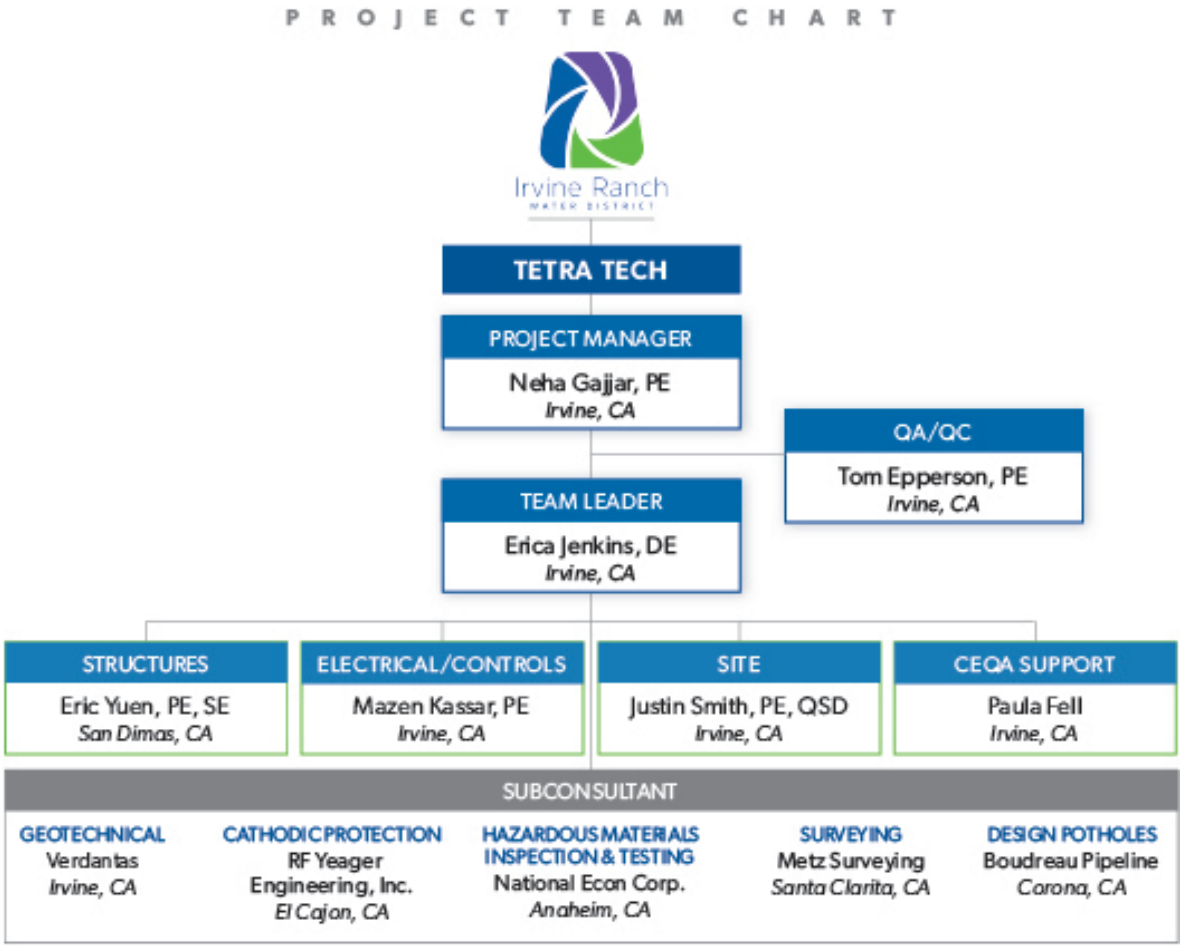
1. ***Plan Revisions:*** Per the RFP, IRWD has budgeted twenty (20) hours of appropriate staff time for plan revisions to the construction drawings. Based on our experience with the design of Flemming Zone 8 Reservoir and BPS, forty hours (40) will be more reasonable.
2. ***Specification Revisions:*** Tetra Tech will budget twenty (20) hours of appropriate staff time for revisions or additions to the project specifications.
3. ***Bidder Questions:*** Tetra Tech will budget twenty (20) hours of appropriate staff time to address and respond to bidder questions.
4. ***Pre-Bid Meeting:*** Tetra Tech will attend one (1) two-hour pre-bid meeting (conducted by IRWD). This will include a site visit with potential bidding contractors.

H. **Exclusions:**

1. No SWPPP will be provided for this project.
2. No WQMP will be provided for this project.

PROJECT TEAM

The key for success on this project is the project team we have assigned and their relationship with IRWD and their previous reservoir experience. As with past assignments for IRWD, we propose to approach this assignment with a spirit of partnership with IRWD. This will enable us to combine the knowledge, ideas, and talents of IRWD's staff with our planning, design and construction experience to provide a comprehensive set of Contract Documents.



The following introduces key members of our project team, all of whom have the knowledge, experience, and enthusiasm necessary to successfully complete your project. **It will be our collective goal to not only meet, but to exceed, your expectations.** The following paragraphs summarize the qualifications of our key project staff:

Project Manager: Ms. Neha Gajjar, P.E., will serve as the Project Manager**,** providing overall project leadership, technical oversight, quality management, and ensuring that the necessary resources are in place to support Ms. Erica Jenkins and the design team in successful project delivery. With more than 33 years of professional experience, Ms. Gajjar brings extensive expertise in water and wastewater infrastructure design**,** including constructability reviews, specification development, and quality control. She and Ms. Jenkins have collaborated for the past seven years, developing a strong, efficient working relationship that blends technical excellence with practical field experience.

For this Shaw Tank Replacement Project, Ms. Gajjar and Ms. Jenkins will jointly lead the design effort, while Mr. Tom Epperson will provide quality assurance and technical review, ensuring that the project maintains the highest standards of engineering excellence. This experienced and collaborative team will continue Tetra Tech's tradition of delivering cost-effective, high-quality solutions that align with IRWD's design standards and operational objectives. We aim to unite our deep institutional knowledge with a fresh, forward-looking perspective.

Team Leader: Ms. Erica Jenkins, will serve as Team Leader, providing overall project direction, coordination, and day-to-day communication with IRWD staff. Ms. Jenkins has more than 33 years of experience in the water and wastewater industry, encompassing the planning, design, and delivery of complex infrastructure projects including pipelines, pump stations, wells, and reservoirs. Most recently, she contributed to the IRWD **Chapman Tank Site Master Planning and Constructability Study**, gaining direct insight into the IRWD's design and operational considerations. This recent experience provides a strong foundation for initiating the Shaw Tank Replacement Project, where many of the same processes, evaluation criteria, and design methodologies will be applied.

Prior to teaming with Ms. Gajjar, Ms. Jenkins worked with Mr. Tom Epperson, P.E., on several IRWD projects prior to 2010—including the Tustin Zone 5 Booster Pump Station, Tustin Zone 5 Transmission Main, Shady Canyon Booster Pump Station, Shady Canyon Zone B and Coastal Modifications, and the Chambord Pipeline Replacement—and later collaborated with other project leads on multiple well replacement projects (Wells 115, 107, and 78). She has built a thorough understanding of the IRWD's design procedures, standards, and operational preferences. Ms. Jenkins long-standing design efforts with the Tetra Tech's team positions her to ensure a smooth transition, technical continuity, and responsive communication with IRWD's project team.

Site Work Task Leader: Justin Smith, P.E., QSD, will provide the design for the preliminary and final grading design for the tank site. Justin has over 13 years of experience at Tetra Tech.

Reservoir Structural Task Leader: Mr. Eric Yuen, P.E., S.E. will serve as the Structural Reservoir Task Leader, supporting the Project Manager and directing the efforts of the structural design team. Over the past 12 years, Mr. Yuen has played a key role in the structural design of numerous water storage reservoirs and pump station facilities, including IRWD's 3.7 MG Zone 1 Reservoir and 1.3 MG Fleming Zone 8 Reservoir and Zone 8 to 9 Pump Station. His extensive experience with reinforced concrete and steel tank structures ensures that all structural design elements will meet IRWD's standards for safety, durability, and constructability.

Electrical Task Leader: Mr. Mazen Kassar, P.E. will serve as the Electrical Task Leader, providing leadership and oversight for all electrical design components. At Tetra Tech, Mr. Kassar has been responsible for the electrical system design of most of the firm's water and wastewater facilities throughout Southern California. His expertise includes power distribution, motor control systems, instrumentation integration, and SCADA coordination, ensuring all electrical designs are reliable, code-compliant, and seamlessly integrated with IRWD's operational standards.

Quality Assurance / Quality Control: Tetra Tech has established an independent Quality Assurance/Quality Control (QA/QC) team, including constructability review, to provide objective evaluation and technical input. Mr. Epperson's involvement brings valuable regional insight and best practices gained from working with multiple Southern California agencies, allowing our team to apply proven design approaches and lessons learned that will enhance the overall quality, efficiency, and reliability of the Shaw Tank Replacement Project.

In order to provide the full range of services required for this project, we have added five (5) subconsultants to our project team. Tetra Tech will be responsible for coordinating and integrating the efforts of each subconsultant. They will serve IRWD as subconsultants to Tetra Tech.

Geotechnical Investigation:	***Verdantas (DIR Registration # 1000007443)***
Hazard Materials Inspection and Testing:	***National Econ Corporation***
Surveying:	***Metz Surveying (DIR Registration # 1000045062)***
Design Potholes:	***Boudreau Pipeline (DIR Registration # 1000003803)***
Corrosion Protection:	***RF Yeager Engineering***

Resumes are included at the end of the proposal.

STAFF	POSITION AND LOCATION	EDUCATION	NO. YEARS EXP.	AVAILABILITY/ COMMITMENT	NO. OF RESERVOIRS	PROJECTS	PROJECT DUTY
Neha Gajjar	Project Manager Irvine Office	B.S. Civil Engineering	33	15%/10%	3	Roseton Plant Improvements Reservoir Management Systems Replacement Simon Ranch Reservoir	PM
Tom Epperson	QA/QC Irvine Office	B.S. Environmental Engineering	45	10%/5%	25 concrete 14 steel	Roseton Plant Improvements 3.7MG Zone 1 Reservoir Simon Ranch Reservoir Rawlings Reservoir Nohl Canyon Reservoir Hillcrest Park Shady Canyon Reservoir	PM
Erica Jenkins	Project Engineer Irvine Office	B.S. Civil Engineering	33	33%/25%	3 concrete 7 steel	Shady Canyon Reservoir Talega DW Reservoir Ladera RW Reservoir Elizabeth Reservoir and BPS Vineyard Hills Cahuilla Desert Dunes/Wildomar/Trilogy	DE
Justin Smith	Project Engineer Irvine Office	B.S. Civil Engineering	13	10%/5%	N/A	Bristol-Tolliver Street Urban Greening Project Harbor Refuse Collection Yard Stormwater Glen Anderson Park Regional Stormwater Capture Green Streets Project Santa Ana Downton Flood Reduction and Stormwater Infiltration	PE
Eric Yuen	Structural Engineer San Dimas Office	B.S. Civil Engineering	12	25%/20%	8 concrete 3 steel	3.7 MG Zone 1 Reservoir Simon Ranch Reservoir Rawlings Reservoir Plant 224	SE
Mazen Kassar	Electrical Engineer Irvine Office	B.S. Electrical Engineering	27	20%/15%	N/A	Orange Heights Zone 6 Reservoir Fleming Zone 8 Reservoir 3.7 MG Zone 1 Reservoir Simon Ranch Reservoir	EE

Legend: PM – Project Manager; PE – Project Engineer; DE – Design Engineer; SE – Structural Engineer; EE – Electrical Engineer.

EXPERIENCE

Tetra Tech is a Delaware Corporation (publicly traded) and has been in business for over 59 years. Founded in 1966, Tetra Tech is a nationally recognized engineering and resource management firm of more than 30,000 engineers, scientists, construction specialists, and technical support personnel in 550 offices worldwide. Listed on the NASDAQ Exchange (TTEK), Tetra Tech's annual revenues now exceed $5.2 billion (2025). Thus, we are in an excellent financial position and can provide the necessary resources to rapidly deploy and meet aggressive project schedules.

Tetra Tech consistently ranks among the top engineering firms annually according to the Engineering News Record. **In 2025, ENR rated Tetra Tech 1st in the "Water Treatment & Desalination" category, 2nd in the "Sewer & Waste" category, and 3rd among the "Top 500 Design Firms" nationwide!**

Tetra Tech is a leading provider of specialized management consulting and technical services. Our management consulting services are complemented by our technical services, including research and development, applied science, engineering and architectural design, construction management, and operations and maintenance. Our clients include a diverse base of public and private sector organizations located in the U.S. and internationally.

Reservoir Experience

During the last 15 years, our Project Team has designed over **64 reservoirs**, **13 of which were steel reservoirs** within Southern California. The following table summarizes the experience of our Project Team on a variety of reservoir projects, not just prestressed concrete types.

Type of Reservoir	Last 10 Years (2014 to 2024)	Previous 5 Years (2009 to 2013)	16 to 20 Years (2004 to 2008)	Total During Last 20 Years
Reinforced Concrete	14	3	13	**30**
Prestressed Concrete	8	2	11	**21**
Welded Steel Reservoir	3	1	9	**13**
Total	**25**	**6**	**33**	**64**

IRWD Design Experience

The Tetra Tech Project Team offers a well-balanced blend of long-standing experience with IRWD and broad technical expertise in water and wastewater infrastructure. Ms. Neha Gajjar, P.E., Mr. Tom Epperson, P.E., and Ms. Erica Jenkins bring together more than 100 years of combined professional experience in the planning, design, and delivery of complex water, wastewater, and recycled water projects. Their collaboration builds upon Tetra Tech's decades-long partnership with IRWD, ensuring design continuity, technical consistency, and alignment with IRWD standards and expectations.

For over 25 years, Tetra Tech has supported IRWD in developing and improving its critical infrastructure encompassing reservoirs, pump stations, wells, pipelines, and feasibility studies. This deep, ongoing relationship has given our team a comprehensive understanding of IRWD's design procedures, electrical and P&ID standards, preferred materials, and operational practices, allowing us to produce coordinated,

cost-effective, and high-quality designs that meet the IRWD's goals for performance and constructability.

REPRESENTATIVE IRWD PAST PROJECTS	
Type of Projects	**Descriptions**
Reservoir Projects	1.3 MG Fleming Zone 8 Reservoir and Zone 8 to 9 Pump Station, 3.7 MG Zone 1 Reservoir, Second Zone 1 Reservoir, Shady Canyon Reservoir, Orange Heights Reservoir, Shady Canyon Zone B and Coastal Modifications
Reservoir Feasibility Study	Chapman Tank Site Master Planning and Constructability Study
Pump Station Projects	South County Booster Pump Station, Zone 1 to 3 BPS, Tustin Zone 5 BPS, Shady Canyon Zone B BPS, Santiago Hills II Zone 5 to 6 and 5 to 7 BPS, Tustin Ranch Emergency Pump, and Coastal Zone 6 and Zone H Booster Pump Station
Well Projects	Wells Improvement Project, Dyer Road Well Field Surge Tank, Wells 115, 107, and 78 Replacement, IDP Wells 115, 76, 77, and 110, and multiple IDP Well Head Facilities (10 total)

These projects collectively highlight Tetra Tech's familiarity with IRWD's infrastructure and our proven ability to deliver innovative, dependable, and cost-effective design solutions that continue to support the IRWD's long-term operational success.

Overall Reservoir Design References

Client	Project Name	Capacity (Mg)	Construction Value ($M)	Completion Date
Golden State Water Company Central District 12035 Burke Street, Suite 1 Santa Fe Springs, CA 90670 Brian To, PE 562/236-6017	Roseton Plant Improvements	0.75 MG **(Steel)**	$6 M	Jan 2026
Irvine Ranch Water District 15600 Sand Canyon Avenue Irvine, CA 92618 Jacob Moeder, PE 949/453-5554	Fleming Tank and Zone 8-9	1.3 MG	$14 M	December 2025
City of South Gate 8650 California Avenue South Gate, CA 90280 Kenneth Tang, PE 323/563-9574	Elizabeth Reservoir and Pump Station	1.8 MG **(Steel)**	$10.6 M	2018
City of Tustin 300 Centennial Way Tustin, CA 92780 Douglas Stack, PE 714/573-3150	Simon Ranch Reservoir Rawlings Reservoir	1.0 MG Two – 3.0 MG	$9 M $10 M	2021 2013

Client	Project Name	Capacity (Mg)	Construction Value ($M)	Completion Date
City of Anaheim 201 S. Anaheim Blvd., Suite 601 Anaheim, CA 92805 Bill Moorhead, PE 714/765-4165	Nohl Canyon Tank	10 MG	$16 M	2012
Suburban Water 1325 N. Grand Ave. Suite 100 Covina, CA 91724 Jorge Lopez 626/543-2500	Plant 224	2.4 MG & 4.7 MG	$13 M	2015
City of Ontario 1425 S. Bon View Ave. Ontario, CA 91761 Scott Burton 909/395-2682	Milliken 1010-281 925-2A Reservoir	Two – 9.0 MG 6.0 MG	$14.5 M $4.0 MG	2008 2006
Santa Margarita WD 26111 Antonio Parkway Las Flores, CA 92688 Daniel Ferons, PE 949/459-6590	Talega Domestic Talega Recycled Ladera Domestic Ladera Recycled	6.0 MG 4.0 MG **(Steel)** 6.0 MG 4.0 MG **(Steel)**	$8 M $9 M	2003 2003/2005

SUMMARY

Client satisfaction is a major objective for Tetra Tech. This commitment to our clients has earned us the privilege of providing continuous services to all our above-mentioned references. We believe that our clients will attest to our technical excellence and responsive staff. We encourage you to contact our references to verify our past performance firsthand.

However, we believe our best reference is IRWD. We are confident that our past projects with IRWD, specifically, will attest to our technical excellence, responsive staff, and our complete understanding of every aspect of this project.

SCHEDULE

Tetra Tech has reviewed the project scope of services and understands the importance of the schedule. We are familiar with the project site and understand the purpose of the work and the extent of our efforts which will be necessary to complete the project. In addition, our project team's familiarity with IRWD standards and our past experience with reservoir design will be valuable to meet a reasonable schedule. Tetra Tech has reviewed the current and planned workload for our project team. They are available to immediately begin work on this project.

Per the RFP, the design is to be completed by September 2026, however, in our experience, we believe this effort will take an additional three months to complete. Considering the holidays this may extend a few weeks past this date into the middle of January. The following table on the next sheet presents our proposed schedule to complete the design successfully:

Task or Milestone	Milestone Date
Notice of Award (Design)	December 16, 2025
Kick-off Meeting	January 6, 2026
Receive Completed Geotechnical Report (Approx. 8 weeks)	March 10, 2026
Draft PDR Submittal	May 5, 2026
IRWD Review – Draft PDR Submittal (2 weeks)	May 19, 2026
Final PDR Submittal and 60% Design	July 14, 2026
IRWD Review – Final PDR Submittal and 60% Design (2 weeks)	July 28, 2026
90% Design Submittal	September 22, 2026
IRWD Review – 90% Submittal (3 weeks)	October 13, 2026
100% Design Submittal	December 8, 2026
IRWD Review – 100% Submittal (2 weeks)	December 22, 2026
Plans Approved	January 19, 2027
Bid Opening and Notice of Award (Construction)	March 2, 2027

It is our opinion that the critical path will be determining the location of the new reservoir.

BUDGET

As requested in the RFP, Tetra Tech has included our budget proposal in a separate sealed envelope. Our budget proposal includes estimated hours per task, subconsultant costs, reproduction and other direct costs. We have also included our proposed Hourly Rate Schedule and a not-to-exceed amount for each phase of the work.

MISCELLANEOUS

Joint Venture. No joint ventures will be used on the project.

Conflict of Interest. Tetra Tech has no Conflicts of Interest on this project.

Insurance. Tetra Tech has insurance coverage in the limits required in the request for proposal. A copy of our insurance documentation is attached at the end of this proposal.

Figures

SITE CONSTRAINTS		
#	UTILITY/AGENCY	CONSTRAINTS
1	AT&T Panel & SCE Meter	Tetra Tech will Confirm Clearances during Design
2	Creek	Tetra Tech will Confirm Clearance from Creek during Design
3	Septic Tank	Tetra Tech will Confirm Location & Clearance during Design 100 ft Clear from Tank
4	Tank Site - Canyon Wall	Tetra Tech will Confrim if Additional Space is Required to Construct a Larger Tank closer to the Steel Eastern Wall of Silverado Canyon near the Back of the Site
5	Trees on the East Side of the Site	Tetra Tech will Confirm Clearances f a Welded Tank is to be Constructed to Mitigate Fire Hazard
6	OCPW Setbacks	Tetra Tech will Confirm Clearanced during Design

Irvine Ranch WATER DISTRICT

N

SHAW TANK REPLACEMENT PROJECT

Site Layout | Demolition & Upgrade

Figure 1

TETRA TECH

Irvine Ranch
WATER DISTRICT

Qualifications

TETRA TECH

Fleming Zone 8 Tank and Zone 8 to 9 Booster Pump Station Improvements

Irvine, CA

Engineering Fee
$927,000

Construction Costs
$9.8M

Project Duration
December 2019 - November 2023

Project Team
Tom Epperson, PE
Project Manager

Neha Gajjar, PE
Deputy Project Manager

Justin Smith, PE, QSD
Project Engineer

Erica Jenkins
Design Engineer

Mazen Kassar, PE
Electrical/Controls Manager

Eric Yuen, PE, SE
Structural Manager

Reference
Irvine Ranch Water District
Richard Mori, PE
Principal Engineer - Capital Projects
mori@irwd.com

IRWD provides potable water supply service to the Santiago Area located in an unincorporated region of Orange County. This service area includes four distinct sub-areas containing a system of reservoirs and pump stations that solely rely on the existing 150,000-gallon steel Zone 8 Fleming storage reservoir and the existing Zone 8 to 9 booster pump station as the main source of water supply.

In 2017, IRWD completed an analysis and recommended improvements for the undersized infrastructure and requirements for additional storage. This project included several primary components, including:

- Demolition of the existing reservoir and pump station
- A new above ground 1.3 MG prestressed concrete reservoir
- Replacement of the Zone 8 to 9 pump station with three 600 GPM pumps
- A replacement storage building
- An RMS building with sodium hypochlorite/aqueous ammonia treatment
- A 2,000-gallon diesel fuel storage tank
- Siting for electrical service, controls, and telemetry improvements

Tetra Tech was selected to provide design, permitting, and construction services for IRWD's 1.3 MG Fleming Zone 8 Reservoir and Zone 8 to 9 Pump Station. Construction phasing was critical for this project, since the new construction took place at an existing facility that was the sole source of water to numerous subareas. The work included demolishing existing facilities and designing a 1.3 MG prestressed concrete reservoir, grading into a rocky hillside for the pump station, three 670-gallon-per-minute pumps, a surge tank, a Reservoir Management System chemical feed system, inlet and outlet piping, overflow and drain piping to an open channel, and a stormwater biofiltration system. In addition, our team coordinated with AT&T to remove and relocate the cellular tower to a temporary location during construction and provide a location for the permanent facility.

Roseton Plant Improvements

Artesia, CA






Engineering Fee
$320,000

Construction Costs
$6M

Project Duration
March 2022 - Present

Project Team

Tom Epperson, PE
Project Manager

Neha Gajjar, PE
Deputy Project Manager

Erica Jenkins
Design Engineer

Mazen Kassar, PE
Electrical/Controls Manager

Eric Yuen, PE, SE
Structural Manager

Reference

Golden State Water Co.
12035 Burke Street
Santa Fe Springs, CA 90670

Brian To, PE
Capital Program Manager
Brian.To@gswater.com

The Golden State Water Company has a site consisting of two active wells and chemical treatment. They would like to add a 0.75-MG welded steel reservoir, booster station, and backup power generator to the existing Roseton plant. The project will also include the relocation of the Fe/Mn backwash tank and skid-mounted recycle pump, and the MCC for Well No. 2. The facilities that will remain include Well Nos. 1 and 2, the three bay chemical building, Fe/Mn treatment system, and SCE transformer, if it is determined that it is adequately sized for the proposed and existing facilities.

The booster pump station is to be comprised of four vertical turbine pumps, each with a capacity of 1,000 GPM against system pressure (with assumed 75-HP motors). The new welded steel reservoir (WSR) will have a usable capacity of 0.75 MG with a separate inlet and outlet. The WSR inlet will incorporate an altitude valve to control tank filling with system water. Desired WSR dimensions will have a maximum external height of 30 feet, an overflow level equal to 26 feet, and a diameter of approximately 70 feet. The groundwater wells will discharge into the WSR following wellhead treatment. The WSR design will also include improvements to fill it from the distribution system via an altitude valve.

Elizabeth Reservoir and Booster Pump Station and Water Well No. 29

South Gate, CA

Engineering Fee
$900,000

Construction Costs
$12M

Project Duration
February 2014 - May 2019

Project Team
Tom Epperson, PE
Project Manager

Erica Jenkins
Design Engineer

Mazen Kassar, PE
Electrical/Controls Manager

Eric Yuen, PE, SE
Structural Manager

Reference
City of South Gate
8650 California Avenue
South Gate, CA 90280

Kenneth Tang, PE
Senior Civil Engineer
ktang@sogate.org

Tetra Tech is providing engineering design services for a water storage tank and booster pump station and a water well with disinfection equipment. The projects have been set up in following two stages:

Water Storage Tank and Booster Pumps: The City of South Gate (City) is constructing an above ground welded steel tank reservoir with a storage capacity of 1.8 million gallons, a booster pump station, and relevant appurtenant infrastructure designed to increase water and fire flow capacity and system pressure in the community. The reservoir, booster pump station and appurtenances will be constructed at the existing City Well No. 28 Site located at 3414 Ardmore Avenue, South Gate. Site improvements include site lighting, site paving, electrical, and SCADA interface. The proposed reservoir will be connected to the City's existing water system.

Water Well No. 29 and Disinfection Equipment: The water well site is located at the Santa Fe Avenue Reservoir at 2700 Ardmore Avenue, South Gate and currently contains an existing 500,000 gallon elevated water tank. The City anticipates that the new well will produce approximately 2,500 gallons per minute and will be supported by a standby emergency generator for backup power with a diesel storage tank. Chlorination facilities are included in the design and will be housed inside a separate building. Disinfection equipment will include sodium hypochlorite tanks, metering pumps, and associated appurtenances. Site improvements will include a perimeter concrete block wall, site lighting, site paving, electrical, and SCADA interface. The well discharge pipeline will be connected to the City's existing water system. The project included seismic retrofit and re-coating of the existing 500,000 elevated water tank.

Rawlings Reservoir

Tustin, CA

Engineering Fee
$610,000

Construction Costs
$11M

Project Duration
November 2004 - August 2011

Project Team
Tom Epperson, PE
Project Manager

Erica Jenkins
Design Engineer

Mazen Kassar, PE
Electrical/Controls Manager

Eric Yuen, PE, SE
Structural Manager

Reference
City of Tustin
300 Centennial Way
Tustin, CA 92780

Douglas Stack, PE
Principal Engineer
dstack@tustinca.org

Project Award
ASCE Orange County Branch, Water Project of the Year, 2013

Tetra Tech provided design engineering services, including completion of the final plans and specifications, and construction support services during the demolition and the construction of the Rawlings Reservoir. The City of Tustin's existing 4 MG Rawlings Reservoir was constructed in 1971. Due to age and condition of the structure, Tetra Tech was contracted to provide engineering design services to prepare contract documents for the demolition of the existing reservoir and then to prepare contract documents for the construction of two 3.0 MG prestressed circular concrete tanks. The tanks are located on a tight site, where space for excavation and material stockpiling during construction presented many challenges. Shoring for excavations was anticipated up to 35 feet in depth would be required during construction. To ensure that the two tanks could be built on the proposed site, a shoring feasibility analysis was performed to determine the constructability and anticipated costs of tie-back and cantilever shoring, in addition to the design of the reservoirs. The tank designs consider all applicable combinations of dead, live, soil, hydrostatic and seismic loadings.

Construction support services include project management, progress meeting attendance, responding to submittals and RFIs, minor plan changes based on field conditions, change order support, and preparation of record drawings.

Simon Ranch Reservoir Replacement

Tustin, CA

Engineering Fee
$637,000

Construction Costs
$10M

Project Duration
November 2014 - November 2019

Project Team
Tom Epperson, PE
Project Manager

Neha Gajjar, PE
Deputy Project Manager

Justin Smith, PE, QSD
Design Engineer

Mazen Kassar, PE
Electrical/Controls Manager

Eric Yuen, PE, SE
Structural Manager

Reference
City of Tustin
300 Centennial Way
Tustin, CA 92780

Eric Johnson, PE
Principal Engineer
ejohnson@tustinca.org

Tetra Tech provided design engineering services, including the completion of final plans and specifications for the demolition and construction of Simon Ranch Reservoir. The existing 1.4 MG rectangular, hopper bottom tank constructed in 1960 and due to its age and condition the City of Tustin elected to replace the reservoir. Tetra Tech was contracted to provide engineering design services to prepare contract documents for the demolition of the existing reservoir and then to prepare contract documents for the construction of a 1.0 MG prestressed circular concrete tank on the same site as the existing Simon Ranch Reservoir, along with a proposed pump station. The design of the proposed tank required partial demolition of the existing tank, determination of a proposed interim grading plan, shoring concepts, and additional geotechnical investigations to confirm that adjacent homes would not be impacted by excavation and grading.

Other design considerations for the Simon Ranch Reservoir Project included: coordination with an architect to develop a site landscape concept, perimeter wall, and tank façade that fit in with the neighborhood; coordination with the California Department of Drinking Water; site drainage and Water Quality Management Plan preparation.

Irvine Ranch
WATER DISTRICT

PROPOSAL TO PROVIDE

ENGINEERING SERVICES FOR THE

SHAW TANK
Replacement Project

TETRA TECH

TETRA TECH

November 12, 2025

Nang Mwe, PE, Project Manager
Irvine Ranch Water District
Engineering Department
15600 Sand Canyon Ave.
Irvine, CA 92618

Reference: Fee Proposal to Provide Engineering Design Services for the Shaw Tank Replacement Project

Dear Ms. Mwe,

Tetra Tech is eager to submit our fee proposal to provide engineering design services for the Shaw Tank Replacement Project. All work will be performed on a time and material basis "not-to-exceed" the contract price and no additional compensation will be received beyond the price negotiated to be performed unless changes are approved in advance by an amendment to our contract signed by the Irvine Ranch Water District.

Attached is our work plan with a breakdown of labor hours by employee billing classification, together with the cost of non-labor and subconsultant services included in the fee proposal. The attached rate schedule includes Tetra Tech's standard billing rates for all classifications of staff likely to be involved in the project; as well as overhead, profit, and expenses.

Tetra Tech appreciates the opportunity to submit our fee proposal and looks forward to your positive response. Should you require additional information or have any questions regarding our submittal, please feel free to contact me at 949/809-5026 or via email at neha.gajjar@tetratech.com.

Respectfully,

Neha Gajjar, PE
Senior Project Manager

Attachments

M:\Marketing\Proposals\FY 2026\IRWD_CA_ShawTankReplacement

Price Proposal

Shaw Tank Replacement Project

Tank Replacement

Submitted to: Irvine Ranch Water District

Contract Type: T&M

Labor Plan

18 Resource

Project Phases / Tasks	Total Labor Hrs	Civil/Mech	Sr Project Manager (Neha Gajjar)	Civil/Mech	Civil QA/QC (Tom Epperson)	Civil/Mech	Site Project Manager (Justin Smith)	Civil/Mech	Sr Engineer 2 (Erica Jenkins)	Civil/Mech	Engineer 3 (Justin Clark)	Civil/Mech	Engineer 1 (Nicholas Mao)	Civil/Mech	Cadd (Russ Wojtaszek)	Civil/Mech	Sr Project Administrator (Deana Escamilla)	Structural	Structural QA/QC (Eric Yuen)	Structural	Structural Engineer (Jose Quiroz)	Structural	Engineer 2 (Miguel Magpantay)	Structural	Sr Cad Designer 2 (Eric Hutchins)	Electrical	Electrical QA/QC (Mazen Kassar)	Electrical	Electrical Engineer (James Roberts)	Electrical	Engineer 1 (Bryan Kim)	CEQA	Sr Planner 3 (Paula Feil)	CEQA	Sr Planner 3 (Jenna Farrell)	CEQA	Sr Planner 3 (Christopher Williams)
Project Phases / Tasks	**3,100**		113		90		120		267		534		536		356		64		86		132		80		120		78		216		258		8		12		30
Task 1: Project Management	**400**		**62**		**80**		**8**		**74**		**-**		**-**		**-**		**8**		**54**		**30**		**-**		**-**		**54**		**30**		**-**		**-**		**-**		**-**
Preparation of Project Status Reports	56		32						24																											
Meetings (9) and Workshop (1) (2 hr/mtg)	137		20						32								5		20		20						20		20							
Meetings (5) In-Person	71		10						18								3		10		10						10		10							
Constructability Review and QA/QC	136				80		8												24								24									
Task 2: Preliminary Design	**877**		**12**		**4**		**12**		**107**		**256**		**184**		**104**		**16**		**16**		**42**		**16**		**8**		**8**		**28**		**14**		**8**		**12**		**30**
Review Background Information	16								2		8		6																							
Utility Research	22								2		4		12				4																			
Coordinate Utility Relocations (SCE and AT&T)	80								40		40																									
Potholes (10 potholes)	2										2																									
Shaw Tank Siting	70		2						4		16		24		24																					
Structural Preliminary Design (Coordination with Tank Manufacturer)	62								4										12		30		16													
Pre-Engineered and Signed Tank Design (2 manufacturers)	-																																		
Site Master Planning (3 - Layouts)	100		2		4				12		24		30		24		4																			
Onsite Pipelines	54		2						4		24		8		16																					
Construction Phasing	28								8		8		8		4																					
Geotechnical Investigation	2										2																									
Grading Plan	36						12		2		6				16																					
Electrical and Controls	26																										4		16		6					
Permit Coordination	52								4		36		12																							
Permit Fees	80								4		36		40																							
CEQA Documentation Assistance	52								2																							8		12		30
Hazardous Materials Inspection	2										2																									
Hazardous Material Testing	-																																			
Surveying Services	6										2				4																					
Project Schedule	15								1		6		8																							
Opinion of Probable Construction Cost	48		2						6		16		24																							
Preliminary Design Report (PDR) Preparation	124		4						12		24		12		16		8		4		12				8		4		12		8					
Task 3: Final Design	**1,823**		**39**		**6**		**100**		**86**		**278**		**352**		**252**		**40**		**16**		**60**		**64**		**112**		**16**		**158**		**244**		**-**		**-**		**-**
Project Manual	60		8		2				12		30						8																			
Construction Plans	**1,351**		**21**		**-**		**100**		**58**		**164**		**128**		**244**		**-**		**14**		**52**		**64**		**104**		**14**		**150**		**238**		**-**		**-**		**-**
General/Title (4 Sheets)	63	-	5						8		18		16		16			-								-					-					
Civil/Site (16 Sheets)	483	-	11				100		36		92		68		152			-	4		8				12	-					-					
Mechanical (9 Sheets)	187	-	5						10		52		44		76			-								-					-					
Structural (7 Sheets)	612	-																-	10		44		64		92	-	14		150		238	-					
Electrical (15 Sheets)	-	-																-								-					-					
Corrosion (3 Sheets)	6	-							4		2							-								-					-	1,060				
Project Schedule	18								2		8		8																			2,470				
Opinion of Probable Construction Cost	38		4		2				4		12		16																			6,360				
Design Deliverables	180										40		120				20															22,800				
Submittals in PDF Format	96								2		8		80				6															11,950				
Addenda Preparation and Pre-Bid Meeting	80		6		2				8		16				8		6		2		8				8		2		8		6	14,450				
Totals	**3,100**		**113**		**90**		**120**		**267**		**534**		**536**		**356**		**64**		**86**		**132**		**80**		**120**		**78**		**216**		**258**		**8**		**12**		**30**

Price Summary / Totals

Task Pricing Totals	680,000
Specify Add'l Fees on Setup	0
Technology Use Fee	
Total Price	**680,000**

Pricing by Resource

	Labor	Subs	ODCs	Task Pricing Totals
	532,710	133,745	13,545	**680,000**
Task 1: Project Management	**108,290**	**-**	**1,720**	**110,010**
Preparation of Project Status Reports	14,760			14,760
Meetings (9) and Workshop (1) (2 hr/mtg)	31,940			31,940
Meetings (5) In-Person	16,430		1,720	18,150
Constructability Review and QA/QC	45,160			45,160
Task 2: Preliminary Design	**139,145**	**103,845**	**11,825**	**254,815**
Review Background Information	2,230			2,230
Utility Research	2,950		825	3,775
Coordinate Utility Relocations (SCE and AT&T)	13,400			13,400
Potholes (10 potholes)	280	18,400		18,680
Shaw Tank Siting	10,250			10,250
Structural Preliminary Design (Coordination with Tank Manufacturer)	11,740			11,740
Pre-Engineered and Signed Tank Design (2 manufacturers)		34,500		34,500
Site Master Planning (3 - Layouts)	15,650			15,650
Onsite Pipelines	8,210			8,210
Construction Phasing	4,260			4,260
Geotechnical Investigation	280	33,350		33,630
Grading Plan	6,470			6,470
Electrical and Controls	4,530			4,530
Permit Coordination	7,260			7,260
Permit Fees	10,620		11,000	21,620
CEQA Documentation Assistance	10,140			10,140
Hazardous Materials Inspection	280	6,095		6,375
Hazardous Material Testing		5,750		5,750
Surveying Services	900	5,750		6,650
Project Schedule	1,995			1,995
Opinion of Probable Construction Cost	6,920			6,920
Preliminary Design Report (PDR) Preparation	20,780			20,780
Task 3: Final Design	**285,275**	**29,900**	**-**	**315,175**
Project Manual	10,900			10,900
Construction Plans	**216,345**	**29,900**	**-**	**246,245**
General/Title (4 Sheets)	10,055			10,055
Civil/Site (16 Sheets)	82,545			82,545
Mechanical (9 Sheets)	27,865			27,865
Structural (7 Sheets)	94,820			94,820
Electrical (15 Sheets)		29,900		29,900
Corrosion (3 Sheets)	1,060			1,060
Project Schedule	2,470			2,470
Opinion of Probable Construction Cost	6,360			6,360
Design Deliverables	22,800			22,800
Submittals in PDF Format	11,950			11,950
Addenda Preparation and Pre-Bid Meeting	14,450			14,450

TETRA TECH

Exhibit A
2025
HOURLY CHARGE RATE AND EXPENSE REIMBURSEMENT SCHEDULE

Project Management	
Project Manager 1	$230.00
Project Manager 2	$290.00
Sr Project Manager	$315.00
Program Manager	$360.00
Principal in Charge	$360.00
Engineers	
Engineering Technician	$100.00
Engineer 1	$120.00
Engineer 2	$130.00
Engineer 3	$140.00
Project Engineer 1	$150.00
Project Engineer 2	$180.00
Sr Engineer 1	$190.00
Sr Engineer 2	$195.00
Sr Engineer 3	$220.00
Principal Engineer	$300.00
Planners	
Planner 1	$105.00
Planner 2	$115.00
Sr Planner 1	$135.00
Sr Planner 2	$150.00
Sr Planner 3	$195.00
Designers & Technicians	
CAD Technician 1	$65.00
CAD Technician 2	$75.00
CAD Technician 3	$90.00
CAD Designer	$105.00
Sr CAD Designer 1	$145.00
Sr CAD Designer 2	$155.00
CAD Director	$160.00
Survey Tech 1	$50.00
Health & Safety	
H&S Administrator	$95.00
Sr H&S Administrator	$115.00
H&S Manager	$145.00

Construction	
Construction Project Rep 1	$80.00
Construction Project Rep 2	$90.00
Sr Constr Project Rep 1	$110.00
Sr Constr Project Rep 2	$120.00
Construction Manager 1	$170.00
Construction Manager 2	$190.00
Construction Director	$235.00
General & Administrative	
Project Assistant 1	$75.00
Project Assistant 2	$80.00
Project Administrator	$100.00
Sr Project Administrator	$140.00
Sr Graphic Artist	$150.00
Technical Writer 1	$97.00
Technical Writer 2	$124.00
Sr Technical Writer	$155.00
Information Technology	
Systems Analyst / Programmer 1	$77.00
Systems Analyst / Programmer 2	$115.00
Sr Sys Analyst / Programmer 1	$130.00
Sr Systems Analyst / Programmer 2	$196.00
Project Accounting	
Project Analyst 1	$90.00
Project Analyst 2	$114.00
Sr Project Analyst	$155.00
Reimbursable In-House Costs:	
Photo Copies (B&W 8.5”x11”)	$0.15/Each
Photo Copies (B&W 11”x17”)	$0.40/Each
Color Copies (up to 8.5"x11")	$2.00/Each
Color Copies (to 11"x17")	$3.00/Each
Compact Discs	$10/each
Large format copies	$0.40 S.F.
Mileage-Company Vehicle	$0.90/mile
Mileage-POV	$0.70/mile*
*current GSA POV mileage rate subject to change	

All other direct costs, such as production, special photography, postage, delivery services, overnight mail, printing and any other services performed by subconsultant will be billed at cost plus 15%.

NOTE: Rates subject to change annually.

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December 9, 2025
Prepared by: J. Burk / J. Moeder
Submitted by: K. Burton
Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

HOWILER WATER TREATMENT PLANT TO ZONE 5 PUMP STATION
CONSULTANT SELECTION

SUMMARY:

IRWD and Serrano Water District (SWD) executed a Purchase and Sale Agreement that transferred ownership of several facilities, including IRWD acquiring the Howiler Water Treatment Plant (Howiler WTP) from SWD. The product water pump station at Howiler WTP currently pumps potable water to SWD's Smith Reservoir. IRWD requested proposals from three consultants to replace the existing product water pump station with pumps and associated improvements to feed IRWD's Zone 5 system. Staff recommends that the Board authorize the General Manager to execute a Professional Services Agreement with MKN in the amount of $788,681 for engineering design services for the Howiler WTP to Zone 5 Pump Station project.

BACKGROUND:

The Howiler WTP is rated as a four million gallons per day surface water treatment plant that delivers potable water to SWD's Smith Reservoir with three pumps (two duty and one standby), each with a capacity of 1,300 gallons per minute. Each of the existing pumps use 25 horsepower motors since there are minimal lift requirements to feed Smith Reservoir that is located at a lower elevation than the treatment plant. In the event of a power outage, an existing backup generator provides emergency power to the entire Howiler WTP including the product water pump station.

In December 2024, IRWD and SWD executed a Water Service Reliability Agreement that described interconnection improvements between the two water districts, including installing a pipeline interconnection and modifications to the Howiler WTP to deliver water from the plant to IRWD. Design for the pipeline interconnection, which will connect IRWD's Zone 5 system to SWD's Smith Reservoir, is underway. Once the interconnection is constructed, improvements to Howiler WTP will begin to deliver product water to IRWD's Zone 5 system. Staff is proceeding with the pump station improvements design to be ready for construction upon completion of the pipeline interconnection improvements.

Delivering Howiler WTP product water to IRWD's Zone 5 system requires replacing the existing pumps, motors, and associated electrical equipment and treatment plant electrical service to accommodate the increase lift of over 300-feet. The project, which is largely focused on the pump station improvements, includes other related improvements associated with the increased hydraulic and electrical demands including adding surge suppression facilities, replacing the existing generator, and incorporating structural improvements to the existing product water wet well.

Consultant Selection:

Staff issued a Request for Proposals for engineering design services for the pump station improvements to three design firms including Carollo, MKN, and Tetra Tech. Staff received proposals from Carollo and MKN. Tetra Tech declined to submit citing heavy existing workloads and schedule conflicts with their pump station design staff.

While both Carollo and MKN's proposals met the project objectives and presented qualified teams, MKN's proposal provided greater overall value. MKN's proposal identified treatment process concerns with upsizing the product water pump station, and thoroughly explained their approach to developing startup plans, which is an element of the design phase scope of work. MKN demonstrated extensive pump station rehabilitation experience with many recent projects. The consultant selection matrix is attached as Exhibit "A," and MKN's scope of work and fee proposal are attached as Exhibit "B."

Staff recommends that the Board authorize the General Manager to execute a Professional Services Agreement with MKN in the amount of $788,681 for engineering design services for the Howiler WTP to Zone 5 Pump Station project.

FISCAL IMPACTS:

The Howiler WTP to Zone 5 Pump Station, Project 13174, is included in the FY 2025-26 Capital Budget. The existing budget is sufficient to fund the recommendation presented herein.

ENVIRONMENTAL COMPLIANCE:

This project is subject to the California Environmental Quality Act (CEQA). In conformance with the California Code of Regulations Title 14, Chapter 3, Section 15004, the appropriate environmental document will be prepared when "meaningful information" becomes available.

RECOMMENDATION:

That the Board authorize the General Manager to execute a Professional Services Agreement with MKN in the amount of $788,681 for engineering design services for the Howiler Water Treatment Plant to Zone 5 Pump Station, Project 13174.

LIST OF EXHIBITS:

Exhibit "A" – Consultant Selection Matrix
Exhibit "B" – Scope of Work and Fee Proposal

Exhibit "A"

CONSULTANT SELECTION MATRIX

Howiler to Zone 5 Pump Station						
Item	Description	Weights	MKN		Carollo	
A	TECHNICAL APPROACH					
1	Project Understanding	30%	1		2	
2	Project Approach	30%	1		2	
3	Project Team	40%	2		1	
	Weighted Score		1.40		1.60	
	Ranking of Consultants		1		2	
B	SCOPE OF WORK					
TASK	DESCRIPTION		Task Hours	Fee	Task Hours	Fee
1	**Project Management**		292	**$83,656**	196	**$63,894**
2	**Basis of Design Report**		524	**$246,450**	1,424	**$410,705**
3	**Final Design**		1256	**$447,672**	3,132	**$794,756**
	TOTAL ENGINEERING SERVICES FEE WITHOUT OPTIONAL TASKS		2,072	**$777,778**	4,752	**$1,269,355**
4	**Optional Tasks**					
4.1	Survey Services		10	**$10,903**	-	-
4.2	MCC-A Replacement		-	**-**	330	84,520
	TOTAL ENGINEERING SERVICES FEE INCLUDING OPTIONAL TASKS		2,082	**$788,681**	5,082	**$1,353,875**
C	OTHER					
	Technical Drawings					
	Total Sheets		52	dwgs	104	dwgs
	Engineering Services Fee per Design Drawings		$15,167		$13,018	
	Personnel					
	Role		**Years of Experience**		**Years of Experience**	
	Principal-In-Charge		Ryan Gallagher	19	Troy Hedlund	20
	Project Manager		Safa Kamangar *	28	Jeff Weishaar *	21
	QA/QC		Dennis Phinney *	46	Juan Loera	30
	Electrical QC		Justin Lee	20	Marissa Petty	17
	Project Engineer		Chang Ye *	20	Susan Fox *	20
	Pipeline Design		Parasto Azami	11	Justin Mercer	13
	Pump Station Design		Kathleen Labrador	11		
	Surge Analysis		Josh Nord	27	Richard Humphreys	39
	Electrical Design Lead		Omid Khodadadi *	11	Max Nasirzadeh *	35
	Instrumentation/Controls		Shawn B. Rohr	38	Jack White	4
	Commissioning/Start Up				Ben Armel	19
	Structural		Peterson Structural Engineers		James Doering	30
	Project Manager		Candice Chong	9		
	Principal-in-Charge		Travis McFeron	23		
	Design Manager		Megan Engle	5		
	Sub Consultants					
	Structural		Peterson Structural Engineers		-	
	Noise Study		LSA		Helix Environmental Planning	
	Survey		Calvada		O'Day Consultants	
	Potholing		Boudreadu		-	
	Confined Space Entry		-		Jamison Engineering	
	Insurance					
	General Liability		Yes		Yes	
	Automobile		Yes		Yes	
	Workers' Compensation		Yes		Yes	

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2 SCOPE OF WORK

Project Understanding

IRWD's (District's) Howiler Zone 5 Pump Station is planned to improve reliability in the District's Zone 5 system. The District seeks engineering services to evaluate existing conditions, identify required upgrades, and prepare design documents that enable the construction of the proposed improvements with minimal disruption.

The planned improvements span mechanical, electrical/I&C, and civil site work. Mechanical upgrades will focus on pumps, surge tank, and yard piping to improve reliability, accessibility, and maintainability. Electrical and instrumentation work will upgrade the power distribution system including an upsized utility service and standby power, existing motor control center (MCC) modifications, and replacement of Programmable Logic Controllers (PLC) and Supervisory Control and Data Acquisition (SCADA) system, complete with new telemetry system, in accordance with IRWD standards and Southern California Edison (SCE) requirements. Civil elements include yard piping connections, grading, paving, and tie-ins to the new Zone 5 pipeline system. Environmental compliance will include a 3-D noise model to evaluate operational sound at nearby receptors and recommend mitigation as needed.

Project Elements include the following:

- **Comprehensive condition assessment** of Howiler Water Treatment Plant (WTP) facilities to inform rehabilitation/ replacement needs.
- **New above-grade steel discharge header** at the pump station, including flow meter, pressure transducers and other appurtenances as needed. MKN proposes including a pressure relief return pipe in the new discharge header design for additional protection.
- **Potable service changeover,** including abandoning the existing 4-inch SWD service and installing a new 4-inch potable service off the Zone 5 pipeline.
- **Pumping upgrades:** upsize/replace pumps and motors to meet Zone 5 hydraulic demands and reliability objectives.
- **Electrical improvements:** upsize and upgrade of the station's power distribution system including, SCE coordination for upsized service equipment.
- **PLC and SCADA:** replace existing PLC and communications equipment and upgrade to current District standards, complete with a new telemetry system.
- **HVAC improvements** for the existing Electrical Room and/or any additional room that may be used for electrical equipment to meet equipment thermal requirements and applicable codes.
- **Emergency standby power:** Remove existing indoor generator and replace with new upsized outdoor-rated standby generator with sound attenuation and 72-hour runtime subbase fuel tank. It should be noted that generally a 72-hour subbase tank is tall enough that it will require installation of a catwalk platform around the generator. Alternatively, we will evaluate the possibility of installing a separate fuel tank adjacent to the proposed generator.
- **Surge protection:** perform a transient analysis and implement targeted surge control improvements as warranted. It is anticipated that a new surge tank will be required for the pump station. MKN recommends a vertical bladder type surge tank, to reduce footprint and maintenance requirements.
- **Discharge pipeline** from Howiler WTP to the Zone 5 point of connection (POC), including valves and appurtenances as required.

Our proposed structural scope of work includes design of the following planned improvements:

- CMU Control Building wall modifications (i.e. in-filling existing louvers) at the Generator Room
- Roof framing design to support new HVAC equipment
- One (1) steel shade structure design for new pumps
- Structural design of concrete base for new pumps
- Miscellaneous equipment anchorage and housekeeping pads such as typical pipe support and Surge tank foundation

Design Considerations

We have identified several critical areas that are essential to the project's success. Our approach emphasizes early and collaborative decision making, focused coordination, and practical solutions to keep design, permitting, and construction on schedule.

1) Standby Power & Electrical Layout

- **Generator siting (proximity to residences).** The upsized generator will likely not fit the existing generator room. Outdoor replacement will be required and will be constrained by property-line setbacks, equipment clearances, airflow/exhaust, access, and neighborhood noise sensitivity. MKN will evaluate code/setback constraints and acoustics, confirm footprint and crane access, and coordinate with the City/Fire early.

  Typical siting criteria: property line setback 5–10 ft; ≥5 ft from building openings/intakes; UL-2085 protected tank 3–5 ft from generator; residential noise limits typically ≤55 dBA daytime/≤50 dBA nighttime at property line.

- **Reuse of the existing generator room.** Consider re-purposing the existing generator room for new electrical gear (e.g., VFDs, MCCs, switchboard) with HVAC upgrades to meet heat-load and code, or place select equipment in NEMA-rated outdoor enclosures adjacent to the generator. MKN will compare indoor vs. outdoor life-cycle cost, reliability, maintainability, and constructability and will incorporate in the final design.
- **Layout options.** Two preliminary site layout alternatives are provided in Appendix A.

2) Pump Shelter & Structural Capacity

- **New pump shelter.** The existing cover is aged/vulnerable; a new shelter is recommended to protect upsized pumps and improve O&M access and safety. We recommend a corrosion-resistant canopy with integrated hoist/rigging features, lighting, and drainage.
- **Clearwell roof loading.** Existing pumps are installed on the clearwell concrete slab roof. With higher discharge pressures, new pumps/motors may impose significantly greater down-thrust. We recommend a targeted structural assessment during the condition assessment; if strengthening is required, MKN will furnish reinforcement details as an optional design item with clearly identified cost/schedule impacts.

3) Permitting

- **SCE power upgrades.** Upsized motors and generator interconnects will drive SCE service requirements. MKN will initiate the SCE Final Service Plan early during the design phase and will closely coordinate with their requirements to prevent delays.
- Regulatory interfaces. Coordination with Division of Drinking Water (potable interfaces) and the City of Orange (encroachment/traffic control) will affect off-site work and the Zone 5 POC. We will hold an early scoping meeting and align submittal/approval timelines with the 60/90/100% design milestones.

4) Long-lead Equipment

- **Generator.** The new generator and switchboard are anticipated to be long lead items with more than 70 weeks of lead time after submittal approval. MKN will work with the District, if desired, to prepare the pre-purchase specifications and contract and will assist IRWD with procurement.

Scope of Work

1 TASK GROUP
Project Management

Successful delivery of this project requires a combination of structured project management, proactive communication, and close coordination with IRWD and key stakeholders. To address these needs, Task 1 is divided into two subtasks: (1) Project Management and QA/QC, and (2) Project Coordination and Meetings.

1.1 Project Management and QA/QC

Effective project management is essential to maintaining schedule, budget, and quality. Our team will provide ongoing oversight of project activities to ensure timely delivery and efficient use of resources. Weekly status emails and monthly progress reports will be prepared to summarize accomplishments, highlight key issues, and identify upcoming activities.

A comprehensive Quality Assurance/Quality Control (QA/QC) program will be implemented to confirm that all deliverables comply with IRWD's technical and administrative requirements. Documentation of QA/QC reviews will be maintained and provided to IRWD throughout the project.

DELIVERABLES

- Weekly status emails and monthly progress reports
- QA/QC documentation

1.2 Project Coordination and Meetings

Effective coordination with IRWD and project stakeholders is critical to project success. Our team will conduct regular meetings and workshops with IRWD, Southern California Edison (SCE), the Division of Drinking Water (DDW), and the City of Orange, as needed. These meetings will facilitate progress reviews, address technical and permitting issues, and secure timely stakeholder input.

In accordance with the RFP, we will provide and manage a structured meeting program that includes twelve monthly progress meetings, two dedicated agency coordination meetings, site visits, technical workshops, and formal design review sessions. Each meeting will be supported with agendas, meeting notes, and action item logs to document decisions, track responsibilities, and ensure follow-through.

The following table summarizes the included meetings per the RFP.

Meeting/Workshop	Description
Monthly design development meetings	Twelve (12) one-hour meetings
Coordination activities with jurisdictional agencies and project stakeholders including, but not limited to, Southern California Edison, Division of Drinking Water, and the City of Orange	Two (2) two-hour meetings
Howiler Treatment Plant Site Visits	Four (4) two-hour meetings
Conditions Assessment Plant Site Visits	One (1) eight-hour assessment
Preliminary Design Workshop	One (1) two-hour workshop
Draft Preliminary Design Report Review Workshop	One (1) three-hour workshop
Present the 60% design and discuss IRWD initial review comments. Meeting to be held in-person	One (1) two-hour meeting
Present 90% design and discuss IRWD initial review comments. Meeting to be held-in-person	One (1) two-hour meeting
Present the 100% design and discuss IRWD initial review and comments	One (1) two-hour meeting

DELIVERABLES

- Meeting agendas and notes
- Action item tracking

2 TASK GROUP Preliminary Design

The preliminary design phase will build upon the condition assessment and background data review to establish a reliable foundation for final design and construction. This task includes a comprehensive evaluation of existing facilities, review of prior studies, and development of technical analyses that will guide design decisions. Subtasks are described below.

2.1 Condition Assessment Report

During a one 8-hour day site visit, we will perform a detailed assessment of major treatment facilities and supporting infrastructure. The site visit will be supplemented with operator interviews to collect operational concerns during the assessment. The assessment will include:

1. Raw water metering vault
2. Ozone injection vault
3. Flash mix system
4. Ozone contact basin
5. Flocculator structure
6. Dual-media filters
7. Backwash supply pumps

8. Backwash recovery and waste sludge pumps
9. Chlorine contact basin
10. Chemical Metering System
11. Piping (above ground)
12. Mechanical equipment (valves, actuators, and gates)
13. Electrical power distribution system and required service size
14. Instrumentation
15. PLC and communication system
16. Ozone Building
17. Control Building, and
18. Related appurtenances

An assessment plan will be developed for IRWD's approval prior to implementation. IRWD will be asked to provide relevant asset information, such as original design life, age, model numbers, and maintenance history. A scoring matrix will be developed to evaluate equipment condition, performance, and replacement priority. Findings will be presented in draft and final Condition Assessment Reports, with input from IRWD during workshops.

DELIVERABLES

- Draft Condition Assessment Report
- Final Condition Assessment Report

2.2 Background Information Review

Our team has reviewed key background documents provided in the RFP, including the preliminary design report and final basis of design report for the most recent ozone building and the Howiler WTP improvements. We will also review existing reports, historical flow data, record drawings, system process information, and other related project data. Findings will be discussed in a workshop with IRWD to ensure a shared understanding of baseline conditions.

DELIVERABLES

- Meeting agenda and notes

2.3 Utility Research

We will research and verify the location of existing utilities within the project area to avoid conflicts during construction. This will include coordination with utility providers and review of record information. Field verification and potholing of the existing interfering utilities as well as tie-in points will be performed where needed.

2.4 Hydraulic Analysis & Pump Selection

We have reviewed **Exhibit F – Hydraulic Technical Memorandum** and performed a preliminary hydraulic analysis of the proposed intertie between the Howiler Water Treatment Plant (HWTP) and IRWD's Zone 5 system. The study considered system hydraulic grade lines (HGLs), anticipated demands, and the ability to transfer up to the full HWTP production capacity of 4 MGD (≈2,778 gpm).

The analysis suggests that in order to deliver flow from the Howiler site (elevation ≈430 feet) into Zone 5 (HGL ≈736 feet), a new dedicated pump station will be required. The static lift is approximately 306 feet, and with allowance for pipeline and appurtenance losses, the total dynamic head (TDH) is estimated in the range of 330–350 feet.

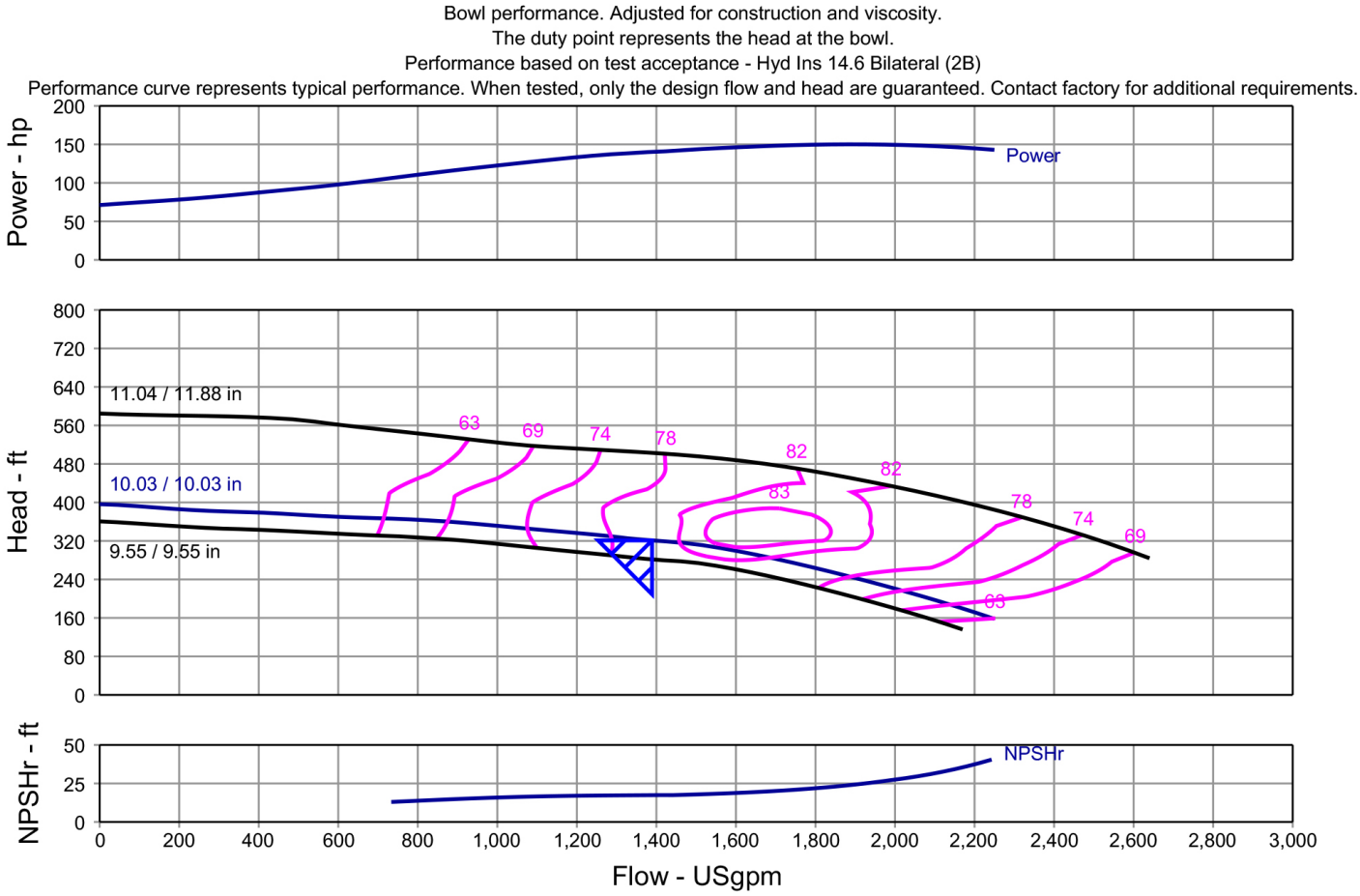
Based on these preliminary findings, we have developed an **initial pump sizing estimate** for proposal purposes. Final pump selection will be verified and refined during the detailed design phase, once vendor data and refined system hydraulic conditions are available. At this stage, an **N+1 configuration** (two duty pumps and one standby) is proposed, with each pump sized to deliver approximately 1,400–1,500 gpm at the estimated TDH. Assuming a pump efficiency of 80 percent, the total brake horsepower is approximately 307 HP, or 150–160 HP per duty pump. For flexibility, 175 HP motors with VFD control are preliminarily recommended.

The table below summarizes the **preliminary estimates** for pump sizing and design considerations:

Parameter	Preliminary Estimate	Notes
Design Flow	4.0 MGD (≈2,778 gpm total)	Per Exhibit F Hydraulic TM
Pump Configuration	2 duty + 1 standby (N+1)	Provides redundancy and flexibility
Unit Flow Capacity	~1,400–1,500 gpm per pump	Preliminary estimate
Static Head	≈316 ft	Elevation difference: Howiler site (~430 ft) to Zone 5 HGL (736 ft)
Allowances for Losses	20–40 ft	Transmission piping, fittings, and appurtenances
Total Dynamic Head (TDH)	330–350 ft	Preliminary estimate, to be confirmed
Estimated Pump Efficiency	~80% (assumed)	To be confirmed with vendor

Parameter	Preliminary Estimate	Notes
Brake Horsepower (BHP)	~307 HP total (≈150–160 HP per pump)	Preliminary estimate
Motor Size (with margin)	175 HP VFD Controlled motors	Recommended for flexibility and surge control
Pump Type	Vertical turbine (VTP)	Suitable for high head, medium flow
NPSH Considerations	NPSH_A ⩾ NPSH_R + margin	Vendor to confirm
Controls	VFD speed control	Matches demand and reduces surge
Other Considerations	Surge study (Task 2.5), noise modeling (Task 2.8)	To verify transients and noise levels

Preliminary pump selection is shown in figure below:



DELIVERABLES

- Draft Technical Memorandum (as part of PDR)
- Final Technical Memorandum (as part of PDR)

2.5 Surge Study

A surge study will be performed to evaluate potential transient pressures in the new intertie pipeline between the Howiler Water Treatment Plant (HWTP) and IRWD's Zone 5 system. The analysis will build upon the **preliminary pump sizing assumptions** presented in Subtask 2.4.

The surge study will be conducted using **Bentley HAMMER software** (or equivalent), applying steady-state hydraulic conditions from the preliminary design as the baseline. Transient scenarios to be simulated include:

- Emergency pump trip/power failure
- Normal pump start-up and shutdown with VFD control

- Rapid valve closure and PRV adjustments
- Air pocket release and column separation conditions

The purpose of this study is to identify the magnitude and frequency of transient pressures, evaluate risks to the pipeline and facilities, and recommend appropriate surge protection measures. Potential mitigation options to be evaluated include:

- **Hydropneumatic (bladder) tanks** at the pump station to absorb transients and stabilize pressures
- **Air release/vacuum valves** at high points to mitigate column separation
- **Pump control strategies** using VFD soft-start/stop sequences
- **Surge relief valves or bypass lines** to protect against extreme overpressures
- **Check valve slam control devices** to minimize water hammer at pump discharge

Final selection and sizing of surge protection devices will be completed during detailed design once pump characteristics, pipeline profile, and valve configurations are confirmed.

2.6 Review of Existing Geotechnical Report

We reviewed the geotechnical report prepared by Leighton Consulting, Inc. (Project No. 602761-001, November 30, 2009), included as Exhibit G in the RFP appendices. The report was developed for treatment modifications at the Walter E. Howiler, Jr., Water Filtration Plant and provides detailed findings on soil conditions, groundwater, seismic hazards, earthwork, and foundation design.

The report documents two borings to depths of approximately 10 and 51 feet. Subsurface conditions were characterized as undocumented fill in the upper 4–5 feet underlain by medium-dense to very-dense sandy gravels with interbedded silty sands and clays. Groundwater was encountered at 30 feet below ground surface. Laboratory testing identified soils with **medium expansion potential (EI ≈ 65)**, negligible sulfate exposure, but **severe corrosivity to ferrous metals** (resistivity ≈ 1,420 ohm-cm). The report concluded that liquefaction and lateral spreading hazards are very low, and the site is not located in an Alquist-Priolo fault zone.

Design recommendations include:

- Overexcavation and recompaction of undocumented fill within proposed building footprints.
- Spread footings or mat foundations with allowable bearing capacities up to 2,500 psf (with provisions for higher embedment).
- Lateral load resistance parameters and settlement estimates.
- Non-expansive granular backfill for retaining walls.
- Avoidance of ferrous pipe in contact with site soils due to corrosivity

Conclusion:

Although the report is dated (2009), it provides site-specific borings, laboratory testing, seismic parameters, and design recommendations that remain valid for the proposed improvements. The primary geotechnical conditions (dense gravelly alluvium, deep groundwater, low liquefaction risk) are not expected to have changed materially. In addition, no new structures beyond the treatment plant site are being introduced that would require expanded exploration. Therefore, **no additional geotechnical report is required at this stage.** However, the existing report recommends geotechnical observation during grading and foundation excavation, which should be incorporated into the construction phase.

DELIVERABLES

- Geotechnical Review Summary (included in PDR), confirming that the 2009 geotechnical report is adequate and that no supplemental geotechnical report is needed at this stage.

2.7 Permits and Coordination

We will identify, coordinate, and track the permits and approvals required for the proposed improvements. At a minimum, the project will require a **City of Orange encroachment permit** and a **Division of Drinking Water (DDW) Domestic Water Supply Permit Amendment**.

Based on the scope of work, the following additional permits and approvals may also be necessary:

- **South Coast Air Quality Management District (SCAQMD):** A permit to construct/operate may be required if new or modified equipment (e.g., emergency generator, ozone or chemical systems) introduces regulated air emissions.
- **Regional Water Quality Control Board (RWQCB):** Construction activities disturbing more than one acre will require coverage under the Construction General Permit (CGP), preparation of a Storm Water Pollution Prevention Plan (SWPPP), and filing of a Notice of Intent (NOI).
- **Southern California Edison (SCE):** Coordination and potential approval may be needed for modifications to electrical service connections and power supply.

- **California Environmental Quality Act (CEQA):** While CEQA documentation review is addressed in Task 2.13, additional agency coordination may be required if new environmental impacts are identified.

We will coordinate with the respective agencies early in the design process to confirm applicability, submittal requirements, and schedule implications. A **Permit Tracking Log** will be maintained throughout the project to ensure timely processing of all approvals.

DELIVERABLES

- Completed permits and approvals (as applicable)
- Permit Tracking Log (updated regularly)

2.8 Noise Model and Draft Noise Report

We will partner with our subconsultant, LSA, to prepare a predictive **noise model** to evaluate potential sound impacts from proposed facility improvements and ensure compliance with City of Orange noise standards, CEQA thresholds, and IRWD design criteria.

The model will use **ISO 9613-2 propagation methods** and commercial acoustical software to account for distance attenuation, barriers, ground absorption, and reflections. Key sources to be evaluated include pumps, blowers, HVAC systems, generators, and chemical feed equipment. Baseline ambient noise levels will be documented through field monitoring, and construction noise will be estimated using the **FHWA Roadway Construction Noise Model (RCNM)**.

If predicted levels exceed applicable limits, we will test mitigation measures such as low-noise equipment, enclosures, silencers, and sound walls. Recommended measures will be presented in performance-based specifications to guide final design. See Table.

Category	Details
Primary Sources	Pumps, blowers, backwash pumps, HVAC units, standby generator, transformers, chemical feed systems, vents/ducts
Sound Power Data	Manufacturer submittals (preferred); ISO 3744/3746, ASHRAE, or FHWA RCNM defaults if not available
Operating Scenarios	Normal operation, peak demand, standby/emergency generator testing
Noise Model Method	ISO 9613-2 propagation using commercial software (e.g., CadnaA, SoundPLAN)
Construction Noise	FHWA Roadway Construction Noise Model (RCNM) – backhoes, concrete pumps, cranes, etc.
Receptor Locations	Facility property lines, nearest residences, schools/parks, operator work areas
Mitigation Measures (if required)	Low-noise equipment, acoustic enclosures, silencers, sound walls, operational restrictions

DELIVERABLES

- Draft Noise Analysis Report (60% Design/PDR)
- Final Noise Analysis Report (90% Design/PDR)

2.9 Surveying Services

An aerial survey of the site is being performed by Borchard Surveying and Mapping, Inc. under subcontract to West Yost through the separate Howiler Intertie Pipeline Project. IRWD will provide this survey data to the design team as supplementary information once it is complete.

Upon receipt, we will **review the aerial survey for completeness and applicability** to this project. If the survey is determined to adequately capture all areas of proposed improvements, no additional services will be required. If gaps are identified (e.g., obscured surface features, utility appurtenances, or missing coverage at facility tie-in points), we will recommend **supplemental field surveying** as an optional task. In this case, we will use our subconsultant, Calvada, to provide ground topographic survey of the site.

Any supplemental survey, if authorized, will be conducted in accordance with IRWD standards and will include:

1. Establishing horizontal and vertical ground control using NAD83 coordinates and NAVD88 benchmark elevations.
2. Preparing contour mapping at a 1"=10' scale with one-foot contour intervals for areas of proposed work.
3. Field locating and adding obscured or critical surface features.

Final survey data will be formatted for direct use in the design base drawings and site master plan.

DELIVERABLES

- Review memo on adequacy of IRWD-provided aerial survey
- Optional supplemental survey services (if required), including ground control, contour mapping, and surface feature verification

2.10 Electrical, Instrumentation, and Controls (EIC)

MKN will evaluate the existing power distribution system, as well as condition and arrangement of cables/conduits, instrumentation and control systems, and develop recommendations for power and controls/communications upgrades. The assessment will note deficiencies and ensure compatibility with IRWD's lasted power and controls/communication. Preliminary load calculations and single-line diagram for proposed improvements are provided in Appendix A.

The MKN Team will conduct interviews with IRWD's operations staff (up to three days anticipated) and review the treatment facility's existing instrumentation and control set points to understand current operational scenarios. Our findings, along with the proposed pump station operations, will be incorporated into a draft and final Process Control Narrative (PCN) for IRWD's review and approval

DELIVERABLES

- Draft and Final Technical Memorandum (as part of PDR)
- Draft and Final PCN

2.11 HVAC Improvement

An evaluation of the existing HVAC systems will be conducted to assess adequacy for current and future operations. Recommendations for upgrades will be provided to ensure compliance with industry standards and operator comfort.

Based on our preliminary review, a new 4-ton outside air conditioning unit may be required for the project.

DELIVERABLES

- Draft HVAC Technical Memorandum (as part of PDR)
- Final HVAC Technical Memorandum (as part of PDR)

2.12 Site Master Plan

We will prepare a Site Master Plan that integrates civil, structural, mechanical, electrical, and architectural components into a cohesive layout. The plan will address access, safety, constructability, and future expansion considerations.

Development of three (3) alternatives is included in our scope of work. Additionally, we have provided two (2) preliminary site plan options, included in Appendix A, for our better understanding of the scope of work.

DELIVERABLES

- Draft Site Master Plan Technical Memorandum (as part of PDR)
- Final Site Master Plan Technical Memorandum (as part of PDR)

2.13 CEQA Documentation Review

Existing CEQA documentation will be reviewed for adequacy relative to the proposed improvements. Additional exhibits or supporting information will be developed if needed.

DELIVERABLES

- CEQA support files and exhibits

2.14 Project Schedule

We will prepare and maintain a dynamic project schedule that identifies major milestones, dependencies, and critical path activities. Updates will be coordinated with IRWD on a regular basis.

DELIVERABLES

- Dynamic project schedule (as part of PDR)

2.15 Opinion of Probable Construction Cost

An engineer's OPCC will be developed based on preliminary design recommendations. The estimate will be prepared using current unit costs, vendor quotes, and historical bid data. Both draft and final estimates will be submitted to IRWD.

DELIVERABLES

- Draft Engineer's OPCC (as part of PDR)
- Final Engineer's OPCC (as part of PDR)

2.16 Preliminary Design Report (PDR)

All subtasks and technical memoranda will be compiled into a comprehensive Preliminary Design Report. The PDR will include a summary of findings, recommended improvements, and cost and schedule implications. Draft and final versions will be submitted to IRWD for review and approval.

DELIVERABLES

- Draft Preliminary Design Report
- Final Preliminary Design Report

3 TASK GROUP
Final Design

The Final Design phase will result in the preparation of one complete set of Contract Documents for the proposed pump station and pipeline improvements. All documents will be prepared in accordance with IRWD's Construction Manual, design requirements, standards, and formatting.

The design will progress through 60%, 90%, 100%, and Final phases. For the 60%, 90%, and 100% submittals, we will conduct an IRWD review workshop to walk through the plans, specifications, and OPCC; document comments; and confirm direction on open items. We will provide a consolidated comment–response matrix after each workshop and incorporate IRWD's feedback into the next submittal.

3.1 Project Manual

We will prepare a Project Manual in standard IRWD format for the Contract Documents. IRWD's front-end documents will be used as the basis, with supplemental special provisions added as needed to comply with IRWD's general provisions. The Project Manual will also describe allowable shutdown durations and sequencing for tie-ins to existing facilities, and include IRWD's General Technical Specifications, modifications thereto, and project-specific technical specifications.

DELIVERABLES

- Draft and Final Project Manual (PDF and Word formats)

3.2 Construction Plans

We will develop detailed construction drawings in AutoCAD using NCS V4.0 layering standards and IRWD's border template (22" x 34" sheets). Plans will include sheet index, location map, legend, general notes, phasing, and detailed connections. Construction notes will be used in lieu of callouts. Existing IRWD utilities will be identified with as-built plan numbers, material types, and pressure zones. A preliminary sheet list has been developed and presented in Section Subtask 3.9.

DELIVERABLES

- Plan sets at 60%, 90%, 100%, and Final Design stages (PDF and AutoCAD formats)

3.3 Utility Research and Potholing

We will research and identify the location of existing and future utilities and features near the project site. We will use Boudreau Pipeline, our long-time partner, to conduct the potholing services. For proposal purpose, we have included budget for potholing of twelve (12) utilities, including coordination of required permits (private encroachment, entry, City encroachment).

DELIVERABLES

- Utility research summary and potholing records

3.4 Electrical, Instrumentation, and Controls (EIC)

We will prepare electrical and controls design documents, including P&IDs, single-line diagrams, equipment lists, and control loop descriptions. The team will meet with IRWD electrical/automation staff to confirm standard operations, programming, and tagging requirement, develop operational schemes and functional descriptions for incorporation into technical specifications, coordinate with IRWD's System Integrator for future PLC/SCADA programming.

Upon approval of the PCN under Task 2.10, P&ID drawings will be developed for the entire plant including the new pump station but excluding the ozone system.

DELIVERABLES

- EIC design package including drawings and specifications

3.5 SCE Final Service Plan

We will coordinate with Southern California Edison (SCE) to obtain a Final Service Plan for the project site. We will incorporate requirements into the design and include the SCE-approved plan in the Project Manual appendix.

MKN team has a long history of supporting So Cal agencies with required startup and commissioning. Provided in Appendix B is a sample of testing plan developed for the commissioning day of a pump station.

DELIVERABLES

- SCE Final Service Plan (included in Project Manual appendix)

3.6 Startup Plan

A Startup Plan will be prepared in accordance with IRWD's Project Manual Section 01510 (Testing, Training, and Facility Startup). The plan will identify required inputs/outputs, equipment requiring COPI/COPO certifications, FAT testing, and startup schedule elements. We will submit a draft Startup

Plan for IRWD review and incorporate comments in the final version.

The MKN team has a long history of supporting SoCal agencies with required startup and commissioning. Provided in Appendix B is a sample of a testing plan developed for the commissioning day of a pump station.

DELIVERABLES

- Draft and Final Startup Plan (included in Project Manual)

3.7 Project Schedule

A Preliminary Project Schedule has been developed and will be updated during the design phase covering design and construction activities. The schedule will include permitting milestones, coordination activities, and critical path items.

DELIVERABLES

- Updated dynamic project schedule

3.8 Opinion of Probable Construction Cost (OPCC)

We will prepare and update an itemized OPCC at each design submittal stage, using current bid data, vendor quotes, and unit costs.

DELIVERABLES

- Draft and final OPCC estimates (submitted with 60%, 90%, and 100% deliverables)

3.9 Final Design Deliverables

- **60% Design:** PDF plan set showing civil, mechanical, structural, electrical, and I&C concepts; PDF of 60% Project Manual.
- **90% Design:** PDF plan set with developed details; PDF of 90% Project Manual including all sections.
- **100% Design:** PDF plan set with full construction detail; PDF of 100% Project Manual.
- **Final Design:** Signed AutoCAD plan set, signed PDF plan set, and Project Manual (Word and PDF).

Proposed Drawing Sheet List

No.	Discipline	Sheet No.	Title
1	General	G-001	Title Sheet
2	General	G-002	General Notes, Abbreviations, and Symbols
3	General	G-003	Project Phasing and Sequence Plan
4	Civil	C-001	Demolition and Existing Conditions Plan 1
5	Civil	C-002	Demolition and Existing Conditions Plan 2
6	Civil	C-003	Overall Site Plan
7	Civil	C-004	Site Grading and Paving Plan
8	Civil	C-005	Yard Piping Plan
9	Civil	C-006	Pipeline Plan and Profile 1
10	Civil	C-007	Connection Details
11	Civil	C-008	Civil Details 1
12	Civil	C-009	Civil Details 2
13	Mechanical	M-001	Pump and Equipment Layout 1
14	Mechanical	M-002	Pump and Equipment Layout 2
15	Mechanical	M-003	Pump and Pump Head Section View 1
16	Mechanical	M-004	Pump and Pump Head Section View 2
17	Mechanical	M-005	Backup Generator Plan and Sections
18	Mechanical	M-006	Mechanical Details
19	Structural	S-000	Structural Notes and Legend
20	Structural	S-001	Basin Modification Plan
21	Structural	S-002	Slab and Equipment Pads
22	Structural	S-003	Shade Structure
23	Structural	S-004	Structural Details 1
24	Structural	S-005	Structural Details 2
25	Electrical	E-000	Electrical Notes and Legend
26	Electrical	E-001	Site Demolition Plan
27	Electrical	E-002	Electrical Site Plan
28	Electrical	E-003	Electrical One-Line Diagram (Demolition)
29	Electrical	E-004	Electrical One-Line Diagram (New)
30	Electrical	E-005	Control Building Power & Controls Plan (Demolition)
31	Electrical	E-006	Control Building Power & Controls Plan (New)
32	Electrical	E-007	Pumps Area Power & Controls Plan
33	Electrical	E-008	Electrical Panel Schedules
34	Electrical	E-009	Cable and Conduit Schedules
35	Electrical	E-010	Control Schematics and Elementary Diagrams
36	Electrical	E-011	Electrical Details 1
37	Electrical	E-012	Network Architecture and Wiring Diagram
38	Electrical	E-013	Instrumentation Details
39	Electrical	E-014	PLC I/O Loop Wiring Diagram
40	P&ID	I-000	P&ID Notes and Symbols
41	P&ID	I-001	Pump Station P&ID
42	P&ID	I-002	Generator P&ID

No.	Discipline	Sheet No.	Title
43	P&ID	I-003	Raw Water P&ID
44	P&ID	I-004	Polymer Injection P&ID
45	P&ID	I-005	Alum Injection P&ID
46	P&ID	I-006	Air Scour Blower P&ID
47	P&ID	I-007	Coagulation / Flocculation P&ID
48	P&ID	I-008	Filtration P&ID
49	P&ID	I-009	Filtration Backwash P&ID
50	P&ID	I-010	Backwash Waste P&ID
51	P&ID	I-011	Finished Water P&ID
52	P&ID	I-012	Project I/O List

3.10 Addenda Preparation and Pre-Bid Meeting

During the project bid phase, we will provide bid support, including preparation of up to three addenda, plan/specification revisions, and responses to bidder questions. We will conduct one pre-bid meeting (including agenda, exhibits, minutes, and optional site visit).

DELIVERABLES

- Bid-phase addenda and pre-bid meeting materials

3.11 Budget Allowance

Includes a budget allowance for additional IRWD requested scope of work that is not covered under any previous tasks here. The allowance will be used only if needed and with written authorization from IRWD for the additional scope.

3 PROJECT TEAM

Irvine Ranch Water District

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LSA
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SURVEY
Calvada
Corona

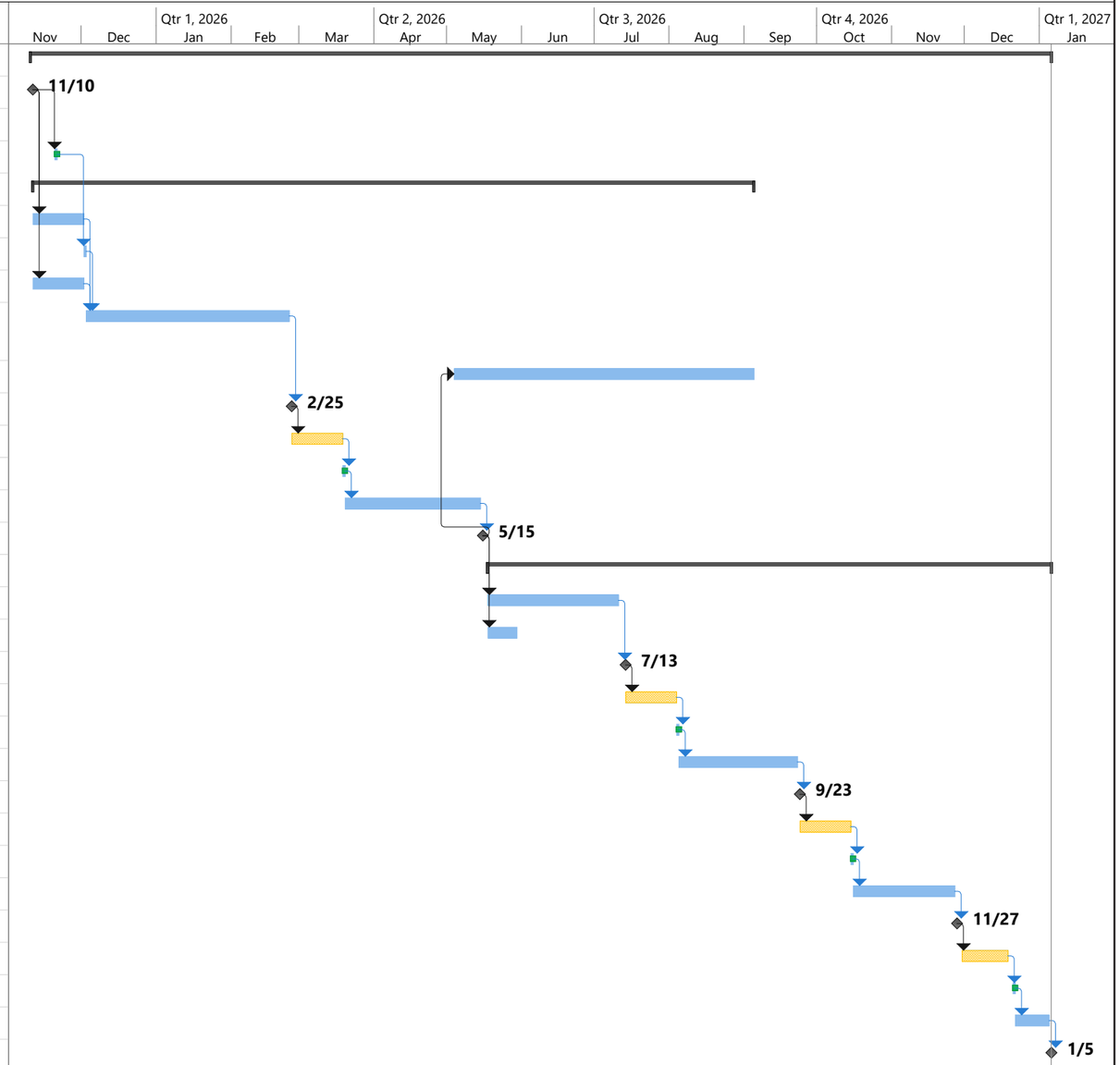
POTHOLING
Boudreau
Corona

**Key Team Member*
Home Offices: MKN - San Luis Obispo, CA; Peterson Structural Engineers - Portland, OR; LSA - Irvine, CA; Calvada - Corona, CA
Boudreau - Corona, CA

5 SCHEDULE

PRPOSED PROJECT SCHEDULE FOR THE HOWILER TO ZONE 5 PUMP STATION PROJECT

ID	Task Name	Duration	Start	Finish
1	**General Project Management**	**302 days**	**Mon 11/10/25**	**Tue 1/5/27**
2	**NTP**	1 day	Mon 11/10/25	Mon 11/10/25
3	**Task 1. Project Management**	**279 days**	**Tue 11/18/25**	**Fri 12/11/26**
4	Kickoff Meeting and Intial Site Visit	1 day	Thu 11/20/25	Thu 11/20/25
5	**Task 2. Preliminary Design**	**214 days**	**Tue 11/11/25**	**Fri 9/4/26**
6	Background Information Review	15 days	Tue 11/11/25	Mon 12/1/25
7	Onsite Condition Assessment	1 day	Tue 12/2/25	Tue 12/2/25
8	Utility Research	15 days	Tue 11/11/25	Mon 12/1/25
9	Draft Condition Assessment Report and Preliminary Design Report (PDR) Development	60 days	Wed 12/3/25	Tue 2/24/26
10	Permits and Coordination	90 days	Mon 5/4/26	Fri 9/4/26
11	Draft Assessment Report and PDR Submittal	1 day	Wed 2/25/26	Wed 2/25/26
12	IRWD Review of Draft Assessment Report and PDR	15 days	Thu 2/26/26	Wed 3/18/26
13	Preliminary Design Report Review Workshop	1 day	Thu 3/19/26	Thu 3/19/26
14	Final Assessment Report and PDR Development	40 days	Fri 3/20/26	Thu 5/14/26
15	Final Assessment Report and PDR Submittal	1 day	Fri 5/15/26	Fri 5/15/26
16	**Task 3. Final Design**	**167 days**	**Mon 5/18/26**	**Tue 1/5/27**
17	60% Design (PS&E)	40 days	Mon 5/18/26	Fri 7/10/26
18	Potholing	10 days	Mon 5/18/26	Fri 5/29/26
19	60% Design Submittal	1 day	Mon 7/13/26	Mon 7/13/26
20	IRWD Review of 60% Design	15 days	Tue 7/14/26	Mon 8/3/26
21	60% Design Review Workshop	1 day	Tue 8/4/26	Tue 8/4/26
22	90% Design (PS&E)	35 days	Wed 8/5/26	Tue 9/22/26
23	90% Design Submittal	1 day	Wed 9/23/26	Wed 9/23/26
24	IRWD Review of 90% Design	15 days	Thu 9/24/26	Wed 10/14/26
25	90% Design Review Workshop	1 day	Thu 10/15/26	Thu 10/15/26
26	100% Design (PS&E)	30 days	Fri 10/16/26	Thu 11/26/26
27	100% Design Submittal	1 day	Fri 11/27/26	Fri 11/27/26
28	IRWD Review of 100% Design	15 days	Mon 11/30/26	Fri 12/18/26
29	100% Design Review Workshop	1 day	Mon 12/21/26	Mon 12/21/26
30	Final Design (PS&E) Updates	10 days	Tue 12/22/26	Mon 1/4/27
31	Final Design Submittal	1 day	Tue 1/5/27	Tue 1/5/27



Task IRWD Task Milestone Summary Meeting or Site Visit

IRVINE RANCH WATER DISTRICT
Engineering Design Services for the Howiler
to Zone 5 Pump Station Project

	Senior Project Director (SK)	Principal Engineer (DP & CY & JL)	Principal Electrical Engineer (OK & JN)	Senior Engineer I (KL & SR)	Project Engineer II (IS)	Assistant Engineer II (SR)	Senior Designer (KN)	Administrative Assistant	Total Hours (MKN)	Labor (MKN)	ODCs (MKN)	Structural (PSE)	Potholing (Boudreau)	Sound Modeling (LSA)	Survey (Calvada)	Non-Labor Costs	Total Fee
Hourly Rates	345	303	303	250	229	193	194	119									
Task 1: Project Management																	
Subtask 1.1. General Project Management & QA/QC	24	60	40					16	140	$ 40,484	$ -	$ -	$ -	$ -	$ -	$ -	$ 40,484
Subtask 1.2 Project Coordination and Meetings	48	24	24	24	16			16	152	$ 42,672	$ 500	$ -	$ -	$ -	$ -	$ 500	$ 43,172
Subtotal	72	84	64	24	16	0	0	32	292	$ 83,156	$ 500	$ -	$ -	$ -	$ -	$ 500	$ 83,656
Task 2: Preliminary Design																	
Subtask 2.1. Condition Assessment Report	2	12	12	24					50	$ 13,962	$ 10,000	$ 37,420	$ -	$ -	$ -	$ 47,420	$ 61,382
Subtask 2.2. Background Information Review		4	8	4	4				20	$ 5,552	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,552
Subtask 2.3. Utility Research				8		8			16	$ 3,544	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,544
Subtask 2.4. Hydraulic Analysis & Pump Selection		4		16	8				28	$ 7,044	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,044
Subtask 2.5. Surge Study			24	16	8				48	$ 13,104	$ -	$ -	$ -	$ -	$ -	$ -	$ 13,104
Subtask 2.6. Review of Existing Geotechnical Report				4					4	$ 1,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,000
Subtask 2.7. Permits and Coordination (Plus Permit Fee Allowance)	2	4		8		24			38	$ 8,534	$ 15,000	$ -	$ -	$ -	$ -	$ 15,000	$ 23,534
Subtask 2.8. Noise Model and Draft Noise Report		4				4			8	$ 1,984	$ -	$ -	$ -	$ 14,520	$ -	$ 14,520	$ 16,504
Subtask 2.9. Surveying Services (See Optional Task at the Bottom)									0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtask 2.10. Electrical, Instrumentation, and Controls (EIC)	8		36	36		32			112	$ 28,844	$ -	$ -	$ -	$ -	$ -	$ -	$ 28,844
Subtask 2.11. HVAC Improvement		4		8	8				20	$ 5,044	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,044
Subtask 2.12. Site Master Plan	2	4	8	8	8	12	16		58	$ 13,578	$ -	$ -	$ -	$ -	$ -	$ -	$ 13,578
Subtask 2.13. CEQA Documentation Review (Budget per RFP)									0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,000
Subtask 2.14. Project Schedule		2			8				10	$ 2,438	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,438
Subtask 2.15. Option of Probable Construction Cost	2	4		8		8			22	$ 5,446	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,446
Subtask 2.16. Preliminary Design Report (PDR)	2	8		40	24		8	8	90	$ 21,114	$ -	$ 28,322	$ -	$ -	$ -	$ 28,322	$ 49,436
Subtotal	18	50	88	180	68	88	24	8	524	$ 131,188	$ 25,000	$ 65,742	$ -	$ 14,520	$ -	$ 105,262	$ 246,450
Task 3: Final Design																	
Subtask 3.1 – Project Manual	2	4	24	16		24		8	78	$ 18,758	$ -	$ 5,599	$ -	$ -	$ -	$ 5,599	$ 24,357
Subtask 3.2 – Construction Plans (See 3.4 for EIC)	12	40		120	80		420		672	$ 146,060	$ -	$ 71,753	$ -	$ -	$ -	$ 71,753	$ 217,813
Subtask 3.3 – Utility Research and Potholing (12 per RFP)						8			8	$ 1,544	$ -	$ -	$ 14,388	$ -	$ -	$ 14,388	$ 15,932
Subtask 3.4 – Electrical, Instrumentation, and Controls (EIC)			80	52		200			332	$ 75,840	$ -	$ -	$ -	$ -	$ -	$ -	$ 75,840
Subtask 3.5 – SCE Final Service Plan			8			12			20	$ 4,740	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,740
Subtask 3.6 – Startup Plan	8	4		24	12		8		56	$ 14,272	$ -	$ -	$ -	$ -	$ -	$ -	$ 14,272
Subtask 3.7 – Project Schedule	2			8	8				18	$ 4,522	$ -	$ 1,100	$ -	$ -	$ -	$ 1,100	$ 5,622
Subtask 3.8 – Opinion of Probable Construction Cost (OPCC)	2	4				12			18	$ 4,218	$ -	$ 2,200	$ -	$ -	$ -	$ 2,200	$ 6,418
Subtask 3.9 – Final Design Deliverables				8	4	4	8		24	$ 5,240	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,240
Subtask 3.10 – Addenda Preparation and Pre-Bid Meeting	2	8		8		4	8		30	$ 7,438	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,438
Subtask 3.11 – Allowance for Additional IRWD Requested Scope									0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 70,000
Subtotal	28	60	112	236	104	264	444	8	1256	$ 282,632	$ -	$ 80,652	$ 14,388	$ -	$ -	$ 95,040	$ 447,672
TOTAL BUDGET	118	194	264	440	188	352	468	48	2072	$ 496,976	$ 25,500	$ 146,394	$ 14,388	$ 14,520	$ -	$ 200,802	$ 777,778
Optional Task Group																	
Additional Survey (Optional)		2					8		10	$ 2,158	$ -	$ -	$ -	$ -	$ 8,745	$ 8,745	$ 10,903
Alternate Tasks Subtotal	0	2	0	0	0	0	8	0	10	$ 2,158	$ -	$ -	$ -	$ -	$ 8,745	$ 8,745	$ 10,903
Total with Optional Tasks	118	196	264	440	188	352	476	48	2082	$ 499,134	$ 25,500	$ 146,394	$ 14,388	$ 14,520	$ 8,745	$ 209,547	$ 788,681