

AGENDA
IRVINE RANCH WATER DISTRICT
ENGINEERING AND OPERATIONS COMMITTEE
TUESDAY, OCTOBER 15, 2019

CALL TO ORDER 7:30 a.m., IRWD Operations Center, Committee Room
3512 Michelson Drive, Irvine, California 92612

ATTENDANCE Committee Chair: Doug Reinhart _____
Committee Member: Mary Aileen Matheis _____

ALSO PRESENT

Paul Cook	_____	Kevin Burton	_____	Paul Weghorst	_____
Jose Zepeda	_____	Wendy Chambers	_____	Tom Roberts	_____
Rich Mori	_____	Eric Akiyoshi	_____	Richard Mykitta	_____
Kelly Lew	_____	Jim Colston	_____	Ken Pfister	_____
Lars Oldewage	_____	Steve Malloy	_____	Scott Toland	_____
John Dayer	_____	Bruce Newell	_____	_____	_____
Malcolm Cortez	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

NOTICE: If you wish to address the Committee on any item, please file your name with the Committee. Forms are provided at the meeting. Remarks are limited to three minutes per speaker on each subject.

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.
4. Determine which items may be approved without discussion.

INFORMATION

5. EMERGENCY OPERATIONS TRAINING EXERCISE SUMMARY – KWAN / ZUNIGA / RONEY

Recommendation: Receive and file.

6. RADIO COMMUNICATION SYSTEM FOR IRWD'S SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM – LAM / ZEPEDA / CHAMBERS

Recommendation: Receive and file.

ACTION

7. ON-CALL PLAN CHECK SERVICES – RIOS / LEW / BURTON

Recommendation: That the Board authorize the General Manager to execute two Professional Services Agreements: one in the amount of \$100,000 with PacRim Engineering, Inc. and one in the amount of \$150,000 with Stantec Consulting Services, Inc. for on-call plan check services.

8. LAKE FOREST ZONE B TO C RECYCLED WATER PUMP STATION CONSULTANT SELECTION – MCGEHEE / MORI / BURTON

Recommendation: That the Board authorize the General Manager to execute a Professional Services Agreement with Stantec Consulting Services, Inc. in the amount of \$735,378 for engineering design services for the Lake Forest Zone B to C Recycled Water Pump Station, Project 11168.

9. 2019 POTABLE WATER, SEWER, AND RECYCLED WATER REGIONAL CAPITAL COST ALLOCATIONS – ROBINSON / AKIYOSHI / BURTON

Recommendation: That the Board approve the proposed Regional Capital Cost Allocations and their application to capital projects, effective December 1, 2019.

10. THREE-YEAR CATHODIC PROTECTION SYSTEM MONITORING PROGRAM CONSULTANT SELECTION FOR FY 2019-20 THROUGH FY 2021-22 – MURPHY / CORTEZ / BURTON

Recommendation: That the Board authorize the General Manager to execute a Professional Services Agreement in the amount of \$343,901 with HDR for the Three-Year Cathodic Protection Monitoring Program for Fiscal Year 2019-2020 through Fiscal Year 2021-2022.

OTHER BUSINESS

11. Directors' Comments

12. Adjourn

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 at the entrance of the meeting room at the District's Operations Committee Room at 3512 Michelson, Irvine, California. The Irvine Ranch Water District's Committee Room is wheelchair accessible. If you require any special disability-related accommodations (e.g., access to an amplified sound system, etc.), please contact the District Secretary at (949) 453-5312 during business hours at least seventy-two (72) hours prior to the scheduled meeting.

October 15, 2019

Prepared by: A. Kwan / E. Zuniga

Submitted by: J. Roney

Approved by: Paul A. Cook



ENGINEERING AND OPERATIONS COMMITTEE

EMERGENCY OPERATIONS TRAINING EXERCISE SUMMARY

SUMMARY:

In August 2019, staff conducted a four-hour emergency response exercise that involved approximately 60 employees from nearly all departments. The training exercise consisted of a hypothetical attack on IRWD's Michelson Water Recycling Plant. This exercise was created to encourage participants to develop situational awareness, act upon the District's goals and objectives, communicate key information, and make decisions based on fast-moving and changing scenarios. This write-up provides an initial summary of this exercise.

BACKGROUND:

In February 2017, IRWD retained consultant Claris Strategy to update IRWD's Emergency Operations Plan. The purpose of the Emergency Operations Plan is to provide an understandable and implementable reference plan to guide staff when responding to a wide range of emergencies. The Plan update also incorporated the emergency response standards outlined in the Federal Emergency Management Agency's (FEMA) National Incident Management System (NIMS), the Federal Incident Command System (ICS) and the California Office of Emergency Services (Cal OES) Standardized Emergency Management System (SEMS). Incorporating these systems into IRWD's Plan will increase staff's ability to respond to emergencies in a structured approach consistent with other responding agencies.

IRWD's updated Emergency Operations Plan was finalized in July 2018. The next phase of implementation consisted of extensive staff training to assign and understand the roles and responsibilities of each member of the response team. This process began with a discussion-based tabletop Emergency Operations Team exercise in November 2018 to put into practice the duties of staff as stipulated in the Plan. This exercise was developed to reinforce the concept of situational awareness, apply the principals of NIMS, ICS and SEMS, and to understand and apply the resources available to employees.

In August 2019, a functional exercise was conducted at IRWD's Alternate Emergency Operations Center (located in the District's Sand Canyon offices) to further develop the skills and understanding for IRWD emergency responders – nearly 60 employees at all levels of the organization. During this exercise, a “simulation cell” was deployed to provide participants with “injects” (by phone) simulating an emergency response scenario. The simulation cell also received phone calls from exercise participants to replicate calls to be made to external agencies. During the four-hour exercise, approximately 80 phone calls were initiated and relayed to the exercise participants – each one providing information that increased the complexity of the scenario and challenged participants with more difficult levels of resource allocation and prioritization.

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Senior management also played a role in the exercise, providing guidance regarding situations that challenged the District's policies, legal issues, and simulated communications with the media and the IRWD Board. The exercise also included a mock press conference. Throughout the exercise, key staff and the consultant Claris acted as observers.

After the event was completed, a debriefing was conducted by Claris to gather participant and observer feedback. Key takeaways from the exercise included the effectiveness of space at the Emergency Operations Center, the excellent collaboration between the Emergency Operations Team members, and staff's high level of expertise regarding available resources. Areas noted for improvement included: 1) additional training to increase participant confidence; 2) increased operational efficiency within the Emergency Operations Center and utilizing the ICS, NIMS and SEMS principles, 3) better issue transition between the core emergency response group and senior management; 4) streamlining information sharing and situational awareness; and 5) providing specific training on more likely emergency response incidents such as wildland fires, power outages, and flooding.

Next month, additional feedback will be collected and an After Action Report will be developed that will be shared with staff. This report will be used to improve IRWD's Emergency Operations Plan and aid the District in developing objectives for future exercises. Staff will continue to develop and implement new training exercises in order to continue improving the District's response and resiliency to impending disasters, and to reinforce the Plan and emergency management principles.

FISCAL IMPACTS:

None.

ENVIRONMENTAL COMPLIANCE:

This project is not subject to the California Environmental Quality Act (CEQA).

RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

None.

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October 15, 2019
Prepared by: J. Lam
Submitted by: J. Zepeda / W. Chambers
Approved by: Paul A. Cook



ENGINEERING AND OPERATIONS COMMITTEE

RADIO COMMUNICATION SYSTEM FOR IRWD'S
SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

SUMMARY:

IRWD relies on its Supervisory Control and Data Acquisition (SCADA) system to monitor and operate its sewer collections, water treatment, recycled water treatment, and distribution systems. The SCADA system utilizes a private radio communication network to exchange data between facilities. Staff will provide an overview of the District's SCADA communication network system.

BACKGROUND:

District staff relies on the SCADA system to monitor and control process equipment, both locally and remotely. To handle the exchange of data between facilities, the SCADA system utilizes a high-speed wireless radio communication network which expanded along with the breadth and complexity of IRWD's infrastructure. This sophisticated radio system is comprised of radio towers, radio communication equipment, computer servers, routers, switches, and firewalls. Staff designed, developed and installed the state-of-art network with the assistance of outside consultants and contractors. Overall, the network is reliable and resilient. Staff will provide more detail at the Committee meeting regarding the SCADA radio communication system with a PowerPoint presentation (attached as Exhibit "A").

FISCAL IMPACTS:

Not applicable.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

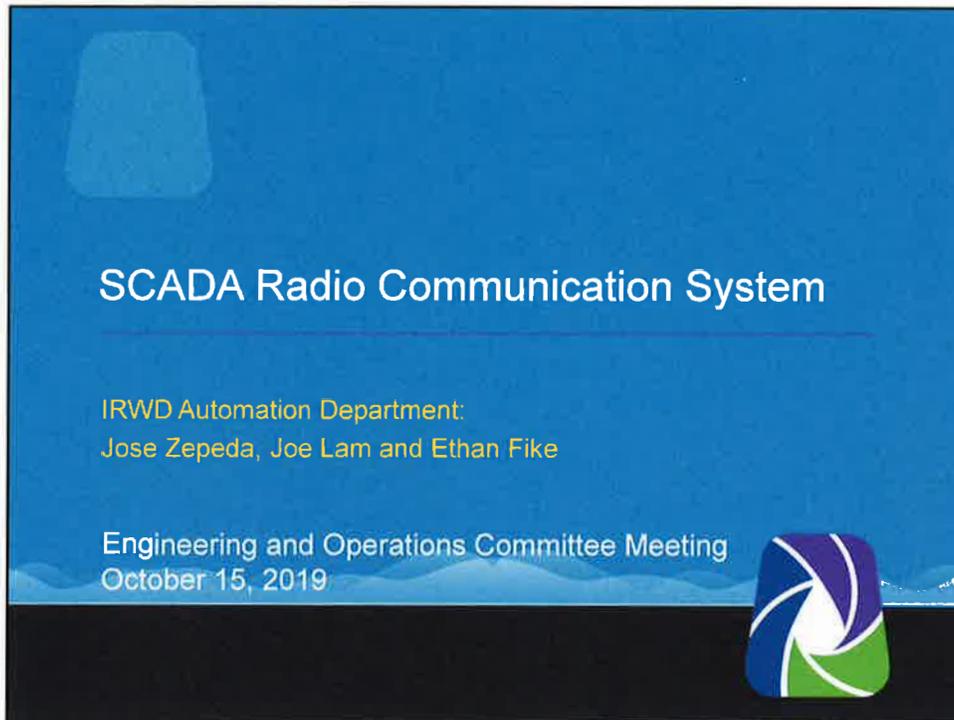
RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

Exhibit "A" – SCADA Radio Communication System PowerPoint

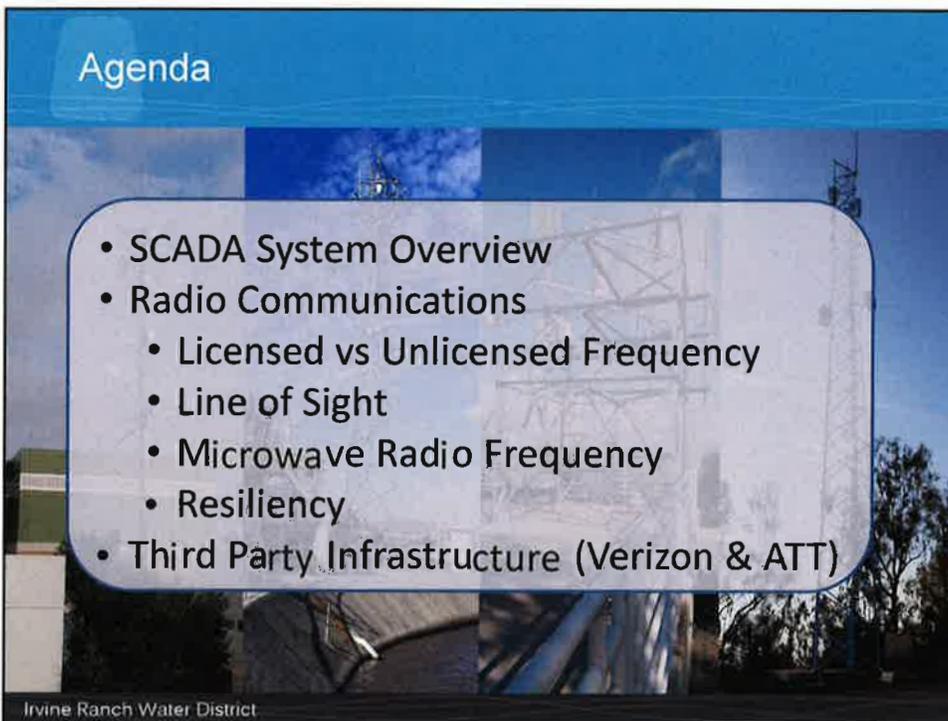
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SCADA Radio Communication System

IRWD Automation Department:
Jose Zepeda, Joe Lam and Ethan Fike

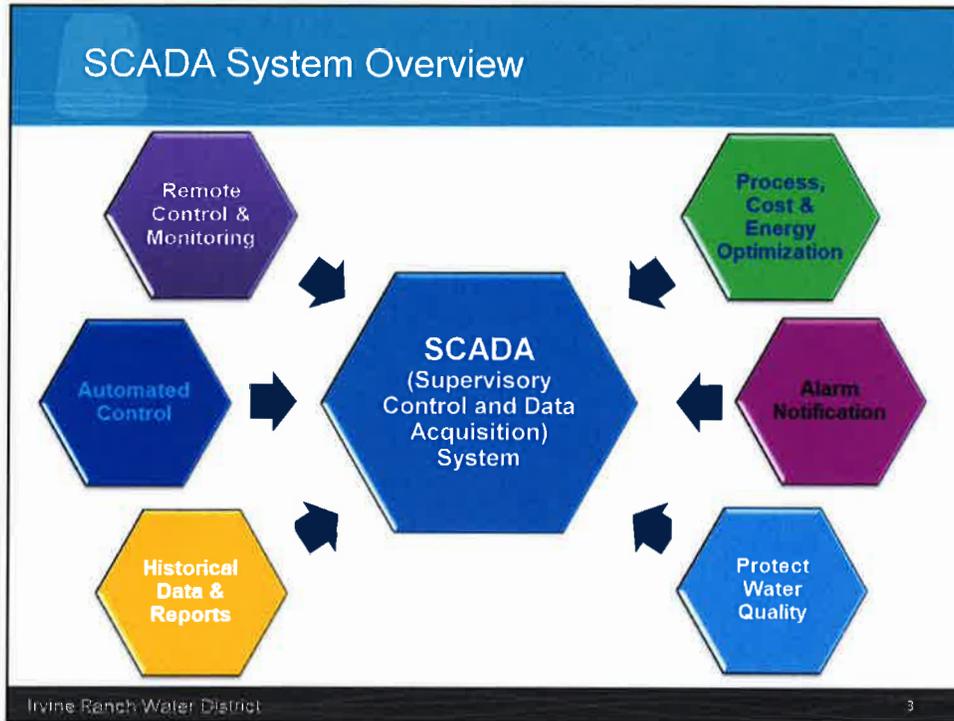
Engineering and Operations Committee Meeting
October 15, 2019



Agenda

- SCADA System Overview
- Radio Communications
 - Licensed vs Unlicensed Frequency
 - Line of Sight
 - Microwave Radio Frequency
 - Resiliency
- Third Party Infrastructure (Verizon & ATT)

Irvine Ranch Water District



Remote Control & Monitoring

The screenshot shows a detailed SCADA interface for "WTP01000 - Process Overview". The interface includes a toolbar at the top with various icons for navigation and control. The main display area shows a complex process flow diagram with numerous tanks, pumps, and control valves, each labeled with technical specifications and status indicators. A sidebar on the right provides a summary of equipment status.

Remote Control

- Improve operations' efficiency
- Operators can turn equipment on or off at their fingertips

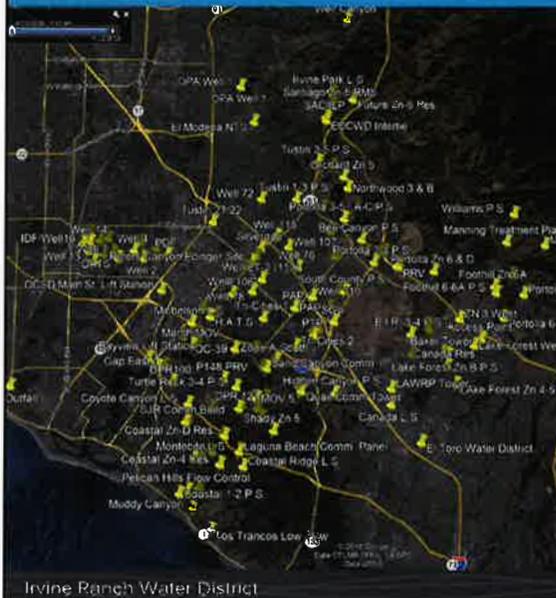
Without Communication

- Impossible to monitor the health and status of the entire treatment plant or system

Irvine Ranch Water District
4529 E. K.R. Rd
Irvine, CA 92618

Irvine Ranch Water District 4

Automated Control



Automated Control

- Impossible to staff operator at every location
- Improve operations' efficiency
- Example: "Don't run the pump stations if the reservoir is full".

Without Communication

- The pump stations and reservoir that are miles apart would not know when to pump or stop.

Irvine Ranch Water District

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Historical Data & Automated Reporting



Collect and Store Process Data

- Build graphs
- Use historical data for troubleshooting, optimization and planning
- Automatically generate compliance report

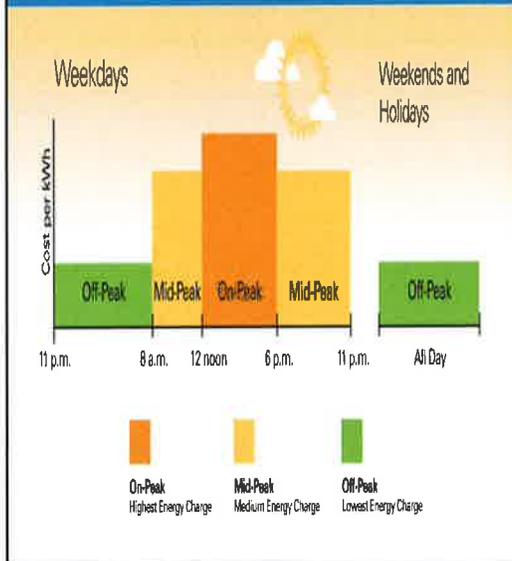
Without Communication

- Not possible to collect data remotely for archiving in the SCADA Historian

Irvine Ranch Water District

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Process, Energy & Cost Optimization



Irvine Ranch Water District

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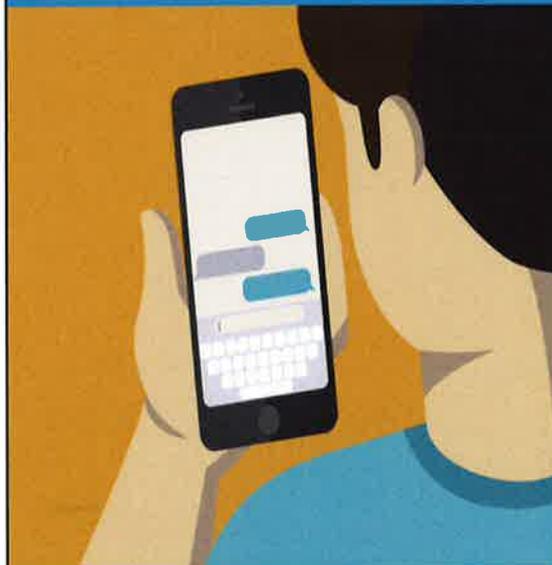
Cost Optimization

- Automatically stop pumping during “on-peak” hours to save money while actively monitoring the system for pressure, reservoir level or other predefined conditions.

Without Communication

- Not possible to notify Operations if problems are detected

Alarm Notification



Irvine Ranch Water District

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Alarm Notification

- Text Message
- Phone Call
- Email

Alarm Escalation Strategies

- Group Text & Email
- Escalation (If standby operators do not respond after three calls, it will escalate to Supervisors and/or Manager)

Protect Water Quality



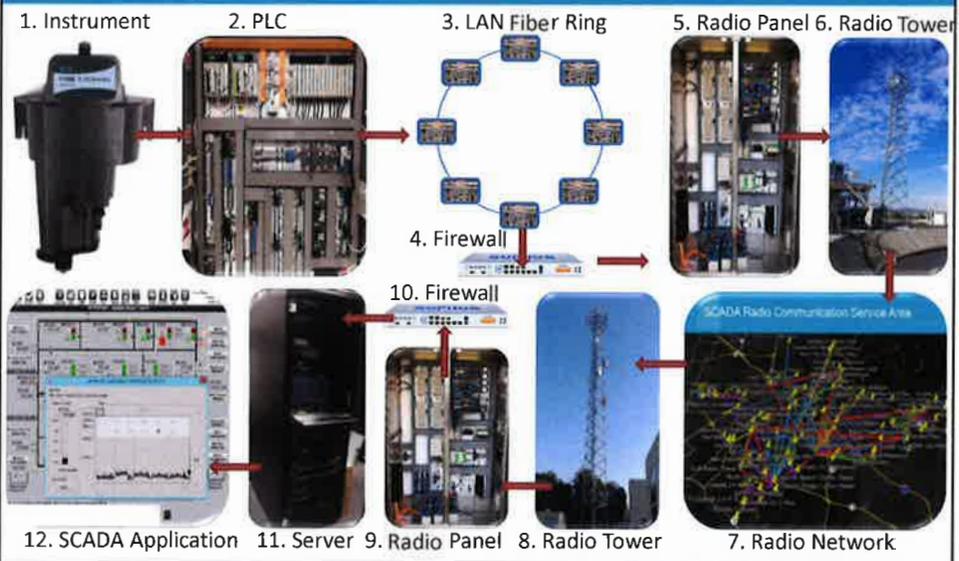
If Turbidity is High



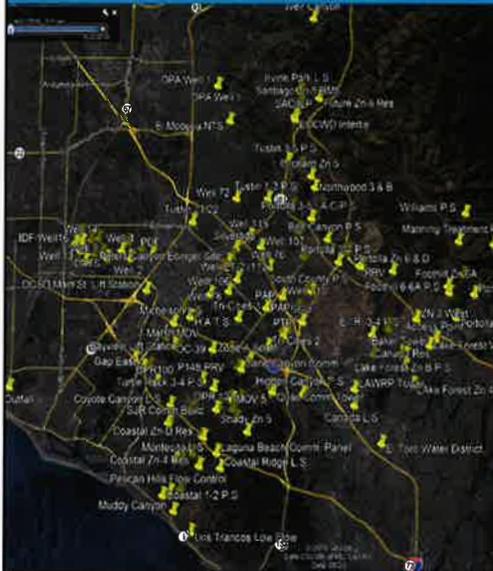
Can be programmed to automatically:

- Stop the upstream process, divert or bypass
- Notify Operations (call, email, text) to take action

SCADA Communication Journey Step by Step



SCADA Radio Communication Assets



Large Radio Towers

MWRP 120 feet
 Baker 100 feet
 LAWRP 80 feet

Communication Assets

250 Radios, 400 Switches
 25 Routers, 8 Firewalls

Radio Frequency

4.9 GHz public safety (licensed)
 900 MHz, 5 GHz, 24 GHz (unlicensed)

Third Party Infrastructures

AT&T
 Verizon
 Coming Soon: T-Mobile & Sprint

Irvine Ranch Water District

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IRWD Radio Towers



Irvine Ranch Water District

Licensed vs Unlicensed Frequency

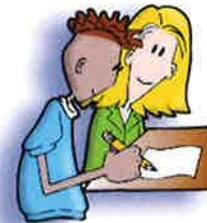
Unlicensed Frequency (900 MHz, 5 GHz and 24 GHz)

- Busy spectrum, potential interference (available for everyone)
- Equipment usually costs less and lots of available vendors

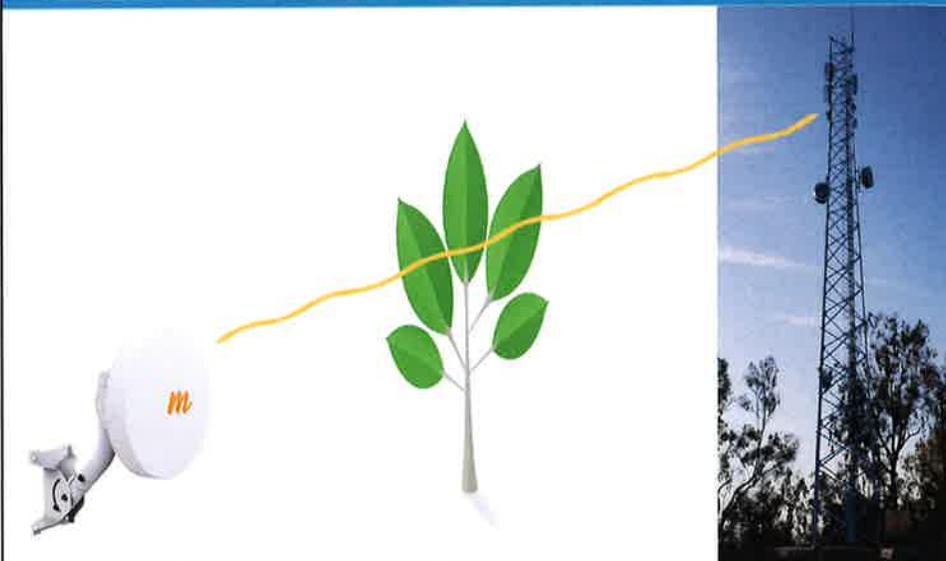


Licensed Frequency (4.9 GHz Public Safety Radio Frequency)

- Clean frequency spectrum (less interference)
- Restricted usage to Public Safety
- Equipment usually costs more and limited vendors
- IRWD obtained multiple licenses in 2017 and 2019



Line of Sight (LOS)



Microwave Radio Frequency

24 GHz (Up to 1500 Mb/s)

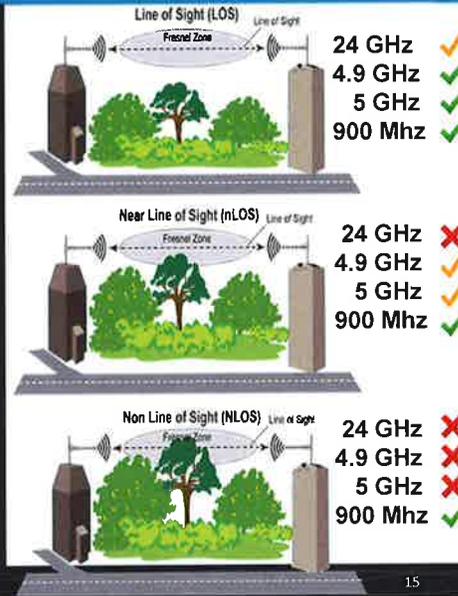
- Range: Short Distance (up to six miles)
- Speed: Fast
- LOS: Must have clear line of sight, sensitive to rain
- For Point to Point operation only

4.9 & 5 GHz (Up to 300 Mb/s)

- Range: Depends on LOS
- Speed: Depends on LOS and range
- LOS: Clear or Near Line of Sight

900 MHz (256 Kb/s)

- Range: Long Distance
- Speed: Slow
- LOS: Able to penetrate through trees and thin walls



Irvine Ranch Water District

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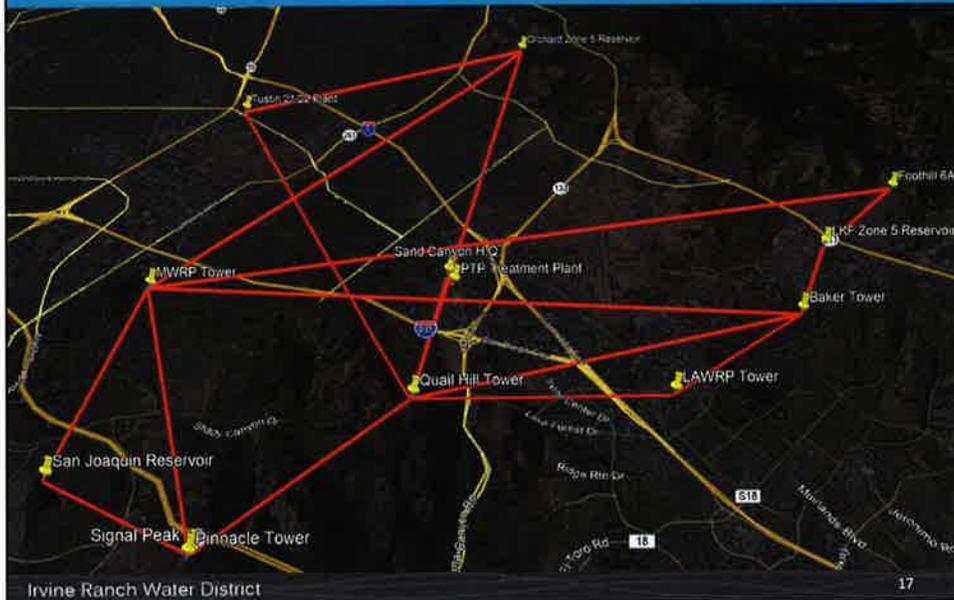
Radio Communication – Point to Point



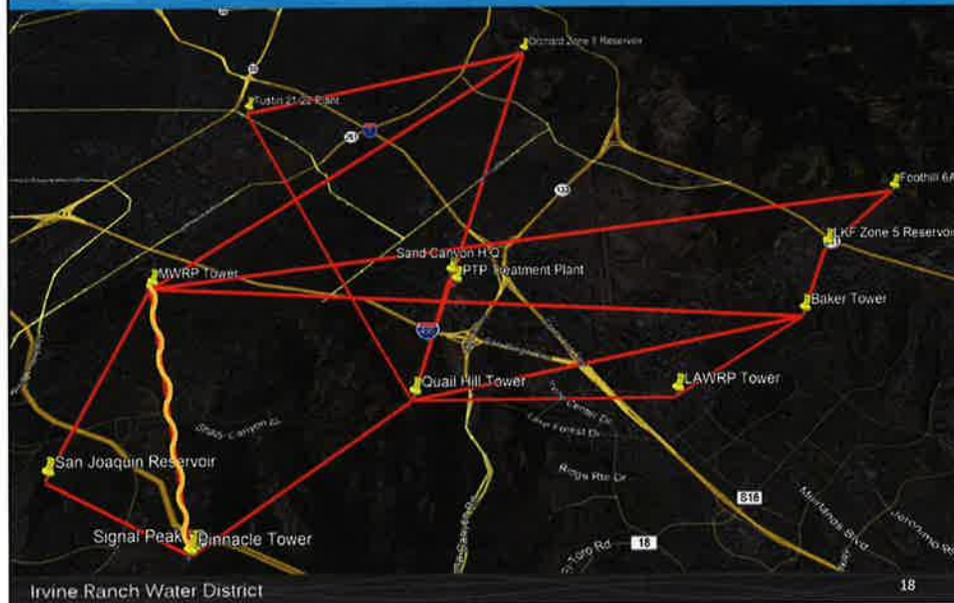
Irvine Ranch Water District

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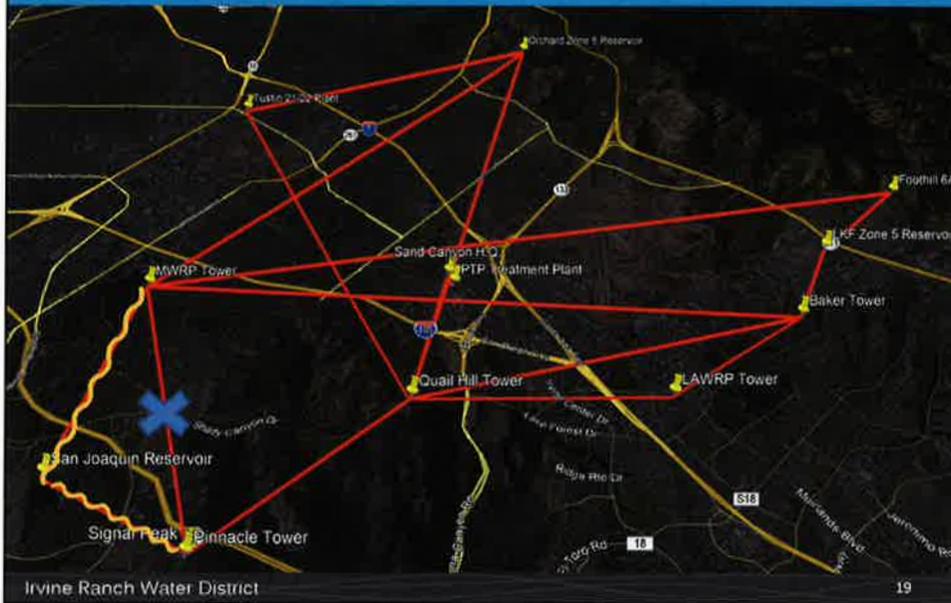
Radio Communication – Backbone



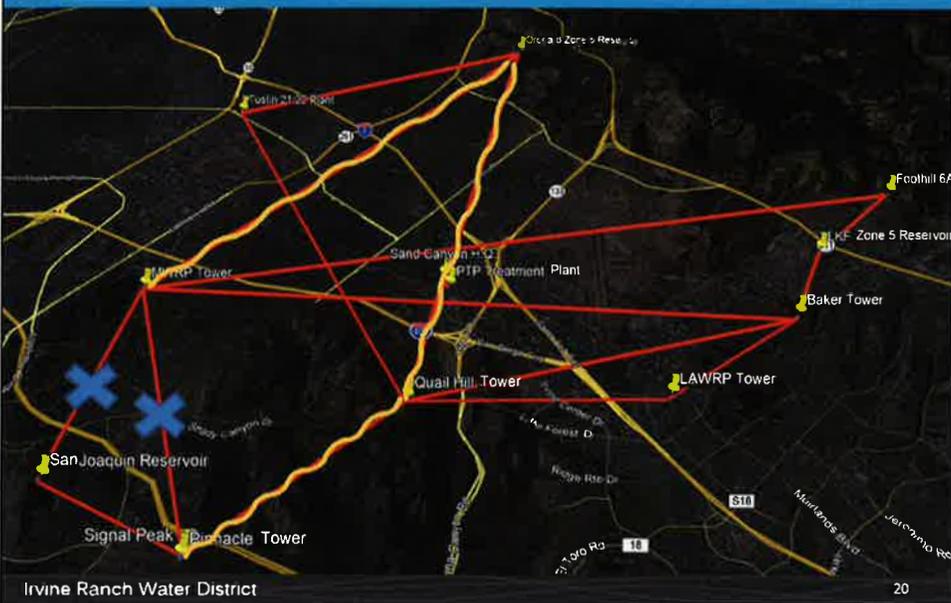
Radio Communication – Point to Point



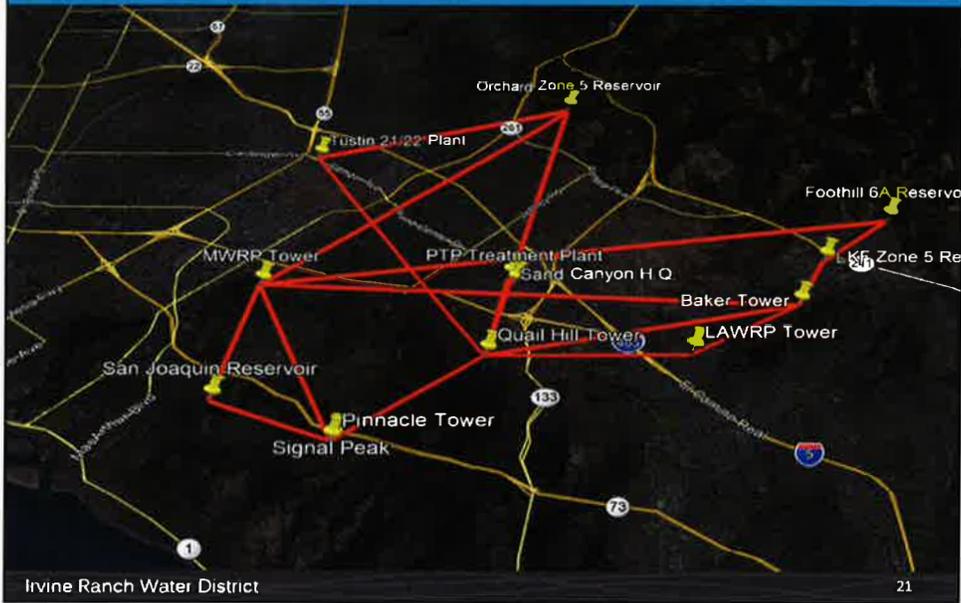
Radio Communication – Backbone (Resilience)



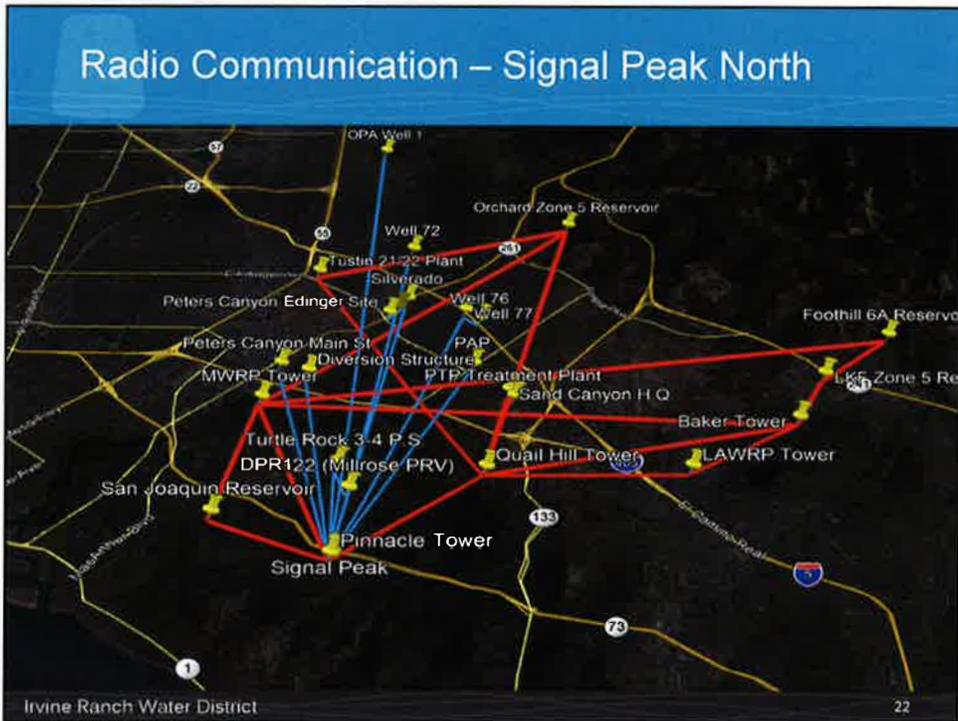
Radio Communication – Backbone (Resilience)



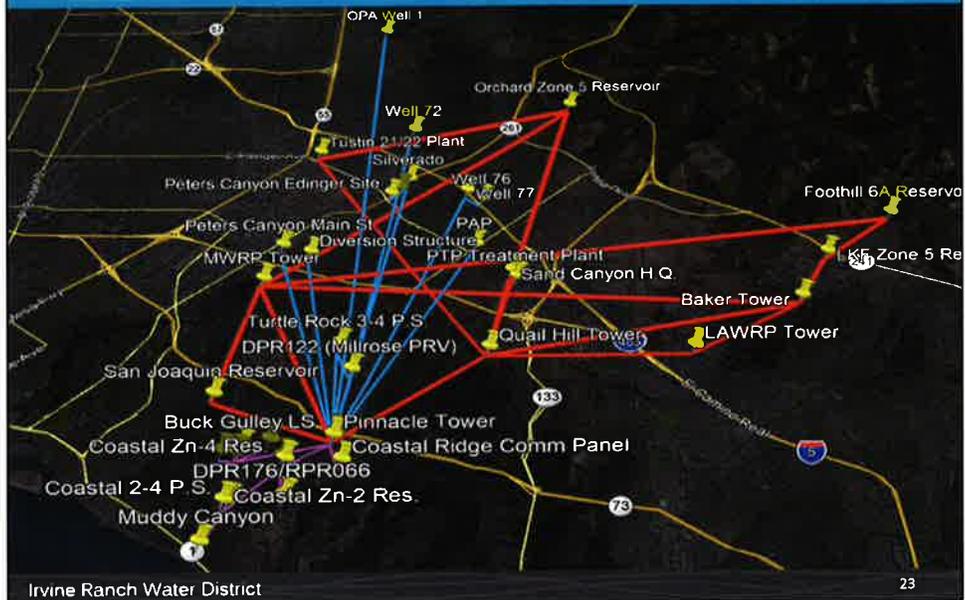
Radio Communication - Backbone



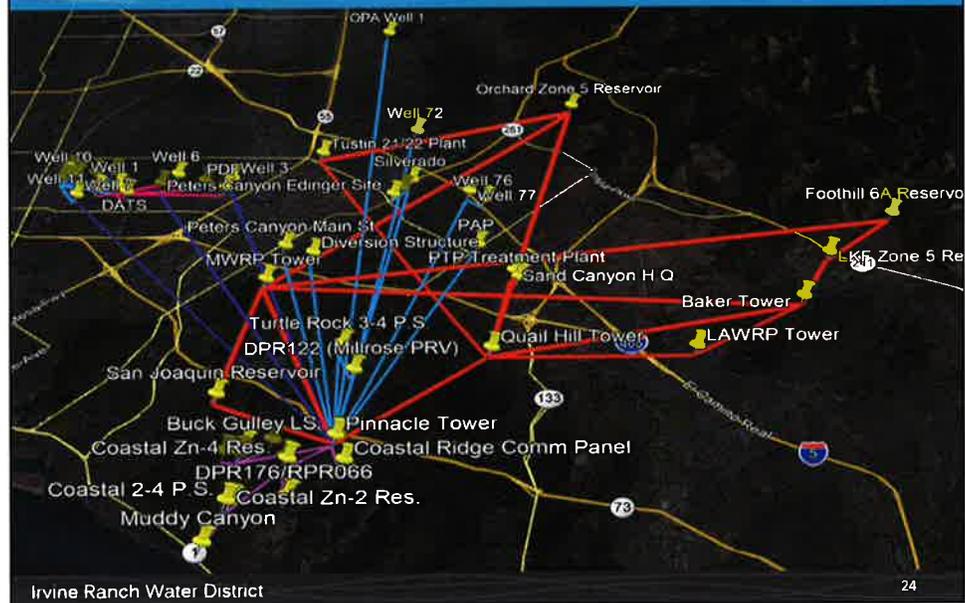
Radio Communication – Signal Peak North



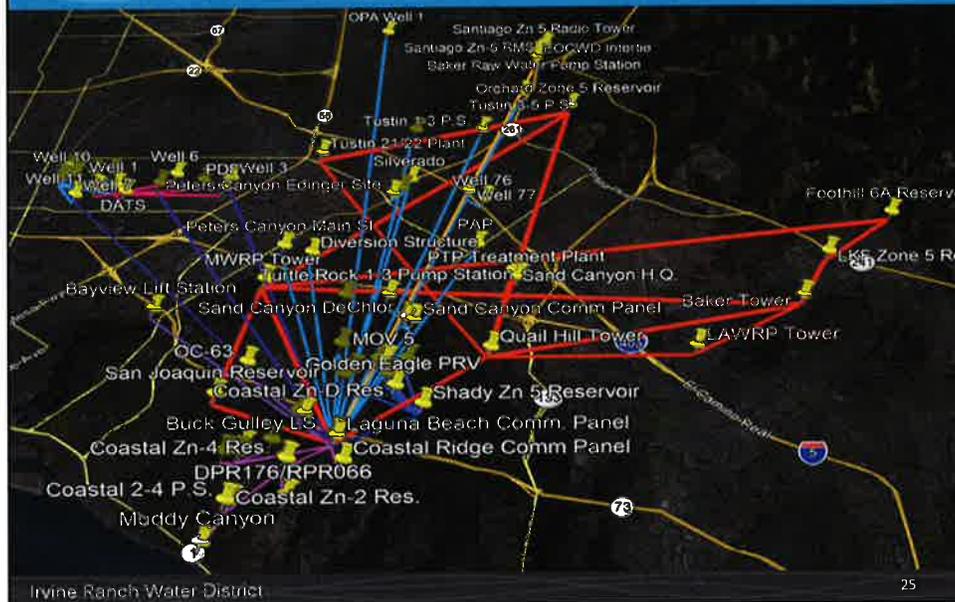
Radio Communication – Signal Peak Newport



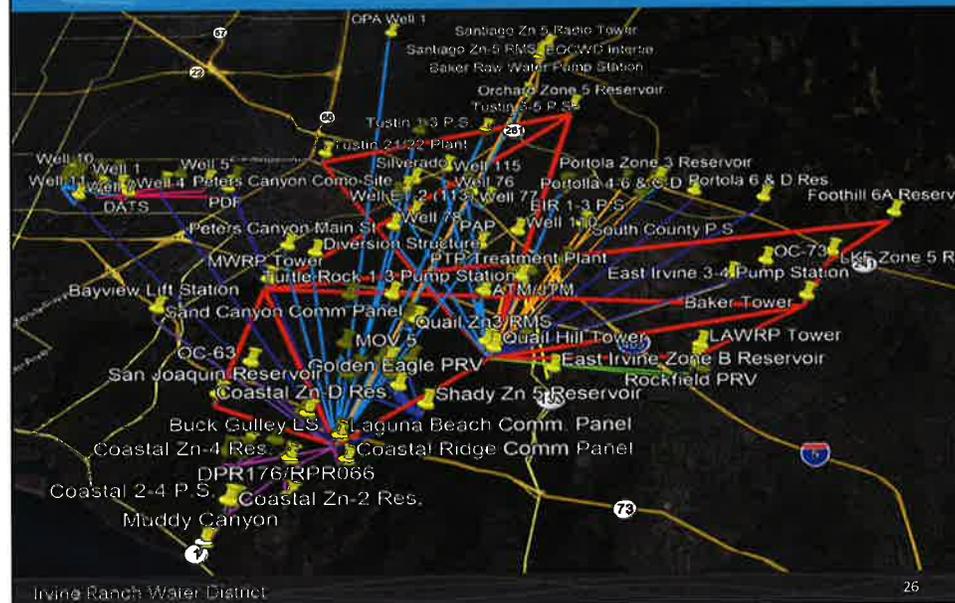
Radio Communication – Signal Peak Dyer Well



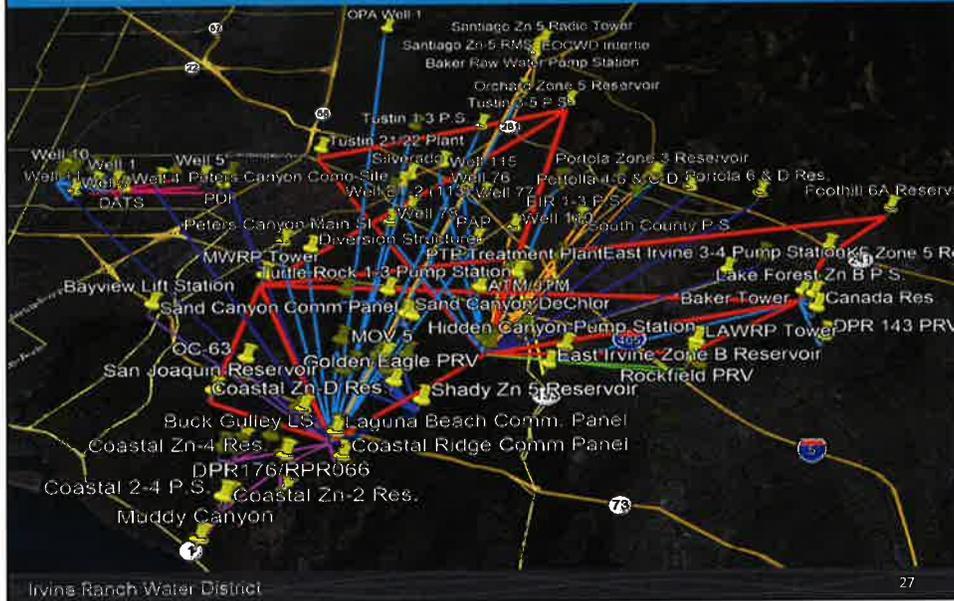
Radio Communication – Signal Peak (All)



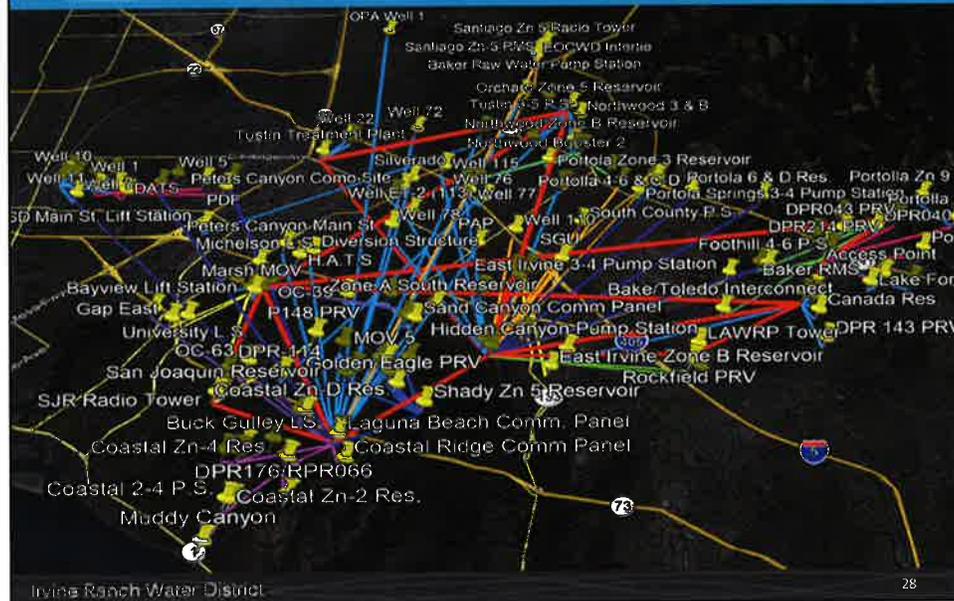
Radio Communication – Quail Hill (All)



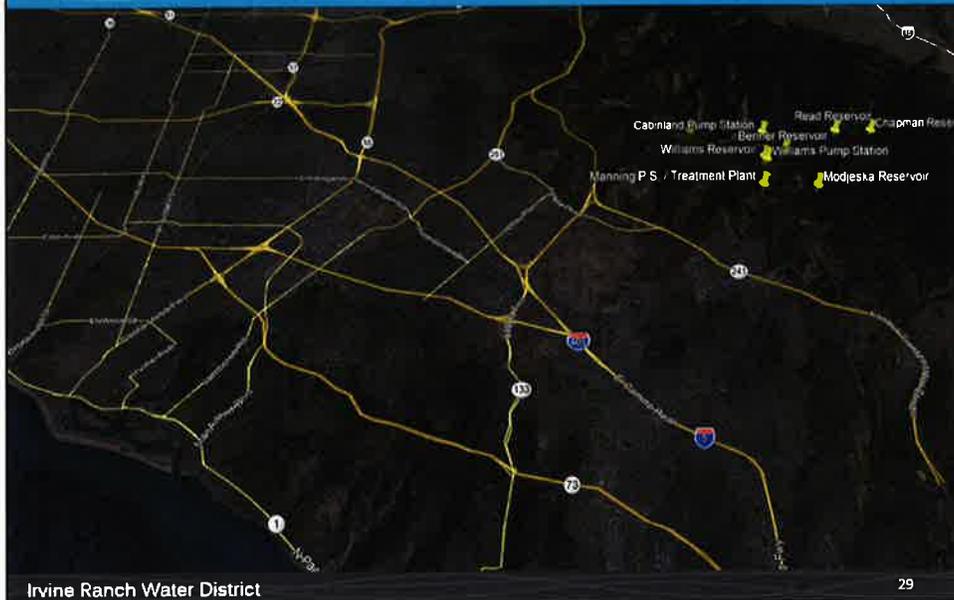
Radio Communication – Baker Tower (All)



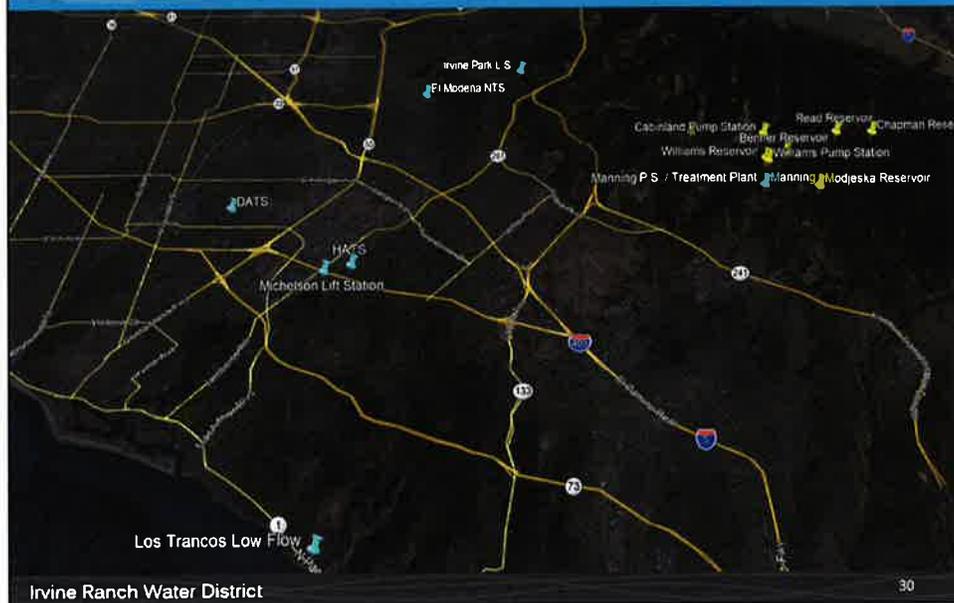
Radio Communication – Overall



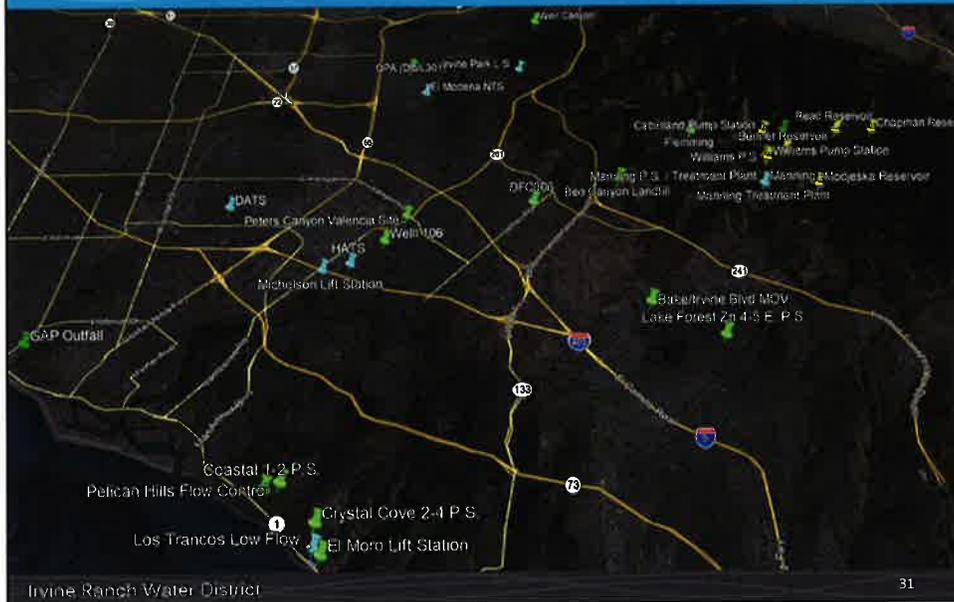
3rd Party – AT&T Star Circuit



3rd Party – AT&T Direct Circuit

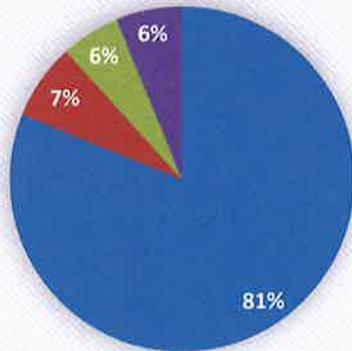


3rd Party – AT&T and Verizon



SCADA Communication Network

Communication Type



- IRWD Private Radio
- AT&T
- Verizon
- Dual (IRWD + AT&T/Verizon)

Private IRWD Radio

Maintenance Outages

Third Party

Maintenance Outages
Congestion Outages

Dual (IRWD + AT&T/Verizon)

Resilience: Automatically switches over from one system to another

Reliability: Automatically picks the best link that has the highest reliability and speed



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October 15, 2019
Prepared by: B. Rios / K. Lew
Submitted by: K. Burton
Approved by: Paul A. Cook



ENGINEERING AND OPERATIONS COMMITTEE

ON-CALL PLAN CHECK SERVICES

SUMMARY:

IRWD's current plan check workload for capital, development, re-development, and operational improvement projects continues to exceed a level that can be supported by staff. The previously approved contract funds for two of the three plan checking consultants are nearly depleted. Staff recommends that the Board authorize the General Manager to execute two Professional Services Agreements: one in the amount of \$100,000 with PacRim Engineering, Inc. and one in the amount of \$150,000 with Stantec Consulting Services, Inc. for on-call plan check services.

BACKGROUND:

IRWD utilizes three engineering consulting firms – Stantec, PacRim, and Hunsaker and Associates – to assist staff with plan checking when workloads exceed staff's capacity. At the current pace of plan reviews, Stantec's and PacRim's approved funds will be depleted within a few months. Funding remains available for Hunsaker, but on many projects Hunsaker is the design engineer so it cannot provide plan checking services. Staff also recommends maintaining the ability to select from multiple plan checking firms to allow for flexibility when addressing scheduling issues, avoid other conflicts of interest, and improve turnaround times on plan reviews during both the design and construction phases.

Although the number of new residential development projects has decreased recently, staff is aware of several pending projects that will likely increase plan checking activity. Staff has coordinated with developers on upcoming large residential projects, including Orchard Hills Neighborhood 4 (approximately 679 dwelling units) and Nakase Farms in Lake Forest (approximately 675 dwelling units), that have major capital facilities as well as non-capital in-tract and builder areas. These projects appear to be moving forward over the next couple of years. Additionally, there has been no discernable slowdown in commercial projects, re-development projects, and other non-residential projects. The Irvine Company is proceeding with commercial office developments at the former Travel Land site as well as the second phase of Spectrum Terrace offices located at the 405 freeway and Laguna Canyon Road.

Consultant Selection:

Both Stantec and PacRim have provided excellent service and responsiveness with on-call plan checking. Both firms thoroughly understand IRWD design guidelines and construction specifications. IRWD staff has reviewed the proposals from PacRim and Stantec (attached as Exhibits "A" and "B", respectively) and finds them satisfactory. Both Stantec and PacRim proposed a rate increase to \$150 per hour. The total proposed funds for each consultant should provide approximately two more years of plan check services.

Staff recommends executing Professional Service Agreements for on-call plan checking with PacRim Engineering, Inc. in the amount of \$100,000, and with Stantec Consulting Services, Inc. in the amount of \$150,000. The recommendation for Stantec's higher funding amount reflects the firm's larger resources capacity.

FISCAL IMPACTS:

Funding for plan check services will be provided from the various developer and capital projects being constructed as part of each project's budget.

ENVIRONMENTAL COMPLIANCE:

This project is exempt from the California Environmental Quality Act (CEQA) as authorized under the California Code of Regulations, Title 14, Chapter 3, Section 15061 (b) (3). The activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA.

RECOMMENDATION:

That the Board authorize the General Manager to execute two Professional Services Agreements, one in the amount of \$100,000 with PacRim Engineering, Inc., and one in the amount of \$150,000 with Stantec Consulting Services, Inc. for on-call plan check services.

LIST OF EXHIBITS:

Exhibit "A" – PacRim Engineering, Inc. Proposal

Exhibit "B" – Stantec Consulting Services, Inc. Proposal

August 4, 2019

Belisario Rios, P.E.
Senior Engineer, Development Services
Irvine Ranch Water District
15600 Sand Canyon Avenue, Irvine, CA 92618
(949) 453-5394 office; rios@irwd.com

Subject: ON-CALL ENGINEERING SERVICES FOR PLAN CHECKING

Dear Mr. Rios,

PacRim Engineering Inc. (PacRim) is pleased to present this proposal for providing On-call Engineering Services for Plan Checking Services to Irvine Ranch Water District (IRWD). For the past several years, PacRim has been working closely with the IRWD staff in supplementing your capacity to plan-check various development projects through IRWD. We will continue providing high quality services that meet your needs during times of high work load.

SCOPE OF SERVICES

It is our understanding that we will provide on-call plan checking services to assist the District staff with reviewing and checking development improvement plans submitted to IRWD for approval. The general scope of work includes the following:

1. Perform plan review of development improvement plans submitted for both initial IRWD approval and delta plan revisions.
2. Attend coordination meetings with District Development Services staff to review comments made on plan submittals.
3. Assist with development improvement plan receipts, log-in and returns.

This assignment will be staffed by Ms. Amy Kok of PacRim who has been the lead person in previous plan check work provided to IRWD . Amy is knowledgeable and familiar with IRWD's Procedural Guideline, Construction Manual and the processing of development improvement plans. She has over 23 years of experience in the field of civil engineering. She is available to fulfill the assignment upon your authorization.

The proposed billing rate for Ms. Kok is \$150.00 per hour. The services provided by her will be billed monthly. The initial contract amount will be a not-to-exceed of \$100,000.

We appreciate this opportunity and look forward to working with you on this important contract. Should you have any questions, please contact me at (714) 683-0471 or Pliu@PacRimEngineering.com.

Sincerely,



Peter Liu, P.E.
Principal

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EXHIBIT "B"



Stantec Consulting Services Inc.
38 Technology Drive, Irvine CA 92618-5312

October 1, 2019
File: 184081166

Attention: Belisario Rios, P.E.
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618

Dear Belisario,

Reference: Stantec Professional Services Agreement – On Call Plan Checking

Stantec Consulting Services Inc. (Stantec) is pleased to submit this proposal to provide On-Call Plan Check Services to assist with technical review and approval of engineering document submittals for the implementation of Irvine Ranch Water District (IRWD, District) infrastructure projects.

Understanding of the Work

IRWD seeks the services of an engineering firm to assist you with the plan checking of submittals received from consultants in various phases of design. These projects may involve potable water, recycled water, sewer and/or storm runoff facility improvements. Plan check services will be provided as requested by IRWD for all technical submittals including, but not limited to, technical memoranda, basis of design calculations and reports, preliminary design reports, design plans, and Project Manuals.

Stantec will conduct plan check services at the IRWD offices; although, in certain cases as directed by the District, Stantec may conduct plan checks at our Irvine regional office.

Plan Check Team

For this work Stantec has assigned Jeff Dunn, P.E. as Project Manager, and Nahid Heidarbaghi, P.E. as the Primary Plan Checker. The Stantec team will be supported by our engineering staff as needed to address specialty disciplines such as storm drainage or structural designs.

Proposed Fees

We have provided Stantec's 2019 Standard Schedule of Billing Rates as an attachment to this proposal. The proposed special hourly rate for Ms. Heidarbaghi, as a Plan Checker, is \$150/hr. This hourly rate will be annually escalated at a rate of 2.5%, or the CPI, whichever is lower. Stantec's services will be conducted as requested, by the District, and be billed on a time-and-materials basis, per assignment, throughout the duration of this contract. The proposed contract limit is \$150,000.

Reference: **Stantec Professional Services Agreement – On Call Plan Checking**

We look forward to the opportunity to continue to provide plan check services to IRWD. Should you have questions, please feel free to contact me at (949) 923-6974.

Best regards,

Stantec Consulting Services Inc.



Jeff Dunn, P.E.
Senior Project Manager
Phone: 949 923 6974
Fax: 949 923 6121
Jeff.dunn@stantec.com



Joseph Long, P.E.
Senior Principal
Phone: 949 923 6011
Fax: 949 923 6121
Joseph.long@stantec.com

Attachment: billing rates

c. Vera Klaich

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SCHEDULE OF BILLING RATES – 2019

Billing Level	Hourly Rate	Description												
3	\$102	Junior Level position <input type="checkbox"/> Independently carries out assignments of limited scope using standard procedures, methods and techniques <input type="checkbox"/> Assists senior staff in carrying out more advanced procedures <input type="checkbox"/> Completed work is reviewed for feasibility and soundness of judgment <input type="checkbox"/> Graduate from an appropriate post-secondary program or equivalent <input type="checkbox"/> Generally, one to three years' experience												
4	\$107													
5	\$121													
6	\$126	Fully Qualified Professional Position <input type="checkbox"/> Carries out assignments requiring general familiarity within a broad field of the respective profession <input type="checkbox"/> Makes decisions by using a combination of standard methods and techniques <input type="checkbox"/> Actively participates in planning to ensure the achievement of objectives <input type="checkbox"/> Works independently to interpret information and resolve difficulties <input type="checkbox"/> Graduate from an appropriate post-secondary program, with credentials or equivalent <input type="checkbox"/> Generally, three to six years' experience												
7	\$137													
8	\$142													
9	\$152	First Level Supervisor or first complete Level of Specialization <input type="checkbox"/> Provides applied professional knowledge and initiative in planning and coordinating work programs <input type="checkbox"/> Adapts established guidelines as necessary to address unusual issues <input type="checkbox"/> Decisions accepted as technically accurate, however may on occasion be reviewed for soundness of judgment <input type="checkbox"/> Graduate from an appropriate post-secondary program, with credentials or equivalent <input type="checkbox"/> Generally, five to nine years' experience												
10	\$158													
11	\$168													
12	\$177	Highly Specialized Technical Professional or Supervisor of groups of professionals <input type="checkbox"/> Provides multi-discipline knowledge to deliver innovative solutions in related field of expertise <input type="checkbox"/> Participates in short and long range planning to ensure the achievement of objectives <input type="checkbox"/> Makes responsible decisions on all matters, including policy recommendations, work methods, and financial controls associated with large expenditures <input type="checkbox"/> Reviews and evaluates technical work <input type="checkbox"/> Graduate from an appropriate post-secondary program, with credentials or equivalent <input type="checkbox"/> Generally, ten to fifteen years' experience with extensive, broad experience												
13	\$185													
14	\$201													
15	\$211	Senior Level Consultant or Management <input type="checkbox"/> Recognized as an authority in a specific field with qualifications of significant value <input type="checkbox"/> Provides multi-discipline knowledge to deliver innovative solutions in related field of expertise <input type="checkbox"/> Independently conceives programs and problems for investigation <input type="checkbox"/> Participates in discussions to ensure the achievement of program and/or project objectives <input type="checkbox"/> Makes responsible decisions on expenditures, including large sums or implementation of major programs and/or projects <input type="checkbox"/> Graduate from an appropriate post-secondary program, with credentials or equivalent <input type="checkbox"/> Generally, more than twelve years' experience with extensive experience												
16	\$225													
17	\$234													
18	\$237	Senior Level Management under review by Vice President or higher <input type="checkbox"/> Recognized as an authority in a specific field with qualifications of significant value <input type="checkbox"/> Responsible for long range planning within a specific area of practice or region <input type="checkbox"/> Makes decisions which are far reaching and limited only by objectives and policies of the organization <input type="checkbox"/> Plans/approves projects requiring significant human resources or capital investment <input type="checkbox"/> Graduate from an appropriate post-secondary program, with credentials or equivalent <input type="checkbox"/> Generally, fifteen years' experience with extensive professional and management experience												
19	\$245													
20	\$255													
21	\$270													
Survey Crews		<table border="1"> <thead> <tr> <th>Crew Size</th> <th>Regular Rate</th> <th>Overtime Rate</th> </tr> </thead> <tbody> <tr> <td>1-Person</td> <td>\$190</td> <td>\$220</td> </tr> <tr> <td>2-Person</td> <td>\$285</td> <td>\$375</td> </tr> <tr> <td>3-Person</td> <td>\$375</td> <td>\$500</td> </tr> </tbody> </table>	Crew Size	Regular Rate	Overtime Rate	1-Person	\$190	\$220	2-Person	\$285	\$375	3-Person	\$375	\$500
Crew Size	Regular Rate	Overtime Rate												
1-Person	\$190	\$220												
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3-Person	\$375	\$500												

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October 15, 2019

Prepared by: J. McGehee / R. Mori

Submitted by: K. Burton

Approved by: Paul A. Cook



ENGINEERING AND OPERATIONS COMMITTEE

LAKE FOREST ZONE B TO C RECYCLED WATER PUMP STATION
CONSULTANT SELECTION

SUMMARY:

IRWD is proceeding with the design of the Lake Forest Zone B to C Recycled Water Pump Station to improve water quality in the recycled water system. Staff recommends that the Board authorize the General Manager to execute a Professional Services Agreement in the amount of \$735,378 with Stantec Consulting Services, Inc. for engineering design services for the Lake Forest Zone B to C Recycled Water Pump Station.

BACKGROUND:

IRWD's Lake Forest Zone C recycled water system receives its water supply from the Los Alisos Water Recycling Plant (LAWRP) and Santa Margarita Water District's (SMWD) Upper Oso Reservoir. IRWD staff recently completed an evaluation to identify ways to increase operational flexibility and improve water quality in the Lake Forest Zone C recycled water system. This evaluation resulted in a recommendation to cover the existing Zone B East Reservoir, establish a closed-loop Zone C distribution system with water supplied primarily from LAWRP, and construct a bi-directional metered interconnection with SMWD that can be used to transfer recycled water between IRWD and SMWD as needed. The installation of the cover is complete, and staff is now proceeding with the design of a new interconnection with SMWD and a new pump station to establish the closed-loop Zone C system.

The proposed pump station will be located at the site of the existing (non-operational) Lake Forest Well No. 5, with the proposed interconnection to be located near the intersection of Portola Parkway and El Toro Road as shown on Exhibit "A". The existing Lake Forest Zone B to C recycled water pump station, an outdoor pump station constructed in 1998, will be demolished as part of the project utilizing replacement funds. The proposed pump station will be enclosed within a building designed to be aesthetically compatible with the surrounding commercial buildings and designed to mitigate sounds from operating equipment as required by the City of Lake Forest's noise ordinance. In addition to the proposed pump station and demolition of the existing outdoor pump station, the project includes the following:

- Destruction of the existing Lake Forest Well No. 5;
- Conceptual siting and reservation of space for a potential future well and well building located on the proposed pump station site; and
- Construction of a metered interconnection between IRWD and SMWD to allow the transfer of recycled water between IRWD and SMWD as needed.

Consultant Selection:

Staff received proposals for engineering design services from Dudek, Lee & Ro, and Stantec. Woodard & Curran declined to submit a proposal due to schedule conflicts with its primary pump station design staff. While each firm provided proposals which generally met the project objectives, Stantec's approach to the project exceeded that presented by the other firms, which included an original design concept that maximized the use of the limited available site space. In addition, Stantec's proposed project manager has successfully managed several recent IRWD projects including the Orange Park Acres Well No. 1 Wellhead Facilities, Stockdale West Wellhead Equipping and Conveyance Facilities, and the Eastwood Recycled Water Pump Stations. The consultant selection matrix is attached as Exhibit "B", and Stantec's scope of work and fee proposal are attached as Exhibit "C".

The design phase will be completed in accordance with the following schedule milestones:

Kick-Off Meeting	October 2019
Final Preliminary Design Report	May 2020
Final Plans Approved	January 2021
Construction Notice of Award	March 2021

Staff recommends that the Board authorize the General Manager to execute a Professional Services Agreement in the amount of \$735,378 with Stantec Consulting Services, Inc. since its design approach, schedule, and staff hours are consistent with the project goals and objectives and scored the highest among the proposals received.

FISCAL IMPACTS:

The Lake Forest Zone B to C Recycled Water Pump Station, Project 11168 is included in the FY 2019-20 Capital Budget and will be funded through 40% Lake Forest development areas funds (Improvement District 2850) and 60% replacement funds (Improvement District 2100). The existing budget is sufficient to fund this design effort.

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 Stantec Consulting Services, Inc. in the amount of \$735,378 for engineering design services for the Lake Forest Zone B to C Recycled Water Pump Station, Project 11168.

LIST OF EXHIBITS

Exhibit "A" – Location Map

Exhibit "B" – Consultant Selection Matrix

Exhibit "C" – Stantec Consulting Services Scope of Work and Fee Proposal

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EXHIBIT "A"
LOCATION MAP



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EXHIBIT "B"

CONSULTANT SELECTION MATRIX

Lake Forest Zone B to C Pump Station									
Item	Description	Weights	Stantec	Dudek	Lee & Ro	Woodard & Curran			
A	<u>TECHNICAL APPROACH</u>								
1	Project Understanding	30%	1	2	3		Declined to submit		
2	Project Approach	40%	1	2	3				
3	Project Team	30%	1	3	2				
	<u>Weighted Score</u>		1.0	2.3	2.7				
	Ranking of Consultants		1	2	3				
B	<u>SCOPE OF WORK</u>								
TASK		Task Hours	Fee	Task Hours	Fee	Task Hours		Fee	
1	Project Management	296	\$63,220	270	\$62,194	142		\$33,548	
2	Preliminary Design	1,006	\$196,904	1,154	\$224,506	1,881		\$375,832	
3	Final Design	3,200	\$475,254	2,720	\$483,269	1,594		\$290,611	
	Total Engineering Services Fee	4,502	\$735,378	4,144	\$769,969	3,617	\$699,991		
C	<u>OTHER</u>								
	Number of Drawings		90	98	117				
	Average Hourly Billing Rate (including subconsultants)		\$163	\$186	\$194				
	Sub Consultants								
	Electrical		Moraes Pham & Associates	Moraes Pham & Associates					
	Civil								
	Structural			Kelsey Structural					
	Architectural		Gillis + Panichapan Architects, Inc.		Sift Lee Office				
	Geotech		Kleinfelder, Inc.	Converse Consultants	Associated Soils Engineering				
	HVAC			ATC, Inc..					
	Survey			Guida Surveying	The Prism Group				
	Surge		Northwest Hydraulics Consultants	ZZ Technologies	Flowscience				
	Traffic Control			Traffic Management, Inc.	Traffic Control Engineering				
	Exceptions taken to IRWD Std. Contract		None	None	None				
	DIR Numbers Provided		Yes	Yes	Yes				
	Insurance (Professional & General Liability)		Yes	Yes	Yes				

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EXHIBIT "C"

Scope of Work

The following scope of work is based on the information presented in the original request for proposal dated 8/1/19 . The scope of work presented herein is for the planning, evaluation, design, and implementing the Lake Forest Zone B to C Pump Station Project. All work will be completed in accordance with the requirements identified in IRWD’s Design Process Manual. The scope of work will be stand-alone documents that will become the Agreement Exhibits.

The scope of work will consist of the following tasks. Changes will be based on the specific needs of the project based on actual field conditions encountered during the project development. Should changes to the scope of work be warranted, all changes will be submitted to you for review and approval. No change will be executed prior to your written approval.

Task 1: Project Management

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

A. PROJECT STATUS REPORT PREPARATION: We will prepare weekly and monthly status reports. Each weekly status report will be submitted on Monday and include a brief (one to two paragraphs) e-mail summarizing the activities completed the previous week, the activities planned for the upcoming week, and critical decisions that need to be made. Each monthly status report will be submitted along with the billing invoice for that month and provide more detail, summarizing the work completed and reviewing work status relative to budget and schedule. The schedule will be updated monthly for inclusion in the monthly status report.

Approach to Weekly Status Preparation: We will provide your project manager a weekly status report to be delivered on the first working day of each week. Generally, status reports will be delivered on Mondays, unless the day is considered as a designated holiday, then the status report will be delivered on the day following the designated holiday. The status report will be in the form of a short email memorandum, identifying accomplished tasks from the prior week and anticipated tasks to be accomplished during the upcoming week.

Approach to Monthly Status Report Preparation: We will prepare a monthly status report providing detailed review of all tasks being executed by this scope of work. We will maintain a Microsoft Project Schedule that will be updated monthly and provided for your review. We will also maintain a decision log, documenting all decisions and resolutions associated with the development and implementation of the project. The decision log will be incorporated into the

monthly status report for your review. We will prepare a monthly budget update based on efforts expended for all project tasks. The budget update will identify fees expended and remaining budget balances.

Monthly Invoicing – We will prepare monthly invoicing. All invoicing will be forwarded to both your project manager and your accounts payable for review and approval. Your project manager shall make efforts to review and approve our invoices within five working days upon receipt of said invoice.

Deliverables for Project Reporting and Invoicing:

- Weekly project status report via an email summary to your project manager
- Monthly status report
- Monthly invoicing

B. MEETINGS AND WORKSHOPS: We will prepare and submit meeting agendas for your review and concurrence at least five days prior to the meeting. We will prepare draft and final minutes for all meetings and workshops and submit them to you within one week of the meeting.

Approach to Meeting and Workshops: We will schedule and lead meetings with you to discuss all design, operational, and maintenance issues through the design development. We will provide meeting agendas and meeting materials to you five working days prior to the subject meeting. We will prepare meeting minutes, action items, and decision logs within five working day subsequent to the meeting date. These efforts are intended to address technical issues, keep the project team informed to the project’s progress, and verify decisions are made in a timely manner.

Meeting/ Workshop	Description
Preliminary Design Kick-off	One two-hour meeting: Prior to the Preliminary Design Kick-off Meeting, We will research and present an overview of the approach and develop initial information requests of materials to be provided by IRWD. We will present an overview of the project approach, early work tasks, identification of workshops and stakeholder outreach efforts and the overall project schedule.

Meeting/ Workshop	Description
General project management and design development meetings	<p>Five two-hour meetings: The general project meetings will be used to coordinate and develop the project with IRWD Engineering and Operations staff members.</p> <p>Meeting – 1 Hydraulic Modeling, Pump Selection and Site Development</p> <p>Meeting – 2 Intertie Connection with IRWD/SMWD and adjacent property owners.</p> <p>Meeting – 3 Architectural Review and Technical Workshop. Stantec and IRWD will review with GPA regarding architectural concepts, approval requirements with the City of Lake Forest and presentation of landscaping concepts.</p> <p>Meeting – 4 Demolish the existing Lake Forest B to C Pump Station including reconfiguration of existing electrical system at Reservoir B.</p> <p>Meeting – 5 Draft review of the PDR with IRWD Staff.</p>
Stakeholder Coordination Meetings	<p>Three two-hours meetings: We will coordinate with project stakeholders and conduct project meetings. The anticipated stakeholder meetings consist of the following:</p> <ul style="list-style-type: none"> Southern California Edison – Permit pre-submittal and application preparation. City of Lake Forest – Traffic Control and Architectural Approvals County of Orange – Adjacent open land coordination
Site visits	<p>Two two-hour meetings: Two site/field visits will be coordinated with IRWD. Although we will have formal field meetings, Stantec will coordinate field visits as necessary to complete the project.</p>
Present Draft Preliminary Design Report	<p>One three-hour meeting: We will present all design features associated with each project site, including pump facilities layout, power requirements, reconfigure the life cycle analyses will be presented to further provide a final basis of the design concept along with 30% plans and control strategies</p>

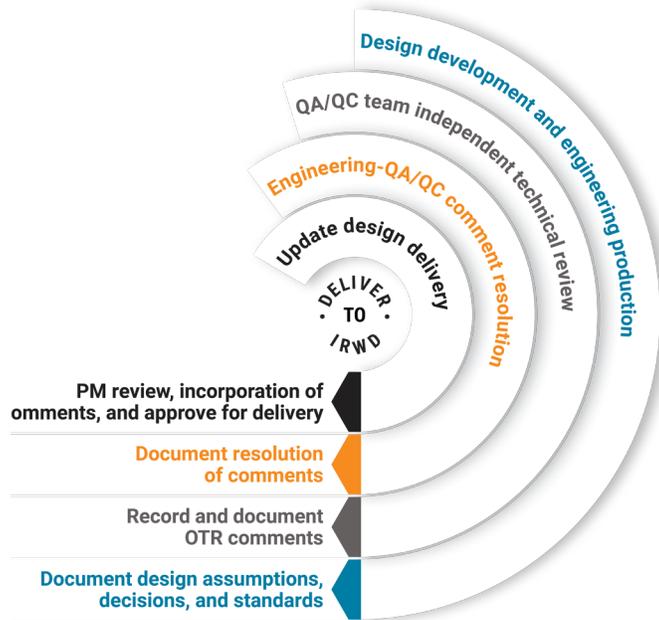
Meeting/ Workshop	Description
Present the 60% design and discuss IRWD's comments and outstanding item resolution	<p>One two-hour meeting: Upon receipt of IRWD 60% submittal comments, we will prepare and present methods to address comments.</p> <p>We will update the anticipated Opinion of Probable Construction Costs to the project team along with a schedule update and next steps.</p>
Present the 90% design submittal and record IRWD comments	<p>One two-hour meeting: Upon receipt of IRWD 90% submittal comments, we will prepare and present methods to address comments.</p> <p>We will update the anticipated Opinion of Probable Construction Costs to the project team along with a schedule update and next steps.</p>
Present the 100% design submittal and record IRWD comments	<p>One two-hour meeting: Upon receipt of IRWD 100% submittal comments, we will prepare and present methods to address comments.</p> <p>We will update the anticipated Opinion of Probable Construction Costs to the project team along with a schedule update and next steps.</p>
Final Plan Signing	<p>One one-hour meeting</p>

C. QUALITY ASSURANCE AND QUALITY CONTROL:

Risk Management: Without early identification, monitoring, and control, risks have the potential to lead to projects being delivered over budget, behind schedule, or without critical stakeholder support. As part of his regular project management duties, Joe will lead the risk management process that includes risk planning (identification, analysis, and mitigation) and risk monitoring and control. The risk register—a database in which potential risks are identified and qualitatively or quantitatively ranked by the likelihood that they may occur and their likely impact on the project—is one feature of our project management approach. Once risks have been identified and ranked, mitigation measures are developed to address high and medium risks.

Quality Management/Quality Control: We have a proven procedure for establishing and maintaining the quality of our professional work products. The QA/QC procedure is founded on selecting an experienced team using proven procedures consistently, following strict standards for engineering, checking to help ensure compliance, and adapting rapidly to unusual events.

Stantec’s QA/QC management is based on a prescriptive methodology that is documented through our Project Management Systems. The QA/QC method includes using senior staff members to review all aspects of the work, review work products for inter-disciplinary coordination and conflicts. Work with the design team to resolve review and conflict issues to be incorporated into the contract plans. Joe as the Project Manager will have the last say as to readiness of our work products to be sent to IRWD.



Task 2 – Preliminary Design

The Preliminary Design Phase will provide Stantec and IRWD with the ability to collaboratively develop and identify the project needs. Ultimately, the Preliminary Design Report will serve as the basis of design for the project identifying project needs and requirements along with preliminary opinions of probable costs, identify stakeholder requirements leading to a successful project. We will, as part of the Preliminary Design Phase, define (1) facility design criteria, (2) provide site and equipment layouts defining the overall project footprint, (3) identify operational requirements including pump sizing and configuration, surge mitigation requirements, electrical requirements, control philosophies, aesthetic requirements and provide an overall project definition.

A. BACKGROUND INFORMATION: We will review available background materials associated with this project, including but not limited to, record drawings, existing system processes and operations of the existing Zone B and Zone C pressures zones, hydraulic information from Santa Margarita Water District associated with the distribution area for Upper Oso Reservoir. We will work with operations staff to identify operational preferences and preferred equipment layout. Site visits will be conducted at the existing Lake Forest Recycled Water Pump Station, proposed Lake Forest

Zone B to C Recycled Water Pump Station and Portola Parkway at the SMWD intertie site to gather additional information necessary to prepare the preliminary design report and final design documents. All site visits will be photo-logged to be used as a design reference of the existing conditions at the project sites.

In addition, we will research existing easements and/or property information to identify existing conditions or restrictions associated with the existing property(ies) that may constrain project development. Our research of materials will include the following entities:

- Irvine Ranch Water District
- Santa Margarita Water District
- City of Lake Forest
- County of Orange

Deliverable:

We will provide an electronic copy of all research materials including a photo/data log that defines the relationship to the project and potential constraints.

B. UTILITY RESEARCH: We will research and identify the location of existing underground utilities and/or other physical features in the immediate vicinity of the proposed facilities and appurtenances. Information on utilities including material, size, and horizontal and vertical locations shall be identified.

Our utility efforts will consist of the following steps:

Utility Research Matrix	
1.	Initial Underground Service Alert (USA) facility ownership with 500 feet of the project sites. Facility ownership will be used to identify potential utility providers that may be affected by either construction activities and/or require relocation due to potential utility conflicts. Although we do fully understand that the majority of this project, with the exception of the SMWD intertie connection will be outside the public rights of way.
2.	Based on the information obtained from the initial USA utility ownership search, Stantec will prepare request letters to obtain As-built information regarding utilities in the project area.

Utility Research Matrix	
3.	As-built utility information will be mapped to serve as the utility base map for the project. We will identify potential impacts and prepare a listing of locations of which field investigations are warranted. For the purposes of this project, we have anticipated that ten pothole locations (10 total all locations) will be implemented upon the early development of the project site layout, including sanitary sewer, potable water, electric and communications.
4.	Validation of existing utilities will be completed upon the final completion of the surveying mapping. Conflicts will be brought to the attention of IRWD staff and coordination for relocation of the utilities will be accomplished during the final design efforts.

C. DESTRUCTION OF EXISTING LAKE FOREST WELL

NO. 5: The existing location of the Lake Forest Well No. 5 is anticipated to be in conflict with the proposed improvement for the Lake Forest Zone B to C Pump Station and, as such, will need to be destroyed as part of the project efforts. Stantec suggests that destructing the existing well be an early work item along the removal of the existing appurtenances prior to the start of construction for the new pump station. As such, we will prepare a Design Memorandum outside the efforts of the preliminary design services. Our efforts will be to develop a Well Destruction Specification in accordance with DWR Health and Safety, Well Ordinance Bulletin 74. We will fast-track the development of the Demolition Plans, Specifications and Estimate on a parallel track of the preliminary design efforts. Our efforts will include a downhole video survey of the existing well to ascertain the existing facilities condition. Stantec’s hydrogeology staff will provide final recommendations as to the requirements of the existing well destruction methods, sealing materials and depth of the final closure cap (mushroom cap).

Deliverable: Bid Ready Demolition Plans, Well Destruction Plans, Specifications and Estimates. We will provide to IRWD final plans including 8- 11”x17” copies, one full size signed mylar plan set, and 5 copies color coded copies of the Project Manual.

D. DEMOLITION OF EXISTING LAKE FOREST ZONE B TO C PUMP STATION:

The existing Lake Forest Zone B to C Pump Station is located adjacent to the Zone B East Reservoir. Following startup and commissioning of the new Lake Forest Zone B to C Pump Station, the existing Zone B to C Pump Station will need to be demolished. We will review as-builts for the existing Lake Forest Zone B to C Pump Station and make recommendations for demolition. Our electrical and I&C subconsultant, Moraes, Pham and Associates (MPA) designed electrical and controls for the existing Zone B to C pump station and the recent addition of the floating cover on the Zone B East Reservoir. MPA will make recommendations

for relocation and/or replacement of the electrical and communication equipment that serves the Zone B East Reservoir and other facilities at the reservoir site that are required to keep the system operational. These facilities include rainwater removal pumps, service switchboard, PLC, site lighting, mission telemetry unit, communication equipment and level instruments.

E. HYDRAULICS ANALYSIS: The proposed Lake Forest Zone B to C Recycled Water Pump Station is necessary to meet peak-hour demands. Utilizing InfoWater, our hydraulic modeling lead, Jeff Dunn, who is familiar with IRWD’s recycled water distribution model, will review IRWD’s model and confirm the current findings or make recommendations on revising the capacity of the Lake Forest Recycled Water Pump Station, as well as the pipeline sizes. Minor losses will be accounted for in the model and the total dynamic head (TDH) for the pump station will be determined. Results of the hydraulic analysis will be discussed with IRWD prior to pump selection.

F. PUMP SELECTIONS: Zone C will be hydraulically isolated from the Upper Oso Reservoir and therefore operate in a closed loop condition. The new pump station will also operate through a wide range of flow rates from nearly 0 to 1,650 gpm. Based on our preliminary analysis Stantec has established that two duty pumps will be required to meet the high demands, a single duty pump will handle flows from 100 gpm to 900 gpm. A low flow pump will maintain water pressure in the system during low demand periods. We will refine our initial analysis based on the overall Zone C hydraulics during the preliminary design phase. A minimum of three alternative pump arrangements will be evaluated that shall include an evaluation of using constant speed drives, variable frequency drives or a combination of the two in addition to a pressure relief valve for return flow to Zone B . To meet low flow demands and maintain system pressure and prevent the pumps from constantly cycling on and off, a low flow pump will be necessary. Following the selection of the preferred pumping arrangement, we will identify three pump models that will meet the hydraulic requirements at four separate design points. Pump models from Flowserve, Goulds and Sulzer will be selected that meet the hydraulic requirements and included in the technical specifications. We will meet with IRWD Operations Staff to discuss any preferred methods of operating the new recycled water pump station.

G. PUMP STATION CONFIGURATION: We will develop at least three alternative building configurations for the new recycled water pump station taking into consideration accessibility for day to day operations staff, as well as pulling pumps, motors and appurtenances. The pump station building shall be constructed of tilt-up concrete or masonry block covered with stucco with a parapet roof and be architecturally compatible with the surrounding

buildings. Our subconsultant, GPA will develop alternative architectural schemes to identify building styling to match the surrounding community. Alternative building layouts shall include provisions for a separate pump room and electrical room. The electrical room shall be equipped with a dedicated air conditioning system and the pump room shall be equipped with ventilation only. The HVAC equipment shall be evaluated based on the availability of space, noise and aesthetics and may be located inside, outside or on the building roof. The pump room shall house the pumps determined under item 6 above, as well as a high-pressure bypass pressure reducing valve (PRV), and a magnetic flowmeter.

H. SITE MASTER PLAN: Stantec shall, in collaboration with IRWD, prepare three alternative site layouts. The detailed site plans shall identify, as a minimum:

- Existing facilities
- Pump station building
- Backup generator
- Surge tank (if needed)
- Yard piping, valves and appurtenances
- Storm drains
- Catch basins
- Electrical transformer and panels
- Future well, associated piping and appurtenances for well operation

Site layouts shall be evaluated for access, routine operation and maintenance and costs. The site plan shall allow adequate space to accommodate the proposed new well housed in a similar style building described in the Pump Station Configuration and the facilities location shall meet the Division of Drinking Water separation standards from the existing well, the proposed recycled water facilities, and will allow sufficient space for drill rig equipment, drilling mud tank, casing and screen, and column pipe laydown. The site shall include a 6-foot high screening wall around the site perimeter. In addition, if a surge tank is required, it shall not exceed six feet in height above finished grade, below the perimeter wall.

Similar to the Orange Park Acres Well No 1, the surge tank will be depressed into an open vault to further hide the intrusive height of the tank. Drainage and water quality improvements will be incorporated into the project site and may include active BMP's to meet Orange County Watershed WQMP Section 7 requirements.

I. PRELIMINARY GRADING PLAN: Based on the facilities discussed in item 8 above, Stantec shall prepare a grading plan for the Lake Forest pump station site. IRWD prefers a minimum slope of 1.5 percent for asphalt drainage.

J. SURGE ANALYSIS:

Transient Analysis of Lake Forest Zone B to C Pump Station, Zone B and Zone C: Coordinate with Stantec to obtain data necessary for the pressure surge analysis work. Extract Zones B and C from IRWD's recycled water distribution system (i.e., steady state) model and import into the TransAM transient analysis software. Develop a surge computer model of the proposed Lake Forest Zone B to C Pump Station, Zone B, Zone C and the existing Zone B East and West Reservoirs.

Establish hydraulic grade line (HGL) elevations for the pipelines in the pressure zones under steady state operation (high and low demand conditions) and static conditions.

Using the above initial HGLs, perform transient analysis simulations for operation of the proposed Lake Forest Zone B to C Pump Station. Simulations will include pump power failure and pump startup at the proposed Lake Forest Zone B to C Pump Station for the critical operating scenarios.

Evaluate the results of the simulations and determine whether surge control measures are required to protect the pressure zone pipelines and proposed LFZB-C from adverse pressure transients (e.g., vapor pressure, large magnitude negative pressures, over-pressure) created by loss of power and startup of the pumps at the proposed Lake Forest Zone B to C Pump Station.

If surge protection is deemed necessary, NHC will determine surge control measures (e.g., volume and dimensions of pressurized surge tanks recessed in concrete pits on both suction and discharge side of pumps, diameter and location of controlled venting vacuum relief valves, diameter and set point pressure of surge/pressure relief valves, etc.) for the proposed Lake Forest Zone B to C Pump Station and Zones B and C. The surge control measures anticipated to be a pressurized surge tank system, will be designed to help ensure that the maximum pressures do not exceed the maximum allowable pressure for the system, and to eliminate the possibility of vapor cavity formation and large magnitude negative pressures in the pipelines following pump power failure and pump startup. The results of the hydraulic transient analysis with the recommended surge protection improvements in place will also be provided. In addition, recommendations for safely starting the pumps will be provided.

Summarize the physical facilities, component data (including a schematic showing the hydraulic transient analysis model), findings of the pressure surge simulations, and surge control recommendations (if necessary) in a technical memorandum. Movies of relevant transient analysis simulations may be included in the memo. Draft and final (three bound and one electronic copy) technical memoranda will be provided.

K. PUMP STATION SITE ELECTRICAL SERVICE:

Electrical service at the existing Lake Forest Well No. 5 site is provided by Southern California Edison (SCE) and will not support the new electrical loads from the Lake Forest Zone B to C Recycled Water Pump Station. Stantec and our subconsultant MPA will evaluate the existing and new loads and determine the size of the new electrical service. Stantec and MPA shall coordinate with SCE to begin preparation of the SCE preliminary service plan and shall support SCE, as needed to develop the final SCE approved service plan during the final design phase.

L. ELECTRICAL AND CONTROLS: Stantec and MPA shall identify the electrical and controls required for the proposed improvements at the Lake Forest Zone B to C Recycled Water Pump Station site. The electrical and controls shall include the new recycled water pump station and potential future new groundwater well. A new service switchboard, triple-switch, and an automatic transfer switch shall be provided. In addition, an evaluation and recommendation shall be made to provide permanent emergency backup power for the pump station electrical loads only. Recommendation shall include size and costs of the backup generator and associated ancillary equipment. Permanent backup power generator shall be located in its own walk-in, acoustic enclosure.

M. GEOTECHNICAL INVESTIGATION:

Setup, Permitting, and HASP: Kleinfelder will review available geology information, as well as the site plan for the proposed project to select representative locations for the field investigation. Prior to executing the field work, Kleinfelder will obtain a well permit in accordance with the requirements of the Orange County Health Care Agency (OCHCA) for the proposed borings. We have assumed that the permit will be procured in IRWD's name and that the IRWD project manager will sign the permit application in order to obtain a "no fee" permit.

In addition, Kleinfelder will prepare a site-specific health and safety plan (HASP) addressing site-specific conditions. The HASP will discuss general safe-work practices and address work hazards, site-specific conditions, and the proposed scope of services. The HASP will include typical industry standard content for projects of similar scope.

Site Reconnaissance, Geophysical Investigation, and Utility Clearance: Prior to our field investigation, Kleinfelder will perform a site reconnaissance, verify site access, verify and mark the locations of our proposed field explorations, and notify Underground Service Alert of our intent to dig in accordance with State law. We request that all available information identifying the type and location of utility lines and other human-made objects beneath the proposed improvement areas be provided to us at least one

week prior to marking our field explorations.

In addition, Kleinfelder will retain a private utility locating service to perform a geophysical survey to aid in identifying underground utilities in the area immediately surrounding the proposed field exploration locations. Although performing a geophysical survey does not guarantee that the locations are clear of underground utilities, it decreases the risk associated with drilling in the subsurface.

Field Exploration: Kleinfelder proposes to drill two (2) borings to depths of approximately 50 feet below ground surface (bgs) or refusal using truck-mounted, hollow-stem-auger drilling techniques. An engineer or geologist from Kleinfelder will oversee the drilling and obtain samples for visual observation, classification, and laboratory testing. Soil samples will be collected from the borings at 5-foot depth intervals alternating between a Standard Penetration Test (SPT) sampler and a California sampler. At least one bulk sample will be collected in the upper five feet at each boring location. The depth to groundwater will be measured during drilling and at the completion of drilling, if encountered. Upon completion of drilling, the borings will be grouted with cement bentonite grout.

It is assumed that Investigation-derived waste (IDW) (soil cuttings from the borings) will be drummed and offsite disposal is required. Kleinfelder's budget includes the cost for profiling of the cuttings, pickup and disposal of non-hazardous soil cuttings. It is assumed that IRWD (or its agent) will sign the bill of lading or hazardous waste manifest required for disposal of the drill cuttings.

Laboratory Testing: Representative samples of the underlying soils obtained from the borings will be returned to our laboratory for visual examination. Selected samples will be tested to evaluate pertinent geotechnical characteristics. Moisture content, density, grain size distribution, hydrometer analysis, corrosivity, Atterberg limits, expansion, compaction, consolidation, direct shear and R-value will be performed as appropriate on selected soil samples to assess the physical characteristics of the subsurface soils encountered at the site. Actual testing program will be designed based on subsurface soil conditions encountered during drilling, and not all tests mentioned may be needed.

Geotechnical Evaluation: Kleinfelder will perform geotechnical engineering analyses based on data obtained from the literature review, proposed field and laboratory testing to evaluate potential geologic and seismic hazards; to provide geotechnical recommendations for the foundation support of the pump station, earthwork and subgrade preparation requirements, and suitability of the on-site soils for use as backfill. Geologic and liquefaction hazards will be evaluated. Seismic design parameters

in accordance with California Building Code 2019 (CBC 2019) will be evaluated for structural design and other miscellaneous structures.

Draft and Final Report: The geotechnical engineering report will summarize the subsurface conditions and contain conclusions and foundation recommendations for support of the structures. We anticipate the report will include the following:

- Our understanding of the proposed construction
- Geologic setting, faulting and seismicity
- Discussion of the subsurface exploration program and laboratory testing program
- Description of soils encountered, subsurface conditions, and soil classification in accordance with the Unified Soil Classification System, and groundwater encountered
- Laboratory test results
- Conclusions and recommendations regarding:
 - Geologic and seismic hazards
 - Temporary slope and shoring requirements for the below grade construction and mitigation measures as appropriate
 - Construction dewatering requirements as appropriate
 - CBC seismic design parameters
 - Earthwork, excavation, subgrade preparation, backfill and compaction requirements, pipe bedding, and suitability of site soil for use as fill
 - Foundation type, allowable bearing, settlement, pavement thickness, lateral pressures for below grade walls, and friction factor recommendations for foundation design

Kleinfelder will submit a draft report for review, and comments will be addressed in our final report. We have assumed responding to one round of review comments will be required.

N. NOISE CONSIDERATIONS: Stantec will catalog all equipment noise levels provided by the manufacture that will include the following operating equipment:

- Pumps
- Air compressor
- Surge tank exhaust
- Backup power generator
- Air Conditioning Compressor
- Air Handling Equipment

Stantec will use the manufacture's information to identify potential noise sources and incorporate into the design noise reduction measures to mitigate

fugitive noise from the site. Wall assemblies, louvers and the roof assemblies will be design to specifications providing a minimum STC rating of 55.

O. SURVEYING SERVICES: Stantec shall conduct a survey of the new Lake Forest Zone B to C Recycled Water Pump Station site, as well as the location of the proposed interconnection between IRWD and SMWD's recycled water system along Portola Parkway. The configuration and location of the proposed meter vault shall be agreed upon with IRWD prior to proceeding with surveying.

As a minimum, the survey completed by Stantec shall include:

- Establish survey ground control for mapping using NAD83 coordinates and NAVD88 County benchmark elevations
- Provide contour mapping at 10 scale, one-foot contour intervals
- Field locate and add obscured surface features for all areas of the proposed work
- Preparation of topographic maps to be used for preparation of the design drawings for the Project as defined herein

P. INTERCONNECTION WITH SMWD: Stantec shall evaluate options and provide recommendations for adding a motor operated butterfly valve and two-way flow meter between the IRWD and SMWD recycled water systems located on Portola Parkway near El Toro Road. Up to three alternative locations will be identified and evaluated taking into consideration piping configurations, power availability, operations and maintenance, and accessibility. The vaults will be configured to allow entrance from the sidewalk and not obstruct traffic. The flow meter, butterfly valve(s) and appurtenances shall be located within a vault(s) and shall be incorporated into IRWD's SCADA system such that remote control and data acquisition can be obtained. Stantec shall coordinate with SCE to begin preparation of the SCE preliminary service plan and shall provide exhibits and information to SCE as needed to develop the final SCE approved service plan during final design.

Q. PERMITS: We will identify and prepare all permit applications and secure all permits with the necessary controlling agencies. We will prepare and furnish the required copies of all plans and exhibits needed to support the permit applications. The permits anticipated as part of this Project include An encroachment permit from the City of Lake Forest for the construction of the new interconnection between the IRWD and SMWD recycled water systems.

A copy of all permits will be included in the Appendix of the Project Manual to be completed

during the final design phase. As requested per the RFP, Stantec has included a \$5,000 allowance for permits in the fee schedule submitted under separate cover. IRWD shall reimburse Stantec for actual permit fees without surcharge.

R. WATER QUALITY MANAGEMENT PLAN

REQUIREMENTS: Stantec shall define project features and best management practices that will mitigate the Project's impact on water quality and the environment in accordance with the IRWD's North Orange County NPDES permit. Stantec shall perform a site assessment, document site conditions, identify hydrologic conditions of concern and pollutants of concern, determine performance criteria, and provide recommendations for low impact development (LID) best management practices for treatment and capture of discharges on the new Project site. Stantec shall review improvements with IRWD staff and determine which improvements are suitable for incorporation into the final design. The preparation of a Water Quality Management Plan is not included in this effort.

S. CEQA DOCUMENTATION: Stantec shall provide information, prepare exhibits, attend meetings and review portions of the environmental documents necessary to support the CEQA efforts as requested by IRWD. As indicated in the RFP, a budget of \$5,000 has been included in our fee estimate submitted under separate cover for this effort.

T. PROJECT SCHEDULE: Stantec shall prepare a detailed project schedule for design and construction of the Project components discussed herein. The schedule shall identify the critical path items, coordination items, permits, submittal milestones, and IRWD review times.

U. OPINION OF PROBABLE CONSTRUCTION COSTS:

We will provide IRWD with detailed and itemized engineer's estimate of probable construction costs for the alternatives that are developed.

V. PRELIMINARY DESIGN REPORT: Stantec shall summarize the findings, concerns and recommendations in items A-U listed above in a preliminary design report (PDR). The PDR shall include findings, concerns, recommendations and development of design criteria that is identified during the preliminary design phase. An anticipated outline of the PDR is as follows:

EXECUTIVE SUMMARY

1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

1.2 PROJECT COMPONENTS

1.2.1 Existing Lake Forest Well No. 5

1.2.2 Existing Lake Forest Zone B to C Pump Station

1.2.3 New Lake Forest Zone B to C Pump Station

1.2.4 SMWD Interconnection

2.0 EXISTING LAKE FOREST WELL NO. 5

2.1 INTRODUCTION

2.2 WELL DESTRUCTION

2.2.1 California DWR Requirements

2.2.2 Pre-Destruction Video Survey

2.2.3 Final Sealing

2.2.4 Mushroom Cap

3.0 EXISTING LAKE FOREST ZONE B TO C PUMP STATION

3.1 INTRODUCTION

3.2 DEMOLITION

3.3 ELECTRICAL, INSTRUMENTATION AND CONTROLS

4.0 NEW LAKE FOREST ZONE B TO C PUMP STATION

4.1 INTRODUCTION

4.2 HYDRAULICS AND PUMP SELECTION

4.2.1 Data Gathering and Review

4.2.2 Hydraulic Design Criteria

4.2.3 Minor Losses

4.2.4 System Head Curves

4.2.5 Booster Pump Selection

4.2.4.1 Booster Pump Selection

4.2.4.2 Summary of Pump Selections

4.2.6 SURGE ANALYSIS

4.2.7 YARD PIPING

4.3 SITE/CIVIL

4.3.1 Layout Criteria

4.3.2 Low Impact Development and Best Management Practices

4.3.3 Yard Piping

4.3.4 Alternative Site Configurations

4.4 BOOSTER PUMP BUILDING CONSIDERATIONS

4.4.1 Comparative Analysis

4.4.2 Architectural Styling Approach

4.5 NOISE REQUIREMENTS

4.5.1 County of Orange Noise Ordinance Requirements

4.5.2 Design Considerations

4.6 GEOTECHNICAL INVESTIGATION

4.6.1 Geotechnical Findings and Design Impact

4.7 ELECTRICAL

4.7.1 Requirements

4.7.2 Power

4.8 OPERATION AND CONTROLS

4.8.1 Instrumentation

4.8.2 Process and Control

4.9 UTILITIES

4.9.1 Required Utilities

4.10 REGULATORY

4.10.1 Water Quality Management Plan Requirements

4.10.2 Encroachment Permits

5.0 SMWD INTERCONNECTION

5.1 INTRODUCTION AND DESIGN CONSIDERATIONS

5.2 ALTERNATIVES EVALUATION

5.3 ELECTRICAL, INSTRUMENTATION AND CONTROLS

5.3.1 Requirements

5.3.2 Power Supply

5.3.3 Operation and Controls

APPENDIX:

Appendix A - Sample Well Completion Report

Appendix B - Transient Analysis

Appendix C - System Hydraulics Pump Selection

Appendix D - Geotechnical Report

Appendix E - New Lake Forest Zone B to C Site Configuration Alternatives

Appendix F – SMWD Interconnection Alternatives

Preliminary Design Deliverables: We will submit eight hard copies of the draft PDR and one electronic copy in PDF format for IRWD's review and comment. Upon resolution and incorporation of IRWD's comments, eight hard copies and one electronic copy in PDF format on a CD of the final PDR. The PDR shall include thirty percent (30 percent) design drawings and a Table of Contents of the anticipated specifications to be developed during the final design.

Task 3 – Final Design

Following IRWD's approval of the final PDR, Stantec shall prepare complete reproducible sets of construction drawings and Project Manuals as well as the SCE final service plans. Stantec shall maintain the project design schedule as well as prepare a schedule for construction activities. As indicated in the RFP, three construction packages inclusive of separate project manuals will be prepared that will include:

- Destruction of the existing Lake Forest Well No. 5
- Construction of a new Zone B to C recycled water pump station/Demolition of existing Zone B to C recycled water pump station and modifications to electrical and instrumentation and controls at Zone B East Reservoir Site.
- Construction of a flow meter and motor operated valve on Portola Parkway to allow the transfer of recycled water between IRWD and SMWD

The details of items to be completed during the final design phase are as follows:

A. PROJECT MANUALS: Stantec shall prepare the Project Manuals in standard IRWD format and, using IRWD templates, complete the front end documents and bidding and contract sections of the project manual. IRWD's general standard technical specifications will be used and supplemental sections will be prepared as needed for the construction of complete Project(s). The allowable shutdown durations and sequencing associated with making all connections and tie-ins to the existing IRWD and SMWD facilities will be included.

Stantec will prepare three separate Project Manual packages for the following:

- Destruction of the existing Lake Forest Well No. 5
- Lake Forest Zone B to C Pump Station and Demolition of the existing Zone B to C Pump station and Reconfiguration of the Existing Electrical/Controls System. Specifications for the development of the Santa Margarita Municipal Water District Intertie shall be incorporated into the Lake Forest Zone B to C Pump Station Project Manual.

Stantec will provide an original set of bidding documents in 8 ½ x 11-inch format for each package. Computer files of the Project Manuals will be submitted to IRWD in the latest version of Microsoft Word on one CD and as a single PDF file on a second CD reproducible ready. The staff that will be preparing the Project Manuals for IRWD have worked on multiple projects for IRWD alleviating the learning curve.

B. CONSTRUCTION PLANS: As discussed above, Stantec shall prepare three sets of construction documents as part of this Project. For all construction plans, Stantec will prepare detailed construction drawings for each set of Contract documents in the latest version of AutoCAD and using NCS V4.0 layering standards, on 22-inch x 34-inch sheets using IRWD's standard title block. Stantec and its subconsultants will prepare all required drawings. This plan set will include general, civil, demolition and mechanical, structural, electrical, instrumentation and control drawings, and associated details necessary for constructible Project(s). Separate sheets with index maps that will include sheet legend, final alignment, valve locations, surrounding streets and significant project site locations, general notes, construction notes, and phasing will be included. Construction notes shall be used (callouts on the plans are not allowed) on all construction drawings. Existing IRWD utilities shall be identified on the plan view by as-built plan set number with the pipeline material and IRWD pressure zone labeled. Construction plans shall be prepared using the NAVD 88 and NAD 83 survey standards. Stantec will comply with the requirements of the preparation of the construction drawings outlined in the RFP.

LAKE FOREST ZONE B TO C PUMP STATION AND DEMOLITION OF THE EXISTING ZONE B TO C PUMP STATION AND RECONFIGURATION OF THE EXISTING ELECTRICAL/CONTROLS SYSTEM:

Stantec shall prepare a separate set of construction documents for the construction of the Lake Forest Zone B to C Recycled Water Pump Station, demolition of the existing recycled water pump station and improvements to the electrical and instrumentation and controls that will be needed at the Zone 2 East Reservoir site when the existing recycled water pump station is decommissioned. The anticipated sheet list for the Lake Forest Zone B to C Recycled Water Pump Station, demolition of the existing recycled water pump station and improvements to the electrical and instrumentation at the Zone 2 East Reservoir site is shown below:

Sheet No.	Drawing No.	Sheet Title
1	G-1	Title Sheet
2	G-2	Location Map, Vicinity Map, and Drawing Index
3	G-3	General Notes, Symbols, Agency Index & Abbreviations
4	G-4	Construction Notes
5	D-1	Demolition Plan
4	C-1	Overall Site Plan

Sheet No.	Drawing No.	Sheet Title
5	C-2	Horizontal Control Plan
6	C-3	Site Grading and Paving Plan
7	C-4	Yard Piping Plan
8	C-5	Site Details
9	C-6	Civil Details 1
10	C-7	Civil Details 2
11	M-1	Mechanical Legend, Symbols, and Abbreviations
12	M-2	Booster Pump Station Plan
13	M-3	Booster Pump Station Sections
14	M-4	Booster Pump Station Sections & Details
15	M-5	Booster Pump Station Details
16	M-9	Surge Tank Plan, Sections, and Details
17	M-10	Surge Tank Air Compressor Plan, Sections, and Details
18	M-11	Mechanical Details 1
19	M-12	Mechanical Details 2
20	A-1	Booster Pump/Electrical Building Plan, Codes, and Notes
21	A-2	Booster Pump/Electrical Building Roof Plan and Details
22	A-3	Booster Pump/Electrical Building Exterior Elevations
23	A-4	Booster Pump/Electrical Building Sections and Wall Details
24	A-5	Architectural Details
25	S-1	Structural Notes and Design Criteria
26	S-2	Structural Foundation/Floor Plan – Pump Station Building
27	S-3	Roof Framing Plans /Pump Station Building
28	S-4	Wall Sections and Details
29	S-5	Structural Details
30	P-1	Plumbing Legend, Schedule, and Notes
31	P-2	Booster Pump Station Plumbing Plan
32	HVAC-1	HVAC Legend, Schedules, Notes, and Specifications
33	HVAC-2	Pump Station/Electrical Buildings HVAC Plan
34	HVAC-3	HVAC Details

Sheet No.	Drawing No.	Sheet Title
35	E-1	Electrical Standard Symbols and Abbreviations
36	E-2	Electrical Site Plan Zone B to C Demolition
37	E-3	Electrical Site Plan – Zone B Reservoir Modifications/Schedules
38	E-4	Electrical Site Plan – Well 5 Demolition
39	E-5	Electrical Site Plan – New Zone B to C
40	E-6	Zone B to C Pump Station Electrical and Signal Plan
41	E-7	Zone B to C Pump Station Lighting and Receptacle Plan
42	E-8	Zone B to C Pump Station Single Line Diagram/Elevations
43	E-9	Zone B to C Pump Station Controls 1
44	E-10	Zone B to C Pump Station Controls 2
45	E-11	Zone B to C Pump Station Controls 3
46	E-12	Zone B to C Pump Station Schedules 1
47	E-13	Zone B to C Pump Station Schedules 2
48	E-14	Electrical Details 1
49	E-15	Electrical Details 2
50	E-16	Zone B to C Pump Station RTU Diagrams 1
51	E-17	Zone B to C Pump Station RTU Diagrams 2
52	E-18	Zone B to C Pump Station RTU Diagrams 3
53	E-19	Zone B to C Pump Station RTU Diagrams 4
54	E-20	Zone B to C Pump Station RTU Diagrams 5
55	E-16	Zone B to C Pump Station RTU Layout
56	E-16	Zone B to C Pump Station RTU System Architecture
57	I-1	P&ID Standard Symbols and Abbreviations
58	I-2	Zone B to C Pump Station P&ID 1
59	I-3	Zone B to C Pump Station P&ID 2

CONSTRUCTION PLANS FOR INTERCONNECTION WITH SMWD:

Stantec shall prepare a separate set of construction drawings for the interconnection facility located on Portola Parkway for submittal to the City of Lake Forest. Detailed traffic control plans shall be prepared in accordance with the City of Lake Forest requirements. The anticipated sheet list is shown below:

Sheet No.	Drawing No.	Sheet Title
1*	G-1	Title Sheet
2*	G-2	Location Map, Vicinity Map, and Drawing Index
3*	G-3	General Notes, Symbols, Agency Index & Abbreviations
4*	G-4	Construction Notes
5*	D-1	Demolition Plan
4*	C-1	Overall Site Plan
5*	C-2	Horizontal Control Plan
6*	C-3	Site Grading and Paving Plan
7*	C-4	Civil Details 1
8*	M-1	Mechanical Legend, Symbols, and Abbreviations
9*	M-2	Flow Meter/Butterfly Valve Vault Plan
10*	M-3	Flow Meter/Butterfly Valve Vault Section
11*	M-1	Flow Meter/Butterfly Valve Vault Sections & Details
12*	M-2	Mechanical Details
13*	S-1	Structural Notes and Design Criteria
14*	S-2	Structural Details
15*	T-1	Traffic Control General Notes
16*	T-2	Traffic Control Plan
17	E-1	Electrical Standard Symbols and Abbreviations
18	E-2	SMWD Interconnection Plan
19	E-3	SMWD Interconnect RTU Diagrams 1
20	E-4	SMWD Interconnect RTU Diagrams 2
21	E-5	SMWD Interconnect RTU Diagrams 3
22	E-6	SMWD Interconnect RTU Layout
23	I-1	SMWD Interconnect P&ID

* Denotes Plans to be submitted to the City of Lake Forest as a separate package for obtaining an Encroachment Permit from the City.

CONSTRUCTION PLANS AND PROJECT MANUAL FOR DESTRUCTION OF EXISTING LAKE FOREST WELL NO. 5:

IRWD shall advertise the destruction of the existing Lake Forest Well No. 5 in advance of the advertisement of the proposed Lake Forest Zone B to C Recycled Water Pump Station project and, as such, a separate set of construction drawings shall be prepared. The contract documents shall be prepared in accordance with IRWD Standards. The anticipated sheet list for the destruction of the existing Lake Forest Well No. 5 is shown below:

Sheet No.	Drawing No.	Sheet Title
1	G-1	Title Sheet
2	G-2	Location Map, Vicinity Map, and Drawing Index
3	G-3	General Notes, Symbols, Agency Index & Abbreviations
4	G-4	Construction Notes
5	D-1	Demolition Plan
6	D-2	Demolition Plan
7	D-3	Demolition Plan
8	C-1	Site Plan

C. ELECTRICAL/INSTRUMENTATION: Stantec and its subconsultant MPA shall meet with IRWD’s electrical and automation staff to understand standard operations, programming and tagging requirements for incorporation into the design documents. MPA shall prepare an operational scheme including P&ID’s, single line diagrams, control equipment list, control loop descriptions, and method of integrating the proposed facilities into IRWD’s existing SCADA system. The operational scheme and functional descriptions shall be provided in plain English for IRWD’s review and approval. Power and telemetry to the new pump station site and at the interconnection with SMWD’s recycled water system shall be coordinated by Stantec and MPA.

D. SCE FINAL SERVICE PLANS: Stantec and its subconsultant, MPA, shall coordinate with SCE during the preliminary design process to obtain the Final Service Plans for both the new Lake Forest Zone B to C Recycled Water Pump Station and the interconnection to SMWD’s recycled water system. All coordination with SCE, exhibits and plans to obtain the Final Service Plans are included under this task. The Final Service Plans shall be included in the appendix to the Project Manuals for the respective Projects.

E. PROJECT SCHEDULE: Stantec shall maintain and update the project design schedule, to be prepared in Microsoft Project, and submit with project status

reports on a monthly basis or more frequently should there be a critical change in project schedule. The schedule shall identify the critical path items, coordination items, permits, submittal milestones, and IRWD review times. Stantec shall also prepare a detailed construction schedule of activities and factors impacting the schedule such as permitting, and coordination activities shall be included.

F. OPINION OF PROBABLE CONSTRUCTION COSTS: Stantec will provide IRWD with detailed and itemized engineer’s estimates of probable construction costs for each of the construction packages. The estimates will be updated with each subsequent design submittal.

G. DESIGN DELIVERABLES: Stantec shall provide final design deliverables pursuant to the RFP. The final design deliverables for each construction package will be as follows:

- **60% Submittal:** Stantec will submit eight, 11”x17” bound copies of the sixty percent (60 percent) submittal and one CD containing a single PDF file of the entire plan set. The 60 percent submittal shall include, at a minimum, civil/site, mechanical and P&ID’s. Basic mechanical equipment, structural and architectural layouts, pipeline alignments, preliminary profiles, and existing utilities. A complete table of contents shall be provided for the Project Manual. In addition, an engineer’s estimate of probable construction costs shall be provided.
- **90% Submittal:** Stantec will submit eight, 11”x17” bound copies of the sixty percent (90 percent) submittal and one CD containing a single PDF file of the entire plan set for IRWD’s review. The 90 percent submittal shall include, at a minimum each component of the design such as civil, structural, mechanical, architectural, electrical, and instrumentation and controls. Electrical plans and comments received from IRWD on the 60 percent submittal will be addressed and incorporated. Each component of the design shall be developed to high levels of detail and pipeline alignments, plan, profile, connection details and location of appurtenances shall be included. Five color coded copies of the Project Manual shall be submitted and all sections including contract documents, general provisions, special provisions, general requirements, technical specifications and appendices. In addition, an updated engineer’s estimate of probable construction costs shall be submitted.
- **100% Submittal:** Stantec will submit eight, 11”x17” bound copies of the one-hundred percent (100 percent) submittal and one CD containing a single PDF file of the entire plan set, and one CD containing AutoCAD files for the entire plan set for IRWD’s review. The 100 percent submittal shall include complete plans and three color coded copies of the Project Manual in its entirety that have addressed IRWD’s comments

received on the 90 percent submittal and one CD of the Microsoft Word files used in the preparation of the Project Manual. In addition, a notebook with the design calculations (including mechanical, civil, structural, HVAC, electrical, pipe thickness and restraint) shall be submitted. An updated engineer's estimate of probable construction costs shall also be submitted with the 100 percent design submittal. One full size stamped and signed reproducible plan set on mylars and one original signed Project Manual for District's signature shall be submitted.

H. ADDENDA PREPARATION AND PRE-BID MEETING:

During the bidding period, Stantec shall provide bidding support and assistance as it pertains to the contract documents and construction drawings for each of the construction packages discussed herein. Stantec will provide information and clarification to prospective bidders and shall prepare up to three addenda including revisions to the design plans and specifications. For budgetary purposes, Stantec has assumed the following:

- **Plan Revisions:** 40 hours of appropriate staff time for revisions to the construction drawings for each of the construction packages.
- **Specification Revisions:** 25 hours of appropriate staff time for revisions and/or additions to each of the Project Manuals.
- **Bidder Questions:** 40 of appropriate staff time to address and respond to bidder questions on each of the construction packages.
- **Pre-Bid Meeting:** Stantec shall attend one two-hour pre-bid meeting for each construction project. The pre-bid meeting shall be conducted by IRWD and shall include a site visit with potential bidding contractors.



**Hours and Fee Summary
Lake Forest Zone B to C Pump Station**

Task No.	Task Description	Stantec		Moraes Pham Associates		GPA Architects		Kleinfelder Project Hours		Northwest Hydraulic Consultants		Other Direct Costs	Total Project Hours	Total Project Fees
		Hours	Fee	Hours	Fee	Hours	Fee	Hours	Fee	Hours	Fee			
TASK 1: Project Management														
1.	Preparation of Project Status Reports (45 weekly, 15 monthly)	50	\$ 13,250.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ 500.00	50	\$ 13,750.00
2.	Meetings and Workshops	130	\$ 27,610.00	8	\$ 1,600.00	64	\$ 8,085.00	0	\$ -	0	\$ -	\$ 1,500.00	202	\$ 38,795.00
3.	QA/QC (Coordination and Sub Review - Other Labor Assigned Per Task)	44	\$ 11,160.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	44	\$ 11,160.00
		0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	0	\$ -
		0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	0	\$ -
SUBTOTAL TASK 1		224	\$ 52,020.00	8	\$ 1,600.00	64	\$ 8,085.00	0	\$ -	0	\$ -	\$ 2,000.00	296	\$ 63,705.00
TASK 2: Preliminary Design														
1.	Background Information	20	\$ 3,578.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	20	\$ 3,578.00
2.	Utility Research	20	\$ 3,332.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	20	\$ 3,332.00
3.	Destruction of Lake Forest Well No. 5	50	\$ 7,514.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	50	\$ 7,514.00
4.	Demolition of Existing Zone B to C Pump Station	34	\$ 4,882.00	6	\$ 1,200.00	0	\$ -	0	\$ -	0	\$ -	\$ -	40	\$ 6,082.00
5.	Hydraulic Analysis	54	\$ 8,726.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	54	\$ 8,726.00
6.	Pump Selection	28	\$ 4,580.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	28	\$ 4,580.00
7.	Pump Station Building Configuration	68	\$ 10,452.00	0	\$ -	74	\$ 8,910.00	0	\$ -	0	\$ -	\$ -	142	\$ 19,362.00
8.	Site Master Plan	56	\$ 8,744.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	56	\$ 8,744.00
9.	Preliminary Grading Plan	14	\$ 2,138.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	14	\$ 2,138.00
10.	Surge Analysis	8	\$ 2,120.00	0	\$ -	0	\$ -	0	\$ -	137	\$ 21,670.00	\$ -	145	\$ 23,790.00
11.	Pump Station Site Electrical Service	4	\$ 1,060.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	4	\$ 1,060.00
12.	Electrical and Controls	0	\$ -	38	\$ 7,000.00	0	\$ -	0	\$ -	0	\$ -	\$ -	38	\$ 7,000.00
13.	Geotechnical Investigation (2 Borings)	8	\$ 1,760.00	0	\$ -	0	\$ -	107	\$ 27,804.00	0	\$ -	\$ -	115	\$ 29,564.00
14.	Noise Control	4	\$ 1,060.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	4	\$ 1,060.00
15.	Surveying (2 person crew, 3 days)	74	\$ 15,458.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ 7,000.00	74	\$ 22,458.00
16.	SMWD Interconnection	34	\$ 5,992.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	34	\$ 5,992.00
17.	Permits	20	\$ 4,380.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ 5,000.00	20	\$ 9,380.00
18.	Water Quality Management Plan Requirements	16	\$ 3,320.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	16	\$ 3,320.00
19.	CEQA Support	46	\$ 8,190.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	46	\$ 8,190.00
20.	Project Schedule	6	\$ 1,590.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	6	\$ 1,590.00
21.	Opinion of Probable Construction Costs	4	\$ 1,060.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	4	\$ 1,060.00
22.	Preliminary Design Report	76	\$ 18,384.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	76	\$ 18,384.00
SUBTOTAL TASK 2		644	\$ 118,320.00	44	\$ 8,200.00	74	\$ 8,910.00	107	\$ 27,804.00	137	\$ 21,670.00	\$ 12,000.00	1,006	\$ 196,904.00
TASK 3: Final Design														
1.	Project Manuals (2)	216	\$ 42,752.00	4	\$ 800.00	0	\$ -	0	\$ -	0	\$ -	\$ -	220	\$ 43,552.00
2.	Construction Plans	1,716	\$ 229,952.00	0	\$ -	362	\$ 41,505.00	0	\$ -	0	\$ -	\$ -	2,078	\$ 271,457.00
3.	Electrical/Instrumentation	8	\$ 2,120.00	507	\$ 69,300.00	0	\$ -	0	\$ -	0	\$ -	\$ -	515	\$ 71,420.00
4.	SCE Final Service Plans (2)	32	\$ 6,640.00	18	\$ 2,400.00	0	\$ -	0	\$ -	0	\$ -	\$ -	50	\$ 9,040.00
5.	Project Schedule	16	\$ 4,240.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	16	\$ 4,240.00
6.	Opinion of Probable Construction Costs	32	\$ 6,640.00	9	\$ 1,400.00	0	\$ -	0	\$ -	0	\$ -	\$ -	41	\$ 8,040.00
7.	Final Design Deliverables (60%, 90%, 100%)	156	\$ 36,860.00	12	\$ 2,400.00	0	\$ -	0	\$ -	0	\$ -	\$ 8,000.00	168	\$ 47,260.00
8.	Addenda Preparation and Pre-Bid Meeting (3 Addenda, 1 Meeting)	112	\$ 17,760.00	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ 2,000.00	112	\$ 19,760.00
		0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	0	\$ -
		0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	\$ -	0	\$ -
SUBTOTAL TASK 3		2,288	\$ 346,964.00	550	\$ 76,300.00	362	\$ 41,505.00	0	\$ -	0	\$ -	\$ 10,000.00	3,200	\$ 474,769.00
TOTAL (TASKS 1 THRU 3)		3,156	\$ 517,304.00	602	\$ 86,100.00	500	\$ 58,500.00	107	\$ 27,804.00	137	\$ 21,670.00	\$ 24,000.00	4,502	\$ 735,378.00

Notes & Assumptions:

- 1) Two (2) borings at the new Lake Forest Zone B to C Recycled Water Pump Station
- 2) Investigation-derived waste (IDW) soil cuttings from borings will be drummed and offsite disposal required
- 3) Direct Costs / Materials include costs such as mileage to meetings/site, courier fees, and document reproduction costs.
- 4) Does not include Surge Analysis for SMWD Interconnection. Optional Task to include \$6715
- 5) Does not include presenting surge analysis to IRWD; Optional task \$6200

October 15, 2019

Prepared by: M. Robinson / E. Akiyoshi

Submitted by: K. Burton

Approved by: Paul A. Cook



ENGINEERING AND OPERATIONS COMMITTEE

2019 POTABLE WATER, SEWER, AND RECYCLED WATER REGIONAL CAPITAL COST ALLOCATIONS

SUMMARY:

IRWD's Regional Capital Cost Allocations have been updated to reflect changes since 2013 – the last time the Regional Allocations were set based on the consolidation of improvement districts (IDs) at that time. The 2019 update incorporates build-out information from the most recent Sub-Area Master Plans (SAMP), General Plan Amendments, developer projections, and Water Supply Assessments (WSA). Staff recommends that the Board approve the updated Regional Allocations.

BACKGROUND:

The 2013 ID consolidation was a strategic initiative to optimize the IDs and update the sources of funding to reflect the most current information and equitable allocation of capital expenditures. This update was extensive and included working closely with developers to gain consensus on all aspects including development and demand projections. Concurrent with the ID consolidation, the Regional Allocations for Potable Water, Sewer, and Recycled Water were updated and approved. These Regional Allocations split capital expenditures for regional projects (e.g., water treatment plants and water supply projects) to the various IDs based on the build-out for potable water, sewer, and recycled water demand projections. IRWD periodically updates the developments projections and calibrates the water demand projections upon which the Regional Allocations are calculated. The 2019 update is focused on the development projections; a subsequent phase will calibrate the water demand factors.

Between 2013 and 2019, entitlement and planning projections have changed in multiple areas throughout IRWD's service area. Staff has reviewed current General Plan land use information, WSAs, developer projections, and SAMPs. Updated developer information was obtained by coordinating with the Irvine Company, which provided updated land use maps. Staff incorporated information from the developer into the Regional Allocations and confirmed final residential and non-residential information with them to ensure the accuracy of the Regional Allocations.

While multiple areas were updated throughout the IRWD service area, the major changes are identified as follows:

- East Orange Area I / East Orange Lake Village / Santiago Hills II – These developments were planned for approximately 3,700 residential dwelling units (DUs). The Irvine Company significantly reduced the footprint of these developments and designated the remainder to permanent open space, changing future development to only include Santiago Hills II with 1,180 DUs resulting in a net reduction of approximately 2,500 DUs;

- Portola Springs – This area increased residential units from 4,650 DUs to 6,180 DUs. Non-residential development has remained relatively the same;
- Great Park Area – This area increased residential units from 10,700 DUs to 14,000 DUs, and increased non-residential development from 7,830 thousand square feet (ksf) to 12,920 ksf;
- Spectrum Area – This area increased residential development by approximately 1,300 DUs, which is primarily comprised of apartment buildings; and
- Tustin Legacy Area – The City of Tustin increased residential development from 4,820 DUs to 7,190 DUs, and decreased non-residential development from 12,120 ksf to 9,680 ksf. The net change in development results in a minor increase in overall demands for the Tustin Legacy Area.

The ID maps for potable water and sewer are shown in Exhibits “A” and “B”, respectively, with the combined changes reflected in the updated Regional Allocations for Potable Water, Sewer, and Recycled Water as shown in Exhibits “C”, “D”, and “E”, respectively.

FISCAL IMPACTS:

The net fiscal impacts to IRWD will be minimal as a whole and will vary by ID. All projects with Regional Allocations will be adjusted on a moving forward basis subsequent to Board adoption of the proposed Regional Allocations.

ENVIRONMENTAL COMPLIANCE:

These studies are exempt from the California Environmental Quality Act (CEQA) as authorized under the California Code of Regulations, Title 14, Chapter 3, Section 15262 which provides exemption for planning studies.

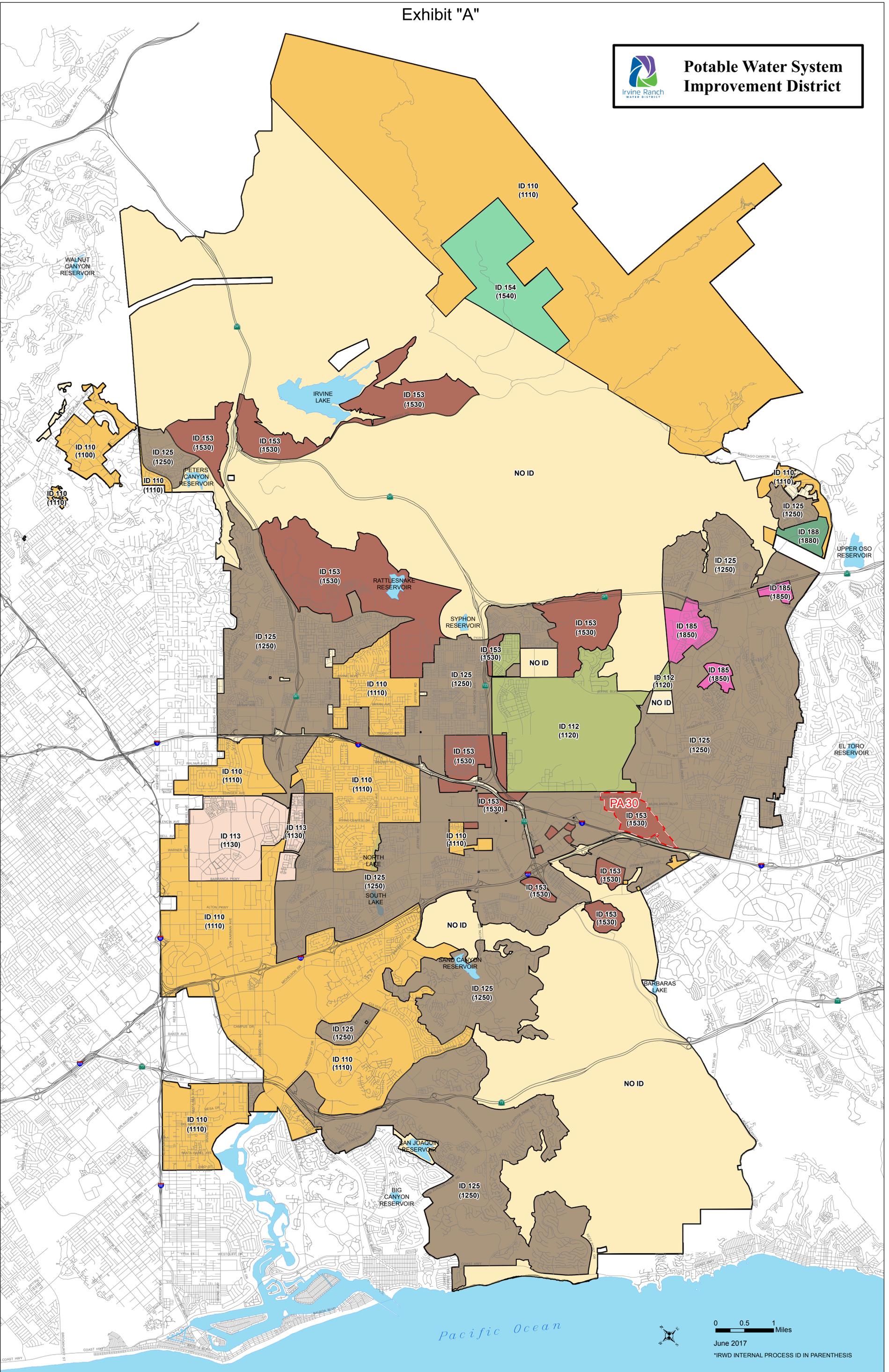
RECOMMENDATION:

That the Board approve the proposed Regional Capital Cost Allocations and their application to capital projects, effective December 1, 2019.

LIST OF EXHIBITS:

- Exhibit “A” – Potable System Improvement District Map
- Exhibit “B” – Sewer System Improvement District Map
- Exhibit “C” – Regional Potable Water ID Allocations
- Exhibit “D” – Regional Sewer ID Allocations
- Exhibit “E” – Regional Recycled Water ID Allocations

Exhibit "A"



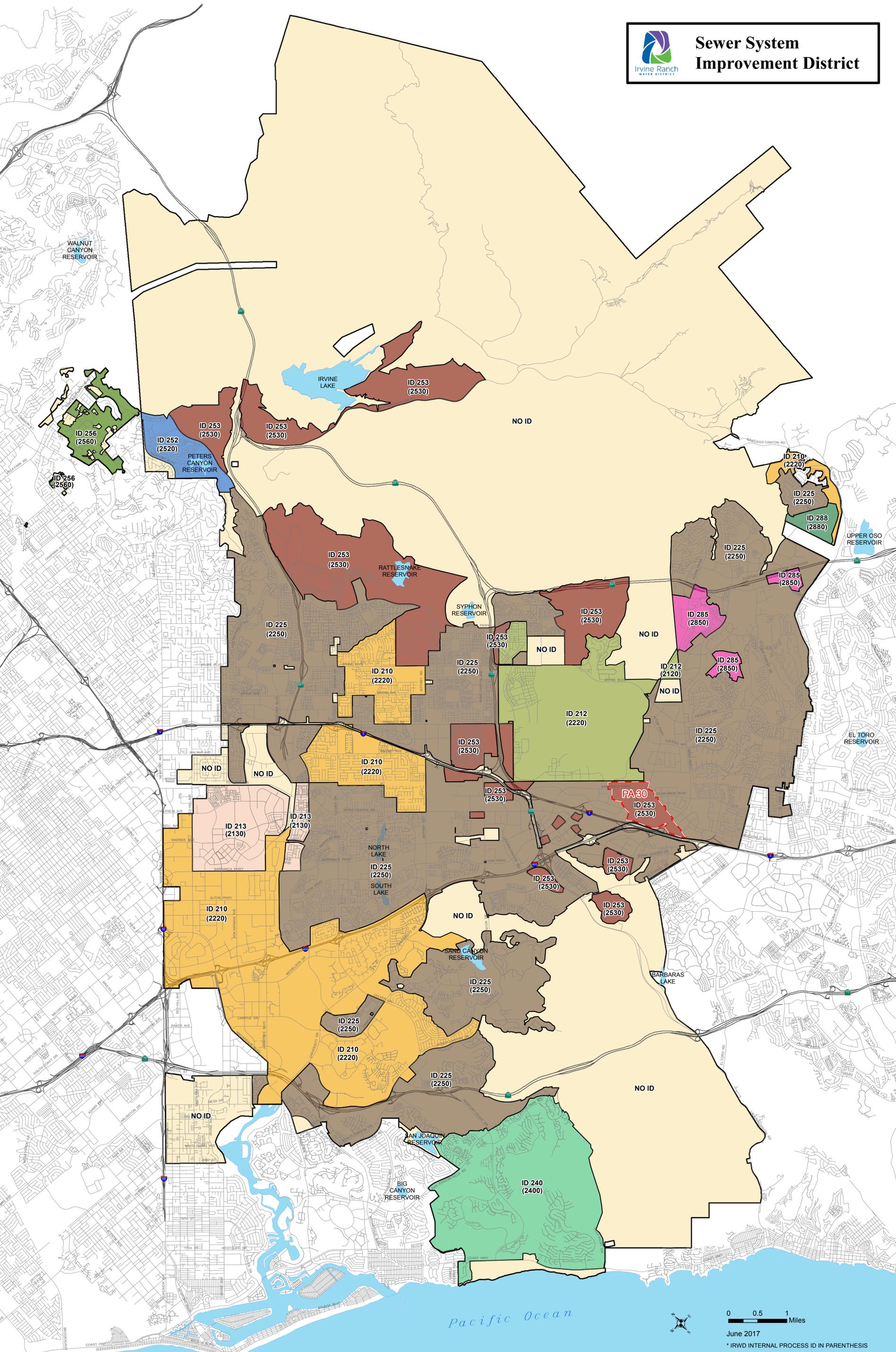
0 0.5 1 Miles

June 2017

*IRWD INTERNAL PROCESS ID IN PARENTHESIS

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Exhibit "B"



0 0.5 1 Miles

June 2017

* IRWD INTERNAL PROCESS ID IN PARENTHESIS

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Exhibit "C"

Potable Water

Regional Improvement District Allocations

	New Allocations		Old Allocations	
	Demand (cfs)	Splits	Demand (cfs)	Splits
Improvement District 1110	39.93	35.2%	37.51	32.6%
Improvement District 1120	5.51	4.9%	3.83	3.3%
Improvement District 1130	3.44	3.0%	3.45	3.0%
Improvement District 1250	52.65	46.5%	54.56	47.5%
Improvement District 1530	9.04	8.0%	12.72	11.1%
Improvement District 1540	0.47	0.4%	0.51	0.4%
Improvement District 1850	1.78	1.6%	1.85	1.6%
Improvement District 1880	0.53	0.5%	0.53	0.5%
Grand Total	113.34	100%	114.98	100%

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Exhibit "D"

Sewer

Regional Improvement District Allocations

	New Allocations		Old Allocations	
	Demand (mgd)	Splits	Demand (mgd)	Splits
Improvement District 2120	2.42	5.4%	1.55	3.4%
Improvement District 2130	1.57	3.5%	1.55	3.4%
Improvement District 2220	15.76	35.4%	15.08	33.1%
Improvement District 2250	20.00	44.9%	22.08	48.5%
Improvement District 2400	0.00	0.0%	0.00	0.0%
Improvement District 2530	3.62	8.1%	4.38	9.6%
Improvement District 2560	0.17	0.4%	0.15	0.3%
Improvement District 2850	0.80	1.8%	0.60	1.3%
Improvement District 2880	0.18	0.4%	0.15	0.3%
Grand Total	44.52	100%	45.55	100%

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Exhibit "E"

Recycled Water

Regional Improvement District Allocations

	New Allocations		Old Allocations	
	Demand (cfs)	Splits	Demand (cfs)	Splits
Improvement District 2120	3.49	8.8%	4.38	10.7%
Improvement District 2130	1.69	4.3%	1.67	4.1%
Improvement District 2220	6.04	15.2%	5.95	14.6%
Improvement District 2250	19.50	49.1%	20.77	51.0%
Improvement District 2400	3.14	7.9%	3.14	7.7%
Improvement District 2530	5.21	13.1%	4.22	10.3%
Improvement District 2560	0.00	0.0%	0.00	0.0%
Improvement District 2850	0.60	1.5%	0.62	1.5%
Improvement District 2880	0.00	0.0%	0.00	0.0%
Grand Total	39.67	100%	40.76	100%

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October 15, 2019
 Prepared by: A. Murphy / M. Cortez
 Submitted by: K. Burton
 Approved by: Paul A. Cook

ENGINEERING AND OPERATIONS COMMITTEE

**THREE-YEAR CATHODIC PROTECTION SYSTEM MONITORING PROGRAM
CONSULTANT SELECTION FOR FY 2019-20 THROUGH FY 2021-22**

SUMMARY:

IRWD’s cathodic protection systems are designed to reduce corrosion of essential metallic pipelines and steel tank reservoirs that have a high rate of corrosion potential. These cathodic protection systems require monitoring, evaluation, and adjustments to ensure optimal protection of the pipelines and structures. The District routinely utilizes consultant services to perform these functions, and staff recommends that the Board authorize the General Manager to execute a Professional Services Agreement in the amount of \$343,901 with HDR for the Three-Year Cathodic Protection Monitoring Program for FY 2019-20 through FY 2021-22.

BACKGROUND:

IRWD owns and operates impressed current and galvanic cathodic protection (CP) systems to reduce the potential failure of its essential metallic pipelines and steel tank reservoirs identified as having a high rate of corrosion. CP systems utilize anode beds and impressed electric current requiring periodic monitoring, evaluation, and adjustments to ensure optimal protection of the metallic structure. The District has routinely utilized consultant services to monitor, evaluate and adjust the 54 metallic pipeline and 18 steel tank reservoir CP systems for a term of three years.

Existing IRWD Cathodic Protection Systems				
Pipelines	Systems	Rectifiers	Test Stations	Miles of Pipe
	54	67	586	79
Reservoirs	Reservoirs		Volume of Reservoirs (Millions of Gallons)	
	15		20.15	

Consultant Selection:

Staff prepared a Request for Proposal for the Three-Year Cathodic Protection Monitoring Program and received proposals from HDR, Universal Corrosion and V&A Consultants. Staff recommends HDR as the most qualified firm based on its thorough scope of work, experienced team, and cost effective proposal. The Consultant Selection Matrix is attached as Exhibit “A”. HDR successfully completed the FY 2016-17 through FY 2018-19 cathodic protection system monitoring for the District. HDR’s proposal, attached as Exhibit “B”, includes monitoring and reporting on the cathodic protection systems, updating the locations of the existing test stations in the District’s Geographic Information System, providing recommendations for improvements to the systems, and troubleshooting irregularities observed in the monitoring data.

Engineering and Operations Committee: Three-Year Cathodic Protection System Monitoring Program Consultant Selection for FY 2019-20 through FY 2021-22

October 15, 2019

Page 2

FISCAL IMPACTS:

Funding for the Cathodic Protection Monitoring Program is included in the FY 2019-20 Operating Budget. Staff will include the required funding in the FY 2020-21 and FY 2021-22 Operating Budgets.

ENVIRONMENTAL COMPLIANCE:

This project is exempt from the California Environmental Quality Act (CEQA) as authorized under the California Code of Regulations, Title 14, Chapter 3, Section 15064 (b) (3). The activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA.

RECOMMENDATION:

That the Board authorize the General Manager to execute a Professional Services Agreement in the amount of \$343,901 with HDR for the Three-Year Cathodic Protection Monitoring Program for Fiscal Year 2019-2020 through Fiscal Year 2021-2022.

LIST OF EXHIBITS:

Exhibit "A" – Consultant Selection Matrix

Exhibit "B" – HDR Proposal for Cathodic Protection Engineering Services

EXHIBIT "A"
3-Year Cathodic Protection Monitoring
FY2019/2020-2021/2022
Consultant Selection Matrix

	Weights	HDR		Universal Corrosion		V&A Consulting Engineers	
TECHNICAL APPROACH	60%						
*Project Approach	40%	2		3		1	
*Scope of Work	30%	1		3		2	
*Man Hour Estimates	30%	1		3		2	
Weighted Score (Technical Approach)		1.40		3.00		1.60	
EXPERIENCE	40%						
*Firm/Team	20%	1		3		2	
*Project Manager	40%	1		1		2	
*Project Engineer	20%	3		2		1	
*Project Engineer	20%	1		3		2	
Weighted Score (Experience)		1.40		2.00		1.80	
COMBINED WEIGHTED SCORE		2.80		5.00		3.40	
		Man-hours		Man-hours		Man-hours	
TOTAL Project HOURS		2070		9508		2238	
Total Meetigs		7		7		7	
FEE		\$343,901.00		\$1,029,847.00		\$405,901.00	
Professional Liability Insurance		yes		yes		yes	
General Liability Insurance		yes		yes		yes	
FORCED RANKINGS:							
1 - First		1-First		3 - Third		2 - Second	
2 - Second							
3 - Third							

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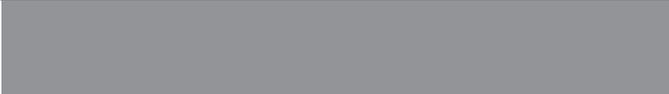
Proposal

Engineering Design Services for the
3-Year Cathodic Protection Systems
Monitoring Program

IRVINE RANCH WATER DISTRICT

Irvine, CA

September 12, 2019





September 12, 2019

Alex Murphy, PE
Project Manager
Irvine Ranch Water District
3512 Michelson Drive
Irvine, CA 92618

Subject: **Request for Proposal – Engineering Design Services for the
Three Year Cathodic Protection Systems Monitoring Program**

Dear Mr. Murphy,

HDR appreciates the opportunity to provide our proposal for this very important program. The District is taking the right approach by monitoring your asset cathodic protection systems and preserving the infrastructure you have instead of contending with failures and eventual capital investment replacements. We would very much like to continue to assist you in this endeavor.

Selecting HDR to support this corrosion protection program will provide the District with the following benefits:

- **Dedicated Project Manager** who has worked successfully with many municipalities and water districts for over 18 years and will remain committed to your corrosion monitoring program;
- **Local technical expertise** with relevant project experience with multiple other Southern California municipalities and districts with projects involving cathodic protection monitoring;
- **Solid understanding of the latest standards and guidelines** relating to corrosion engineering services;
- **Strong familiarity with local corrosion engineering related issues** and community concerns through previous and current involvement on similar projects with Southern Californian agencies including San Diego County Water Authority, City of Huntington Beach, City of Ontario, and Irvine Ranch Water District itself to name just a few;
- **In-house GIS experts** prepared and committed to transition the existing geodatabase to one that utilizes the District's TS ID unique identifiers during the first year of the contract; and
- **A highly experienced HDR team with in-house expertise** that is intimately familiar with the District's cathodic protection systems and ready to start on day one with no learning curve.



Please feel free to reach out to Brien Clark, who will be your primary point of contact at HDR. He can be reached at 909.962.5470, on his cell phone at 909.917.6820, or email at brien.clark@hdrinc.com. We are excited about this opportunity to continue our working relationship. We look forward to continuing to provide you with corrosion engineering support services.

Sincerely,
HDR Engineering, Inc.

A handwritten signature in blue ink, appearing to read 'A. Meilleur'.

Aaron Meilleur, PE
Vice President

A handwritten signature in blue ink, appearing to read 'Brien Clark'.

Brien Clark, PE
Project Manager



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Scope and Methodology

Task 1 – Project Management

Every project requires oversight and management to stay on task, on budget, and on schedule. HDR will work closely with the District in the most complete, cost-effective, and efficient manner to keep project tasks focused. Having worked on the previous 3-year contract will allow us to hit the ground running. Our understanding of the District’s procedures, staff, and public concerns will provide results that stay within budget and meet schedules. We acknowledge the FY2018-2019 final report schedule slipped as we had underestimated the amount of additional time it would take to incorporate the out-of-scope depolarized potentials into the database. Prior submittals were submitted timely. HDR will redouble efforts to ensure that schedules are met moving forward.

A. Project Status Reports

Regular communication throughout the program with the District’s Project Manager is essential. All correspondence will be directed through Brien Clark, HDR’s Project Manager, and he will be responsible for sharing information with team members. In addition to more informal communications he will provide quarterly status updates summarizing activities performed that quarter and those planned for the upcoming quarter.

B. Meetings

Internal team meetings will be held to plan program tasks, discuss and resolve program challenges, and verify schedule adherence. The results of these meetings will be shared with the District via progress reports, e-mails, and telephone conversations.

HDR will also organize and attend several meetings with the District to review and discuss the submitted report deliverables, or other reasons as deemed necessary by the District. Agendas and meeting summaries will be prepared before and after each meeting, respectively.

C. Quality Assurance/Quality Control

Your program calls for a high level of accountability, and you will find that our attention to detail and adherence to standards lead to successful outcomes. Our QMS provides an important framework for ensuring that we are reaching the highest levels of quality—for both you and for ourselves. We remain focused on continual opportunities for improvement throughout our daily activities to achieve client satisfaction and meet performance expectation. The QMS includes programs, policies, and business processes, and has four key elements:

Management Responsibility: Management actively promotes quality in our business activities and defines responsibilities for maintaining our focus on quality.

Resource Management: Resources are trained, available, and committed to providing quality services.

Professional Service Delivery: Processes and procedures are in place



that promote quality in the delivery of our products and services.

Measurement, Analysis, and Improvement: Continual improvement is achieved through performance measurement and identification of areas for improvement.

Unlike other consultants, HDR does more than promise to check the final deliverables.

Our processes strive to get things done right, from the beginning through to completion:

- **Project Approach and Resource Review (PARR).** At the beginning of the project, the national practice leader appoints experts to interview the PM and the project team and to review their technical approach.
- **Periodic Management Reviews.** A “zero-percent” review precedes all projects, to ensure that the PM has a plan and adequate resources to deliver. Progress reviews are held at other major milestones.
- **EBS/PRONTO and “Project Wise” Tracking.** An HDR database and document control system tracks and documents the QC process. Monthly reports show where reviews are required. Periodic system-wide QC audits ensure compliance and look for ways to improve the processes.
- **Earned Value Tracking** – HDR utilizes modern Earned Value software tools to effectively monitor, plan, and forecast project outcomes. This allows real-time accuracy when reviewing CPI, SPI, EAC and related indexes.

Task 2 – Background Material Collection and Review

HDR will thoroughly review existing documentation including, Atlas maps, as-built construction drawings for pipeline construction and cathodic protection installation, historical cathodic protection monitoring reports and recommendations, reservoir inspection reports, construction record drawings, geotechnical reports, plans and specifications, District GIS database, and other available information.

For in-depth investigations HDR may conduct interviews with District personnel to fill in the information gaps and to determine the history of each pipeline with respect to repairs, leak history, pipe section replacements, and any third party damage. HDR previously identified several pipeline segments that would benefit from this scrutinized review including Newport Coast Segment A Units 100/24/34/35, Newport Coast Segment C Unit 51, Dyer Road Unit 42, and Santiago Canyon, among others.

It is understood that it is HDR’s responsibility to ensure data is presented in a format acceptable to the District and consistent with District naming conventions. Test points will be collected by pipeline, station number, and District tagged Cathodic Protection ID number. HDR was as frustrated as the District in the inability to mesh the existing geodatabase with the District’s new TS ID unique identifier. While HDR was able to match 65 percent of the cathodically protected test stations with this number, without keeping the previously used number the remaining data would have perished. HDR’s extensive knowledge and experience in the District’s existing cathodic protection geodatabase will allow an easy transition to the geodatabase utilizing the new TS ID number during the first year of this contract.

Task 3 – One-Time Troubleshooting

The One-Time Troubleshooting task will finally allow the cathodic protection geodatabase to be fully integrated into the District's GIS database. HDR is committed to making this happen the first year of this contract.

HDR is excited by the prospect of the one-time troubleshooting task. Having previously worked on the existing database HDR understands what is required to transform the database that uses unit-labeled test stations—the District's previous CP ID nomenclature—and now-defunct AS400 data into one GIS database that utilizes the new TS ID unique identifiers.

conductive or inductive locating of test stations and compare them to the as-built drawings to confirm test station association with pipelines. Where test stations do not already have GPS coordinates with sub-foot accuracy they will be recorded.

Extensive time reviewing as-built drawings has already taken place. HDR is prepared to perform

This important task will allow the existing database to be transformed to one that is consistent with the District's new naming convention. This will occur during the first year of this contract.

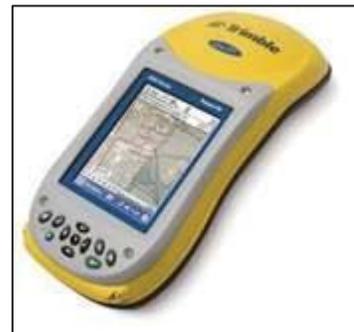
Task 4 – Initial Data Collection

A. Pipeline Corrosion Monitoring Survey

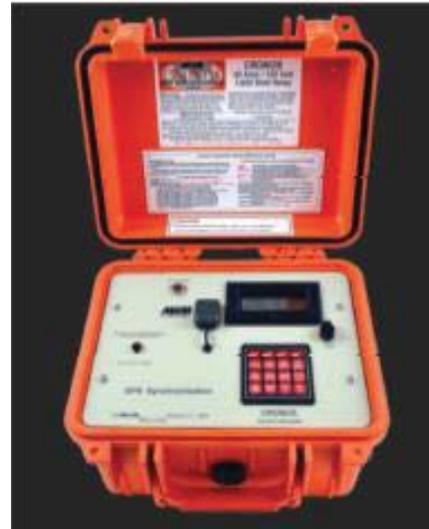
The survey will include inspection of corrosion monitoring and cathodic protection systems, pipe-to-soil potential readings, rectifier readings, anode current output, and insulating flange and casing isolation testing. Minor maintenance or damage to corrosion test stations, including shunts and identification will be performed by HDR at no additional charge.

HDR's goal is to understand the District's objectives beyond this scope of work and help select appropriate criteria based on objectives as balanced by the need to protect, yet not over protect or create sources of stray current.

As part of each survey, HDR will continue to employ an innovative approach to improve efficiency and reduce the cost for this contract and future contracts. Using Trimble Global Positioning System (GPS), ESRI Geographic Information System (GIS) and Apple iPad technologies, our technicians are able to collect and tabulate data and imagery directly in the field. The iPad communicates directly with our server in real time, where the data file is safely stored and backed up. This means that the data are immediately available for quality control review by others in the office. This technique eliminates the cost of later tabulation of data, eliminates possible tabulation or transcription error, and allows for immediate quality control review of the data which eliminates the need for returning to the site to re-collect data. Once setup, a GIS geodatabase can be integrated into the District's existing GIS system allowing easy access to survey data and photo documentation by the District and future consultants to employ for all future contracts.



Measurements of the pipeline pipe-to-soil potentials will be conducted at approximately 610 cathodic protection test station (CPTS) on approximately 52 impressed current segments protected by 67 rectifiers, and four (4) galvanic CP segments as outlined in the RFP's Program Description. The survey will measure on and instant off potentials by interrupting the cathodic protection current using GPS synchronizable interrupts. The interrupt cycle will have a minimum 80% duty cycle to minimize depolarization of the pipe during the survey.



- A majority of the necessary depolarized, baseline pipe-to-soil potentials were measured last contract. These data are sometimes necessary to determine if proper polarization is being achieved on pipelines that are less than -850 mV when an instant-off is measured per NACE SP0169 or SP0100 for cement-mortar coated piping. Where baseline data remains unavailable, such as at the galvanic systems, but found to be necessary, a depolarization survey may be performed where the cathodic protection system is briefly disconnected for a period of time to measure the depolarized, baseline potential.
- All test stations, rectifiers and reservoirs will be photographed for updated imagery, and submitted to the District.
- All GPS coordinates will be collected using sub-foot accuracy.

At most 10 minutes will be spent locating each lost test station. Locating instruments may include metal detectors, probe bars (bar-holders), measuring distances from known tie-down features, and light shoveling. If not found after that duration, the test station will be classified as "could not locate" (CNL).

Flange Isolation and Casing Isolation Testing – Insulating flange and pipeline casing isolation testing will be conducted in accordance with NACE Standard SP0286 and documented within the reports.

Rectifier Survey – Concurrent with the initial and quarterly surveys, a rectifier survey will be conducted to verify functionality. Anode and pipe connections, tap setting, and cleanliness will be recorded. Minor maintenance including cleaning, wire connections, and fuse replacement will be included as part of HDR's survey.

Stray Current Evaluation – Based on HDR's review of the historical data there are pipelines that may be experiencing stray current from foreign cathodically protected pipelines, or potentially causing stray current to foreign structures. A complete stray current investigation requires coordination between owners, as well as coordinated field surveys. For this evaluation, the scope will be limited to review of record drawings and visual site assessments to preliminarily investigate possible cause. If the preliminary findings warrant further investigation, HDR will notify IRWD and recommend further action.

Site Visual Assessment – As conditions warrant, a visual investigation of the surrounding area will be performed. This will include looking for nearby rectifiers from foreign pipelines, damage to cathodic protection instrumentation and system hardware, leaks, corrosion, and other relevant features.

Traffic Control – Utilizing a subcontractor traffic control will be provided to access and test the 14 CPTS outlined in the RFP. The temporary traffic control will be performed by the WATCH manual.

B. Reservoir Survey

Tank to water potentials will be measured at 16 reservoirs. In addition to the reservoir survey, the Zone 2 and Zone B reservoir bottoms and piping will also be assessed. Testing will be in accordance with NACE Standard SP0388 for impressed current cathodic protection systems and NACE SP0196 for galvanic cathodic protection systems. Measurements will be collected at the bottom of each reservoir and every one foot of elevation until the maximum water level is reached. Water levels and time of test will be recorded and included in the report. Instant off potentials will be evaluated in order to determine the current requirement of the submerged portion of the reservoir, as well as provide an indication of the bare surface, uncoated portion of the reservoir's lining.



As part of our survey, HDR will determine proper polarization of the internal surface of the reservoir by allowing it to depolarize for a minimum of 10 minutes. This will allow a baseline, native potential, which will be used to determine if the reservoirs are cathodically protected.

Since safety requires two technicians at tank sites, if authorized by IRWD, HDR will continue to conduct a hatch inspection in order to assess the cathodic protection system, coating condition, and general condition of the reservoirs. In addition, a verification and calibration of the permanent reference electrode will be measured against a calibrated portable reference electrode. This will aid in determining the condition, as well as provide clarity to other potential issues such as anode depletion, anode output and other related issues affecting cathodic protection and corrosion prevention. Photo documentation and tabulations of the interior visual assessment will be provided with the Task 6 Final Report. There will not be additional costs associated with this option since two technicians will already be onsite.

All test equipment including temporary reference electrodes and cables will be disinfected prior to insertion into the water reservoirs. HDR has conducted similar testing for multiple clients and understands the importance of disinfection. Prior to commencing work, a disinfection plan will be submitted along with a detailed safety plan, referencing this requirement.

Since safety and protection of the District's resources are a top priority, HDR will notify IRWD Systems Operations Department prior to entry or exit of any reservoir site. Additionally, it is understood that 72 hours notice is required prior to entering the East Irvine Zone 4 reservoir, and testing of the Canada reservoir be coordinated to coincide with the reservoir's time in service. All fall protection and confined space requirements will be practiced at all times.

Task 5 – Impressed Current Cathodic Protection System Adjustments

Subsequent to the CPTS Pipe-to-Soil potential survey, cathodic protection will be evaluated to determine current requirement to provide adequate cathodic protection, and the NACE International Standard most reflective for completing this will be determined. All testing shall be reflective of NACE Standards, which in many cases may determine that some of the pipelines and reservoirs are not receiving adequate cathodic protection.

Rectifier Survey – Concurrent with the initial and quarterly pipeline and tank surveys, a rectifier survey will be conducted to verify functionality. Anode and pipe connections, tap setting, and cleanliness will be recorded. Minor maintenance including cleaning, wire connections, and fuse replacement will be included as part of HDR's survey.



Task 6 – Initial Report

A draft Initial Report of the baseline pipeline data will be submitted to IRWD within eight weeks after the Notice to Proceed at a review/comments meeting and each subsequent year within the contract period. Four bound hard copies and one PDF electronic copy will be submitted to IRWD for review. Within four weeks of the review/comments meeting, four hard copies and the PDF electronic file for the Initial Report, including incorporated comments, will be submitted.

In addition to the baseline report, HDR will provide a GIS geodatabase containing all test stations and their respective attributes within the Scope. The geodatabase will continue to be updated with the District after each survey is completed.

Task 7 – Quarterly Data

HDR will monitor rectifier output and anode measurements to verify proper cathodic protection of the pipelines. As part of the survey, one test point midway between each rectifier or anode bed, and test points at the ends of the pipeline will be monitored to verify adequate distribution of cathodic protection. At the time of the survey, rectifier adjustments will be made in accordance with NACE criteria as outlined in SP0169, *Control of External Corrosion on Underground or Submerged Metallic Piping Systems*. All quarterly data will be added to the GIS geodatabase.

It is understood that reservoirs with galvanic cathodic protection systems will not be included in the quarterly data collection. These systems will only be tested and adjusted once per year as part of Task 2 through Task 5.

Task 8 – Final Report

A draft Final Report will be submitted to IRWD following the 3rd quarter data collection at a review/comments meeting. Four bound hard copies and one PDF electronic copy shall be submitted to IRWD for review. Within 4 weeks following the comments meeting, four bound hard copies and the electronic file PDF of the Final Report, including incorporated comments, will be submitted. After the final report has been accepted, all GIS data will be uploaded to the District's GIS database.

As requested by the District, the report shall include the following:

- a) Presentation of the initial, quarterly, and final data in tabular and graphical form which shall include the data observations and results of the field surveys, calculations, estimates, analyses, and the Engineer's recommendations.
- b) Determination of interference on project pipelines from other cathodic protection systems and/or stray currents.
- c) Negative impacts on adjacent pipelines and recommendations for corrective measures.
- d) Summary of cathodic protection system adjustments.
- e) Recommended repair and maintenance items discovered during data collection to be corrected by IRWD.
- f) Recommendations for the type and extent of additional cathodic protection facilities that may be needed, including test stations, bonds, or insulators.
- g) Recommendations for the repair or replacement of cathodic protection facilities including anodes, rectifiers, permanent reference cell electrodes, and additional test stations.
- h) An Engineer's estimate of the design and construction costs of recommended facilities.

HDR will continue with the updated report format that was introduced last contract. This format succinctly presents the data for each pipeline and provides recommendations. The following is a sample report from the last contract:

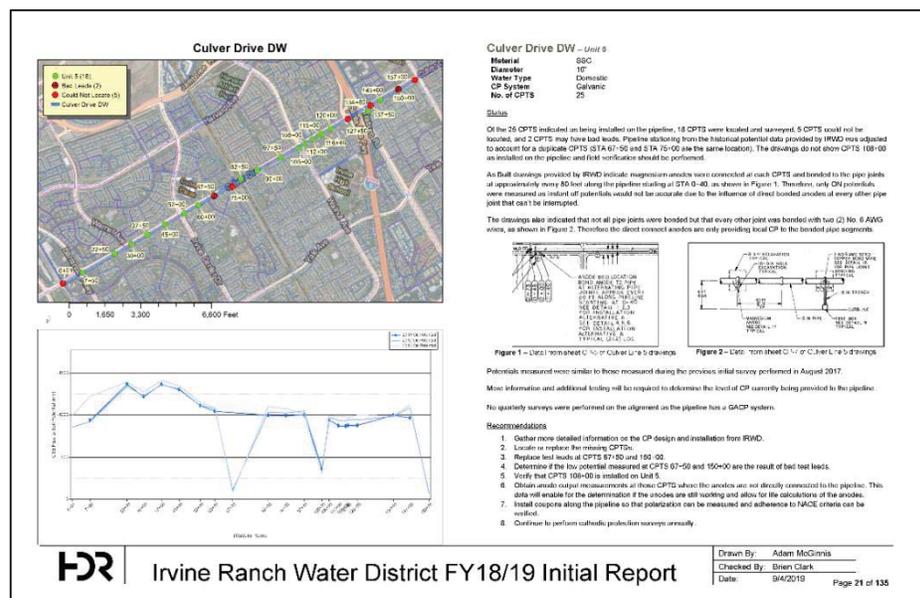


Figure 1. Sample Report

Task 9 – Troubleshooting

As part of this Scope of Work, 40 hours per year (total 120 hours for three years) is proposed for troubleshooting various system issues. HDR will provide written confirmation of work within this task, as well as tracking such hours when the project is invoiced. Based on the 2019 Final Report identified possible issues that would fall under this task order include:

- a) Measuring depolarized potentials for the remaining pipelines where potentials are more electropositive than -850 instant off, and evaluated to determine if the 100mV criteria is applicable.
- b) Pipeline electrical continuity and IJ testing at Charter Apartments (Unit 219) to resolve cause of depressed potentials on one leg of piping.
- c) Pipelines exhibiting potential issues and selected for review.
 1. Unit 3 – Harvard Ave. 42"
 2. Unit 7 – University Drive
 3. Unit 30 – Michelson Intertie (University Drive)
 4. Unit 32 – Rattlesnake Outfall
 5. Unit 42 – Dyer Road
 6. Newport Coast Drive Segments A, B, and C

Task 10 – GIS Cathodic Protection Data

As part of each report deliverable will be the GIS cathodic protection data in a format that that utilizes IRWD conventions. A shape file and data base file (dbf) will be included in the submittal that references both the District TS ID number and the cathodic protection survey data for each location.

Comprehensive Safety Program

Interwoven into all of our tasks outlined in this proposal is safety. As an employee-owned company, nothing is more important to us than health and safety of our employees and partners. This is reflected in how we live and work in offices and on projects across the globe. Safety is an embedded part of our culture and a consistent emphasis on every program and project. Our goal is always that everyone associated with our projects goes home safe.

We support and grow our safety culture through a comprehensive health and safety program that has received national recognition for excellence. This program includes extensive mandatory safety training for all employees and is supported by a team of certified safety professionals. Our safety professionals help project teams navigate the sometimes complex web of local and national health and safety regulations.

We understand that no program or project is the same and develop custom-fit safety plans to address each project's unique needs. Our safety approach focuses on client requirements, avoids accidents that could result in unplanned delays, and reduces client's overall project risk.

Our people-centered safety culture sets us apart from our competitors and has enabled us to maintain one of the best safety records in the industry. Our OSHA recordable incident and lost time injury rates are

consistently lower than the industry average for our NAICS code (5413 - Architectural, Engineering, and Related Services).

Safety Matters

We care about our people and are dedicated to keeping them safe. Our low safety rates and certification by third-party review programs show we are serious about safety:

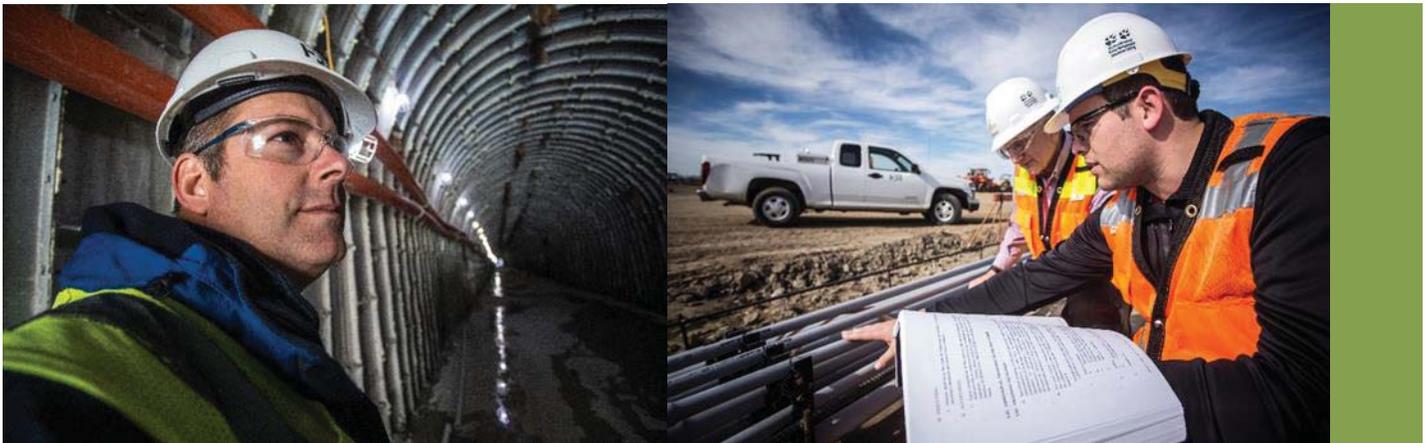


Program Team

Introduction

Our greatest asset is our people.

To meet the District's program goals, we have customized a team to leverage the knowledge and experience of our technical resources to effectively meet your goals. Most of our team members have a long history with our organization, creating a stable leadership core to guide long-term strategies and daily operations. We also have tremendous global resources available to assist local staff, as requested, to meet your needs. With our local knowledge and experience, combined with our national depth of resources, our team is focused on collaboration, quality, and developing innovative solutions that are practical and value oriented.





Our team is led by **Project Manager – Brien Clark, PE**, who brings 19 years of experience and is recognized as an expert on cathodic protection system design. Brien will be the District’s main point of contact, and will provide overall technical oversight for the program. He is already familiar with the District’s facilities and the geodatabase as the project manager of the previous contract.

Rick Veihl, PE – Quality Manager, will have overall responsibility for management of our quality program. Rick will work directly with Brien Clark to develop a comprehensive phasing plan and schedule. He will leverage over 30 years of corrosion experience to provide recommendations on pipeline conditions, as well as his previous experience on District pipelines as the Quality Manager on the previous contract.

Our project execution team consists of the following: **Lucy Jaramillo, Corrosion EIT** who will lead field service operations for cathodic protection monitoring and oversee our field engineers.

In addition, our program team will also include one subconsultant, **TPR Traffic Solutions**, who will provide traffic control services.

Located in Commerce, California, TPR Traffic Solutions is a licensed (CA 787313 / D42) traffic management company. They provide traffic control devices and services such as traffic plans, permits, pre-job inspections, etc. HDR recently worked with TPR for traffic control services on a project we completed for West Basin Municipal Water District.

Program Team Qualifications

Our key personnel qualifications and capabilities relevant to your program are listed on the following page. Our team members are comprised of industry experts with years of experience and selected based on the District’s goals and scope of services. With over 60 years of combined experience, an emphasis on condition assessment and pipeline experience, we hope to leverage our local experience to bring value added solutions to the District.



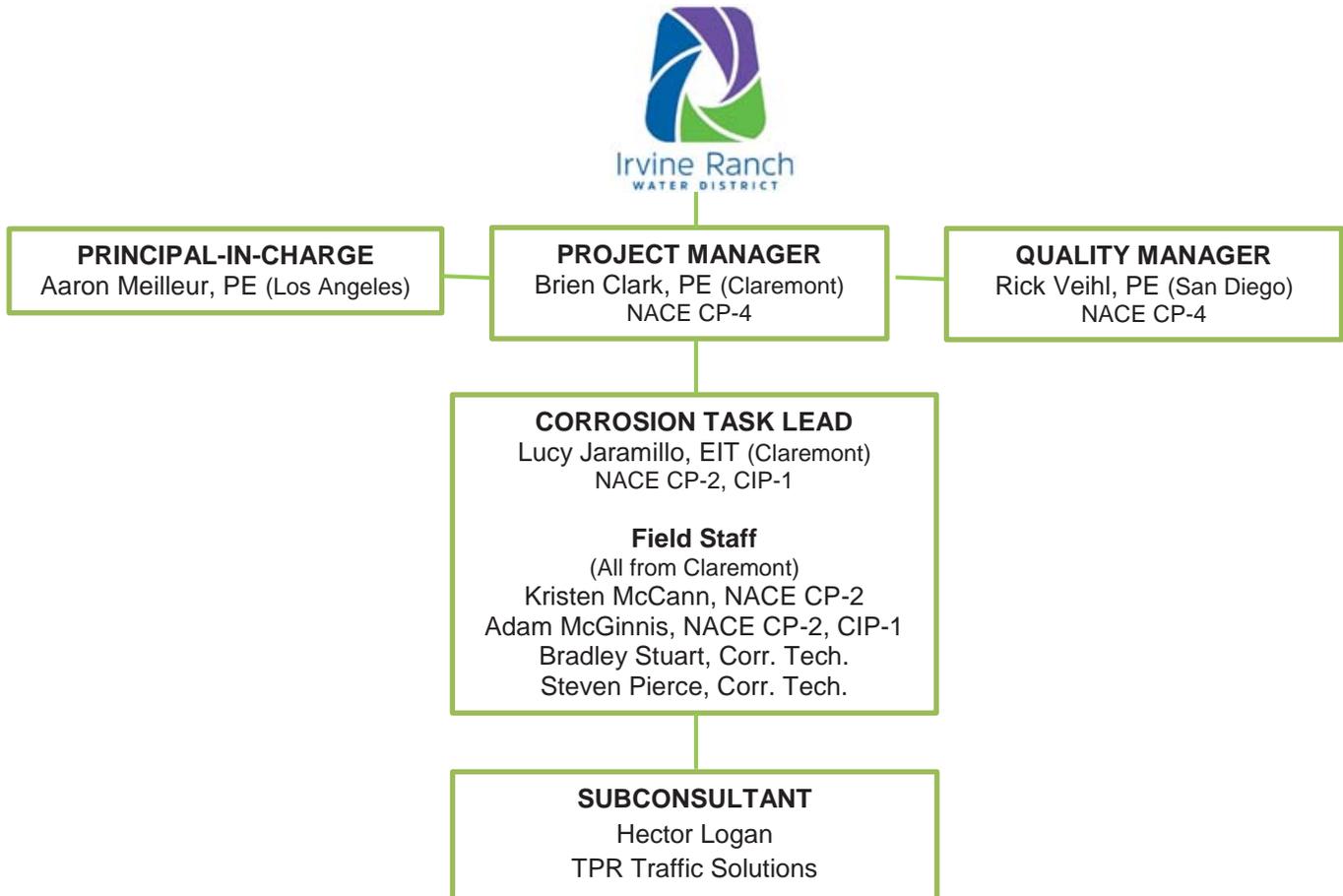
Key Personnel Bios

Key Staff	Education	Registrations	Relevant Experience
<p>Brien Clark, PE <i>Project Manager</i></p> 	<p>BS – Chemical Engineering, California State Polytechnic University, Pomona, CA</p>	<ul style="list-style-type: none"> • PE – Chemical, CA No. 6291 • NACE CP-4 No. 17978 	<ul style="list-style-type: none"> • 19 Years of Experience • Irvine Ranch Water District 3-Year Cathodic Protection Monitoring Program for Metallic Pipelines and Reservoir Tanks for FY2016-17 through FY2018-19, Irvine. CA, Project Manager • City of Huntington Beach 2018 Pipeline Cathodic Protection Annual Survey, Huntington Beach, CA, Project Manager • City of Ontario Pipeline Corrosion Annual Survey, Ontario, CA, Project Manager
<p>Aaron Meilleur, PE <i>Principal-In-Charge</i></p> 	<p>BS – Civil Engineering, US Military Academy</p>	<ul style="list-style-type: none"> • PE – Civil, CA No. C62473; • HI No. 15215; • WA No. 38518 	<ul style="list-style-type: none"> • 23 Years of Experience • City of San Diego Public Utilities Department Pure Water Program North City Conveyance System Civil Engineering Services, Principal-In-Charge • Rainbow Municipal Water District Distribution System Renewal Program, Fallbrook, CA, Principal-In-Charge • City and County of Honolulu Comprehensive Sewer System Assessment, Honolulu, HI, Project Manager
<p>Rick Veihl, PE <i>Quality Manager</i></p> 	<p>BS – Electrical Engineering, Penn State University</p>	<ul style="list-style-type: none"> • PE – Corrosion, CA No. CR1034 • NACE CP-4 No. 9230 	<ul style="list-style-type: none"> • 32+ Years of Experience • Irvine Ranch Water District 3-Year Cathodic Protection Monitoring Program for Metallic Pipelines and Reservoir Tanks for FY2016-17 through FY2018-19, Irvine. CA, QC Reviewer • San Diego County Water Authority Support Services for Corrosion Engineer & Corrosion Technician, San Diego County. CA, Corrosion Engineer, QC Reviewer. • City of Huntington Beach 2018 Pipeline Cathodic Protection Annual Survey, Huntington Beach, CA, QC Reviewer
<p>Lucy Jaramillo, EIT <i>Field Services Lead</i></p> 	<p>BS – Chemical Engineering, California State Polytechnic University, Pomona, CA</p>	<p>NACE CP-2, No. 66998</p>	<ul style="list-style-type: none"> • 4 Years of Experience • Irvine Ranch Water District 3-Year Cathodic Protection Monitoring Program for Metallic Pipelines and Reservoir Tanks for FY2016-17 through FY2018-19, Irvine. CA, Corrosion EIT • City of Huntington Beach 2018 Pipeline Cathodic Protection Annual Survey, Huntington Beach, CA, Corrosion EIT • City of Ontario Pipeline Corrosion Annual Survey, Ontario, CA, Field Services Manager



Organizational Chart

Our organizational chart below highlights our team's roles, responsibilities, and reporting structure. Staff shown below are available throughout the duration of the contract. **Our team consists of several licensed California-registered professional engineers** –Brien Clark, Aaron Meilleur and Rick Veihl.



Percentage of Time Staff will contribute to the Program:

Our team is available and ready to begin the *Three – Year Cathodic Protection Systems Monitoring Program* and see it through to completion.

PROJECT TEAM MEMBERS ROLE	LOCATION	PERCENTAGE of TIME CONTRIBUTED for the LIFE of the PROJECT
Brien Clark, PE Project Manager	Claremont	20
Rick Veihl, PE Quality Manager	San Diego	10
Aaron Meilleur, PE Principal-In-Charge	Los Angeles	2
Lucy Jaramillo, EIT Corrosion Task Lead	Claremont	30
Field Staff	Claremont	30

Project Experience

Our Project Manager and Team are Committed to Partnership Principles

Our team is focused on the District and helping you save money. Our Claremont-based Project Manager, Brien Clark, specializes in water utility condition assessment, renewal, and cathodic protection design. Because Brien and HDR have worked with utilities around the country (noted by the dots on the map) performing condition assessment and renewal, many lessons learned elsewhere will be applied to your project.



Supporting Brien is a solid team of California based corrosion staff who have practical experience performing cathodic protections surveys around the country.

HDR has been providing inspection and assessment of pipelines in California for nearly 30 years, and has been at the forefront of industry efforts to advance the application of appropriate technologies.



Fee Estimate

**3-Year Cathodic Protection Systems Monitoring Program
Irvine, CA
P19-0027ENG**

**Mr. Alex Murphy
Irvine Ranch Water District**

Task Description	Personnel Hours									Non-Labor				Budget			
	Principal Engineer-MGT420 (\$350 /Hr)	Project Manager-PJM310 (\$240 /Hr)	Associate Engineer-PJM300 (\$240 /Hr)	Corrosion Task Lead-ECO200 (\$160 /Hr)	Corrosion Technician-TEC020 (\$127 /Hr)	Corrosion Technician-TEC020 (\$127 /Hr)	GIS Technician-SGS10 (\$115 /Hr)	Project Controller-FIN230 (\$140 /Hr)	Project Support-FIN210 (\$95 /Hr)	Total Hours	Mileage (miles @ \$0.58/mile)	CONUS Per Diem M&IE (days @ \$66/day)	CONUS Per Diem Lodging (nights @ \$180/night)	Lodging Tax (nights @ \$21.6/night)	Labor	Subconsultants	Non-Labor
Year 1: FY 2019/2020																	
Task 1: Project Management	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	\$ -	\$ -	\$ -
Task 1A: PM/Status Report	-	28	2	2	4	2	2	16	8	64				\$ 11,512	\$ -	\$ -	\$ 11,512
Task 1B: Meetings	-	12	-	4	-	-	-	-	4	20	264			\$ 3,900	\$ -	\$ 153	\$ 4,053
Task 1C: QA/QC	8	4	40	2	-	-	-	-	4	58				\$ 14,060	\$ -	\$ -	\$ 14,060
Task 1D: Safety	-	2	-	2	4	2	-	-	4	14				\$ 1,942	\$ -	\$ -	\$ 1,942
Task 2: Background Mtrl Collection & Review	-	-	-	12	12	-	-	-	-	24				\$ 3,444	\$ -	\$ -	\$ 3,444
Task 3: One-Time Troubleshooting (200 hrs)	-	-	-	-	192	-	8	-	-	200	640	25	20	\$ 25,304	\$ -	\$ 6,053	\$ 31,357
Task 4: Initial Data Collection	-	-	-	-	-	-	-	-	-	-				\$ -	\$ -	\$ -	\$ -
Task 4A: Pipelines (610 CTS)	-	-	-	-	96	-	12	-	-	108	384	12	9	\$ 13,572	\$ 2,976	\$ 2,829	\$ 19,377
Task 4B: Reservoirs (16 ICCP + Galvanic)	-	-	-	-	24	24	-	-	-	48	118	6	4	\$ 6,096	\$ -	\$ 1,271	\$ 7,367
Task 5: Impressed Current CP Adjustments	-	-	-	-	8	-	-	-	-	8	176			\$ 1,016	\$ -	\$ 102	\$ 1,118
Task 6: Initial Report / Data Reduction	-	4	-	24	40	-	12	-	-	80				\$ 11,260	\$ -	\$ -	\$ 11,260
Task 7: Quarterly Data (58 PL/ICCP Reservoirs)	-	-	-	-	96	-	-	-	-	96	384	12	9	\$ 12,192	\$ -	\$ 2,829	\$ 15,021
Task 8: Final Report	-	4	-	12	24	-	8	-	-	48				\$ 6,848	\$ -	\$ -	\$ 6,848
Task 9: Troubleshooting (40 hours Combined)	-	4	4	12	20	-	-	-	-	40	264			\$ 6,380	\$ -	\$ 153	\$ 6,533
Task 10: GIS Cathodic Protection Data	-	2	-	-	-	-	16	-	-	18				\$ 2,320	\$ -	\$ -	\$ 2,320
Subtotal	8	60	46	70	520	28	58	16	20	826	2,230	55	42	\$ 119,846	\$ 2,976	\$ 13,391	\$ 136,213



Fee Estimate

**3-Year Cathodic Protection Systems Monitoring Program
Irvine, CA
P19-0027ENG**

**Mr. Alex Murphy
Irvine Ranch Water District**

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	Principal Engineer-MGT420 (\$350 /Hr)	Project Manager-PJM310 (\$240 /Hr)	Associate Engineer-PJM300 (\$240 /Hr)	Corrosion Task Lead-ECO200 (\$160 /Hr)	Corrosion Technician-TEC020 (\$127 /Hr)	Corrosion Technician-TEC020 (\$127 /Hr)	GIS Technician-SGS10 (\$115 /Hr)	Project Controller-FIN230 (\$140 /Hr)	Project Support-FIN210 (\$95 /Hr)	Total Hours	Mileage (miles @ \$0.58/mile)	CONUS Per Diem M&IE (days @ \$66/day)	CONUS Per Diem Lodging (nights @ \$180/night)	Lodging Tax (nights @ \$21.6/night)	Labor	Subconsultants	Non-Labor	Total
Year 2: FY 2020/2021																		
Task 1: Project Management	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	\$ -	\$ -	\$ -	
Task 1A: PM/Status Report	-	28	2	2	4	2	2	16	8	64				\$ 11,512	\$ -	\$ -	\$ 11,512	
Task 1B: Meetings	-	8	-	4	-	-	-	-	4	16	176			\$ 2,940	\$ -	\$ 102	\$ 3,042	
Task 1C: QA/QC	8	4	40	2	-	-	-	-	4	58				\$ 14,060	\$ -	\$ -	\$ 14,060	
Task 1D: Safety	-	2	-	2	4	2	-	-	4	14				\$ 1,942	\$ -	\$ -	\$ 1,942	
Task 2: Background Mtrl Collection & Review	-	-	-	12	12	-	-	-	-	24				\$ 3,444	\$ -	\$ -	\$ 3,444	
Task 3: One-Time Troubleshooting	-	-	-	-	-	-	-	-	-	-				\$ -	\$ -	\$ -	\$ -	
Task 4: Initial Data Collection	-	-	-	-	-	-	-	-	-	-				\$ -	\$ -	\$ -	\$ -	
Task 4a: Pipelines (610 CTS)	-	-	-	-	96	-	12	-	-	108	384	12	9	\$ 13,572	\$ 2,976	\$ 2,829	\$ 19,377	
Task 4b: Reservoirs (16)	-	-	-	-	24	24	-	-	-	48	118	6	4	\$ 6,096	\$ -	\$ 1,271	\$ 7,367	
Task 5: Impressed Current CP Adjustments	-	-	-	-	8	-	-	-	-	8	176			\$ 1,016	\$ -	\$ 102	\$ 1,118	
Task 6: Initial Report / Data Reduction	-	4	-	24	40	-	12	-	-	80				\$ 11,260	\$ -	\$ -	\$ 11,260	
Task 7: Quarterly Data (58 PL/ICCP Reservoirs)	-	-	-	-	96	-	-	-	-	96	384	12	9	\$ 12,192	\$ -	\$ 2,829	\$ 15,021	
Task 8: Final Report	-	4	-	12	24	-	8	-	-	48				\$ 6,848	\$ -	\$ -	\$ 6,848	
Task 9: Troubleshooting (40 hours Combined)	-	4	4	12	20	-	-	-	-	40	264			\$ 6,380	\$ -	\$ 153	\$ 6,533	
Task 10: GIS Cathodic Protection Data	-	2	-	-	-	-	16	-	-	18				\$ 2,320	\$ -	\$ -	\$ 2,320	
Subtotal	8	56	46	70	328	28	50	16	20	622	1,502	30	22	22	\$ 93,582	\$ 2,976	\$ 7,286	\$ 103,844



Fee Estimate

**3-Year Cathodic Protection Systems Monitoring Program
Irvine, CA
P19-0027ENG**

**Mr. Alex Murphy
Irvine Ranch Water District**

Task Description	Personnel Hours									Non-Labor					Budget			
	Principal Engineer-MGT420 (\$350 /Hr)	Project Manager-PJM310 (\$240 /Hr)	Associate Engineer-PJM300 (\$240 /Hr)	Corrosion Task Lead-ECO200 (\$160 /Hr)	Corrosion Technician-TEC020 (\$127 /Hr)	Corrosion Technician-TEC020 (\$127 /Hr)	GIS Technician-SGS10 (\$115 /Hr)	Project Controller-FIN230 (\$140 /Hr)	Project Support-FIN210 (\$95 /Hr)	Total Hours	Mileage (miles @ \$0.58/mile)	CONUS Per Diem M&IE (days @ \$66/day)	CONUS Per Diem Lodging (nights @ \$180/night)	Lodging Tax (nights @ \$21.6/night)	Labor	Subconsultants	Non-Labor	Total
Year 3: FY 2021/2022																		
Task 1: Project Management	-	-	-	-	-	-	-	-	-	-	-	-	-	\$ -	\$ -	\$ -	\$ -	
Task 1A: PM/Status Report	-	28	2	2	4	2	2	16	8	64				\$ 11,512	\$ -	\$ -	\$ 11,512	
Task 1B: Meetings	-	8	-	4	-	-	-	-	4	16	176			\$ 2,940	\$ -	\$ 102	\$ 3,042	
Task 1C: QA/QC	8	4	40	2	-	-	-	-	4	58				\$ 14,060	\$ -	\$ -	\$ 14,060	
Task 1D: Safety	-	2	-	2	4	2	-	-	4	14				\$ 1,942	\$ -	\$ -	\$ 1,942	
Task 2: Background Mtrl Collection & Review	-	-	-	12	12	-	-	-	-	24				\$ 3,444	\$ -	\$ -	\$ 3,444	
Task 3: One-Time Troubleshooting	-	-	-	-	-	-	-	-	-	-				\$ -	\$ -	\$ -	\$ -	
Task 4: Initial Data Collection	-	-	-	-	-	-	-	-	-	-				\$ -	\$ -	\$ -	\$ -	
Task 4a: Pipelines (610 CTS)	-	-	-	-	96	-	12	-	-	108	384	12	9	\$ 13,572	\$ 2,976	\$ 2,829	\$ 19,377	
Task 4b: Reservoirs (16)	-	-	-	-	24	24	-	-	-	48	118	6	4	\$ 6,096	\$ -	\$ 1,271	\$ 7,367	
Task 5: Impressed Current CP Adjustments	-	-	-	-	8	-	-	-	-	8	176			\$ 1,016	\$ -	\$ 102	\$ 1,118	
Task 6: Initial Report / Data Reduction	-	4	-	24	40	-	12	-	-	80				\$ 11,260	\$ -	\$ -	\$ 11,260	
Task 7: Quarterly Data (58 PL/ICCP Reservoirs)	-	-	-	-	96	-	-	-	-	96	384	12	9	\$ 12,192	\$ -	\$ 2,829	\$ 15,021	
Task 8: Final Report	-	4	-	12	24	-	8	-	-	48				\$ 6,848	\$ -	\$ -	\$ 6,848	
Task 9: Troubleshooting (40 hours Combined)	-	4	4	12	20	-	-	-	-	40	264			\$ 6,380	\$ -	\$ 153	\$ 6,533	
Task 10: GIS Cathodic Protection Data	-	2	-	-	-	-	16	-	-	18				\$ 2,320	\$ -	\$ -	\$ 2,320	
Subtotal	8	56	46	70	328	28	50	16	20	622	1,502	30	22	\$ 93,582	\$ 2,976	\$ 7,286	\$ 103,844	
Total	24	172	138	210	1,176	84	158	48	60	2,070	5,234	115	86	\$ 307,010	\$ 8,928	\$ 27,963	\$ 343,901	
Grand Total for Above Tasks																	\$343,901	