CALL TO ORDER

PLEDGE OF ALLEGIANCE

PUBLIC COMMENTS

**Non-Agendized Matters:** Members of the public are invited to address the Board on matters which are not on the Agenda. Each speaker is limited to three (3) minutes. The Board will set aside thirty (30) minutes for public comments.

**Agendized Matters:** Members of the public may comment on Agenda items before action is taken, or after the Board has discussed the item. Each speaker is limited to five (5) minutes.

**CONSENT CALENDAR ITEMS:**
Approve all matters under the Consent Calendar by one motion unless a Board member, staff, or a member of the public requests a separate action.

1. Developer Project Status Report
2. Mesa Water® and Other Agency Projects Status Report
3. Water Quality Call Report
4. Committee Policy & Resolution Review or Development
5. Water Operations Status Report

**PRESENTATION AND DISCUSSION ITEMS:**
*Items recommended for approval at this meeting may be agendized for approval at a future Board meeting.*

None

**ACTION ITEMS:**

6. Board of Directors’ Vacancy, Division III
7. South Croddy Way Well Real Property Purchase
8. West Chandler Avenue Well, South Croddy Way Well and Pipeline Project Design Services
9. Pipeline Integrity Testing Program Consulting Services
10. HVAC System Design Amendment

**REPORTS:**

12. Directors' Reports and Comments

INFORMATION ITEMS:

13. Zero Usage Accounts

In compliance with California law and the Americans with Disabilities Act, if you need disability-related modifications or accommodations, including auxiliary aids or services in order to participate in the meeting, or if you need the agenda provided in an alternative format, please contact the District Secretary at (949) 631-1206. Notification 48 hours prior to the meeting will enable Mesa Water District (Mesa Water) to make reasonable arrangements to accommodate your requests.

Members of the public desiring to make verbal comments utilizing a translator to present their comments into English shall be provided reasonable time accommodations that are consistent with California law.

Agenda materials that are public records, which have been distributed to a majority of the Mesa Water Board of Directors (Board), will be available for public inspection at the District Boardroom, 1965 Placentia Avenue, Costa Mesa, CA and on Mesa Water’s website at www.MesaWater.org. If materials are distributed to the Board less than 72 hours prior or during the meeting, the materials will be available at the time of the meeting.

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<tr>
<td>C003-16-01</td>
<td>788 Center Street</td>
<td>2 Single Family Homes</td>
<td>Plans received and plan check fees paid on 6/28/16. Plans returned on 7/14/16. Fees paid and permit issued on 1/6/17. Owner contact on 5/25/17, construction to begin in July 2017. (7/7/17)</td>
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<td>C0008-17-01</td>
<td>410 Walnut Place</td>
<td>4 Single Family Homes</td>
<td>Plans received and plan check fees paid on 8/10/16. Plans returned on 8/24/16. Awaiting resubmittal. Fees paid and permit issued on 4/7/17. Service installation on 7/5/17. (7/7/17)</td>
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<tr>
<td>C0011-17-01</td>
<td>587 Anton</td>
<td>Fire Line Backflow Relocation</td>
<td>Plans received and plan check fees paid on 9/8/16. Fees paid and permit issued on 4/10/17. Mainline installation on 4/25/17. Parking structure in construction, backflow to be reinstalled at completion. (7/7/17)</td>
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<td>C0013-17-01</td>
<td>2803 Royal Palm Drive</td>
<td>Fire Station</td>
<td>Plans received and plan check fees paid on 8/25/16. Plans picked up on 10/4/16. Plans resubmitted on 3/1/17. Fees paid and permit issued on 5/5/17. (7/7/17)</td>
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<tr>
<td>C0014-17-01</td>
<td>Segerstrom Center for the Arts</td>
<td>Water Main Relocation</td>
<td>Plans received and plan check fees paid on 10/19/16. Plans picked up on 11/5/16. Fees paid and permit issued on 2/16/17. Mainline placement on 4/7/17. Mainline tie-in on 4/19/17. (7/7/17)</td>
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<td>C0015-17-01</td>
<td>548 Victoria Street</td>
<td>5 Single Family Homes</td>
<td>Plans received and plan check fees paid on 10/26/16. Plans returned on 11/9/16. Awaiting final fee payment. (7/7/17)</td>
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<td>C0017-17-01</td>
<td>166 Rochester</td>
<td>2 Single Family Homes</td>
<td>Plans received and plan check fees paid on 12/7/16. Plans returned on 12/15/16 and resubmitted on 1/5/17. Fees paid and permit issued on 5/5/17. (7/7/17)</td>
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<td>C0018-17-01</td>
<td>1951 Tustin</td>
<td>2 Single Family Homes</td>
<td>Plans received and plan check fees paid on 12/6/16. Plans returned on 12/7/16. Fees paid and permit issued on 4/13/17. (7/7/17)</td>
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<tr>
<td>C0021-17-01</td>
<td>2068 Maple Ave</td>
<td>4 Single Family Homes</td>
<td>Plans received and plan check fees paid on 1/13/17. Plans picked up on 4/21/17. Hot-tap on 5/31/17. Meter box installed on 6/28/17. (7/7/17)</td>
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<tr>
<td>C0022-17-01</td>
<td>330 E 17th Street</td>
<td>Bar/Lounge</td>
<td>Plans received and plan check fees paid on 3/22/17. Awaiting final fee payment. (7/7/17)</td>
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<td>C0024-17-01</td>
<td>1989 Orange</td>
<td>Meter Upgrade</td>
<td>Plans received and plan check fees paid on 3/27/17. Fees paid and permit issued on 4/25/17. (7/7/17)</td>
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<td>C0025-17-01</td>
<td>2053 Tustin</td>
<td>2 Single Family Homes</td>
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<td>C0026-17-01</td>
<td>326 E 16th Street</td>
<td>2 Single Family Homes</td>
<td>Plans received and plan check fees paid on 3/20/17. Awaiting final fee payment. (7/7/17)</td>
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<td>C0027-17-01</td>
<td>231 Flower Street</td>
<td>Meter Upgrade</td>
<td>Plans received and plan check fees paid on 3/23/17. Fees paid and permit issued on 4/21/17. (7/7/17)</td>
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<td>C0029-17-01</td>
<td>127 23rd St.</td>
<td>4 Single Family Homes</td>
<td>Plans received and plan check fees paid on 5/12/17. Awaiting final fee payment. (7/7/17)</td>
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<td>C0030-17-01</td>
<td>208 Camella Lane</td>
<td>New Home</td>
<td>Plans received and plan check fees paid on 5/12/17. Fees paid and permit issued on 5/25/17. (7/7/17)</td>
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<td>C0031-17-01</td>
<td>235 Paularino Ave</td>
<td>Service Abandonment</td>
<td>Plans received and plan check fees paid on 6/5/17. First plan check returned on 6/22/17. Field verified service connections on 7/3/17. (7/7/17)</td>
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<tr>
<td>C0032-17-01</td>
<td>328 Cabrillo</td>
<td>Meter Upgrade</td>
<td>Plans received and plan check fees paid on 6/15/17. Awaiting final fee payment. (7/7/17)</td>
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Project Title: OC-44 Replacement and Rehabilitation Evaluation and Cathodic Protection Study

File No.: M 2034

Description: Evaluate potential repair and replacement options

Status: Contract awarded to RBF Consulting 2/12/13. Kick-off meeting held on 2/21/13. TM 1, 2 and 3 reviewed by Mesa Water® and City of Huntington Beach. Revised TM 1 and 3 submitted 6/12/13. Final study report due 7/31/13. Staff requested RBF to perform hydraulic modeling and habitat assessment to supplement original SOW. A meeting with MWDOC, MET and RBF to analyze possible new service connections on the OC Feeder held on 6/25/13. Workshop to discuss TM’s held on 7/2/13. Meeting to discuss PDR, permitting, work plan and design concerns held on 7/16/13. Draft PDR and final design scope proposal received 8/6/13. Hydraulic studies “Evaluation of MWD Water Supply Facilities” and “Analysis of Emergency Supply from OC-44 and OCF” received 8/8/13. Staff reviewed the PDR and Hydraulic Study reports and submitted comments to RBF 9/12/13. Received proposal for design of OC-44 Pipeline Rehabilitation Project 9/24/13. Proposal approved by E&O Committee 11/19/13 and by Board on 12/12/13. Staff prepared change order to RBF. Kick-off meeting held on 01/22/14. Project on progress. Outreach coordination meetings with project stakeholders took place on 2/14/2014. RBF is working with City of Newport Beach, County of Orange, and Irvine Company on receiving permits for surveying and geotechnical boring work. Orange County Health Care Permit issued 3/24/2014. Geotechnical boring conducted on 3/28/14. The county of Orange permit was issued April 7, 2014. Biological and Topographic Survey started in mid-April and will continue through the end of July. Scour analysis completed on May 30, 2014. Jurisdictional Delineation completed on 6/30/2014. Project progress meeting with RBF and City of Huntington Beach held on 7/2/14 to review environmental assessment and predesign requirements. The design of the pipeline rehabilitation started on 7/8/2014. 60% plans and specifications submitted for review 9/8/2014. Staff is coordinating with City of Huntington Beach and finalizing review of the design package. Initial Study and Mitigated Negative Declaration submitted 11/2/14. Staff is reviewing the submittal (11/6/14). 60% review meeting with City of Huntington Beach and RBF held on 12/1/14. 90% design submittal received on 2/5/15. Notice of Intent (NOI) posted at County Clerk and State Clearinghouse on 1/29/15. Initial Study/Mitigated Negative Declaration (IS/MND) posted on Mesa Water® website and distributed to agencies/parties identified on distribution list on 1/29/15. Permit applications submitted to the regulatory agencies, legal notice posted in the Daily Pilot, and hard copy of IS/MND posted at front counter on 1/29/15 for public review. The review period concluded 2/27/15. Three comment letters received. Prepared written responses to the comments and held public hearing at the Board Meeting on 4/9/15. 90% design submittal comments sent back to RBF on 3/31/15. Additional questions from RBF analyzed in coordination with the City of Huntington Beach and comments provided to RBF on 6/1/15. Progress meeting with RBF and City of Huntington Beach
MESA WATER® AND OTHER AGENCY PROJECTS STATUS REPORT
July 2017

held 7/1/15. RBF is working with the regulatory agencies on obtaining encroachment permits and/or certifications. On 7/16/15 the consultant is scheduled to meet with the US Army Corps of Engineers (USACE) to discuss initial comments and obtain additional directions. Due to USACE staff shortage the permit is anticipated to be issued in March 2016. RBF is working with Regional Water Quality Control Board (RWQCB) on drafting the 401 Water Quality Certification for the project. The 401 Water Quality Certification was issued on 9/29/15. Comments to the California Department of Fish and Wildlife (CDFW) draft agreement were sent by RBF on 7/17/15. The CDFW permit is predicted to be issued in late October, 2015. In mid-June, 2015 RBF provided response to the California Coastal Commission’s (CCC) comments. The comments from CCC were received in the late July, 2015 and the permit is expected to be issued in mid-November, 2015. Permit from Caltrans obtained on August 17, 2015. 100% design package submitted on 7/21/15. Scour protection evaluation and recommendations submitted on 11/5/15. The CDFW should be issued by 12/18/15. The USACE has indicated that their permit should be issued in mid-January 2016. The Habitat Mitigation and Monitoring Plan (HMMP) has been updated by Michael Baker (former RBF) to reflect the USACE’s process and submitted to Mesa Water® for review on 1/8/16. Once the HMMP is revised and approved (1/19/16) it will be forward to all agencies, including Coastal Commission. Draft 1602 Streambed Permit obtained on 12/18/15. Final 1602 Streambed Permit pending CDFW will be issued while HMMP is accepted. U.S. Army Corps of Engineers’ 404 permit received on 2/10/16. Revised HMMP sent to CCC for review and approval. Project is pending CCC’s approval at an upcoming hearing. On 2/29/16 a meeting with Fletcher Jones Motorcars, City of Newport Beach, MBI (former RBF), and City of Huntington Beach was held to discuss issues associated with proposed construction activities. Traffic Plan prepared and submitted to the City of Newport Beach for approval on 6/29/16. Per request of CCC a dewatering plan was prepared and submitted for approval. Mesa Water® staff, MBI and CCC met on 10/6/16 and discussed mitigation conditions. Project approved at CCC Public Hearing on 12/7/16. MBI is working on finalizing the HMMP and construction plans and will submit them to CCC. Staff met with MBI on 5/1/17 and discussed comments after reviewing the draft final HMMP. New proposed mitigation criteria received from MBI on 7/5/17. Coastal Development Permit for Construction is anticipated in August, 2017. Project in progress.

Project Title: Well Automation and Rehabilitation

File No.: MC 2101

Description: Rehabilitate all clear water wells and add remote control SCADA capabilities

Status: Construction activities began at Well 5 on October 3, 2016 with demolition and well rehabilitation beginning in the first week. Video of Well 5 showed scale on the louvers, and potential failure of an unused sounding tube and a small area of the louvers potentially requiring swage patches. Repair completed on November 29, 2016. Well 5 rehabilitation resumed on December 3, 2016. Well 5 chemical facility pad has
been constructed and is awaiting a weather forecast of 8 days with no predicted rain to apply the chemical-resistant coatings to the concrete. Well 5 pumping development began on January 4, 2017, and produced fine sand at pumping rates above 1100 gpm. Repairs were made to Well 5, and test pumping performed in February showed acceptable well production over 2500 gpm with manageable sand. Construction is substantially complete at the Well 5 site. A start up planning meeting was held on March 29, 2017. Well 5 is running and producing good quality water. Construction of the Well 7 chemical facility is also substantially complete. Well 7 rehabilitation is complete, and test pumping shows production of 1,450 gpm. The Well 7 pump is expected to be installed the week of August 14, 2017, with startup planned for the following week.

**Project Title:** Two New Wells  
**File No.:** MC 2158  
**Description:** New wells and real estate services to identify and acquire property  

**Status:** Change Order to Well Rehabilitation and Automation approved at January 20, 2015 E&O to retain Carollo and subconsultant Geotechnical Consultants Inc. (GTC) to provide typical well site layout and hydrogeological investigation to identify promising locations for two new 2,000-gpm clear wells. Met with Real Estate Professionals on February 2, 2015, to discuss scope of work for well site property identification and acquisition. Met with OCWD Chief Hydrogeologist on March 24, 2015, to identify study area for new well sites. Gave Notice to Proceed to Real Estate company on May 4, 2015, and provided consultant report on preferred well site property characteristics. Real Estate consultant developed an advertisement postcard to describe the type of property needed, and sent it to over 1,000 commercial and industrial property owners in the study area. Three sites have been presented for evaluation. Also met with the Laguna Beach County Water District (LBCWD) Manager of Engineering and Operations on October 13, 2015, to discuss development of a jointly-owned well on property in Fountain Valley owned by LBCWD. An offer to purchase one site was presented to the property owner on November 16, 2016. The owner has not responded, and the offer time frame has expired. An offer for a different property was prepared and presented on January 6, 2016. Owner has decided to lease the property rather than selling. A third property is being evaluated by staff and OCWD for potential interference from the OCWD mid-basin injection. Travel time analysis results from OCWD showed that the property is inside the six month travel time window. A meeting was held on February 22, 2016, with OCWD and DDW to discuss the travel time analysis, and DDW determined that it would not issue a permit for a drinking water well at the site. A meeting with the City of Santa Ana Water Department was held to discuss the possibility of a jointly-owned well on a City of Santa Ana-owned site. An offer to purchase was presented to a property owner for an underutilized portion of a property on May 4, 2016. The offer was rejected. A revised offer was submitted on June 7, 2016. The owner has decided not to sell the property. Staff is working with Voit Real Estate to identify and evaluate underutilized sites in the vicinity of the study area. One
underutilized site on Sunflower Boulevard was considered but rejected for being only 200 feet from the current Well 9B site, which would add significantly to pumping costs at both sites. Another site near Bristol and St. Gertrude was considered, but rejected due to the cost of the property, its location adjacent to a residential area, and the cost of construction of two miles of pipeline to Mesa Water’s service area. A purchase agreement for an industrial site at 4011 W. Chandler Avenue in Santa Ana was negotiated in January 2017. The purchase agreement includes a 45 day contingency period, escrow close date of March 31, 2017, and 18 month leaseback to the seller. The Phase 1 Environmental Site Assessment and Property Condition Assessment were received on February 23, 2017, and showed the site and property to be in good condition. The lease was executed on March 27, 2017, and escrow closed on April 5, 2017. A request for proposal for design services for the new well and pipeline was released in May 2017. An offer for a second new well site at 3120 S. Croddy, which would utilize the same water transmission pipeline as planned for the W. Chandler well site. A contract for purchase of 3120 S. Croddy was signed on July 6, 2017, and escrow opened on July 7, 2017 with a 45 day contingency period for property assessment.

**Project Title:** MWRF Parking Project  
**File No.:** M 2052  
**Description:** Conduct parking layout design  
**Status:** Parking study prepared by Onward Engineering in November 2013. The Board approved alternative # 3 Parking Along the MWRF Frontage on Gisler Ave. on 3/15/2014. RFP for the parking design in consultants’ review (11/6/14). RFP sent out to consultants 11/25/14. Proposals due 12/19/14. Interview with three consultants held on 1/7/15. Recommendation brought to January E and O for consideration of approval and will be brought to the Board on 2/12/15 for approval. Project approved 2/12/15. Kick-off meeting held on 2/19/15. Design in progress. 30% design submittal submitted 3/23/15. Staff met with C.J. Segerstrom and discussed concept and details of the proposed parking layout. Segerstrom verbally approved the project. City of Costa Mesa approved the concept and currently consultant is evaluating the landscape requirements with the City of Costa Mesa. E and O Committee accepted the conceptual design and provided comments on 5/19/15. The condition approval from Segerstrom received on 6/29/15. Staff is working with the designer (CivilSource), Mesa Water’s attorney, and City of Costa Mesa on addressing Segerstrom’s comments. Staff is reviewing the Initial Study/Summary of Findings Report received on 8/3/15. Staff has addressed all Segerstrom’s requests included in their 6/29/15 letter and prepared a response letter. Approved construction plans were received from the City of Costa Mesa on 12/29/15. The final bid package completed 3/15/16. Encroachment Permit Application submitted to the City on 3/6/16. Hold Harmless Agreement for the Installation of Off-Site Parking Improvements within Public Right-of-Way received on 5/4/16. Staff reviewed the Agreement and sent comments to the City of Costa Mesa on 5/27/16. City approved all revisions as proposed by Mesa Water® and sent the
agreement for signature on 6/24/16. The Engineering and Operations Committee reviewed the Agreement at July 19, 2016 meeting and recommended Board approval. Board approval obtained on August 11, 2016. Agreement sent to the City for execution and recording on 9/7/16. Recorded Agreement received from the City on 10/19/16.

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<td>File No.: MC 2112</td>
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Description: Implement Resolution No. 1442 Replacement of Assets to annually perform non-destructive testing of 1% of the distribution system, and destructive testing of segments that are shown to have less than 70% of original wall thickness by non-destructive testing.

Status: Identifying segments for FY 2015 non-destructive testing and arranging for excavation and removal of segments that tested below 70% remaining wall thickness in FY2014 non-destructive testing. Released a Request for Proposal for a consultant to administer the program and develop standard operating processes on February 6, 2015. Three proposals were received on February 26, 2015, and interviews conducted on March 4, 2015. A contract with RBF was approved by the Board on April 9, 2015. Kickoff meeting held on April 21, 2015. Project status meeting held on June 8, 2015. Draft deliverable of prioritization of asbestos concrete pipe (ACP) for non-destructive testing received on June 26, 2015; updated draft received on August 7, 2015. Draft deliverable with recommendations for non-destructive testing technologies for metallic pipe received on August 7, 2015. Draft evaluation of destructive testing laboratories and tests received on August 21, 2015; final report received on September 16, 2015. Echologics performed non-destructive testing of 3 miles of ACP from July 13-17, 2015. Draft report received on August 14, 2015; final report received on September 1, 2015. Based on the Echologics reports from 2013 and 2015, ten ACP segments were selected for sampling and destructive testing. Three ferrous material pipelines with a history of repairs were also selected for field sampling and destructive testing. Draft bid documents for field sampling received on October 16, 2015. Final bid documents were released to three on-call contractors on November 23, 2015, for bids. Pre-bid meeting was held on December 7, 2015 and attended by all three of the bidders. Three bids were received on December 16, 2015. All bids exceeded the budget and the General Manager’s signing authority. An action item to approve a contract with the low bidder was approved by the Engineering and Operations Committee on January 19, 2016, and by the Board on February 11, 2016. Notice to Proceed with field sampling was given on March 7, 2016. An encroachment permit from the City of Costa Mesa was received on April 25, 2016. Field sampling began on May 16, 2016 and completed on June 28, 2016. Samples were shipped to MEIC Lab in Portland, Oregon, for destructive testing on July 7, 2016. Samples were received at MEIC on July 11, 2016. Lab results, including estimates of remaining useful life, were received on October 24, 2016. Non-destructive testing of the next 3 miles of ACP was completed on September 16, 2016, and the draft report was received October 1, 2016. All of the ACP and Cast Iron Pipe (CIP) showed less than 70% remaining wall thickness compared to its assumed original...
Extraction of six sections of ACP and two sections of CIP are in process for 2017 destructive testing. ACP samples were sent to WSP Canada for destructive testing. Results are expected in July 2017. CIP samples will be sent to McWane Ductile’s lab in Ohio for destructive testing. Results were received on June 30, 2017. A Request for Qualifications for consulting services for the Pipeline Integrity Testing Program was released in May 2017. Four Statements of Qualifications were received and a recommendation for contract award is on the July E&O agenda.

**Project Title:** MWRF Outreach Center  
**File No.:** MC 2147  
**Description:** Report on the feasibility of reconfiguring and potentially expanding the functional uses of the MWRF Operations and Administration Building to include a multi-purpose room and educational forum.

**Status:** Mesa Water® is coordinating with IBI Group (designer) on the feasibility of implementing an education and outreach center at the MWRF. Kick-off meeting was held on 6/1/2015. Program Requirement Questionnaire meetings were held on 6/9/2015 and 6/17/15. Program Report delivered to Mesa Water® for review on 7/7/2015. 60% design concepts are scheduled for submittal on 08/14/15. 100% concept design received on 09/29/15. Virtual rendering received on 10/6/15. Concept designs presented at the October Board Workshop. A follow-up planning session was held at the November Engineering and Operations Committee Meeting to capture the Board’s input on evaluating reduced cost options and to revisit the existing Boardroom improvements. Board directed staff to develop a scope of work to evaluate scaled down layouts of the MWRF Outreach Center and revisit expanded layouts of the main Boardroom. Engineering and Operations Committee approved a contract amendment with IBI Group to reflect the revised scope of work. Item was approved by the Board February 11, 2016. IBI Group performed an inspection of the existing Boardroom on February 25, 2016 and are in the process of developing conceptual layouts. Staff review and meeting occurred on April 11, 2016. Conceptual layout work has been completed.

**Project Title:** Mesa Water® Main Office HVAC Study  
**File No.:** MC 2171  
**Description:** Evaluate the existing HVAC system and provide recommendations for improved efficiency and operations of the system.

**Status:** Mesa Water® has contracted with Goss Engineering Inc. to perform this study. Kick off meeting was held January 13, 2016. Goss Engineering performed a field survey of both main campus buildings over the course of three days. Draft report with results and recommendations was reviewed by staff. The final report was delivered on June 30, 2016 and was reviewed by staff for completeness. Staff presented the findings and recommendation to the Board of Directors at the July E&O Committee
Meeting. Board approved contract to move forward with the design of a complete Variable Refrigerant Flow system. Contract has been executed and returned to Goss Engineering. Project kick-off and notice to proceed was issued on November 30, 2016. 50% drawings have been delivered for review and comments returned. Stakeholder meeting was held on February 2, 2017 to provide comments for the new VRF system 50% design. 90% design drawings and specifications were submitted for Mesa Water® review on March 10, 2017. Bid package is currently being developed by the consultant. Proposals for roof design are currently being solicited.

**Project Title:** Reservoirs 1 & 2 Pumps, Controls, and Chemical System Assessment Project

**File No.:** MC 2173

**Description:** Evaluate the existing Pumps, Controls, and Chemical Systems at Reservoirs 1 & 2. The project includes lab testing of pump efficiency, physical assessment of pumps and pipework, assessment of the existing control system, and preliminary design of a chemical dosing system. Recommendations for improved efficiency and operations of the system will be included in a final report.

**Status:** Mesa Water® has contracted with Hazen & Sawyer to perform this study. Kick off meeting was held September 30, 2015. The consultant performed a field survey of both Reservoirs 1 & 2 over two days. A preliminary outline of technical memo 1 was provided on December 11, 2015. Initial data requests were responded to by December 7, 2015, with follow up responses provided on January 7, 2016 (SCADA Data) and February 9, 2016 (Jockey Pump Data). Pump testing scope of work has been reviewed by Mesa Water® and returned to the Consultant for revision. TM-1 has been reviewed by staff and returned to the consultant. Pump extraction plan and bid documents are currently being reviewed by staff. The Consultant has begun the preliminary design of a chemical dosing system. Request for bids for the pump extraction will be released in August 2016. Bids for the pump extraction were submitted and reviewed. The item was presented to the Engineering and Operations Committee at the September 20, 2016 meeting. Contract has been executed. Field assessment was completed on October 19, 2016. Factory pump testing scheduled in early January 2017. Further field tests conducted on December 2, 2016. Pump 2 from Reservoir 1 was removed and sent to the factory test facility on January 3, 2017. Factory testing was completed on February 27, 2017 with results aligning with the results obtained in the field. The pump has undergone a physical assessment and a refurbishment scope of work developed. The pump will be installed and operational on May 9, 2017. TM-2 is scheduled for resubmittal on July 14, 2017. Chemical management PDR is currently under review.
### Project Title: Other Agency Project Coordination

**File No.:**

**Description:** Median construction in Placentia Ave. between Wilson St. and Adams Ave.

**Status:** Mesa Water® 16" main runs 5' East of the street center line. Mesa Water® is coordinating with designer and City on design of necessary protection and root barrier for the water main. 85% design plans received on (12/22/14). Plan review in progress 1/8/15. Plan review comments sent to the City 2/6/15. Mesa Water® provided update comments to landscaping plans on 6/17/15. Mesa Water® continuing to coordinate with the City, Stivers and Associates, Inc., and City Designer on layout of project. Revised final plans submitted for Mesa Water® review on 11/19/15. Staff reviewed the submittal in cooperation with Mesa Water® landscape consultant (Stivers Associates) and submitted comments to the City Designer on 12/28/15. The comments have been accepted by the Designer and Final Plans were submitted on 2/9/16. New comments sent to the Designer on 2/18/16. The revised final plans received on 3/21/16 and approved by Mesa Water® on 3/31/16. On May 24, 2017 the City Designer notified Mesa Water® that the City was planning to advertise the project in the first half of June, 2017. City received bids at the end of June, 2017 and is taking the project to the City Council for approval on 7/18/17. The project is anticipated to kick off on 7/28/17 and construction start on early August, 2017 (7/7/17)

### Project Title: Well 8 Demolishing Project

**File No.:** M 2219

**Description:** Prepare Well 8 demolishing plans and remove above-ground portions of the well and onsite facilities at the well facility to the scope and extent acceptable to the land owner Interinsurance Exchange of the Automobile Club of Southern California (the “Exchange”) to return the site to its near original condition.

**Status:** The Consultant has performed the required site Investigation and final design Services. In November 2016, the property owner assigned a project manager to work with Mesa Water® to move the project forward. The Consultant provided a 90% design which was reviewed by Mesa Water®. On February 6, 2017, Mesa Water® staff met with the Exchange personnel and discussed the 90% plan review comments. The Exchange decided to use the facility as a gated parking for their equipment and thus requested that all underground and aboveground structures be removed and wells properly destructed. The comments were incorporated into the 100% design. Well 8 demolition was scheduled for early June and should take approximately 60 calendar days.
Received 100% construction plans on 4/19/17. Project sent out to bid (13 contractors) on 4/20/17. The pre-bid job walk held on 4/26/16. One bid received on 5/4/17. Board of Directors awarded a contract to RC Foster Corporation on May 16, 2017. The kick-off meeting took place on 6/15/17 and construction started on 6/20/17. The scope of project includes removal of the transformer with concrete pad and electrical system, CMU Control Building, two wooden sheds, 120 feet of 14” piping, two chemical injection vaults, Well 8 pump, 11 feet of Well casings (well 8 and two monitoring wells), filling the wells with concrete, backfilling and repaving. To date the contractor has demolished the aboveground structures, two underground vaults; removed 80 feet of 14” pipeline, transformer and well pump. Project in progress (7/6/17).
Date: 6/8/2017  
Source: Phone  
Address: 1315 Corte Maltera  
Description: Customer inquired about hardness level in order to set his water softener.

Outcome: Hardness levels were provided to customer along with explanation on where to look in the Annual Water Quality Report for the data. Customer was satisfied.

Date: 6/12/2017  
Source: Phone/Visit  
Address: 1979 Federal Ave  
Description: Customer concerned about their family becoming ill after changing the refrigerator filter 5 weeks prior.

Outcome: Staff went out to check chlorine residual, pH and temperature of the water at the outside hose bib, bathroom faucet, and refrigerator. Chlorine residual was normal for outside hose bib and bathroom faucet water. The refrigerator water was low in chlorine residual as it has gone through a carbon filter. Bacteriological samples were collected from the front hose bib and refrigerator and submitted to the certified laboratory for analysis. Both samples came back negative for total coliform and heterotrophic plate count. Customer was contacted and given the results. Customer was satisfied.

Date: 6/12/2017  
Source: Phone  
Address: Fairview Development  
Description: Customer inquired about the disinfection used in Mesa Water® service area.

Outcome: Explained to customer that Mesa Water’s supply is disinfected with chloramines.
Date: 6/15/2017  
Source: Phone/Visit  
Address: 951 Paularino Ave  
Description: Customer reported water tasting “funny” after he hooked up a new water filter system.

Outcome: During site visit, customer tasted water from outside hose bib and noticed that it does not taste like the water from the kitchen faucet. Explained to customer that taste is from the new water filter system that has been installed and he should contact the manufacturer.

Date: 6/19/2017  
Source: Phone  
Address: 1097 Tulare  
Description: Customer called to find out how to calculate grains per gallon in order to set her water softener unit.

Outcome: Explained to customer where to look in the water quality report to find hardness levels and how to convert hardness to grains per gallon. Customer was satisfied.

Date: 6/19/2017  
Source: Phone/Visit  
Address: 3412 Geranium  
Description: Customer concerned about water quality due to new baby.

Outcome: Samples were collected and submitted to the laboratory. Results showed high quality water and were communicated to the customer.

Date: 6/20/2017  
Source: Phone  
Address: 2142 Aster Place  
Description: Customer reported cold tap water was warmer than usual and takes longer to get soap out. She wants to get the water tested.

Outcome: Explained to customer that warmer temperatures will affect the water temperature in the mainline and is out of Mesa Water's control. Also explained to customer that some wells are naturally harder or softer than others. Depending on operations, she may have received the softer water which has less minerals and takes longer to rinse the soap out, but it is not a health concern.
Date: 6/22/2017  
Source: Phone/Visit  
Address: 327 W. Wilson St #63  
Description: Customer reported water tasting bad (metallic or methane).

Outcome: During site visit, samples were taken from near the meter, hose bib at the mobile home, and the bathroom faucet and tested for pH, temperature, and chlorine residual. All sample results were within normal range. Customer drew sample from bathroom faucet where odor was noticed and after smelling it, he agreed that there was no odor present. An explanation was provided about sink traps and odors associated with them. Customer will disinfect drains and call if he has questions.

Date: 6/23/2017  
Source: e-mail/visit  
Address: 2078 Phalarope  
Description: Customer has noticed a butterscotch color sandy substance in his toilet tank and bowl. The substance also clogged a screen filter in his irrigation line. The substance has also been noticed in his washed clothes using cold cycle.

Outcome: A sample was taken at the hose bib closest to the water meter. Sample was clear with normal pH, temperature, and chlorine residual. Took a sample from his toilet tank and determined it was water softener resin from his water softening equipment. Customer mentioned it had recently been replaced and some resin must have gotten into his plumbing. Suggested to customer that he flush all hose bibs throughout the home.

Date: 6/26/2017  
Source: Phone  
Address: Fairview Development  
Description: Customer inquired about the effectiveness of chloramination on Legionella as he is tasked to put together a plan to control/prevent Legionnaires’ disease.

Outcome: Explained to customer that water meets all State and Federal drinking water regulations. Customer was provided with the link to CDC website which contains information on Legionella and a guideline for reducing the risk of Legionella growth and spread for those who maintain and manage building water systems.
Date: 6/26/2017
Source: Phone/Visit
Address: 3107 Sumatra Pl
Description: Customer stated that there’s a lot of air in the water, especially in the water filter system at the kitchen sink.
Outcome: Checked water at the outside hose bib and kitchen faucet. Both were clear and temperature, pH, and total chlorine were within normal range. Customer was advised to flush the filter system thoroughly and call if she has any other questions.
### Policy Assignments for 2017

<table>
<thead>
<tr>
<th>Policy Name</th>
<th>Resolution</th>
<th>Date Adopted</th>
<th>Revision Schedule</th>
<th>Next Review</th>
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<td>Standard Specifications and Drawings</td>
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<td>01/12/17</td>
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## Water Operations Status Report
### July 1, 2016 - June 30, 2017

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<tr>
<th>Operations Department Status Report</th>
<th>Wk Unit</th>
<th>Plan Days</th>
<th>Act Days</th>
<th>Plan Qty</th>
<th>Act Qty</th>
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<td><strong>01 - HYDRANTS</strong></td>
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<td><strong>TOTAL</strong></td>
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<td>$1,061,616</td>
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</table>
MEMORANDUM

TO: Engineering & Operations Committee
FROM: Denise Garcia, Administrative Services Manager
DATE: July 18, 2017
SUBJECT: Board of Directors’ Vacancy, Division III

RECOMMENDATION

Take action as the Board desires.

STRATEGIC PLAN

Goal #1: Provide a safe, abundant, and reliable water supply.
Goal #2: Practice perpetual infrastructure renewal and improvement.
Goal #3: Be financially responsible and transparent.
Goal #4: Increase public awareness about Mesa Water® and about water.
Goal #5: Attract and retain skilled employees.
Goal #6: Provide outstanding customer service.
Goal #7: Actively participate in regional water issues.

PRIOR BOARD ACTION/DISCUSSION

At its July 13, 2017 meeting, the Board of Directors received a letter of resignation from President Ethan Temianka, effective July 19, 2017.

DISCUSSION

Staff will review the actions and procedures required for filling the vacancy on Mesa Water District’s Board of Directors.

FINANCIAL IMPACT

None.

ATTACHMENTS

None.
MEMORANDUM

TO: Engineering and Operations Committee
FROM: Paul E. Shoenberger, P.E., General Manager
DATE: July 18, 2017
SUBJECT: South Croddy Way Well Real Property Purchase

RECOMMENDATION

Announce that the South Croddy Way Well property purchase has opened escrow for a price of $2,256,800.00.

STRATEGIC PLAN

Goal #1: Provide a safe, abundant, and reliable water supply.
Goal #2: Practice perpetual infrastructure renewal and improvement.

PRIOR BOARD ACTION/DISCUSSION

At its November 25, 2014 meeting, the Engineering and Operations (E&O) Committee approved recommendations from the 2014 Water Systems Master Plan Update to direct staff to plan water supply to meet 115% of projected demands and explore the development of two new well sites while abandoning Well 8.

At its January 20, 2015 meeting, the Board of Directors (Board) approved a motion to retain professional real estate services for the acquisition of two new well sites for an amount not-to-exceed $25,000. The contract was awarded to Voit Real Estate Services (Voit).

At its September 15, 2015 meeting, the E&O Committee received a presentation on the properties being considered for purchase and approved the General Manager to negotiate on behalf of the Board for the property purchase of two new well sites.

At its July 14, 2016 meeting, the Board awarded a contract change order to Voit for $50,000 to continue real estate acquisition services for two new well sites and authorize execution of the change order.

At its May 18, 2017 meeting, the Board met in closed session and authorized the General Manager to negotiate on behalf of the Board for purchase of the property at 3120 S. Croddy Way.

At its June 20, 2017 meeting, the E&O Committee announced the purchase of the property at 4011 W. Chandler Avenue in Santa Ana for use as a new well site.

DISCUSSION

On June 20, 2017, the E &O committee met in closed session to review purchase of Real Property located at 3120 S. Croddy Way, Santa Ana, California. Direction was provided to the District’s Real Property Negotiator, the District’s General Manager.

On July 3, 2017, Mesa Water entered into a purchase agreement for the above-referenced Real Property for a purchase price of $2,256,800.00, upon specified terms and conditions.
In order to comply with the requirements of the Ralph M. Brown Act, the Board of Directors needs to announce the details and that the purchase is in process.

FINANCIAL IMPACT

In Fiscal Year 2018, $2,200,000 is budgeted for the South Croddy Way Well; additional funds for this property will come from Cash on Hand.

ATTACHMENTS

None.
MEMORANDUM

TO: Engineering and Operations Committee
FROM: Phil Lauri, P.E., Assistant General Manager
DATE: July 18, 2017
SUBJECT: West Chandler Avenue Well, South Croddy Way Well and Pipeline Project Design Services

RECOMMENDATION

Recommend that the Board of Directors award a contract to Tetra Tech Inc. for $920,000 plus a 10% contingency for a not-to-exceed amount of $1,012,000 to provide professional engineering design and permitting services for the West Chandler Avenue Well, the South Croddy Way Well, and the Pipeline Project.

STRATEGIC PLAN

Goal #1: Provide a safe, abundant, and reliable water supply.
Goal #2: Practice perpetual infrastructure renewal and improvement.
Goal #6: Provide outstanding customer service.

PRIOR BOARD ACTION/DISCUSSION

At its June 20, 2017 meeting, the Engineering and Operations Committee was informed that the Request for Proposals was being solicited.

BACKGROUND

As part of the 2014 Master Plan, the Board of Directors adopted a policy for Mesa Water’s local water supply reliability to be at least 115% of water demand. This requirement will provide Mesa Water with the additional assurance to meet its demands with local groundwater supplies during peak demand periods and when water production facilities are undergoing routine maintenance.

In March 2017, Mesa Water purchased a 0.42 acre lot containing a 10,000 square-foot industrial/commercial building at 4011 West Chandler Avenue in the City of Santa Ana. The lot is located approximately 0.6 miles outside of Mesa Water’s service area and is intended to house a new well that will provide additional water supply and reliability to the District.

Mesa Water recently opened escrow on an additional well at 3120 South Croddy Way in the City of Santa Ana. This property is 0.5 acres and contains a 6,700 square foot industrial/commercial building. This new well site is approximately 0.2 miles outside the District service area.

The pipeline alignment project will be located within the City of Santa Ana, connecting both new well sites to the Mesa Water distribution system at the City of Costa Mesa border along MacArthur Avenue.

DISCUSSION

Mesa Water requested proposals to provide professional services for the West Chandler Avenue Well and Pipeline Project. This work requires the Consultant to develop design drawings, specifications, bid documents, and provide engineering support services during the bid process.
The Project includes civil, electrical, architectural, structural, geotechnical, and mechanical design efforts. A request for proposals was distributed on May 23, 2017. Mesa Water solicited proposals from 12 engineering Consultants. Proposals were received from Dudek, Hazen & Sawyer, and Tetra Tech. Each of the proposals was reviewed and scored by a selection committee. The selection committee consisted of the Assistant General Manager, Water Operations Manager, Associate Civil Engineer, and outside expert from Orange County Water District. The selection committee interviewed the three proposing firms to evaluate each firm’s qualifications and depth of experience of similar work. The following is a summary of the selection process results:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Proposer</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tetra Tech</td>
<td>93</td>
</tr>
<tr>
<td>2</td>
<td>Dudek</td>
<td>83</td>
</tr>
<tr>
<td>3</td>
<td>Hazen &amp; Sawyer</td>
<td>83</td>
</tr>
</tbody>
</table>

While each of the Consultants provided a qualified approach and team, the selection committee ranked Tetra Tech as the top choice based on their qualifications and extensive experience. Tetra Tech led the design and permitting effort for the OCWD Mid-Basin Injection Project and has extensive experience with the City of Santa Ana permitting requirements. Additionally, Tetra Tech brings an abundant level of experience in the design of wells (17 wells in the last 15 years) and pipelines (100+ miles of pipeline in the last decade). The Tetra Tech proposal is included as Attachment A. Other proposals will be made available for review upon request.

The costs for each of the proposing teams’ design of the West Chandler Avenue Well Site and Pipeline Project, excluding construction support services, are as follows:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Proposer</th>
<th>Design Fees</th>
<th>Hours</th>
<th>Average Rate</th>
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<td>$666,800</td>
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<td>2</td>
<td>Dudek</td>
<td>$560,588</td>
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<td>Hazen &amp; Sawyer</td>
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<td>1,802</td>
<td>$221</td>
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</table>

Following the release of the RFP, Mesa Water entered into the negotiation process for acquiring a second well site (3120 South Croddy Way). The South Croddy Way Well Site is similar in size and functional use (i.e. commercial/industrial office building) as the West Chandler Avenue Well Site. In order to maximize the value of design services, Tetra Tech was requested to amend their fees to reflect design services associated with a second well site. The additional fees have been broken out separately for Board consideration. The following is a summary of the proposed costs and level of effort to account for the comprehensive design of the South Croddy Way Well Site:
The aforementioned additional costs for the South Croddy Way Well Site are approximately 44% more than the original single well site design project. Mesa Water will recognize an additional savings of approximately 56% as an economy of scale due to avoided duplicative work that would be performed under a separate design contract. Duplicative work consists of shared pipeline disciplines, well design disciplines, and savings in design solicitation and bidding process. A combined design will allow for consistency in site layout, equipment selection, and functionality. Tetra Tech’s proposed approach contains practical and technical elements that will avoid unnecessary costs and delays.

Upon review of the submitted proposals and subsequent interviews, Tetra Tech demonstrated expertise in all aspects required to make the design of the new wells and pipeline a success.

Staff recommends that the Board consider awarding a contract to Tetra Tech to provide professional engineering design and permitting services for $920,000 plus a 10% design contingency for a not-to-exceed amount of $1,012,000 for the West Chandler Avenue Well, the South Croddy Way Well, and the Pipeline Project.

**FINANCIAL IMPACT**

In Fiscal Year 2018, $450,000 has been budgeted for the West Chandler Avenue Well and Pipeline Project Design.

<table>
<thead>
<tr>
<th>Project Estimate Amounts</th>
<th>Project Cost Amounts</th>
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<tbody>
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**ATTACHMENTS**

Attachment A: Tetra Tech Proposal
Proposal for

PROFESSIONAL SERVICES FOR

West Chandler Avenue Well and Pipeline Project

JUNE 20, 2017
June 20, 2017

Mr. Tim Beaman, P.E., Project Manager
Mesa Water District
1965 Placentia Avenue
Costa Mesa, CA 92627

Reference: Proposal to Provide Professional Services for
West Chandler Avenue Well and Pipeline Project

Dear Mr. Beaman:

Tetra Tech is pleased to submit our proposal for the West Chandler Avenue Well and Pipeline Project. Our Project Team is the “right” team to provide these services for the following reasons:

- **Extensive Well Experience** – During the last 15 years, members of our project team have been involved in the design of the equipping of 16 water wells within Southern California. Richard C. Slade & Associates (RCS) has designed the drilling of over 20 wells within the Orange County Basin.

- **Extensive Pipeline Design Experience** – During the last 15 years, members of our project team have been involved in the design of more than 100 miles of water, recycled water and sewer mains within fully developed areas having extensive traffic control and utility conflicts.

- **Extensive Experience Working in Santa Ana** – Members of our project team have completed more than 20 projects for the City of Santa Ana since 2000. In addition, Tetra Tech just completed the design of the Mid Basin Injection Facilities within the City for OCWD so we have an excellent understanding of the permitting requirements, building and electrical, for an outside agency.

- **In-house Process, Structural, Electrical and Control Capabilities** – We have our own in-house process, structural, electrical and control engineers.

Tetra Tech, Inc. is a Delaware Corporation (publically traded) and has been in business for over 50 years. Our website is address is: tetratech.com, and our Federal Tax ID Number is 95-4148514. This project will be managed and directed from our Irvine office location: 17885 Von Karman, Suite 500. The primary contact for this project will be Mr. Tom Epperson, Vice President, Water, Environment & Infrastructure; telephone 949-809-5156; fax 949-809-5010; e-mail: tom.epperson@tetratech.com.

Tetra Tech will execute the Professional Services Agreement with no exceptions. Tetra Tech will provide the required insurance coverage, including Professional Liability, as requested in the RFP/Agreement. Thank you for the opportunity to submit our proposal. If you have any questions regarding our proposal, please feel free to contact me.

Sincerely,

Tom Epperson, P.E.
Vice President, Water, Environment & Infrastructure

TLE/eg
M:\Marketing\Proposals\FY2017\MesaWD_WestChandlerAveWell&Pipeline
Attachment
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<tr>
<th>Section</th>
<th>Page</th>
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<td>Section 2: Staff Experience and Availability</td>
<td>14</td>
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<td>Section 3: Scope of Work Understanding and Schedule</td>
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<tr>
<td>APPENDICIES</td>
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<td>Appendix A: Resumes</td>
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</tr>
<tr>
<td>Appendix B: Professional Services Agreement Acceptance Form</td>
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</tbody>
</table>
SECTION 1: FIRM QUALIFICATIONS AND EXPERIENCE

Tetra Tech, Inc. is a nationally recognized engineering and resource management firm of more than 17,000 engineers, scientists, construction specialists, and technical support personnel in 400 offices worldwide. Listed on the NASDAQ Exchange (TTEK), Tetra Tech’s annual revenues now exceed $2.6 billion (2016). Thus, we are in excellent financial position and can provide necessary resources to rapidly deploy and meet aggressive project schedules.

Established in 1966, Tetra Tech is a leading provider of specialized management consulting and technical services. Our management consulting services are complemented by our technical services, including research and development, applied science, engineering and architectural design, construction management, and operations and maintenance. Our clients include a diverse base of public and private sector organizations located in the U.S. and internationally.

Our Company’s Annual Report is available on our website www.tetratech.com.

Tetra Tech consistently ranks among the top engineering firms annually according to Engineering News-Record, a highly regarded news magazine. In 2017, Tetra Tech, Inc. was ranked 5th among the top 500 design firms nationwide and was ranked #1 in the water service industry for the 14th year in a row!

Organization/Available Resources

The specialized expertise of our local office includes the planning, design and construction management services for diverse municipal capital improvement facilities. The following summarizes information specific to our firm, staff and available resources:

LEGAL NAME & ADDRESS:
Tetra Tech, Inc. (Corporate Headquarters)
3475 East Foothill Boulevard, Suite 300
Pasadena, CA 91107
Telephone: (626) 351-4664
Fax: (626) 683-0060

LEGAL FORM OF COMPANY:
Corporation (publicly traded–NASDAQ-TTEK)

DUNN & BRADSTREET NO.:
04-522-4250

YEAR ESTABLISHED:
1966 Tetra Tech, Inc. (51 years in business)

STAFF RESOURCES:
Over 17,000 Associates Company-wide
1,233 personnel in Southern California

As a publicly traded company, Tetra Tech’s financial information is publicly disclosed on a quarterly basis in accordance with the regulations of the U.S. Security and Exchange Commission. This information, as well as our firm’s Annual Reports containing independently audited financial statements, is provided on the company website.

PROPOSING OFFICE:
Tetra Tech
17885 Von Karman, Suite 500
Irvine, CA 92614
Telephone: (949) 809-5000

CONTACT PERSON:
Tom Epperson, Vice President
Water, Environment & Infrastructure
(949) 809-5056
tom.epperson@tetratech.com

ANNUAL REPORT:
Available at: http://www.tetratech.com/annual-reports.html
Why Tetra Tech

Our Project Team is the “right” team to provide the professional services for the West Chandler Avenue Well and Pipeline Project for the following reasons:

- **Extensive Well Experience** – During the last 15 years, members of our project team have been involved in the design of the equipping of 16 water wells within Southern California. Richard C. Slade & Associates (RCS) has designed the drilling of over 20 wells within the Orange County Basin.

- **Extensive Pipeline Design Experience** – During the last 15 years, members of our project team have been involved in the design of more than 100 miles of water, recycled water and sewer mains within fully developed areas having extensive traffic control and utility conflicts.

- **Extensive Experience Working in Santa Ana** – Members of our project team have completed more than 20 projects for the City of Santa Ana since 2000. In addition, Tetra Tech just completed the design of the Mid Basin Injection Facilities within the City for OCWD so we have an excellent understanding of the permitting requirements, building and electrical, for an outside agency.

- **In-house Process, Structural, Electrical and Control Capabilities** – We have our own in-house process, structural, electrical and control engineers.

Our extensive experience with similar projects will ensure that Mesa Water will receive a high level of service delivered by qualified, knowledgeable engineering professionals. Highly meticulous and coherent plans and specifications greatly benefit all project stakeholders, with the largest benefit realized by the Owner. Quality contract documents clearly lead to a larger number of bidders, lower competitive bid prices (due to increased competition, the contractor has less to assume and take the risk for, and a greater overall comfort level in our design based on a long history of successful projects), and lowest overall cost while achieving a very high quality end product (quality contract documents mitigates the potential, and impact of change orders, and sets forth a standard of quality the contract must achieve).

No two projects are the same, although many are similar. The key is to utilize elements of work that have been successful and apply to this project, and continue to improve construction efficiencies without lowering quality based on contractor feedback.

Our goal is to provide the necessary expertise and resources to deliver the project on time, within budget and in compliance with the design and construction standards set forth by Mesa Water. Tetra Tech has a large talent pool to draw from and can provide the necessary resources to rapidly deploy and meet aggressive project schedules. In addition, Tetra Tech is especially proud of its high level of repeat customers, which we attribute to our dedication and commitment to quality engineering and client satisfaction. Thus, we invite you to contact our references regarding our past record of performance, client relations, and project satisfaction.

**Relevant Experience**

We believe that our project team’s relevant design and construction experience in the last 15 years of 25 water/recycled water pump stations and 16 water well projects and over a 100 miles of pipeline experience makes us well qualified for this project.

Summarized in the tables on the following two pages is our recent well facility and similar pipeline projects that have been completed by our project team.
# TETRA TECH | Well Experience

<table>
<thead>
<tr>
<th>CLIENT / CONTACT</th>
<th>PROJECT</th>
<th>NO. OF WELLS</th>
<th>CAPACITY (gpm)</th>
<th>WELLHEAD TREATMENT</th>
<th>COMPLETION DATE</th>
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TETRA TECH | Pipeline Experience

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</tbody>
</table>
Subconsultants

In order to provide all of the services we feel will be needed for this project, Tetra Tech has added the following subconsultants to our project team:

**Hydrogeological Services:**  Richard C. Slade & Associates LLC

**Geotechnical Services:**  Leighton Consulting, Inc.

**Sound Mitigation:**  Behrens & Associates

**Potholing:**  C-Below

**Survey**  Coast Surveying, Inc.

Richard C. Slade & Associates LLC (RCS) has over 30 years of hydrogeologic experience in California. Typical clients for RCS include city water departments, county water agencies, water districts, engineering firms, and numerous wineries and vineyards. In the Orange County region, RCS over the years has sited, designed and assisted in the construction of 21 wells for the cities of Anaheim (10), Fullerton (3), Garden Grove (1), Golden State Water Company (2), Irvine Ranch Water District (2) and for Orange County Water District (3). Tetra Tech and RCS have worked together on over ten (10) separate well drilling and equipping projects during the last 15 years.

Similar Projects

The following are three projects that are similar to the West Chandler Avenue Well and Pipeline Project.

1. **Mid-Basin Injection Centennial Park Project (OCWD):** These facilities include four (4) submersible backflush pumps and motors within a vault structures. The main relevance of this project is that Orange County Water District (OCWD) was drilling and equipping well facilities within the City of Santa Ana and our services included obtaining the necessary City permits for both the injection wells, electrical facilities as well as the piping within city streets.

2. **Elizabeth Reservoir and Booster Pump Station Water Well No. 29 (City of South Gate):** This project included the design of the drilling and equipping of Water Well No. 29, corresponding disinfection equipment and an emergency generator. The main relevance of this project is that Tetra Tech had to work with the City of South Gate and the Division of Drinking Water to obtain approval of variance to Section 64560 (a) (2) of Title 22, California Code of Regulations. This Section of Title 22 requires a well site control zone of 50 feet radius around the site to protect the well from vandalism, tampering, or other threats. Due to the location of the existing elevated tank on the site, the City could not meet the required 50 foot clearance from the property line (only 30 feet from property line). Tetra Tech was able to work with DDW to obtain approval of locating the well as long as it was 50 feet away from the adjacent existing warehouse building and worked with the City’s planning department to approve that no industrial use will be allowed at the adjacent lot.

3. **Well 27 Drilling and Equipping (City of Orange):** The main relevance of this project is that it included the partial demolition of the Water Division’s warehouse in addition to the design of the well and corresponding facilities.

Detailed descriptions of these projects and the requested contact information are included on the following pages.
The Mid-Basin Injection Centennial Park Project is located within Centennial Park in the City of Santa Ana. Four injection wells constructed in below ground vaults are proposed to inject 12 MGD of GWRS water into the principal groundwater aquifer approximately 1,200 feet below ground surface. The project consists of the following:

- Four (4) Submersible backflush pumps will be installed within the injection wells with a design flowrate of 3,000 gpm to purge the entire well column and surrounding strata.

- Each of the four injection wells will require a pipeline connection to deliver the supply water for injection. The source of water for these wells will be the GWRS pipeline located in the western levee of the Santa Ana River. Approximately 5,700 linear feet of supply pipeline will be constructed to injection wells within Centennial Park. The supply pipeline is proposed to be cement mortar coated and epoxy lined steel pipe, and will vary in size from 36-inch, 16-inch, and 12-inch. The supply line will cross the Santa Ana River which will require the pipeline to be constructed on the newly expanded Edinger Avenue Bridge.

- Approximately 4,200 linear feet of 16-inch backflush pipeline will be constructed within Centennial Road to convey well backflush discharge to the lake or the Greenville-Banning Channel.

- A monitoring well is proposed down gradient of the Park’s injection wells to monitor the impacts to the groundwater basin. The monitoring well is proposed within the Heritage Museum of Orange County. The area around the monitoring well will be improved and a new irrigation system for the museum farm will be installed.

- Two (2) Shared Facilities that will be occupied by OCWD and the City of Santa Ana.
Elizabeth Reservoir and Booster Pump Station Water Well No. 29
South Gate, California

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

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

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

**Client Name**
City of South Gate

**Year Completed**
2016 (Design)
Construction (On-Going)

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

Mr. Kenneth Tang, P.E,
323-563-9574
ktang@sogate.org
Tetra Tech provided engineering design services for the well drilling and well equipping of a potable water well in the City of Orange. This project originally started in 2008 and due to funding shortage the project was stopped in 2010. In 2012, the project resumed design. The project was broken up into three stages:

**Water Division Warehouse Partial Demolition Plan:** The proposed well site is located within an extension of the City of Orange Water Division warehouse. This portion of work included partial demolition of the warehouse, grading and installation of 230 lineal feet of 24-inch storm drain pipeline for the well waste line.

**Well Drilling Plan:** The well drilling plans were for drilling of a 20-inch portable water well to 950 feet below ground surface with a maximum operational rate of 3,000 gallons per minute. The work included destroying the existing Well 14.

**Well Equipping Plan:** The well equipping plans were for the equipping of a 3,000 gallons per minute pump, electrical and chemical building for sodium hypochlorite treatment, emergency generator and acoustical enclosure.
SECTION 2: STAFF EXPERIENCE AND AVAILABILITY

Although overall firm credentials and experience are important, the key to a successful project is the caliber and depth of experience of the specific individuals assigned to the project team. Tetra Tech's approach for your project has been to assess the technical and management skills required and then match Tetra Tech and staff members to address the needs. This careful teaming approach, which draws from a large technical resource base, enables Tetra Tech to deliver the most effective project team that can quickly and efficiently focus on your project issues.

This section presents our project organization (shown on the next page) and introduces the members of the proposed project team. Abridged resumes of all key individuals are set forth in the Appendix for Mesa Water’s further review and evaluation.

<table>
<thead>
<tr>
<th>Key Personnel</th>
<th>Project Responsibility</th>
<th>No. Years Experience</th>
<th>Pipeline Design</th>
<th>No. of BPS</th>
<th>No. of Wells</th>
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<td>Mike Tsoi, P.E.</td>
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<td>Cory Heggtveit</td>
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<td>Laurence Esguerra, P.E.</td>
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<td>Erin Cabañero</td>
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<td>Mazen Kassar, P.E.</td>
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<td>Victor Ramirez, P.E., S.E.</td>
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<td>NA</td>
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</table>

**Project Manager**

Providing the team oversight is an experienced Project Manager. We are committing Mr. Tom Epperson, P.E. as the Project Manager for this contract. Mr. Epperson has over 35 years of experience devoted entirely to wastewater, water and recycled water facility projects and has been responsible for completing the design, bidding, and construction management of over 180 miles of water/reclaimed water/sewer mains, 36 water/recycled water pump stations, and 18 wellhead facilities. He will be responsible for making sure the resources are committed to this project and verifying that Mesa Water’s goals are being met. If problems on the project develop, Mr. Epperson will be responsible to make sure that the issues are resolved to the Mesa Water’s satisfaction. He will ensure that the team will implement and maintain a quality project throughout the duration of the project. Mr. Epperson was the Project Manager on the three similar projects included in the previous section of the proposal.

**Mr. Mark Bush, P.E.** will serve as the team’s QA/QC Manager. Our team clearly understands the importance of making certain Mesa Water receives the highest quality product from Tetra Tech. We have assigned Mr. Bush to lead the QA/QC review team for this project, and strictly monitor the project’s engineering and construction components. As QA/QC Manager, it will be Mr. Bush’s responsibility to
assign and oversee QA/QC for each phase of the project to ensure that all of the project goals are met. Mr. Bush is also very familiar with Mesa Water.

Technical Leads

Mr. Mike Tsoi, P.E., will be the design lead for the well. Mr. Tsoi has over 24 years of experience and has been working with Mr. Epperson on various projects for over 20 years. Over his career, Mr. Tsoi has designed over 20 pump station, lift station and well facilities. During the last 10 years, Mike has been working almost exclusively with Mr. Epperson on our pump station and well projects. Mr. Tsoi understands the design and construction aspects of a well. Mr. Tsoi will utilize his experience to work with the team’s
hydrogeologist and work through all of the layout issues for the construction equipment required to construct and rehabilitate the well in the future. Mr. Tsoi has been the project engineer for the following well drilling and equipping projects: Mid Basin Centennial Park for OCWD; Well 27 for City of Orange; Well 115, 107 and 78 for IRWD; and all of the IDP potable and non-potable wells for IRWD.

Mr. Laurence Esguerra, P.E., will be the design lead for the pipeline. Over his career, Mr. Esguerra has been the project engineer for over 70 miles of water, recycled water and sewer pipelines. Recently, he was the Project Engineer for over 20 miles of recycled water pipelines for El Toro Water District. In addition, he has been the Project Engineer for the majority of the City of Santa Ana pipeline replacement projects.

Mr. Mazen Kassar, P.E. will be the Project Manager for Electrical and Controls. Mr. Kassar has more than 24 years of experience in electrical engineering design and construction management. His background includes designing medium and low voltage power distribution as well as instrumentation and control systems for a wide variety of projects.

Mr. Victor Ramirez, P.E., S.E. will be the Project Manager for Structural Engineering. Mr. Ramirez has more than 28 years of experience in structural engineering design and construction support services with an emphasis in the design of water storage/water containment and water conveyance related structures. This includes: reservoirs, water/wastewater treatment plants, booster pump stations, well facilities, flow control facilities, pressure reducing stations and pipelines.

Ms. Emilie Johnson, AICP, REA will provide CEQA Documentation services. Ms. Johnson previously completed the Supplemental Environmental Documentation for the SARI Replacement project, as well as obtained permits from the regulatory agencies. Her relationships, persistence and hard work directly led to the timely completion of the task at hand.

Subconsultants

In order to provide all of the services we feel will be needed for this project, Tetra Tech has added the following subconsultants to our project team:

**Hydrogeological Services:**
Richard C. Slade & Associates LLC

**Geotechnical Services:**
Leighton Consulting, Inc.

**Sound Mitigation:**
Behrens & Associates

**Potholing:**
C-Below

**Survey:**
Coast Surveying, Inc.

Richard C. Slade & Associates LLC (RCS) has over 30 years of hydrogeologic experience in California. In the Orange County region, RCS over the years has sited, designed and assisted in the construction of 21 wells for the cities of Anaheim (10), Fullerton (3), Garden Grove (1), Golden State Water Company (2), Irvine Ranch Water District (2) and for Orange County Water District (3). Tetra Tech and RCS have worked together on over ten (10) separate well drilling and equipping projects during the last 15 years.

Brief company introductions are provided for each of these subconsultants in Appendix A.
Work Load

Listed below is a summary table showing the availability of our key in-house management and technical discipline lead personnel to work on your project and their current assignments:

<table>
<thead>
<tr>
<th>Individual/Location</th>
<th>Project Role</th>
<th>% Available</th>
<th>Current Assignments</th>
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</thead>
</table>
| Tom Epperson, P.E.  | Project Manager    | 15%         | • Second Zone 1 Reservoir (IRWD)  
• Regional Force Main Replacement (MNWD)  
• Well 32 Rehabilitation (Santa Ana) |
| Mark Bush, P.E.     | QA/QC Manager      | 10%         | • DWP Contracts  
• Chief Engineer for Tetra Tech  
• Well 32 Rehabilitation (Santa Ana) |
| Mike Tsoi, P.E.     | Well Design Lead   | 25%         | • Second Zone 1 Reservoir (IRWD)  
• Well 32 Rehabilitation (Santa Ana)  
• Mid Basin Construction (OCWD) |
| Laurence Esguerra, P.E. | Pipeline Design Lead | 33%     | • Various MNWD Projects  
• Regional Force Main Replacement (MNWD)  
• Huntington Beach Well |
| Cory Heggtveit      | Well Designer      | 25%         | • Upper District On-Call  
• West Basin Retrofit Projects  
• SOCWA Construction Support |
| Erin Cabañero       | Pipeline Designer  | 33%         | • ETWD Construction Support  
• Regional Force Main Replacement (MNWD)  
• MNWD/SOCWA Various Projects |
| Mazen Kassar, P.E.  | Electrical and Controls | 15%     | • GRIP Project (WRD)  
• Construction Support  
• Variety of Electrical Projects |
| Victor Ramirez, S.E.| Structural Engineering | 20%     | • GRIP Project (WRD)  
• Second Zone 1 Reservoir (IRWD)  
• Variety of Structural Projects |

The above key staff are committed to fulfilling their respective assignment for the full term of this project and will be made available as required to meet the planned project schedule.

Tetra Tech, and more importantly, the team dedicated to this project, has demonstrated a track record in delivering identical services to water agencies in Orange County. This project displays many similar elements to several past projects involving new wells. We believe our references are our best demonstration of the successful partnering and completion of these projects. We invite Mesa Water to call our references listed in this proposal.
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| 7     | Well Site Bid Phase Services | 12  | 4   | 16  | 4   | 36       | $7,600 |       | $2,320 | $10,470 |
|       | Confirm Space and Drawings | 2   | 4   | 8   | 2   | 14       | $2,040 |       | $2,270 | $4,310 |
|       | **Subtotal** | 12  | 4   | 20  | 4   | 8       | $9,640 |       | $4,580 | $14,220 |

| 8     | Well Site Construction Phase | 6   | 16  | 40  | 40  | 102      | $14,300 |       | $0   | $14,300 |
|       | Conceptual Design/ Hydraulic Analysis | 6   | 16  | 40  | 40  | 102      | $14,300 |       | $0   | $14,300 |
|       | Surveys | 4   | 12  | 24  | 60  | 150      | $16,280 |       | $14,280 | $30,560 |
|       | Geotechnical/Boring | 2   | 1   | 3   | 8   | $840    | $25,300 | $25,940 | $51,240 |
|       | Change Order Review (10) | 0   |     |     |     | 0       | $0     |       | $0   | $0   |
|       | Project Close-out | 0   |     |     |     | 0       | $0     |       | $0   | $0   |
|       | Record Drawings | 0   |     |     |     | 0       | $0     |       | $0   | $0   |
|       | **Subtotal** | 0   |     |     |     | 0       | $0     |       | $0   | $0   |

| 9     | Pipeline PDR | 4   | 12  | 16  | 8   | 4       | $8,900 |       | $2,240 | $11,140 |

| 10    | Pipeline 50% Design Services | 4   | 10  | 16  | 30  | 60      | $15,180 |       | $0   | $15,180 |
|       | Plan and Profile (5 sheets) | 4   | 10  | 16  | 30  | 60      | $15,180 |       | $0   | $15,180 |
|       | Miscellaneous Details | 4   | 12  | 20  | 40  | 76      | $15,920 |       | $0   | $15,920 |
|       | Specifications | 4   | 4   | 12  | 4   | 24      | $4,480 |       | $0   | $4,480 |
|       | Cost Estimate and Schedule | 2   | 4   | 8   | 8   | 24      | $3,910 |       | $0   | $3,910 |
|       | **Subtotal** | 6   | 16  | 50  | 64  | 282     | $26,850 |       | $0   | $26,850 |

| 11    | Pipeline Final Design Services | 4   | 10  | 16  | 30  | 60      | $15,180 |       | $0   | $15,180 |
|       | Plan and Profile (5 sheets) | 4   | 10  | 16  | 30  | 60      | $15,180 |       | $0   | $15,180 |
|       | Miscellaneous Details | 4   | 12  | 20  | 40  | 76      | $15,920 |       | $0   | $15,920 |
|       | Specifications | 4   | 4   | 12  | 4   | 24      | $4,480 |       | $0   | $4,480 |
|       | Cost Estimate and Schedule | 2   | 4   | 8   | 8   | 24      | $3,910 |       | $0   | $3,910 |
|       | **Subtotal** | 12  | 40  | 85  | 130 | 280     | $70,780 |       | $2,510 | $73,290 |

| 12    | Pipeline Bid Phase Services | 8   | 16  | 18  | 4   | 48      | $8,900 |       | $0   | $8,900 |
|       | Confirm Space and Drawings | 4   | 8   | 2   | 14  | 2       | $2,040 |       | $2,270 | $4,310 |
|       | **Subtotal** | 8   | 16  | 20  | 4   | 50      | $10,940 |       | $2,200 | $13,140 |

| 13    | Pipeline Construction Phase | 4   | 10  | 16  | 30  | 60      | $15,180 |       | $0   | $15,180 |
|       | Change Order Review (6) | 0   |     |     |     | 0       | $0     |       | $0   | $0   |
|       | Project Close-out | 0   |     |     |     | 0       | $0     |       | $0   | $0   |
|       | Record Drawings | 0   |     |     |     | 0       | $0     |       | $0   | $0   |
|       | **Subtotal** | 0   |     |     |     | 0       | $0     |       | $0   | $0   |

**Total** | 140  | 252 | 750 | 838 | 1296 | 58 | 4026 | $753,870 | $164,320 | $918,190 |
SECTION 3: SCOPE OF WORK UNDERSTANDING AND SCHEDULE

Project Overview

As part of the 2014 Master Plan, the Board of Directors adopted a policy for Mesa Water® (Mesa Water) local reliability to be 115% of demand. This requirement will provide Mesa Water with the additional assurance to meet its demands with local groundwater supplies during peak demand periods and when water production facilities are undergoing routine maintenance.

In March 2107, Mesa Water purchased a 0.42 acre lot containing a 10,000 square-foot building at 4011 West Chandler Avenue in the City of Santa Ana. The lot is located approximately 0.6 miles outside of Mesa Water’s service area and is intended to house a new well that will provide water reliability enhancement to the District. The pipeline alignment will be located within the City of Santa Ana and has been assumed to be located within Croddy Way from Chandler Avenue to MacArthur Boulevard where it is connected to the Mesa Water’s distribution system at the City of Costa Mesa boarder.

The West Chandler Avenue Well and Pipeline Design Project includes civil, electrical, structural, geotechnical, hydrogeological and mechanical design efforts.

Approach

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

- Service: Tetra Tech puts its clients first. We listen to and better understand our clients’ needs and deliver smart, cost-effective solutions that meet those needs. Our philosophy is to “Do it Right.”
- Value: Tetra Tech takes on our clients’ problems as if they were our own. We develop and implement real-world solutions that are cost-effective, efficient, and practical.
- Excellence: Tetra Tech brings superior technical capability, disciplined project management, and excellence in safety and quality to all of our work.
- Opportunity: Our people are our number one asset. Our workforce is diverse and includes leading experts in our fields. Our entrepreneurial nature and commitment to success provides challenges and opportunities.

Tetra Tech is committed to providing Mesa Water with the high quality service you expect and deserve. Our strength lies in our proven track record that has led to successful completion of multi-projects for Mesa Water, as well as other project participants or nearby agencies. The following is a summary of the distinct advantages that the Tetra Tech team brings to Mesa Water.

Previous Experience with Mesa Water

Tetra Tech has previously completed over 10 small projects for Mesa Water. These projects included: as-needed construction support services; Kemp Reservoir Pump Station silencer replacement; MWRF improvements; update District Standards; vault lid replacements; third party review of the Colored Water Treatment Facility (CWTF); analysis of greenhouse gas from CWTF; capital cost for membrane treatment at CWTF; and miscellaneous improvements at Mesa Reservoirs. Therefore, we do know Mesa Water.
**Experience with City of Santa Ana**

Members of our project team have completed more than 20 projects for the City of Santa Ana since 2000. These included several well projects as well as eight pipeline replacement projects throughout the City. But more important, Tetra Tech just completed the design of the Mid Basin Injection Facilities for Orange County Water District (OCWD) within the City of Santa Ana Centennial Park. To obtain approval from the City for the OCWD’s injection well facilities and the corresponding pipelines as well as the shared facilities, Tetra Tech was required to process permits through the following City of Santa Ana departments: Public Works encroachment permit for pipeline construction; planning approval; building permit; electrical permit; plumbing permit; mechanical permit; separate building permit for fence and walls; separate building permit for paving and striping; Orange County Fire Authority approval; and the City of Santa Ana Police Department. In summary, Tetra Tech has an excellent understanding of the red tape an outside agency will need to go through to obtain a permit from the City of Santa Ana.

**Design of Pipelines within Project Area**

For the City of Santa Ana, Tetra Tech previously prepared recycled water retrofit plans for the center medians located at the intersection of MacArthur Boulevard and Harbor Boulevard. In addition, Tom Epperson was the Project Manager for the design of OCWD’s Green Acres Pipeline project which was constructed within Harbor Boulevard from north of MacArthur Boulevard to Gisler Avenue. He has an excellent understanding of the difficulty of constructing a pipeline within Harbor Boulevard.

**Project Management**

Over the years, Tetra Tech has established well defined, rigorous procedures for project management. These techniques have been developed and refined and have contributed to our success and reputation. The keys to our project management system are communications, project planning, monitoring, and quality assurance. The Tetra Tech team’s goal is to keep Mesa Water’s staff “in the loop” from Day One of the project. Communication tools include the formal progress reports afforded through our project management system and an informal give-and-take approach starting with Tom Epperson, our Project Manager, and extending to every member of the Tetra Tech team. At the project’s outset, the chain of command and appropriate communication methods will be agreed upon and can be as formal or as informal as Mesa Water desires. We will use the entire communication spectrum. We will conduct formal meetings with agenda and typewritten notes, and we will use informal meetings with notes to file. We also will have documentation of telephone communications, with notes to file or letters of understanding as appropriate follow-up. Another important communication link will be our e-mail system.

We are proposing to use e-mail to keep Mesa Water aware of the status of the project. Every two weeks, Tetra Tech will prepare a brief (one or two paragraphs or bullet items) e-mail summarizing the following: activities completed in the previous two weeks; the activities planned for the upcoming two weeks; any critical decisions that need to be made; and schedule of upcoming events/meetings.

In addition, each month we will prepare a project status report containing the following: summary of completion of tasks; description of key issues/concerns which have surfaced along with proposed options and solutions; status of action items; and a project status summary report showing current schedule and budget status.

Our team understands the importance of ensuring Mesa Water receives a quality product. Therefore, a detailed Quality Control/Quality Assurance Plan will be prepared and submitted for review. This plan will establish the lines of communications and procedures for ensuring quality during all phases of the project’s design.
**Key Issues**

Successful implementation of the project will involve resolution of several key issues. We believe Tetra Tech has an excellent grasp of these issues based on our overall design experience as well as the knowledge we have gained from our similar well design projects. Our approach to resolving project issues is summarized below:

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<th>SUMMARY OF KEY ISSUES</th>
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<tr>
<td><strong>Issues</strong></td>
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| Well Location | • Well will need to be located a minimum of 50’ from property line (Section 64560 (a) (2) of Title 22 requires well control zone of 50-foot)  
• Provide adequate room for drilling equipment as well as future well rehabilitation work  
• City will not allow equipment to extend into public right-of-way  
• Provide preliminary layout showing drilling rig, pipe trailer, dog house, rolling bin, mud tank and baker tanks  
• Based on our experience, well will need to be located a minimum of 55’ north of Chandler right-of-way and 50’ from the east property line |
| Demolition Limits | • Based on the preliminary layouts, work with Mesa Water on the proposed limits of the building demolition  
• Based on our experience, the minimum required well drilling work area will be about 120’ north of Chandler and a minimum of 60’ from east property line. Existing building east wall is less than 50’ from east PL  
• It may be very difficult to keep any portion of the existing building |
| Site Layout | • Keys for site layout: 1) well location; 2) maintaining room for future well rehabilitation; 3) access for well equipment and treatment facilities; 4) noise and aesthetics  
• Sound panels during well drilling  
• Well enclosures verses well building  
• Exterior of building to match City aesthetic requirements  
• Additional facilities desired by Mesa Water (office/restroom/etc.) |
| Pipeline Design | • Assume alignment within Croddy Way. Will need to keep street open for traffic but may limit pipeline construction work area  
• Croddy Way: about 42’ wide; for cost-effective pipeline construction require minimum 24’ wide work area; only one way traffic feasible  
• Assume traffic control will include one way traffic with detours  
• Segerstrom Avenue crossing will be critical. City may require bore and jack Recommend meet with City to show advantage of open cut with limited work hours/weekend work verses 24 hour/7 day lane closure  
• City most likely will require full street grind and cap restoration |
| Permitting | • DDW approval of well location – Section 64560 requirements  
• Street, building and electrical permits with Santa Ana will take multi-reviews and will be very time consuming. Allow for in schedule and budget for costs accordingly. Start early and document everything |
Phasing of Work

To construct the project, the following contractors will be required: demolition contractor; well drilling contractor; well equipping contractor; and a pipeline contractor. The City of Orange had a similar project, Well 27, which required a warehouse demolition prior to well drilling and equipping and the construction of a discharge pipeline within streets to the connection to the distribution system. The City of Orange decided to do four separate contracts: demolition contract; well drilling contract; well equipping contract; and a pipeline contract. They felt that was the most cost-effective (no subcontractor mark-ups) and less risky alternative (each contractor was an expert in the work he was performing). However, this only worked because the City of Orange had time. Doing separate demolition, well drilling and well equipping contracts extended the project schedule by almost two years. If the City wanted to accelerate the schedule, it still would have delayed the completion of the project about a year.

The City of South Gate also had a similar well project, Well 29, which required the demolition of an existing building prior to well drilling, well drilling and equipping and pipeline construction. The City of South Gate decided to include it all into one contract. They have a prime contractor, actually a steel reservoir contractor who will also perform the well equipping, a well driller subcontractor, and a demolition subcontractor. The City of South Gate felt one contract will be the best solution to complete the construction the quickest. The schedule was the key and not economics. The City of South Gate also hired a construction manager, and they felt managing one contractor/contract instead of three or four would be a cost savings.

The Mid Basin Injection Project for OCWD was also constructed by one contract and it includes well drilling, well equipping, building demolition and pipeline construction.

Tetra Tech recommends that as a minimum, the pipeline construction should be bid as a separate contractor. It is important that the street work is done by a contractor who specializes in this work. Well drillers sometimes have a difficulty coordinating with other contractors. So Mesa Water may want to have a separate demolition contract that starts while the well design is still being performed.

Regarding including the drilling and equipping in the same contract, the key is the expected hydrogeologic conditions. Tetra Tech does not recommend combining the drilling and equipping of a well if there is a potential of water quality issues or a possibility that the desired flow is pushing the limits of what may be possible at that location. Tetra Teach will work with RCS and Mesa Water on this issue.

Scope of Work

In preparation for this proposal, our project team has reviewed the Request for Proposal (RFP), and visited the project site. Based on this information and our experience with similar projects, we propose the following scope of services. Due to proposal page limitation, we are only including sections of the scope that we have comments on, options or enhancements, and/or want to expand.

Task 1.5 - Project Communication: In addition to the communications protocol, Tetra Tech will submit a detailed Quality Control/Quality Assurance Plan for review by Mesa Water.

Task 2 - Well Site and Pipeline Permitting: Per Mesa Water’s answer to proposal questions, for budgetary purposes, Tetra Tech has included $30,000 in our budget covering all of the tasks included within Task 2 of the RFP, permit plan, meetings with agencies, schedule, and CEQA documentation.

Task 4.E - Well Site Preliminary Design Report – Local Well Summary: For the desk top study of drill logs and performance of surrounding wells, RCS will review not only Mesa Water wells, but also other
nearby wells owned by IRWD, the City of Fountain Valley, the City of Santa Ana and the City of Newport Beach. RCS will also rely on its company database and its current correlation network of available electric logs (E-logs) for other water wells and oil/gas wells in the region. RCS will summarize its findings and conclusions in a memorandum for inclusion into the Permit Plan.

One issue that may arise is the occurrence of colored water that is generally associated with the lower Main Aquifer system (or the Deeper Aquifer System). Thus, correlation of electric logs becomes an important tool in determining the depths of these aquifer systems beneath the proposed well site and will be an integral part of the initial “desktop” well study.

**Task 4.J - Well Site Preliminary Design Report – Mechanical Design:** We have assumed that Mesa Water will provide its typical well equipping and treatment design plans so that we can maintain the consistency of these facilities from site to site.

**Task 4.L - Well Site Preliminary Design Report – Architectural:** Based on our review of the surrounding buildings exterior features, we have assumed the following: buildings will have stucco covered CMU block walls, textured and painted to match the surrounding buildings with a “flat” roof and parapets. Our level of design effort was assumed based on buildings with CMU walls, steel framed roof and corrugated steel deck diaphragm, with removable steel wall and roof panels.

**Task 6 - Well Site Final Design Services:** We envision the construction drawings consisting of the following sheets:

- General Sheets (3 sheets)
- City of Santa Public Works, Building and Fire Authority Notes
- Horizontal control plan
- Demolition plan and demolition notes
- Demolition details including protection requirements/harmful materials
- Site plan – general site layout with cross section
- Grading and paving plan
- Civil site, gate and fencing details (2 sheets)
- Yard piping plan
- Piping profiles (storm drain, discharge piping, potable water service and sewer)
- Trench and paving details
- Connection details (storm drain, sewer and water)
- Well drilling site plan
- Well details including well orientation, centralizers, camera port/sounding tube (2 sheets)
- Well mechanical plan
- Well mechanical sections
- Sodium Hypochlorite plan
- Sodium Hypochlorite sections and details
- Well details (2 sheets)
- HVAC and ventilation plan (assuming VFD)
- Piping details (2 sheets)
- Fire sprinkler plan and details
- General structural notes and observations (2 sheets)
- Floor plan
- Exterior elevations
Task 8.3 – Well Site Construction Phase Services – Field Observation: RCS assumes an average drilling rate of 8 feet per hour. Thus, the drilling operation will take approximately five days. RCS proposes to be present part-time to geologically log the cuttings collected by the driller. RCS recommends a maximum of three (3) zones be selected for the isolated aquifer zone testing in the open pilot borehole. RCS geologist will be present on a full-time basis during the installation of the casing, gravel pack and the cement seal. RCS geologist will monitor well development by mechanical, chemical and pumping methods, step drawdown testing, and constant rate pumping testing, on a part-time basis.

Task 11 – Pipeline Final Design Services: We envision the construction drawings consisting of the following sheets:

- General sheets (3)
- City of Santa Ana Public Works Notes
- Horizontal Control Plan
- Overall Pipeline Key Map and Profile
- Plan and Profile (6 sheets)
- Trench and Paving Details
- Segerstrom Crossing Details
- Connection Details
- Pipe Details (2 sheets)
- Paving Replacement Plan
- Traffic Control Plans (12 sheets)
### Project Summary

**Project Name:** Pipeline Preliminary Design Report

**Project Purpose:**
- **Well Site Preliminary Design Report**
- **Well Site Final Design Services**

**Stakeholders:**
- **MESA WATER DISTRICT**
- **City of Santa Ana**

**External Milestones:**
- **Receive Comments from District**
- **Receive Comments from City of Santa Ana**
- **Submit 100% Pipeline Plans to City of Santa Ana**

**Timeline:**
- **Pipeline Preliminary Design Report**
  - **Receive Comments from District**
  - **Submit 90% Plans to City of Santa Ana**
  - **Submit 100% Pipeline Plans to District**
- **Well Site Final Design Services**
  - **Receive Comments from District**
  - **Submit Revised 50% Plans to City of Santa Ana**

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### Project Timeline

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APPENDIX A
Resumes of Key Staff
Mr. Epperson has over 35 years of professional experience in water, wastewater, and reclaimed water engineering. Mr. Epperson has been responsible for the preparation of water, wastewater, and reclaimed water master plans; project design reports for various water, wastewater, and reclaimed water facilities; and the planning and design of water, wastewater, and reclaimed water pipelines, along with pump stations and reservoirs. He has been responsible for completing the design, bidding, and construction management of over 200 miles of water/reclaimed water/sewer mains, 36 water/reclaimed water pump stations, 18 well-head facilities, 12 sewer lift stations and 25 water/reclaimed water storage reservoirs throughout Southern California.

EXPERIENCE

Mid-Basin Injection: Centennial Park Design Services, Orange County Water District, Santa Ana, CA – Project Manager responsible for the design of four injection wells to be located within Centennial Park in the City of Santa Ana for Orange County Water District. In addition to the engineering services for the four injection wells, the project includes the design of the supply pipeline, backflush pipeline, bridge crossing, two shared facility sites, a monitoring well site, site improvements, and paving of park access roads and parking lots.

Well No. 27, City of Orange, CA – Project Manager for the drilling and equipping of Well 27, a new potable water well (930 feet deep). The project involved the partial demolition of an existing warehouse to accommodate the footprint of the new well, installation of a CMU block control building and sodium hypochlorite building, 12.5% sodium hypochlorite disinfection facility, sound enclosure around the well head, as well as, site and landscaping improvements.

Well No. 29 and Elizabeth Reservoir and Booster Pump Station, City of South Gate – Project Manager for the design and construction support for the drilling and equipping of a new 2,500 gpm well, sodium hypochlorite facilities, and generator at the well site and a 1.8 steel reservoir, booster pump station consisting of three 125 hp pumps/motors at the reservoir site, and about 5,000 feet of water main replacements within the City of South Gate. The project combined the well drilling and well equipping phases of the work together.

Equipping Well No. 15 and Treatment Plant, City of Paramount, CA – Project Manager for the design and construction support for a new bulk sodium hypochlorite and ammonia chemical delivery system at the City’s new Well 15. Design included the equipment for the well including the pump and motor, the discharge piping, and a manganese and future arsenic treatment system. Included within the facility were an arsenic manganese filtration system, backwash tank, backwash
recirculation pumps, sludge mixer pumps, sodium hypochlorite and ammonia treatment systems, and an emergency generator. The facility included the following building/enclosures: well building removable sound enclosure; pre-engineered, prefabricated precast concrete electrical building; and prefabricated fiberglass insulated building for the backwash pump enclosure.

**Plant 13 Booster Station Rehabilitation and Well 22 Improvements, City of Lakewood, Lakewood, CA** – Project Manager for plans, specifications and cost estimate for the replacement of a 4,800 gpm booster pump station and replacement of a 1,200 gpm well pump. In addition to the booster pump station replacement, the construction was phased so the booster station was operational during construction.

**Well 107 Replacement, Irvine Ranch Water District, Irvine, CA** – Project Manager for the preparation of the plans, specifications, cost estimate and construction services for the drilling and equipping of a potable water well in the City of Irvine. This project combined the well drilling and well equipping phases of the project together.

**Equipping of Well No. 39, City of Santa Ana, Santa Ana, CA** – Project Manager for the design of the equipping of Well No. 39 and corresponding piping and site improvements.

**Well 78 Replacement, Irvine Ranch Water District, Irvine, CA** – Project Manager for the drilling and equipping of a recycled water well in the City of Irvine.

**Irvine Desalter Project – Potable Wells 76, 77, 107, and 110, Irvine Ranch Water District, Irvine, CA** – Project Manager for the design and construction services of four potable wells including drilling and equipping of each well.

**Burris Pump Station, Orange County Water District, Anaheim, CA** – Project Manager for the design of the new Burris Pump Station which consists of four 1,750 horsepower vertical turbine pumps delivering a maximum flow rate of 200 cfs to the Santiago Basins from Burris Basin. Work consists of reviewing the existing Burris Pump Station Evaluation Report, assisting OCWD with selecting a replacement option, performing final design of the selected option and providing bid and construction phase services. The project also included unique designs: 190,000 cubic yards of earthwork to be completed prior to pump station construction, the construction of a 55 foot diameter by 55 foot high circular wet well which was computer and physically modeled during design for flow characteristics, and the construction of a 180,000 gallon surge suppression system.

**Centennial Park Neighborhood Water Main Improvements, City of Santa Ana, CA** – Project Director for approximately 20,000 linear feet of 8-inch PVC water main to replace existing water mains.

**Central City Water Main Improvements, City of Santa Ana, CA** – Project Director for approximately 6,600 linear feet of 8-inch PVC water main to replace existing water mains.

**Pico-Lowell Neighborhood Water Main Improvements, City of Santa Ana, CA** – Project Director for approximately 8,200 linear feet of 8- and 12-inch PVC water main to replace existing water mains.

**Mid City Neighborhood Water Main Replacement Project, City of Santa Ana, CA** – Project Director for approximately 9,000 linear feet of 12- and 8-inch PVC water main to replace existing water mains. Project included the hot tap of two existing water mains and fifteen cut in connections.

**Bristol Street Widening Water Main Replacement Project, City of Santa Ana, CA** – Project Director for approximately 6,000 linear feet of 12- and 8-inch PVC water main to replace existing water mains.
Mr. Bush has over 21 years of professional experience in water, wastewater and recycled water engineering. He has been responsible for the completion of over 100 miles of potable water, recycled water and sewer mains, 20 potable water and recycled water pump station and well projects and 14 potable and recycled water reservoirs.

Mr. Bush is an integral part of the Water/Wastewater Department and brings leadership, strong work ethic, technical knowledge and dedication to overall client satisfaction on each and every project.

**EXPERIENCE**

**Mid-Basin Injection: Centennial Park Design Services, Orange County Water District, Santa Ana, CA** – Responsible for the QA/QC of the design of four injection wells to be located within Centennial Park in the City of Santa Ana for Orange County Water District. In addition to the engineering services for the four injection wells, the project includes the design of the supply pipeline, backflush pipeline, bridge crossing, two shared facility sites, a monitoring well site, site improvements, and paving of park access roads and parking lots.

**Well No. 27, City of Orange, Orange, CA** – Project Engineer for the drilling and equipping of Well 27, a new potable water well (930 feet deep). The project involved the partial demolition of an existing warehouse to accommodate the footprint of the new well, installation of a CMU block control building and sodium hypochlorite building, 12.5% sodium hypochlorite disinfection facility, sound enclosure around the well head, as well as, site and landscaping improvements.

**Equipping of Well No. 39, City of Santa Ana, Santa Ana, CA** – Project Engineer for the drilling and equipping of Well No. 39, a new potable well (1,350 feet deep), installation of three sodium hypochlorite disinfection facilities, and site landscaping improvements.

**Centennial Park Neighborhood Water Main Improvements, City of Santa Ana, Santa Ana, CA** – Project Manager for approximately 20,000 linear feet of 8-inch PVC water main to replace existing water mains.

**Central City Water Main Improvements, City of Santa Ana, Santa Ana, CA** – Project Manager for approximately 6,600 linear feet of 8-inch PVC water main to replace existing water mains.

**Pico-Lowell Neighborhood Water Main Improvements, City of Santa Ana, Santa Ana, CA** – Project Manager for approximately 8,200 linear feet of 8- and 12-inch PVC water main to replace existing water mains.

**Mid City Neighborhood Water Main Replacement Project, City of Santa Ana, Santa Ana, CA** – Project Engineer for approximately 9,000 linear feet of 12- and 8-inch PVC water main to replace existing water mains. Project included the hot tap of two existing water mains and 15 cut in connections.

**Education:**
- University of California, Irvine
  - B.S. Civil Engineering, 1997
  - B.S. Environmental Engineering, 1997

**Registrations/Certifications:**
- Registered Civil Engineer
  - California No. 60477

- Emtelle fiberflow, Design and Engineering Certification

**Project Management:**
- PSMJ – PM Workshop
- Tetra Tech PM Series

**Professional Affiliations:**
- American Society of Civil Engineers
- American Water Works Association
- Orange County Water Association

**Office:**
- Irvine, California

**Years of Experience:**
- 21

**Years with Tetra Tech:**
- 21
Mr. Tsoi has over 24 years of professional experience in water, wastewater, and recycled water engineering. Mr. Tsoi has been responsible for the planning and design of water, wastewater, and recycled water pipelines along with pump stations, flow control facilities, reservoirs and site improvements. He is knowledgeable in the use of the latest computer software including CADD, horizontal control, hydrology, hydraulics and various spreadsheet programs.

EXPERIENCE

Mid-Basin Injection: Centennial Park Design Services, Orange County Water District, Santa Ana, CA – Design of four injection wells to be located within Centennial Park in the City of Santa Ana for Orange County Water District. In addition to the engineering services for the four injection wells, the project includes the design of the supply pipeline, backflush pipeline, bridge crossing, two shared facility sites, a monitoring well site, site improvements, and paving of park access roads and parking lots.

Well 27 Equipping Plan, City of Orange, Orange, CA – Project Engineer for the preparation of the plans, specifications and cost estimate for the equipping of a potable water well. As part of the well equipping a generator room was installed for backup power.

Plant 13 Booster Station Rehabilitation and Well 22 Improvements, City of Lakewood, Lakewood, CA – Project Engineer for plans, specifications and cost estimate for the replacement of a 4,800 gpm booster pump station and replacement of a 1,200 gpm well pump. In addition to the booster pump station replacement, the construction was phased so the booster station was operational during construction.

Well 107 Replacement, Irvine Ranch Water District, Irvine, CA – Project Engineer for the preparation of the plans, specifications, cost estimate and construction services for the drilling and equipping of a potable water well in the City of Irvine. This project combined the well drilling and well equipping phases of the project together.

Well 78 Replacement, Irvine Ranch Water District, Irvine, CA – Project Engineer for the drilling and equipping of a recycled water well in the City of Irvine. This project included construction of the well within a highly visible area with limited work space.

Irvine Desalter Project Potable and Non-Potable Well Drilling and Equipping, Irvine Ranch Water District, Irvine, CA – Project Engineer for the preparation of plans and specifications for the drilling and equipping for design of well drilling for five potable water wells and one non-potable water well. This includes wellhead equipping for each well for both aboveground and belowground facilities. Also included in this project was the modification to an existing non-potable water well.
Mr. Heggtveit has provided design engineering in various water and wastewater projects including domestic and reclaimed water pipelines, water main replacements, gravity sewer mains, pump stations, lift stations, reinforced concrete reservoirs, flow control facilities, recycled water customer conversions, and pressure reducing valve vaults. Responsibilities have included preparation of construction plans, specifications, and design calculations; assisted supervisors in preparing project memorandums.

EXPERIENCE

Mid-Basin Injection: Centennial Park Design Services, Orange County Water District, Santa Ana, CA – Design of four injection wells to be located within Centennial Park in the City of Santa Ana for Orange County Water District. In addition to the engineering services for the four injection wells, the project includes the design of the supply pipeline, backflush pipeline, bridge crossing, two shared facility sites, a monitoring well site, site improvements, and paving of park access roads and parking lots.

Burris Pump Station, Orange County Water District, Anaheim, CA – Design Engineer for the design of the new Burris Pump Station which consists of four 1,750 horsepower vertical turbine pumps delivering a maximum flow rate of 200 cfs to the Santiago Basins from Burris Basin. Work consisted of reviewing the existing Burris Pump Station Evaluation Report, assisting OCWD with selecting a replacement option, performing final design of the selected option and providing bid and construction phase services. The project also included unique designs: 190,000 cubic yards of earthwork to be completed prior to pump station construction, the construction of a 55-foot diameter by 55-foot high circular wet well which was computer and physically modeled during design for flow characteristics, and the construction of a 180,000 gallon surge suppression system.

Irvine Desalter Project Potable and Non-Potable Well Drilling and Equipping, Irvine Ranch Water District, Irvine, CA – Design Engineer for the preparation of plans and specifications for the drilling and equipping of five potable water wells and one non-potable water well. This included wellhead equipping for each well for both aboveground and belowground facilities. Also included in this project was modification to an existing non-potable water well.

South County Booster Pump Station, Irvine Ranch Water District, Irvine, CA – Design Engineer for the planning, design and construction of a new potable water pump station and pump station modification.

Education:
B.S., Civil Engineering, California State University, Long Beach, 2009

Registrations/Certifications:
Engineer in Training, California, 2005, No. 121854

Office:
Irvine, California

Years of Experience:
15

Years with Tetra Tech:
15
Mr. Esguerra has provided design engineering in various water and wastewater projects including domestic and reclaimed water pipelines, water main replacements, gravity sewer mains, pump stations, lift stations, reinforced concrete reservoirs, steel reservoirs, flow control facilities, and pressure reducing valve vaults. Responsibilities have included preparation of construction plans and specifications, design calculations and project memorandums.

**EXPERIENCE**

**Well No. 29 and Elizabeth Reservoir and Booster Pump Station, City of South Gate** – Project Engineer for the design and construction support for the drilling and equipping of a new 2,500 gpm well, sodium hypochlorite facilities, and generator at the well site and a 1.8 steel reservoir, booster pump station consisting of three 125 hp pumps/motors at the reservoir site, and about 5,000 feet of water main replacements within the City of South Gate. The project combined the well drilling and well equipping phases of the work together.

**Sand Canyon Grade Separation, Irvine Ranch Water District, Irvine, CA** – Design Engineer for the design of the relocation of over 5,000 linear feet of 8- to 24-inch potable pipeline in the City of Irvine as part of the Roadway Grade Separation for the Railroad. The project also included the design of 2,000 feet of 16-inch recycled waterline.

**Centennial Park Neighborhood Water Main Improvements, City of Santa Ana, Santa Ana, CA** – Design Engineer for approximately 20,000 linear feet of 8-inch PVC water main to replace existing water mains.

**Central City Water Main Improvements, City of Santa Ana, Santa Ana, CA** – Design Engineer for approximately 6,600 linear feet of 8-inch PVC water main to replace existing water mains.

**Carlsbad Seawater Desalination Conveyance Pipeline, KSD Joint Venture, Carlsbad, CA** – Design Engineer for the Carlsbad Conveyance Pipeline Design-Build Project. The project was designed for the Kiewit Shea Desalination Joint Venture team and consists of approximately 10 miles of 54-inch welded steel pipe. The pipeline was installed in existing city streets and right-of-way through the cities of Carlsbad, Vista, and San Marcos. The 54-inch transmission main is sized for 54 million gallons per day (mgd) of desalinated seawater. Pressures range from 250 psi at the point of connection to 500 psi at the seawater desalination plant.

**Recycled Water Distribution System Expansion, El Toro Water District, Laguna Woods, CA** – Project Engineer for the design of over 20 miles of recycled water pipelines for the El Toro Water District’s - Recycled Water Distribution System Expansion Project. The pipelines range in size from 4-inch to 20-inch in diameter, and convey up to 775 acre-feet of tertiary treated recycled water per year.

**Education:**
University of California, Irvine
B.S., Civil Engineering, 2004

**Registrations/Certifications:**
Registered Civil Engineer
California No. 73803

**Professional Affiliations:**
American Society of Civil Engineers, Orange County

**Office:**
Irvine, California

**Years of Experience:**
13

**Years with Tetra Tech:**
13
Ms. Cabañero has provided design engineering in various water and wastewater projects including domestic water pipelines, water main replacements, gravity sewer mains, gravity force mains, pump stations, lift stations, reinforced concrete reservoirs, steel tank reservoirs, flow control facilities, and pressure reducing valve vaults. Responsibilities have included preparation of construction plans, specifications, and design calculations; assisted supervisors in preparing project memorandums and project schedules; and organized office technical library.

EXPERIENCE

Mid-Basin Injection: Centennial Park Design Services, Orange County Water District, Santa Ana, CA – Design Engineer for four injection wells to be located within Centennial Park in the City of Santa Ana for Orange County Water District. In addition to the engineering services for the four injection wells, the project includes the design of the supply pipeline, backflush pipeline, bridge crossing, two shared facility sites, a monitoring well site, site improvements, and paving of park access roads and parking lots.

Well No. 29 and Elizabeth Reservoir and Booster Pump Station, City of South Gate – Design Engineer for the design and construction support for the drilling and equipping of a new 2,500 gpm well, sodium hypochlorite facilities, and generator at the well site and a 1.8 steel reservoir, booster pump station consisting of three 125 hp pumps/motors at the reservoir site, and about 5,000 feet of water main replacements within the City of South Gate. The project combined the well drilling and well equipping phases of the work together.

Peters Canyon Channel Water Capture and Reuse Pipeline, Irvine Ranch Water District, Irvine, CA – Design Engineer for over 17,000 linear feet of 10-inch to 16-inch steel and PVC pipeline. This was a joint project with the City of Irvine, City of Tustin, County of Orange, and Caltrans. Project included three storm drain diversion structures and intake design, hanging the pipeline from two bridges, bore and jack under the railroad and backpressure vault.

Recycled Water Distribution System Expansion, El Toro Water District, Laguna Woods, CA – Design Engineer for the design of over 20 miles of recycled water pipelines for the El Toro Water District’s - Recycled Water Distribution System Expansion Project. The pipelines range in size from 4-inch to 20-inch in diameter, and convey up to 775 acre-feet of tertiary treated recycled water per year. The major customer being served recycled water is the Laguna Woods Village Home Owners Association (formerly Leisure World).
Mr. Mazen Kassar has more than 25 years of experience in electrical engineering and industry standard that include electrical engineering staff management, project management, construction management and supervision, water and wastewater treatment, petro-chemical design, and environmental soil and groundwater treatment. His background includes designing medium and low voltage power distribution, designing instrumentation, control systems and SCADA systems for a wide-variety of projects, and the installation of electrical systems for remediation projects, including soil vapor extraction systems and groundwater pump-and-treat systems. Other experience includes, working with utility companies to provide new electrical service to new projects, working with local Building and Safety Departments to obtain Plan Check and construction permits, field trouble shooting of electrical and mechanical systems, system commissioning and startup, problem solving, and managing an operation and maintenance department. He has strong knowledge in MS Office and AutoCAD.

EXPERIENCE

Mid-Basin Injection: Centennial Park Design Services, Orange County Water District, Santa Ana, CA – Electrical P responsible for the design of four injection wells to be located within Centennial Park in the City of Santa Ana for Orange County Water District. In addition to the engineering services for the four injection wells, the project includes the design of the supply pipeline, backflush pipeline, bridge crossing, two shared facility sites, a monitoring well site, site improvements, and paving of park access roads and parking lots.

Lakewood Plant 13 Project, Lakewood, CA – Managing the electrical design for Plant 13 pump station upgrade. The design consists of replacing the plant old MCC with new outdoor NEMA 3R MCC, installing new conduits and wires to the new pumps, and reinstalling the existing control and telemetry system. This replacement upgrade requires interfacing with Southern California Edison (SCE) and relocating the existing ATS.

Well 27 Equipping Plan, City of Orange, Orange, CA – Electrical Project Manager for the preparation of the plans, specifications and cost estimate for the equipping of a potable water well. As part of the well equipping a generator room was installed for backup power.

City of Paramount, Well 13 & 14, Paramount, CA – Managed instrumentation and control design for Well 13 and Well 14 chlorination system. The design included providing new PLC system to control chlorine and ammonia metering pumps. Provided P&ID, loop diagram, wiring schematic and instrumentation and control plans.

Education:
B.S., Electrical Engineering, California State University, Long Beach, 1990

Registrations/Certifications:
Professional Electrical Engineer California, 1998, No. 15809
General Construction, Class B California, 2008, No. 777845
Contractor - C-10 Electrical, California Class C – Specialty 2000, No. 777845

Training and Certifications:
ETAP Electrical Power Modeling
Project Management I & II
Auto CAD 2005
GE and Allen Bradley PLC programming
GE/Intellution and Wonderware SCADA programming
Vapor extraction and Groundwater Treatment
OSHA 8-hour Hazardous Waste Operations Site Supervisor Training, 1992
OSHA 40-hour Hazardous Waste Operations Training, 1989

Professional Affiliations:
Institute of Electrical and Electronics Engineers IEEE

Office:
Irvine, California

Years of Experience:
25
Astrid Fleischer is an electrical and controls systems engineer with 26 years of experience in water and wastewater treatment, capital improvement and industrial control projects. Ms Fleischer’s electrical and controls design experience includes projects in California and overseas involving Modicon Quantum Automation Platform, Siemens Simatic PLCs, Allen Bradley RSLogix5000 programming, installation and support services for Wonderware InTouch HMI, Wonderware Active Factory, Wonderware Historian, installation and maintenance of Marathon Endurance VT virtual Redundant Server Systems, SNMP Network Management implementation and integration into Plant HMI and network design, configuration and troubleshooting. Additionally, Astrid is proficient in standard configuration of Schneider Electric Network Infrastructure Devices (Fiber Optic Repeaters, Switches), interface programming for Profibus DP and design and integration of Process Control Application interfacing with Variable Frequency Drives (VFDs).

EXPERIENCE

Pyrite Canyon Treatment Facility, State of California, Department of Toxic Substances Control, Glen Avon, CA – I&C Engineer – Reviewed Instrumentation & Control and Electrical Submittals from vendor supplied packaged systems such as filter presses, bag presses, air compressors, booster pumps, inclined plate clarifiers, flocculating clarifiers and others. Reviewed control panel design submittals and electrical drawings. Responsible for keeping project documents such as piping and instrumentation diagrams (P&ID), PLC input/output lists, Master Equipment Lists as well as conduit and cable schedules up to date.

Alamitos Barrier Telemetry System Upgrade, County of Los Angeles Department of Public Works, Los Angeles, CA – I&C Engineer – Specified the project’s Siemens S7-1200 control system and network equipment. Designed the project’s control and instrumentation panels including panel load calculations and design of the photovoltaic power supply for the control panels. Prepared project documents such as conduit schedules, project drawings and project specifications.

Union Mine Digester 1 and 2 Level Monitoring, El Dorado County Environmental Management Department, El Dorado, CA – I&C Engineer – Designed the control for the new digester 1 and 2 level monitoring including instrumentation specifications and communication panel design. Prepared project documents such as conduit schedules, project drawings and project specifications.

SCADA System Project, West Basin Municipal Water District, Carson, CA – I&C Engineer – Specified the project’s network equipment and technology (4G cellular) as well as the SCADA application software (SCADA Expert ClearSCADA) for the new SCADA network.

Education:
Professional Engineer in Control System Engineering (PE), California
Bachelor of Science Electrical Engineering
University of Nuremberg, Germany
Vocational College for Electrical Engineering and Data Systems Technology Erlangen, Germany

Registration/Certification:
Registered Professional Engineer in Control Systems, California No. CS 7440

Office:
Irvine, CA

Years of Experience:
26

Years with Tetra Tech:
Two

Key Areas of Experience:
Process control design, implementation, start-up and maintenance services
Project management, process control review and consultant services
Project Lead Engineer
Programming, installation and support services
Mr. Ramirez has over 30 years of structural engineering design experience with special emphasis in the design of water storage/water containment and water conveyance related structures. This includes reservoirs, water/wastewater treatment plants, booster pump stations, flow control facilities, pressure reducing stations and pipelines. His experience also includes the design of a wide variety of other types of structures, including buildings, bridges and storm drainage related structures. He is thoroughly knowledgeable in all types of construction, including reinforced concrete, masonry, structural steel, and timber.

EXPERIENCE

Mid-Basin Injection: Centennial Park Design Services, Orange County Water District, Santa Ana, CA – Structural Project Manager responsible for the design of four injection wells to be located within Centennial Park in the City of Santa Ana for Orange County Water District. In addition to the engineering services for the four injection wells, the project includes the design of the supply pipeline, backflush pipeline, bridge crossing, two shared facility sites, a monitoring well site, site improvements, and paving of park access roads and parking lots.

Design-Build of Wells 21 and 22 Desalter, Irvine Water District, Irvine, CA – Structural Project Engineer for a project that is the third membrane water treatment plant completed by the design/build team of Tetra Tech and Pascal & Ludwig. The main treatment facility is housed in a 10,000 square foot tilt-up concrete building which also contains pump, control, HVAC and electrical rooms. A corner of the building is constructed on a 12 foot deep, 100,000 gallon, buried, cast-in-place concrete water storage structure. Special consideration was given in the analysis and detailing of the tilt-up building and buried concrete structure so that all design forces are properly resisted and the potential differential settlement between the shallow building foundations and the deep water storage structure is mitigated. Various concrete and steel structures for pre- and post-treatment areas are also located on the site. These areas are hidden from public view by 27 foot tall freestanding tilt-up concrete screen walls and by the main treatment building itself.

Burris Pump Station, Orange County Water District (OCWD), Anaheim, CA – Structural Engineer for the replacement of an existing pumping facility at the Burris Pump Station location. Mr. Ramirez was involved in the comprehensive design of the 0.8 MG buried circular wet well. The new facility will allow OCWD to transfer up to 200 cubic feet per second from the Santa Ana River, which will be and utilized for groundwater recharge to the Santiago Basins.

Wells No. 40 and 44, City of Ontario, CA – Project consisted of two new domestic water wells approximately 1,200 feet deep. Well capacities are 2,000 to 3,000 gpm. Included masonry block enclosure with open roof courtyard. Also included disinfection and construction administration.
Mr. Yuen has over eight years of experience in the design, analysis and detailing in structural engineering. He is knowledgeable in reinforced concrete, masonry, structural steel and wood frame design, and construction for a variety of building and infrastructure projects including reservoirs, water/wastewater treatment facilities, as well as seismic retrofit of existing structures.

EXPERIENCE

**Burris Pump Station, Orange County Water District (OCWD), Anaheim, CA** – Design Engineer for the replacement of an existing pumping facility at the Burris Pump Station location. Mr. Yuen was involved in the comprehensive design of the 0.8 MG buried circular wet well. The new facility will allow OCWD to transfer up to 200 cubic feet per second from the Santa Ana River, which will be and utilized for groundwater recharge to the Santiago Basins.

**Plant 224 Pump Station, Suburban Water System, Whittier, CA** – Mr. Yuen served as the Structural Design Engineer for the design of a 2,700 square foot single story concrete block pump station building on continuous concrete footings in the City of Whittier. The pump station serves two new concrete reservoirs with a capacity of 2.4 MG and 4.7 MG, and will pump potable water to Suburban Water Systems customers. The masonry building was designed with high parapet walls to satisfy several design criteria which include the city’s building architectural guidelines, shielding the roof mounted HVAC equipment from view, and reducing noise from the roof mounted equipment. The building was designed with specially reinforced shear walls based on seismic design category D. The building uses a flexible roof diaphragm comprised of 1 ½-inch deep metal deck supported on wide flange roof joists that span approximately 34 feet. The masonry building was designed for gravity loads due to roof dead and live loads, as well as lateral loading from a seismic event.

**Milliken Pump Station, Chino Basin Desalter Authority, Ontario, CA** – Structural Design Engineer for the design of a building for a booster pump station with separate pump and electrical rooms. The building has concrete block walls and a steel framed roof structure. Consideration was given to the appearance of the building so that it will complement the existing well building and 29 MG prestressed concrete tanks which share the site with the Milliken Pump Station.

**Equipping of Wells I-16, I-17, and I-18, Chino Basin Desalter Authority, Chino, CA** – Tetra Tech is providing design and construction engineering services for the equipping of three new wells at three separate sites. The scope of the structural design includes foundations for prefabricated electrical enclosures, surge tank, well pedestals, pipe racks and supports. Services include conceptual design, permitting assistance, final design, bid assistance, and construction assistance.
Ms. Johnson has over 21 years of experience in California Environmental Quality Act/National Environmental Policy Act (CEQA/NEPA) document preparation, including large, complicated, controversial environmental compliance documents; general plan/long-range planning documents; and Phase I Environmental Site Assessments (ESAs). Since joining Tetra Tech, Ms. Johnson has worked on the Santa Ana River Interceptor (SARI) Line project within Orange County, and environmental documents for renewable energy projects.

**EXPERIENCE**

Santa Ana River Interceptor (SARI) Line Protection/ Relocation Project Draft Supplemental Environmental Assessment (SEA) and Addendum to Environmental Impact Report (EIR) IP 03-226, County of Orange – Project Manager for the SARI Line Protection/Relocation Project Final SEA/EIR Addendum. The SARI Line Project will relocate the Orange County portion of the pipeline between Prado Dam and Weir Canyon Road to allow operation of the Santa Ana River Mainstem Project, specifically for releases from Prado Dam of up to 30,000 cubic feet per second. The US Army Corps of Engineers is the lead NEPA agency. The Orange County Flood Control District is the Lead CEQA agency. The Final SEA/EIR Addendum assesses the environmental impacts of detailed project design refinements and modifications of the approved SARI Line Orange County Alternative OC 3B – Relocate to South Shallow Alternative. The major project elements include installation of the new SARI Line; installation of the Yorba Linda Spur sewer line; temporary use of staging and laydown areas; construction of a new metering station and odor control facility; and establishment of a temporary bikeway detour to accommodate cyclists during project construction. All CEQA/NEPA environmental issues are addressed, with the primary issues being biological resources, noise and traffic. Updated vegetation mapping and habitat classification was performed for the project site as part of this 2010 work effort. A jurisdictional delineation was prepared to assess potential impacts to jurisdictional areas. Authorizations have been obtained from the U.S. Army Corps of Engineers, Santa Ana Regional Water Quality Control Board, and California Department of Fish and Game because the project will impact limited areas subject to State and federal jurisdiction.

Alternate Raw Water Transmission Line Environmental Documentation and Permitting, Trabuco Canyon Water District, Orange County, CA – Project Manager/Environmental Compliance Technical Lead and principal author of the Initial Study/Proposed Mitigated Negative Declaration (IS/MND) for an alternate raw water transmission line in South Orange County for a local water district. An Initial Study/Proposed Mitigated Negative Declaration (IS/MND) is being prepared, supported by technical studies addressing biological and cultural resources, air quality and greenhouse gas emissions, and noise.

**Education:**

MBA with Corporate Environmental Management Emphasis, Graduate School of Management, UC Irvine; Bren School of Environmental Science and Management, UC Santa Barbara

BA, Environmental Studies, UC Santa Barbara

**Registrations/Certifications:**

Registered Environmental Assessor I (REA I), CalEPA/DTSC

Certificate in Urban Planning, UC Extension, Irvine

Certificate in Environmental Auditing, UC Extension, Riverside

**Office:**

Irvine, California

**Years of Experience:**

21
COMPANY INTRODUCTION

Mr. Richard C. Slade has over 50 years of hydrogeologic experience in California, the last 33 of which have been as Principal Hydrogeologist and owner of Richard C. Slade & Associates LLC (RCS), Consulting Groundwater Geologists. Mr. Slade maintains licenses as a Registered Geologist and Certified Engineering Geologist in California. The RCS firm has seven full-time professional groundwater geologists including:

- Two senior project-level hydrogeologists, Mr. Earl LaPensee and Mr. Anthony Hicke. Both are Professional Geologists and Certified Hydrogeologists in California. Mr. LaPensee has been with RCS since 1989, whereas Mr. Anthony Hicke has been with RCS since 2001.

- Four staff/field-level geologists (Messrs. Luis Busso, Chris Wick, Joe Amar, and Sean Bowen) to provide as-needed field and office support services on groundwater projects. All three are degreed geologists; Mr. Busso and Mr. Wick have been with RCS for approximately 7 and 10 years, respectively, while Mr. Amar and Mr. Bowen started with the firm in 2013 and 2016, respectively. Mr. Busso, Mr. Wick, Mr. Amar, and Mr. Bowen are all California Professional Geologists.

Specific areas of expertise for RCS include:
- groundwater resource development via siting, specifying, designing and testing of new water wells for both municipal-supply and agricultural-supply;
- conducting analysis and correlations of the resistivity signatures on geophysical electric logs available from water wells, oil wells, and groundwater monitoring wells;
- providing independent, detailed E-log correlation networks and cross sections based on key marker beds;
- preparing Technical Specifications and detailed line item bid sheets for the preliminary design and cost analysis of new wells and monitoring wells;
- providing detailed geologic logs of drill cuttings generated during pilot hole drilling for new water wells and groundwater monitoring wells;
- providing experienced geologists to field monitor the drilling, final design, construction and testing of new water wells and groundwater monitoring wells;
- providing evaluations, cost estimates, Technical Specifications and field monitoring services for the rehabilitation and destruction of existing wells;
- groundwater basin evaluations and basin management and water well feasibility studies;
- conducting pumping tests and providing technical analyses of pumping test data
- evaluating groundwater contamination;
- assessing groundwater quality;
- rehabilitation of older wells;

Typical clients include city water departments, county water agencies, water districts, engineering firms, environmental attorneys, and numerous wineries and vineyards. In the Orange County region, RCS over the years has sited, designed and assisted in the construction of 21 wells for the cities of Anaheim (10), Fullerton (3), Garden Grove (1), Golden State Water Company (2), Irvine Ranch Water District (2) and for Orange County Water District (3 in Fullerton).
Leighton Consulting, Inc. (Leighton) has been in business for 52 years, providing materials testing and inspection, geotechnical engineering and environmental assessment services to public agencies. We have an established, strong local presence, and offer particular expertise in infrastructure projects. Our local experience includes geotechnical design of numerous pipelines and transmission lines, pump stations, reservoirs, and other water utility and wastewater facilities.

As regionally established geotechnical consultants, Leighton has extensive experience in a broad range of water facility projects, providing a full range of services, including geotechnical design investigations and hazardous materials assessment. Supporting the professional consulting services, we have in-house geotechnical and materials testing laboratories in three of our offices. Laboratory personnel are certified by several pertinent agencies including Caltrans and AASHTO. Deputy Inspectors are certified by Caltrans, ICC, City of LA, and other local jurisdictions.

Our water resource experience for local water districts and regional authorities includes the geotechnical design of numerous reservoirs, pump stations, transmission lines and other water utility and wastewater facilities; groundwater resource analysis and geotechnical studies for EIR documentation.

Leighton has successfully completed projects for the following water districts and public agencies:

<table>
<thead>
<tr>
<th>Moulton Niguel Water District</th>
<th>Central Basin Municipal Water District</th>
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<tr>
<td>Golden State Water Company</td>
<td>Southern California Water Company</td>
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<tr>
<td>L.A. Co. Department of Public Works</td>
<td>Las Virgenes Municipal Water District</td>
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<td>L.A. County Flood Control District</td>
<td>L.A. Department of Water and Power</td>
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<td>Santa Fe Springs Water District</td>
<td>Municipal Water District of Orange County</td>
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<td>Orange County Water District</td>
<td>Orange County Sanitation District</td>
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<td>City of Irvine</td>
<td>City of Monterey Park</td>
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<td>Irvine Ranch Water District</td>
<td>Orange County Flood Control District</td>
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<td>City of Laguna Beach Water District</td>
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<td>West Basin Municipal Water District</td>
<td>South Coast Water District</td>
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<td>City of Newport Beach</td>
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<td>Trabuco Canyon Water District</td>
<td>Tri-Cities Municipal Water District</td>
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<td>City of Huntington Beach</td>
<td>El Toro Water District</td>
</tr>
</tbody>
</table>

**PRIMARY CONTACT – LEIGHTON CONSULTING, INC.**

Djan Chandra  
17781 Cowan; Irvine, CA 92614  
P | 949-681-4267    F | 949-250-1114  
dchandra@leightongroup.com
Coast Surveying, Inc., a California Corporation, was founded in 1981. Coast specializes in surveying, mapping, aerial photogrammetry and Right-of-Way mapping. Approximately 98% of our work is performed for public agencies, including: Caltrans - Districts 5, 6, 7, 8, 9, 11 and 12; METRO; NAVFAC; OCTA; RCTC; SCRRRA; SCAG; TCA; MWD; U.S. Army Corp of Engineers; U.S. Navy; WBMWD; numerous cities; water districts; and the Counties of Orange and Los Angeles. Coast has built a solid reputation by consistently performing quality services, responding immediately to client requests and delivering projects on schedule and within budget. The satisfaction of our clients is evidenced by the fact that 85% of our work is from previous clients. Coast Surveying, Inc. is a Certified DBE/SBE/MBE firm. Coast Surveying, Inc. is a financially stable company with 12 employees of which 4 are highly qualified licensed surveyors.

CONTACT PERSON
Ruel del Castillo, PLS 4212 - Survey Manager

MOULTON NIGUEL WATER DISTRICT
EXPERIENCE AS A CONSULTANT

2013 – Gallup Circle Sewer Conflicts near La Paz Road – Locate and dip sewer manholes, Locate and dip storm drain manholes, and locate and dip catch basins.
2011 – Bear Brand Legal Description at Old Ranch Road at Point Catalina – Design surveys and prepare legal description.
2011 – North Aliso Lift Station at s'ly corner of Los Alisos & Jeronimo - Design surveys and prepare legal description.
2011 – Mathis Nellie Gail Reservoir Site at Nellie Gail Road & Gallup Circle – Recover record property corner monuments and mark property lines.
2011- La Paz Road Topo west of I-5 SB off ramp – Topographic survey at hotel entrance.
2011 – Charles Road Design Surveys in Laguna Niguel – Cross-sections and topographic surveys of roadway near school.
2011 – La Paz Reservoir in Mission Viejo – Prepare legal descriptions.
2011- Rancho Reservoir in Laguna Niguel – Boundary survey.
2008 – Mission Viejo Country Club site off of Oso Parkway – Aerial photo control and aerial photogrammetric mapping.

EXPERIENCE AS A SUBCONSULTANT

2012 – Bridlewood Pressure Reducing Station – Design surveys and legal descriptions.
2011 – Lower Salada Lift Station on Crown Valley Parkway just s/o Camino Avion – Settlement monitoring.
2011 – New La Paz Road Pipeline from Muirlands to Paseo de Valencia – Construction staking and Corner Records.
2008 – Eastern Transmission Main at Oso Parkway - Construction staking.
2003 – Kite Hill Water Loop System - Construction staking.
2003 – Aliso Creek Sewer Lift Station Upgrades - Construction staking.
2002 – 920 Zone Upgrades - Construction staking.
2001 - Niguel Road - Construction staking.
2001 – Big Niguel Flow Control at facility parking lot - Construction staking.
2000 – Moulton Park Recycled Water Reservoir - Construction staking.
APPENDIX B
Professional Services Agreement Acceptance Form
Appendix B: Professional Services Agreement Acceptance Form

Firm Name: TETRA TECH, INC.

Address: 17885 Von Karman Avenue, Suite 500

City Irvine State CA Zip Code 92614

Telephone: (949) 809-5000 Fax: (949) 809-5010

I have reviewed the RFP and Professional Services Agreement in their entirety. Our firm will execute the Professional Services Agreement with no exceptions.

Name of Authorized Representative: Tom Epperson

Signature of Authorized Representative: [Signature]

Date: June 20, 2017
2016-17
INSURANCE COVERAGE

Broker: AON Risk Insurance Services West, Inc.
707 Wilshire Blvd., Suite 2600
Los Angeles, CA 90017
(866) 283-7122; Fax (847) 953-5390

Ann Whisenhunt, Account Manager
(213) 630-3270; Fax (847) 953-0574
ann.whisenhunt@aon.com

Ordering Certificates: acs.chicago@aon.com;
cc Janice.young@aon.com
or fax 1-800-363-0105

Coverage: See below

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<th>Coverage</th>
<th>Company</th>
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<th>Policy Dates</th>
<th>Limits</th>
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*Two year policy term

Open Claims: Contact broker
MEMORANDUM

TO: Engineering and Operations Committee
FROM: Phil Lauri, P.E., Assistant General Manager
DATE: July 18, 2017
SUBJECT: Pipeline Integrity Testing Program Consulting Services

RECOMMENDATION

Recommend that the Board of Directors approve a contract with HDR, Inc. for $50,000 per year for five years with two one-year renewal options for a not-to-exceed amount of $350,000 to provide consulting services for the Pipeline Integrity Testing Program, and authorize execution of the contract.

STRATEGIC PLAN

Goal #2: Practice perpetual infrastructure renewal and improvement.

PRIOR BOARD ACTION/DISCUSSION

At its March 15, 2014 workshop, the Board of Directors (Board) adopted Resolution No. 1442 Replacement of Assets superseding Resolution No. 1268 to better define the concept of pipeline useful life introduced in Resolution No. 1268.

At its March 17, 2015 meeting, the Engineering & Operations (E&O) Committee approved a contract with RBF Consulting, a Michael Baker International Company, to provide consulting services for the Pipeline Integrity Testing Program.

At its January 19, 2016 meeting, the E&O Committee received an update on the progress of the Pipeline Integrity Testing Program.

At its February 11, 2016 meeting, the Board approved contracts with Paulus Engineering, Inc. to remove pipeline segments for testing and to MEI-Charlton Lab for destructive testing.

At its September 8, 2016 meeting, the Board approved a contract change order to MEI-Charlton Lab for additional sample preparation and evaluation of additional pipeline samples.

At its November 8, 2016 workshop, the Board received a presentation on the results of the first year of destructive testing.

At its June 20, 2017 meeting, the E&O Committee received an information item regarding the Request for Qualifications for consulting services for the Pipeline Integrity Testing Program.

BACKGROUND

Resolution No. 1442 Replacement of Assets

Mesa Water District (Mesa Water®) has implemented Resolution No. 1442 Replacement of Assets, adopted by the Board on March 15, 2014.
Objectives

Resolution No. 1442 was established to optimize Mesa Water’s assets’ useful life using accepted industry test methods. This approach allows full recognition of an asset’s useful life, reduces costs to rate payers, and ensures timely replacement to maintain reliability to Mesa Water’s customers.

Resolution No. 1442 uses three metrics to assess the remaining useful life: known pipeline failure rate, non-destructive testing results, and destructive testing results. Resolution No. 1442 first considers the known failure rate of the pipelines. Failure rates exceeding 0.1 breaks per mile per year are considered to have reached the end of their useful life. Otherwise, pipelines are subject to a two-step testing method:

- Nondestructive testing (NDT) of 1% of the system (~3 miles each year) to measure the pipeline wall thickness; and
- Destructive testing methodologies of pipe segments shown by nondestructive testing to have less than 70% of wall thickness remaining compared to a new pipe.

Resolution No.1442 prioritizes pipelines for testing as follows:

- Pipelines with a known history of failure
- Pipelines within 10 years of age-based useful life based on industry standards
- Pipelines within soil known to be corrosive
- Pipelines with the largest diameter

Distribution System Statistics

Mesa Water’s distribution system includes approximately 317 miles of pipelines ranging from 4” to 42” in diameter. Nearly 90% of the distribution system was installed between 1950-1990. Approximately 235 miles (74%) of the pipelines are Asbestos Cement Pipe (ACP), with the remaining 26% comprised of Polyvinyl Chloride (PVC) (37 miles), Cement Mortar Lined and Coated (CML&C) Steel (25 miles), Concrete Cylinder Pipe (CCP) (16 miles), Cast Iron Pipe (CIP) (2.3 miles), and Ductile Iron Pipe (DIP) (1.7 miles).

Age-Based Useful Life

The average age-based expected useful life of each pipeline material was assessed from AWWA, WEF and WRF publications as part of the 2014 Water System Master Plan Update and is shown in Table 1. Resolution No. 1442 calls for non-destructive testing to begin when a pipe segment is within 10 years of its average age-based useful life.
Table 1. Age-Based Useful Life and Testing Age by Pipeline Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Age-Based Useful Life</th>
<th>Age to Start Testing</th>
<th>Installation Year to Start Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP</td>
<td>75</td>
<td>65</td>
<td>1951</td>
</tr>
<tr>
<td>CIP</td>
<td>65</td>
<td>55</td>
<td>1961</td>
</tr>
<tr>
<td>CML&amp;C</td>
<td>80</td>
<td>70</td>
<td>1946</td>
</tr>
<tr>
<td>CCP</td>
<td>80</td>
<td>70</td>
<td>1946</td>
</tr>
<tr>
<td>DIP</td>
<td>82.5</td>
<td>72.5</td>
<td>1943</td>
</tr>
<tr>
<td>PVC</td>
<td>85</td>
<td>75</td>
<td>NA</td>
</tr>
</tbody>
</table>

DISCUSSION

The Pipeline Integrity Testing Program was established to implement Resolution No. 1442. In the first three years of the Pipeline Integrity Testing Program, Mesa Water and its consultants have accomplished the following:

- Assessment of pipeline materials and installation dates based on information in GIS;
- Evaluation of age-based useful life by pipeline material;
- Non-destructive testing of approximately 7 miles of ACP using Echologics e-Pulse;
- Non-destructive testing prioritization of ACP segments based on age, break history, water quality, diameter, and traffic loading;
- Non-destructive testing of approximately 1 mile of CIP using Echologics epulse;
- Evaluation of non-destructive testing methods for CML&C and CCP pipelines;
- Template plans and specifications for removing pipe segments for destructive testing;
- Destructive testing plan for ACP;
- Evaluation of testing labs for ACP;
- Method for estimating remaining useful life of ACP pipelines;
- Collection and destructive testing of 18 ACP samples;
- Collection and destructive testing of 2 CML&C samples; and
- Collection and destructive testing of 3 CIP samples.

ACP and CIP samples are currently at laboratories undergoing destructive testing; results are expected in July 2017.

DISCUSSION

Staff released a Request for Qualifications (RFQ) to select a highly qualified consultant to assist Mesa Water with the Pipeline Integrity Testing Program for the next five years. The role of the Consultant is envisioned to provide technical support to Mesa Water’s Program Manager in the following key areas:
- Evaluation of non-destructive and destructive test data, including correlation of non-destructive and destructive results;
- Estimation of remaining useful life using the methods described in WRF Report #4093, Long Term Performance of Asbestos Cement Pipe, and WRF Tailored Collaboration, Development of An Effective Management Strategy for Asbestos Cement Pipe;
- Evaluation of break history to classify failure modes;
- Training for Mesa Water Operations and Engineering staff to document and classify pipe failure modes;
- Determination of method for estimating the remaining useful life of ferrous material pipes;
- Evaluation of non-destructive, in-situ ferrous pipeline testing methods;
- Identification of additional destructive testing labs for asbestos cement and ferrous material pipelines;
- Statistical application and financial analysis of future replacement valuation of non-destructive and destructive pipe testing results to Mesa Water’s global distribution system;
- Recommendations for improvements to cathodic protection equipment and maintenance program; and
- Development of the program annual report and annual presentation to Mesa Water’s Board of Directors.

The RFQ was sent to Black & Veatch, Inc., Brown and Caldwell, Carollo Engineers, Inc., Civil Source, Inc., HDR, Inc. (HDR), JDH Corrosion, Inc. (JDH), Michael Baker International, Inc., Rajani Consulants (Rajani), and V&A Engineers, Inc. (V&A). Statements of Qualifications (SOQs) were received from HDR, JDH, Rajani, and V&A. Each of the firms that submitted an SOQ is an industry leader in one or more technical areas of Mesa Water’s Pipeline Integrity Testing Program. The SOQs were reviewed and evaluated by a selection committee comprised of Mesa Water staff and staff from City of Huntington Beach Water Department. Each SOQ was scored based on the firm’s qualifications and approach to achieving the program’s goals. The following table summarizes the selection process evaluation scores:

<table>
<thead>
<tr>
<th>Final Ranking</th>
<th>Proposer</th>
<th>Score</th>
<th>Hourly Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HDR</td>
<td>4.96</td>
<td>$70-$375</td>
</tr>
<tr>
<td>2</td>
<td>JDH</td>
<td>3.93</td>
<td>$75-$220</td>
</tr>
<tr>
<td>3</td>
<td>Rajani</td>
<td>3.10</td>
<td>$160-$180</td>
</tr>
<tr>
<td>4</td>
<td>V&amp;A</td>
<td>2.90</td>
<td>$86-$297</td>
</tr>
</tbody>
</table>

The selection committee found that HDR had the most thorough approach and team experience to deliver the program goals. HDR’s SOQ is included as Attachment A. Hardcopies of the other SOQs are available upon request.
While all the proposing firms had qualified staff and good experience, HDR’s qualifications provided the most comprehensive approach, had excellent experience in delivering similar projects, and proposed staff who are leaders in assessment of both ACP and ferrous material potable water pipelines. HDR’s proposed staff has recently authored a WRF report titled Development of an Effective Management Strategy for Asbestos Cement Pipe, which is based on the findings from more than 100 ACP sample destructive tests.

Staff recommends that the Board consider approving a contract with HDR, Inc. for $50,000 per year for five years with two one-year renewal options for a not-to-exceed amount of $350,000 to provide consulting services for the Pipeline Integrity Testing Program, and authorize execution of the contract.

FINANCIAL IMPACT

In Fiscal Year 2018, $310,000 has been budgeted for the Pipeline Integrity Testing Program, including consulting services, nondestructive testing, pipeline sampling, and destructive testing.

<table>
<thead>
<tr>
<th>Project Estimate Amounts</th>
<th>Project Cost Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Project Estimate (FY 2015)</td>
<td>$ 565,000</td>
</tr>
<tr>
<td>Original Contracts (FY 2015, 2016, 2017)</td>
<td>$ 985,937</td>
</tr>
<tr>
<td>Change order #1&amp;2</td>
<td>$ (-336)</td>
</tr>
<tr>
<td>Requested funding (FY 2018-2024)</td>
<td>$ 350,000</td>
</tr>
<tr>
<td>Revised Contracts</td>
<td>$1,335,601</td>
</tr>
<tr>
<td>Actual spent to date</td>
<td>$897,347</td>
</tr>
<tr>
<td>Revised Project Estimate</td>
<td>$ 1,335,601</td>
</tr>
</tbody>
</table>

ATTACHMENTS

Attachment A: HDR Statement of Qualifications for Pipeline Integrity Testing Program Consulting Services
Statement of Qualifications
Pipeline Integrity Testing Program Consulting Services
MESA WATER DISTRICT
Costa Mesa, CA
June 21, 2017
COVER LETTER

June 21, 2017

Karyn Igar, PE
Senior Civil Engineer
MESA WATER DISTRICT
1965 Placentia Avenue
Costa Mesa, CA 92627

RE: Statement of Qualifications – Pipeline Integrity Testing Program Consulting Services

Dear Ms. Igar,

HDR appreciates the opportunity to submit our qualifications for Pipeline Integrity Testing Program Consulting Services. The District’s proactive approach to its infrastructure is commendable. Too many utilities wait until widespread problems occur before taking action. By selecting HDR, the District can focus its resources where they can be most effective.

The District’s 320 miles of distribution mains are predominantly asbestos cement (AC). HDR can confidently state that no consultant better understands what causes AC pipe to fail. The HDR team proposed for your program wrote the Water Research Foundation Report 4480, “Development of an Effective Management Strategy for Asbestos Cement Pipe”, a study that built upon the findings of Report 4093, cited in the RFQ. Through our work on this and other projects, we know which condition assessment methods work best, and the significance of their results.

Additionally, HDR includes legacy company, Schiff Associates, a premier, California-based corrosion engineering firm. Dr. Graham Bell of Schiff co-wrote WRF Report 2608, “External Corrosion and Corrosion Control of Buried Water Mains”, a seminal study for the industry. Dr. Bell’s staff of corrosion engineers and technicians have expertise to effectively assess and evaluate mains made from steel, cast-iron, ductile iron and other metals, protected by various coatings, linings, and cathodic-protection systems.

More importantly, HDR provides practical, real-world solutions for utilities such as Mesa, in determining how best to plan strategic infrastructure investments. We recently helped the City of Buena Park (85% AC pipe) determine appropriate priorities and budget. Useful-life expert, Dave Spencer has performed similar assessments throughout California and the U.S., including East Bay Municipal Water District, Honolulu, Padre Dam, Eugene (Oregon), Lincoln (Nebraska), and many others. He will be supported by Dan Ellison, the founding Chair of AWWA’s Water Main Condition Assessment Committee. Through Dan’s development of the soon-to-be-published, M77 Manual, he is thoroughly abreast all the inspection methods and technologies, their capabilities and their limitations.

HDR’s leverages these capabilities with the District’s data and own knowledge. We will start with an in-depth analysis of break data and other records. From this analysis, and in-conjunction with District staff, priorities for testing and evaluation will be developed. The goal is not a report, but a system of pipeline management that the District will ultimately own, which provides a methodology for today’s and tomorrow’s decisions.

Replacing pipe is not the right answer, if the pipe is in good condition. Testing pipe, for the sake of testing, is also not the right answer. HDR’s approach is to evaluate performance, test the right mains, and establish realistic life expectancies based on how your pipes are performing in their environment. HDR will demonstrate to the District how to best balance future investments and repairs, so costs remain reasonable, and service stays reliable.
The following information is in accordance with the RFQ:

<table>
<thead>
<tr>
<th>Name of Business / Company:</th>
<th>HDR Engineering, Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business / Company Address:</strong></td>
<td>3230 El Camino Real, Suite 200</td>
</tr>
<tr>
<td><strong>Telephone Number(s):</strong></td>
<td>714.730.2300</td>
</tr>
<tr>
<td><strong>Email Address:</strong></td>
<td><a href="mailto:david.spencer@hdrinc.com">david.spencer@hdrinc.com</a></td>
</tr>
<tr>
<td><strong>Website Address:</strong></td>
<td><a href="http://www.hdrinc.com">www.hdrinc.com</a></td>
</tr>
<tr>
<td><strong>Federal Tax ID:</strong></td>
<td>47-0680568</td>
</tr>
<tr>
<td><strong>Type of Business:</strong></td>
<td>S Corporation</td>
</tr>
<tr>
<td><strong>Number of Years in Business:</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name, Title, Telephone Number, and Address of Person(s) Authorized to Represent Business Entity:</th>
<th>Kip Field, Vice President/Area Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong></td>
<td>Kip Field</td>
</tr>
<tr>
<td><strong>Title:</strong></td>
<td>Vice President/Area Manager</td>
</tr>
<tr>
<td><strong>Telephone Number:</strong></td>
<td>714.730.2300</td>
</tr>
<tr>
<td><strong>Address:</strong></td>
<td>3230 El Camino Real, #200</td>
</tr>
<tr>
<td><strong>City:</strong></td>
<td>Irvine</td>
</tr>
<tr>
<td><strong>State:</strong></td>
<td>CA</td>
</tr>
<tr>
<td><strong>Zip Code:</strong></td>
<td>92602</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name, Title, Telephone Number, and Address of Person(s) Authorized to Sign Contracts for the Business Entity:</th>
<th>Kip Field, Vice President/Area Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong></td>
<td>Kip Field</td>
</tr>
<tr>
<td><strong>Title:</strong></td>
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<td><strong>Zip Code:</strong></td>
<td>92602</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Certificate of Insurance:</th>
<th>Please see Appendix for Insurance Certificate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Professional Services Agreement Form – Appendix B:</th>
<th>Please see Appendix for PSA Form</th>
</tr>
</thead>
</table>

We appreciate the opportunity to provide this Statement of Qualifications. We look forward to working with you and the District. Should you have any questions, please feel free to contact David Spencer at 858.712.8308 or via email at david.spencer@hdrinc.com.

Sincerely,

HDR ENGINEERING, INC.

David Spencer, PE
Project Manager
858.712.8308

Aaron Meilleur, PE
Water Business Group Area Manager
714.730.2329
FIRM QUALIFICATIONS

The purpose of the Pipeline Integrity Testing Program is to maximize the useful life of Mesa Water’s existing pipeline infrastructure. While Mesa Water currently has a very low rate of breaks, several miles of pipeline are approaching 70 years of service. The Pipeline Integrity Testing Program seeks to estimate the remaining useful life of Mesa Water’s pipelines based on measured pipeline properties, rather than using an age-based approach.

"HDR is one of the Oldest and Most Experienced Pipeline Integrity Assessment Firms in the United States."

We have over 58 years of experience providing corrosion engineering consulting services to clients in California and across the United States. Acquired by HDR Engineering, Inc. (HDR) in 2011, M. J. Schiff & Associates, Inc., (dba Schiff Associates) is now part of an employee owned full service architecture-engineering (A/E) firm

Following are descriptions of the methods used by HDR to assess pipeline integrity and projects where these methods have been used successfully:

Evaluation of AC Water Mains

AC pipe constitutes 75 percent of water main footage in Mesa Water District, so its performance is a major determinant of the magnitude of any pipe replacement program. Like cast iron pipe, AC pipe is quite brittle; it tends to fracture, often producing catastrophic results. It performs poorly in areas where ground movement occurs and its seismic performance is particularly poor. However, in most comparisons to cast iron pipe, it fairs considerably better.

Many utilities have concerns about the performance of AC pipe, but most data indicate that the material performs significantly better than cast iron, its contemporary competitor. At equivalent ages in most systems, the break rates for AC pipe are usually 50 percent or less than those for CI pipe. There is no basis for the common notion that the life expectancy of AC pipe is only about 50 to 75 years.

Early types of AC pipe (referred to as Type I) contained approximately 20 percent asbestos fibers and 80 percent Portland cement. By the mid-1930s, autoclave curing was introduced in the U.S., a process involving high-pressure steam. The new autoclaved pipes (referred to as Type II) enabled faster production and several important product improvements. Type II pipe was a superior product in essentially all respects. It was much more resistant to calcium leaching and other corrosive processes.

Because most AC pipe in the Mesa system was installed after 1950, it is likely to be Type II pipe. Also, water in Mesa comes from either local ground water or is imported by Metropolitan Water District (MWD) from the Sacramento or Colorado Rivers, and is not considered to be aggressive toward AC pipe.

The depth of calcium loss is very commonly measured by the phenolphthalein stain test, which shows where a change in pH has occurred. The pH change reflects a loss of free lime (Ca(OH)₂) from the concrete matrix. Free lime is both highly soluble and very reactive (pH > 12.5); where it is present, concrete products are generally assumed to be undegraded; where it is absent, some amount of degradation has occurred. Where the pH is above 8.2, phenolphthalein is pink. At a pH of 9.3 or higher, the staining can be very vivid. Where no change in color occurs, free lime is essentially absent. More recently, pipe degradation has been measured non-destructively using the acoustic-velocity testing method, as offered by Echologics. This is perhaps a more reliable test method, because it more directly measures pipe strength.

In WRF Project 4480, HDR showed the poor correlations between all methods of assessment and pipe breaks. This is partly due to inherent flaws in the testing methods and also the fact that strain (not degradation) breaks most AC pipes. Figure 1 shows a case where the stain loss1 and the loss of calcium do not correspond. Significant stain loss is seen on the pipe exterior, but negligible (if any) calcium loss is seen on the exterior. On the inside of the pipe, the other hand, calcium loss is very pronounced, corresponds with stain loss, and also corresponds with an uptake of magnesium (which is just above calcium on the periodic table). Many similar examples of this phenomenon were found in samples AC pipe tested for WRF.

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1 For convenience the term “stain loss” will be used in this report to connote the portion of the pipe wall that does not turn pink in phenolphthalein stain testing. Stain loss is thus associated with a reduction in pH.
Project 4480 using both phenolphthalein and SEM/EDS and it is also seen in tests of pipe from other studies. Stain loss without calcium loss occurs due to carbonation, which is not necessarily deleterious to the pipe.

The 

Figure 1. Comparison of phenolphthalein tests and SEM/EDS results.

The Relationships between AC Pipe Aging, Pipe Strength, and Breaks

The relationship between free-lime depletion (as determined by stain tests) and loss of strength has been found to be generally quite weak. The limitations of the stain test, no doubt, contributes to this weakness, but so do other factors, including the considerable variability of undegraded AC material itself. The relationship between loss of strength (as determined by crushing and other mechanical tests) and the likelihood of failure has been found to be almost non-existent. Tests of aged pipe materials taken from break repairs almost always exceed the strength requirements for new pipe. Even when the stain tests shows a pipe to be extremely degraded, crush testing will reveal considerable residual strength. This is because of stain tests limitations (as discussed earlier), but also because new pipe was often much stronger than minimum requirements. The original safety factors of some pipes have tested as high as 10, far exceeding the minimum of 4.

Figure 2 compares the crushing strengths and stain losses of samples taken from the Alameda County Water District. While a correlation appears to exist, the coefficients of determination ($R^2$) are relatively low. It is noteworthy that this graph implies that interior degradation has a greater influence on strength than exterior degradation. This is inferred from both the $R^2$ factors and slopes of the lines, and supports the notion presented earlier that free-lime depletion on the interior and exterior may have different significance; a decrease in pH does not necessarily mean a loss of cementitious calcium.
In the Alameda County Water District System, the relationship between strength and free-lime depletion is as expected—as depletion occurs, strength declines—but the statistical correlation is not strong. Also, depletion of interior lime had a much greater impact on strength than exterior lime.

HDR will apply its knowledge of the test methods and their limitations, along with an analysis of other Mesa Water data, to develop accurate and reliable projections of pipe life expectancies for different cohorts of AC pipe.

Metallic Pipe Evaluations

**Corrosion Evaluation and Protection Services**

HDR performs a variety of cathodic protection (CP) services including corrosion surveys (CP free, sacrificial, impressed, continuity testing, and close interval surveys), engineering (design, CP modeling with BEASY corrosion modeling software, and plan checks), and construction (installation, material procurement, and material QC). These methods are used to determine where soils are most corrosive and also where corrosion is actively occurring. The best corrosion control measures are those which can be buried and forgotten with the structure. Cathodic protection is the last resort. If CP is necessary, we work to reduce current requirement, minimize economic impact, and simplify CP installation.

**Corrosion Test Station Monitoring**

From designing new facilities to conducting annual surveys, HDR performs a variety of corrosion test station-related services. Our test station design incorporates tried-and-true materials and established best practices to provide monitoring facilities with low maintenance requirements and increased ease of use. We also perform construction support to ensure the proper material procurement, installation, and testing of the test stations. HDR has extensive experience conducting annual corrosion test station surveys. We utilize state-of-the-art data acquisition software to reduce costs and to integrate survey data directly with existing client GIS databases. Our experienced engineering staff analyzes the data and provides decisive conclusions and recommendations to prevent future failures.

**External Corrosion Direct Assessment**

External Corrosion Direct Assessment (ECDA) improves safety by assessing and reducing the impact of external corrosion on pipeline integrity. It enhances the assessment of external corrosion by identifying and addressing corrosion activity and proactively prevents defects from growing large enough to impact structural integrity. ECDA identifies and addresses where corrosion activity has occurred, is occurring, or may occur. Lastly, it integrates data from multiple field and pipe examinations, physical examinations and operating history. ECDA is a four-step process that includes pre-assessment, indirect examinations, direct examinations and post assessment.
Internal Corrosion Services

Internal Corrosion Assessments

HDR provides internal corrosion assessment services on pipelines and other facilities for asset management, failure analysis, and rehabilitation purposes. Numerous techniques are employed to assess coatings, concrete, and metals. Our experienced condition assessment personnel are knowledgeable in corrosion mechanisms and propagation methods to efficiently diagnose issues and provide recommended rehabilitation.

Corrosion Rate Monitoring Services

Our instrumentation staff perform field evaluations of facilities and environments in order to apply sensors and instrumentation for monitoring corrosion rates both internally (pipelines and vessels) and externally (pipelines with and without cathodic protection applied). They also provide system engineering to integrate monitoring systems with existing data acquisition systems or remote monitoring systems. Data collection and analysis services are also available. HDR can assist you in selecting the best communication system for remote monitoring. Our engineers will provide recommendations for procurement, installation, and system commissioning.

Laboratory Services

Failure Analysis

HDR has over 50 years of experience in determining the cause of a variety of failures due to corrosion of metals or concrete. Our experts use state of the art equipment to image and measure the failures. Our laboratory is equipped to analyze the contributing factors to a failure due to metallurgical microstructure, corrosive elements in soils, concrete, and water; microbiologically influenced corrosion (MIC) and coatings defects. Failure site visits are recommended.

Corrosivity Testing

Our in-house laboratory provides support services including soil corrosivity testing, water testing, and concrete testing. Services include but are not limited to: resistivity per ASTM G187 or CTM 643, pH measurement per ASTM D4972, electrical conductivity measurement per ASTM D1125, analysis of anions by ion chromatography per ASTM D4327, analysis of cations by ion chromatography per ASTM D6919, alkalinity analysis of carbonate and bicarbonate per ASTM D513, sulfide and redox tests per AWWA C105, and thermal resistivity.

Research

HDR performs research projects on new technologies related to corrosion control and monitoring. One of our research projects involves an overview of electrochemical noise (EN) technology for corrosion monitoring. EN technology is based on the measurement of spontaneous fluctuations in current and potential on surfaces due to micro-anodic and micro-cathodic events.

Material Selection/Design

Protective Coatings and Linings Selection

HDR is constantly researching, reviewing, and updating the need for new coatings systems that meet regulations while maintaining the performance that is expected by our clients for successful coating and lining projects. We review, generate, and update coating and lining client/project specifications in order to use the latest technologies for each client’s project requirements.

Unfortunately, coating failures are a reality. Our approach to a coating failure analysis is to gather historical information available in regards to coating applications and review, perform a site visit for the purpose of destructive and non-destructive testing, gather samples and perform forensic analysis, and compile all data into a comprehensive final report of findings with conclusions and recommendations. We provide expert witness services in the event that failures end up in arbitration or litigation.
Material Selection

Many questions must be answered before a structural material can be selected for specific services: Is the alloy available in the size and thickness required? Is it the most economical choice? Should welded or seamless be specified? Is the material suitable for maximum anticipated operating temperature, pressure, and stresses? Is electrical isolation of the material necessary? Most importantly, are different materials compatible with each other in the corrosive environment? At HDR, we ask all necessary questions and make sure all materials are supplied and installed as we designed.

Non-destructive and Destructive Test Methods and Test Data

Aside from our strong team of locally based cathodic protection specialists, corrosion field engineers and technicians, HDR has an outstanding team of engineers with extensive experience in non-destructive and destructive test methods and test data. We recently provided a Criticality Assessment for the City of Buena Park for their asbestos cement (AC) and ductile iron (DI) pipelines and an AC pipe study for the City of Sacramento. HDR has also participated in AC pipe studies for the Water Research Foundation. Descriptions of these projects can be found below.

PROJECT EXPERIENCE

Our experience makes it possible.

The following projects demonstrate innovative solutions that will be applied to your project’s challenges. In these case studies, we employed cost-effective strategies, similar to those required in your scope of work. These projects represent successful partnerships with our clients – reaching performance goals and delivering within the required schedule.


The objective of this research project was to develop an effective strategy for management of utility asbestos cement (AC) pipe assets, which included condition assessment and remaining life prediction, water quality optimization, rehabilitation and replacement, renewal prioritization modeling, and cost analysis. Performed analysis of more than 100 samples of pipe and 20 years of break data for 1,100 miles of East Bay Municipal Utility District (EBMUD) AC pipes.

Client References:
Xavier Irias, EBMUD | 375 11th St., Oakland, CA 94607 | 510.287.8402
Jian Zhang, WRF | 6666 W. Quincy Ave., Denver, CO 80235 | jzhang@waterRF.org

Project Cost: $1,000,000

City of Buena Park | AC and DIP Criticality Assessment, Buena Park, CA (2015-2017)

The City was concerned about the system’s remaining useful service life and was interested in developing a plan for future replacement of their distribution piping. HDR conducted a criticality assessment of the City’s asbestos cement, ductile iron, and steel pipes to prioritize assets requiring immediate attention by means of replacement or repair. Over 40% of the existing pipelines were over 50 years old, with the oldest in service for approximately 65 years. HDR performed the following:

- Analysis of available break data | Comparison to industry norms
- Field corrosion survey | Acoustic velocity testing

Client Reference: Francisco Gutierrez | 6650 Beach Blvd., Buena Park, CA 90622 | 714.562.3687 | fgutierrez@buenapark.com

Project Cost: $217,877
City of Phoenix | Watermain Breakage Reduction Study / Asset Management Plan, Phoenix, AZ (2016)

HDR renewed and analyzed the City’s 25-year break history to help quantify the impact of the City’s prior investment in distribution system replacement and optimize the future investment required to achieve targeted break rates. Geospatial analysis of the City’s prior breaks and readily available operating data quantified the impact on long-term pipe performance of intrinsic properties such as material and age, and extrinsic properties such as soils and operating pressure. The resulting curves allow City staff to better target its future main replacement program on higher risk pipe and avoid wasting money on pipe with a high expected remaining useful life. Failure modeler: Performed the Weibull failure modeling analysis used to determine forecasted break rates by pipe attributes.

Client Reference: Matthew Woodland, MBA, PE | Phoenix AZ | 602.534.6849 | phoenix.gov
Project Cost: $200,000

Johnson County Wastewater | Sewer Assessment, Maintenance, and Rehab/Repair Program: Part 2 – Asset Management Assessment and Implementation Planning, Johnson County, KS (2013-On-going)

JCW owns approximately 2,145 miles of gravity sewer pipes, 188 miles of which are large diameter pipes (defined as 18” in diameter or larger). JCW has previously developed and implemented an inspection and rehabilitation program for small diameter pipe based on a Business Risk Exposure (BRE) Model and wishes to pursue the development of a Business Case for the Large Diameter Program. The project entailed developing a detailed recommended implementation plan for the program; developing yield projections for inspections, assessments, maintenance, and R&R including annual costs for planning purposes; providing methodology for assessing and prioritizing JCW’s large diameter sewers 18” and larger and refining the methodology for assessing and prioritizing small diameter sewers smaller than 18”, updating JCW’s Business Risk Exposure (BRE) Model, and incorporating manhole assessments into the long term plan.

Client Reference: Joe Barnes | 4800 Nall Avenue, Mission, KS 66202 | 913.715.8636 | joseph.barnes@jcw.org
Project Cost: $1,000,000


Under a tailored collaboration effort, HDR is currently delivering WRF Project 4471 with project sponsors Los Angeles Department of Water & Power (LADWP), Seattle Public Utilities, Fairfax Water, Denver Water, and DC Water. The goal of the project is to leverage current non-destructive evaluation (NDE) technology to help determine when select ferrous water mains should be renewed. Traditionally, water utilities relied on pipeline leak and break data to determine when pipeline renewal was needed. In recent years, several devices have been introduced that can find structural defects or pinpoint leaks. However, the cost of using these tools can be relatively expensive and the results can be varied. He project has included the testing of five different inspection technologies side-by-side on cast iron main in Los Angeles. Technologies included:

Following data collection of the technologies, portions of the mains were exhumed, visually inspected,
• Push-in video/audio probe (Wachs Water Service)
• In-pipe remote field electromagnetic scanning (PICA’s SeeSnake)
• Acoustic velocity pipe wall analysis (Echologics)
• External scanning with broadband electromagnetic tool (Rock Solid)
• Internal scanning with broadband electromagnetic tool (Rock Solid)

photographed and cataloged as to its actual condition, including taking corrosion pit and wall thickness measurements, and compared to the NDE technology inspection results. Initial results show that 75 percent of the main had no appreciable corrosion. Only a portion of unlined pipe dating to 1933 needed to be replaced. Beginning in May 2014, HDR applied the technologies on mains within the five sponsoring utilities (LA, Seattle, Denver, Fairfax, and DC). In the final phase of the project, the benefits of the testing were assessed by comparing the projected life expectancies of mains, both with and without the field test data. The differences in confidence provided by the various models were also assessed.


The City encountered numerous premature failures on their extensive asbestos cement (AC) pipe water distribution system. As the on-call corrosion engineering consultant, HDR was tasked with determining the anticipated remaining life of several AC pipe sections and investigating if there were commonalities regarding the failures. Several AC pipe samples were provided to perform condition assessment and failure analysis of coupons. Soil samples at the coupon sites were provided for soil corrosivity testing. System water aggressivity was studied. A detailed desktop and laboratory study was performed to determine the degree of deterioration and to draw conclusions on the root cause of failures.

Western Municipal Water District | NDE Condition Assessment of the Mills Gravity Pipeline, Riverside, CA (2015-2016)

HDR provided condition assessment services for the Mills Gravity Pipeline (MGL). The pipeline was constructed in 1986 through 1990 and includes approximately 73,522 feet of concrete coated pipe (CCP), 60-inches in diameter, carrying pressure at over 250 psi. Western requested services to determine existing and probable future conditions, develop rehabilitation plans to reduce failure risks (if needed), to maximize the life of the MGL. HDR proposed a multi-phased project approach, using information from early phases to guide the work in later assessments. Our approach was designed to make the optimum use of Western’s resources, with expenditures tailored to assessments of risk.

HDR teamed with Pure Technologies (Pure) to provide in-pipe leak detection surveys. Pure provided the in-pipe leak detection tool using the SmartBall tool. By finding leaks at joints and areas where corrosion has weakened the pipe, this device identifies areas where pipe excavation and external direct assessment would be warranted.
We believe our greatest investment is in our people.

Effectively providing professional services to the Mesa Water District (District), requires the right local team with a complete toolbox of resources to deliver each individual assignment efficiently and effectively. A comprehensive project control plan is essential to meeting project schedule, budget, and managing other items such as resource planning, documentation, and scope control. Our objective is to deliver successful projects that meet the District’s goals while managing the work so it is completed efficiently, with quality, and within budget.

Dave Spencer, PE will manage and coordinate the work from HDR’s San Diego office, with hands-on support from Amy Omae, PE from HDR’s Irvine office. Further, HDR can draw upon nearly 300 specialized personnel in the southern California area, should additional resources be required. Within those specialized personnel, HDR’s Condition Assessment and Rehabilitation division in Claremont is solely devoted to performing services related to cathodic protection, corrosion control, and condition assessments and can provide additional technical staff to the project should the need arise.

Full resumes are available in the Appendix.

HDR Organizational Chart
### Key Personnel Bios

#### David Spencer, PE | Project Manager
**HDR Engineering, Inc.**
San Diego, CA

David has been a project manager on many asset management related projects including:

**Water Research Foundation | Report #4471, Leveraging Data from Non-Destructive Examinations to Help Select Ferrous Water Mains for Renewal,** Denver, CO. The goal of the project is to leverage current NDE (Non-destructive Examination) technology to help determine when select ferrous water mains should be renewed. Traditionally, water utilities relied on pipeline leak and break data to determine when pipeline renewal was needed. In recent years, several devices have been introduced that can find structural defects or pinpoint leaks. However, the cost of using these tools can be relatively expensive and the results can be varied. To date, the project has included the testing of five different inspection technologies side-by-side on cast iron main in Los Angeles.

**Vista Irrigation District | Potable Water Master Plan,** City of Vista, CA
HDR was selected by the District to prepare an update to their 2000 Potable Water Master Plan. As part of that Master Plan, condition assessment of the District’s reservoirs and pipelines is being conducted and prioritization of rehabilitation and replacement projects. David is leading the condition assessment and renewal prioritization components of the project which includes assessing and cleansing existing data, quantifying deterioration, identifying investment scenarios compared with level of service, and incorporating results into the master plan.

#### Amy Omae, PE | Deputy Project Manager
**HDR Engineering, Inc.**
Irvine, CA

Amy has been a project manager on many related projects including:

**Irvine Ranch Water District | Filter Pump Station No. 2 Discharge Header Replacement,** Irvine, CA | Deputy Project Manager: Ms. Omae is responsible for coordinating and collaborating with Irvine Ranch Water District (IRWD), managing the project work, schedule, and team. HDR was selected to develop the design to replace the corroded discharge header for the Michelson Water Recycling Plant (MWRP) Filter Pump Station No. 2 (FPS-2) and incorporate cathodic protection measures on the new header. FPS-2 is part of the MWRP conventional treatment train to convey up to 22 mgd of secondary effluent to the tertiary filters, high-rate clarifier, or long-term storage. Bypass pumping will be needed to cover the entire flow range. The project is being expedited due to the critical nature of the FPS-2 to the overall plant operation and the poor condition of the discharge valves and header for construction to occur when lower flows are expected at MWRP.

**Irvine Ranch Water District | Recycled Water Salt Management Plan,** Irvine, CA | Project Manager/Deputy Project Manager/Project Engineer: Assisted the management of project work, schedule, and team. Identified and assigned tasks to the project team, coordinated and collaborated with IRWD, other utility agencies and subconsultants, performed data collection and analysis, provided direction to develop the model and resolve data gaps, and evaluated alternative mitigation strategies. To better understand the contributing sources of salt in IRWD’s recycled water product, IRWD selected HDR to prepare a Salt Management Plan that contains a comprehensive historic, present day and future salt balance analysis, quantifies salt concentration limits for recycled water customers and identifies costs and benefits of mitigation strategies to control salts in the recycled water product. Solutions from both the potable water and wastewater perspective were evaluated to determine the most cost-effective approach to reducing salinity. IRWD requested additional model development in two subsequent projects; one project is currently ongoing to analyze the impact of desalinated water on recycled water.
<table>
<thead>
<tr>
<th>Statement of Qualifications</th>
<th>Pipeline Integrity Program Consulting Services</th>
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</table>

Dan Ellison, PE | Useful Life Assessment  
*HDR Engineering, Inc.*  
Ventura, CA

Mr. Ellison has gained national and international recognition as an expert on pipe assessment, rehabilitation, and trenchless construction, having authored several books on the subject. He is the founding Chair of the Water Main Condition Assessment Committee of AWWA.

**EDUCATION**  
MBA – Finance  
BS – Chemical Engineering  
BA – English

**REGISTRATIONS**  
Professional Engineer – Civil, CA,  
Structural Engineer, CA

**INDUSTRY TENURE – 16 Years**

Brien Clark, PE | CP Task Lead  
*HDR Engineering, Inc.*  
Claremont, CA

Mr. Clark is the Manager of Technical Services for HDR Engineering, Inc. He has been with HDR Engineering since 2000. Mr. Clark has performed condition assessments, external direct assessments, failure analyses, soil corrosivity studies, water aggressivity studies, cathodic protection surveys, cathodic protection/corrosion control designs, and construction checkouts.

**EDUCATION**  
BS - Chemical Engineering

**REGISTRATIONS**  
PE - Chemical Engineering – CA - #6291  
NACE CP Specialist - #17978

**INDUSTRY TENURE- 16 Years**

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Dan has been involved with many ACP related projects including:

**Water Research Foundation | Report #4471, Leveraging Data from Non-Destructive Examinations to Help Select Ferrous Water Mains for Renewal, Denver, CO.** The goal of the project is to leverage current NDE (Non-destructive Examination) technology to help determine when select ferrous water mains should be renewed. Traditionally, water utilities relied on pipeline leak and break data to determine when pipeline renewal was needed. In recent years, several devices have been introduced that can find structural defects or pinpoint leaks. However, the cost of using these tools can be relatively expensive and the results can be varied. To date, the project has included the testing of five different inspection technologies side-by-side on cast iron main in Los Angeles.

**Water Research Foundation | Report #4480, Development of an Effective Asbestos Cement Distribution Pipe Management Strategy for Utilities, Denver, CO.** David participated on this research project that involved developing an effective strategy for management of utility asbestos cement (AC) pipe assets, which included condition assessment and remaining life prediction, water quality optimization, rehabilitation and replacement, renewal prioritization modeling, and cost analysis. Project involved analysis of more than 100 samples of pipe and 20 years of break data for 1,100 miles of East Bay Municipal Utility District (EBMUD) AC pipes.

Mr. Clark has project management experience on many related corrosion and cathodic protection projects:

**City of Sacramento Department of Utilities| AC Pipe Evaluation and Soil Corrosivity Testing Report, Sacramento, CA (2016)**  
Project manager/QC Reviewer: The City of Sacramento Department of Utilities (City) encountered numerous premature failures on their extensive asbestos cement pipe (ACP) water distribution system. As the on-call corrosion engineering consultant, HDR Engineering, Inc. (HDR) was tasked with determining the anticipated remaining life of several ACP sections and investigating if there were commonalities regarding the failures. Several AC pipe samples were provided to perform condition assessment and failure analysis of coupons. Soil samples at the coupon sites were provided for soil corrosivity testing. System water aggressivity was studied. A detailed desktop and laboratory study was performed to determine the degree of deterioration and to draw conclusions on the root cause of failures.

Project Engineer: JCW owns approximately 2,145 miles of gravity sewer pipes, 188 miles of which are large diameter pipes (defined as 18” in diameter or larger), JCW has previously developed and implemented an inspection and rehabilitation program for small diameter pipe based on a Business Risk Exposure (BRE) Model and wishes to pursue the development of a Business Case for the Large Diameter Program. The project entailed developing a detailed recommended implementation plan for the program; developing yield projections for inspections, assessments, maintenance, and R&R including annual costs for planning purposes; providing methodology for assessing and prioritizing JCW’s large diameter sewers 18” and larger and refining the methodology for assessing and prioritizing small diameter sewers smaller than 18”, updating JCW’s Business Risk Exposure (BRE) Model, and incorporating manhole assessments into the long term plan. Mr. Clark conducted a Project Approach and Resource Review (PARR) for the corrosion aspects of the project and later performed Weibull failure prediction models for the various pipeline asset classes.
<table>
<thead>
<tr>
<th>Eric Scherch, PE</th>
<th>Condition Assessment / Useful Life Assessment</th>
<th>HDR Engineering, Inc.</th>
<th>San Diego, CA</th>
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<tr>
<td>Eric has more than 10 years of experience developing, planning, and implementing asset management programs throughout the U.S. His expertise lies in developing statistically significant condition assessment and renewal forecasting for water and wastewater including development of risk models. Eric focuses on risk analysis, operations and maintenance, condition assessment, aging infrastructure renewal forecasting, program alternative evaluation, information systems development, regulatory reporting, staffing analyses, and work planning.</td>
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<tr>
<td>EDUCATION</td>
<td>BE - Civil Engineering</td>
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<tr>
<td>REGISTRATIONS</td>
<td>Professional Engineer – Civil, CA, #74238</td>
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<tr>
<td>INDUSTRY TENURE</td>
<td>12 Years</td>
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<thead>
<tr>
<th>Greg Frost, PE</th>
<th>Cathodic Protection</th>
<th>HDR Engineering, Inc.</th>
<th>Claremont, CA</th>
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<tbody>
<tr>
<td>Mr. Frost is a Corrosion Engineer with HDR Engineering, Inc. since 2012. Mr. Frost has 7 years of experience in the field of civil engineering. At HDR he has been involved with corrosion control and condition assessment of water and wastewater facilities across all phases of the infrastructure life cycle including pre-design, design, construction support, activation, and condition assessment. He has performed field corrosivity studies to prepare the basis of corrosion control design, designed galvanic and impressed current cathodic protection systems for water and wastewater tanks, directed installation of cathodic protection systems, performed activation testing and system adjustment, led condition assessment field investigations on existing pipeline and tank systems, and performed construction management on replacement projects.</td>
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<tr>
<td>EDUCATION</td>
<td>BS - Civil Engineering</td>
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<tr>
<td>REGISTRATIONS</td>
<td>PE – Civil Engineering – CA - #83780 NACE CP Technician - #60213</td>
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<tr>
<td>INDUSTRY TENURE</td>
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<p>| Eric has served as a technical lead for clients such as Orange County Sanitation District, City of Vista, City of San Diego, and West Basin Municipal Water District. Eric has related experience including: |
| <strong>Water Research Foundation | Report #4471, Leveraging Data from Non-Destructive Examinations to Help Select Ferrous Water Mains for Renewal, Denver, CO.</strong> Analyst. The objective of this project is to demonstrate that NDE can be used cost effectively on some mains, and the results can be used to infer the condition of similar mains. Tailored Collaboration partners: DC Water, Denver Water, Los Angeles Department of Water and Power, Fairfax Water, and Seattle Public Utilities. |
| <strong>City of Phoenix | Water Distribution Asset Management Plan Development, Phoenix, AZ.</strong> Modeler and Analyst. The City of Phoenix owns and operates approximately 7,000 miles of distribution systems wants to refine its asset management plan for water distribution and transmission mains. HDR provided an overall program assessment which included: data clean-up and analysis, development of long term renewal investment levels, development of near-term renewal project identification and prioritization procedures, and knowledge transfer to City staff to support more efficient and effective data driven decision making. |
| <strong>San Francisco Public Utilities Commission | Bay Division Pipelines 1-5 CP System Improvement, San Francisco, CA (2014)</strong> Field Engineer: HDR performed condition assessment surveys and recommended cathodic protection system improvements for the Bay Division Pipelines 1, 2, 3, 4, and 5 (approximately 130 miles of pipelines) carrying potable water to San Francisco and the south Bay area. Mr. Frost performed cathodic protection surveys and organized field data for the condition assessment report. |
| <strong>Tarrant Regional Water District | Integrated Pipeline (IPL) Program, Dallas, TX, (2013) Corrosion Engineer:</strong> Program consisted of the design of 150 miles of 96- to 108-inch diameter WSP and PCCP with two reservoirs and booster pump stations, divided between nine project design teams. HDR served as program-wide corrosion engineering consultants, tasked with establishing corrosion control and cathodic protection for the entire program. Mr. Frost provided basis of design reports for cathodic protection systems of various pipeline sections and conducted data reduction and corrosivity analysis on collected field data. |</p>
<table>
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<tr>
<th>Mersedeh Akhoondan, PhD</th>
<th>Condition Assessment / Useful Life Assessment</th>
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<tr>
<td>HDR Engineering, Inc.</td>
<td>San Diego, CA</td>
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Dr. Akhoondan is a Corrosion EIT with HDR Engineering. She has 9 years of experience in the evaluation of corrosion performance of coated metal pipes and novel concrete reinforcing alloys. She also developed rational methods for predicting corrosion rates of metals in soil and water as well as computational modeling of cathodic protection systems for concrete bridges and computational durability modeling of submerged concrete structures. She has designed and managed corrosion testing programs, performed failure analysis on metallic pipes and done extensive metallographic evaluations of specimens and field coupons.

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<th>Education</th>
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<tr>
<td>PhD - Civil &amp; Environmental Engineering</td>
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<tr>
<th>Registrations</th>
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<tr>
<td>EIT - #1100016063</td>
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| Industry Tenure | 8 Years |

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<tr>
<th>Graham Bell, PE, PhD</th>
<th>PIC / QAQC</th>
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<td>HDR Engineering, Inc.</td>
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Dr. Bell is Sr. Vice President and National Director for HDR's Condition Assessment and Rehabilitation Business Class. Dr. Bell has more than 30 years of experience in designing and testing corrosion control facilities and forensic evaluation of corrosion damage on buried and submerged structures. Dr. Bell is certified by NACE International as both a Corrosion and Cathodic Protection Specialists, and was named a NACE International Fellow in 2015.

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<th>Education</th>
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<tr>
<td>PhD - Nuclear Engineering</td>
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<tr>
<td>PE - Corrosion Engineering - #C1034</td>
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<tr>
<td>NACE CP Specialist - #5350</td>
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<td>NACE Corrosion Specialist - #5350</td>
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| Industry Tenure | 35 Years |

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The WRF is a nonprofit organization that sponsors research that enables water utilities, public health agencies, and other professionals to provide safe and affordable drinking water to consumers. Dr. Bell provided technical expertise and quality control for this project whose objective was to determine if the concept of “assess-and-fix” was useful in determining if water mains should be replaced or rehabilitated based on concerns regarding water quality, hydraulics, and an aging infrastructure.

**Los Angeles Dept. of Water & Power | Expert Review of Water System Pipeline Breaks**, Los Angeles, CA. Investigator: During the summer of 2009, several high-profile water main breaks occurred in Los Angeles. As a result, the City requested an independent investigation to study the cause of the increase in water pipeline breaks and the overall vulnerability of the City’s water supply and distribution network. Dr. Bell was selected by LADWP to serve on the Investigation Team along with a number of other multidisciplinary experts in water distribution systems. He examined the effects of external corrosion and metal fatigue and provided additional data sets from other cities. The Team analyzed data collected by LADWP and identified the main factors contributing to the pipeline breaks that occurred during the summer of 2009. Material sciences, geotechnical engineering and statistics and geostatistics were considered. The Team also initiated a pilot study in hydraulics to measure pressure transients as well as to audit water pressures at key locations within the distribution systems. A second pilot study was then initiated in remote sensing, led by the Jet Propulsion Laboratory (JPL) to assess the effects of tectonic deformation, subsidence, and earthquakes on water pipeline breaks. Finally, the Team conducted a review of the asset management practices for the City’s water distribution systems.

**City of Buena Park | Pipeline Criticality Study**, Buena Park, CA (2016)

Technical Lead for prioritization of ductile iron and steel pipe. The City of Buena Park water system consists of approximately 220 mile of buried pipelines (generally 6 to 12-inches in diameter). Over 85% of pipelines are made of asbestos cement, AC, and the remaining includes cast iron, ductile iron, and steel pipe. Over 40% of the City’s existing pipelines are over 50 years old and expected to encounter a significant number of leaks and other failures as the pipelines near the end of their service lives. HDR conducted the criticality assessment of City’s pipelines in order to prioritize assets requiring immediate attention by means of rehabilitation or replacement. Dr. Akhoondan provided technical support on conducting the criticality study based on pipe properties, environmental factors, break data and City’s institutional knowledge.

**City of Sacramento Department of Utilities | AC Pipe Evaluation and Soil Corrosivity Testing Report**, Sacramento, CA (2016)

Technical Lead for desktop and laboratory studies of AC pipe. The City of Sacramento Department of Utilities (City) encountered numerous premature failures on their extensive asbestos cement pipe (ACP) water distribution system. As the on-call corrosion engineering consultant, HDR Engineering, Inc. (HDR) was tasked with determining the anticipated remaining life of several ACP sections and investigating if there were commonalities regarding the failures. Several AC pipe samples were provided to perform condition assessment and failure analysis of coupons. Soil samples at the coupon sites were provided for soil corrosivity testing. System water aggressivity was studied. A detailed desktop and laboratory study was performed to determine the degree of deterioration and to draw conclusions on the root cause of failures. Dr. Akhoondan performed desktop and laboratory studies to determine the degree of deterioration of City’s AC system based on provided information.
David Spencer developed and implemented condition assessment and renewal programs encompassing over 60,000 miles of pipelines in the U.S. David specializes in developing and implementing practical results-oriented programs for aging water, recycled water, and wastewater infrastructure. He is adept in interacting with all levels of a utility organization from field staff to management. David is currently engaged in the evaluation of several emerging condition assessment technologies including acoustic testing, non-destructive examinations, an ASCE Manual of Practice, and other Water Research Foundation projects. Proficient in ESRI and Microsoft analytical tools, David has supported many high performing utilities in building and refining asset management practices including the Cities of San Diego, Poway, Vista, Phoenix and Honolulu, Vista Irrigation District, Los Angeles Bureau of Sanitation, Johnson County Wastewater, and Seattle Public Utilities.

**RELEVANT EXPERIENCE**

**Water Research Foundation, WRF 4471, Leveraging Data from Non-Destructive Examinations to Help Select Ferrous Water Mains for Renewal, Denver, CO.** The goal of the project is to leverage current NDE (Non-destructive Examination) technology to help determine when select ferrous water mains should be renewed. Traditionally, water utilities relied on pipeline leak and break data to determine when pipeline renewal was needed. In recent years, several devices have been introduced that can find structural defects or pinpoint leaks. However, the cost of using these tools can be relatively expensive and the results can be varied. To date, the project has included the testing of five different inspection technologies side-by-side on cast iron main in Los Angeles.

**Answers to Challenging Infrastructure Management Questions - Water Research Foundation (WRF), Denver, CO.** David authored the asset management chapter of this research project which seeks to integrate and summarize industry research in an understandable manner. Using a question and answer format, the asset management chapter answers “How long will my pipes last?”, “When should a pipe be replaced?”, “What is the appropriate level of service for water mains repair rates?”, and “How do I select pipes for assessment and renewal”.

**City of Lincoln, NE, Lincoln Water Facilities Master Plan, Lincoln, NE.** David developed a condition and asset management framework for system renewal. The project included a review of the city’s water capacity requirements, supply availability, treatment capacity and future regulatory requirements, distribution system analysis, development of a water main replacement program, asset management program, and development of a final report.

**Vista Irrigation District, City of Vista, CA**
HDR was selected by Vista Irrigation District (VID) to prepare an update to their 2000 Potable Water Master Plan. As part of that Master Plan, condition assessment of the District’s reservoirs and pipelines is being conducted and prioritization of rehabilitation and replacement projects. David is leading the condition assessment and renewal prioritization components of the project which includes assessing and cleansing existing data, quantifying deterioration, identifying investment scenarios compared with level of service, and incorporating results into the master plan.

**2016 Comprehensive Sewer Management Plan, City of Vista, CA.** David is developing an asset management program and plan that will close gaps in the
asset registers for GIS/Cityworks/Pipelogix/hydraulic model. David will identify likelihood and consequence of failure for asset risk, replacement costs, renewal prioritization, and evaluation of levels of service and associated levels of investment. David will conduct workshops with operations staff on best practices and SOPs. The results of asset management analysis and asset information will be coordinated with GIS staff for inclusion in appropriate systems and the identification of asset management software. A continuous improvement plan will be developed that includes analysis of existing business processes and systems and identification of prioritized opportunities for improvement for policies, processes and systems.

City of Poway, Utilities Operational Effectiveness Study (UOES), Poway, CA. Project Manager who reviewed operational activities for the potable water, wastewater operations, and recycled water, then assessed their organizational efficiency and effectiveness to prepare an operational effectiveness report with competitive levels for (O&M) of the system with recommended cost savings and improvement strategies. Worked closely with the city’s public works department’s utilities manager and key representatives from labor, management and employees.

WRF 4480, Development of an Effective Asbestos Cement Distribution Pipe Management Strategy for Utilities, Denver, CO. David participated on this research project that involved developing an effective strategy for management of utility asbestos cement (AC) pipe assets, which included condition assessment and remaining life prediction, water quality optimization, rehabilitation and replacement, renewal prioritization modeling, and cost analysis. Project involved analysis of more than 100 samples of pipe and 20 years of break data for 1,100 miles of East Bay Municipal Utility District (EBMUD) AC pipes.

Water Distribution Asset Management Plan Development, Phoenix, AZ. The City of Phoenix owns and operates approximately 7,000 miles of distribution systems wants to refine its asset management plan for water distribution and transmission mains. David, as the technical lead, provided an overall program assessment which included; data clean-up and analysis, development of long term renewal investment levels, development of near-term renewal project identification and prioritization procedures, and knowledge transfer to City staff to support more efficient and effective data driven decision making.

City of Westminster, Westminster Distribution System Renewal Program Prioritization and Modeling, Denver, CO. Evaluated the water distribution system and prioritized water main repair and replacement projects based on a number of criteria. A risk analysis and prioritization factors matrix was established and was used to develop an optimized pipe and valve replacement capital improvement program (CIP). Role: Asset Management Lead

Asset Management Plan, Otay Water District, Otay, CA. Prepared a district-wide asset management plan as the framework for district staff to implement the ongoing condition assessment and associated service life estimates for all of the fixed assets. The project included the development of asset criticality criteria, condition assessment rating and ranking criteria, and asset valuation methodology that serve as the basis for future rates and bond financing.

Asset Management Program Update - Zone 7 Water Agency, Alameda, CA. Developed Zone 7’s asset management program policies and framework including: an information system roadmap, inspection and condition assessment procedures, and repair, rehabilitation and replacement decision making processes for mechanical equipment and pipelines. Implemented a condition assessment program to support development of a near-term rehabilitation and replacement budget.
Amy Omae  
Project Manager

Amy is a proven project manager with extensive experience in water and wastewater master planning, design, and engineering services during construction projects throughout Southern California. Her expertise is in the design of treatment plant processes, pipeline alignments, mechanical pumping systems, pilot testing and research, alternative technology evaluations, mass balance and financial model development, data analysis for technically based local limits, quality assurance, and field engineering services during construction. Amy has worked closely with Irvine Ranch Water District throughout her tenure with HDR and is currently leading IRWD’s FPS-2 Discharge Header Replacement. Her dedication to delivering quality projects has made her one IRWD’s most trusted project managers.

**EDUCATION**

Master of Science, Environmental Engineering (Civil Engineering with Environmental Emphasis), University of Miami, 2006

Bachelor of Science, Chemistry (Chemistry and Environmental Health Science), University of Miami, 2004

**REGISTRATIONS**

Professional Engineer - Civil, California, United States, No. 76824

LEED Accredited Professional, United States National Registration, No. 10328834

**PROFESSIONAL MEMBERSHIPS**

American Society of Civil Engineers (ASCE), Associate Member, 2007-2017

Water Environment Federation, Member, 2011-2017

Asian American Architects / Engineers Association (AAa/e), Member, 2014-2017

WateReuse, Member, 2015-2017

Orange County Water Association, Member, 2016-2017

**RELEVANT EXPERIENCE**

**Irvine Ranch Water District, Filter Pump Station No. 2 Discharge Header Replacement, Irvine, CA**

Ms. Omae is responsible for coordinating and collaborating with Irvine Ranch Water District (IRWD), managing the project work, schedule, and team. HDR was selected to develop the design to replace the corroded discharge header for the Michelson Water Recycling Plant (MWRP) Filter Pump Station No. 2 (FPS-2) and incorporate cathodic protection measures on the new header. FPS-2 is part of the MWRP conventional treatment train to convey up to 22 mgd of secondary effluent to the tertiary filters, high-rate clarifier, or long-term storage. Bypass pumping will be needed to cover the entire flow range. The project is being expedited due to the critical nature of the FPS-2 to the overall plant operation and the poor condition of the discharge valves and header for construction to occur when lower flows are expected at MWRP.

*Role: Project Manager*

**Irvine Ranch Water District, Recycled Water Salt Management Plan, Irvine, CA**

Assisted the management of project work, schedule, and team. Identified and assigned tasks to the project team, coordinated and collaborated with Irvine Ranch Water District (IRWD), other utility agencies and subconsultants, performed data collection and analysis, provided direction to develop the model and resolve data gaps, evaluated alternative mitigation strategies, and wrote reports. To better understand the contributing sources of salt in IRWD’s recycled water product, IRWD selected HDR to prepare a Salt Management Plan that contains a comprehensive historic, present day and future salt balance analysis, quantifies salt concentration limits for recycled water customers and identifies costs and benefits of mitigation strategies to control salts in the recycled water product. Solutions from both the potable water and wastewater perspective were evaluated to determine the most cost-effective approach to reducing salinity. IRWD requested additional model development in two subsequent projects; one project is currently ongoing to analyze the impact of desalinated water on recycled water.

*Role: Project Manager, Deputy Project Manager, and Project Engineer*

**Irvine Ranch Water District, Water Supply Reliability Evaluation, Irvine, CA**

Provided modeling and evaluation of local and imported water supply reliability under a variety of emergency scenarios based on a rigorous and transparent probability of risk analysis. Recent climate change research and projected reliability of imported water resources were incorporated into the analysis. Level of service expectations were established and mitigation strategies developed.

**Role:** Project Engineer

**Irvine Ranch Water District, Michelson Water Reclamation Plant Phase 2 Expansion, Design and Engineering Services During Construction, Irvine, CA**

Responsible for developing the financial model to evaluate biosolids and sludge handling alternatives analysis, design of the agitation aeration distribution system for the influent junction structure, headworks, primary splitter box, and primary distribution channel, managing and performing QA/QC review of submittal reviews and requests for information (RFIs), change orders, civil site grading design, and field engineering. HDR performed the conceptual design, preliminary design, and final design, and provided engineering services during construction of the Michelson Water Reclamation Plant Phase 2 expansion to 33 mgd. Improvements included influent sewers, headworks, expansion of the primary sedimentation tanks, new primary effluent pumping station and flow control, modified flow equalization basins, secondary treatment expansion with membrane bioreactors (MBR), new high-rate clarifier to treat filter backwash, effluent filtration, new ultraviolet (UV) disinfection system, reclaimed water pumping, modifications to chlorine contact basins, chemical feed systems, new pumping and other ancillary facilities, and electrical modifications.

**Role:** Project Engineer and Staff Engineer

**Reyes Construction, NAVFAC P1046 North Area Waste Water Conveyance Project Design and Construction Services, Camp Pendleton, CA**

Responsible for the design of the Tributary Area Pump Station 9 (TAPS9), decommissioning and demolition of the Sanitation Treatment Plant 9 (STP9), and QA/QC review. HDR served as Designer-of-Record for the installation of new wastewater conveyance, pumping, and storage facilities at Marine Corps Base Camp Pendleton (MCBCP) in San Diego. The new facilities provide enhanced infrastructure to convey increased sewage flows throughout the camp and convey wastewater to the Southern Regional Tertiary Treatment Plant (SRTTP). HDR provided preliminary and final design along with engineering services during construction. The P-1046A project includes 28,500 feet of 6-inch through 20-inch HDPE wastewater force main, 7,000 feet of gravity sewer manhole and pipe capacity increase from 8-inch to 10-inch, approximately 2,500 feet is upsized by pipe bursting, five separate Horizontal Directional Drill locations under environmental and cultural boundaries and beneath Caltrans and Railroad rights-of-way with a total distance of about 10,000 feet, four new lift stations and one lift station upgrade with capacities ranging from 500,000 gpd up to nearly 2 mgd, emergency overflow storage for four lift stations, demolition of existing lifts stations and a 1.5 mgd wastewater treatment plant.

**Role:** Project Engineer

balance, and identification of recommended local limits, and preparing a summary report.

**Role:** Project Manager
Dan Ellison, PE
Quality Manager

Dan Ellison has gained national and international recognition as an expert on pipe assessment, rehabilitation, and trenchless construction, having authored several books on the subject. He is the former Chair of the Water Main Rehabilitation Committee of AWWA.

Dan has managed groups with more than 40 employees, and programs with annual budgets up to $40 million. Projects have ranged from record-setting trenchless river crossings, to published research, to power plant retrofits, even a fish ladder. This diversity of projects, along with superior management skills of people and programs make Dan tremendously flexible and creative.

### RELEVANT EXPERIENCE

**LADWP, Pipeline Rehabilitation Program, Los Angeles, CA.** Program Manager for $36 million annual program that upgraded water mains and trunk lines, primarily through the cement mortar lining method. During Mr. Ellison’s tenure, the program set new production and efficiency records, while making numerous improvements in customer service. Slip lining and pipe bursting methods were introduced. Oversaw both the design and construction management for more than 3 million feet of pipeline rehabilitation costing over $100 million. Directly managed up to 43 people performing this and other functions. Completed over 30 projects involving contracts, which averaged between $1.5 and $2.5 million. Approximately 18 contracts were completed annually, with 12 projects underway at any time. Pipe sizes ranges from 4 inches to 60 inches.

**LADWP, Trunk Line Testing Program, Los Angeles, CA.** Devised methodology and established program for testing and rehabilitation of large-diameter riveted and welded steel pipelines. Prior to this program, plans were underway to replace 144-miles of large-diameter, pre-1940 pipe. Pipe sizes ranged from 20 inches to 84 inches. Pipe materials included rivet steel and welded steel. All were originally installed without cement mortar lining and with minimal external coatings. This program demonstrated that 90 percent of the trunk lines were not at risk of catastrophic failure and could remain in service, with periodic testing, cathodic protection, and other rehabilitation. This program saved the LADWP literally hundreds of millions of dollars.

**WRF 4480, Development of an Effective Asbestos Cement Distribution Pipe Management Strategy for Utilities, Denver, CO.** The objective of this research project is to develop an effective strategy for management of utility asbestos cement (AC) pipe assets, which included condition assessment and remaining life prediction, water quality optimization, rehabilitation and replacement, renewal prioritization modeling, and cost analysis. Performed analysis of more than 100 samples of pipe and 20 years of break data for 1,100 miles of East Bay Municipal Utility District (EBMUD) AC pipes.

**Water Research Foundation, WRF 4471, Leveraging Data from Non-Destructive Examinations to Help Select Ferrous Water Mains for Renewal, Denver, CO.** Principal Investigator. The objective of this project is to demonstrate that NDE can be used cost effectively on some mains, and the results can be used to infer the condition of similar mains. Tailored Collaboration partners: DC Water, Denver Water, Los Angeles Department of Water and Power, Fairfax Water, and Seattle Public Utilities.

**Water Research Foundation, WRF 4473, The Assess-and-Fix Approach: Using Non-Destructive Evaluations to Help Select Pipe Renewal Methods, Denver, CO.** This project (1) developed an analytical approach and guidelines for...
selecting pipe rehabilitation methods, based on full non-destructive examination (NDE) scans of a cast iron or ductile iron water main; and (2) showed how an NDE tool can be used economically, as part of a rehabilitation project, to optimize the rehabilitation.

**Eugene Water & Electric Board, Water Distribution System Assessment, Eugene, OR.** Technical Advisor. Helped develop defensible statistical analysis used to determine the life expectancies of different pipeline asset classes. Used historical repair records, information regarding pipe materials, and published reports from the Water Research Foundation and other sources for an unbiased assessment needed to support annexation of two smaller districts.

**Publications**
Principal author of 7 books for the Water Research Foundation on asset management, condition assessment, and pipeline rehabilitation:

- Distribution Infrastructure Management: Answers to Common Questions (2001)
- No-Dig and Low-Dig Service Connections Following Water Main Rehabilitation (2007)
- Answers to Challenging Infrastructure Management Questions (2014)
- Contributor to Water Research Foundation Report: Failure of Prestressed Concrete Cylinder Pipe (2008)
Brien Clark, PE
Cathodic Protection Lead

Brien Clark will provide valuable input on cathodic protection and condition assessment strategies and implementation. As part of the direct corrosion assessment of the District’s North Feeder Pipeline, Brien evaluated assessment data and provided detailed recommendations for cathodic protection and future monitoring. He will also perform Weibull Failure Modeling of the District’s pipe to better understand pipe deterioration, as part of the risk modeling.

Brien was a technical lead on several WRF projects and is experienced in performing condition assessments, external direct assessments, failure analyses, soil corrosivity studies, water aggressivity studies, cathodic protection surveys, cathodic protection/corrosion control designs, and construction checkouts. Brien is certified by NACE International as a cathodic protection specialist and technologist, and in cathodic protection interference. He is also certified as a Corrosion Prevention Field Technician and for Abnormal Operating Conditions in Field Operations by the National Center for Construction Education and Research.

RELEVANT EXPERIENCE

Rainbow Municipal Water District, North Feeder Pipeline Evaluation, Fallbrook, CA. Project Manager/Project Engineer. A corrosion investigation was performed to determine the likely failure mode of the North Feeder pipeline. It was believed that the failure may have been related to the presence of cathodic protection on a high pressure gas line running near the waterline. HDR performed in-situ and laboratory soil corrosivity testing, cell-to-cell close interval surveys with the foreign rectifier de-energized, and pipeline excavation to perform external direct assessments. The direct assessments documented the condition of the pipeline and determined if stray current was involved in the failure and recommendations were made for cathodic protection.

Cedar Street Pipeline Corrosion Direct Assessment, Ontario, CA. Project Engineer/Project Manager. HDR conducted an emergency failure analysis and external corrosion direct assessment of a 14-inch CML&TW spiral welded steel pipe. The analysis included examination of the pipe surface, pipe-to-soil potential measurement, electrical continuity testing, soil sample collection and laboratory soil corrosivity testing. Brien conducted the field testing, analyzed the data, and provided all the test data to the client with full explanation.

Inland Empire Utilities District, Recycled Water Pipeline 930 Zone Water Pipeline, Chino, CA. Corrosion Protection Technical Reviewer. Corrosion control pre-design, design, and construction support services was provided for approximately 12,500 feet of 30-inch diameter ductile iron pipe and cement mortar coated steel pipe, and a 5 MG water reservoir. Cathodic protection was designed for both the piping and the reservoir. Brien was a technical reviewer for the cathodic protection calculations, drawings, and specifications.

Eastern Municipal Water District, Domenigoni 24-Inch Pipeline Corrosion Assessment, Perris, CA. Project Manager/Project Engineer. HDR performed a condition assessment of the Domenigoni pipeline, a critical 21- and 24-inch transmission main approximately 12,000 lineal feet in length, for EMWD. The purpose of the investigation was to assess the piping from a corrosion standpoint for its continued failure-free operation. Brien performed a full document review, conducted a soil corrosivity study, electrical continuity testing, cathodic protection stray current investigation, a pipe-to-soil potential survey, electrical isolation testing, cell-to-cell close interval survey (CIS), and excavated the pipeline at three (3) locations to perform external corrosion direct assessments.
Watermain Breakage Reduction Study/Asset Management Plan, Phoenix, AZ. Failure modeler. Performed the Weibull failure modeling analysis used to determine forecasted break rates by pipe attributes. HDR renewed and analyzed the City’s 25-year break history to help quantify the impact of the City’s prior investment in distribution system replacement and optimize the future investment required to achieve targeted break rates. Geospatial analysis of the City’s prior breaks and readily available operating data quantified the impact on long-term pipe performance of intrinsic properties such as material and age, and extrinsic properties such as soils and operating pressure. The resulting curves allow City staff to better target its future main replacement program on higher risk pipe and avoid wasting money on pipe with a high expected remaining useful life.

City of Lincoln, Lincoln Water Facilities Master Plan, Lincoln, NE. Weibull Failure Modeling. Performed an asset management analysis as part of the preparation of the water facilities master plan. The project included a review of the city’s water capacity requirements, supply availability, treatment capacity and future regulatory requirements, distribution system analysis, development of a water main replacement program, asset management program, and development of a final report. Development of a condition and asset management framework for system renewal.

City of Sacramento Department of Utilities, AC Pipe Evaluation and Soil Corrosivity Testing Report, Sacramento, CA. Project Manager/QC Reviewer. The City of Sacramento Department of Utilities (City) encountered numerous premature failures on their extensive asbestos cement pipe (ACP) water distribution system. As the on-call corrosion engineering consultant, HDR Engineering, Inc. (HDR) was tasked with determining the anticipated remaining life of several ACP sections and investigating if there were commonalities regarding the failures. Several ACP samples were provided to perform condition assessment and failure analysis of coupons. Soil samples at the coupon sites were provided for soil corrosivity testing. System water aggressivity was studied. A detailed desktop and laboratory study was performed to determine the degree of deterioration and to draw conclusions on the root cause of failures.

San Diego County Water Authority (SDCWA), Tri-Agencies Pipeline Investigation, San Diego County, CA. Project Engineer/Field Engineer. Spurred by a pipeline leak, an investigation along the alignment of the Tri-Agencies Pipeline (TAP) was conducted. The potable water pipeline is co-owned by SDCWA, Vista Irrigation District, City of Oceanside, and Carlsbad Municipal Water District. SDCWA’s portion of the pipeline is approximately 22,300 feet of 30- to 42-inch diameter rod-wrapped concrete cylinder pipe (AWWA C303). Tests performed included electromagnetic conductivity, field soil resistivity, laboratory soil analysis, and linear polarization resistance (LPR) corrosion rate testing. An analysis of soil resistivity, corrosion initiation modeling, similitude (Romanoff) analysis, and LPR testing was performed. Recommendations included locations for direction assessment as part of the continuing condition assessment.

Water Research Foundation, Development of an Effective Asbestos Cement Distribution Pipe Management Strategy for Utilities, Report 4480, Oakland, CA. Weibull Failure Modeling. The objective of this research project is to develop an effective strategy for management of utility asbestos cement (AC) pipe assets, which included condition assessment and remaining life prediction, water quality optimization, rehabilitation and replacement, renewal prioritization modeling, and cost analysis. Performed analysis of more than 100 samples of pipe and 20 years of break data for 1,100 miles of East Bay Municipal Utility District (EBMUD) AC pipes.
Graham Bell, PhD, PE
Quality Control Manager

Graham is Sr. Vice President and National Director for HDR’s Condition Assessment and Rehabilitation Business Class. He has more than 30 years of experience in designing and testing corrosion control facilities and forensic evaluation of corrosion damage on buried and submerged structures. Graham is a registered Corrosion Engineer in the State of California and a registered Mechanical Engineer in the States of Arizona, Tennessee, Nevada, Colorado, Ohio, Alaska, Oregon, and South Dakota. He is certified by NACE International as both a Corrosion and Cathodic Protection Specialists, and was named a NACE International Fellow in 2015.

Graham has authored and coauthored more than 60 technical papers and given more than 150 technical conference presentations. He is the current vice chairman for the AWWA Committee on Corrosion (519) and was the Chairman of the NACE International Task Group T-10A-21 on Corrosion Control for Cast and Ductile Iron Pipe. These committees are preparing a new version of their state-of-the-art reports for corrosion control and condition assessment of pipe materials used in the water industry. Graham currently serves as the Strategic Program Lead on Condition Assessment for the HDR Water Business Group.

RELEVANT EXPERIENCE

Los Angeles Dept. of Water & Power, Expert Review of Water System Pipeline Breaks, Los Angeles, CA
Investigator. During the summer of 2009, several high-profile water main breaks occurred in Los Angeles. As a result, the City requested an independent investigation to study the cause of the increase in water pipeline breaks and the overall vulnerability of the City’s water supply and distribution network. Dr. Bell was selected by LADWP to serve on the Investigation Team along with a number of other multidisciplinary experts in water distribution systems. He examined the effects of external corrosion and metal fatigue and provided additional data sets from other cities. The Team analyzed data collected by LADWP and identified the main factors contributing to the pipeline breaks that occurred during the summer of 2009. Material sciences, geotechnical engineering and statistics and geostatistics were considered. The Team also initiated a pilot study in hydraulics to measure pressure transients as well as to audit water pressures at key locations within the distribution systems. A second pilot study was then initiated in remote sensing, lead by the Jet Propulsion Laboratory (JPL) to assess the effects of tectonic deformation, subsidence, and earthquakes on water pipeline breaks. Finally, the Team conducted a review of the asset management practices for the City’s water distribution systems.

Los Angeles Dept. of Water & Power, Independent Review of Material Selection Water Main, Los Angeles, CA
Investigator. The staff and management of the LADWP were challenged to reconsider their selection of pipe materials for water mains. Most of the water mains in the city’s water system were cast iron. LADWP employed a “Blue Ribbon” committee to investigate and compare the cost and performance of commonly used pipeline materials, preparing a report and a presentation to the Board of Commissioners. Dr. Bell was part of the “Blue Ribbon” committee and provided corrosion expertise.
San Francisco Public Utilities Commission, Corrosion Control Master Plan and As-Needed Corrosion Control Services, San Francisco, CA.

Project Principal. The objective for this $1.6M project was to determine the potential for corrosion and investigate the existing cathodic protection systems by performing a comprehensive condition assessment on the entirety within a six month time frame. Dr. Bell oversaw the work on development of the 1999 and 2010 corrosion control Master Plans for more than 300 miles of large diameter piping. Work included identifying and implementing appropriate condition assessment inspection technologies and internal inspections. The program resulted in a 10-year program for asset preservation and protection improvement utilizing the concept of risk assessment as a methodology for prioritizing projects and protection.

San Diego County Water Authority, As-Needed Corrosion Engineering Contract, San Diego County, CA.

Project Manager/Principal-In-Charge. Dr. Bell assisted SDCWA in assessing the condition of their PCCP lines and other mortar coated steel pipelines using traditional and state of the art methods and methodologies. In particular, Dr. Bell and HDR developed the use of electromagnetic soil conductivity testing in conjunction with minimal intrusion soil sampling methods to cost effectively obtain soil corrosivity data on existing pipelines. This methodology was presented in the paper at the 1998 ASCE Pipeline conference in San Diego.

Otay Water District, Professional Corrosion Services FY 2008 – 2015, San Diego County, CA.

Principal-in-Charge. The Otay Water District (District) program consists of monitoring and maintaining 60 separate pipelines and 29 reservoirs at the beginning of the project. As The District grew and the program expanded, 19 more piping systems were incorporated. HDR was instrumental for the initiation and implementation of the District’s GIS corrosion database. HDR also provided design, construction, and coordination for professional cathodic protection services for the District.


QAQC/Technical Advisor. The WRF is a nonprofit organization that sponsors research that enables water utilities, public health agencies, and other professionals to provide safe and affordable drinking water to consumers. Dr. Bell provided technical expertise and quality control for this project whose objective was to determine if the concept of “assess-and-fix” was useful in determining if water mains should be replaced or rehabilitated based on concerns regarding water quality, hydraulics, and an aging infrastructure.

Santa Clara Valley Water District | Central Pipeline Inspection and Condition Assessment, San Jose, CA.

HDR conducted and Dr. Bell oversaw the internal inspections of approximately 15 miles of 72-inch PCCP in three phases. These inspections occurred in three phases and included joint inspections, soundings and electromagnetic inspections by others. Data were summarized and reported along with recommendations for internal repairs.
Eric Scherch has more than 10 years of experience developing, planning, and implementing asset management programs throughout the U.S. His expertise lies in developing statistically significant condition assessment and renewal forecasting for water and wastewater including development of risk models. Eric focuses on risk analysis, operations and maintenance, condition assessment, aging infrastructure renewal forecasting, program alternative evaluation, information systems development, regulatory reporting, staffing analyses, and work planning. Eric has served as a technical lead for clients such as Orange County Sanitation District, City of Vista, City of San Diego, West Basin Municipal Water District, San Antonio Water Systems, City and County of Honolulu, Seattle Public Utilities, Winston-Salem, and Eugene Water & Electric Board.

**2016 Comprehensive Sewer Management Plan, City of Vista, CA.** Asset Management Support. Responsible for the development of the risk model, asset management planning and renewal forecasting including workshops with operations, engineering and GIS staff. The program includes identifying likelihood and consequence of failure for asset risk, asset replacement costs, asset renewal prioritization, evaluation of levels of service and associated levels of investment, asset renewal forecasting scenarios and identification of asset management software for risk and renewal forecasting. Includes development condition assessment program recommendations and development of a staff owned program.

**Vista Irrigation District, City of Vista, CA.** HDR was selected by Vista Irrigation District (VID) to prepare an update to their 2000 Potable Water Master Plan. As part of that Master Plan, condition assessment of the District's reservoirs and pipelines is being conducted and prioritization of rehabilitation and replacement projects. Eric is providing technical support for the condition assessment and renewal prioritization components of the project which includes assessing and cleansing existing data, quantifying deterioration, identifying investment scenarios compared with level of service, and incorporating results into the master plan.

**Water Research Foundation, WRF 4471, Leveraging Data from Non-Destructive Examinations to Help Select Ferrous Water Mains for Renewal, Denver, CO.** Analyst. The objective of this project is to demonstrate that NDE can be used cost effectively on some mains, and the results can be used to infer the condition of similar mains. Tailored Collaboration partners: DC Water, Denver Water, Los Angeles Department of Water and Power, Fairfax Water, and Seattle Public Utilities.

**Water Distribution Asset Management Plan Development, Phoenix, AZ.** Modeler and Analyst. The City of Phoenixowns and operates approximately 7,000 miles of distribution systems wants to refine its asset management plan for water distribution and transmission mains. HDR provided an overall program assessment which included: data clean-up and analysis, development of long term renewal investment levels, development of near-term renewal project identification and prioritization procedures, and knowledge transfer to City staff to support more efficient and effective data driven decision making.

**Water Distribution Study, Eugene, OR.** Data Analysis and Risk Modeling. HDR assisted the Eugene Water & Electric Board (EWEB) complete a water distribution
study for two water districts which receive their retail water service. The objective of the study was to estimate a reasonable annual budget or level of investment (funding) for the districts to effectively maintain their distribution system over the long-term and to meet service goals. Two methodologies were used to assess Service Life Planning using this data: (i) Asset Class Performance Analysis; and (ii) Weibull Failure Rate Analysis. An informal regional utility survey was also conducted to compare the findings from the analysis. HDR worked with EWEB staff to train them in the use of the data-driven model used in the service life analysis.

Condition Assessment Program Support Quick Start Task, Winston-Salem, NC. Eric was the technical Lead for the Condition Assessment Program Support quick start task for the Collection System Improvement Program Manager Services for City/County Utilities Commission in Winston-Salem, NC. Eric lead workshops to determine Near-Term condition assessment work based on risk and worked with staff to determine goals, technologies, data collection needs, and schedules the first two years of the Program. The approach included a statistical sampling methodology for assessment that included determining appropriate sample sizes for each asset class, field data collection, QA/QC, rehabilitation and replacement forecast analysis, and an implementation plan.

Clark County Water Reclamation District, 5-Year Plan for Asset Management Service, Las Vegas, NV. Supported development of Asset Management Policy and Framework and the Asset Management Program Implementation Roadmap for approximately 2,000 miles of gravity sewer system. Services included working collaboratively with stakeholders to develop a 5-year roadmap with level of effort that organized key initiatives according to the framework into categories including asset registry, condition assessment, remaining useful life, life-cycle and replacement costs, levels of service, business risk, optimization of operations and maintenance investment, optimize capital investment, and funding strategy. Example initiatives include adding process and instrumentation diagrams to the CMMS to establish a direct link to SCADA, semi-automated work order generation for condition assessment, develop replacement planning model for long-term renewal forecasting, and integrate asset management program key performance indicators into a dashboard or reporting workflow.

West Basin Municipal Water District, Asset Management Consulting Services, Los Angeles, CA. Provided asset management consulting services for the District’s unique operations, which include treating wastewater to five different levels of recycled water quality for industrial, municipal, and public customers. Services included working collaboratively with stakeholders to develop asset management program, asset management framework, and opportunities for improvement in the following focus areas: Asset Databases; Inspection and Condition Assessment; Rehabilitation and Replacement; Financial Planning; Operations and Maintenance; Inventory Management; Information Technology; and Asset Management Strategies. Opportunities for improvement were organized into an implementation plan with level of effort forecasts and schedules. Supported a pilot implementation of asset management processes and opportunities for improvement identified in the implementation plan and supported implementation of asset management software.
Mersedeh Akhoondan, EIT
Condition Assessment

Dr. Mersedeh Akhoondan is a Corrosion Engineer with HDR Engineering. She has over 8 years of experience in the evaluation of corrosion performance of pipelines and novel concrete reinforcing alloys. She also developed rational methods for predicting corrosion rates of metals in soil and water as well as computational durability modeling of concrete structures. She has designed and managed corrosion testing programs, performed failure analysis on concrete, asbestos pipes and done extensive metallographic evaluations of specimens and field coupons.

EDUCATION
Doctor of Philosophy, Civil & Environmental Engineer (Specialization: Infrastructure Corrosion Engineer), University of South Florida, 2012
Master of Civil Engineering, Civil Engineering (Structural Engineering), University of South Florida, 2007
Bachelor of Civil Engineering, Civil Engineering, University of South Florida, 2007

REGISTRATIONS
Engineer in Training, United States National Registration, No. 1100016063
OSHA 30 Hour Construction Safety, Florida

PROFESSIONAL MEMBERSHIPS
National Association of Corrosion Engineers (NACE), 2006-2016
American Society of Civil Engineers (ASCE) 2005-2016

INDUSTRY TENURE
8 years

HDR TENURE
4 years

OFFICE LOCATION
San Diego, CA

RELEVANT EXPERIENCE

City of Buena Park | Pipeline Criticality Study, Buena Park, CA (2016)
Technical Lead for prioritization of ductile iron and steel pipe. The City of Buena Park water system consists of approximately 220 mile of buried pipelines (generally 6 to 12-inches in diameter). Over 85% of pipelines are made of asbestos cement, AC, and the remaining includes cast iron, ductile iron, and steel pipe. Over 40% of the City’s existing pipelines are over 50 years old and expected to encounter a significant number of leaks and other failures as the pipelines near the end of their service lives. HDR conducted the criticality assessment of City’s pipelines in order to prioritize assets requiring immediate attention by means of rehabilitation or replacement. Dr. Akhoondan provided technical support on conducting the criticality study based on pipe properties, environmental factors, break data and City’s institutional knowledge.

City of Sacramento Department of Utilities | AC Pipe Evaluation and Soil Corrosivity Testing Report, Sacramento, CA (2016)
Technical Lead for desktop and laboratory studies of AC pipe. The City of Sacramento Department of Utilities (City) encountered numerous premature failures on their extensive asbestos cement pipe (ACP) water distribution system. As the on-call corrosion engineering consultant, HDR Engineering, Inc. (HDR) was tasked with determining the anticipated remaining life of several ACP sections and investigating if there were commonalities regarding the failures. Several AC pipe samples were provided to perform condition assessment and failure analysis of coupons. Soil samples at the coupon sites were provided for soil corrosivity testing. System water aggressivity was studied. A detailed desktop and laboratory study was performed to determine the degree of deterioration and to draw conclusions on the root cause of failures. Dr. Akhoondan performed desktop and laboratory studies to determine the degree of deterioration of City’s AC system based on provided information.

Technical Expert: The objective of this research project is to develop an effective strategy for management of utility asbestos cement (AC) pipe assets, which included condition assessment and remaining life prediction, water quality optimization, rehabilitation and replacement, renewal prioritization modeling, and cost analysis. Performed analysis of more than 100 samples of pipe and 20 years of break data for 1,100 miles of East Bay Municipal Utility District (EBMUD) AC pipes.

City of San Diego | AC Pipe Program, San Diego, CA (2014)
Researcher and Quality Controller: As a second priority to City’s Cast Iron Replacement Program, the City of San Diego dedicated its resources to the Asbestos Cement Water Main Replacement Program Master Plan - a key component of the City’s Public Utilities Department asset management system. The Master Plan was developed by ARCADIS with HDR serving as the technical
PUBLICATIONS

Articles

Akhoondan M., Bell G., "Fasteners Corrosion", Structural Insight Magazine, March 2016


Akhoondan M., Sagues A., "Corrosion of Spiral Rib Aluminized Pipe", Final Report on Project No. BDK 84 977-11 to Florida Department of Transportation (FDOT), 8/2012

Akhoondan M., "Comparative Cathodic Behavior of ~9% Cr and Plain Steel Reinforcement in Concrete", Corrosion the Journal of Science and Engineering, Vol. 68, No. 4, 4/2012


AWARDS

Certification of Appreciation for Outstanding Contribution as Technical Reviewer for Corrosion 2014 Symposia advisor and quality control for the project. The project consisted of four (4) main phases: literature review, desktop study and development of failure forecasting models, field and laboratory testing and Master Plan development. Dr. Akhoondan completed the literature review task and conducted utility surveys to be incorporated into failure forecasting model. She also prepared presentations for the City's workshop/trainings and served as a quality controller for the project.


Corrosion Engineer/Researcher. The research team consists of Stratus Consulting, HDR and various water utilities. The objective of this project is to assist water utilities in making a compelling and accurate business case for effective asset management and related investments in infrastructure and operating protocols, embodying condition assessment, Triple Bottom Line (TBL) assessment of asset failure consequences, and optimization of risk mitigation options. Dr. Akhoondan worked with Stratus team members to develop algorithms related to various costs associated with pipe failures and repairs, in addition to collecting failure data from various water utilities.

Orange County Water District- GWR Pipeline Unit III Mortar Lining Condition Assessment, Orange County, CA

Technical Lead. HDR conducted a corrosion study to assess the condition of the mortar lining of GWR pipeline (66-inch diameter steel pipeline) transporting tertiary-treated recycled water from Fountain Valley to Anaheim in California. The project was focused on identifying bacteria that may influence the corrosion or lime leaching process of mortar by generating a red color biofilm on the surface. As part of this project, Dr. Akhoondan conducted a field investigation to perform microbiological induced corrosion (MIC) testing of mortar and to assess the condition of the cement mortar lining. She prepared a technical memorandum including a literature review on causes of red color slime on cement mortar lined water pipelines and recommendation to mitigate the degradation of the liner.

City of San Diego | Corrosion Assessment of City of San Diego North and South Metro Interceptors, San Diego, CA

Corrosion Engineer. North and South Metro Interceptors were constructed in the early 1960s and consist of over 18 miles of pipelines which are part of a major sewer pipeline serving the South Bay community in San Diego. The City of San Diego has set out to assess the condition of the North and South Metro Interceptors and any associated appurtenances. In support of this goal, the City contracted with HDR Engineering, Inc. (HDR), in conjunction with RBF Consulting, to provide an inspection and condition assessment for all structures associated with the interceptors. Dr. Akhoondan analyzed the soil corrosivity data and prepared a technical report, presenting the findings and conclusions in regards to the risk of external corrosion for reinforced concrete pipelines installed in this system. As part of this task, she also prepared a criticality report, identifying and prioritizing the condition assessment of City’s high-risk segments based on the pipeline properties, City’s institutional knowledge, manholes structure assessments and the corrosivity data.
Greg Frost, PE  
Corrosion Engineer

Mr. Frost is a Corrosion Engineer with HDR Engineering, Inc. since 2012. Mr. Frost has 7 years of experience in the field of civil engineering. At HDR he has been involved with corrosion control and condition assessment of water and wastewater facilities across all phases of the infrastructure life cycle including pre-design, design, construction support, activation, and condition assessment. He has performed field corrosivity studies to prepare the basis of corrosion control design, designed galvanic and impressed current cathodic protection systems for water and wastewater tanks, directed installation of cathodic protection systems, performed activation testing and system adjustment, led condition assessment field investigations on existing pipeline and tank systems, and performed construction management on replacement projects.

RELEVANT EXPERIENCE

Pacific States Environmental | Hilmar Cheese Wastewater Tank Cathodic Protection System Design and Installation (2013)  
Hilmar, CA

Corrosion EIT. The project consisted of the design, installation, and commissioning of CP systems on two wastewater digester tanks at the Hilmar Cheese facility. Mr. Frost assisted with the design and verification of the CP systems, performed material selection and procurement, led the installation crew, and performed system commissioning and activation testing. Other duties included schedule and budget management, project resource allocation, and preparation of an operations and maintenance manual for the tank CP systems.

City of Folsom | Water Storage Tank Condition Assessment (2013-2014)  
Folsom, CA

Corrosion EIT. The project consisted of a condition assessment and coating evaluation on twelve existing steel water storage tanks and one water main for the City of Folsom. Mr. Frost performed the current requirement testing, cathodic protection system evaluation, and coating inspection on each tank, as well as measuring potentials on all known test stations for the water main. He also prepared a summary report of findings with detailed recommendations for rehabilitation of each tank and an engineer’s cost estimate for the repairs.

Lake Elsinore, CA

Alternate Inspector. The project consisted of construction management and coating inspection for the interior and exterior rehabilitation and recoating of an existing 8 MG water storage tank. Mr. Frost assisted Mr. Mieczkowski as a backup field inspector during the welding and rafter cutting activities, as well as during abrasive blasting work on the tank.
exterior. He also performed technical review on the design submittal for the tank cathodic protection system.

**California Water Service Co. | Station 12 Tank Replacement (2015-2016)**

*Los Angeles, CA*

Construction Manager. The project consisted of civil design and construction management for replacement of an existing 1 MG buried water storage tank with a new 3 MG aboveground tank. Approximately 30,000 cubic yards of soil were removed as part of the site regarding work. Mr. Frost performed construction management tasks such as leading weekly progress meetings, reviewing submittals and RFIs, assisting the owner in responding to change order requests, coordinating with County permit inspectors, and scheduling special inspectors as needed. He also performed onsite general construction inspection and prepared daily reports of contractor progress.

**California Water Service Co. | Union Pacific Railroad Yard Main Replacement (2016)**

*Commerce, CA*

Construction Manager. The project consisted of construction management and cathodic protection design for replacement of a 30-inch steel water main through the Union Pacific Railroad yard. New cement mortar lined and coated pipeline and casing were installed at a depth of approximately 16 feet by jacking and boring. Mr. Frost performed construction management tasks such as leading weekly progress meetings, reviewing submittals and RFIs, assisting the owner in responding to change order requests, coordinating with the railroad operations staff, and scheduling special inspectors as needed. He also performed onsite general construction inspection and prepared daily reports of contractor progress.
RFP ADDENDUM

ADDENDUM NO. #1
To the
RFQ for Pipeline Integrity Testing Program Consulting Services
M18-103

TO ALL RFQ Holders: Effective this date, June 15, 2017

The following changes, additions and/or deletions are hereby made a part of the RFQ for the Pipeline Integrity Testing Program Consulting Services for Mesa Water District, Costa Mesa, California, as fully and completely as if the same were fully set forth therein:

Appendix A: Professional Services Contract, Appendix Four, Insurance Requirements: In the Professional Liability or Errors and Omissions Insurance paragraph, delete the sentence, “Coverage shall apply on a primary non-contributing basis in relation to any other insurance or self-insurance (primary or excess) available to Mesa Water, its directors, officers, employees, and authorized volunteers., in its entirety.

A COPY OF THIS ADDENDUM SIGNED BY THE BIDDER SHALL BE ENCLOSED WITH THE PROPOSAL.

MESA WATER DISTRICT

Bidder

HDR Engineering, Inc.

By

Karyn Igar

Karyn Igar, PE

Senior Civil Engineer

By

Aaron Meilleur

Title: Vice President
Appendix B: Professional Services Agreement Acceptance Form

Firm Name: HDR Engineering, Inc.

Address: 3230 El Camino Real, Suite #200

City Irvine State CA Zip Code 92602

Telephone: 714.730.2300 Fax: 714.730.2301

I have reviewed the RFP and Professional Services Agreement in their entirety. Our firm will execute the Professional Services Agreement with no exceptions.

Name of Authorized Representative: Aaron Meilleur - Water Business Group Area Mgr.

Signature of Authorized Representative: 

Date: June 21, 2017
CERTIFICATE OF LIABILITY INSURANCE

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFER NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Willis of Minnesota, Inc.
c/o 26 Century Blvd
P.O. Box 305191
Nashville, TN 372305191 USA

CONTACT NAME
1-877-945-7378
FAX 1-888-467-2378
E-MAIL
ADDRESS certificates@willis.com

INSURER(S) AFFORDING COVERAGE
NAIC# 23043

INSURED
MJK Engineering, Inc.
8404 Indian Hills Drive
Omaha, NE 68114

COVERAGES
CERTIFICATE NUMBER: WZ314174

REVISION NUMBER:

COLUMNS: TYPE OF INSURANCE ADD'L SUB/RED UM/WD POLICY NUMBER POLICY EFF (MM/DD/YYYY) POLICY EXP (MM/DD/YYYY) LIMITS

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DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Employers Liability for the Monopolistic States of ND, OH, WA, & WI is provided in the Worker's Compensation policy.

CERTIFICATE HOLDER
For Informational Purposes Only

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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ACORD ID: 14623380 BATCH: 329722
We practice increased use of sustainable materials and reduction of material use.

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MEMORANDUM

TO: Engineering and Operations Committee
FROM: Phil Lauri, P.E., Assistant General Manager
DATE: July 18, 2017
SUBJECT: HVAC System Design Amendment

RECOMMENDATION

Recommend that the Board of Directors approve a contract amendment to Goss Engineering, Inc. in the amount of $52,467 to provide design and documentation for a new roof and skylight on the Administration and Operations Buildings as part of the HVAC System Design Project, and authorize execution of the contract amendment.

STRATEGIC PLAN

Goal #2: Practice perpetual infrastructure renewal and improvement.

PRIOR BOARD ACTION/DISCUSSION

At its August 11, 2016 meeting, the Board of Directors awarded a contract to Goss Engineering to perform design of a new heating, ventilation, and air conditioning (HVAC) system for the Administration and Operation Buildings.

At its June 20, 2017 meeting, the Engineering and Operations Committee was informed that the Request for Proposals was being solicited.

BACKGROUND

Mesa Water District’s (Mesa Water®) current HVAC system has provided 24 years of service. The HVAC system is a roof top mounted fan-coil type system consisting of seven units placed atop the Operations and Administration Buildings. The system has been periodically maintained throughout the years and various repairs made to accommodate changing office configurations. With an increasing frequency in repairs, a need for more systematic control to address varying thermal conditions within the office environment, changing code compliance requirements, and the age of the current system, Mesa Water® engaged Goss Engineering Inc. (GEI) in July 2015 to perform an assessment of Mesa Water’s HVAC system.

The assessment recommended that Mesa Water replace the rooftop units with a new variable refrigerant flow (VRF) system. VRF systems provide more flexibility with improved zoning ability with the installation of individual cooling units in each occupant’s space. VRF systems consist of interior fan-coil units that can be ducted, ceiling mounted or wall-mounted and rooftop condensing units. The most appropriate fan-coil solution would include a ceiling-mounted approach. Ceiling-mounted units are preferred as they simplify condensate pipe installation and provide a cleaner appearance once installed. Installing a fan-coil unit in each space would allow individual occupant control of temperature in each office or workspace. GEI was awarded a contract to complete the design of a new VRF system.
GEI has completed the design drawings, specifications, and contract documents to the 90% level and are currently preparing the final deliverable for bid solicitation. Copies of the 90% design drawings are available upon request.

**DISCUSSION**

During the 2016-17 winter season, the Mesa Water Operations and Administration Buildings were subject to water infiltration on several occasions. It was determined that the roofs on both buildings, as well as the skylight in the Administration Building, were in need of replacement. In order to prevent patching of an old roof or removal of the new HVAC units to install a new roof at a later date, the projects will be combined under one construction contractor to streamline the installation of all disciplines (i.e., roof, skylight, HVAC system). Proposals for roof and skylight design services were solicited by GEI from qualified subconsultants.

GEI is proposing to work with Brady to perform the aforementioned design services for a not-to-exceed amount of $52,467. Brady brings the required design experience and has experience with similar projects at Mesa Water facilities. GEI’s cost proposal for the aforementioned amendment is attached as Exhibit A.

Staff recommends that the Board consider approving a contract amendment in the amount of $52,467 for roof and skylight design services for the Mesa Water HVAC System Replacement Project.

**FINANCIAL IMPACT**

In Fiscal Year 2018, $970,000 is budgeted for the construction of the new VRF HVAC System and Roof.

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<tr>
<th>Project Estimate Amounts</th>
<th>Project Cost Amounts</th>
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<td>Revised Contracts</td>
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<td>Revised Project Estimate</td>
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**ATTACHMENTS**

Attachment A: GEI Amendment Cost Proposal
July 12, 2017

Mr. Tim Beaman  
Associate Engineer  
Mesa Water District  
1965 Placentia Ave  
Costa Mesa, CA 92627

Subject: Mesa Water Roof Replacement Design – Extra Services Proposal

Dear Mr. Beaman:

Thank you for the opportunity to propose on this important design project at Mesa Water. As requested, Goss Engineering, Inc. (Goss) is pleased to submit this proposal for the engineering effort.

This proposal includes Scope of Work, Staff, Schedule, and requested Compensation.

SCOPE OF WORK

The general scope-of-work is to design for the roof replacement, in conjunction with the present rooftop unit replacement project. The specific additional scope of work is envisioned as follows:

- Rooftop design drawings including:
  - Demolition plans and specification for tear-off of existing roofing, slip-sheet, skylights, and counterflashing down to concrete and disposal of materials
  - White membrane replacement
  - Membrane replacement at curbs and base flashings
  - Counterflashing replacement at wall base flashing
  - Expansion joint metal
  - Walkway at roof access and around equipment to match current layout
  - Skylights
  - Through-wall scuppers as overflows

- Rooftop specifications
- Coordination of present rooftop unit design with new rooftop scope
- Provide standard engineering assistance during construction including:
  - Pre-Construction Meeting Attendance
  - Review of Contractor Submittals
  - Response to Contractor’s Request for Interpretation (RFI)
  - Construction Site Visits and Observation
  - Plan Revisions Due to Mesa Water District -Initiated Changes
Goss’ deliverables are proposed to include electronic copies of drawings and specifications at the listed submittals.

**Mesa Water Requirements**

Please provide:

- As-built drawings (completed)
- Access to site for field investigation
- Access to building personnel for staff interviews
- Comments at each submittal review phase
- Contractor redlines for record drawing preparation

**Services not Included**

- Preparation of as-built drawings of existing systems
- Testing/metering
- Engineering other than mechanical, electrical, structural, and roofing
- Replacement of roofing with material other than in-kind replacement
- Structural modifications or alterations to the roof framing system
- Energy studies
- Value engineering
- Drawing production other than specified
- Construction management (this proposal assumes Mesa Water will provide management of contractor’s efforts)
- Commissioning
- Actual construction effort
- Any item not reasonably inferred as part of the scope of work

We would be happy to provide any of the above services, except the actual construction effort, for additional fee consideration.

**ENGINEERING STAFF**

Mr. Shaw Gentry, PE, CEM, CWEP, is the proposed project manager and mechanical engineer-of-record. Brady is the proposed roofing sub-consultant.

**SCHEDULE**

We are ready to begin work on this project upon your written notice to proceed and we are able to meet any reasonable scheduling requirement.
REQUESTED ENGINEERING FEE

Based on the scope of work presented above, we will be pleased to provide the required additional engineering services on a lump sum basis for the amount of $52,467.

This requested engineering service fee also includes other direct costs associated with telephone, computers, travel, etc., which are necessary to complete the engineering effort.

We greatly appreciate the opportunity to submit our proposal for this project and to have the opportunity to continue working with you in making a positive difference. If you have any questions, comments, or concerns, please call me at (951) 340-1977 so that I may address.

Very truly yours,

GOSS ENGINEERING, INC.

Shaw Gentry, PE, CEM, CWEP

M36781
REPORTS:

11. REPORT OF THE GENERAL MANAGER:
REPORTS:

12. DIRECTORS' REPORTS AND COMMENTS:
RECOMMENDATION

This item is provided for information only.

STRATEGIC PLAN

Goal #3: Be financially responsible and transparent.
Goal #6: Provide outstanding customer service.

PRIOR BOARD ACTION/DISCUSSION

At its July 15, 2014 meeting, the Engineering and Operations Committee requested this report be provided on an annual basis.

DISCUSSION

To complete this annual report, staff extracted from the billing system the following:

- Installation dates greater than one-year
- Meter read equal to zero
- Consumption equal to zero
- Accounts that are active

As of June 30, 2017, there is just one account that meets the above criteria. The date range for that account is from 2002 to 2017. During this time, the meters are regularly checked for proper functionality. As a standard Customer Services policy, these customers will be contacted to notify them of their zero consumption on the meter. Previous communication with these types of customer has determined that customers are aware of the non-usage on the active meter and have elected to maintain the account as active. Additionally, staff will provide annual updates to the Board regarding accounts having zero usage.

FINANCIAL IMPACT

None.

ATTACHMENTS

None.