

PROFESSIONAL CONSULTANT SERVICES AGREEMENT

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Condition Assessment of Garner B Treatment Plant (RFP No. 2021)

THIS PROFESSIONAL CONSULTANT SERVICES AGREEMENT (“Agreement”) is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 2021 (“Effective Date”), by and between the CITY OF RIVERSIDE, a California charter city and municipal corporation (“City”), and PACIFIC ADVANCED CIVIL ENGINEERING, INC., a California corporation (“Consultant”).

1. **Scope of Services.** City agrees to retain and does hereby retain Consultant and Consultant agrees to provide the services more particularly described in Exhibit “A,” “Scope of Services” (“Services”), attached hereto and incorporated herein by reference, in conjunction with Condition Assessment of Garner B Treatment Plant (RFP No. 2021) (“Project”).

2. **Term.** This Agreement shall be effective on the date first written above and shall remain in effect for one year from the Effective Date of this Agreement, unless otherwise terminated pursuant to the provisions herein.

3. **Compensation/Payment.** Consultant shall perform the Services under this Agreement for the total sum not to exceed Seventy-Two Thousand Six Hundred Twenty Dollars (\$72,620), payable in accordance with the terms set forth in Exhibit “B.” Said payment shall be made in accordance with City’s usual accounting procedures upon receipt and approval of an itemized invoice setting forth the services performed. The invoices shall be delivered to City at the address set forth in Section 4 hereof.

4. **Notices.** Any notices required to be given, hereunder shall be in writing and shall be personally served or given by mail. Any notice given by mail shall be deemed given when deposited in the United States Mail, certified and postage prepaid, addressed to the party to be served as follows:

To City

Riverside Public Utilities/Water Operations  
City of Riverside  
Attn: Fernando Romero  
3900 Main Street  
Riverside, CA 92522

To Consultant

Pacific Advanced Civil Engineering, Inc.  
Attn: Duncan S. Lee  
17520 Newhope Street, Suite 200  
Fountain Valley, CA 92708

5. **Prevailing Wage.** If applicable, Consultant and all subcontractors are required to pay the general prevailing wage rates of per diem wages and overtime and holiday wages determined by the Director of the Department of Industrial Relations under Section 1720 et seq. of the California Labor Code and implemented by Resolution No. 13346 of the City Council of the City of Riverside. The Director's determination is available on-line at [www.dir.ca.gov/dlsr/DPreWageDetermination.htm](http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm) and is referred to and made a part hereof; the wage rates therein ascertained, determined, and specified are referred to and made a part hereof as though fully set forth herein.

6. **Contract Administration.** A designee of the City will be appointed in writing by the City Manager or Department Director to administer this Agreement on behalf of City and shall be referred to herein as Contract Administrator.

7. **Standard of Performance.** While performing the Services, Consultant shall exercise the reasonable professional care and skill customarily exercised by reputable members of Consultant's profession practicing in the Metropolitan Southern California Area, and shall use reasonable diligence and best judgment while exercising its professional skill and expertise.

8. **Personnel.** Consultant shall furnish all personnel necessary to perform the Services and shall be responsible for their performance and compensation. Consultant recognizes that the qualifications and experience of the personnel to be used are vital to professional and timely completion of the Services. The key personnel listed in Exhibit "C" attached hereto and incorporated herein by this reference and assigned to perform portions of the Services shall remain assigned through completion of the Services, unless otherwise mutually agreed by the parties in writing, or caused by hardship or resignation in which case substitutes shall be subject to City approval.

9. **Assignment and Subcontracting.** Neither party shall assign any right, interest, or obligation in or under this Agreement to any other entity without prior written consent of the other party. In any event, no assignment shall be made unless the assignee expressly assumes the obligations of assignor under this Agreement, in a writing satisfactory to the parties. Consultant acknowledges that any assignment may, at the City's sole discretion, require City Manager and/or City Council approval. Consultant shall not subcontract any portion of the work required by this Agreement without prior written approval by the responsible City Contract Administrator. Subcontracts, if any, shall contain a provision making them subject to all provisions stipulated in this Agreement, including without limitation, the insurance obligations set forth in Section 12. The Consultant acknowledges and agrees that the City is an intended beneficiary of any work performed by any subcontractor for purposes of establishing a duty of care between any subcontractor and the City.

10. **Independent Contractor.** In the performance of this Agreement, Consultant, and Consultant's employees, subcontractors and agents, shall act in an independent capacity as independent contractors, and not as officers or employees of the City of Riverside. Consultant acknowledges and agrees that the City has no obligation to pay or withhold state or federal taxes or to provide workers' compensation or unemployment insurance to Consultant, or to Consultant's employees, subcontractors and agents. Consultant, as an independent contractor, shall be responsible for any and all taxes that apply to Consultant as an employer.

## **11. Indemnification.**

**11.1 Design Professional Defined.** For purposes of this Agreement, “Design Professional” includes the following:

- A. An individual licensed as an architect pursuant to Chapter 3 (commencing with Section 5500) of Division 3 of the Business and Professions Code, and a business entity offering architectural services in accordance with that chapter.
- B. An individual licensed as a landscape architect pursuant to Chapter 3.5 (commencing with Section 5615) of Division 3 of the Business and Professions Code, and a business entity offering landscape architectural services in accordance with that chapter.
- C. An individual registered as a professional engineer pursuant to Chapter 7 (commencing with Section 6700) of Division 3 of the Business and Professions Code, and a business entity offering professional engineering services in accordance with that chapter.
- D. An individual licensed as a professional land surveyor pursuant to Chapter 15 (commencing with Section 8700) of Division 3 of the Business and Professions Code, and a business entity offering professional land surveying services in accordance with that chapter.

**11.2 Defense Obligation For Design Professional Liability.** Consultant agrees, at its cost and expense, to promptly defend the City, and the City’s employees, officers, managers, agents and council members (collectively the “Parties to be Defended”) from and against any and all claims, allegations, lawsuits, arbitration proceedings, administrative proceedings, regulatory proceedings, or other legal proceedings to the extent the same arise out of, pertain to, or relate to the negligence, recklessness or willful misconduct of Consultant, or anyone employed by or working under the Consultant or for services rendered to the Consultant in the performance of the Agreement, notwithstanding that the City may have benefited from its work or services and whether or not caused in part by the negligence of an Indemnified Party. Consultant agrees to provide this defense immediately upon written notice from the City, and with well qualified, adequately insured and experienced legal counsel acceptable to City. Consultant will reimburse City for reasonable defense costs for claims arising out of Consultant’s professional negligence based on the percentage of Consultant’s liability. This obligation to defend as set forth herein is binding on the successors, assigns and heirs of Consultant and shall survive the termination of Consultant’s Services under this Agreement.

**11.3 Indemnity For Design Professional Liability.** When the law establishes a professional standard of care for Consultant’s services, to the fullest extent permitted by law, Consultant shall indemnify, protect and hold harmless the City and the City’s employees, officers, managers, agents, and Council Members (“Indemnified Parties”) from and against any and all claim for damage, charge, lawsuit, action, judicial, administrative, regulatory or arbitration proceeding, damage, cost, expense (including counsel and expert fees), judgment, civil fines and

penalties, liabilities or losses of any kind or nature whatsoever to the extent the same arise out of, pertain to, or relate to the negligence, recklessness or willful misconduct of Consultant, or anyone employed by or working under the Consultant or for services rendered to the Consultant in the performance of the Agreement, notwithstanding that the City may have benefited from its work or services and whether or not caused in part by the negligence of an Indemnified Party.

**11.4 Defense Obligation For Other Than Design Professional Liability.**

Consultant agrees, at its cost and expense, to promptly defend the City, and the City's employees, officers, managers, agents and council members (collectively the "Parties to be Defended") from and against any and all claims, allegations, lawsuits, arbitration proceedings, administrative proceedings, regulatory proceedings, or other legal proceedings which arise out of, or relate to, or are in any way connected with: 1) the Services, work, activities, operations, or duties of the Consultant, or of anyone employed by or working under the Consultant, or 2) any breach of the Agreement by the Consultant. This duty to defend shall apply whether or not such claims, allegations, lawsuits or proceedings have merit or are meritless, or which involve claims or allegations that any or all of the Parties to be Defended were actively, passively, or concurrently negligent, or which otherwise assert that the Parties to be Defended are responsible, in whole or in part, for any loss, damage or injury. Consultant agrees to provide this defense immediately upon written notice from the City, and with well qualified, adequately insured and experienced legal counsel acceptable to City. This obligation to defend as set forth herein is binding on the successors, assigns and heirs of Consultant and shall survive the termination of Consultant's Services under this Agreement.

**11.5 Indemnity For Other Than Design Professional Liability.** Except as to the sole negligence or willful misconduct of the City, Consultant agrees to indemnify, protect and hold harmless the Indemnified Parties from and against any claim for damage, charge, lawsuit, action, judicial, administrative, regulatory or arbitration proceeding, damage, cost, expense (including counsel and expert fees), judgment, civil fine and penalties, liabilities or losses of any kind or nature whatsoever whether actual, threatened or alleged, which arise out of, pertain to, or relate to, or are a consequence of, or are attributable to, or are in any manner connected with the performance of the Services, work, activities, operations or duties of the Consultant, or anyone employed by or working under the Consultant or for services rendered to Consultant in the performance of this Agreement, notwithstanding that the City may have benefited from its work or services. This indemnification provision shall apply to any acts, omissions, negligence, recklessness, or willful misconduct, whether active or passive, on the part of the Consultant or anyone employed or working under the Consultant.

**12. Insurance.**

**12.1 General Provisions.** Prior to the City's execution of this Agreement, Consultant shall provide satisfactory evidence of, and shall thereafter maintain during the term of this Agreement, such insurance policies and coverages in the types, limits, forms and ratings required herein. The rating and required insurance policies and coverages may be modified in writing by the City's Risk Manager or City Attorney, or a designee, unless such modification is prohibited by law.

**12.1.1 Limitations.** These minimum amounts of coverage shall not constitute any limitation or cap on Consultant's indemnification obligations under Section 11 hereof.

**12.1.2 Ratings.** Any insurance policy or coverage provided by Consultant or subcontractors as required by this Agreement shall be deemed inadequate and a material breach of this Agreement, unless such policy or coverage is issued by insurance companies authorized to transact insurance business in the State of California with a policy holder's rating of A or higher and a Financial Class of VII or higher.

**12.1.3 Cancellation.** The policies shall not be canceled unless thirty (30) days' prior written notification of intended cancellation has been given to City by certified or registered mail, postage prepaid.

**12.1.4 Adequacy.** The City, its officers, employees and agents make no representation that the types or limits of insurance specified to be carried by Consultant pursuant to this Agreement are adequate to protect Consultant. If Consultant believes that any required insurance coverage is inadequate, Consultant will obtain such additional insurance coverage as Consultant deems adequate, at Consultant's sole expense.

**12.2 Workers' Compensation Insurance.** By executing this Agreement, Consultant certifies that Consultant is aware of and will comply with Section 3700 of the Labor Code of the State of California requiring every employer to be insured against liability for workers' compensation, or to undertake self-insurance before commencing any of the work. Consultant shall carry the insurance or provide for self-insurance required by California law to protect said Consultant from claims under the Workers' Compensation Act. Prior to City's execution of this Agreement, Consultant shall file with City either 1) a certificate of insurance showing that such insurance is in effect, or that Consultant is self-insured for such coverage, or 2) a certified statement that Consultant has no employees, and acknowledging that if Consultant does employ any person, the necessary certificate of insurance will immediately be filed with City. Any certificate filed with City shall provide that City will be given ten (10) days' prior written notice before modification or cancellation thereof.

**12.3 Commercial General Liability and Automobile Insurance.** Prior to City's execution of this Agreement, Consultant shall obtain, and shall thereafter maintain during the term of this Agreement, commercial general liability insurance and automobile liability insurance as required to insure Consultant against damages for personal injury, including accidental death, as well as from claims for property damage, which may arise from or which may concern operations by anyone directly or indirectly employed by, connected with, or acting for or on behalf of Consultant. The City, and its officers, employees and agents, shall be named as additional insureds under the Consultant's insurance policies.

**12.3.1** Consultant's commercial general liability insurance policy shall cover both bodily injury (including death) and property damage (including, but not limited to, premises operations liability, products-completed operations liability, independent contractor's liability, personal injury liability, and contractual liability) in an amount not less than \$1,000,000 per occurrence and a general aggregate limit in the amount of not less than \$2,000,000.

12.3.2 Consultant's automobile liability policy shall cover both bodily injury and property damage in an amount not less than \$1,000,000 per occurrence and an aggregate limit of not less than \$1,000,000. All of Consultant's automobile and/or commercial general liability insurance policies shall cover all vehicles used in connection with Consultant's performance of this Agreement, which vehicles shall include, but are not limited to, Consultant owned vehicles, Consultant leased vehicles, Consultant's employee vehicles, non-Consultant owned vehicles and hired vehicles.

12.3.3 Prior to City's execution of this Agreement, copies of insurance policies or original certificates along with additional insured endorsements acceptable to the City evidencing the coverage required by this Agreement, for both commercial general and automobile liability insurance, shall be filed with City and shall include the City and its officers, employees and agents, as additional insureds. Said policies shall be in the usual form of commercial general and automobile liability insurance policies, but shall include the following provisions:

It is agreed that the City of Riverside, and its officers, employees and agents, are added as additional insureds under this policy, solely for work done by and on behalf of the named insured for the City of Riverside.

12.3.4 The insurance policy or policies shall also comply with the following provisions:

- a. The policy shall be endorsed to waive any right of subrogation against the City and its sub-consultants, employees, officers and agents for services performed under this Agreement.
- b. If the policy is written on a claims made basis, the certificate should so specify and the policy must continue in force for one year after completion of the services. The retroactive date of coverage must also be listed.
- c. The policy shall specify that the insurance provided by Consultant will be considered primary and not contributory to any other insurance available to the City and Endorsement No. CG 20010413 shall be provided to the City.

12.4 **Errors and Omissions Insurance.** Prior to City's execution of this Agreement, Consultant shall obtain, and shall thereafter maintain during the term of this Agreement, errors and omissions professional liability insurance in the minimum amount of \$1,000,000 to protect the City from claims resulting from the Consultant's activities.

12.5 **Subcontractors' Insurance.** Consultant shall require all of its subcontractors to carry insurance, in an amount sufficient to cover the risk of injury, damage or loss that may be caused by the subcontractors' scope of work and activities provided in furtherance of this Agreement, including, but without limitation, the following coverages: Workers Compensation, Commercial General Liability, Errors and Omissions, and Automobile liability.

Upon City's request, Consultant shall provide City with satisfactory evidence that Subcontractors have obtained insurance policies and coverages required by this section.

**13. Business Tax.** Consultant understands that the Services performed under this Agreement constitutes doing business in the City of Riverside, and Consultant agrees that Consultant will register for and pay a business tax pursuant to Chapter 5.04 of the Riverside Municipal Code and keep such tax certificate current during the term of this Agreement.

**14. Time of Essence.** Time is of the essence for each and every provision of this Agreement.

**15. City's Right to Employ Other Consultants.** City reserves the right to employ other Consultants in connection with the Project. If the City is required to employ another consultant to complete Consultant's work, due to the failure of the Consultant to perform, or due to the breach of any of the provisions of this Agreement, the City reserves the right to seek reimbursement from Consultant.

**16. Accounting Records.** Consultant shall maintain complete and accurate records with respect to costs incurred under this Agreement. All such records shall be clearly identifiable. Consultant shall allow a representative of City during normal business hours to examine, audit, and make transcripts or copies of such records and any other documents created pursuant to this Agreement. Consultant shall allow inspection of all work, data, documents, proceedings, and activities related to the Agreement for a period of three (3) years from the date of final payment under this Agreement.

**17. Confidentiality.** All ideas, memoranda, specifications, plans, procedures, drawings, descriptions, computer program data, input record data, written information, and other materials either created by or provided to Consultant in connection with the performance of this Agreement shall be held confidential by Consultant, except as otherwise directed by City's Contract Administrator. Nothing furnished to Consultant which is otherwise known to the Consultant or is generally known, or has become known, to the related industry shall be deemed confidential. Consultant shall not use City's name or insignia, photographs of the Project, or any publicity pertaining to the Services or the Project in any magazine, trade paper, newspaper, television or radio production, website, or other similar medium without the prior written consent of the City. This provision shall survive the expiration or termination of this Agreement.

**18. Ownership of Documents.** All reports, maps, drawings and other contract deliverables prepared under this Agreement by Consultant shall be and remain the property of City. Consultant shall not release to others information furnished by City without prior express written approval of City. This provision shall survive the expiration or termination of this Agreement.

**19. Copyrights.** Consultant agrees that any work prepared for City which is eligible for copyright protection in the United States or elsewhere shall be a work made for hire. If any such work is deemed for any reason not to be a work made for hire, Consultant assigns all right, title and interest in the copyright in such work, and all extensions and renewals thereof, to City, and agrees to provide all assistance reasonably requested by City in the establishment, preservation

and enforcement of its copyright in such work, such assistance to be provided at City's expense but without any additional compensation to Consultant. Consultant agrees to waive all moral rights relating to the work developed or produced, including without limitation any and all rights of identification of authorship and any and all rights of approval, restriction or limitation on use or subsequent modifications. This provision shall survive the expiration or termination of this Agreement.

**20. Conflict of Interest.** Consultant, for itself and on behalf of the individuals listed in Exhibit "C," represents and warrants that by the execution of this Agreement, they have no interest, present or contemplated, in the Project affected by the above-described Services. Consultant further warrants that neither Consultant, nor the individuals listed in Exhibit "C" have any real property, business interests or income interests that will be affected by this project or, alternatively, that Consultant will file with the City an affidavit disclosing any such interest.

**21. Solicitation.** Consultant warrants that Consultant has not employed or retained any person or agency to solicit or secure this Agreement, nor has it entered into any agreement or understanding for a commission, percentage, brokerage, or contingent fee to be paid to secure this Agreement. For breach of this warranty, City shall have the right to terminate this Agreement without liability and pay Consultant only for the value of work Consultant has actually performed, or, in its sole discretion, to deduct from the Agreement price or otherwise recover from Consultant the full amount of such commission, percentage, brokerage or commission fee. The remedies specified in this section shall be in addition to and not in lieu of those remedies otherwise specified in this Agreement.

**22. General Compliance With Laws.** Consultant shall keep fully informed of federal, state and local laws and ordinances and regulations which in any manner affect those employed by Consultant, or in any way affect the performance of services by Consultant pursuant to this Agreement. Consultant shall at all times observe and comply with all such laws, ordinances and regulations, and shall be solely responsible for any failure to comply with all applicable laws, ordinances and regulations. Consultant represents and warrants that Consultant has obtained all necessary licenses to perform the Scope of Services and that such licenses are in good standing. Consultant further represents and warrants that the services provided herein shall conform to all ordinances, policies and practices of the City of Riverside.

**23. Waiver.** No action or failure to act by the City shall constitute a waiver of any right or duty afforded City under this Agreement, nor shall any such action or failure to act constitute approval of or acquiescence in any breach thereunder, except as may be specifically, provided in this Agreement or as may be otherwise agreed in writing.

**24. Amendments.** This Agreement may be modified or amended only by a written agreement and/or change order executed by the Consultant and City.

**25. Termination.** City, by notifying Consultant in writing, shall have the right to terminate any or all of Consultant's services and work covered by this Agreement at any time. In the event of such termination, Consultant may submit Consultant's final written statement of the amount of Consultant's services as of the date of such termination based upon the ratio that the work completed bears to the total work required to make the report complete, subject to the City's

rights under Sections 15 and 26 hereof. In ascertaining the work actually rendered through the termination date, City shall consider completed work, work in progress and complete and incomplete reports and other documents only after delivered to City.

25.1 Other than as stated below, City shall give Consultant thirty (30) days' prior written notice prior to termination.

25.2 City may terminate this Agreement upon fifteen (15) days' written notice to Consultant, in the event:

25.2.1 Consultant substantially fails to perform or materially breaches the Agreement; or

25.2.2 City decides to abandon or postpone the Project.

26. **Offsets.** Consultant acknowledges and agrees that with respect to any business tax or penalties thereon, utility charges, invoiced fee or other debt which Consultant owes or may owe to the City, City reserves the right to withhold and offset said amounts from payments or refunds or reimbursements owed by City to Consultant. Notice of such withholding and offset, shall promptly be given to Consultant by City in writing. In the event of a dispute as to the amount owed or whether such amount is owed to the City, City will hold such disputed amount until either the appropriate appeal process has been completed or until the dispute has been resolved.

27. **Successors and Assigns.** This Agreement shall be binding upon City and its successors and assigns, and upon Consultant and its permitted successors and assigns, and shall not be assigned by Consultant, either in whole or in part, except as otherwise provided in paragraph 9 of this Agreement.

28. **Venue.** Any action at law or in equity brought by either of the parties hereto for the purpose of enforcing a right or rights provided for by this Agreement shall be tried in the Superior Court, County of Riverside, State of California, and the parties hereby waive all provisions of law providing for a change of venue in such proceedings to any other county. In the event either party hereto shall bring suit to enforce any term of this Agreement or to recover any damages for and on account of the breach of any term or condition of this Agreement, it is mutually agreed that each party will bear their own attorney's fees and costs.

29. **Nondiscrimination.** During Consultant's performance of this Agreement, Consultant shall not discriminate on the grounds of race, religious creed, color, national origin, ancestry, age, physical disability, mental disability, medical condition, including the medical condition of Acquired Immune Deficiency Syndrome (AIDS) or any condition related thereto, marital status, sex, genetic information, gender, gender identity, gender expression, or sexual orientation, military and veteran status, in the selection and retention of employees and subcontractors and the procurement of materials and equipment, except as provided in Section 12940 of the California Government Code. Further, Consultant agrees to conform to the requirements of the Americans with Disabilities Act in the performance of this Agreement.

30. **Severability.** Each provision, term, condition, covenant and/or restriction, in whole and in part, of this Agreement shall be considered severable. In the event any provision,

term, condition, covenant and/or restriction, in whole and/or in part, of this Agreement is declared invalid, unconstitutional, or void for any reason, such provision or part thereof shall be severed from this Agreement and shall not affect any other provision, term, condition, covenant and/or restriction of this Agreement, and the remainder of the Agreement shall continue in full force and effect.

31. **Authority.** The individuals executing this Agreement and the instruments referenced herein on behalf of Consultant each represent and warrant that they have the legal power, right and actual authority to bind Consultant to the terms and conditions hereof and thereof.

32. **Entire Agreement.** This Agreement constitutes the final, complete, and exclusive statement of the terms of the agreement between the parties pertaining to the subject matter of this Agreement, and supersedes all prior and contemporaneous understandings or agreements of the parties. Neither party has been induced to enter into this Agreement by and neither party is relying on, any representation or warranty outside those expressly set forth in this Agreement.

33. **Interpretation.** City and Consultant acknowledge and agree that this Agreement is the product of mutual arms-length negotiations and accordingly, the rule of construction, which provides that the ambiguities in a document shall be construed against the drafter of that document, shall have no application to the interpretation and enforcement of this Agreement.

33.1 Titles and captions are for convenience of reference only and do not define, describe or limit the scope or the intent of the Agreement or any of its terms. Reference to section numbers, are to sections in the Agreement unless expressly stated otherwise.

33.2 This Agreement shall be governed by and construed in accordance with the laws of the State of California in effect at the time of the execution of this Agreement.

33.3 In the event of a conflict between the body of this Agreement and Exhibit "A" - Scope of Services hereto, the terms contained in Exhibit "A" shall be controlling.

34. **Exhibits.** The following exhibits attached hereto are incorporated herein to this Agreement by this reference:

Exhibit "A" - Scope of Services  
Exhibit "B" - Compensation  
Exhibit "C" - Key Personnel

IN WITNESS WHEREOF, City and Consultant have caused this Agreement to be duly executed the day and year first above written.

CITY OF RIVERSIDE, a California charter city and municipal corporation

PACIFIC ADVANCED CIVIL ENGINEERING, INC., a California corporation

By: \_\_\_\_\_  
City Manager

By:   
Duncan Lee

Attest: \_\_\_\_\_  
City Clerk

[Printed Name]  
Vice President / Principal, QA/QC Manager -  
Utilities Division  
\_\_\_\_\_  
[Title]

Certified as to Availability of Funds:  
By:   
Chief Financial Officer

By:   
Mark E. Krebs  
[Printed Name]  
Secretary  
\_\_\_\_\_  
[Title]

Approved as to Form:

By:   
Senior Deputy City Attorney

**EXHIBIT "A"**

**SCOPE OF SERVICES**

**EXHIBIT "A"**  
**SCOPE OF SERVICES**

The following Scope of Services outlines the services required for this project:

**Task 1 – Project Management Services**

- A. Conduct a kickoff meeting with the City to discuss the goals and objectives for the project. At this kickoff meeting, project reporting/communication protocols will be established, a project schedule will be provided and key issues will be discussed to establish the project guidelines. Consultant will prepare a meeting agenda for City's review prior to the kickoff meeting and draft meeting minutes with action items within five working days following the meeting.
- B. Provide a detailed billing breakdown with each invoice submitted listing all individuals and sub consultants/contractors who worked on the project, along with billing rates and hours charged.
- C. Provide a detailed budget summary with each invoice showing budget spent, remaining, and forecast for next billing period, along with a written summary of work performed for the invoice period and to be performed during next billing period.

**Task 2 – Preliminary Engineering Services**

- A. Review City's existing data and record drawings concerning treatment plant location, design, construction and other issues.
- B. Review groundwater quality data including PFAS monitoring results.

**Task 3 – Field Inspection Services**

- A. Provide all labor, equipment, materials, and incidentals necessary to perform an inspection of the existing treatment plant, including treatment plant appurtenances. Inspection will include but not limited to exterior inspection of above ground pipe system, treatment vessels, flanges, gaskets, valves and valve operators and chains, flow meters, gauges, instruments, electrical, and instrumentation and control. Interior visual inspection to include all five treatment vessels.

**Task 4 – Engineering Services**

- A. Perform a multidiscipline site-specific evaluation of the existing treatment facilities by a licensed engineer in the State of California. The evaluation, including mechanical and electrical, will include a full review of the original design plans and will take into consideration the existing conditions identified during the Field Inspections and any other applicable standards to identify potential areas of deficiency and provide recommendations accordingly.
- B. Perform process engineering evaluation/studies regarding treatment of groundwater by GAC. Evaluation shall include water quality of influent and effluent, treatment plant

capacity and anticipated O&M cost estimates.

- C. Prepare a detailed baseline Condition Assessment Report of the findings, including a summary with photos of the existing conditions discovered from the field inspections, a summary of the evaluations performed, recommendations for treatment plant retrofit and/or repair options, budgetary estimates for the retrofit and/or repair options presented, and a schedule for performing the recommended improvements. The repair options shall have the objective to place the treatment facilities back into full operation.
- D. Submit a copy of the draft Condition Assessment Report for City staff review and comment in Portable Document Format (PDF).
- E. Incorporate the City staff review comments and submit a copy of the final Condition Assessment Report incorporating comments from City staff in Portable Document Format (PDF).
- F. Conduct a Workshop with City staff to determine the scope of improvements, if any, that will be included in the contract documents.

**Task 5 – Prepare Bid Documents to Perform Treatment Facility Improvements and Select a Contractor (OPTIONAL TASK)**

- A. Prepare bid documents for a Contractor to construct all recommended improvements approved by City staff and assist City staff in answering questions during bidding, analysis of bids, and selection of Contractor.

Please provide a list of assumed improvements based on exhibits and photos provided with the RFP and your experience and expertise with similar projects.

**Task 6 – Perform Engineering Services during Construction (OPTIONAL TASK)**

- A. Provide engineering services during construction including answering RFIs and review of submittals. The services will also include performing specialty inspections and assistance in the startup and commissioning of the constructed improvements.

**Task 7 – Additional Engineering Services (OPTIONAL TASK)**

- A. This Task shall include a City controlled allowance for additional engineering services. The value of this task shall be ten-percent of the total project fee, less this task.

**Task 8 – Knowledge Transfer Session (OPTIONAL TASK)**

- A. Conduct a two-hour knowledge transfer session at the conclusion of the project for City staff. The session shall include a PowerPoint presentation and handouts with relevant photos and exhibits as necessary to convey the key issues of the project. The meeting will be held at the City offices.



# UNDERSTANDING AND APPROACH

## UNDERSTANDING **SCOPE OF SERVICES**

According to the City of Riverside (City) 2015 Urban Water Management Plan (2015 UWMP), the City provides about 75,000 acre-feet per year (AFY) of potable water to its customers. To meet this demand, the City currently operates 50 groundwater wells, and only purchases treated imported water from Western Municipal Water District if supply is needed. In 2001, the City constructed a five (5) vessel Granular Activated Carbon (GAC) contaminant treatment system to remove 1,2-dibromo-3-chloropropane (DBCP) from their Garner B and Russell C Wells, which had a combined well production of 3,600 gpm (Garner B – 1,600 gpm; Russell C – 2,000 gpm). With a drop in the contaminant level below the MCL, the treatment system was placed in an idle mode in 2009, along with Russel C Well being deactivated/abandoned.



The recent August 23, 2019 announcement of new Notification Levels for PFOA and PFOS by the California Division of Drinking Water (DDW) started a thundering and trickling effect on so many water purveyors who rely heavily on much less expensive groundwater. Many purveyors have already been impacted by shutting down their high producing primary wells when levels exceed DDW's new Response Levels, and a number of other wells may be soon to follow.

The City is taking the proactive approach of implementing a full-scale pilot project to treat water pumped from Garner B Well by utilizing the existing suspended Garner B GAC Treatment Plant. To understand treatment efficiencies for PFOS/PFOA removal the City's goals are:

- ◆ To perform a baseline condition assessment to determine the feasibility to rehabilitate Garner B Treatment Plant for use on a full-scale pilot project (Since the existing treatment system has been out of operation for over a decade).
- ◆ To obtain the most current information on the effectiveness of PFOS/PFOA removal of City's affected Garner B Well raw water supply using GAC.



PACE has carefully considered the appropriate approach to execute this project by reviewing the project RFP, the 2015 UWMP, photographs, non-record drawing design plans, the 2001 permit application with DDW, as well as current findings from other proactive water agencies like the Orange County Water District (OCWD). The project appears to be dictated by several overlying key factors, including, but not limited to:

## KEY FACTOR 1

### Production Focus to Minimize Annual Unplanned Budgetary Impact From Excess Purchase of Import Water

The very low revised Notification Level for PFOS and PFOA have caused many potable wells to be taken offline throughout county, and many are located within Southern California. Any new well today will require substantial amount of time and funding to design, drill and build. Pumping capacities steadily degrade due to on-going aging of the groundwater well system, and this management challenge is exponentially compounded when sudden loss in pumping capacity is caused by this contaminant that can greatly increase the financial burden of having to purchase costly import water.

## KEY FACTOR 2

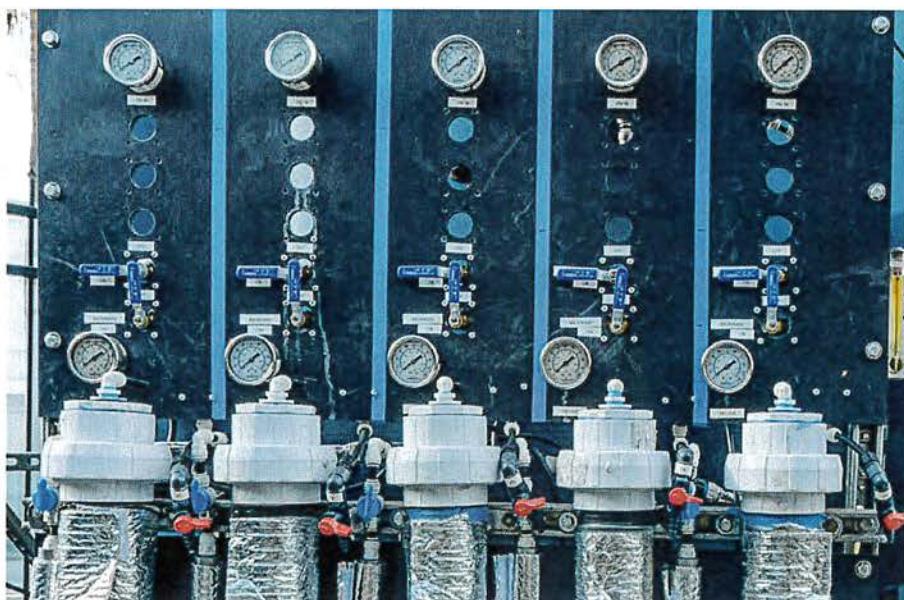
### The Existing Treatment System Will Operate at Below 50 Percent Flow Rate From Past Treatment Operation

According to the 2001 permit application with DDW, each of the five (5) existing 10-foot diameter vessels was to operate at a minimum Empty Bed Contact Time (EBCT) of 8.4 minutes, so that each vessel would have a design capacity of 750 gpm. For a 5 parallel vessel treatment system, the original design capacity would be approximately 3,750 gpm. Since the proposed treatment for PFAS would be significantly less at 1,600 gpm, the existing system can simply be altered with valves to allow two (2) trains of lead-lag arrangement to flow 650 gpm per train, and having the fifth vessel to operate at a reduced stand-alone flow rate of 300 gpm. The combined flow will not only be able to meet the Garner B Well production capacity of 1,600 gpm, but having the lead-lag arrangement will provide sufficient alert to City's operation staff to never have to worry about any breakthrough when the GAC media is exhausted in any of the lead tanks.

## KEY FACTOR 3

### Unplanned High Capital and O&M Expenditures with New Treatment Systems

Although supporting the topic of replacing aging water infrastructure seems to be obvious and necessary, with public agencies facing annual budgetary constraints, decision-makers for various water purveyors will likely still expect more evaluations and convincing justifications to support improvements. While adsorption treatment using GAC is currently the most favorable and proven method, it still is a high capital and O&M expenditure. To join the challenge of finding other effective alternative treatment methods with lower operational costs, PACE developed a small-scale pilot skid system that can be placed at the Garner B Well site to operate simultaneously with the existing full scale pilot system, in order for PACE to separately test other innovative treatment solutions – at no additional cost to the City.



## KEY FACTOR 4

Potential Uncertainty if PFAS Contaminants are More Prevalent at Different Zones Within the Groundwater Aquifer

Garner B Well was constructed in 1968 to a depth of 412 feet. The 16-inch diameter steel well has a 50-foot cement grout annular sanitary seal with perforations from 100 to 405 feet. The RFP did not indicate if any dynamic profiling was done in the past at Garner B Well to determine if PFAS is more prevalent at different stratified depths within the well. Recent dynamic profiling and ambient zone profiling efforts by our sub-consultant (optional) with their other clients relating to PFAS found a pattern that showed attenuation of PFAS contaminants with increased depths. This finding could provide additional short-term solutions, such as to utilize packers to "contain and isolate" PFAS from an active well with low level of PFAS, and to "isolate and capture" PFAS for treating wells with higher concentrations of PFAS. If the City believes this optional zone profiling is beneficial to attempt on Garner B Well, our sub-consultant can use equipment to extract water sample at various depths, and the City can then utilize their existing designating water quality laboratory to perform testing for PFAS. This optional testing task would have little to no impact to design schedules for it would be done concurrently with condition assessment.

## KEY FACTOR 5

Biogrowth Within Pressure Vessel Driving Up Back Pressures and Flow Reduction

The RFP did not indicate if past operation of the GAC system required routine backwashing to prevent excessive back pressures and flow reductions. More often than not, water quality from wells can be different from one another for a variety of reasons. For instance, in the City of Huntington Beach, three (3) of their eight (8) active wells have hydrogen sulfide with sulfur oxidizing bacteria in the raw water. When treatment media is added, like that of GAC, a biomass grows with sulfur and precipitates on the top several inches of the media, thus causing a steady increase in back pressures and reduction in flow capacity. Furthermore, backwash with produced effluent water alone lacks agitation energy to detach such biomass from the GAC. Air-scouring by injection of air has proven to generate sufficient agitation prior to water backwash.

## THE CITY IS SEEKING AN EXPERIENCED ENGINEERING CONSULTANT

It is PACE's understanding that the City is seeking an experienced engineering consultant that can:

- ◆ Provide a complete condition assessment of the existing GAC treatment system to determine the feasibility to rehabilitate the system into a full-scale pilot system to treat PFOA/PFOS. This will include and not be limited to exterior inspection of the above ground pipe system, treatment vessels, flanges, gaskets, valves and valve operators and chains, flow meters, gauges, instruments, electrical, and instrumentation and control. Interior visual inspection on all five treatment vessels is also needed.
- ◆ Perform a multidiscipline site-specific evaluation of the existing treatment facilities by a licensed engineer in the State of California. The evaluation, including mechanical and electrical, will include a full review of the original design plans and will take into consideration the existing conditions identified during the field inspections and any other applicable standards to identify potential areas of deficiency and to provide recommendations accordingly.
- ◆ Perform process engineering evaluations/studies regarding treatment of groundwater by GAC. Evaluation shall include water quality of influent and effluent, treatment plant capacity and anticipated O&M cost estimates.
- ◆ Prepare a detailed baseline Condition Assessment Report of the findings, including a summary with photos of the existing conditions discovered from the field inspections, a summary of the evaluations performed, recommendations for treatment plant retrofit and/or repair options, budgetary estimates for the retrofit and/or repair options presented, and a schedule for performing the recommended improvements. The repair options shall have the objective to place the treatment facilities back into full operation.
- ◆ Provide a Project Manager and a support team with experience similar to this treatment project.
- ◆ Provide additional insights and experience to possibly expand or revise current scope of work in the RFP.
- ◆ (Optional Tasks) – Prepare bid documents, perform engineering services during construction, perform additional engineering design services during construction, and to conduct a minimum two-hour knowledge transfer session at the conclusion of the project for City staff. Since actual scope of work of improvement cannot be determined until the conclusion of the Condition Assessment Report, the estimate fee schedule for these optional tasks is based on an assumed list of improvements, so that the amount can be adjusted at a later date, with either an increase or decrease in actual required scope of work.

# PROJECT OBJECTIVES

The following are project goals and criteria for the well site treatment improvements, provided from the "owner/operator" perspective to obtain reliability, and ability to repair and reduce maintenance costs with the existing treatment system layout:

## 01 Prioritize This Project at the Highest Level With Hyper Responsiveness

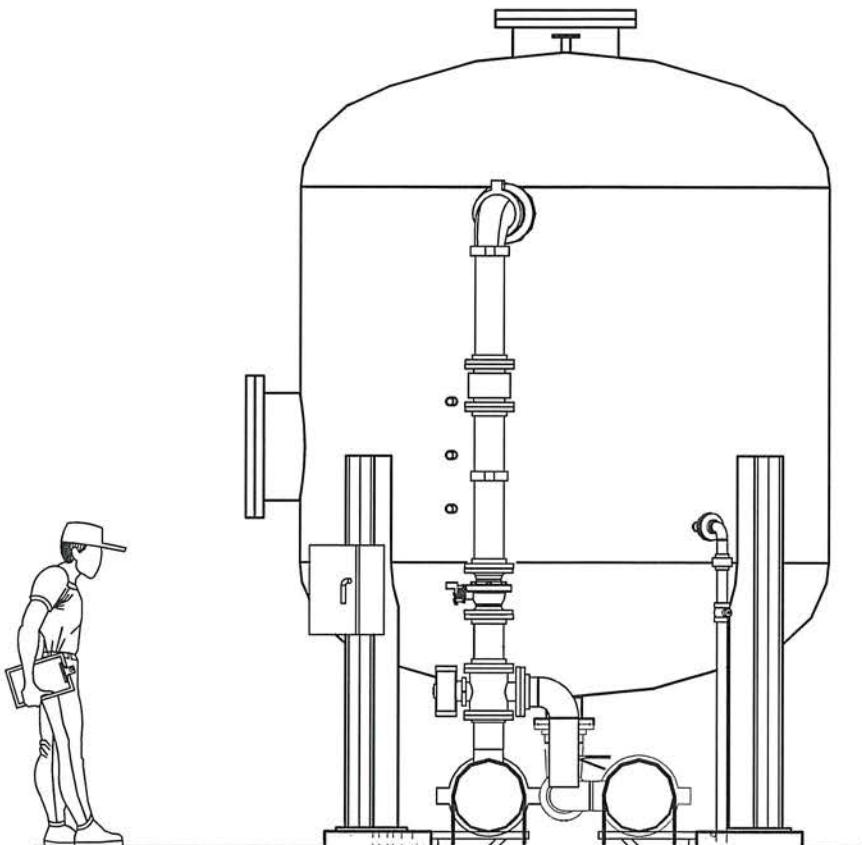
Team Project Manager has been a public servant and has led high profile priority projects for the majority of his 30+ year career. Under his proactive leadership, the PACE team will effectively and efficiently meet our objectives and schedule of milestones. Our hyper-responsiveness begins with routine dialogue with our stakeholders, monitoring schedule of milestones, paying attention to significant details, and being aggressive in managing internal staff to complete deliverables with quality and on time.

## 02 Integration of Monitoring/Controls

Individual pressure sensors and flow meters for each treatment train can be integrated with City's existing SCADA to monitor and balance flow, providing simple, yet effective means for asset management. This can also allow operators to anticipate when backwash cycles (if necessary) should occur for each pressure vessel.

## 03 Establish a "Template Design Approach"

While benefits from having a template design approach is obvious, it is typically a challenge to implement new technologies, design approaches, features, and equipment to an existing water system. However, the success and knowledge to be obtained from operating this existing treatment system at Garner B Well will inadvertently allow the City to be ready to mobilize if treatment becomes necessary at other City owned well sites in the future.



# PROJECT APPROACH

PACE will provide a cohesive team of engineers and operators with extensive experience in the design and operation of water well and treatment facilities. PACE will meet the challenges head-on by working with the Project Manager of the City.

## STRATEGY 01

**Validate and assess conditions with the existing treatment system layout.** PACE can review City's design plans, visit the well site, meet with the Project Manager and their supporting engineering team, and meet with operators to validate and assess the conditions of the existing treatment system in order to flush out any requirements or potential obstacles to complete the project.

## STRATEGY 02



**Involve City O&M staff early and often in the development of the Condition Assessment, along with optional tasks leading to Final Design, Plans and Specifications.** PACE will integrate past experience into the design, construction and operation of well production and treatment systems with the existing treatment system, along with optional tasks to prepare plans and specifications to rehabilitate the existing treatment system. PACE will start by meeting with the City's engineering teams, and with the O&M staff to solidify the project objectives.

## STRATEGY 03

**Use 3D modeling to visualize the completed installation and quickly identify potential construction and operational conflicts.** If recommended improvements will require significant changes to existing piping or layout (note: based on design plans and photos, PACE is not anticipating this to be the case), the initial concept plans can be developed as a 3D Model, allowing stakeholders and PACE team to visualize the completed installation and quickly identify potential construction and operational conflicts. PACE will then generate traditional drawings for bid. Progress drawing sets will be submitted based on 60%, 90% and final milestones, and team will meet to review comments from City staff at each milestone.



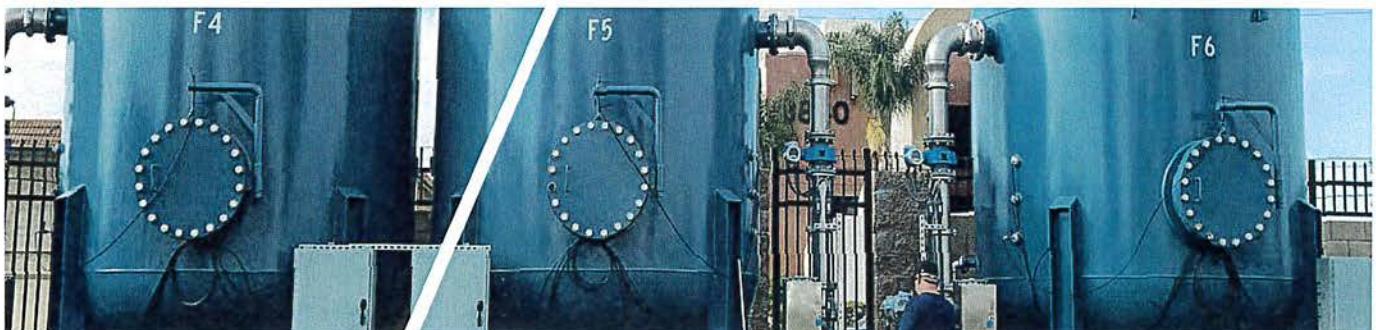
## STRATEGY 04



**Select common components and parts wherever possible to simplify O&M across other potential future sites.** Where possible, keep commonality of components and parts in mind during all facets of the design phase, to streamline and improve operability, replacement, and "globally" provide education for maintenance practices if other well sites also require treatment in the future.

## STRATEGY 05

**Design for flexibility to make future adaptive modifications to accommodate the evolving PFAS treatment market and technologies.** To anticipate for the possibility for future improved technologies for pre-treatment or treatment, consider provisions for placing additional pipe fittings, valves and blind flanges for future tie-in, and minimize the use of available open space for this system rehabilitation phase.



# SCOPE OF WORK

PACE has developed the following scope of work to coincide with instructions specified in the RFP, broken down into multiple primary categories. The following detailed scope of work is based on PACE meeting requirements established in the RFP, including any optional tasks listed in the RFP, but not including additional recommended optional tasks by PACE. PACE is not responsible for any regulatory and city permit fees. City can opt for PACE to pay the fees as-needed, and be reimbursed by the City on a monthly basis. PACE made the following assumptions during preparation of the detailed scope of work:

- ◆ Rehabilitation of the existing treatment system will be given a Categorical Exemption for CEQA compliance.
- ◆ For optional tasks (Task 5 to Task 8) starting with preparing bid documents for improvements recommended in the Conditional Assessment Report, PACE's estimated fee schedule is based on the following assumed level of rehabilitations:
  - » Replace valves, gaskets, nuts, washers, and bolts
  - » Replace and/or install new flow meter(s) and pressure transmitters
  - » Replace any small diameter tubings
  - » Recoat and reline pressure vessels

The only optional task outside of those identified in the RFP to perform is to perform well profiling as mentioned in "Key Factor 5". Since the optional task is to be performed by a sub-consultant and can be done in parallel with PACE's efforts, it would have little to no impact to the project schedule.

PACE has read the City's Sample Professional Services Agreement and can comply with the insurance requirements.

## ITEMS NEEDED FROM THE CITY

Based on the Scope of Work presented herein, PACE anticipates requesting the following information from the City:

1. Historical data, including and not limited to system flow rates, pressures, and typical backwash frequency.

## Required Tasks

<b>TASK 1.0 PROJECT MANAGEMENT</b>	<ul style="list-style-type: none"> <li>◆ <b>Project Kick-off Meeting</b> – PACE will initiate a project and kick-off meeting for the purpose of reviewing the project scope and objectives and for receiving pertinent project information from the City.</li> <li>◆ <b>Progress Meetings and Project Management</b> – PACE will develop a project schedule using Microsoft Project, showing pertinent tasks, milestones, staff review time (two weeks typical), etc. and will be updated for every progress meeting.</li> <li>◆ <b>Provide Detailed Billing Breakdown</b> – PACE will provide a detailed billing breakdown with each invoice submitted listing all individuals and sub consultants/contractors who worked on the project, along with billing rates and hours charged. PACE will also provide a detailed budget summary with each invoice showing budget spent, remaining, and forecast for next billing period, along with a written summary of work performed for the invoice period and to be performed during the next billing period.</li> </ul>
<b>TASK 2.0 PRELIMINARY ENGINEERING SERVICES</b>	<ul style="list-style-type: none"> <li>◆ <b>Review City's Existing Data</b> – PACE will review City's existing data and record drawings concerning treatment plant location, design, construction and other issues. PACE will also review groundwater quality data including PFAS monitoring results.</li> </ul>
<b>TASK 3.0 FIELD INSPECTION SERVICES</b>	<ul style="list-style-type: none"> <li>◆ <b>Condition Assessment</b> – PACE will provide all labor, equipment, materials, and incidentals necessary to perform an inspection of the existing treatment plant, including treatment plant appurtenances. Inspection will include but not limited to exterior inspection of above ground pipe system, treatment vessels, flanges, gaskets, valves and valve operators and chains, flow meters, gauges, instruments, electrical, and instrumentation and control. Interior visual inspection to include all five treatment vessels.</li> </ul>

## **TASK 4.0 ENGINEERING SERVICES**

- ◆ PACE to perform a multidiscipline site-specific evaluation of the existing treatment facilities by licensed engineers in the State of California. The evaluation, including mechanical and electrical, will include a full review of the original design plans and will take into consideration the existing conditions identified during the Field Inspections and any other applicable standards to identify potential areas of deficiency and provide recommendations, accordingly.
- ◆ PACE to perform process engineering evaluation/studies regarding treatment of groundwater by GAC. Evaluation shall include water quality of influent and effluent, treatment plant capacity and anticipated O&M cost estimates.
- ◆ PACE to prepare a detailed baseline Condition Assessment Report of the findings, including a summary with photos of the existing conditions discovered from the field inspections, a summary of the evaluations performed, recommendations for treatment plant retrofit and/or repair options, budgetary estimates for the retrofit and/or repair options presented, and a schedule for performing the recommended improvements. The repair options shall have the objective to place the treatment facilities back into full operation.
- ◆ PACE to submit a copy of the draft Condition Assessment Report for City staff review and comment in Portable Document Format (PDF).
- ◆ PACE to incorporate the City staff review comments and submit a copy of the final Condition Assessment Report incorporating comments from City staff in Portable Document Format (PDF).
- ◆ PACE to conduct a Workshop with City staff to determine the scope of improvements, if any, that will be included in the contract documents.

## **OPTIONAL TASKS LISTED IN THE RFP**

### **TASK 5.0**

#### **Prepare Bid Documents to Perform Treatment Facility Improvements and Select a Contractor**

- ◆ PACE to prepare bid documents for a Contractor to construct all recommended improvements approved by City staff and assist City staff in answering questions during bidding, analysis of bids, and selection of Contractor. Design submittals will consist of 60%, 90% and 100% Final plans, specifications and cost estimates.

### **TASK 6.0**

#### **Perform Engineering Services during Construction**

- ◆ PACE to provide engineering services during construction including answering RFIs and review of submittals. The services will also include performing specialty inspections and assistance in the startup and commissioning of the constructed improvements.

### **TASK 7.0**

#### **Additional Engineering Services**

- ◆ This Task shall include a City controlled allowance for additional engineering services. The value of this task shall be ten-percent of the total project fee, less this task.

### **TASK 8.0**

#### **Knowledge Transfer Session**

- ◆ PACE to conduct a two-hour knowledge transfer session at the conclusion of the project for City staff. The session shall include a PowerPoint presentation and handouts with relevant photos and exhibits as necessary to convey the key issues of the project. The meeting will be held at the City offices.

# PROJECT MANAGEMENT

The Project Manager will coordinate all planning and design work with all subconsultants and staff. Regular meetings or teleconferences will be held with applicable Project Team members and consultants to coordinate engineering study and/or design issues. Meeting minutes will be kept and retained in project files.

## CLIENT COORDINATION

The Project Manager will be the project's primary source contact with the client on contracting matters.

All correspondence to the client, whether incoming or outgoing, will be through the Project Manager. The Project Manager will keep the client informed of the project progress on a monthly basis unless otherwise indicated in the work plan or contract work scope. The monthly progress reports will, at a minimum include:

- Schedule status
- Work planned for upcoming month
- Progress to date
- List of issues which may affect project schedule / objectives

In addition to the progress reports, an Action Items Matrix (AIM) will be prepared and monthly updated provided to the Client. The AIM will identify actions to be accomplished, description of the activity, date for completion and lead person/ party responsible for ensuring the action is completed.

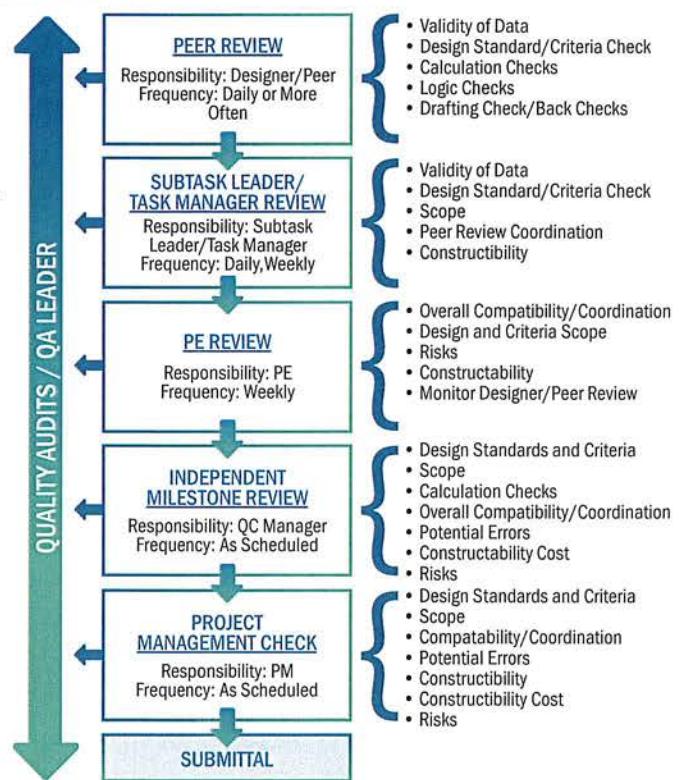
## SUBCONSULTANT MANAGEMENT

Agreements with our subconsultants will be followed by detailed task orders delineating the budget, schedule, and scope. These task orders will be monitored for progress and compliance. We will track the resources and the costs against the planned targets to ensure the resources are efficiently employed. With the high level of local and specialized expertise proposed, our subconsultant selection within the team depends on a well-organized planning and conceptual design process that uses staff only when needed for as long as needed and is delineated by the specific project requirements and locations. Our project knowledge and the skill of our management team provide the basis for a well-managed study and design process.

## QUALITY ASSURANCE / QUALITY CONTROL PROCEDURES

Our team will provide the highest quality work products. This will be accomplished through implementation of a Quality Assurance/Quality Control program that will be clearly defined in a quality control plan developed specifically for this project. Quality management will be used to ensure that the deliverables for the project meet a formally established standard of acceptance. Reviews are provided at critical points and specific responsibilities for the different levels of reviews during the life of the project are pre-defined. NOTHING is released from the project team to the client without at least one review. The plan will include:

1. Quality control for the project will utilize tools and methodologies for ensuring that all deliverables comply with approved quality standards.
2. Senior level staff and technical area experts will assist the Project Manager in verifying the quality standards are met for the deliverables.
3. Use of a **Technical Advisory Panel** made up of senior technical experts to review recommendations developed by the project team. These experts will attend the criteria committee meetings, constructability review meetings and workshops, as needed.
4. Regularly scheduled project coordination meetings between City and our project manager and project engineers.
5. Independent review of each technical work product before its submission to City.
6. Bi-monthly performance assessments from City.



**EXHIBIT "B"**

**COMPENSATION**

# PRICING



Task	Work Item Description	ESTIMATED PACE MANHOURS										FEE SUMMARY			FEE SUMMARY OF OPTIONAL												
		Principle Project Manager (D. Lee)	Project Assistant Manager (D. Lee)	Project Engineer (R. Akromot)	Project Specialist (C. Alabaraan)	Project Specialist (R. Sr. Electric Engineer)	Project Engineer (E. Lamarena)	Project Engineer (L. Wi)	Project Engineer (R. Sr. Electric Engineer)	Project Engineer (E. Lamarena)	Project Manager (D. Lee)	Man Power Subtotal (Optional)	Task Costs Subtotal (Optional)	Lump Sum Fee for Services (Optional)	Total Task Costs (Optional)	Total Task Costs Subtotal	Man Power Subtotal	Lump Sum Fee for Services	Total Task Costs	Total Task Costs Subtotal	Man Power Subtotal (Optional)	Lump Sum Fee for Services (Optional)	Total Task Costs (Optional)				
<b>TASK 1.0 - PROJECT MANAGEMENT</b>		0	22	0	0	0	0	0	0	0	3	0	25	\$5,080	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
1.1	Project Kick-off Meeting	-	4	-	-	-	-	-	-	-	2	-	6	\$1,040	-	\$1,040	0	0	0	0	-	-	-	-	-		
1.2	Project Meeting and Project Management	-	16	-	-	-	-	-	-	-	-	-	16	\$3,520	-	\$3,520	0	0	0	0	-	-	-	-	-		
1.3	Provide Detailed Billing Breakdown	-	2	-	-	-	-	-	-	-	1	-	3	\$520	-	\$520	0	0	0	0	-	-	-	-	-		
<b>TASK 0 - PRELIMINARY ENGINEERING SERVICES</b>		0	2	2	8	0	12	0	0	0	0	0	26	\$4,310	\$0	\$4,310	0	0	0	0	-	-	-	-	-		
2.1	Review City's Existing Data	-	2	2	2	8	-	12	-	-	-	-	26	\$4,310	-	\$4,310	0	0	0	0	-	-	-	-	-		
<b>TASK 3.0 - FIELD INSPECTION SERVICES</b>		0	8	8	8	0	16	0	0	0	0	0	48	\$8,640	\$0	\$8,640	0	0	0	0	-	-	-	-	-		
3.1	Condition Assessment	-	8	8	8	8	-	16	-	-	-	-	48	\$8,640	-	\$8,640	0	0	0	0	-	-	-	-	-		
<b>TASK 4.0 - ENGINEERING SERVICES</b>		0	16	7	7	21	0	42	0	0	0	0	93	\$15,770	\$0	\$15,770	0	0	0	0	-	-	-	-	-		
4.1	Multidiscipline Site-Specific Evaluation	-	4	4	4	4	-	8	-	-	-	-	24	\$4,320	-	\$4,320	0	0	0	0	-	-	-	-	-		
4.2	Process Engineering Evaluation for Treatment	-	4	-	4	-	4	-	-	-	-	-	12	\$2,140	-	\$2,140	0	0	0	0	-	-	-	-	-		
4.3	Prepare Draft Condition Assessment Report	-	4	2	2	8	-	24	-	-	-	-	40	\$6,310	-	\$6,310	0	0	0	0	-	-	-	-	-		
4.4	1st Submittal of Draft Condition Assessment Report	-	1	1	1	2	-	4	-	-	-	-	9	\$1,525	-	\$1,525	0	0	0	0	-	-	-	-	-		
4.5	2nd and Final Submittal of Condition Assessment Report	-	1	-	1	-	2	-	-	-	-	-	4	\$665	-	\$665	0	0	0	0	-	-	-	-	-		
4.6	Presentation Workshop for City Staff	-	2	-	2	-	-	-	-	-	-	-	4	\$810	-	\$810	0	0	0	0	-	-	-	-	-		
<b>TASK 05 - PREPARE BID DOCUMENTS (OPTIONAL)</b>		0	12	8	8	24	0	40	0	0	80	0	4	0	0	0	0	0	0	0	176	\$24,720	\$0	\$24,720			
5.1	Prepare 60%, 90% and 100% Final P&E Bid Documents	-	12	8	8	24	-	40	-	-	80	-	4	-	-	-	-	-	-	50	176	\$24,720	-	\$24,720			
<b>TASK 6.0 - PERFORM ENGINEERING SERVICES DURING CONSTRUCTION (OPTIONAL)</b>		0	2	4	4	4	0	16	0	0	0	0	4	0	0	0	0	0	0	50	50	50	34	\$5,240	\$0	\$5,240	
6.1	Response to RFIs, Submittals, Specialty Inspection/Assistance in Startup	-	2	4	4	4	-	16	-	-	-	-	4	-	-	-	-	-	-	50	34	\$5,240	-	\$5,240			
<b>TASK 7.0 - ADDITIONAL ENGINEERING SERVICES (OPTIONAL)</b>		0	12	0	0	16	0	4	0	0	0	0	0	0	0	0	0	0	0	0	32	\$6,120	\$0	\$6,120			
7.1	10% Contingency of Total Project (less this task)	-	12	-	-	16	-	4	-	-	-	-	-	-	-	-	-	-	50	32	\$6,120	-	\$6,120				
<b>TASK 8.0 - KNOWLEDGE TRANSFER SESSION (OPTIONAL)</b>		0	4	0	0	4	0	8	0	0	0	0	1	0	0	0	0	0	0	50	50	50	17	\$2,740	\$0	\$2,740	
8.1	2-Hour Knowledge Transfer Session to City Staff	0	4	-	-	4	-	8	-	-	-	-	1	-	-	-	-	-	50	17	\$2,740	-	\$2,740				
		192	\$33,800	\$0	\$33,800	\$0	\$38,820	\$0	\$38,820	\$0	\$38,820	\$0															
ESTIMATED TOTAL PROJECT COST: \$72,620																											

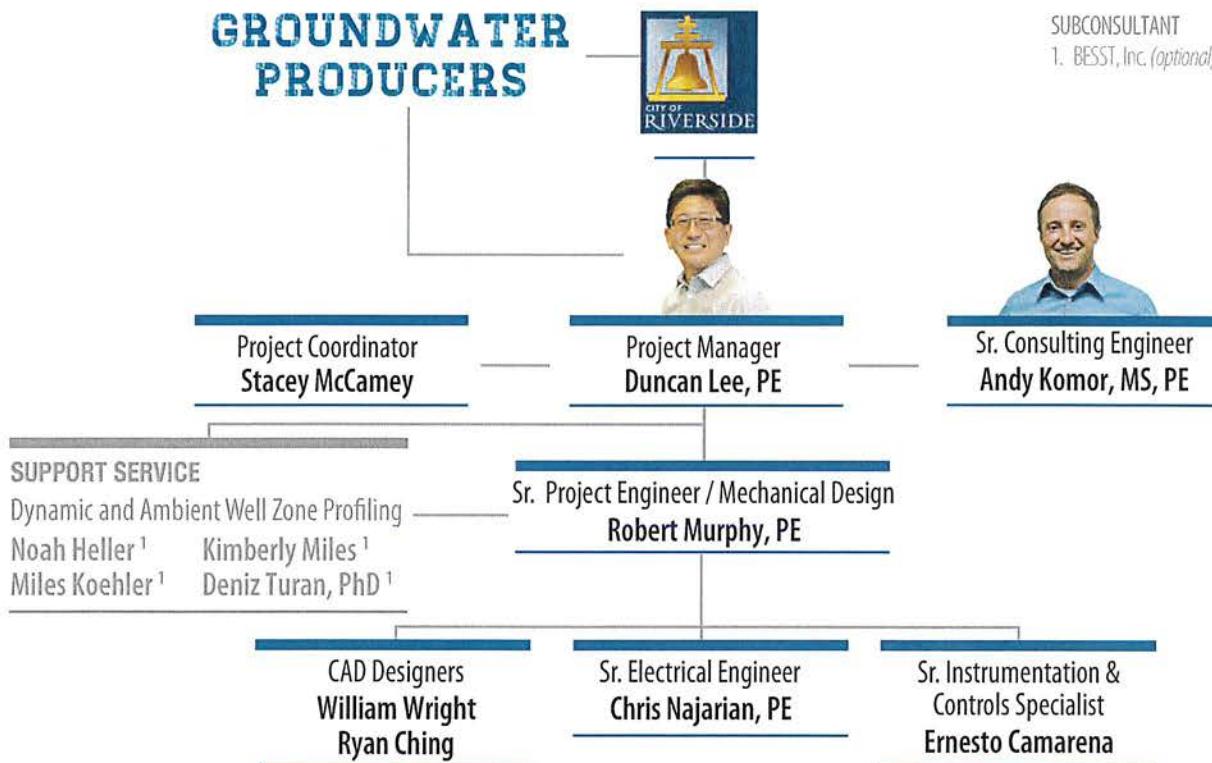
**EXHIBIT "C"**

**KEY PERSONNEL**



# COMPANY PERSONNEL

## TEAM ORGANIZATION CHART



### Project Manager

With a combined 30 years of municipal / public agency experience including 17 years as a Principal Engineer for the City of Huntington Beach and nearly 10 years of experience with the Los Angeles Department of Water and Power (LADWP) with drinking water and recycled water, Duncan Lee offers technical expertise on engineering of municipal water infrastructure in both the design role and the City project management role. He has managed all aspects of water systems from capital improvement design and project implementation, master planning, rate studies, rate increases, water conservation, and construction management. He will impart several strategies to overcome key potential project issues and his value is most felt in his proven ability to unite engineering, operation, maintenance and consultants in a productive collaborate environment. His recent project experience includes project management and design of important well system improvements for Orange County Water District Groundwater Producers, including piloting to remove hydrogen sulfide using GAC and PFAS removal through co-precipitation filtration and biological treatment (confidentially during this testing phase), as well as new and upgraded facilities for communities throughout California.



# SUBCONSULTANT OPTIONAL



## Zone Profiling

**Best Environmental Subsurface Science and Technologies (BESST, Inc.)** founded in 1998 and has been profiling municipal groundwater production wells using the US Geological Survey's Tracer Flow and Depth Dependent Sampler technology for the past 15 years. Within this time span, BESST has performed over 800 profiles throughout California as well as many profiling surveys in other western and some northeastern states.

**BESST Degree of Involvement:** Described in the Statement of Understanding and Approach section of the proposal.

**BESST Length of Time Working with PACE Project Manager:** The Project Manager, Duncan Lee, has worked with BESST for over ten years while employed at the City of Huntington Beach as the Principal Engineer.

## KEY TEAM MEMBER QUALIFICATIONS

NAME, TITLE, CONTACT NUMBER	EDUCATION & LICENSES/ CERTIFICATIONS	RELEVANT EXPERTISE	RELATED PROJECT EXPERIENCE
<b>PACE</b>			
<b>DUNCAN LEE, PE</b> <i>Project Manager</i> Direct: (714) 481-0662 Cell: (714) 553-6967	32 years BS Civil Engineering, CSU, Long Beach PE – CA: 44825	<ul style="list-style-type: none"> <li>Water treatment</li> <li>Water infrastructure</li> <li>QA/QC review</li> <li>Construction management</li> <li>Rate studies</li> <li>O&amp;M</li> <li>Construction cost estimating</li> <li>Feasibility and planning studies</li> </ul>	<ul style="list-style-type: none"> <li>City of Huntington Beach Well 9 GAC Filtration System</li> <li>Hydrogen Sulfide Removal of a Water Well for a Coastal City in Southern California</li> <li>City of Huntington Beach Replacing Well 1 with Well 1A</li> <li>City of Huntington Beach Well 13 Chlorine Storage Structure</li> <li>City of Huntington Beach New Well 12</li> <li>Southern California Pilot Testing for Removal of PFAS</li> <li>City of Vernon Well #22 Well Head Equipping, Treatment and Site Improvements</li> </ul>

<b>ANDY KOMOR, MS, PE</b> <i>Sr. Consulting Engineer</i> Direct: (714) 481-7225 Cell: (714) 514-8919	20 years MS Civil and Environmental Engineering, Arizona State University BS Civil Engineering, University of Minnesota PE – CA: 64928	<ul style="list-style-type: none"> <li>Advanced potable water treatment</li> <li>New technology research &amp; development</li> <li>Bench-scale pilot testing</li> <li>Pumping / mechanical equipment</li> <li>Water storage facilities</li> <li>Pipeline systems / hydraulics</li> </ul>	<ul style="list-style-type: none"> <li>Golden State Water Company Del Monte Well 4 Arsenic Removal</li> <li>City of Huntington Beach Well 9 Treatment System</li> <li>San Diego County Public Water System Wellhead Treatment System</li> <li>San Diego County Ion Exchange for a Series of Potable Water Wells</li> <li>Hydrogen Sulfide Removal of a Water Well for a Coastal City in Southern California</li> <li>Dateland Water Treatment Plant GAC and RO Pretreatment Upgrade</li> <li>Santa Ana Country Club Pretreatment GAC and RO Filtration System</li> <li>Santa Monica Sustainable Water Infrastructure Project (SWIP) Advanced Water Treatment Facility</li> <li>Los Angeles Country Club Wells and Ozone Injection System</li> <li>El Toro Water District Chloramination Injection Facilities at R1 and R2 Reservoirs</li> <li>Mesa Water District Well rehabilitation, Automation and Ozone Treatment</li> <li>Lenain Water Treatment Plant Operations and Water Infrastructure Consulting and Engineering</li> <li>BNSF Groundwater Wells, Water Tank and Booster Pump Station</li> <li>Orange Grove and Rancho Mesa Verde Potable Water System</li> </ul>
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NAME, TITLE, CONTACT NUMBER	EDUCATION & LICENSES/ CERTIFICATIONS	RELEVANT EXPERTISE	RELATED PROJECT EXPERIENCE
<b>ROBERT MURPHY, PE</b>  <i>Sr. Project Engineer / Mechanical Design</i>  Direct: (714) 481-0675 Cell: (714) 397-2070	14 years  BS Civil Engineering, CSU, Long Beach  PE – CA: C83207	<ul style="list-style-type: none"> <li>• Water treatment</li> <li>• Water conveyance and distribution</li> <li>• Water storage</li> <li>• Pump station / mechanical</li> <li>• Well design / wellhead treatment</li> <li>• Surveying services management</li> <li>• Equipment selection</li> <li>• Construction administration</li> <li>• Development of plans, specifications, and reports</li> <li>• Cost estimates</li> </ul>	<ul style="list-style-type: none"> <li>• Huntington Beach Well 9 Treatment System</li> <li>• Dateland Water Treatment Plant GAC and RO Pretreatment Upgrade</li> <li>• BNSF Groundwater Wells, Water Tank and Booster Pump Station</li> <li>• Upper Oso Reservoir Emergency Water Quality Improvements Super Oxygenation System</li> <li>• El Toro Water District Disinfection System Improvements</li> <li>• Oso Creek Nuisance Water Pump Station and Treatment</li> <li>• San Diego County Ion Exchange for a Series of Potable Water Wells</li> <li>• San Diego County Public Water System Wellhead Treatment System</li> </ul>
<b>CHRIS NAJARIAN, PE</b>  <i>Sr. Electrical Engineer</i>  Direct: (714) 481-1772 Cell: (714) 425-7753	10 years  BS Electrical Engineering, Illinois Institute of Technology  PE – CA: 22545  C-10 Electrical Contractor – CA: 1047665	<ul style="list-style-type: none"> <li>• Water treatment systems</li> <li>• Pump stations</li> <li>• Control networks for plants</li> <li>• Flow meters</li> <li>• Relay panels</li> <li>• PLCs</li> <li>• HMIs</li> </ul>	<ul style="list-style-type: none"> <li>• LACFD Fire Camp 11 and Henninger Flats Campground Wells and Potable Water Treatment System</li> <li>• Vernon Water Well 22 Equipping and Treatment System</li> <li>• City of Long Beach Covanta Renewable Energy Project</li> <li>• Mountain House Tanks and Dual Zone Booster Pump Station &amp; Westside Booster Pump Station</li> <li>• City of Manhattan Beach Larsson Street Pumping Station</li> <li>• San Gabriel Valley Water Plant B6 Construction</li> </ul>
<b>ERNESTO CAMARENA</b>  <i>Sr. Instrumentation and Controls Specialist</i>  Direct: (714) 481-7228 Cell: (714) 263-6921	26 years  A.A. / Applied Science, Computer Aided Drafting, ITT Technical Institute, West Covina, CA	<ul style="list-style-type: none"> <li>• Water treatment</li> <li>• Water treatment Process and instrumentation design</li> <li>• Controls and automation design for wells and pump stations</li> <li>• Storage reservoirs</li> <li>• Process flow schematics</li> <li>• Conceptual design exhibits</li> <li>• QA / QC</li> </ul>	<ul style="list-style-type: none"> <li>• City of Huntington Beach Well 9 Treatment System</li> <li>• Wellhead Ion &amp; Manganese Treatment and Controls</li> <li>• San Diego County Public Water System Wellhead Treatment System</li> <li>• Dateland Water Treatment Plant GAC and RO Pretreatment Upgrade</li> <li>• Santa Ana Country Club Pretreatment GAC and RO Filtration System</li> <li>• Santa Monica Sustainable Water Infrastructure Project (SWIP) Advanced Water</li> <li>• LACFD Fire Camp 11 and Henninger Flats Campground Potable Water Treatment System</li> <li>• Lenain Water Treatment Plant Operations and Water Infrastructure Consulting and Engineering</li> <li>• Los Angeles Country Club Sulfide Removal</li> <li>• El Toro Water District Disinfection System Improvements</li> <li>• San Diego County Ion Exchange for a Series of Potable Water Wells</li> </ul>

NAME, TITLE, CONTACT NUMBER	EDUCATION & LICENSES/ CERTIFICATIONS	RELEVANT EXPERTISE	RELATED PROJECT EXPERIENCE
<b>OPTIONAL SUBCONSULTANT - BESST</b>			
<b>NOAH HELLER</b> <i>President</i> Cell: (415) 302-7354	35 years  BA Geology, Rutgers University  MS Geology, Mississippi State University  PG – CA: 5792	<ul style="list-style-type: none"> <li>• Dynamic profiling</li> <li>• Ambient profiling</li> <li>• QA/QC review</li> <li>• Well construction</li> <li>• Well modification</li> <li>• Feasibility testing</li> <li>• Packer integration and isolated sampling</li> <li>• Monitoring well installation</li> <li>• Borehole logging</li> <li>• Dissipation testing</li> <li>• Technology development</li> </ul>	<ul style="list-style-type: none"> <li>• WRD of Southern California</li> <li>• American Water</li> <li>• Department of Toxic Substances Control (DTSC)</li> </ul>
<b>KIMBERLY MILES</b> <i>Senior Hydrogeologist</i> Cell: (907) 723-0686	7 years  BS Geology, BS Hydrogeology, University of Idaho	<ul style="list-style-type: none"> <li>• Dynamic Profiling</li> <li>• Ambient Profiling</li> <li>• QA/QC Review</li> <li>• Well construction</li> <li>• Well modification</li> <li>• Error Analysis</li> <li>• Feasibility Testing</li> </ul>	<ul style="list-style-type: none"> <li>• WRD of Southern California</li> <li>• American Water</li> <li>• Department of Toxic Substances Control (DTSC)</li> </ul>
<b>MILES KOEHLER</b> <i>Field Operations Manager</i> Direct: (415) 453-2105 Cell: (510) 414-9984	6 years  BS Geology, San Francisco State University	<ul style="list-style-type: none"> <li>• Dynamic profiling</li> <li>• Ambient profiling</li> <li>• Packer integration and isolated sampling</li> <li>• Monitoring well installation</li> <li>• Borehole logging</li> <li>• Dissipation testing</li> <li>• Technology development</li> </ul>	<ul style="list-style-type: none"> <li>• WRD of Southern California</li> <li>• American Water</li> <li>• Department of Toxic Substances Control (DTSC)</li> </ul>
<b>DENIZ TURAN, PHD</b> <i>Report Manger</i> Direct: (415) 453-2106	5 years  BS Geological Engineering, MS Hydrogeology, Middle East Technical University	<ul style="list-style-type: none"> <li>• Dynamic profiling</li> <li>• Ambient profiling</li> <li>• QA/QC review</li> </ul>	<ul style="list-style-type: none"> <li>• WRD of Southern California</li> <li>• American Water</li> </ul>

# DUNCAN LEE, PE

## PROJECT MANAGER



### EDUCATION

B.S. Civil Engineering  
California State University, Long Beach / 185

### YEARS OF EXPERIENCE

32+ Years  
Joined PACE in 2018

### REGISTRATIONS

Professional Engineer / CA  
1989 / 44825

Duncan Lee has extensive design, construction, financial management, asset management, and operation and maintenance experience as he has served in several public agencies for nearly 30 years. His last role was about 17 years as the Principal Civil Engineer, in charge of the Water Engineering Systems for the City of Huntington Beach. His knowledge and understanding in both the water and wastewater industry includes master planning, design, construction, and rate studies, but his value is most felt in his proven ability unite engineering, operation, maintenance, and consultants in a productive and collaborative environment. Duncan adds significant value on a wide range of utility projects serving as the Project Manager and will impart current experience with GAC wellhead treatment systems in Southern California.

### RELATED EXPERIENCE

#### Huntington Beach Well 9 GAC Treatment System – Huntington Beach, CA

Mr. Lee served as the City Engineer managing the analysis and design of a complete 3,000 gpm (4.3 MGD) Granular Activated Carbon (GAC) filtration system treatment facility. The project included multiple phases of project development, lab services, piloting, concept development, water treatment facility engineering, preparation of plans and specifications, planning division visualization graphics, and startup and operations support services on this innovative and unique treatment system.

#### Hydrogen Sulfide Removal of a Water Well for a Coastal City in Southern California – Southern California (Client Confidential)

Mr. Lee is serving as the Project Manager to lead a pilot study for a 3,000 gpm drinking water well located within a southern California municipality to remove hydrogen sulfide through various methods including air stripping, regeneration of GAC media, and biological treatment. The hydrogen sulfide concentration at this well site is over four times greater than City of Huntington Beach's Well 9 treatment project, and does not have any native sulfide oxidizing bacteria in the groundwater.

#### Pilot Testing for Removal of PFAS – Southern California, CA (Client Confidential)

Mr. Lee is serving as the Project Manager to lead a pilot study for a 1,750 gpm drinking water well located within a southern California municipality to remove PFAS using various methods including co-precipitation filtration and biological treatment. This research and development effort is to see potential additional treatment alternatives or enhancements that could lower capital costs and/or lower annual O&M costs.

#### Replacement of Well 1 with Well 1A – Huntington Beach, CA

Led by Duncan Lee while employed by the City of Huntington Beach, this water well replacement project was critical to increasing overall reliability of the City's aging well infrastructure. The project was challenging as it sits on a small lot, located in a quiet residential neighborhood, and adjacent to homes. In order to obtain public support and to obtain necessary permit from the City's Planning Department, the new structure and landscaping are aesthetically pleasing as it was designed with an appearance of a real home. All equipment was placed indoors to protect it from public view, and to comply with the City's noise ordinance. The well room was designed with removable walls and a roof to allow for major well maintenance and rehabilitation activities. The well can produce up to 2,500 gpm with a 250 horsepower motor, with options to operate with a variable frequency drive at fixed or variable speed. In the event of a catastrophic loss in both electrical power and natural gas supply to the site, a 500-gallon liquid propane gas tank provides back-up energy to operate a natural gas engine generator. Well-head treatment consists of chlorine and fluoride addition. Chlorine is stored in an isolated ventilated room, in a one-ton double wall containment vessel, and a separate 150-pound double wall containment vessel. A separate chemical room designed with a floor containment system can store chemicals like Fluoride.

# DUNCAN LEE, PE



PROJECT MANAGER

## Well 13 Chlorine Storage Structure – Huntington Beach, CA

Led by Duncan Lee while employed by the City of Huntington Beach, a new chlorine storage structure was designed and installed to house two new one-ton double wall containment vessels. The new structure was equipped with a hoist beam and fixed loader for routine delivery of chlorine supply and pick-up of empty vessels. The top of the structure is approximately 18' above the finished floor elevation. This effort was one of multiple well site improvements made to ensure City workers are protected from possible chlorine leaks, and also to protect adjacent residents and businesses from such risks.

## New Well 12 – Huntington Beach, CA

Led by Duncan Lee while employed by the City of Huntington Beach, this new water well sits on a commercially zoned property obtained through development agreement with the Boeing Corporation. The well room was designed with removable walls and roof to allow for major well maintenance and rehabilitation activities. The electrically driven well equipment can produce up to 3,000 gpm with a 300 horsepower motor, with a 250 horsepower motor, with options to operate with a variable frequency drive at fixed or variable speed. At the time this well was designed, there were adequate redundant overall well pumping capacity so no back-up equipment was included at this site. Chlorine is stored in an isolated ventilated room, in a one ton double wall containment vessel, and a separate 150 pound double wall containment vessel. Well-head treatment consists of chlorine and fluoride addition. A separate chemical room designed with a floor containment system can store chemicals like Fluoride.

## Vernon Water Well 22 Equipping and Treatment System – Vernon, CA

Mr. Lee is serving as the Project Manager to prepare plans and specifications for the City of Vernon to equip their newly drilled water well to provide up to 2,100 gpm of potable well water directly into their existing distribution system. The pump will be driven by a 350 HP motor, and the well head will be covered with a removable enclosure to provide protection of the equipment from the environment. PACE was tasked to satisfy both Low Impact Development (LID) requirements, as well as to minimize use of scarce space for non-essential well head components. PACE suspected 2,000 feet of the existing cast iron distribution piping that the new 12" discharge will be connecting to has tuberculation, and will create excess pressure build-up if the new well operates at full capacity. PACE collaborated with the City to implement a physical flow test, and validated that the existing pipe has lost over half of its capacity. As a result, plans and specifications were prepared to replace the existing 10" cast iron pipe with a new 12" ductile iron pipe.

## Huntington Harbor Waterline Replacement – Huntington Beach, CA

Led by Duncan Lee while employed by the City of Huntington Beach, this waterline replacement project was critical to the sustained and reliable delivery of potable water to this high-end residential, waterfront area. The design consisted of 670 feet of 16-inch HDPE and involved careful planning and coordination due to numerous stakeholder agencies and regulatory approval requirements, as well as the very close proximity to private residences, traffic concerns, accessibility limitations and noise risks. The stakeholder and regulatory processes were streamlined and managed by holding three townhall meetings to inform / involve the public and stakeholders. By the 3rd meeting, almost nobody attended since they had been satisfied with the information presented in previous meetings to ease concerns. Careful constructability review and staging planning took place since there were added construction complications by having to construct within public beach areas and waterway areas.

### Other Projects:

- City of Huntington Beach: Edwards Hill Booster Pump Station
- City of Huntington Beach: Overmyer Reservoir and Booster Pump Station
- City of Huntington Beach: Over 10 projects of water main replacements for 12" or smaller diameter of drinking water distribution system
- City of Huntington Beach: Chlorine Containment Structure Project
- City of Huntington Beach: Pine Street Residential Neighborhood Watermain Replacement - Replaced with approximately 700' of 12" PVC pipe
- City of Huntington Beach: Gregory Ln and Laura Cr. Residential Neighborhood Watermain Replacement - Replaced with approximately 1,100' of 6" and 8" PVC pipe
- Los Angeles Department of Water and Power: LA Greenbelt Water Reclamation Project – 24" pipe
- Los Angeles Department of Water and Power: East Valley Water Reclamation Project – 54" DIP, 26 miles of pipeline, and a pump station at the Tillman Plant

# ANDY KOMOR, MS, PE

## SR. CONSULTING ENGINEER



### EDUCATION

B.S. Civil Engineering  
University of Minnesota / 1999  
Cum Laude  
M.S. Civil and Environmental Engineering  
Arizona State University / 2001

### YEARS OF EXPERIENCE

20 Years  
Joined PACE in 2000

### REGISTRATIONS

Professional Engineer / CA  
2003 / 64928  
Professional Engineer / AZ  
2007 / 46719  
Professional Engineer / LA  
2009 / 34854

### AFFILIATIONS

Adjunct Instructor of Water Reuse,  
Santiago Community College  
Past President of Orange County  
Water Association  
(OCWA)  
California Water Environment  
Association (CWEA)  
WaterReuse Foundation  
National American Lake Management  
Society (NALMS)

### PUBLICATIONS

Photobiological Treatment of RO  
Reject. Global Water Intelligence.  
2020

Cost to Benefit Analysis of  
Desalination of Golf Irrigation Water.  
Water Reuse Symposium, Phoenix,  
AZ. 2011

Effects of Nitrification, Stratification,  
and Algaecidal Disinfection in  
Country's Largest Recycled Water  
Reservoirs. Water Reuse Symposium,  
Washington DC. 2010

Upper Oso Reservoir: Lake  
Management Update. Presentation to  
Santa Margarita Water District. 2009

Evaluation of Denitrification  
Mechanisms in Constructed Wetlands

Andy Komor is a technical expert on engineering infrastructure having successfully performed engineering design, project management, and field services for over \$200 million in capital on over 40 completed water resource projects in the past eight years. His background as a researcher has led to four national presentations and technical papers. Mr. Komor is sought after as a technical consultant and designer on water resources projects including water treatment, well design, storage tank and booster pump station design, groundwater recharge, advanced ocean and brackish water desalination, lake and reservoir water quality enhancements, wastewater treatment and water recycling, and new technology research and development. As part of the design and engineering of such projects, Mr. Komor is adept at providing comprehensive civil, mechanical, structural, electrical, and controls designs which are innovative, cost effective, and highly-operable. He also has significant experience in field engineering, construction oversight and start-up services through design-build projects and design-bid-build project structures.

### RELATED EXPERIENCE

#### Golden State Water Company (GSWC) Del Monte Well 4 Arsenic Removal – San Dimas, CA

As the Project Manager, Mr. Komor provided professional consulting services for Del Monte Well No. 4 arsenic reduction project in Claremont, CA. The Claremont Water System includes the Del Monte Supply Wells 1, 2 and 4 located on College Avenue. The raw water from Well 4 contains varying arsenic content, generally exceeding the state MCL of 10 µg/L, with typical concentrations ranging from 20 to 40 µg/L. Treatment and blending were required to reduce the average arsenic concentration to less than 8 µg/L. Mr. Komor proposed a plan including six operation scenarios and testing schedules for Well 4 based on the key findings from the site visit at the Del Monte storage tank and booster station plant. The plan also included installation concepts for the tank mixing system, analysis of tank inlet/outlet, as well as the water quality testing protocols for properly monitoring the system performance, parameters including dissolved oxygen, oxidation-reduction potential, total dissolved solids, pH, color, alkalinity, total arsenic, dissolved arsenic, total iron, dissolved iron, total manganese, dissolved manganese, total chlorine, free chlorine, total volatile compounds, total organic carbon, ammonia and sulfide.

#### Huntington Beach Well 9 GAC Treatment System – Huntington Beach, CA

Mr. Komor served as the Project Manager for multiple phases of project development, lab services, piloting, concept development, water treatment facility engineering, planning division graphics, and worked with the City staff through startup and operations support services on this innovative and unique treatment system. Sophisticated desktop, bench, pilot scale, and full scale demonstration was first provided for confirmation of the proposed treatment process for innovative biological treatment of reduced (non-oxidized) drinking water quality constituents in the potable supply at Well 9, and other City wells. This first stage of work confirmed mechanisms for biological oxidation of hydrogen sulfide. A complete 3,000 gpm (4.3 MGD) treatment facility design was then designed including six 10-foot diameter biologically active carbon (BAC) filtration vessels and media, with complete structural, mechanical, electrical, and controls integration design for reliable and simple operation.

#### Public Water System Wellhead Treatment System – San Diego County, CA

As the Process Selection Engineer, Mr. Komor oversaw the design of a groundwater water treatment facility that was built in two phases, treats 99% of the water annually and removes Iron, Manganese, and Arsenic to meet EPA Primary and Secondary drinking water standards. The system consists of 12 potable water wells, 6 irrigation wells, 5 potable water storage tanks and the groundwater treatment facility. A 500 GPM iron and manganese filtration system was designed and installed using a brand-new proprietary filtration media (Penox), allowing the client to completely remove Iron and Manganese from their potable water supply without the use of complicated chemical injection systems. This system was designed for a series of water wells to bring the production water to an average of 5 µg/L with a maximum concentration of 20 µg/L, well below the EPA's MCL of 30 µg/L. Due to uranium concentration exceeding the required MCL, this

# ANDY KOMOR, MS, PE

SR. CONSULTING ENGINEER



system brought the water into compliance. Mr. Komor was able to reduce capital and operational costs significantly and still provide a total treatment capacity of 500 gpm.

## **San Diego County Ion Exchange for a Series of Potable Water Wells – San Diego County, CA**

As the Process Selection Engineer, Mr. Komor oversaw the design of a 400 gpm Uranium Specific Ion Exchange system to improve potable water production efficiency and water quality for a community within San Diego County. Due to the uranium concentration of these four wells exceeding the required MCL, this treatment system was implemented to bring the water into compliance. This system was designed for a series of water wells to bring the production water to an average of 5  $\mu\text{g/L}$  with a maximum concentration of 20  $\mu\text{g/L}$ , which is well below the EPA's MCL of 30  $\mu\text{g/L}$ . However, the system is producing water at non-detect levels. The system was placed at the well head located within the surrounding fence on-site. While maintaining a small footprint size, PACE was able to reduce capital and operational costs significantly and still provide a total treatment capacity of 400 gpm. PACE also provides bi-annual regeneration services of the media, making PACE well versed in operational requirements for such a system.

## **Hydrogen Sulfide Removal of a Water Well for a Coastal City in Southern California – Southern California (Client Confidential)**

A confidential municipality has a well that currently produces up to 4,000 GPM and is one of the City's four water wells. Historical water quality data showed a high range of hydrogen sulfide (H<sub>2</sub>S) concentrations level. Therefore, the well is currently being under-utilized, operating at low flow rates to avoid odor complaints. Mr. Komor served as the QA/QC Principal for the pilot studies which identified a (passive) treatment method using Granular Activated Carbon (Passive GAC) to reduce/remove H<sub>2</sub>S odor and reduce chlorine chemical dosage. PACE is now conducting additional pilot studies to determine the effectiveness of a different biological treatment process, that will also involve the use of GAC (BAC). This method has proven to be successful and was used for one of PACE's award-winning treatment projects for the City of Huntington Beach.

## **Santa Ana Country Club Pretreatment GAC and RO Filtration System – Santa Ana, CA**

Mr. Komor served as the Project Manager for the design of a packaged colored and brackish groundwater treatment system using reverse (RO) osmosis, including provision of RO water quality modeling, economic evaluation of the opportunity to reduce gypsum addition and excessive leaching of salts, consulting on system configurations, and desalination system design. Phase II of the system consisted of design and installation of a GAC pre-filtration system, which assists with reducing organic fouling of the desalination system. Mr. Komor led the treatment process development, performance-based specifications (a highly effective process for reducing costs and guaranteeing performance of equipment), engineering design of civil, mechanical, electrical and control systems and treated water storage systems and cost estimating.

## **Dateland Water Treatment Plant GAC Pretreatment and RO Upgrade – Dateland, AZ**

Mr. Komor served as Project Manager for this brackish groundwater potable water treatment project. PACE provided Dateland Public Service Company with several inland-desalination alternatives, engineering design, environmental permitting, and grant funding application services to improve and expand their existing groundwater Reverse Osmosis (RO) treatment system which features a Granular Activated Carbon (GAC) pre-filtration and ion exchange (IX) skid. The groundwater in the Dateland basin contains several trace contaminants including arsenic and fluoride, has irrigation inhibitors boron, chloride, and sodium, and overall contains high levels of TDS. PACE was able to increase the treatment capacity to over 80,000 gpd and increased recovery from 65 to 85%. The evaporation basin area was increased to handle waste with a redundant basin for drying, the treated storage was increased from 50K to 150Km, a second well with an 8" diameter casing was installed, and 3-phase power and motors were also provided.

## **Santa Monica Sustainable Water Infrastructure Project (SWIP) Advanced Water Treatment Facility – Santa Monica, CA**

The Santa Monica Water Infrastructure Project (SWIP) is using the City's existing infrastructure and linking together three new distributed water reuse elements to harvest, treat, and reuse non-conventional water resources. The SWIP will inject advanced treated water into the local groundwater basins for indirect potable reuse via aquifer recharge, while meeting the non-potable reuse demands. As the Sr. Consulting Engineer, Mr. Komor designed the Advanced Water Treatment Facility (AWTF) with a capacity of 1.0 MGD using a Membrane Bioreactor-Reverse Osmosis-UV Advanced Oxidation Process to treat municipal wastewater, stormwater, and dry weather runoff to replenish the groundwater aquifer, making the facility an indirect potable reuse system. The UVAOP process will use hypochlorite as the hydroxyl radical to oxidize 0.5 log 1,4-dioxane. Using hypochlorite as the oxidant removes of quenching as a downstream requirement and maintains a downstream chlorine residual. While hypochlorite could form additional regulated and unregulated byproducts that are not formed with UV/peroxide, including bromate, chlorite, and chlorate, DBP precursors will be removed with RO. Therefore, DBP levels should remain low. Because UVAOP is downstream of RO membranes the UV Transmittance is high, typically 96% at 254 nm, which makes the system more efficient at achieving the required UV dose.

# ANDY KOMOR, MS, PE

SR. CONSULTING ENGINEER



## **Los Angeles Country Club Wells and Ozone Injection – Los Angeles, CA**

Mr. Komor was the Project Manager and led the study to determine the best approach to improving irrigation water quality for the LACC which led to the design-build of an ozonation water treatment system. LACC was plagued with three main issues with their irrigation water supply, 1) odorous and corrosive hydrogen sulfide in the groundwater supply causing unpleasant odors around the golf course and damaging the irrigation storage tank and distribution system, 2) poor turf conditions and high maintenance due to water quality, and 3) borderline brackish groundwater quality with high levels of bicarbonate and moderate levels of sodium and chloride. The selected solutions include a 130 lb/day ozonation system for oxidizing the excess sulfide, installation of a third groundwater well, rehabilitation of the existing 800,000 gallon water storage tank, and chemical injections into the turf to reduce excessive bicarbonate alkalinity. The ozonation system designed by Mr. Komor includes new piping, instruments, ozone generation skid, injection skid and pump from tank, liquid oxygen storage and controls.

## **Mesa Water Wells Treatment System Upgrades – Costa Mesa, CA**

As the Project Manager, Mr. Komor led the civil, process, conveyance and water quality improvements of Wells 1, 3, 5, 7, 8 and 9. An innovative, low-cost approach was developed to treat colored water with ozone, preceded by monochloramine addition to suppress bromate formation. The existing chloramination system was modified to add Ammonia first, prior to chlorine addition, which resulted in a substantial savings in chemicals and improvement in disinfection control. Efforts included extensive evaluation of the existing systems, site inventories, alternatives identification and evaluation, water quality analysis at PACE's in-house laboratory, bench-scale pilot testing, and design services to automate operations, improve safety, and upgrade electrical and mechanical systems.

## **El Toro Water District Chloramination Injection Facilities at R1 and R2 Reservoirs – Laguna Hills, CA**

The El Toro Water District (ETWD) existing 2MG and 3MG potable water tank reservoirs had difficulty with chlorine residual due to temperature stratification. ETWD contracted PACE to design new tank mixing systems with a residual sampling system, a liquid chemical injection system and storage facility, and a new building with automation and site security. As Project Manager, Mr. Komor oversaw the civil, mechanical, electrical and control design plans, specifications, and cost estimates were produced for construction. He also provided calculations for disinfection storage requirements, as well as a process flow diagram for routing of flows of water, chemicals, analyzer lines, and the flow for mixing.

## **Lenain Water Treatment Plant Operations and Water Infrastructure Consulting and Engineering – Anaheim, CA**

Mr. Komor served as the Project Manager, in charge of the study and recommended optimal operation of Walnut Canyon Reservoir, a large 1.0-billion-gallon raw water reservoir. The reservoir is used as a feed source for the City's Lenain Water Treatment Plant (LWTP). Mr. Komor helped the LWTP operators and City engineers optimize their treatment processes to remove several drinking water contaminants. PACE conducted a series of bench-scale tests to determine the ozone dose for sulfide and manganese oxidation.

# ROBERT MURPHY, PE



## EDUCATION

B.S. / Civil Engineering  
California State University,  
Long Beach  
2007

## YEARS OF EXPERIENCE

14+ Years  
Joined PACE in 2006

## REGISTRATIONS

Professional Engineer  
2014 / C83207

## AFFILIATIONS

Water Environment Federation (WEF)  
American Society of Civil Engineers  
(ASCE)

## PUBLICATIONS

Peterson, J.D., Murphy, R.R., Jin, Y.,  
Wang, L., Nessl, M.B., Ikehata, K.  
(2011) *Health effects associated with  
wastewater treatment, reuse, and  
disposal. Water Environment Research*  
83:10, 1853-1875.

## SR. PROJECT ENGINEER / MECHANICAL DESIGN

Robert Murphy has civil and environmental engineering experience spanning back to 2006. He has performed engineering design and support in several areas including water and wastewater treatment, well equipping, water conveyance and distribution, and surveying services. Mr. Murphy is adept at providing comprehensive civil and mechanical designs which are inventive, cost effective, and practical. His experiences also include process equipment selection, construction administration, and coordinating project plans, specifications, and reports with multiple consultants to obtain an efficient buildable and operable system. He also has significant construction oversight experience which has led him to focus on constructability in his design strategy leading to straightforward layout and processes. His recent experience includes several potable water pumping facilities and other advanced pumping facilities, as well as water and wastewater treatments systems for municipalities and communities throughout California.

## RELATED EXPERIENCE

### Huntington Beach Well 9 GAC Treatment System – Huntington Beach, CA

Mr. Murphy served as the Process Engineer for testing, alternatives analysis, and design services at Wells 3, 6, and 9. Sophisticated desktop, bench, pilot scale, and full scale demonstration was first provided for confirmation of the proposed treatment process for innovative biological treatment of reduced (nonoxidized) drinking water quality constituents in the potable supply at Well 9, and other City wells. This first stage of work confirmed mechanisms for biological oxidation of hydrogen sulfide. A complete 2,500 gpm (3.5 MGD) treatment facility design was then designed including six 10-foot diameter biologically active carbon (BAC) filtration vessels and media, with complete structural, mechanical, electrical, and controls integration design for reliable and simple operation.

### San Diego County Public Water System Wellhead Treatment System – San Diego County, CA

Mr. Murphy served as the Project Engineer for the groundwater water treatment facility, built in two phases, that treats 99% of the water annually and removes Iron, Manganese, and Arsenic to meet EPA Primary and Secondary drinking water standards. The system consists of 12 potable water wells, 6 irrigation wells, 5 potable water storage tanks and the groundwater treatment facility. A 500 GPM iron and manganese filtration system was designed and installed using a brand-new proprietary filtration media (Penox), allowing the client to completely remove Iron and Manganese from their potable water supply without the use of complicated chemical injection systems. With the new system, simple backwashing completely restores/regenerates the media's removal capacity. The system does not require costly media replacement typical with conventional systems (i.e. green sand filters). The backwash from the filters is sent to the wastewater reclamation facility at no cost. The media can also, in the presence of "free" iron, to remove arsenic. Lab tests revealed the filtered water had up to 50% less arsenic than the influent. PACE was able to reduce capital and operational costs significantly and still provide a total treatment capacity of 500 gpm. PACE continues to provide testing and operating supervisory oversight services while the client manages the day to day testing.

### San Diego County Ion Exchange for a Series of Potable Water Wells – San Diego County, CA

Mr. Murphy served as the Project Engineer for the design of a 400 gpm Uranium Specific Ion Exchange system to improve potable water production efficiency and water quality for a community within San Diego County. Due to the uranium concentration of these four wells exceeding the required MCL, this treatment system brings the water into compliance. This system was designed for a series of water wells to bring the production water to an average of 5 µg/L with a maximum concentration of 20 µg/L, which is well below the EPA's MCL of 30 µg/L. However, the system is producing water at non-detect levels. PACE was able to reduce capital and operational costs significantly and still provide a total treatment capacity of 400 gpm. PACE also provides bi-annual regeneration services of the media, making PACE well versed in operational requirements for such a system.

# ROBERT MURPHY, PE



SR. PROJECT ENGINEER / MECHANICAL DESIGN

## Dateland Water Treatment Plant GAC Pretreatment and RO Upgrade – Dateland, AZ

Mr. Murphy was the design engineer for a new multi-well groundwater treatment plant in Southwestern Arizona. The project consists of two new VFD-driven wells controlled to operate at constant pressure into a pre-treatment system followed by a desalination RO system. Post treatment including disinfection and storage is also provided. The entire system is highly automated included pre-treatment backwash and regeneration, and controls automation.

## BNSF Groundwater Wells, Water Tank and Booster Pump Station – Seligman, AZ

Mr. Murphy served as the Sr. Project Engineer to provide water resource consulting, design and environmental permitting services for the replacement and rehabilitation of the City of Seligman's water supply infrastructure. The project involved the replacement of two groundwater wells, by-pass and demolition of an intermediate water transfer pump station and tank, replacement of approximately 3,000 feet of old (from 1897) lead joint transmission pipeline, demolition and by-pass of the primary water storage tank and distribution pump station, construction of a new 280,000 gallon water storage tank and 800 gpm variable speed distribution pumping station. In addition, PACE provided the control and instrumentation integration which included a complete, radio networked, automation and data management system for the control of the two new wells, new water tank, new pre and post chlorination systems and new booster station.

## El Toro Water District Disinfection System Improvements – Laguna Hills, CA

The El Toro Water District (ETWD) existing 2MG and 3MG potable water tank reservoirs had difficulty with chlorine residual due to temperature stratification. Mr. Murphy served as the Sr. Project Engineer for the design of the new tank mixing systems with a residual sampling system, a liquid chemical injection system and storage facility, and a new building with automation and site security. PACE evaluated numerous mixing equipment manufacturers and ranked each manufacturer based on several criteria including capital cost, mixing rate, and energy consumption. The tank mixer chosen is an external pump, which is easily accessible when the system requires maintenance. The high mixing rate of 7,500 gpm mixes the tank within 12 hours, and features built-in chemical monitoring. PACE provided calculations for disinfection storage requirements, as well as a process flow diagram for routing of flows of water, chemicals, analyzer lines, and the flow for mixing. The 300 SF liquid chemical storage facility houses a 500-gallon Ammonium Hydroxide tank and a 2,000 gallon tank for Sodium Hypochlorite.

## Mountain House Water Storage Tanks and Dual Zone Booster Pump Station & Westside Booster Pump Station – Mountain House, CA

As the Design Engineer, Mr. Murphy was responsible for design and field construction services for two twin 3.7 MG pre-stressed concrete tank and a multi-zone, multi-pump water booster pump station. The dual-zone pump station allows water from either storage tank to be boosted into either of two pressure zones. Chemical injection facilities located within the facility automatically maintain chlorine residuals within the tanks as well as water entering the distribution system.

## Grizzly Ranch Potable Water System – Portola, CA

Mr. Murphy served as the Sr. Project Engineer for the design of all the potable and wastewater water infrastructure components. The project included the development of four groundwater wells which contained high levels of arsenic, iron, manganese and H2S. Design and engineering construction management was performed for a 300 gpm, two-stage, water treatment system. Additional infrastructure designed included a welded steel potable water storage tank, two water booster pump stations, a four-zone water distribution network, and wastewater reclamation facility for the community.

## Vernon Water Well 22 Equipping and Treatment System – Vernon, CA

Mr. Murphy is serving as the Pumping System / Sr. Project Engineer / providing the Mechanical Design to equip the City of Vernon's newly drilled water well to provide up to 2,100 gpm of potable well water directly into their existing distribution system. The pump will be driven by a 350 HP motor, and the well head will be covered with a removable enclosure to provide protection of the equipment from the environment. The site is very small and narrow, and the location of the drilled well was pre-determined before PACE joined the team. PACE was tasked to satisfy both Low Impact Development (LID) requirements, as well as to minimize use of scarce space for non-essential well head components. PACE suspected 2,000 feet of the existing cast iron distribution piping that the new 12" discharge will be connecting to has tuberculation, and will create excess pressure build-up if the new well operates at full capacity. PACE collaborated with the City to implement a physical flow test, and validated that the existing pipe has lost over half of its capacity. As a result, plans and specifications were prepared to replace the existing 10" cast iron pipe with a new 12" ductile iron pipe.

# CHRISTOPHER NAJARIAN, PE



## SR. ELECTRICAL ENGINEER

### EDUCATION

B.S. Electrical Engineering  
Illinois Institute of Technology /2010

### YEARS OF EXPERIENCE

10 Years  
Joined PACE in 2019

### REGISTRATIONS

Professional Engineer / CA  
2018 / 22545

C-10 Electrical Contractor / CA  
2018 / 1047665

### AFFILIATIONS

Institute of Electrical and Electronic Engineers (IEEE)

Mr. Najarian received his Bachelor of Science degree in Electrical Engineering from the Illinois Institute of Technology in 2010 and is a licensed electrical contractor in the state of California. He has extensive experience testing and installing electrical equipment during construction such as pumps, motors, control panels and instrumentation at industrial sites, water treatment plants, oil refineries, generating stations and manufacturing plants. His background in electrical field service and troubleshooting allows him to effectively design drawing packages in various water applications. He has prepared electrical drawing packages for wastewater neutralization systems, pumping stations, aeration treatment, reverse osmosis, and chemical injection.

### RELATED EXPERIENCE

#### LACFD Fire Camp 11 and Henninger Flats Campground Wells and Potable Water Treatment System – Los Angeles County, CA

Mr. Najarian served as the Sr. Electrical Engineer to review the drawings for the design of the potable water treatment systems for five remote sites owned and operated by the Los Angeles County Fire Department. PACE designed wells and treatment systems with SCADA communications that enabled remote monitoring and control that automatically switched to propane generators in the event of a power loss. The modular treatment facility designed provides consistency of equipment and functionality and reduces overall maintenance costs for the Fire Department. PACE also provided the Fire Department with Operations Plans for regulatory compliance as well as assistance in obtaining permits. Both Fire Camp 11 and the Henninger Flats Campground contain groundwater under the influence of surface water and are therefore required to have a surface water treatment system. PACE completed evaluations of all of the camp facilities and looked at several processes and determined that the use of a packaged Rosedale filter system followed by chlorination was the most cost effective (in both capital and operational) way to meet State regulations.

#### Vernon Water Well 22 Equipping and Treatment System – Vernon, CA

Mr. Najarian is serving as the Sr. Electrical Engineer to equip the City of Vernon's newly drilled water well to provide up to 2,100 gpm of potable well water directly into their existing distribution system. The pump will be driven by a 350 HP motor, and the well head will be covered with a removable enclosure to provide protection of the equipment from the environment. The site is very small and narrow, and the location of the drilled well was pre-determined before PACE joined the team. PACE was tasked to satisfy both Low Impact Development (LID) requirements, as well as to minimize use of scarce space for non-essential well head components. PACE suspected 2,000 feet of the existing cast iron distribution piping that the new 12" discharge will be connecting to has tuberculation, and will create excess pressure build-up if the new well operates at full capacity. PACE collaborated with the City to implement a physical flow test, and validated that the existing pipe has lost over half of its capacity. As a result, plans and specifications were prepared to replace the existing 10" cast iron pipe with a new 12" ductile iron pipe. Furthermore, the site layout needed to be able to accommodate future steel treatment tanks for well head treatment.

#### Covanta Renewable Energy – Long Beach, California

As the lead Field Service Electrical Engineer, Mr. Najarian designed and installed a Reverse Osmosis water filtration system for the boiler water supply. Special fail safes needed to be put in place to meet customer requirements of receiving only pure water from the RO system. A vacuum distillation system was added to the system design to ensure productivity during maintenance. Project scope included adding new power, communications, pumps, sensors and filters to an existing site.

# CHRISTOPHER NAJARIAN, PE

SR. ELECTRICAL ENGINEER



## Mountain House Water Storage Tanks and Dual Zone Booster Pump Station & Westside Booster Pump Station – Mountain House, CA

As the Sr. Electrical Engineer, Mr. Najarian reviewed the drawings for the design of a new twin storage tank and dual-zone potable water booster pumping facility for the Town of Mountain House, CA. The design included two separate sets of potable water booster pumps, a pressure reducing / sustaining valving and metering station, and two twin 3.7 million gallon pre-stressed water storage tanks. The booster pump station consisted of twin 3,500 to 5,500 gpm pumping systems, one for Zone 1 and one for Zone 2, which provide drinking water and fire protection to approximately 8,500 homes. The station has redundant pumps, automatically transferred back-up power, disinfection injection and monitoring, and full remote telemetry and security systems with full-motion video surveillance. PACE provided the automation design to provide dual tank, dual zone pumping with proper chlorine dose, sustaining valve operation, and shared redundant pumps. PACE also provided engineering design for the 5,000 gpm potable water Westside Booster Pump Station for the new Mountain House Community Services District, adjacent to the City of Tracy. The Mountain House Water Treatment Plant (WTP) supplies network flows to Zone 1 of the distribution system. The station provides sufficient and reliable flow capacity for distribution to the Zone 2 drinking water supply network. The new station includes two main domestic booster pumps, an intermediate flow pump, and a low flow pump.

## City of Manhattan Beach Larsson Street Pumping Station – Manhattan Beach, CA

As the Sr. Electrical Engineer, Mr. Najarian performed the electrical design for the addition of a new above ground building and 4-40 HP pumps being replaced in an underground vault for the Larsson Street Pumping Station. In addition to a new MCC and Service Entrance section, the project scope included incorporating an existing standby generator and Automatic Transfer Switch. Unique constraints for this project included a small work space which made proper equipment selection for panels, motor drives and switchgear essential.

## San Gabriel Valley Water Plant B6 Construction – Baldwin Park, California

As the lead Field Service Electrical Engineer, Mr. Najarian helped coordinate the review and installation of the electrical equipment of an advanced and innovative pressurized water treatment system for groundwater drinking supplies. Mr. Najarian oversaw the electrical design and construction of this treatment site including installation of control panels, pumps, actuated valves, compressors, level switches, transmitters, pressure gauges, Nitrogen monitors and PLC components.

## Santa Margarita Water District Pico Zone A Recycled Water Pump Station and Talega Lift Station Modifications – San Clemente, CA

Mr. Najarian served as the Sr. Electrical Engineer for the design of two pump stations to provide pumping at the Pico site and Talega Site to finalize the new permanent shared San Clemente connections for wastewater and recycled water. PACE reconfigured the existing Pico Sewer Lift Station into a new multi-zone recycled water pump station with suction and discharge lines, flow metering, and cross connection PRV valve. Each Zone A pump has a capacity of approximately 1,500 gpm each at about 200 feet of discharge boost. The Bella Colina Golf Course pump shall have a capacity of approximately 600 gpm at approximately 100 feet of discharge boost. A small residential grinder pumping system was also installed and a new 1" diameter forcemain out to a street manhole was designed to discharge the onsite restroom flows. PACE also re-designed the existing system with new smaller sewer pumps at the existing Talega Sewer Lift Station including new discharge lines and flow metering.

## Potable Water Twin Lakes Booster Pump Station Expansion – Chatsworth, CA

As a result of additional residential development within the Las Virgenes Municipal Water District's Service Area, Mr. Najarian served as the Sr. Electrical Engineer for the expansion of the potable water pumping capacity of the existing Twin Lakes Booster Pump Station. The design included repurposing the existing suction and discharge headers, installing new vertical turbine pumps and booster pump control valves, associated electrical and control improvements, installation of a 500 kW stand-by generator, and upgrading the existing surge capacity of the pump station. The upgrades were also designed in a manner to allow for special consideration to maintain continuous operation of the existing booster pump station, preventing the need for bypass and stand-by equipment.

# ERNESTO CAMARENA



## SR. INSTRUMENTATION & CONTROLS SPECIALIST

Ernesto Camarena has automation experience spanning back to 1994. His areas of expertise include controls and automation design for water treatment, wells, pump stations, storage reservoirs, and wastewater treatment. Mr. Camarena's responsibilities include preparing process and instrumentation design, process flow schematics, conceptual design exhibits including termination diagrams, and QA/QC for the electrical power and controls design. Mr. Camarena is a valuable and unique designer and startup expert of water infrastructure due to his extensive background in hands-on implementation of projects including panel building, programming, troubleshooting, and installation in the field during construction and operations. Because of his experience in performing water and wastewater related controls designs and installations, Mr. Camarena also is well-versed on water transport and treatment processes, which enable him to provide complete and accurate process and instrumentation diagrams.

### EDUCATION

A.A. / Applied Science, Computer Aided Drafting,  
ITT Technical Institute,  
West Covina, CA 1993

### YEARS OF EXPERIENCE

26+ Years  
Joined PACE in 2005

### SEMINARS

TESCO New Plant and SCADA Security Regulations, Cell Modem Telemetry via 4G, High Voltage Safety Codes  
Temecula, 2010

Sage Clear SCADA and SCADAPak Certification  
Los Angeles, 2009

### RELATED EXPERIENCE

#### [Huntington Beach Well 9 GAC Treatment System – Huntington Beach, CA](#)

Mr. Camarena served as the Sr. Instrumentation and Controls Specialist for a 2,500 gpm (3.5 MGD) treatment facility that was designed for Well 9 including six 10-foot biologically active carbon (BAC) filtration vessels and media, with complete structural, mechanical, electrical, and controls integration design for reliable and simple operation. Mr. Camarena designed the custom filtration control panel for this treatment system for ease of operation. PACE provided all project bid documents, permitting, coordination with Southern California Edison, and is assisting the City with the bid process and construction support services.

#### [San Diego County Public Water System Wellhead GAC Treatment System – San Diego County, CA](#)

Mr. Camarena served as the Sr. Instrumentation and Controls Specialist for the groundwater water treatment facility, built in two phases, that treats 99% of the water annually and removes Iron, Manganese, and Arsenic to meet EPA Primary and Secondary drinking water standards. The system consists of 12 potable water wells, 6 irrigation wells, 5 potable water storage tanks and the groundwater treatment facility. A 500 GPM iron and manganese filtration system was designed and installed using a brand-new proprietary filtration media (Penox), allowing the client to completely remove Iron and Manganese from their potable water supply without the use of complicated chemical injection systems. With the new system, simple backwashing completely restores/regenerates the media's removal capacity. The system does not require costly media replacement typical with conventional systems (i.e. green sand filters). The backwash from the filters is sent to the wastewater reclamation facility at no cost. The media can also, in the presence of "free" iron, to remove arsenic. Lab tests revealed the filtered water had up to 50% less arsenic than the influent. PACE was able to reduce capital and operational costs significantly and still provide a total treatment capacity of 500 gpm. PACE continues to provide testing and operating supervisory oversight services while the client manages the day to day testing.

#### [San Diego County Ion Exchange for a Series of Potable Water Wells – San Diego County, CA](#)

Mr. Camarena served as the Sr. Instrumentation and Controls Specialist for the design of a 400 gpm Uranium Specific Ion Exchange system to improve potable water production efficiency and water quality for a community within San Diego County. Due to the uranium concentration of these four wells exceeding the required MCL, this treatment system was implemented to bring the water into compliance. This system was designed for a series of water wells to bring the production water to an average of 5  $\mu\text{g/L}$  with a maximum concentration of 20  $\mu\text{g/L}$ , which is well below the EPA's MCL of 30  $\mu\text{g/L}$ . However, the system is producing water at non-detect levels. While maintaining a small footprint size, PACE was able to reduce capital and operational costs significantly and still provide a total treatment capacity of 400 gpm. PACE also provides bi-annual regeneration services of the media, making PACE well versed in operational requirements for such a system.

# ERNESTO CAMARENA



SR. INSTRUMENTATION & CONTROLS SPECIALIST

## Santa Ana Country Club Pretreatment GAC and RO Filtration System – Santa Ana, CA

As the Controls and P&ID Specialist, Mr. Camarena designed the controls for this reverse osmosis treatment system to provide a custom water source for irrigating the golf course greens at the Santa Ana Country Club. PACE developed the treatment process, utilized performance-based specifications (a highly effective process for reducing costs and guaranteeing performance of equipment), engineering design of civil, mechanical, electrical and control systems and treated water storage systems and cost estimating. PACE also designed phase II of the system including a GAC pre-filtration system, which assists with reducing organic fouling of the desalination system.

## Dateland Groundwater Treatment Plant Pretreatment GAC and RO Upgrade – Dateland, AZ

Mr. Camarena provided instrumentation and controls design for this brackish groundwater potable water treatment project. PACE provided Dateland Public Service Company with several inland-desalination alternatives, engineering design, environmental permitting, and grant funding application services to improve and expand their existing groundwater Reverse Osmosis (RO) treatment system which features a Granular Activated Carbon (GAC) pre-filtration and ion exchange (IX) skid. The groundwater in the Dateland basin contains several trace contaminants including arsenic and fluoride, has irrigation inhibitors boron, chloride, and sodium, and overall contains high levels of TDS. PACE was able to increase the treatment capacity to over 80,000 GPD and increased recovery from 65 to 85%.

## Santa Monica Sustainable Water Infrastructure Project (SWIP) Advanced Water Treatment Facility – Santa Monica, CA

The Santa Monica Water Infrastructure Project (SWIP) is helping secure the City of Santa Monica's water future by using the City's existing infrastructure and linking together three new distributed water reuse elements into a single cohesive and comprehensive project to harvest, treat, and reuse non-conventional water resources. The SWIP will deliver reliable advanced treated water to be injected into local groundwater basins for indirect potable reuse via aquifer recharge, while meeting the non-potable reuse demands. Mr. Camarena served as the Sr. Instrumentation and Controls Specialist for the design of the Advanced Water Treatment Facility (AWTF) with a capacity of 1.0 MGD through the use of a Membrane Bioreactor-Reverse Osmosis-UV Advanced Oxidation Process to treat municipal wastewater, stormwater, and dry weather runoff to replenish the groundwater aquifer, making the facility an indirect potable reuse system.

## Los Angeles Country Club Wells and Ozone Injection – Los Angeles, CA

Mr. Camarena was the Controls and P&ID Specialist, and led the control design for the ozonation system including new instruments, ozone generation skid, injection skid and pump from tank, liquid oxygen storage and controls. The 130 lb/day ozonation system for oxidizing the excess sulfide, and also included the installation of a third groundwater well, rehabilitation of the existing 800,000-gallon water storage tank, and chemical injections into the turf to reduce excessive bicarbonate alkalinity.

## Mesa Water Wells Treatment System Upgrades – Costa Mesa, CA

PACE provided an innovative, low-cost approach to treat colored water with ozone, preceded by monochloramine addition to suppress bromate formation. The existing chloramination system was modified to add Ammonia first, prior to chlorine addition, which resulted in a substantial savings in chemicals and improvement in disinfection control. Mr. Camarena served as the Sr. Instrumentation and Controls Specialist for six well sites which included a completely secured and centralized building for chemical storage, chemical pumping, chemical instrumentation, and side-stream injection facilities. The systems are a major improvement over the existing operation which was prone to scaling and lacked stable process control.

## El Toro Water District Disinfection System Improvements – Laguna Hills, CA

The El Toro Water District (ETWD) existing 2MG and 3MG potable water tank reservoirs had difficulty with chlorine residual due to temperature stratification. Mr. Camarena served as the Sr. Instrumentation and Controls Specialist to design new tank mixing systems with a residual sampling system, a liquid chemical injection system and storage facility, and a new building with automation and site security.

## LACFD Fire Camp 11 and Henninger Flats Campground Wells and Potable Water Treatment System – Los Angeles County, CA

Mr. Camarena served as the Sr. Instrumentation and Controls Specialist for the design of the potable water treatment systems for five remote sites owned and operated by the Los Angeles County Fire Department. The SCADA communications, designed by Mr. Camarena, enable remote monitoring and control for the wells and treatment systems with that automatically switch to propane generators in the event of a power loss. The modular treatment facility designed provides consistency of equipment and functionality and reduces overall maintenance costs for the Fire Department. Both Fire Camp 11 and the Henninger Flats Campground contain groundwater under the influence of surface water and are therefore required to have a surface water treatment system. PACE completed evaluations of all of the camp facilities and looked at several processes and determined that the use of a packaged Rosedale filter system followed by chlorination was the most cost effective (in both capital and operational) way to meet State regulations.

## **Key Project Team Members**

Information for key personnel are listed below.

***Noah Heller, Hydrogeologist, MS PG, President/CEO***

Contact Info: (415) 302-7354, [nheller@besst-inc.com](mailto:nheller@besst-inc.com)

Home Office: San Rafael, CA

MS PG (CA 5792) Licensed California Geologist. MS Geology Mississippi State University with emphasis in sedimentology and down-hole geophysics. BA Geology Rutgers University. President of BESST, 1995 – Present. Mr. Heller has invented various technologies over the past 20 years for groundwater sampling and monitoring and holds various patents and patent applications. BESST, Inc. received an exclusive license from the USGS in 2004 for the Tracer Flow and Depth Dependent Sampler. Mr. Heller has been the California registered geologist of record on over 750 dynamic mass profiling projects, and on hundreds of groundwater sampling and monitoring projects using advanced samplers, multilevel well technologies and sensors. Over the past 12 years, Mr. Heller has taught over 400 CEU classes approved by the California Department of Public Health (now part of the CA RWQCB) on well profiling methods and diagnostics as well as how to use these data for well modification to achieve treatment avoidance and reduction. Mr. Heller has co-authored a number of peer reviewed articles in various journals and presents at various professional conferences on a routine basis. Mr. Heller is a regular speaker with the Rural Community Assistance Corporation (RCAC) and with the California Rural Water Association (CRWA).

Mr. Heller is the person responsible for overall corporate commitment to the project, as well as being one of the primary points of contact. He is the most experienced member of our team, and oversees many project aspects.

***Miles Koehler, Operations Manager / Hydrogeologist***

Contact Info: (510) 414-9984, [mkoehler@besst-inc.com](mailto:mkoehler@besst-inc.com)

Home Office: San Rafael, CA

Mr. Koehler holds a B.S. in Geology from San Francisco State University. He has worked for BESST for over 4 years and serves in the position of Operations Manager. He is involved in all planning and logistics, as well as field work for well profiles and other projects. Mr. Koehler leads BESST's deep sampling projects, as well as managing the company's products department, which includes many subsurface soil and groundwater sampling technologies. Mr. Koehler has worked several dynamic and ambient mass profiling projects, as well as many other applications of the tracer and BESST's deep sampling technology.

***Kimberly Miles, Hydrogeologist***

Contact Info: (907) 723-0686, [kmiles@besst-inc.com](mailto:kmiles@besst-inc.com)

Home Office: San Rafael, CA

Ms. Miles holds a BS in Geology, BS in Hydrogeology from the University of Idaho, and worked for BESST for almost 4 years before pursuing a PhD at the University of California, Davis, where she studies hydrogeology and well construction methods. Ms. Miles has worked on numerous dynamic and ambient mass profiling projects across the state of CA for BESST and is focused on field methodologies, data analysis and interpretation and report writing. Ms. Miles is retained by BESST on a continuous basis for consulting on data analysis and report recommendations.

***Ms. Deniz Turan: PhD, Hydrogeologist***

Contact Info: (646) 704-4527, [dturan@besst-inc.com](mailto:dturan@besst-inc.com)

Home Office: San Rafael, CA

Ms. Turan holds a BS in geological engineering from Middle East Technical University as well as an MS in hydrogeology from the same school. She also holds a PhD in hydrology/hydrogeology from Rutgers University and has completed her post doctorate in hydrogeology from University of North Carolina. Ms. Turan is focused on data analysis, report preparation and QAQC.

***Other Staff Members:***

Home Office: San Rafael, CA

Mr. Samuel Anderson: Ph.D. Candidate, Hydrogeology, Tulane University

Mr. Michael Serio: Hydrogeologist, BS Geology, Northern Arizona University

Mr. Stefan McLin: Hydrogeologist, BS University of Nevada, Reno

Mr. Aaron Marriott: Hydrogeologist, BS Geophysics, University of California, Berkeley